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3532 HRES COMINCO RED DOG PROJECT--OVERVIEW

1408

5) Reserves at several major zinc mines will be exhausted over the medium term, and as most existing zinc mines are underground producers, actual costs will increase as mining depths increase .

6) Unlike the copper industry, the Free World's primary zinc production is largely in private sector hands, eliminating the danger that government operated mines, for the sake of generating foreign exchange, will overproduce and undermine metal prices.

7) It is possible that the socialist countries and China in particular could become significant zinc importers.

8) In addition to increased demand due to an expanding world economy, the potential exists for further increases in zinc consumption as the use of protective zinc coatings becomes more widespread, substitution of zinc for silver or copper in coinage becomes common, and new applications, such as thermoforming zinc alloys, are developed.

A base level zinc price is forecast at 55¢ per pound with probable and high levels forecast at 60¢ and 65¢ respectively.

Lead

Lead is the fifth most widely used industrial metal behind zinc. The two major uses are in automotive batteries and as a gasoline additive.

Consumption as a gasoline additive has declined in North America and Europe due to lead emission restrictions. However demand for lead additives in developing nations has not decreased at present and it is not clear whether or when such restrictions will begin to be imposed.

The trend towards smaller, lighter automobiles, and a concurrent reduction in needed "cranking" power has reduced the amount of lead in the average automobile battery from 30 pounds in the 1970's to about 20 pounds at present. Eighty percent of all automotive batteries sold are for replacement, and therefore lead battery demand is more a function of total number of vehicles in use than annual new car pr uc-tion.

Long term demand for lead, as with zinc, will depend upon the world economy and the economic growth of developing nations. The U.S. Bureau of Mines estimates a probable world growth of 2.8%. However other sources feel it may be as low as 1%.

The present price of 25¢ per pound is unrealistically low, possibly being lower than the cost of even secondary production. This is the result of record inventories of lead stocks. A realistic minimum base level is the price at which secondary production (recycled lead) is viable. That price is felt to be 30¢ per pound. A 35¢ price is felt to be a probable 20 year price average, with a 40¢ per pound high average.

Silver

Silver is an industrial metal used in photographic film and processing and in electronic and electrical components and solders. It is also an investment precious metal and as a "poor man's" gold, its price is influenced by gold prices. As an industrial metal there is little likelihood of significant substitution and with an expanding world economy and rising standard of living, consumption of industrial silver will increase. The U. S. Bureau of Mines estimates an annual growth of 2.5%.

A base price level of $10 is realistic, with a probable average 20 year price of $18, and a high of $25.

Summary

In general these price forecasts are conservative, in that they are predicated on a moderate growth in the world's economy. Stability of world energy prices, resolution of debt crises and general political stability could initiate a period of prosperity for developing nations and create a much higher growth rate for the demand of these metals.

D. Zinc Resources of Alaska and Northwestern Canada

Zinc mineralization is found almost ubiquitously in association with lead and silver. Throughout extensive areas of Alaska and Northwest Canada zinc-lead-silver mineralization occurs in two broad geological associations

i) as disseminated and massive sulfide in shales and other fine grained sediments;
ii) as massive sulfide in volcanic sequences which accumulated in submarine depositional environments.

1. Alaska

Red Dog, though unique in its combined attributes of size and high grade, is but one of a large number of deposits which contain zinc as the main metal or more usually as a significant co-product. Because of the extensive distribution of favorable host rocks, future exploration is certain to discover new major deposits.

Red Dog with its presently defined reserve of 85 million tons grading 22.1% combined zinc-lead and 2.4 oz. silver per ton is the largest and best known deposit of its type in an arcuate trend which could become known as the Noatak Zinc Belt. Within this belt, which extends for several tens of miles, at least 15 significant prospects are known. There is a high probability that this region could become one of the world's major supply sources of zinc, with lead and silver as major co-products.

The Lik and Su prospects appear to be segments of a contiguous deposit located some ten miles from Red Dog. GCO Minerals, owners of Lik, has released a reserve estimate of 25 million tons of 8.8% zinc 3.0% lead and 1.2 oz/ton of silver. This reserve, which is based upon 75 ore sections from 103 diamond drill holes, appears to be well defined.

The orebody itself is open along strike to the north, and southwards it extends into a Cominco owned claim block where it forms the Su deposit for which no tonnage or grade figures have been released. A developed infrastructure for Red Dog should, in time, favorably influence the development schedule for Lik and possibly other reserves in the area. Although GCO Minerals has proposed a northerly access road to the coast as a component of a possible development scenario for Lik, no firm development commitments have been made.

The regional significance of metal associations within a certain rock assemblage is emphasized by the fact that some 90 miles from the heart of the Noatak region, the Drenchwater deposit occurs in similar sedimentary units. This discovery has not been intensively prospected as it was included within the National Petroleum Reserve - Alaska (NPRA) and is off limits for mineral entry. Sampling of surface exposures returned grades of 17.4% zinc 3.0% lead and 3.3 oz/ton silver - very similar tenors to those of Red Dog. However no reserve tonnage has been estimated. Still other impressive surface showings of mineralization have been included within the Noatak National Monument and are off limits to further exploration.

Zinc and lead are significant potential co-products of the Ambler Schist Belt which extends over a trend of more than 100 miles across the south flank of the Brooks Range, north of the broad Kobuk River Valley. Exploration over a period of more than 20 years has identified a large tonnage of polymetallic ore contained in at least four major prospects and the potential for significantly more ore exists in many known but not intensively prospected occurrences. Given the large established reserve base, there is little to encourage further high-cost exploration until some progress is made towards solving access and transportation problems. Although copper appears to be the major metal found in this belt, zinc and lead grades are significant and concentrates containing both metals would be produced from all potential

operations in the area with the possible exception of the Bornite deposit which is geologically different.

