ALASKA LEGISLATURE COMMITTEE FILES 1985-1986 8672
3533 HRES COMINCO RED DOG PROJECT--OVERVIEW

409

TABLE C-4

RED DOG MINE
ESTIMATED ANNUAL INCOME
FROM INDIRECT AND SECONDARY EMPLOYMENT
(Millions--1983 Dollars)

	Jobs* During CP	Annual Income @$25K/Job	Jobs* During FPP (Avg.)	Annual Income @$25K/Job
Kotzebue	12	$ 0.3	54	$ 1.35
Villages	11	0.275	52	1.30
Anchorage**	52	1.30	92	2.30
Other AK***	17	0.425	28	0.70
TOTALS:	92	$ 2.30	226	$5.65

CP = Construction Phase
FPP = Full Production Phase (@ total work force of 350-400 employees)

* From Table C-2.
** Includes 8 personnel at Anchorage financial office.
*** Distributed across the State.

Source: Office of Management and Budget, State of Alaska

4. UNEMPLOYMENT IMPACTS

The Red Dog Mine project is expected to have a substantial effect on unemployment within the NANA region, due to the jobs made available through employment at the mine site. While the number of jobs likely to be obtained by regional residents can be estimated, however,it is not so clear what the effects of those jobs may mean in terms of regional unemployment levels. Many unemployed regional residents may be available for work, for example, but do not appear on the State's unemployment rolls. Also, some unemployed regional residents simply do not seek conventional forms of employment, preferring instead a traditional subsistence lifestyle. Identifying an overall regional "unemployment level" which would be "reduced" by the direct employment at the mine site, consequently, is complicated by the existence of these two groups of people. For this reason, and because of the time constraints surrounding preparation of this report, no estimate has been made of the unemployment impacts likely to be caused by the project's direct employment effects, other than to acknowledge that those impacts will likely be important. Given the assumptions made earlier, however, it is possible to estimate the unemployment impacts likely to occur because of the project's indirect and secondary employment effects.

Based on the assumptions made in Section "b." of this part of the report ("Indirect and Secondary Employment"), estimates have been made of the number and distribution of net unemployment reductions caused within Alaska by the indirect and secondary employment effects of Red Dog Project hiring. These estimates, representing numbers of local residents hired who previously were unemployed, are shown in Table C-5. (See Table C-5.)

TABLE C-5

RED DOG MINE
NET UNEMPLOYMENT REDUCTIONS
THROUGH INDIRECT AND SECONDARY EMPLOYMENT

	Number of Previously Unemployed Residents Hired During:			
	CP	FPP@350	FPP@400	Average FPP Range Mid-Points
Kotzebue	5	14-21	17-25	19
Villages	7	24-35	28-41	32
Anchorage*	19	21-39	24-43	32
Other AK	7	7-13	8-14	10
TOTALS:	38	66-108	77-123	93

CP = Construction Phase
FPP = Full Production Phase (@ total work force level indicated)

* Includes 8 personnel at Anchorage Office.

Source: Office of Management and Budget, State of Alaska

11/1368

It should be noted that every $1 million spent by Cominco in Anchorage for short-term resupply of the mine is estimated to result in the hiring of an additional 14 Anchorage area residents (net) who previously were unemployed.

5. POPULATION IMPACTS

Because of the "enclave" nature of the Red Dog Mine project, population increases within the NANA region currently are expected to be limited to approximately 5%. The project sponsors also intend to emphasize the project's local hire aspect in their recruiting advertisements, which should further help to contain regional population growth. If regional population gains due to the project's direct employment effects were only 5%, however, this still would represent approximately 275 new residents in the region (5,500 population x .05), with roughly half of that growth likely to occur in Kotzebue and half in the region's other community.

Based on the assumptions made in Section "b." of this part of the report ("Indirect and Secondary Employment"), estimates have been made of the net increases in local populations caused within Alaska by the indirect and secondary employment effects of the Red Dog project. These estimates, which include net population increases due to new employees and their families, are shown in Table C-6. (See Table C-6.)

It should be noted that every $1 million spent by Cominco in Anchorage for short-term resupply of the mine is estimated to increase the Anchorage area population by an additional 55 people (net).

TABLE C-6

RED DOG MINE
NET LOCAL POPULATION INCREASES
DUE TO INDIRECT AND SECONDARY EMPLOYMENT

Net Population Gains During:

	CP	FPP@350	FPP@400	Average FPP Range Mid-Points
Kotzebue	15	55-82	61-92	72
Villages	8	29-48	38-52	42
Anchorage*	70	82-156	93-179	128
Other AK	21	23-46	25-55	36
TOTALS:	114	189-332	217-378	278

CP = Construction Phase
FPP = Full Production Phase (@ total work force level indicated)

* Includes 8 personnel at Anchorage Office.

Source: Office of Management and Budget, State of Alaska

6. REGIONAL SAVINGS IN SHIPPING COSTS

The sponsors of the Red Dog Mine project propose to use their ore-concentrate vessels to back-haul supplies of fuel and cargo to the NANA Region. These supplies would be lightered from the proposed port facility West of Noatak to Kotzebue, and then distributed to Kotzebue residents and to residents of other communities in the region. Execution of this operation would entail supplanting the shipping operation which currently provides this service to Kotzebue and regional residents, according to the project sponsors.

Cominco has estimated that this use of the port facility will save regional residents approximately $2.6 - $3.5 million a year in shipping costs, compared with the current method of shipping bulk cargo and fuel into the region. Such a level of savings would represent an annual savings of approximately $630 per regional resident, according to the estimate, or about 9% of the average regional resident's annual income.

Analysis shows this estimate to be reasonably made, although it does rest on several assumptions which are subject to change. One is that tax-exempt financing for the port facility can be obtained at 8% annual interest. A second is that no overtime expenses are incurred regarding labor costs. A third is that land for the port facility can be leased or purchased for no cost, other than an estimated $7,000 per year for land disturbance expenses. A fourth is that cycle times for the port's operations will be maximally efficient and thus minimally expensive. A fifth is that shipping costs for bulk cargo and fuel will remain constant at present levels. A sixth is that the capital costs of the port facility itself will turn out to be as currently estimated.

Of these assumptions, only two could be assessed within the report's timeframe. These were the cost of tax-exempt financing, and the overtime cost for labor. After adjusting for these factors, however, and after correcting calculation errors in the estimate, only a slight difference from

the original estimate was found. As an "outside" case, for example, the estimate was tested using the following assumptions: a 12% annual interest rate for financing, an overtime labor expense equalling 30% of payroll (for those labor categories likely to be affected), and imposition of a 5% import duty on bulk fuel delivered from Canada. Under these assumptions, the total annual savings in regional shipping costs would be approximately $2.3 million per year. This would represent an annual savings of approximately $418 per resident, or roughly 6% of the average regional resident's annual income.

Allowing for the other assumptions made in the Cominco estimate, therefore, an estimate of roughly $2 - $3 million saved annually would seem to be reasonable at this point.

7. SUMMARY OF FINDINGS

The principal findings of this analysis address the economic impacts which can be expected during the projected 40-year life of the proposed Red Dog Mine. These findings, based on the assumptions made, have resulted in the following overall estimates:

- total long-term mine employment probably will range between 350 and 400 full-time jobs;
- NANA-Region residents probably will obtain 50%-75% of those jobs, or approximately 220-250 jobs, with the total divided evenly between Kotzebue residents and residents of other communities in the region;
- the project probably will generate approximately 225 indirect and secondary jobs, of which approximately half (106 jobs) will be obtained by NANA-Region residents;

- approximately 92 of the indirect and secondary jobs generated by the project will be obtained by Anchorage area residents, with another 28 such jobs distributed among other Alaskan communities;

- for every $1 million that Cominco spends on supplies in Anchorage, approximately 40 additional new jobs will be created in the Anchorage area;

- total direct income generated by the mine probably will range between $11-$13 million per year in 1983 dollars, with NANA-Region residents obtaining between $7-$8 million of the total;

- residents of other parts of Alaska probably will receive approximately a third (30%) of the $11-$13 million in total annual income, divided approximately evenly between Anchorage area residents and those of other Alaskan communities;

- indirect and secondary employment deriving from the mine's effects probably will produce some $5.7 million in total annual income, of which approximately half ($2.65 million) will be received by NANA-Region residents;

- the project's indirect and secondary employment effects will cause a modest drop in local unemployment levels, causing approximately 50 previously unemployed persons to be hired within the NANA Region and an additional 30-60 persons across the rest of the State; and,

- local population increases due to the mine project's indirect and secondary employment effects probably also will be modest, totaling approximately 280 new residents and dependents across the State, but may have significant local consequences within the NANA Region (e.g., approximately 70 new residents in Kotzebue).

FOOTNOTES

1 Letter from Don Argetsinger, Vice President of NANA Development Corporation, to John Sims, Director of the Office of Mineral Development, State of Alaska, Dated November 11, 1983.

2 Ibid.

3 Ibid.

4 Estimates are by Cominco-American, Inc., Alaska Department of Community and Regional Affairs, and Kevin Waring and Associates, respectively.

5 Based on 1982 regional population estimates made in 1983 by the Alaska Department of Labor from U.S. Census data. Estimate agrees with 1982 estimate made by the Department of Community and Regional Affairs in November, 1983.

6 Job multipliers shown for the NANA Region are averages of estimates made by Kevin Waring and Associates and the Alaska Department of Community and Regional Affairs in 1983.

D. FISCAL IMPACTS

INTRODUCTION

This analysis estimates the major fiscal impacts which the State of Alaska may experience as a result of the proposed Red Dog Mine project. The fiscal impacts estimated include the magnitude of tax revenues likely to be received by the State from the earnings and operations of the project, and the potential State expenditures for the project's infrastructure (an access road and a port facility). Other potential impacts noted include the effects of the project on the State's programming costs, and the effects of the project on local unemployment costs.

1. TAX IMPACTS

The principal State taxes applicable to the Red Dog operation, and therefore the greatest potential source of tax revenues to the State, are the mining license tax (MLT) and the corporate income tax (CIT). A third tax applicable to the project is the State's motor fuel tax (MFT), though it is not a major source of tax revenues for this particular project.

For an operation the size of the Red Dog project, the applicable mining license tax rate is $4,000 plus 7% of the taxpayer's net income in excess of $100,000. An exemption from tax payments is permitted for the first three and one-half years of a new mine's operation, as is a specific depletion allowance, depending on the particular resource being extracted. In the case of the Red Dog mine, which is primarily a zinc and lead mine with associated silver ore, the applicable depletion allowance appears to be 15% (AS 43.650.010(e)(2)).

The applicable corporate income tax rate for the Red Dog mine operation is $4,500 plus 9.4% of the taxpayer's taxable income over $90,000. While calculation of this tax appears straightforward enough,

however, a substantial complication arises in estimating corporate income tax payments because of the prolixities and uncertainties regarding the State's unitary tax formulas. (Alaska uses the traditional three-factor approach, which apportions a multi-state or multi-national corporation's sales, property values and salaries, and levys the tax on the proportion of those elements which are directly relatable to Alaska.) This is a particularly difficult constraint in the case of the Red Dog mine analysis, as the project sponsors have provided the only available estimate of their potential tax liability in Alaska, and this estimate has not been based on the unitary approach.

The State's motor fuel tax entails a levy of 2¢ per gallon for internal-combustion equipment which is used off-highway, and a levy of 8¢ per gallon for such equipment when used on roads. Because both the mining license tax and the corporate income tax are both net profits taxes, and therefore sensitive to taxpayers' reported earnings, a certain amount of uncertainty is involved in estimating future tax payments based on these instruments. In the case of the Red Dog operation, this necessitates a significant reliance on forecasts of future metals prices. This analysis, therefore, has used a range of 20-year average price forecasts for the Red Dog mine metals which has been provided by the Office of Minerals Development, Alaska Department of Commerce and Economic Development. These price forecasts, along with recent market prices for the Red Dog metals, are shown in Table D-1. (See Table D-1.)

Based on these forecasts, Cominco-American, Inc., has estimated that its annual tax amounts due to the State from the Red Dog Mine operation will be approximately as shown in Table D-2, below. (See Table D-2.)

TABLE D-1

PRINCIPAL METALS OF RED DOG MINE
TWENTY-YEAR AVERAGE PRICE FORECASTS

	Nov. 1983 Price (Appx.)	"Low" Avg. 20-Yr. Price	"Probable" Avg. 20-Yr. Price	"High" Avg. 20-Yr. Price
Zinc	49¢/lb.	55¢/lb.	60¢/lb	65¢/lb.
Lead	25¢/lb.	30¢/lb.	35¢/lb.	40¢/lb.
Silver	$9/Tr. oz.	$10/Tr. oz.	$18/Tr. oz.	$25/Tr. oz

Source: Department of Commerce and Economic Development, State of Alaska

11/1368

TABLE D-2

RED DOG MINE
COMINCO'S ESTIMATED AVERAGE ANNUAL TAX PAYMENTS
TO THE STATE*

(Millions--1983 Dollars)

Metal Price Forecast Scenario:	MLT	CIT	MFT	Average Total Taxes to State Per Year
"Low"	$4.09	$3.63	$0.13	$7.85
"Probable"	5.25	4.83	0.13	10.21
"High"	6.65	6.22	0.13	13.00

MLT=Mining License Tax
CIP=Corporate Income Tax
MFT=Motor Fuel Tax

*Over the first 20-25 years of the mine's life, approximately.

Source: Cominco-American, Inc. (Spokane, Washington)

As can be seen from Table D-2, Cominco-American, Inc., estimates that its tax payments to the State will average approximately $8 - $13 million per year (in 1983 dollars). Analysis of this estimate shows that the company's estimation procedure is consistent with current Alaska statues and provisions therein. Several factors should be kept in mind, however, as they will ultimately determine the actual amount of State taxes paid by Cominco-American. These include: (1) the State has not yet promulgated regulations regarding implementation of the mining license tax; (2) Cominco-American's tax estimates are based on a separate accounting method, whereas the method actually used could turn out to be the unitary tax basis; and (3) Cominco's corporate income tax liability was calculated without provision for any debt or interest costs in the base that are unrelated to a possible State loan.