Substantial production of zinc and lead concentrates from the Ambler District in the future (beyond 1995) would fall far short of the projected production of concentrates from Red Dog.

Another newly discovered base metal trend in Alaska extends across the north flank of the Alaska Range from the Bonnifield area, south of Fairbanks to Tok-Big Delta region in East Central Alaska. Exploration work has been continuous since 1978 to evaluate the potential of the extensive belt within which dozens of individual massive sulfide occurrences have been located. The company most actively involved in evaluating this potentially important belt is Resource Associates of Alaska (RAA), a company within the NERCO Group. Potential tonnage and grade figures supplied by RAA are cited below.

Name	Re-serve*	%Cu	%Zn	%Pb	Oz/Ag	Oz/Au	Remarks
Delta System 1) Valley	1.0	.26	3.45	.46	0.7	0.018	Offset segments of one massive sulfide body with overall potential of +40 MT
2) DW	3.65	.93	1.74	1.15	0.72	0.012	
3) Middle	5.2	.46	3.34	1.36	1.49	0.038	
4) LP	1.2	.40	3.69	1.54	1.80	0.061	
DD South	1.60	1.09	5.66	2.27	2.03	0.061	Expectations are to double the reserve base
Dry Creek	1.2 MT	No specific grade figures released					Tenors believed to be significantly better than Delta

* Reserves in millions of tons

In Southeastern Alaska numerous mineral deposits containing zinc are known. However, with the exception of Greens Creek, no development plans for properties capable of producing zinc concentrates have been announced.

Greens Creek is expected to be the first major new metal mine into production in Alaska for many years, and it will produce silver, gold, zinc, lead and copper from an underground mining operation on Admiralty Island. The deposit has not been fully defined by exploration work to date and substantial additions to the reserve base are assured in the future. The last published ore reserve cites 4 million tons grading 13 oz/ton silver, .1 oz/ton gold, 7.5% zinc, 2.5% lead and 0.4% copper. Once in production at a planned milling rate of +800 tons per day, the mine will ship approximately 30,000 tons of lead concentrate and 48,000 tons of zinc concentrate annually. Though significant, these volumes are small compared with the planned production from Red Dog.

2. Northwestern Canada (Yukon, Northern British Columbia and Western NWT)

Excluded from consideration here are the producing properties such as Pine Point and Sullivan in which Cominco has a major interest.

The Yukon has two mining properties which have produced and shipped zinc and lead concentrates. United Keno Hill, which first and foremost is a silver mine, maintains a relatively small proven reserve base and is unlikely, given the geologic characteristics of the deposit, to greatly expand concentrate production. Cyprus Anvil, with its operations centered near the town of Faro, is a major producer of zinc and lead concentrates from a large open pit operation. Future plans may involve underground mining on at least one of the orebodies in Anvil Range.

The Selwyn Basin is rimmed by zinc-lead prospects which occur in rocks equivalent in age to those which host the mineralization in the Anvil Range. Undeveloped reserves in the Anvil District plus other major known deposits in the Selwyn Basin will likely form the next generation of major zinc-lead base metal properties which may be developed in the Yukon Territory between now and the year 2000. The following table lists the announced reserves and grades of major properties in Northwest Canada.

An eastward extension of the Alaska Railroad into the Yukon Territory could "capture" the large volume of mineral traffic which future mines, especially in the Selwyn Basin, are likely to generate. Concentrates would be transported through Alaska to a major bulk materials handling port situated in Cook Inlet. There would be more than enough feed from Interior Alaska and Canadian mines to justify the development of smelter-refinery facilities at tidewater utilizing clean state-of-the-art technology. Two advantages Alaska has which could make this industrial development possible are 1) the abundance of energy in Southcentral Alaska, available in the form of gas, coal, and if the Susitna Dams are built, hydroelectric power; and 2) tidewater access to major Pacific Rim markets. As the value of refined metal products is much greater than the value of the equivalent metal content of ore concentrates, the economic benefits of in-state processing of Canadian and Alaskan minerals far exceeds the benefits to be derived from exporting these resources in raw form.

E. Potential Alaskan Mineral Projects Requiring Public Sector Infrastructure

Given the extraordinary potential within Alaska for the discovery of major new mineral deposits, additional calls for infrastructure support will be made in the future. However some major discoveries will be made as a consequence of the intensification of exploration efforts along arterial transportation corridors constructed to serve the new generation of mining activity between now and 2000. This is an intangible economic benefit of transportation development. However these benefits are not considered in a financial analysis when the initial end user are required to guarantee total capital debt retirement. Without an appreciation of this factor, development of transportation to serve remote areas, such as the Ambler District, will be nearly impossible and public policy will continue to focus on the ability of the initial end-user to totally repay any public sector financing.

Mining projects in Alaska can be divided into two categories in relation to their transportation infrastructure needs.

1) Stand alone projects - Those projects which involve high value, low bulk commodities such as precious metals and those which are located close to a deep water port site which can be developed for exclusive use of the proposed mining operation as are Quartz Hill and Greens Creek.

2) Contingent projects - These are projects which like Red Dog will require significant transportation development.

The following tabulation lists known projects and estimates transportation infrastructure costs and the possible timing of projects.

Lik, Su and Other Deposits. The Lik deposit is located approximately 10 miles from Red Dog and in the same mineralized terrain. The Lik claims are held by GCO Minerals in association with Tenneco. Lik has been intensively prospected and a diamond drill program has identified a reserve of 25 million tons grading approximately 12% combined lead and zinc with 1.3 oz/ton silver. The ore grade is about half of the Red Dog average and mining conditions are such that a much greater ratio of waste stripping to ore would characterize the operation at Lik. These factors notwithstanding, Lik appears to be a very good deposit when compared, in terms of tonnage and grade, with potential lead-zinc properties in northwestern Canada and elsewhere.

The announced reserve for the Lik deposit does not take into account the open-ended character of the orebody or the unannounced reserves which have been proven by diamond drilling on the extension of the Lik orebody on claims held by Cominco. In the Cominco claim block the deposit is known as the Su and a substantial reserve is known to be present.

A number of other zinc occurrences have been staked in the region and it may be reasonable to refer to this area as the "Noatak Zinc Belt." Major additional discoveries will be made as the geology and the ore controls become better understood.

Greens Creek. The Greens Creek project is a "stand alone" mining development on Admiralty Island. No public sector involvement in transportation infrastructure components is foreseen. Impacts on public sector spending which relate to the workforce and their families being housed in Juneau focus upon community service needs - schooling, police protection, emergency services, etc. A power intertie would be a highly desirable component of the project if this satisfied basic beneficial economic parameters. The anticipated workforce to be directly employed at Green Creek is 315.

Quartz Hill. Similarly this is a "stand alone" project which will proceed largely independent of public sector involvement in infrastructure. The 850 employees and their families will be permanently housed in Ketchikan where community service costs will be incurred in the public sector. A power intertie to Quartz Hill is under consideration as part of a Southern S.E. Alaska integrated electric distribution grid. A formula for capital and operational costs of such a system could provide a total user benefit throughout the region.

Bering River Coal. This is a project aimed at developing a large, high quality coal resource for export to Korea. Three years of exploration work have been completed and the feasibility and cost parameters associated with overland transportation and port site alternatives are currently under examination. The project is a joint venture of the Bering Development Company involving Chugach Natives Incorporated, a Native regional corporation, and KADCO, a consortium of Korean companies including the large Hyundai Corporation.

A possible scenario may involve the of an underground mining operation capable of producing 2 million tons per year; an overland transportation system which would link the mine development by service road to Cordova and also provide for a delivery system, probably an overhead tramway, to the coast near Katalla; and the construction of a port-loading terminal possibly on Kanak Island. Transportation infrastructure costs associated with the development of an access-service road, overhead coal transportation tram, and a port loading facility capable of handling 3 million tons per year could approximate $180 million.

The Bering River Project could create a permanent employment base of more than 500 Cordova based jobs, and annual revenues from coal shipments on a 2 million tons per annum basis may approximate $120 million.

An interesting feature of the project is the captive market represented by the involved Korean business participation at all stages of the project.

Alaska Asbestos Project. This is a joint venture project involving the Doyon Native Corporation and GCO Minerals. Progress to bring the project on line will depend largely upon market interest and the extent to which any mining and milling operation will be able to satisfy stringent regulations.

Transportation infrastructure needs center on the construction of a 40 mile haul road from the mine site to join the Taylor Highway near Chicken, Alaska. From Chicken to its junction with the Alaska Highway some 60 miles of major upgrade of the Taylor Highway would be needed. Total cost is estimated to be $100 million. At a production rate of 150,000 tons per year of processed fiber grades, the mining project will generate approximately 500 permanent year round jobs and revenues of $90 million a year.

An eastwards extension of the Alaska Railroad could favorably influence the economics of this project.

Beluga Coal Terminal. Development of coal resources located on State leases and Cook Inlet Regional Corporation (CIRI) land within the Beluga Coalfield will require the construction of a large coal export loading facility near Granite Point on Cook Inlet. Efforts to develop the leases in the near term hinge upon market interest from the Pacific Rim, especially by Japan and Korea. Recent gluts in international markets of oil, natural gas and coal have detracted from the short term development potential for this enormous resource. Diamond Alaska and Placer Amax could supply major Pacific Rim markets with the cheapest delivered energy source in the future. Advantages this resource has over other coal suppliers are the favorable location of coalfield close to tidewater and shorter ocean freight distance.

The major leaseholders at Beluga have not approached the State for infrastructure assistance and in fact, when Beluga coal development potential was brighter, the major leaseholders expressed a willingness to construct and operate a port facility without any assistance. However, as Granite Point may be the only good port site on the west side of Cook Inlet, any port development should require provision for future expansion to handle bulk resources such as coal from Yentna and Nenana and metal concentrates and industrial minerals from the Interior.

A world scale deep water port facility in Cook Inlet would also act as a catalyst for the location of other facilities which may include in-state metals smelting and refining and agricultural product export handling capability.

A major mineral export facility for Beluga Coal having an initial capacity of 15 million tons per year would cost an estimated $250 million, exclusive of any additional rail spurs which could link to the existing railroad or access the Mobil leases in the Yentna area. Full development of the Beluga coal properties could create as many as 1,000 year round jobs.

Yentna Spur Line. A 50 mile long rail spur would be needed to deliver coal from the Yentna leases of Mobil into the feeder system and on to a Beluga coal terminal. The estimated cost of this spur could amount to $75-100 million.

Matanuska Spur Line. Future production of high quality coal from the Matanuska Coalfield would require rehabilitation of the former rail bed extending beyond Palmer to Sutton. The right-of-way is still owned by the Alaska Railroad. Cost of rehabilitation and engineering improvements to the line may total $25 million based upon $750,000 per mile for ballast, ties and track.

Depending upon the scale of operations a coal mine in the Matanuska field could support as many as 250 year round jobs.

Interior Rail Extension to Canadian Border. Serious justification for this long promoted rail extension may hinge upon potential mineral traffic. The line could capture bulk mineral traffic from a variety of potential mine properties, including Alaska Asbestos (150,000 tpy), Tok-Big Delta massive sulfide base metal district (125,000 tpy), Jarvis Creek coal (up to 500,000 tpy) and perhaps most importantly the next generation of major base metal mines to be developed in Yukon's Selwyn Basin which could have a potential for 1 million tpy. This latter opportunity would make good economic sense if a metal smelting and refining complex was built at Cook Inlet, a logical export gateway to expanding Pacific Rim markets. Agricultural resources from Interior Alaska would also be served by such a route.