A similar situation arises in attempting to assess the potential tax revenues which the State may receive from NANA Development Corporation (NANA) because of the project. Based on Cominco's projections of the royalties to be paid to NANA for the project, NANA's average annual tax payments to the State are estimated as shown in Table D-3, below. (See Table D-3.)

Table D-3 indicates that NANA may have a total State tax liability of approximately $1.4 - $3.2 million per year prior to 1991 (i.e., until its projected conversion from advance royalty payments from Cominco to net proceeds payments), and approximately $4 - $7 million per year thereafter, in 1983 dollars. In fact, NANA itself will pay a considerably lower amount of annual State taxes, as NANA representatives estimate that approximately 66% of NANA's total proceeds from the mine will be distributed to the other regional Native corporations in Alaska under section 7(i) and 7(j) of the Alaska Native Claims Settlement Act. The total amount of annual taxes received by the State should remain relatively unchanged, however, as State taxes on the distributed portion of NANA's proceeds should be recouped through tax payments from the other Native corporations.

TABLE D-3
NANA AVERAGE ANNUAL STATE TAX LIABILITY
BASED ON ROYALTIES RECEIVED

(Millions of 1983 Dollars)

	Average Annual Royalties	Average Annual CIT Due* (Begins In 1988)	Average Annual Net Proceeds Royalties	Average Annual MLT Due** (Begins In Mid-1991)	CIT and MLT Combined After 1991: Average Annual Taxes Due State During 1988-91	CIT and MLT Combined After 1991: Average Annual Taxes Due State After 1991
"Low"	$15.24	$1.43	$34.97	$2.44	$1.43	$3.87
"Probable"	25.11	2.36	48.57	3.39	2.36	5.75
"High"	33.78	3.18	58.88	4.12	3.18	7.30

CIT=Corporate Income Tax
MLT=Mining License Tax

*Payable on all royalties received over the life of the mine.
**Payable on all net proceeds royalties due (in addition to CIT).

Source: Office of Management and Budget, State of Alaska

11/1368

Several factors thus make assessment of the potential Red Dog Mine tax revenues somewhat uncertain at this point. The most important among these are the profit-based orientation of the two major tax instruments involved, the current absence of mining license tax regulations, and the as yet indeterminate effects of any unitary tax applications yet to come.

2. STATE INFRASTRUCTURE EXPENDITURES

Three financing scenarios have been discussed regarding possible State participation in the infrastructure costs for the Red Dog mine. One is the case where the State simply offers a flat grant in the amount of $135 million (1983 dollars) to build both the road ($83 million) and the port facility ($52 million). A second is the case where industrial development bond financing is provided for the project infrastructure, either through the Alaska Industrial Development Authority or through a regional resource development authority. A third is the case where the State extends a $135 million no-interest loan to Cominco for construction of the road and the port.

The first two cases require little elaboration, because the costs to the State are fairly clear. In the case of a direct grant, the cost to the State would be the full $135 million. In the case of revenue bonding, assuming the project would withstand the scrutiny of investors, the costs to the State would be limited to relatively small administrative costs incurred as handling costs for the bond issue.

The implications of a $135 million no-interest loan to Cominco, however, are not so clear. On the one hand, Cominco proposes to pay off the loan, yet still leave ownership of the road and port in the hands of the State. On the other hand, however, Cominco proposes that payback occur over a 20-year period which begins after a 10-year period

of deferred payments. The potential cost implications of this scenario for the State should not be overlooked. Specifically, depending on how the State chooses to define its opportunity cost of capital (e.g., between 8% and 12%), and assuming overnight construction costs, the payback to the State from such a loan could be worth approximately $16-$30 million in present value. This would represent a direct State cost of approximately $105-$119 million dollars.

Table D-4, below, shows the present value to the State of a $135 million no-interest loan offered with varying periods of deferred payments. Also shown are the related direct State costs involved. As can be seen from Table D-4, State costs are not sensitive to varying deferment periods, as even with no deferment the direct State cost ($68 million in 1983 dollars) is still approximately half the cost of the original loan, or more. (See Table D-4.)

Table D-5, below, shows a broader range of options for State lending assistance to the Red dog project, and the associated direct costs to the State. It can be seen from the table that various combinations of shortening the $135 million loan's deferment period, and charging Cominco an interest rate commensurate with the State's own cost of capital, could significantly reduce the State's cost. Additionally, it might be possible to equate annual loan repayment amounts with the sum of the annual direct benefits received from the project. This latter approach might at least provide a basis for determining the loan level (or terms) which the State would be willing to offer to Cominco and NANA. (See Table D-5.)

3 STATEWIDE PROGRAM COSTS

Time constraints have prevented analysis of the potential increases in State program costs which might result from the effects of the Red Dog Mine project. However, it is possible to estimate broadly the likely magnitude and distribution of net local population increases due to the project's indirect and secondary employment effects. These estimated local population gains have been estimated as follows:

* approximately 70 new people will move into the Kotzebue area;

* approximately 40 new people (total) will move into the other ten NANA region villages.

* approximately 125-130 new people will move into the Anchorage area;

* Cominco supply expenditures could cause additional population gains in the Anchorage area, at the rate of approximately 55 new residents per $1 million spent locally; and

* approximately 40 new people (total) will move into other communities across the State.

4. STATEWIDE UNEMPLOYMENT COSTS

Time constraints have prevented analysis of the potential decreases in State unemployment costs which might result from the effects of the Red Dog Mine project. However, it is possible to estimate broadly the magnitude and distribution of net local unemployment reductions due to the project's indirect and secondary employment effects. These reductions have been estimated as follows:

* approximately 20 previously unemployed residents of Kotzebue will gain employment;

* approximately 30 previously unemployed residents (total) of the NANA region's other communities will gain employment;

* approximately 30 such individuals in Anchorage will gain employment;

TABLE D-4

COST TO THE STATE

OF NO-INTEREST LOAN OF $135 MILLION

WITH VARYING PAYBACK PERIODS*

(Millions--1983 Dollars)

Payback Deferment Options	Present Value to State of Payback @ OCC =			Direct State Costs (-NPV) OCC =		
	8%	10%	12%	8%	10%	12%
10 Years	$30	$22	$16	$105	$113	$119
5 Years	45	35	28	90	100	107
No Deferment	67	58	51	68	77	84

OCC = Opportunity cost of capital for the State.
-NPV = Negative net present value.

* Loan is to be paid back in equal installments over a 20-year period, with different deferment periods as shown.

NB: Estimates based on overnight construction costs, (i.e., initial loan is made at a single point in time, after which the deferment period or repayment period begins).

Source: Office of Management and Budget, State of Alaska

11/1368

TABLE D-5

REPAYMENT OPTIONS AND STATE COSTS FOR $1[illegible]5 MILLION LOAN
(1983 Dollars, In Millions)

REPAYMENT OPTIONS:

Interest Rate	Deferment	PV OF Payback	Direct Costs To State
0%	10 yr	$16-30	$105-119
	5 yr	28-45	90-107
	none	51-67	68-84
5%	10 yr	25-48	87-110
	5 yr	45-72	63-90
	none	81-107	28-54
8%	10 yr	31-61	74-104
	5 yr	57-91	44-78
	none	103-135	0-32
10%	10 yr	36-71	64-99
	5 yr	66-105	30-69
	none	0-118	0-17
12%	10 yr	41-80	55-94
	5 yr	75-120	15-60
	none	0-135	-0-

Source: Office of Management and Budget, State of Alaska

11/1368

* Cominco supply expenditures could cause additional employment of previously unemployed persons in the Anchorage area, at the rate of approximately 14 unemployed persons hired per $1 million spent locally; and,

* Approximately 10 such individuals (total) will gain employment in other Alaska communities.

E. COMINCO/NANA CONTRACTUAL AGREEMENT

The agreement appears to contain no provisions which would alter this report's assessment of the fiscal and economic impacts of the project.

F. EFFECTS ON STATE BONDING CAPACITY

Industrial development bonding, either through the Alaska Industrial Development Authority or through a yet-to-be structured regional resource development authority, is the only bonding option which has been discussed seriously to date for financing the Red Dog Mine infrastructure (the access road or the port facility). This approach, if undertaken, would essentially require the project sponsors to pledge Red Dog Project revenues toward repayment of any revenue bond financing obtained. As such, this financing method would not be "affordable" to the State only to the extent that it:

(1) increased the State's borrowing costs on other bond issues;
(2) saturated the national market for Alaska bonds; or,
(3) diluted the strength of the State's so-called "moral obligation pledge". None of these outcomes are regarded as likely.

Assuming that the Red Dog Project will be viewed as economically feasible by market investors, therefore, industrial development bonding for the project infrastructure should not in itself adversely affect the State of Alaska's overall bonding capacity.

G. SYNOPSIS

This synopsis presents the major findings of the Office of Management and Budget on the Red Dog Mine project.

Task 1 - Cominco Corporate Profile

- Cominco Ltd. is an established and sound company, with good overall prospects, and is backed by a large and reputable parent corporation.

- The company appears able to provide a solid corporate base for support and development of the Red Dog Mine project.

Task 2 - NANA Corporate Profile

- NANA Regional Corporation appears to be solvent and strongly oriented towards projects which offer long-term employment benefits to its shareholders (principally joint business ventures within northwest Alaska).

- The corporation's participation in the Red Dog Mine project appears consistent with its corporate purposes and past activities.

Task 3 - Direct and Indirect Economic Impacts

- No guarantee exists that the project sponsors' projected employment goals or local hire goals will be achieved.

- The project appears likely to create 350-400 permanent jobs at the mine site, constituting approximately $11-$13 million per year (1983 dollars) in total direct income.

- NANA region residents may obtain an estimated 220-250 (50%-75%) of the mine jobs, constituting approximately $7-$8 million per year (1983 dollars) in direct income for regional residents.

- The project may generate an estimated 225 additional jobs within the State due to indirect and secondary employment effects, constituting an estimated $5.7 million per year (1983 dollars) in additional income.

- NANA region residents may obtain an estimated 100-110 (47%) of these additional jobs, constituting approximately $2.7 million per year (1983 dollars) in additional income for regional residents.

- The project's indirect and secondary employment effects may cause approximately 50 previously unemployed persons to be hired within the NANA region, plus an additional 30-60 such persons elsewhere in the State (chiefly, in the Anchorage area).

- No basis is available at present for estimating the number of job-seeking in-migrants which the project might attract into the State, though the project sponsors will attempt to minimize such effects through advertising.

- Local population increases due to the project itself probably will be moderate, totaling an estimated 280 new residents (including dependents) across the State, exclusive of in-migration. These increases could have significant local consequences within the NANA region, however, (e.g., an estimated 70-75 new residents in Kotzebue, exclusive of in-migrants).

Task 4 - Fiscal Impacts

- The total amount of tax revenues that the State is likely to receive for the Red Dog Mine project has been estimated to be approximately $9 to $16 million per year during the years 1988 to 1991, and approximately $12 to $20 million per year after 1991 (in 1983 dollars). This estimate is reasonably made and is consistent with current Alaska tax statutes. It is necessarily speculative, however, due to the profits based nature of the taxes involved, the current absence of mining license tax regulations in Alaska and the possibility that the project sponsors' actual tax liability may be based on unitary taxation principles in the future.

- An interest-free loan to Cominco of $135 million (with a 10-year deferment of payments, to be followed by a 20-year repayment period), for construction of the mine access road and port facility, could represent a direct net cost to the State of approximately $100-$120 million (1983 dollars).

- Increases in State and local program costs due to project-caused population increases could be moderate, though not insignificant at the local level. Such costs would depend largely on the extent to which the project induced speculative in-migration into the State and into the NANA region.

Task 5 - Cominco/NANA Contractual Agreement

- The agreement appears to contain no provisions which would alter this report's assessment of the fiscal and economic impacts of the project

Task 6 - Effects on State Bonding Capacity

- Industrial development bond (revenue bond) financing of the project infrastructure, including the access road and the port facility, would not, in itself, adversely affect the State's bonding capacity.

VI. Report of the Department of Community and Regional Affairs

A. Examination of Regional Government Structure

B. Evaluation of Regional Socio-Economic Impacts

C. Regional Dependence on State and Federal Appropriations

D. Comments and Recommendations

E. Appendices

RED DOG ANALYSIS

Task Items C.1, 2, 3 and 4)

Department of Community and Regional Affairs
Municipal and Regional Assistance Division

February 21, 1984

I. TASK C-1: Examine the present and future relationship between the North Slope and project participants.

TASK C-2: Evaluate potential separation of mine properties from the North Slope Borough.

II. TASK C-3: Evaluate impact of the project on the region of influence with regard to labor, transfer payments, taxation, etc.

III. TASK C-4: Review the extent to which the economy of the region (NANA area of influence) is financed by State and federal appropriations.

IV. General Comments and Recommendations

Appendix A: list of analysis assumptions

Appendix B: results of Department of Community and Regional Affairs Developments Assessment Model (CRADAM) as applied to the Red Dog Mine and the community of Kotzebue.

Appendix C: Bibliography

I. TASK C-1 and 2: 1.) Examine the present and future relationship between the North Slope Borough and project participants (Cominco and NANA. 2.) Evaluate potential separation of mine properties from the North Slope Borough.

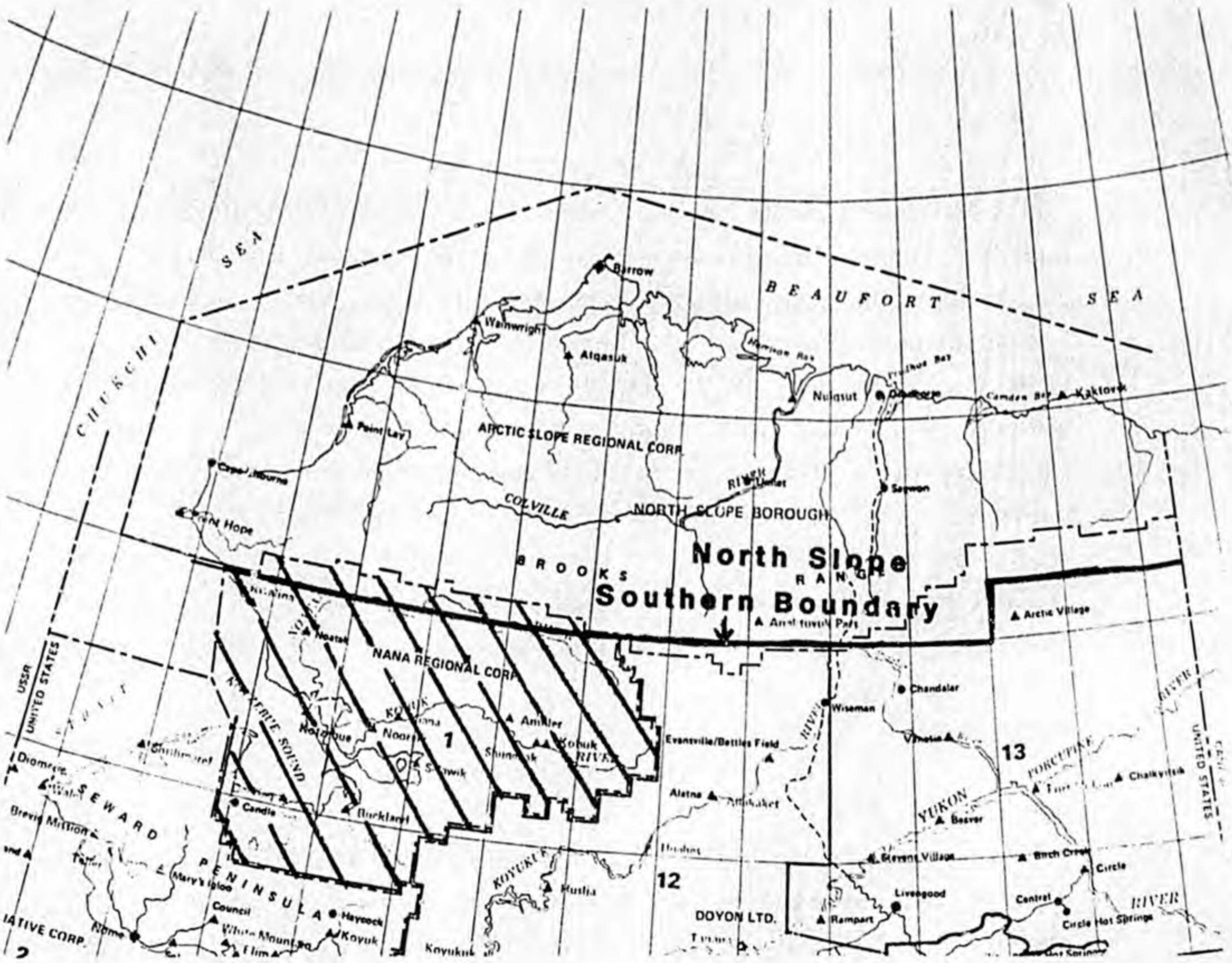
INTRODUCTION

The North Slope Borough encompasses the vast majority of the Arctic Slope Regional Corporation boundaries, and portions of the NANA and Doyon Ltd. regional corporation boundaries (see map 1). The NANA region is investigating the possibility of initiating the procedures for the incorporation of a borough coterminous with its corporation boundaries.

The section of the NANA region which is within the North Slope Borough boundaries contains a highly mineralized area. This mineralized territory includes the Red Dog Mine. It is essential to the formation of the NANA borough that it have the Red Dog Mine within its boundaries so as to provide an adequate economic base for the borough.

The Red Dog Mine and the surrounding NANA territory lying within the North Slope Borough has no population nor has it been assessed for Borough property taxes. The Borough Assessor visited the area this fall, but has not arrived at a tax assessment. This territory has not received any Borough services.

For the past year, representatives of the NANA Corporation have been discussing with the North Slope Borough the matter of detaching the portion of the NANA corporation territory remaining within the North Slope Borough. Up to this time a resolution of this issue has not been achieved between the two entities. It is the intention of the NANA Corporation to formally request that the North Slope Borough initiate detachment procedures for the territory in question at a November 30th meeting in Kotzebue.



BEAUFORT SEA
CHUKCHI SEA
Barrow
Wainwright
Atqasuk
Harrison Bay
Prudhoe Bay
Nuiqsut
Camden Bay
Kaktovik
Point Lay
ARCTIC SLOPE REGIONAL CORP.
Cape Lisburne
Point Hope
COLVILLE
RIVER
Umiat
Sagwon
NORTH SLOPE BOROUGH
BROOKS
RANGE
North Slope
Southern Boundary
Arctic Village
Noatak
NANA REGIONAL CORP.
Ambler
Kobuk
Shungnak
Selawik
Noorvik
Buckland
Candle
1
Chandalar
Wiseman
Evansville/Bettles Field
Alatna
Allakaket
13
PORCUPINE
Chalkyitsik
YUKON
Beaver
Stevens Village
Birch Creek
Circle
Central
Circle Hot Springs
Livengood
Rampart
12
DOYON LTD.
Huslia
SEWARD PENINSULA
Mary's Igloo
Brevig Mission
Diomede
Council
Nome
Haycock
Koyuk
USSR
UNITED STATES

MAP 1

The following narrative has two purposes. The first section gives a historical perspective on the creation of the North Slope Borough and the formation of the Arctic Slope Corporation and NANA boundaries. The second section explains the alternative procedures for the detachment of that portion of the NANA region remaining within the North Slope Borough.

HISTORICAL PERSPECTIVE

In Inupiat people of the Arctic Slope and NANA Region have inhabited Alaska for thousands of years. Throughout this vast homeland, Inupiat language and lifestyles are remarkably similar. Flexibility and adaptability have been the keystones to the Inupiat success in this harsh region. Their social organization promoted cooperative effort and community sharing, and this, combined with mobility, adaptability regarding diet, and sophisticated techniques of travel, hunting, and survival, produced enduring cultural traits that persist in modified form to the present day. It is this sense of cooperation that has fostered the current negotiations between the NANA region and the North Slope Borough over the detachment of the Red Dog Mine area from the North Slope Borough.

North Slope Borough

A petition proposing the incorporation of a first class North Slope Borough was received by the Local Affairs Agency on April 4, 1971. On May 7, 1971, the agency notified the representative of the petitioners - the Arctic Slope Native Association - that the petition was accepted. The Commission conducted a public hearing on the petition in Barrow on December 2, 1971. The Commission approved the petition on February 25, 1972. Following the Commission's decision, an election was conducted, resulting in the incorporation of the North Slope Borough on July 1, 1972.

In arriving at the decision to approve the petition to incorporate the North Slope Borough, the Local Boundary Commission identified the

territory which would meet the standards for borough formation. The Commission found that the boundaries of the proposed organized borough conformed generally to the natural geography of the area proposed for incorporation.

The North Slope Borough petitioners proposed the incorporation of the entirety of a geographically distinct area of the State approximately bounded on the north and west by the Arctic Ocean, Beaufort and Chukchi Seas, on the south by the mountains cresting the Brooks Range. The most easterly boundary observes the State of Alaska-United States of American/Yukon Territory-Canada border.

The southerly boundary more precisely follows latitude 68°00'N from the State of Alaska Chukchi Sea boundary in an easterly direction to the point of intersection with longitude 146°00'W. At this point, the proposed boundary is extended northerly to its intersection with latitude 68°30'N from which point it follows latitude 68°30'N in an easterly direction to the State of Alaska/Canada border.

In rendering its decision, the Commission was further aware that the Congress of the United States, in the Alaska Native Claims Settlement Act of 1971 (Public Law 92-203), had required the Secretary of the Interior to form Regional Corporation in Alaska whose boundaries conformed to those of the existing Native Associations, that Congress had designated the Arctic Slope Native Association, and had characterized it as "Point Hope-Barrow," and that, in fact, the Arctic Slope Native Association did embrace the area comprehended by the petition, with the relevant provision of the Act, providing as follows:

> "For purposes of this Act, the State of Alaska shall be divided by the Secretary within one year after the date of enactment at this Act into twelve geographic region, which each region composed as far as practicable of Natives having a common heritage and sharing common interests. In the absence of good cause shown to the contrary, such regions shall approximate the areas covered by the operations of the following existing Native Associations."

On July 1, 1972, the North Slope Borough became the regional government for the entire Alaska Arctic region, with an elected mayor (three year term), a seven member assembly, and a seven member school board. As home rule borough, it has assumed all legislative powers not prohibited by State law and allowed by its charter. Mandatory powers are: taxation, education; and planning, platting and zoning. The following powers were transferred to the Borough in an April 1974 election; 1) streets and sidewalks; 2) sewers and sewage treatment; 3) water course and flood control facilities; 4) health services and hospital facilities; 5) telephone systems; 6) light, power and heating utilities; 7) transportation systems; 8) water; 9) libraries; 10) garbage and solid waste collection and disposal services and facilities; 11) housing and urban renewal, rehabilitation, and development; 12) preservation, protection and maintenance of historical sites, buildings and monuments. Areawide police powers were transferred to the Borough in a July 1976 election.

Regional Corporation Boundaries

As previously noted, Sec. 7(a) of the Alaska Native Claims Settlement Act states that within one year of the date of enactment of the act, that the Secretary of the Interior would divide the State of Alaska into twelve geographic regions. Each region was to be composed of Natives having a common heritage and sharing common interests. This section of the Act continues to identify the twelve regional Native associations the geographic regions are to follow. The Arctic Slope Native Association (Barrow, Point Hope) and the Northwest Alaska Native Association (Kotzebue) regions are specifically identified.

The formation of the regional corporation's boundaries was not completed until the end of 1972. During the time that the regional boundaries were being defined, the North Slope Borough was incorporated. Consequently, the incorporation of the Borough prior to the establishing of the corporation boundaries resulted in the inclusion of the Red Dog Mine territory within the North Slope Borough boundaries.

It was not clear until the creation of the regional boundaries was completed whether the community of Point Hope and the lands in the vicinity of Point Hope would be in the NANA or Arctic Slope regions. An election conducted in Point Hope settled the issue, as residents voted to be part of the Arctic Slope Region.

DETACHMENT PROCESS

As previously stated, the northern portion of the NANA region is within the North Slope Borough. Unless this territory is detached from the Borough, it is doubtful that the NANA region will have a sufficient economic base from which to finance the management of a borough government. The following section examines the process by which the territory can be detached from the North Slope Borough.

Detachment Process

There are two alternative approaches to initiating a detachment petition. The first approach (local action) initiates a petition that would be presented, if approved by the Local Boundary Commission (Commission), for a vote by the residents of the territory proposed for detachment. A simple majority would effect the detachment. As there are no residents in the northern section of the NANA region to be detached from the North Slope Borough, the local action process is not an alternative.

The second approach (legislative review) requires the petition to be presented, if approved by the Commission, to the Alaska Legislature for its final approval. However, both types of petition have a limited number of ways in which they can be initiated. In 19 AAC 10.470, it stated that a petition may be initiated by:

1. The governing body of a municipality whose boundaries are to be changed;

2. The governing body of an organized borough in which the territory is located;

3. At least 10 percent of the registered voters residing in the territory to be annexed or detached, in the municipality to be dissolved, or in each municipality emerged or consolidated;

4. The Commissioner.

The first and second means of initiating a detachment petition are both applicable to the North Slope Borough as it is the municipality whose boundaries are to be changed. The third means of initiating a detachment petition is not applicable in the detachment of the Red Dog Mine territory as there are no residents in the territory proposed for detachment. Consequently, the detachment process must be initiated either by the North Slope Borough or the Commissioner of the Department of Community and Regional Affairs.

Legislative Review Proce..

The legislative review process has established procedures for initiating and conducting a detachment (19 AAC 10.450-.620). The following describes the process:

Department Review

In accordance with 19 AAC 10.520, the Department must review the petition and brief to determine that they are substantially in proper form and contain the factual information required. If the Department determines that the petition and brief are sufficient, the petition will be submitted to the Local Boundary Commission. In addition, the Department prepares a report to the Commission on the proposed action.

Commission Review

Upon receipt of the petition from the Department, the Commission will establish a time and place for public hearing(s) concerning the

proposed boundary change. The public hearing would be held in or near the territory proposed for detachment. In this instance, public hearings might be held in both the North Slope Borough and the NANA region. In accordance with 19 AAC 10.225-.250, the Commission will review the detachment petition through the application of the established standards for detachment of territory from organized boroughs.

Commission's Recommendation

Following the public hearing, the Commission will either deny or approve the petition. The Commission does have the authority to amend the boundaries proposed for detachment. If the Commission approves the petition, with or without amendments, it will forward its recommendation to the Legislature.

Legislative Review

The Commission's recommendation must be submitted to the Legislature within the first ten days of legislative session. After 45 days from the date of the Commission's recommendations submittal to the Legislature, the proposed boundary change becomes effective unless there is a concurrent resolution passed by both houses of the Legislature in opposition to the proposed boundary change.

Borough Incorporation

It should be noted that 19 AAC 10.170(c) and 19 AAC 10.240(b) state that the Commission will not consider a petition for incorporation of an area located partially or wholly within an organized borough until the petitioners have submitted, and the Commission has approved, a petition for detachment of the area from the borough.

If it is the intention of the NANA region to petition for the formation of a borough, which will include the area to be detached from the North Slope Borough, the timing of the sequence of events is crucial.

SUMMARY

A quick review of the sequences of events identifies why the Red Dog Mine is within the North Slope Borough. The 1972 incorporation of the North Slope Borough was completed several months prior to the establishing of regional Native corporation boundaries. The final land selections for the Arctic Slope Regional Corporation and the NANA Corporation were made during the 1975-76 period.

It is unclear at this time, if the area containing the Red Dog mining project will be detached from the North Slope Borough. However, it is obvious that the detachment will be a factor in the decision to proceed with the development of the project given the uncertain future taxation policies of the North Slope Borough.

The formation of the NANA Borough is dependent upon the detachment of this property from the North Slope Borough. Various organizations and leaders have supported the concept of borough formation in this area, given a tax base of this nature.

I. TASK C-3: Evaluate impact of the project on the region of influence with regard to labor, transfer payments, taxation, etc.

For the purposes of this analysis, the region of influence was taken to be the incorporated boundaries of the NANA Regional Native Corporation. Where relevant, the region was further divided into two major components: Kotzebue and the outlying villages (ten). Some further focus was placed on the communities of Kivalina and Noatak which are most closely located to the project.