The total aggregate of possible annual mineral tonnage could exceed 2 million tons well above the threshold required to justify a rail extension. Capital cost of extending the railroad eastward to the Canadian border would be high. The least tangible cost of railroad construction relates to the primary grading (cuttings, embankments, bridges, etc. across difficult terrains). Such costs could lie in the $1 to $2 million per mile range to which the known cost of ballasting, ties and rail amounting to $750,000 per mile needs to be added. A ballpark figure for total rail construction cost would lie somewhere between $1.75 and $2.75 million per mile. The proposed rail extension to the Canadian border, which is approximately 300 miles, could cost anywhere between $600 and $900 million.

Ambler Mining District. For more than two decades the issue of how best to access the mineral wealth of the Kobuk Valley, represented by the Bornite deposit and those of the Ambler Schist Belt characterized by Arctic, Smucker and Sun-Picnic Creek, has challenged the resolve and ingenuity of Alaskans anxious to see the development of

this mineral rich province. The issue was successively examined by the Federal Field Committee in its 1968 report, "Transportation and Economic Development in Alaska," the North Commission in the "Alaska Corridor Study (1970-1972)" and the Corps of Engineers in a study commissioned through the University of Alaska titled, "Northwest Alaska Port Study." More recently the issue has been reexamined by the DOT/PF commissioned "Western Arctic Alaska Transportation Study-1982" (WAATS), and a proprietary 1983 report for Bear Creek Mining Company by Parker Associates, Inc. titled "An Analysis of the Transportation of Ore Concentrates from the Ambler Mining District to Ports in North America and Japan."

The potential aggregate concentrate production from Arctic, Smucker, Sun and Bornite (980,000 tons per year according to an Alaska Miners Association study 1982) exceeds the threshold level of 400,000 tons per year which would favor rail over road haulage. The combined reserve base in known deposits exceeds 100 million tons; a figure which possibly represents a fraction of the gross potential of this mineral province. Future additions to the proven reserve of known deposits and new discoveries will add greatly to the resource value of the District. However until the deadlock over access is resolved and tangible progress made towards opening up the region, there is little or no incentive to add to the proven reserve base.

Besides the question of who would pay for a transportation system serving the Ambler District, there are other concerns which focus on:

1) the most cost effective and long term utilitarian system;
2) the best interests of the regional peoples whose traditions, values and customs differ from those of metropolitan Alaskans.

A recent report prepared by Parker Associates for Bear Creek Mining identifies a railroad from Ambler to a port site near Cape

Krusenstern in Western Alaska as the best choice for a projected 1 million tons per year load. This route seems to satisfy both concerns expressed above. In the WAATS study three transportation modes rail, haulroad and slurry pipeline were compared for four basic routes:

1) Interior Alaska Railbelt link
2) Cape Krusenstern
3) Cape Nome
4) Golovnin Bay

Using cost parameters generated by the WAATS report, a haul road system could cost from a low of $214 million (link to the Dalton Highway at Prospect Creek) to $502 million for a road and related facilities at Golovnin Bay. Projected freight volumes and the preferences of area residents appear to rule out the road in favor of a rail link. Rail costs were estimated by WAATS to be in the range $1037 million for the Krusenstern route up to $1896 million for the Cape Nome scenario; both cases include port construction costs. The Nenana route linking to the existing Railbelt would cost an estimated $1117 million. WAATS revealed that for a traffic volume in excess of 1.5 million tons per year, certainly achievable within a short time of the system going into operation, the Railbelt link through Nenana would have a cost per ton advantage over the other alternatives.

In the Parker Associates 1983 study for Bear Creek, a range of four alternative road and rail routes were. Three western routes for both road and rail provided links to Cape Krusenstern, Cape Darby and Cape Nome. Two other routes were considered; a road to Fairbanks and a railroad to Nenana.

Parker considered two scenarios - one of 400,000 tons per year, the other 1,000,000 tons per year in calculating total delivered costs of concentrates to Vancouver, B.C. Both appear to fall short of the true potential freight tonnage which could move over a regional system.

Major departures between the WAATS and Parker Associates findings focus on capital costs of rail construction. These differences are highlighted in the following tabulation.

		CAPITAL ESTIMATES ($ Millions) WAATS	PARKER
ROAD	Cape Krusenstern	398.7	261.4
	Cape Darby		360.0
	Golovnin Bay	502.3	
	Cape Nome	479.0	365.4
	Interior (Prospect C Fbks)	214.0	227.2
RAIL	Cape Krusenstern	1037.3	368.0
	Cape Darby		518.0
	Golovnin Bay	1589.1	
	Cape Nome	1896.1	653.5
	Interior (Nenana)	1117.0	668.8

Major capital cost disparities are most evident in comparing the capital estimates of rail construction. The lower costs cited by Parker are based on using a single construction heading over a longer time period as opposed to using multiple construction headings of several years (essentially reverting to construction practices used in the heyday of railroad development). Under the Parker approach a rail link to C. Krusenstern or Nenana would take 5 years to complete from mobilization. Other major differences relate to contingency and engineering overheads which total 40% in the WAATS and and 15% in the Parker analysis. On a per mile basis a comparison of the C. Krusenstern and Nenana rail alternatives is as follows:

	WAATS/Mile	Parker/Mile	Parker as a Rate % of WAATS
Ambler-C. Krusenstern	$3,427 M	$1,640 M	48%
Ambler-Nenana	$3,243 M	$1,715 M	53%

Some costs such as major and minor bridging estimates are not significantly different.