The impacts here discussed include:

- regional employment (direct/secondary; resident/nonresident)
- population (resident/nonresident; Kotzebue/outlying villages)
- per capita (household) income
- area service needs (schools, medical, public safety, governmental, etc.)
- transfer payments (state, federal, etc.)
- cultural

EMPLOYMENT (AND UNEMPLOYMENT)

Existing employment patterns. A baseline description of existing employment patterns will first be presented, followed by an assessment of the likely affects of employment resulting from development of the Red Dog Mine.

It is important to note that the existing regional economy is, to a large degree, a reflection of the continuing subsistence relationship to

the land maintained by a large number of the region's residents. Consequently, a number of accepted measures of "employment" or "occupation" are simply not valid when applied to the activities pursued by the NANA resident population. In particular, the use of U.S. Census measures of employment, and unemployment, is limited primarily to providing some indication of the proportion of residents who participate more directly in the region's "wage earning" economy.

Another measure of unemployment, the State's unemployment roles, reflect only those numbers of individuals who are actively seeking "wage earning" employment and are subsequently picked up by the tracking system provided by the State's job service programs. A rough calculation based on the 1980 U.S. Census information available for the outlying villages in the region indicated generally that less than 3-5% of the population were employed in "full-time" wage-earning jobs. Another 5-10% held "half-time" jobs and another 25-40% found some "part-time" employment during the year.

It should be noted that a large number of the above full and half-time jobs were teaching jobs; often occupied by non-Native persons. There are about 300-500 full-time-equivalent jobs in the outlying villages and about 250 of these jobs are education/profession related (including librarians, teacher aides, etc.). The next largest providers of employment are local government and federal programs.

In Kotzebue, based on the 1980 Census, there are about 500 full-time jobs, about 150 half-time jobs, and about 400 part-time jobs. It is estimated that there are about 600-800 full-time-equivalent jobs in the Kotzebue area. Of the full-time jobs, about 250 positions are connected with the administration and provision of services (i.e., NANA; Maniilaq, State, federal and local agencies). Another 150 jobs are connected with School District operations (both administration and teaching).

Combining the above employment estimates for Kotzebue and the outlying villages indicates a regional full-time-equivalent employment of

approximately 1,200. A recent labor market study performed by Darbyshire and Associates for NANA estimated a total of 1,400 full-time-equivalent jobs in the region. That report also projected that, in the absence of the Red Dog project, there would be essentially no growth in the regional employment opportunities over the next ten years. Our review of available materials substantiates that assumption.

Estimated Red Dog Mine Employment. Figures 1 and 2 present employment estimates for the Red Dog project (onsite), including estimates of NANA resident employment. Figure 1 breaks out the employment for each of the construction and production phases, while Figure 2 combines the workers associated with these two phases to indicate the total number of jobs for a given period of time. Figure 2 includes some employment information for the early exploratory drilling activities which have already taken place (1982).

During the construction phase, it is estimated that the NANA resident workforce will rise from 35% of the total workforce at the beginning of actual construction (25 residents), to a figure of more than 50% (100 residents) during the peak of construction. Two other studies of resident employment (Darbyshire, 1982; Waring, 1983) are less optimistic and project a resident employment of 33% throughout the construction phase. The higher employment estimates proposed in this report result from a consideration of the construction phase job descriptions as provided by Cominco; the aggressive approach being taken by various training/placement agencies; the positive attitude of the residents (Berger and Associates, 1983; Cultural Dynamics, Ltd., 1983); and previous resident employment experience with the Alaskan Pipeline Project (Naylor and Gooding, 1978).

Two years before actual production begins, Cominco will begin to employ a number of managerial/technical personnel for the Red Dog Project. Many of these positions will simply transfer from other Cominco operations. At any rate, NANA residents are not likely to participate directly in this "pre-production" labor force until about a year before startup, at which time a number of entry level professions

FIGURE 1

ESTIMATED RED DOG MINE EMPLOYMENT
CONSTRUCTION AND PRODUCTION PHASES

TOTAL WORKFORCE AND NANA RESIDENT WORKFORCE
(excluding Anchorage office)

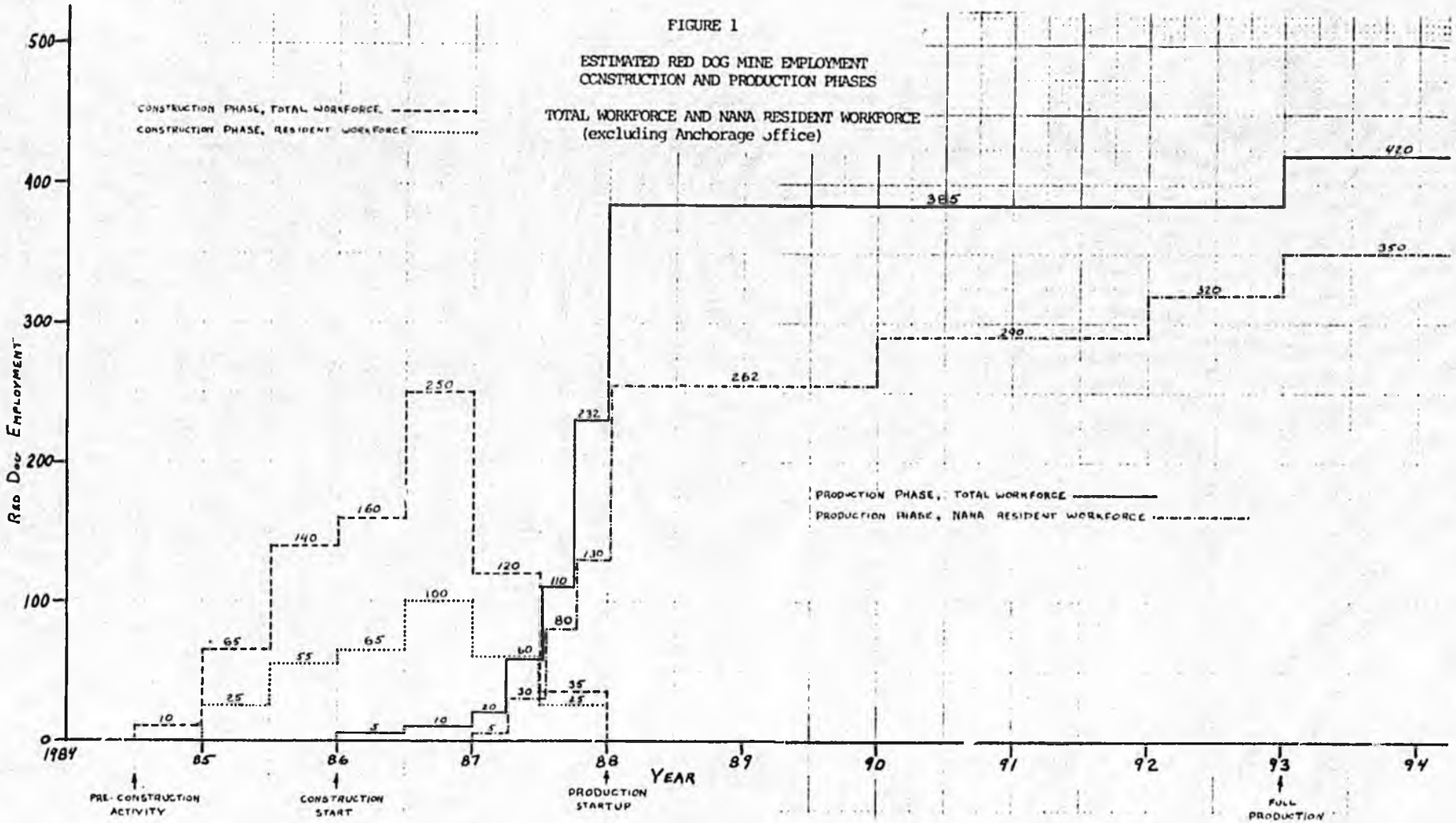
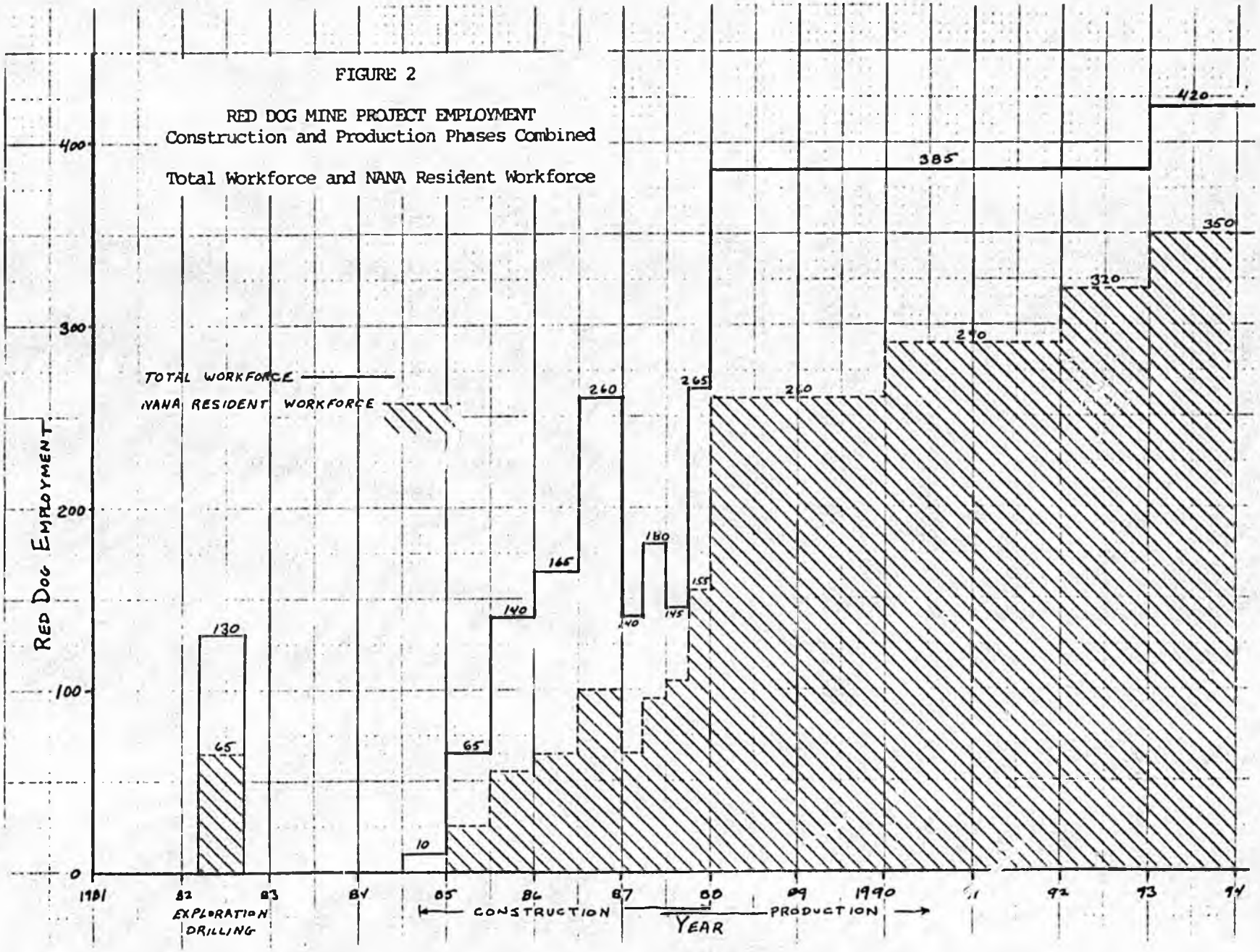


FIGURE 2

RED DOG MINE PROJECT EMPLOYMENT
Construction and Production Phases Combined

Total Workforce and NANA Resident Workforce



will be required to assist in the mobilization of the plant (assistant operators, administrative assistance, etc.). At that time, NANA residents in the slowly growing production workforce should represent about 25% (5 residents) of the total production mobilization workforce. However, that number should quickly grow over the course of the last preproduction year, reaching a value of about 66% (262 NANA residents) at the time of production startup.

This number for resident employment at startup was again derived by an inspection of the individual job descriptions provided by Cominco, considering the available labor force and assuming the successful implementation of planned vocational training programs. This estimate is higher than the value of 42% assumed in the Draft EIS for the project (Waring, 1983), which was reportedly provided by Cominco. It is most likely that actual resident employment at startup (1988) will fall somewhere between these two values.

As a rough guess, 80 of the above 262 residents in the startup workforce would come from the villages of Kivalina and Noatak (40 from each community), with the remainder of jobs evenly distributed throughout the region by population (Kotzebue, 90; outlying villages, 90).

It is assumed that the proportion of resident employment will continue to increase slowly over the course of mining operations. Notable increases in resident employment should occur at about two years into production as resident graduates from trade and vocational schools come into the labor force. Again, after four to five years from startup, another increase in local employment should take place as residents obtain advanced degrees in technical fields, assisted by Cominco scholarship funds (up to $30,000 per year). A final jump in resident employment should occur when the mine steps up to full operation in year six. Most of the new jobs at that time should be obtainable by NANA residents. At that time, NANA residents should represent over 80% of the total workforce.

Further increases in the proportion of resident hire should occur slowly over the life of the mine. It is possible that NANA could achieve its stated goal of 100% resident employment; however, no time frame is here assumed.

Secondary Employment Estimates: Because of the fully enclaved nature of the proposed project, there should be virtually no direct employment away from the site (other than in Anchorage). However, there should be a substantial number of support service jobs generated as a result of the mine operations and the generally increased affluence of the population. Most of these secondary jobs will occur in Kotzebue, although there should be some small increases in service and construction employment in the outlying villages.

As many as 150 secondary jobs should occur during the transition from project construction to project operation. This number will quickly diminish to 100 within a year or two of startup, finally stabilizing between 50 and 100 jobs as the local economy absorbs the transient activity of the new development. NANA residents should capture most of the secondary employment resulting from the mine, although there are certain to be at least a small number of nonresidents who find work in Kotzebue, particularly during the construction/early production phases.

POPULATION

The current population of the NANA region is approximately 5,200. Of these, approximately 4,500 are Native (86%). The population of Kotzebue is estimated to be 2,400, of which 1,800 (79%) are Native.

Table B.1, Appendix B, presents a projection of the population of Kotzebue as it would be expected to grow without the Red Dog development, and as it would grow as a result of developing the mine. The variance between the "base case" and the "operations" case is the estimation of the effect of the mine's presence. According to this scenario, Kotzebue's population would jump by about 125 people (5%)

during the construction phase, and increase another 125 (10% total) during initial production phases. Many of these people would be current NANA residents that will have moved into Kotzebue, perhaps as many as 75% of the total number of inmigrants. Therefore, the net effect of the mine on the population within the region as a whole should not be significant.

INCOME

According to the 1980 Census, the mean average household income in the region varies from $8,000 to $20,000 between the outlying villages, and is about $30,000 in Kotzebue.

On the basis of earlier (Summer 1983) Cominco employment estimates, annual gross payroll was initially estimated at about $23 million (372 employees) during the construction phase, $13 million during operating years one through five, and about $13.4 million dollars from year six onwards (424 employees).

Since that time, employment estimates for the construction phase have been revised considerably downwards; however, revised payroll estimates were not included with the updated information. To provide a rough estimate of direct income during the construction phase, it is assumed that actual construction payroll will be reduced in proportion to the revised reduction in construction workforce. On this basis, it is assumed that the construction phase payroll will peak at about $15.5 million (250 employees), averaging about $9 million a year for the overall construction phase (143 full-time-equivalent employees). On this same basis, the payroll during the first five project years is estimated to be about #12 million (385 employees), and would increase to about $13.4 million for years six onwards (420 employees).

It is difficult to assess what portion of these wages will go to NANA residents, who will first tend to occupy lower paying positions, particularly during the construction stage. It is here estimated that

during construction an average of approximately $4 million dollars a year will be paid in gross wages to residents.

Again, during the initial phases of production, NANA residents will largely be occupied at the lower end of the wage scale. Of the $12 million annual Cominco gross salary, it is estimated that initially about $7 million will go to about 260 NANA residents. This number would increase constantly over time as NANA residents moved into professional and technical positions with the mine.

AREA SERVICE/FACILITIES IMPACTS

Because of the stringent requirement that the Red Dog be a fully enclaved development, there are not expected to be substantial additional demands placed upon the regions service delivery.

The Department's development impact model (CRADAM, Appendix B) was applied to the Kotzebue/Red Dog development. The facility needs component is driven by the Demographic component already discussed above. In brief summary, the additional 100 jobs which will occur in Kotzebue, and accompanying overall population increase of some 10%, should not stress existing facilities (i.e., schools, public safety, fire, electrical, etc.) in the near future, and do not represent a significant planning component in comparison to the increase in population which would occur with or without the project. One possible exception is the present water system which is reported to be operating at near to full capacity.

It is likely that many mine workers from the outlying villages would wish to pass through Kotzebue while traveling between home and the mine. Depending upon the policy that NANA/Cominco develop concerning the air chartering of mine workers, this could result in a significant impact to several service delivery sectors. However, it is not possible to predict at this time the level of increased service delivery.

The outlying villages are also likely to require some increased social service delivery, at least transiently, in the wake of a degree of social disruption that will accompany the region's sudden increase in affluence (about 30% in regional income; Waring, EIS) and the introduction of an absentee-parent lifestyle that will occur in many village homes with workers at the mine. No attempt is made here to place a dollar value on the increase in social service delivery.

TRANSFER PAYMENTS

It was not possible in the time permitted for this study to link in a logical manner the potential increase in regional affluence to a possible decrease in State, federal and private transfer payments going into the region. Even before considering the possible effects of the mine's wages within the economy, there is a phenomenon presently occurring in program use which remains unexplained by the servicing agencies. Interviews with the State's Department of Health and Social Services indicated that the Department's two main transfer payment programs (i.e., AFDC, food stamps) have shown an unexplained dramatic 50% decrease in use the last two years.

The total transfer payments into the NANA region in 1980 amounted to $11,517,363, or $6,274,254 federal; $4,203,609 State; and $679,500 in private funds (Darbyshire, 1982). It was reported that the two distributions of the Permanent Fund Dividend were followed by periods of marked decrease in State program use. It is certainly likely that the continued incomes derived from mine wages in the extended family will have some positive effect on reducing transfer payments.

III. TASK C-4: Review of the extent to which the economy of the region (NANA area of influence) is financed by State and federal appropriations.

The primary source of information relevant to this task has been the documentation prepared by Darbyshire and Associates (1982) for the NANA Coastal Resource Service Area - Coastal Management Plan (CMP) in conjunction with follow-up interviews with Darbyshire staff responsible for producing these documents.

Figures presented in the CMP were cross-checked with a recent House Research Agency document (DeVries and Pomeroy, 1982) which examined the distribution of State appropriations by Election District. Since the Kotzebue Election District also includes the communities within the North Slope Borough, the Borough's annual financial reports were used to subtract out the bulk of State appropriations to the Arctic Slope Region, leaving an approximation of State appropriations going into the NANA region.

The CMP figure for State Appropriations (1980) were $31,482,815. The alternative method produced a figure of $32,500,000. This figure does not include the State's capital budget which varies radically from year to year for a given region. The capital budget appropriations for the Kotzebue Election District for FY '81 and FY '82 were respectively 20 and 50 million dollars.

Federal funds going to the NANA region in 1980 totaled about 24 million dollars - private transfer payments totaled about $700,000.

Important findings reported in the CMP documents included:

"The combined federal and State revenues are, by far, the most imports important source of demand on all three levels of the regional economy. Of the $63 million earned in the total NANA region, State and federal revenue sources support (i.e., directly

and indirectly) approximately $55.5 million (88%), while private sources support the remaining $7.8 million;"

- "State revenues to education, construction, social services and so on alone support 31.5 million (50%) of the total income earned throughout the NANA region;"

- "Mining and exploration activities are the largest private contributors to the economic base of the outlying villages (8%);" and

- "The largest single contributing source to the regional economy are the State revenues supporting schools and local government throughout the NANA region."

III. General Comments and Recommendations

With regard to the fulfillment of the NANA/Cominco agreement, there are several unstated policies, or potential policies, which could have significant effects on the distribution of the impacts of the Red Dog Mine development:

- One possible policy that may need to be clarified is the air charter transfer of residents from outlying communities (or other Northwest Alaska communities) to the mine site and back. The frequency of visit and duration of stay of these transients through the City of Kotzebue will play a determining factor in the total impact of the project upon the service delivery provided by the city, including transient housing, police and containment facilities, the recreational/entertainment economy, etc.

- Another policy, which will probably become highly sensitive, is the actual distribution of jobs among and within the communities throughout the region. NANA could develop a formula that would provide increased economic leverage for the more economically depressed villages, or a policy could be established strictly on a per capita basis, or the policy could be one of laissez faire. At any rate, existence or lack of existence of such a policy will be a determining factor in the ultimate distribution of the economic product of the Red Dog Mine in the NANA region.

- It might be advisable for some of the smaller communities to establish rotating labor pools through which all eligible residents could participate directly in the Red Dog's workforce. This would also provide increased flexibility in relation to subsistence lifestyles.

- Beyond training and placement, the various critical agencies in Kotzebue should be preparing for an extended service of counseling in support of residents who will be experiencing industrial employment for the first time.

Appendix A

Analysis Assumptions

A. The Red Dog mine construction and production schedules, as provided by Cominco in its engineering reports, will be essentially adhered to with regard to time and labor force requirements.

B. The goals of the NANA/Cominco operating agreement (N/C Agreement) of October 1982 will be aggressively pursued with regard to hiring and operating policies (goal = 100% local employment within 12 years of mine startup). That is, the several agencies and committees responsible for the training and placement of NANA residents will have a substantial effect (within several years) on the skills available in the local labor force and the placement of those skills at the minesite. Within five years of startup, resident skills will include increasing numbers of "professional occupations" as residents matriculate through the proposed scholarship program (up to $30,000 per year).

C. More specifically, regarding the phasing of local hire, it is assumed that, within two years, an additional 30-40 residents would become eligible for placement at the mine as a result of trade school/vocational training offered in Kotzebue. These people would probably move into positions vacated by residents moving up the scale of positions at the mine site, as they progress through on-the-job experience. Another 15-30 local residents would become eligible for professional range jobs (geology, lab technicians, etc.) at the completion of university level education. Finally, it is assumed that the jobs resulting from the planned increase in production at year six will be taken almost entirely by residents, that is, 30 more jobs.

D. In accordance with the N/C agreement, the Red Dog development will be as strictly isolated in its effects as possible; that is, fully enclaved.

E. NANA/Cominco will make special efforts to "broadly advertise" both the enclave and resident hire aspects of the Red Dog operation, thereby discouraging speculative inmigration into the region, and into Kotzebue in particular. However, it is assumed that a certain degree of speculative inmigration will still occur in anticipation of employment in secondary (mine support and service sector industries) and in anticipation of filling job vacancies which will occur as presently employed residents take positions with the mine. In particular, this will probably result in a temporary acceleration of intraregional migration, as people gravitate into the regional service center of Kotzebue; however, no estimate as to the degree of this movement has been assumed for the purposes of this analysis.

F. It is assumed that there will be some impact on service provision in Kotzebue as a result of resident mine employees preferring to travel through Kotzebue on the way to their home villages after their two-week stint at the mine.

G. The actual secondary employment multiplier applied to Kotzebue as a result of the Red Dog operations is assumed to be 0.5 for both the construction and production phases.

H. There will be a very small increase in secondary employment in the outlying villages as a result of the generally increasing affluence of the population. It is assumed that all such employment opportunities will be absorbed by the resident populations.

I. On the basis of several recent regional attitude surveys, and the precedent of NANA resident employment on the Alaskan pipeline project, it is assumed that there is a strong desire amongst NANA residents to get a job at the mine and keep it.

J. The residents of Kivalina and Noatak may be offered some degree of preference in hiring in compensation for the disruptive physical presence of a mine and road in their proximity. Otherwise, it is

assumed that attempts will be made to distribute employment opportunities evenly throughout the region.

K. Lacking more direct information, the anticipated annual gross payrolls during construction and production were taken from the draft Environmental Impact Statement (EIS) for the project (Socioeconomic section; Kevin Waring).

L. Levels of annual State financing of the regional and local economies were derived through a cross referencing of the NANA region draft Coastal Management Program document; a House Research Agency document of Appropriation by Election District (which includes the North Slope Borough); and the Annual Reports of the North Slope Borough.

M. The 1983 population of Kotzebue is assumed to be 2,400 which is the number arrived at after extended discussion between the City and the Census Bureau (which had placed the number at 2,054). The present City Planner has initiated a statistical survey of the community and preliminary results indicate a community population possibly as large as 2,900. The NANA region population is assumed to be approximately 5,200, reflecting the increased number in Kotzebue.

N. A number of specific baseline assumptions have been made in order to run the Department's CRADAM development assessment computer model (facilities needs component). These values, which are listed in Appendix B, were determined on the basis of information provided by the City of Kotzebue.

APPENDIX B

Community and Regional Affairs Development Assessment Model
Kotzebue/Red Dog Project

CRADAM is an interactive computer model which projects community response to specific development projects over a 20 year period. The model is community oriented and, therefore, is not directly applicable to projections for the NANA region as a whole. It has been applied in this case to the community of Kotzebue in its relationship to the prospective Cominco/Red Dog Mine development. Two components of the model have been run in this case: a demographic projection, and a facilities needs projection (which is driven by the demographic component's output). Tables B.1 and B.2 present the results of two elements of the demographic components: population and school age population. The results of the facilities needs component are extensive and are not reproduced here.

Specific assumptions for the demographic run included:

- Fully enclaved development project
- Construction start: January 1986
- Production start: February 1988
- Current annual rate of population increase: Kotzebue, 0.2%
- Construction phase, total workforce: 250
- % of these skilled labor: 62%
- Production phase, total workforce: 384 (onsite)
- % of these skilled labor: 67%
- Secondary employment multiplier: 0.5
- Average household size: 4.7
- Current population, by age cohorts: 0-4, 275; 5-9, 286; 10-14, 235; 15-19, 262; 20-24, 224; 25-29, 274; 30-34, 190; 35-39, 127; 40-44, 117; 45-49, 117; 50-54, 76; 55-59, 37; 60-64, 53; 65 and over, 123; total: 2,396
- Current effective unemployment: 50%

Specific assumptions for the facilities needs computer run include:

- Municipal acreage: 3,200
- Industrial acreage: 20
- Residential acreage: 200
- Elementary school (square feet): 50,000
- High School (square feet): 55,000
- Police department (square feet): 20,000
- Police vehicles: 6
- Fire department (square feet): 22,000
- Fire vehicles: 4
- Medical facilities (square feet): 40,000
- Residential buildings: 570
- Remaining Municipal buildings (square feet): 250,000
- Electrical demand (kwh/capita/day): 18
- Water demand (gallons/capita/day): 100
- Proposed residential density (units/acre): 8

Outputs from the computer run include:

- Total population estimates for the 20-year period (base case, development and production phases (table B.1)
- Number of school aged children for the 20-year period (table B.2)
- Number of high school students for the 20-year period
- Number of elementary students for the 20-year period

- Elementary school floor space demand
- High school floor space demand
- High school floor space surplus/deficit
- Police department floor space demand
- Police vehicle demand, surplus, deficit
- Fire department floor space demand, surplus, deficit
- Fire department vehicle demand, surplus, deficit
- Medical facility floor space demand, surplus, deficit
- Hospital beds required

- Municipal space requirement
- Average daily water demand
- Average daily electrical demand
- Residential housing demand
- Residential acreage demand

Table B.1

Demographic Projections
Kotzebue Population (base case, construction, operation)

Year	Base Case	Construction	Operations
0 (1983)	2396		
1	2429		
2	2483	2608	
3	2553	2681	
4	2637		2879
5	2646		2698
6	2751		2803
7	2808		2857
8	2997		3049
9	3138		3190
10	3293		3344
11	3460		3509
12	3226		3436
13	3840		4057
14	4454		4679
15	4285		4502
16	4534		4744
17	4804		5022
18	5096		5313
19	5410		5623

Table B.2

Demographic Projections
School Aged Children (base case, construction, operations)

Year	Base Case	Construction	Operations
0 (1983)	783		
1	794		
2	812	852	
3	834	876	
4	862		945
5	865		886
6	899		920
7	937		958
8	979		1000
9	1026		1046
10	1076		1097
11	1131		1152
12	1190		1211
13	1255		1276
14	1325		1346
15	1400		1421
16	1482		1494
17	1570		1591
18	1665		1686
19	1768		1789

APPENDIX C

Bibliography

Darbyshire and Associates, 1983, Job Availability and Labor Market Relations for the NANA Region.