Using accelerated construction schedules and considering current cost figures estimated by the ARR, a realistic capital construction cost per mile appears to lie somewhere between the two extremes represented by WAATS and PARKER. The ARR states that once basic grading costs (which are the real intangibles) have been met, the current cost of laying ballast, ties and rail is $750,000 per mile.

The basic findings of the Parker Associates study which focuses specifically on Ambler are as follows:

1) Cape Krusenstern is cheapest route irrespective of mode up to 1 million tons per year.

2) Shipment to Southcentral Alaska through the existing Railbelt is the most expensive irrespective of mode, tonnage or capital amortization schedule (but does not consider a total system volume greater than 1 million tons per year).

3) As tonnages increase so do advantages of a railroad to Cape Nome or Cape Darby.

4) Capital amortization costs for a 1 million tons per year freight volume exceed working costs by more than 100%.

5) Concentrate storage costs, imposed by limited shipping windows for three of the options, do not significantly affect rankings between the four port site alternatives.

Very little consideration is given to the following:

i) the benefits the operation of a year round port site at Cook Inlet or Seward could provide.

ii) the benefits of operating one integrated rail system rather than two unconnected rail lines.

iii) the catalytic effect an integrated transportation system could have in stimulating the creation of a value-added industry along the Railbelt or at Cook Inlet.

The major recommendation contained in the Parker Associates study urges the creation of a Transportation Authority for Northwest Alaska with the prime purposes of:

1) acquiring a right-of-way to the Ambler District and

2) arranging financing for a rail link.

In making this recommendation it is acknowledged that eminent domain has not been tested for public acquisition of reconveyed native lands.

Western NPRA Coal. This is a really long term scenario which if it ever materializes might commence at some time well into the next century. Enormous reserves of good quality coal on the North Slope may eventually be mined on a large scale to help satisfy future domestic and foreign energy needs. Practicalities may require on site processing to liquid phase products which would be moved by pipeline, however bulk transportation of coal by rail may also be viable.

Before development of NPRA coal deposits commences, several major components of a transportation system could already be in place in the form of

1) a western arctic railway to Ambler from C. Krusenstern

or

a completed rail extension from Nenana to the Ambler District;

2) a world scale minerals export facility at Cook Inlet for year round shipments;

3) a seasonal port facility in the Western Arctic for summer shipment.

If these components were already in place, the capital cost of completing an integrated rail system to haul large volumes of coal might not be too intimidating. An estimate in 1983 dollars would be $1.5 billion for completion of the additional 500 to 625 miles of track.

Economic benefits which might flow from a rail link between the existing Railbelt and Northwest Alaska would include:

i) year round servicing of the Ambler Mining District

ii) year round servicing of the Noatak Zinc Belt

iii) year round servicing of coalfields on the NPRA and adjacent lands.

iv) overland servicing for oil and gas related activities

v) intangible benefits stemming from major new mineral discoveries proximal to the arterial transportation route.

Nome Regional Port. Future expansion of the Nome port beyond the planned initial phase may be justified by hardrock mining production from the Seward Peninsula and the servicing needs of offshore oil and gas activity in Norton Sound. Two sites which appear to offer the

best potential for mineral development are the Lost River and Kougarok Mountain tin deposits. At Lost River development plans for a major mining project which received considerable prominence in the early 1970's were shelved and the project status became mired in litigation. A large tonnage of ore containing tin, tungsten, fluorite and beryllium has been outlined by drilling and underground development on the property. The Lost River deposit represents the nation's largest known proven tin reserves and therefore assumes a significant strategic importance. Kougarok Mountain, some 40 miles to the east, is a more recent discovery which reportedly has major potential for tin and related mineralization.

Besides port expansion, an estimated 80 miles of new road construction would be needed to tie these properties into the Nome port through an extension of the existing Nome-Teller Road via Brevig Mission. DOT/PF estimated the cost of constructing a road to Lost River and Tin City at $30.9 million, however this figure would increase substantially in order to access Kougarok.

DOT/PF in an analysis of other projects which may need or request infrastructure assistance from the State drew attention to several potential mine sites in addition to those already described. Brief descriptions of these follow.

Dry Creek. This is a deposit undergoing active exploration of similar type to the Greens Creek orebody in S.E. Alaska. It is a polymetallic deposit containing precious metals and zinc, lead and copper. No tonnage or actual grade estimates have been announced. A possible development scenario would include plans to widen 21 miles of existing road, and build an extension for approximately 15 miles. The current access point of is through Ferry which is on the Alaska Railroad between Nenana and Healy.

Twin Mountain. Houston Oil and Minerals has for several years conducted exploration on a tungsten-rich district northeast of Fairbanks. Access to the area would require construction of a 62 mile extension of the Chena Hot Springs Road. No development schedule has been announced by the company. The proposed road extension would serve a broad spectrum of need including access to a potentially valuable mineral deposit, recreation and tourism as well as improve access for placer mining.

Bonanza Creek. This is another tungsten property on land owned by Doyon Ltd. No details relating to grade or tonnage have been released. Construction of a 24 mile gravel road would provide adequate access to the property.

Lignite Creek-Kantishna. This is another proposed road which would serve multiple user needs while providing access into a known mineral-rich district. Of prime importance is the access that would be provided to antimony deposits in Kantishna District. This district is also important for precious metals. The proposed access is from a point on the Parks Highway at Lignite Creek and would involve the construction of 75 miles of road which would link up with the seasonally congested Wonder Lake Road which serves Denali National Park. Opposition for such a road may be expected from the National Park Service and conservation groups although it would serve a broad public need.

Chandalar Mining District. Increased activity in the Chandalar area in recent years, with focus upon hardrock as well as placer deposits, highlights the excellent potential for expansion of mining activity. Current access during the mining season is by air using a 4500 foot runway. Construction of a 65 mile road from the Dalton Highway would provide access and enhance the prospect for more mining in the district.

Point-Lay Cape Lisbourne Coal Deposits. These coal fields would be included in the discussions of transportation to the North Slope coalfields. Major development is some years away and would be contingent upon an adequate transportation system. The Arctic Slope Regional Corporation has examined the possibility of mining 100,000-200,000 tons of coal from the Cape Beaufort area to serve local needs of communities within range of barge transport. Suggestions that this could also satisfy the energy needs of mining development in the Noatak region have not enjoyed support from Cominco officials who feel the capital costs for coal-fired generating equipment for their power requirements overshadow any savings to be realized by purchasing coal rather than fuel oil.

Another scenario for exploiting coal for local Northwest Alaska needs focuses on the Chicago Creek deposits on the north side of the Seward Peninsula. This development would require a 170 mile road to link the Chicago Creek mine site to Kotzebue, however the route would cross terrain with a high mineral potential for placer gold, uranium and a range of base metals.

There is little merit in further cataloging the hundreds of known mineral occurrences in Alaska and speculating on possible access needs. In remote regions of Alaska it is not the lack of minerals that is inhibiting industry, but the lack of transportation to allow development. Any expansion of Alaska's ground transportation system to serve major, economically viable, mining centers will enhance access to other known deposits as well as stimulate exploration for undiscovered ore deposits.

The development of transportation infrastructure is the key to the creation of an Alaskan mineral industry that will strengthen and diversify Alaska's economic base.

IV. Report of the Division of Finance and Economics: Department of Commerce and Economic Development

Red Dog Economic Analysis

Red Dog Mine Analysis

Division of Finance and Economics
Department of Commerce
and Economic Development

This report will identify the direct benefits to the State of Alaska that result from subsidization of the Red Dog Mine. The report will also identify the maximum level of expenditure the State can make on the project and still retain a positive rate of return.

The following analysis is based on a 60¢ per pound price of zinc, the most important metal produced from the mine in terms of the mine's economic viability. Sixty cents (60¢) per pound, in 1984 dollars, represents the "best estimate" in terms of expected real future zinc prices. This estimate was made by the Office of Mineral Development. A low estimate of 55¢ per pound and a high estimate of 65¢ per pound were also considered.

All quantifiable benefits are given in terms of their present value for purposes of consistency and in order to protect the confidential nature of the data supplied by Cominco Corporation. All present values are based on 30 years of mine operation regardless of when mine development begins. A 15% return on investment (ROI) was assumed to be the threshhold level needed to induce mine development and production. (This implies a capital recovery period of approximately 5 years.)

At a price level of 60¢ per pound for zinc and assuming mine development beginning in 1985, the present value to the State of taxes is $205.69 million. In addition to the tax estimate, "transfer payment" reductions have a present value of $41.61 million, for a total direct benefit of $246.85 million. The corresponding values to the State for zinc prices of 55¢ per pound and 65¢ per pound can be found in Table I.

Table I

Returns* to the State from
Red Dog Mine Development
(Millions of Dollars)

	Price of Zinc		
	55¢	60¢	65¢
Taxes	157.50	205.69	262.52
Transfers	41.16	41.16	41.16
Total	198.66	246.85	303.68

* All returns are given in terms of their present value.
Only direct returns to State Government are considered.

In order to get the requisite 15% return on investment with no State involvement the price must reach a real price of 63¢ per pound.

Based on the above assumptions, to obtain a 15% return on investment at a real price of 60¢ per pound for zinc, the State would have to subsidize the capital costs of Cominco by $40.1 million. For this $40.1 million investment the State will directly benefit by $246.85 million which is a positive benefit/cost ratio to the State of 6.2:1. The ratio is high because it appears the project would not be viable without State support. Under the foregoing assumptions, the minimum level of investment the State can make in the project and have any expectation

of immediate development is estimated to be $40.1 million. Higher involvement by the State through larger amounts of subsidy will increase expected rates of return to Cominco, and increase the likelihood of immediate project development. At a price of 60¢ per pound for zinc the State could subsidize the project up to $245.0 million and still have a benefit/cost ratio greater than 1, i.e., the State investment becomes increasingly marginal as it approaches $245 million.

The relationship between the return on investment and State subsidy is shown in Chart I and the relationship between State subsidy and benefit/cost is shown in Chart II.

CHART I

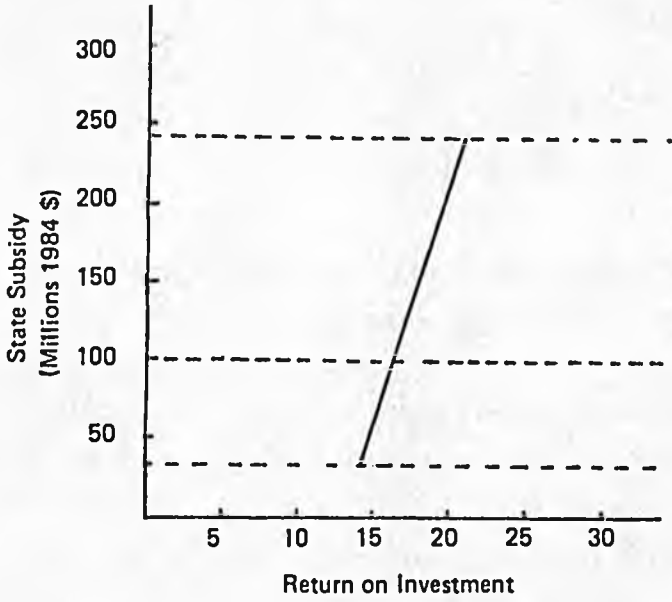
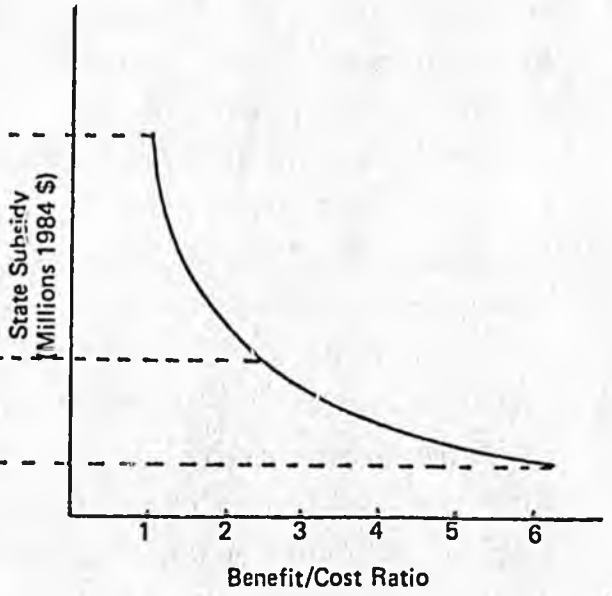