Darbyshire and Associates, 1982, NANA Coastal Resource Area - Coastal Management Plan.

Waring, Kevin, 1983, Draft Environmental Impact Statement for the Red Dog Project.

Cultural Dynamics, Ltd., 1983, Chukchi Sea Sociocultural Systems Baseline Analysis.

Berger, Louis and Associates, 1983, Present State of Well-Being in Two Selected Regions of Alaska.

Maniilaq Association, 1982, NANA Regional Strategy.

DeVries, Anne and Pomeroy, Deb, 1982, Election District Breakdown of FY '81 and FY '82 Operating and Capital Budgets.

North Slope Borough, 1981-82, Annual Financial Reports, FY '81 and FY '82.

Oral Communications:

Matt Conover, November 1983, Planning Director, Maniilaq

Carol Dellahanty, November 1983, Planner, City of Kotzebue

Jake Rogers, November 1983, Assistant Administrator, Northwest Arctic School District

VII. Report of the Department of Transportation and Public Facilities

A. Review of Cominco's Road Design and Cost Estimates

B. Review of Cominco's Port Design and Cost Estimates

C. Alaskan Extractive Resource Projects

D. Qualification Matrix for State Transportation Projects

E. Impact of the Jones Act

F. Synopses of Two Canadian Mining Projects with Joint Public / Private Sector Participation

MEMORANDUM

State of Alaska
Department of Transportation & Public Facilities

TO: Robert Venusti
Deputy Director
Design and Construction

DATE: November 10, 1983

FILE NO:

TELEPHONE NO:

FROM: Ronald E. Olmstead, P.E.
Assistant Construction Chief
Aviation Design and Construction

SUBJECT: Red Dog Mine Project

A. Review of Cominco's Road Design and Cost Estimates

At your request, I have reviewed preliminary conceptual engineering data and cost estimates furnished by Cominco Alaska, Inc. for various roadway alternates from proposed port facilities north of Kotzebue to the Red Dog Mine. Data reviewed included the following:

REPORT	AUTHOR
Red Dog Mine Access Ground Transportation Study	R & M Consultants, Inc.
Preliminary Hydrology Report (Appendix 1)	R & M Consultants, Inc.
Geotechnical Report (Appendix 2)	R & M Consultants, Inc.
Preliminary EIS Red Dog Mining Site U.S.	EPA Region 10
Engineering Report on the Red Dog Project Vol 1 & Vol 2	Cominco Engineering Services
Engineering Estimate for the Red Dog Project Vol 1 and Vol 2	Cominco Engineering Services

ENGINEERING ANALYSIS

I. ROUTE SELECTION

From an engineering perspective, major items which should be considered in route selection for this region are as follows:

o Minimize alignment length

o Consider material site availability and haul

o Consideration of future maintenance, including drifting snow

o Consideration of construction problems and scheduling

- o Maintain fill section to the extend possible, avoiding problems associated with cuts in permafrost areas, especially on side hills
- o Minimize environmental disturbance
- o Minimize potential problems with drainage, ground water flow and and aufeis
- o Minimize roadway alignment on ice rich, high moisture content silts, organics, and poor route soils conditions
- o Avoid known areas of soil instabilities and/or movement
- o Efficient use of fill, especially in areas of mineral material shortage
- o Bridge siting
- o Future or proposed route expansion
- o Land ownership

Analysis of data furnished by Cominco Alaska, Inc. indicate that routes were selected and evaluated based on criteria similar to that mentioned above. The data utilized is preliminary in nature, however, with limited field verification and must be viewed as such. Alternate routes were delineated utilizing on U.S.G.S. mapping expanded to a 1" = 2000' scale for the plan portion of plan-profile sheets. Route alignments and profiles were plotted on these sheets utilizing the above mentioned criteria and engineering geometrics developed for the proposed routes.

II. Design Geometrics

Design criteria developed for the proposed roadway are as follows:

Design speed	30 mph
Road width	30 feet
Maximum grade	4%
Minimum radius	400 feet
Passing turnouts	2 mile intervals
Fill depth	6.5 feet based on thermal considerations
Alternate fill	2 feet minimum on 3 inches rigid insulation
Design vehicle	GVW 443,000 lbs
Maximum tandem axle loading	109,500 lbs

Roadway width and maximum grades are conservative due to the size of the design vehicle. Under normal usage conditions, a roadway width of 28 feet or even less may be adequate, with maximum desirable roadway grades up to 5% on rolling or 7% in mountainous terrain.

The fill depth of 6.5 feet assumes some thaw into the existing terrain, thus some settlement will result depending on soil type. This method is consistent with existing practice, with the final depth/depths selected being dependent on soil groupings or 'terrain units" and foundation conditions. The final typical sections developed for the roadway design would be a major engineering decision for the project with the governing factor being allowable thaw into the subgrade. The 6.5 foot fill depth is considered adequate for preliminary engineering purposes. In reality, it could be expected that depths would vary, with lesser depths being utilized should actual soil conditions warrant or deeper sections utilized should more protection be required in other locations. The alternate insulated fill section consisting of 2 foot of fill placed on 3 inches of rigid insulation board was utilized to a very limited extent in the preliminary analysis (approximately 1.3 miles total length in the preferred route) and appeared to be utilized primarily through vertical curve areas where it was desired to reduce the depth of fill for short stretches of roadway. This method of construction has been tested and utilized for heavy haul vehicles on the Trans Alaska Pipeline System with some success. Final design should consider carefully the exact placement and bedding methods for insulation.

III. Quantities

Fill quantities were computed utilizing the 6.5 foot of fill, or alternate section and providing for addition fill material for those sections going into and out of vertical curve locations and cross slope areas, utilizing factors developed for that purpose. Haul distance was determined by plotting material sites, selected by limited field examination and aerial photo interpretation. Drainage structures, types and sizes were developed based on drainage size and other hydraulic considerations. All data furnished by Cominco Alaska, Inc. was examined and appeared to be adequate for preliminary quantity determination.

IV. Cost

Cost figures for the proposed roadway were initially developed by R & M Consultants and provide the basis for those cost figures presented by Cominco Alaska, Inc. Base-line cost figures developed for major bid items are as follows:

Item	Estimated Cost
Embankment (c.y.)	$9.20 c.y.
Cubic Yard-mile (c.y.m.)	$1.30 c.y.m.
Drainage culverts (ea)	
24"-120" dia.	$6,400 - 61,200 ea.
Bridge (l.f.)	$1,800 - 5,760 l.f.
Insulation	$0.80 bd. ft.
Turnouts	Approx. $5000/mile

Cost estimates prepared for the state for the proposed 170 mile route from Kotzebue to Chicago Creek indicate estimated embankment costs of $10.00 c.y. with haul being estimated at $1.00 per c.y.m. after the first two miles. At a much smaller scale, embankment costs for the current Kotzebue Airport Improvements Project was bid at $6.74 c.y. Embankment costs at the new Buckland Airport was bid at $13.50 c.y., with similar type embankments running $4.00 c.y. in Fairbanks.

Culverts were estimated to be 80 l.f. in length with sizes from 24" to 120" in diameter being estimated. Estimated costs appear reasonable based on review of available bid tabs.

Bridge costs were checked with the DOT/PF bridge design section in Juneau and also appear to be reasonable estimates.

Costs not included in the original base line cost estimates by R & M consultants were additional costs for processing surfacing material, mobilization and de-mobilization costs, royalties on borrow material, engineering and contingencies. I have attached sheets summarizing the estimated costs for all the proposed routes. The preferred route estimated costs prepared by Cominco appear to be reasonable estimated roadway construction costs.

V. Comments and Conclusions

Methodology utilized for preliminary route selection and cost estimates appear to be reasonable and consistent with other state preliminary route selection efforts. The data presented by Cominco is based on very limited field efforts. It would be expected that substantial refinement would be made to the selected alignment and design assumptions after centerline drilling, material site exploration and evaluation and other design level field work is completed.

MEMORANDUM State of Alaska

TO: Robert Venusti
Deputy Director
Design and Construction

DATE: November 22, 1983

FILE NO:

TELEPHONE NO: 452-1911

FROM: Ronald E. Olmstead, P.E.
Assistant Construction Chief
Aviation Design and Construction

SUBJECT: Red Dog Mine Project

B. Review of Cominco's Port Design and Cost Estimates

At your request, I have reviewed preliminary conceptual engineering data and cost estimates furnished by Cominco Alaska, Inc. for proposed port facilities north of Kotzebue. Data reviewed included the following:

REPORT	AUTHOR
Preliminary EIS Red Dog Mining Site U.S.A.	EPA Region 10
Engineering Report on the Red Dog Project Vol. 1 & Vol. 2	Cominco Engineering Services
Engineering Estimate for the Red Dog Project Vol. 1 & Vol. 2	Cominco Engineering Services

The proposed recommended port facility for the Red Dog Mine is composed of 3 major component parts:

1. Deep Water Dock Facility (off shore)
2. Shallow Water Dock (on shore)
3. Concentrate Storage Facility at Mile 2.5 (Roadway Borrow Site)

My review consisted primarily of listing major items/quantities taken from the Cominco Alaska, Inc. reports and "backing into" the engineers estimate as independently as I could to confirm the estimated costs. My comments for each major division are as follows:

I. SITE DEVELOPMENT

Cost figures utilized for the port site development are the same as those utilized for the roadway portion of the project. Using Cominco's estimated quantities of 63,500 c.y. of fill for the pad on shore and a 7 foot fill height works out to approximately a 5.5 acre site.

02-001A(Rev. 10/79)

It was assumed by Cominco that the concentrate storage site at 2.5 mile would be graded during borrow operations from construction of the roadway.

II. BUILDINGS

Estimated costs for the concentrate storage building were taken from the 1983 Means estimating guide and projected for Anchorage, then the remote siting as shown on the attached sheets. The median unit price given was utilized. The smaller buildings were estimated at $250.00 s.f. which may be slightly high but are currently being utilized by our staff, for estimating purposes

III. SHALLOW WATER DOCK

The Means estimating guide was utilized for the sheet piling. The remaining estimated costs were judgement calls.

IV. CONCENTRATE HANDLING (SHORE BASED)

Equipment costs were obtained from N.C. Machinery, FOB the factory, with exception of the lightering barge, and loading equipment which were estimated, along with miscellaneous costs shown.

V. DEEP WATER DOCK

Per ton costs for modification of a used tanker were obtained from Todd Shipyards in Seattle. I was unable to obtain a figure for a used tanker, however a review of costs supplied for new steel modifications make the tanker costs estimated, seem not unreasonable. The remaining costs were estimated by judgement.

VI. CONCENTRATE HANDLING (DEEP WATER DOCK)

Equipment costs were obtained from N.C. Machinery, FOB the factory. The remaining costs were estimated.

VII. SUPPLIES HANDLING EQUIPMENT

Some equipment costs were obtained from N.C. Machinery, others were estimated. The fuel pipeline costs were taken from in house bid tabs from Galena. The pipeline consists of two lines, one nestled inside the other.

VIII. SERVICES

The estimated costs for generator sets were obtained from N.C. Machinery. It was estimated that the cost of the units in place and operating would be approximately twice the costs of the bare bones units at the factory.

IX. ACCOMODATIONS

It was assumed that the construction camp utilized during construction of the road would be utilized, thus some costs were allotted to refurbish it, by Cominco.

X. COMMENTS AND CONCLUSIONS

Estimated costs for the proposed scheme appear reasonable. They are somewhat less than those proposed for the proposed facility at Port Blossom. Port Blossom costs were estimated at approximately $34,861,000 for Phase I and $51,458,000 for Phase II for a total of $86,319,000. In addition, facilites on shore were estimated at $14,932,000. Concepts between the two are substantially different, with Port Blossum having a structural dock to deep water vs. an island with lightering required. Depending on the states involvement, it is recommended that thorough conceptual review be performed. Other items that may need additional consideration depending on overall use of the facility are:

1. Air Port Facilities
2. CFR Vehicles/Facilities
3. Land Requirements
4. Storage Facilities
5. Security

C. Alaskan Extractive Resource Projects

Lost River Mine: The U.S. Bureau of Mines estimates the size of the Lost River flourspar-tin deposit near the community of Lost River on the Seward Peninsula, to be in excess of 10 million tons. The current market value per ton of tin ore is $9,660. The mine has the potential of exporting 304,000 tons of tin, flourite, and tungsten annually. Transportation infrastructure required to mine development is a 60 mile extension of the Nome-Teller Road that will tie into the proposed Nome port for exporting the ore out of the region.

Slate Creek Asbestos: Asbestos reserves at Slate Creek are believed to range from 50 to 100 million tons. Doyon Corporation is actively pursuing development of this deposit and have estimated that the most likely level of production would be 150,000 tons per year. The current market value per ton of asbestos is $600. Transportation requirements for development of a mine is a 43 mile road to connect to the Taylor Highway near Chicken.

Delta Belt: Large high grade copper deposits have been located near the Robertson River, southeast of Delta Junction. Anaconda Copper, Resource Associates of Alaska and Cook Inlet Native Corporation have done exploratory drilling. Production estimates vary from 250,000 to 1,000,000 tons annually with an estimated project life of 50 years. The current market value per ton of copper is $482. A 90 mile extension of the Alaska Railroad would provide access to the copper deposits as well as providing service to the Delta Agriculture Project.

Dry Creek Deposit: Dry Creek has been identified as being a large lead deposit with lesser amounts of copper, zinc, silver and gold. Production potential is estimated to be approximately 68,000 tons of lead ore annually, which would provide an annual revenue of approximately $11 million. Widening the existing 21 mile road to 18 feet and a 15 mile extension of the road would provide adequate access to the deposit.

Lignite-Kantishna: The Kantishna antimony deposit has an estimated production potential of 33,000 tons per year. In addition, 1981 production of placer gold deposits was 3,000 oz. The estimated annual revenue resulting from development of the antimony deposits is $12.5 million. Access to the mine area would consist of a 75 mile road from the Parks Highway near Lignite. It has been proposed that this access road could also serve as an alternative route for Denali National Park visitors.

Bonanza Creek: Tungsten deposits of unknown quality and quantity at Bonanza Creek are owned by Doyon Ltd. Based on the limited information, it is assumed that yearly concentrate production could be 6,540 tons, with an estimated annual revenue of $1.3 million. Construction of a 24 mile gravel road from the Dalton Highway would provide access to the deposit.

Ambler Mining District: There are two major copper mine areas that have been identified in the Ambler Mining District. The Kennecott Area consists of two large deposits, the Arctic Mine with deposits of approximately 37 million tons and the Ruby Mine with deposits of approximately 4 million tons. The Anaconda Area consists of two deposits, the Sun Mine with deposits of approximately 25 million tons and the Smucker Mine with deposits of approximately 10 million tons. Bear Creek Mining Company has estimated that the Arctic Mine alone has the capability of producing 400-500,000 tons per year with an estimated mine life of 20 years. The best estimate of the value of the known resources in the ground is $18 billion. Long-term jobs, as a result of development, are estimated to be 1,350 by the year 2000 and 2900 in the post 2000 time frame.

In addition to the copper deposits, NANA Development Corporation currently has a jade mine in operation which has a limited production rate because of the lack of an adequate transportation system. Several alternative access routes have been examined for both rail and road. In addition to the necessary road or rail construction, a port on the

coast would be required in either the Krusenstern area or along the coast of the Seward Peninsula.

Chandalar Mining District: Extensive gold and silver deposits are present in the Chandalar Mining District; 100 placer lode claims, 2 operating mines and one ore processing mill currently exist in this area. Estimated gold production of known deposits is 3,000 oz. per year, with potential annual revenues of $1.2 million. Construction of a 65 mile road would provide access to supplement the existing 4,500 foot runway.

Chicago Creek Coal: Coal in this area is known at four locations. These include the Chicago Creek Mine, Kugruk (Wallin) Mine, Superior Mine, and an 1.5 million tons of fairly low quality coal. Coal development at site has been considered as a means of reducing heating costs in the villages of Kotzebue, Buckland, Deering, and the mining and reindeer herding activities at Candle. The cost of heating by coal would equate to a $.51 per gallon fuel oil price. The current price per gallon of fuel oil (in the NANA Region) is $2.40. Therefore, development of the resources at Chicago Creek is viewed as being economically justified. The transportation infrastructure required is a 170 mile road from Chicago Creek to Kotzebue. This road would also facilitate access to several other mineral resources that are located in close proximity to the route (uranium, placer gold, lead, zinc, silver, molybdenum).

Pt. Lay-Cape Lisburne Coal: There are several occurrences of coal deposits throughout the northwestern section of the State. On-shore sources for the Cape Beaufort area, 55 miles south of Pt. Lay, are calculated to be 35 million tons of inferred resources. Within a 50 mile radius of Pt. Lay, there are several deposits that appear to be of the best quality. Total indicated resources are 236 million tons and 2,769 million tons of inferred resources. The Corwin-Thetis mines, 80 miles from Pt. Lay, have indicated deposits of 49 million tons and 848 million tons of inferred deposits.

The Arctic Slope Regional Corporation has indicated that a mine in the Cape Beaufort Area could produce approximately 100,000 to 200,000 tons per year and be in production in 3 years. The use of coal is forecasted to reduced heating costs in Northwest Alaska by about $10 million per year. The Alaska Power Authority has determined that the quality and quantity of the coal resources make it economically feasible to barge coal as far south as Unalakleet. To facilitate development of the resources, the preferred transportation needs would be the development of a resource export and coal loading port capable of handling 500 ton coal barges. In addition, a road transportation network to link various coal deposit sites to a common corridor to the coast should be considered.

Lik Deposits: The Lik lead and zinc deposits are located 12 miles north of Red Dog and owned by GCO Minerals. If a transportation corridor was established, it would take 6 years to bring a mine into production. Estimated annual production would be 150,000 tons. Transportation infrastructure requirements are a road to the coast and a port facility to deliver the ore to market. The most likely scenario is linkage to the access developments at Red Dog.

Twin Mountain: There are significant tungsten deposits located in the Twin Mountain Area. additionally, several placer gold mines are in operation at Van Curlers Bar. Houston Oil and Minerals, Inc. has been conducting exploration work in the area and, to date, ore grades and tonnages are unavailable. The current market value per ton of tungsten is $200. Access to the Twin Mountain area would require construction of a 62 mile extension of the Chena Hot Springs road.

ALASKAN EXTRACTIVE RESOURCE PROJECTS

NAME	RESOURCE TYPE	LOCATION	POSSIBLE TIME	COST ESTIMATE
Lost River Mine Extension of the Nome-Teller Road from Teller-Wales (60 miles), via Brevig Mission, Lost River Mine and Tin City	Flourspar, Tin	Seward Peninsula	* 2000	$30.9 million
Slate Creek Asbestos Development Extension of the Taylor Highway near Chicken (43 miles)	Asbestos	Between Delta Junction and Eagle	1987	$33 million
Delta Belt Rail Extension Extension of the Alaska Railroad (90 miles)	Copper, Lead, Zinc	Southeast of Delta Junction near the Robertson River	1986	$643 million
Dry Creek Deposit 15 mile road extension	Lead, Copper, Zinc, Silver, Gold	35 miles east of Ferry (North of Healy)	2000	$9 million
Lignite-Kantishna 76 mile road construction	Antimony, Placer Gold	Adjacent to Denali Park	2000	$64 million
Bonanza Creek 24 mile road construction	Tungsten	200 miles northeast of Fairbanks	2000	$15 million

*Timeframe has not been forecasted. Year 2000 has been arbitrarily set.

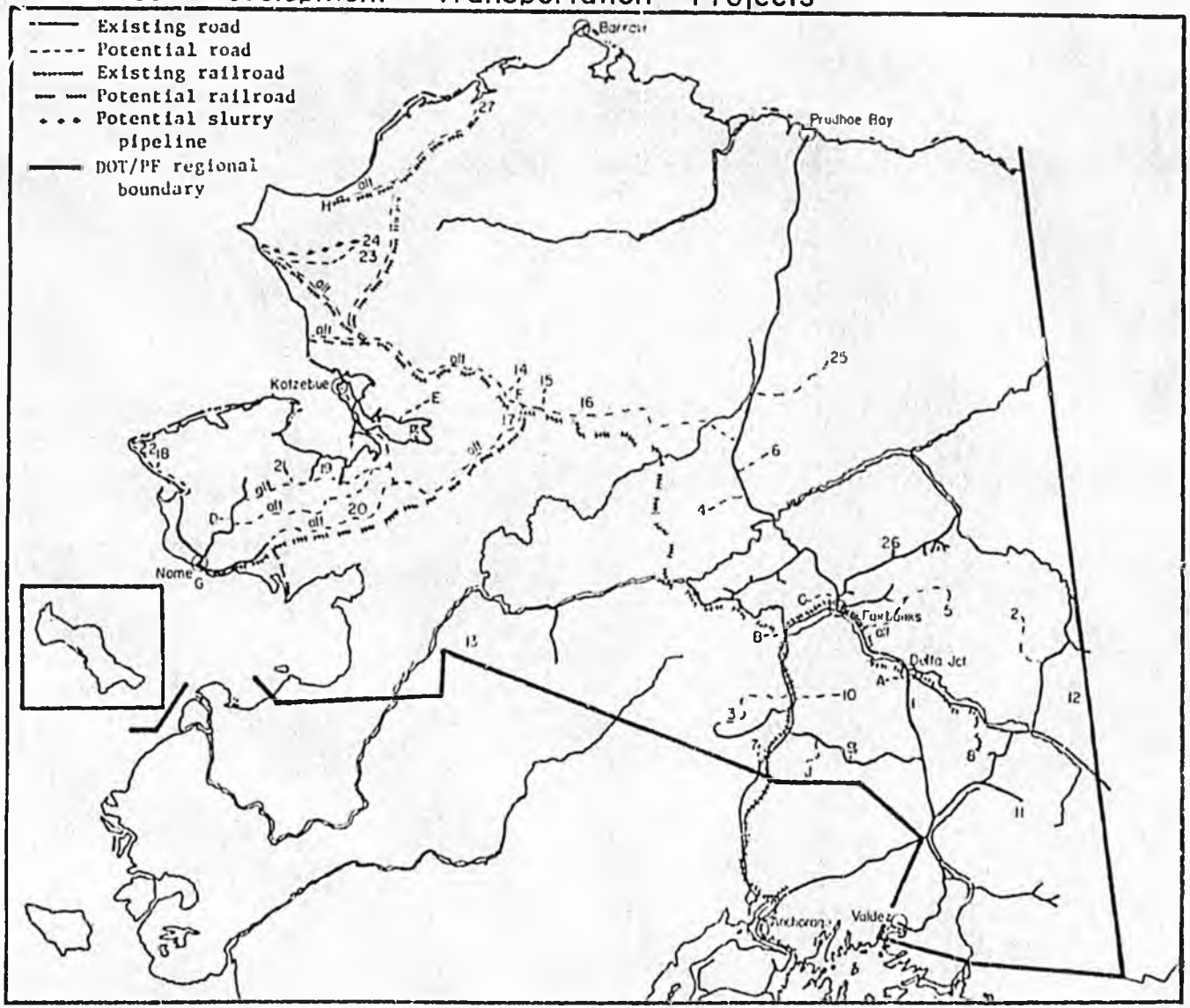
ALASKAN EXTRACTIVE RESOURCE PROJECTS

NAME	RESOURCE TYPE	LOCATION	POSSIBLE TIME	COST ESTIMATE
Ambler Mining District	Zinc, Copper, Silver, Gold, Jade, Lead	160 miles northeast of Kotzebue	2000	
I Haul Road System				
a) Ambler to Cape Krusenstern (225 miles)				Ia) $350 million
b) Ambler to Golovin Bay (322 miles)				Ib) $315 million
c) Ambler to Nome (434 miles)				Ic) $613 million
d) Ambler to Prudhoe Bay Haul Road (203 miles)				Id) $275 million
II Rail Transportation System				
a) Ambler to Nenana (390 miles)				IIa) $800 million
b) Ambler to Cape Krusenstern (225 miles)				IIb) $450 million
c) Ambler to Nome (434 miles)				IIc) $786 million
d) Ambler to Cape Darby (322 miles)				IId) $622 million
Dalton Highway to Chandalar Mining District	Gold, Siver	Coldfoot to Toblin Creek	2000	$39.7 million
65 mile road construction				

ALASKAN EXTRACTIVE RESOURCE PROJECTS

NAME	RESOURCE TYPE	LOCATION	POSSIBLE TIME	COST ESTIMATE
Kotzebue to Chicago Creek Road Construction (170 miles)	Coal	15 miles west of Candle	1990	$204.1 million
Pt. Lay-Cape Lisburne Coal Port Construction of a port to access several large deposits	Coal	Cape Beaufort area	2000	$100 million
Twin Mountain 62 mile extension of th ena Hot Springs Road	Tungsten		2000	$40 million
Sithylemenkat Road 39 mile road construction	Tin, Tungsten	170 miles northeast of Fairbanks	2000	$23 million

Resource Development Transportation Projects



POSSIBLE MINING SITES

1. Jarvis Creek
2. Slate Creek
3. Kantishna
4. Sithylemenkat
5. Twin Mountain
6. Bonanza Creek
7. Golden Zone
8. Delta Belt
9. Denali (Valdez Creek)
10. Dry Creek
11. Orange Hill
12. Tarus
13. Illinois Creek

Ambler District

14. Smucker
15. Arctic Camp
16. Picnic Creek
17. Bornite

Seward Peninsula

18. Lost River
19. Chicago Creek
20. Granite Mountain
21. Hannum Lode
22. Tin City

Noatak District

23. Red Dog
24. Lik

25. Chandalar District

Circle Mining District

26. Nome Creek Uranium

27. Pt. Lay-Cape Lisburne Area Coal

OTHER DEVELOPMENT

A. Delta Creek Ag & Forestry area
B. Nenana-Totchaket Ag & Forestry area
C. Goldstream Ag & Forestry area
D. Pilgrim Hot Springs Geothermal Development and Ag area
E. Stilivitchaq--Selawik Lake Ag & Forestry area
F. Ambler Ag area
G. Nome Port Development
H. Pt. Lay-Cape Lisburne Port Devl.
J. Susitna Hydro Access Roads

D. Qualification Matrix for State Transportation Projects

QUALIFICATION MATRIX with scoring feature
check highest category

ISSUE	HIGH ←				→ LOW
Type of major state benefit	Includes royalty payments	Includes taxes	Includes direct economic	Includes indirect economic	No benefit
State investment payback period for royalties/taxes	Less than 5 years	5 - 10 years	10 - 15 years	15 - 20 years	over 20 years
State investment payback period for economic benefits	Less than 5 years	5 - 10 years	10 - 15 years	15 - 20 years	over 20 years
Degree of state investment being considered	Less than 20% of transportation facility	20 - 40% of transportation facility	40 - 60% of transportation facility	60 - 80% of transportation facility	over 80% of transportation facility
Project viability as related to payments to third parties (royalties)	No payment to 3rd party	State requirement reduced by 0 - 30% if payment eliminated	State requirement reduced by 30 - 60% if payment eliminated	State requirement reduced by 60 - 99% if payment eliminated	No state requirement if payment to 3rd party reduced or eliminated
Transportation need other than resource development	Provides new highly needed service	Replaces existing inadequate service	Provides new convenient service	Replaces existing service with more convenient service	No effect
Area effected by facility	Provides full statewide service	Provides partial statewide service	Provides regional service	Provides local service only	Provides no service
Bonding authority to provide support (regional or municipal)	Yes, tolls/fees to be collected (revenue bonds)	Commited to create bonding authority	May create bonding authority	Not feasible to create bonding authority	Not willing to create bonding authority
Potential to support future resource development	Commitments already made	High potential	Some potential	Low potential	No potential
Facility open to public	Yes, no charge	Yes, but only for commerce	Yes, with tolls or fees	Yes, but only for commerce with tolls or fees	Not open to public
Ground work: EIS, permits, ROW	Yes, all permits etc. in hand no state work required	Commitment to obtain permits, no state work required	Asking for partial state involvement	All work must be done by state	No cooperation

RED DOG PROJECT: Relationship of the Jones Act

The Jones Act, established in 1920 as an amendment to the Shipping Act of 1916, restricts the shipment of American goods between U.S. ports to vessels built in the U.S. and operated by U.S. crewmembers.