CHART II



[* Assumes a real price of zinc of 60¢ per pound.]

While the above analysis is based on what appear to be reasonable assumptions, changes in these assumptions produce different results. For example, the development of the mine is sensitive to changes in the price of zinc. If the zinc price is lowered from 60¢ to 55¢ per pound he low side of our estimated future price), the rate of return to Cominco would also fall. At the 55¢ price, to get the return to Cominco up to 15% the State might have to put a subsidy of $158.0 million in the project. Because of the lower price, the taxes are also lower; this, coupled with the higher level of subsidy, reduces the benefit cost ratio to 1.25 in comp rison to the 6.2 figure generated by a 60¢ price. On the other side, if the higher price level of 65¢ per pound of zinc is attained, the return is estimated to be in excess of the requisite 15% ROI with no State subsidy and the State benefits directly by $303.48 million even with no contribution.

In addition to direct benefits to the State in the form of tax revenues and reduced transfer payments, there are gains to the public in the form of wages, reduction in freight costs and the implicit benefits of having a road and port where previously there was none. The present value of direct wage gains, freight cost reductions, and royalties to NANA are set forth below. The present value was calculated for a period of 30 years, however, the Red Dog Mine and road is anticipated to be active for at least 50 years. The benefits for the additional years are so far in the future that their present value is not included, but should be considered from a social point of view. Implied infrastructure benefits are not quantified though the existence of a State road and port offers opportunities for future expansion at Red Dog and for other mining opportunities in the region.

Table II

Private Sector Benefits* from
Red Dog Mine Development
(Million $)

Benefit	Amount
Wages	$365.25
Freight Cost Reduction	50.96
Infrastructure Gains	Not Quantified
Royalty payments to NANA**	658.56

* Present value over 30 year period.

** These monies are subject to the revenue sharing provisions of the Alaska Native Claims Settlement Act, 7(i) Clause, and could also be taxed by the State and Federal Governments.

The wages and salaries generated are a result of average annual employment increase of 500.

V. Report of the Office of Management and Budget Office of the Governor

A. Corporate Profile of Cominco Ltd. (Canada)

B. Corporate Profile of NANA Regional Corporation Inc.

C. Direct and Indirect Economic Impacts Within the State of Alaska

D. Fiscal Impacts

E. Cominco / NANA Contractual Agreements

F. Effects on State Bonding Capacity

G. Synopsis

OFFICE OF MANAGEMENT AND BUDGET
OFFICE OF THE GOVERNOR
STATE OF ALASKA

RED DOG PROJECT

Report Prepared for Part IV of the Interagency Task Force on
State Participation in Infrastructure Development
February 21, 1984

INTRODUCTION

The Office of Management and Budget participated in the State's interagency task force on the Red Dog Mine project during the period September-December, 1983. The purpose of the task force was to evaluate whether and how the State of Alaska might participate in the infrastructure development necessary for the Red Dog mine, which is located in the northwest region near Kotzebue. The Office of Management and Budget was responsible for completing the following six tasks:

(A) preparation of a detailed corporate profile of Cominco Ltd., with reference to its financial structure, operational spread and market participation;

(B) preparation of a similar corporate profile of NANA Regional Corporation, Inc.;

(C) evaluation of the direct and indirect economic impacts of the Red Dog Mine project within Alaska;

(D) evaluation of the taxation impacts of the Red Dog Mine project, utilizing Alaska's current taxation framework;

(E) examination of the contractual relationship between Cominco-Alaska, Inc. (the Alaska subsidiary of Cominco Ltd.), and NANA Regional Corporation, Inc.; and,

(F) assessment of the possible effects of various risk-sharing scenarios for total project development on the State of Alaska's bonding capacity.

The sections below present the Office of Management and Budget's findings and conclusions regarding these six tasks.

A. CORPORATE PROFILE OF COMINCO, LTD. (CANADA)

Cominco Ltd. of Canada is the parent company of Cominco-American, Inc., and its branch, Cominco-Alaska Inc., which has joined with NANA Development Corporation, Inc., to develop the Red Dog Mine near Kotzebue. This corporate profile describes the operations and relationships of Cominco Ltd.