Cominco/NANA intends to use foreign-built, owned and operated ships to transport the ore to destinations in Canada, Japan, and Europe. They have proposed using the port at Red Dog as a public port and backhauling fuel and cargo for the NANA region on their ships that have off-loaded the ore in Vancouver. However, goods destined for the NANA Region are now normally purchased in the Pacific Northwest, U.S.A. and the Jones Act would preclude routing of ships from the U.S. west coast ports to Vancouver. There are two options available to circumvent the shipping restrictions.

One alternative is for goods normally purchased in the Lower 48 for shipment out of Seattle to Northwest Alaska, to be purchased instead in Canada and shipped direct to the Red Dog port from Canadian ports. This option, therefore, creates an incentive for Alaskans to spend their money on Canadian goods rather than U.S. goods. The goods may actually be cheaper in Canada. In fact, Cominco's evaluation of the use of the Red Dog port as a regional port indicates that the transportation costs of fuel purchased and shipped from Vancouver are $30 cheaper per ton than fuel purchased and shipped from Seattle. However, there is a potential political issue regarding the expenditures of Alaskan dollars in a foreign country, for goods readily available in the U.S.

The second alternative is to make use of a provision of the Jones Act (known as the Third Proviso), which allows for intermodal transporting of American goods into foreign countries. This option would allow for rail shipments from the U.S. to Vancouver where the goods would be transferred onto the Cominco ships and backhauled to

the Red Dog port. There currently is a bill in Congress that will eliminate the Third Proviso which would, therefore, eliminate this alternative.

Another shipping aspect that relates to the Red Dog project is Senate Bill 1624, Cargo Preference Legislation. This bill is currently being discussed in Congress and is backed by Senator Stevens. SB 1624 proposed to require that 50% of all U.S. bulk exports be transported on U.S. flag carriers. The State of Alaska DOT&PF has expressed to Senator Stevens their opposition to the cargo preference requirements. DOT&PF contends that the high costs of using U.S. flag carriers would severely impact potential exports and place Alaska at a competitive disadvantage relative to other Pacific Rim exporters.

If Senate Bill 1624 is enacted into law, Cominco/NANA would be required to ship their ore on U.S. flag carriers and the transportation costs of freight for both the Red Dog Project and NANA Regional goods that are backhauled on the ships serving the Red Dog Project, are forecasted to increase.

F. Synopses of Two Canadian Mining Projects with Joint Public / Private Sector Participation

Two resource development projects that evolved through joint public/private sector participation are summarized in this report:

1. Northeast Coal Development

2. Pine Point Mines Ltd.

Three companies, Societe Quebecois d' Exploration Miniere (SOQUEM), Elf Aquitane and the Potash Company of Saskatchewan (PCS), were also looked at. However, though they represent cases of investment by the public sector in mineral developments, the nature of this investment was viewed as being far removed from the Red Dog proposal and, therefore, not applicable to the purpose of this report.

1. NORTHEAST COAL DEVELOPMENT

Located at the Peace River coal field in British Columbia. The size of the northeast coal deposit is estimated to be 8 billion tons. The center of the deposit is located approximately 78 miles southwest of Dawson Creek (the nearest highway and railway lines) and 400 miles from the Port of Vancouver.

In 1975, the Provincial Government of British Columbia, which owned substantial coal reserves, decided that development of these resources was the economic priority of the government. Approximately $15 million was spent by the government on 77 studies relating to the mine and its potential impact.

Three main parties have participated and have an interest in the development of the mine. They are the Provincial Government who owns the resources; the Federal Government which has an interest in the regional economic policy, is owner of the national railway (CN Rail), has jurisdiction over ports and their development, and has

constitutional responsibility for international trade; and private industry that has expertise in mine development.

In June 1980, the Provincial Government informed major coal producers that the Province would develop the rail and highway systems, organize a town at the site, provide power transmission facilities, and negotiate with the Federal Government for construction of a terminal facility if the producers would develop the mine. No tax or royalty concessions were offered, freight rates would be commercially negotiated with a special rate prevailing until 1989, and complex cost recovery techniques would be developed to meet a sales contract and then the necessary infrastructure would be put in place.

In January 1981, two companies, Quintette Coal Ltd. and Teck Corporation, negotiated contracts with the Japanese steel industry for an annual supply of 7.7 million tons of coal. The price was negotiated at $76.00 and $76.50 per ton, plus escalation, with deliveries commencing in December, 1983.

The development responsibilities among the three parties consisted of the following tasks:

Private Industry

1. Quintette Coal Ltd. would develop an open pit coal mine capable of producing 6.3 million tons per year.

2. Teck Corporation would reestablish operations at their Bullmoose Mine to be capable of shipping 1.7 million tons per year.

Provincial Government

1. The Highway Department would build a new 57 mile road and upgrade other area roads.

2. The Provincial railroad would build 80 miles of new track with two major tunnels (3.7 miles and 5.5 miles).

3. A new substation for electrical power would be constructed and 79 miles of new power lines installed.

4. The Province would establish a new community near the mine site to accommodate a population of 6,000 people.

Federal Government

1. The federally owned railway would upgrade 677 miles of its system.

Federal Government and Private Industry

1. A new coal terminal would be constructed, funded jointly by the Federal Government and private industry. The facility would be capable of handling 12 million tons of coal per year and berthing vessels up to 250,000 dwt.

Total capital expenditures for the project are estimated to be $3 billion. Approximately 10,000 permanent jobs have been created. The estimated present value of taxes and other government revenues resulting from this project is $1.7 billion over a 20 year project life. These revenues, which are shared by the Provincial and Federal Governments, consist of income taxes, mining taxes and coal royalties paid by the mining companies, as well as sales taxes on goods and services and the personal income taxes paid by construction and operating employees.

2. PINE POINT MINES

The Pine Point lead and ore deposit is located near the Great Slave Lake in the Mackenzie District of the Northwest Territory, Canada. Cominco Ltd. began staking the property in 1928 and in 1951 Pine Point

Mines Ltd. was formed with Cominco owning a 78% interest. In 1955, the estimate of the size of the deposit was 5 million tons or ore averaging 4% lead and 7% zinc. At that time, the company determined that it was impractical to develop a mine until adequate transportation facilities were established.

In 1955, The Deputy Minister of Northern Affairs advocated the construction of a railway, 438 miles long, from Grimshaw, Alberta, to the Great Slave Lake as a project of national interest and to serve the Pine Point Mine. In 1961 an agreement was reached between the Federal Government, Pine Point Mines Ltd., and the Canadian National Railway Company (CNRC). The agreement called for the Federal Government to construct the railway, the Northern Canada Power Commission to build a hyro plant for supplying power to the mining area, and for Pine Point Mines Ltd. to bring the mine into production. The mining company guaranteed shipments of 215,000 tons per year for 10 years to CNRC, and the cost of the hydro plant construction was underwritten by Pine Point Mines Ltd.

Mining operations began in 1963 with a planned production capacity of 5,000 tons/day. The railroad reached Pine Point in 1964 and ore shipments began in 1965. Additional mineral leases were acquired and in 1968 the company increased its concentrating capacity to 10,000 tons per day.

Following are the key points outlined in the agreement between the Federal Government, CNRC, Pine Point Mines, and Cominco:

1. CNRC agreed to complete construction of the 438 mile rail line by December 31, 1966.

2. Pine Point Mines Ltd. agreed to ship exclusively on the rail for 10 years at least 215,000 short tons per year at a rate of $7.75 per short ton (subject to any increase or decrease in rates). If more than 215,000 short tons were shipped in a

particular year, CNRC will credit the surplus to the mining company, and vice versa.

3. All rates that apply to the Point Point Mines Ltd. shall apply evenly to any new operations established along the rail route.

4. No mineral rights will be transferred to CNRC for lands leased by Cominco that are crossed by the railway.

5. All income taxes paid by Pine Point Mines Ltd. are subject to the "Income Tax Act" and all royalties paid to the government are established according to the Canada Mining Regulations.

As a result of the payment schedule established in the agreement, the capital costs for the new railroad line ($79 million) were paid off after 7 years of the mines' operation. Power costs were subject to an agreed surcharge. Public investment in the hydroelectric power plant has long since been amortized. The current production rate is 11,000 tons per day and the mine operation and production is expected to continue for at least another 10 years. There are a total of 640 employees at Pine Point Mines with Pine Point community members having the second highest per capita income rate in the Northwest Territory.

VIII. Report of the Division on Land and Water Management Department of Natural Resources

A. Summary of DLWM Involvement in Red Dog Project

B. Outline of Topics to be Considered in a Right-of-Way Agreement

C. Commissioner's Response to Cominco and GCO Minerals Right-of-Way Applications

MEMORANDUM State of Alaska

TO: John Sims, Director
Office of Mirerals Development
Department of Commerce and
Economic Development

DATE: February 23, 1984

FILE NO:

TELEPHONE NO: 465-2400

FROM: Esther C. Wunnicke
Commissioner
Department of Natural Resources

SUBJECT: Red Dog Project

I am responding to your recent request for comments from the Department of Natural Resources on the proposed Red Dog project. I am strongly supportive of the proposed development and offer the Department's resources in your review.

To encourage optimum eventual development in the area, all landowners and users must cooperate in providing for multiple industrial use of rights-of-way, development areas, and tidelands. We have proposed a reciprocal use agreement that would cover tidelands, the port and uplands, rights-of-way, material uses, and other matters of public concern. The attached memoranda to you from the Northcentral District staff of the Division of Land and Water Management indicate our concerns about the right-of-way and other development areas.

I strongly urge that affected landowners and users be brought together soon to discuss reciprocal use. The Department will be prepared for preliminary discussions within two weeks and has so informed NANA. We have been assisted by the Attorney General's Office in drafting a reciprocal use agreement.

In the executive summary I have noted a few points that I would recommend rewording. I am sending my suggestions under separate cover.

Thank you for requesting the Department's involvement. My staff and I are available if you have any further questions.

Attachments

02-001A (Rev. 10/79)

MEMORANDUM State of Alaska

DEPARTMENT OF NATURAL RESOURCES - DIVISION OF LAND AND WATER MANAGEMENT
NORTHCENTRAL DISTRICT - 4420 AIRPORT WAY, FAIRBANKS, ALASKA 99701

TO: John Sims
Director, Office of Minerals Dev.
Dept. of Commerce & Economic Dev.

DATE: November 18, 1983

FILE NO:

THRU: Jerry L. Brossia
District Manager

TELEPHONE NO: 479-2243

FROM: Michael E. Vediner
Natural Resource Officer
Classification & Coordination

SUBJECT: Summary of DLWM Involvement in Red Dog Project

Initial involvement of this division in the Red Dog project dates to August, 1982 with receipt of a ROW application from GCO Minerals to develop their Lik deposit. In January, 1983 Cominco applied for a different ROW to develop Red Dog.

In response to this potential for multiple facilities and in support of CZM mandates Commissioner Wunnicke issued the following general policy statements to both GCO and Cominco:

1. The State of Alaska will authorize the development of a single transportation corridor. The route will be public and available to multiple use by other future resource developments in the region. As a public route, reciprocal right-of-way agreements must be acquired wherever private or corporate ownership is encountered.

2. Tideland (and associated upland) port development will also be available to support multiple users such as oil and gas, coal exploration, or support services development.

3. Local concerns, particularly subsistence use must be accommodated to the maximum extent possible.

4. One EIS should be produced that considers all potential options. To this end, the research data collected by both companies should be available to all participating agencies.

For the project proposed by Cominco the division anticipates issuance of tideland lease(s), tideland permit(s), right-of-way permit, material sales, water appropriation certificates, dam safety permits, and possibly, instream flow reservation. To date only the right-of-way application has been received and at the request of the other state reviewing agencies further action is awaiting completion of the EIS.

We will be working closely with OMB on permit coordination regarding the CZM consistency determination. OMB has indicated that a single determination to cover all permits may be possible.

02-001A(Rev. 10/79)

Several issues have been identified by this division that through the EIS process remain unresolved, particularly with respect to your task force objectives and possible direct state involvement. These are summarized below.

1. Land ownership status was not considered in assessing the regional, multiple use perspective, during the EIS process. As a result the preferred (southern) alternative crosses a variety of land owners and terminates at tidewater on native corporate land. Since the applicant is in partnership with the native corporation they obviously have no objections.

   From the Department of Natural Resources' stated objective of one, multiple use, public road however the ownership status is of greater concern. Certainly we can insist on reciprocal rights-of-way for the primary road but upland facility land needs for possible future developments are not readily obvious. By comparison the northern (GCO) alternative crosses and terminates on public owned land. In fact the northern port site location is within the only stretch of accessible, unencumbered, public land along the northwest coast.

   If the state builds the road we may well consider a route that traverses a national monument and ends on private land as a greater barrier to public, multiple use than the number of bridge crossings, particularly since the environmental concerns of river crossings can be mitigated by appropriate construction techniques.

2. Both Cominco and GCO have investigated the preliminary engineering and costs associated with road construction. Their costs per mile vary from $1.5M to $800K, respectively, even though both roads are designed to support 222,000 pound loads. These cost differences are significant when considering state funded construction. The shorter southern route costs less to build for any given set of standards. Yet in absolute costs GCO could build their northern route for less than Cominco could build their southern route. Two questions that arise are: would state construction follow state highway standards and are the cost factors more important than land availability?

3. Design of port facilities should emphasize availability to other users. Items such as location of artifical islands and upland facilities should allow easy access to multiple users.