1. BACKGROUND

Cominco Ltd. is an integrated natural resources company whose principal activities are in minerals exploration, mining, smelting and refining. Headquartered in Vancouver, British Columbia (Canada), the company with its subsidiaries constitutes one of the world's largest mining and metallurgical concerns. Cominco Ltd. employees numbered approximately 10,500 as of August, 1983, with union representation encompassing some 70% of the total. [1]

The Cominco enterprise was first incorporated in Canada in 1906 as Canadian Consolidated Mines Ltd., as a means of amalgamating the mining interests of the Canadian Pacific Railway. (The name was changed a month later to Consolidated Mining and Smelting Company of Canada Ltd.) The company was acquired and re-chartered in 1962 by Canadian Investments Ltd. (now Canadian Pacific Enterprises Ltd.), which is an investment holding corporation for Canadian Pacific Ltd., a private Canadian company. Under this arrangement, the company's name was changed to Cominco Ltd. in 1966. Finally, in 1970, Cominco Ltd. moved its executive offices from Montreal to Vancouver.

The range of Cominco Ltd. business operations is extensive. Its participation in mining and minerals industries includes exploration and mining operations (chiefly for zinc, lead, silver, copper and gold) in North America, South America, Europe, Asia, Africa and Australia, as well as the operation of major smelting and refining facilities in Canada, Japan and India. Worldwide, Cominco Ltd. and its subsidiaries operate some 14 major mines and 4 major smelting and refining complexes. Cominco Ltd. was the world's largest producer of zinc and lead in 1982, accounting for approximately 10% and 11% of the western world's mine production of those metals, respectively.[2]

Beyond its mining and metals operations, Cominco Ltd. also is one of Canada's largest producers of phosphates and chemical fertilizers, and is a major supplier of these commodities for the upper American Midwest. Additional Cominco Ltd. operations include the production of high purity metals, steel products, fabricated metals products, compound semiconductors and electronic components, and hardware specialties, as well as the distribution of electrical power in western Canada. Its Project Research Center at Sheridan Park, Ontario, is the world's largest research center for new and improved uses of lead and zinc.[3] The company also is a holding and investment concern with a relatively large number of corporate subsidiaries and affiliates.

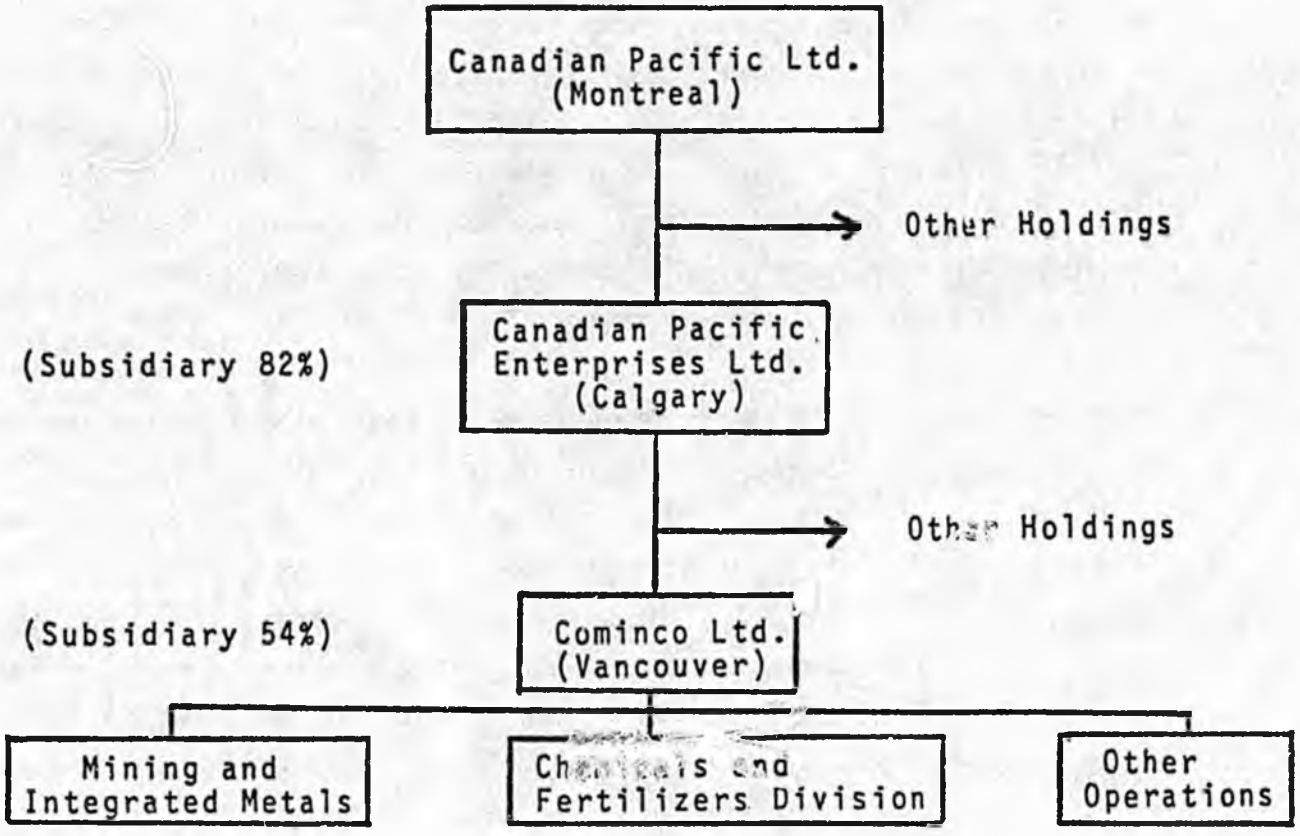
2. CORPORATE STRUCTURE AND MARKET PARTICIPATION

Diverse and large as its holdings are, Cominco Ltd. occupies a position within a yet larger corporate structure. (See Figure A-1.) Principally, it is 54% owned by Canadian Pacific Enterprises Ltd. (Calgary, Alberta), which is a large investment company with interests in oil and gas, mines and minerals, iron and steel, forest products, real estate, hotels and food services. Canadian Pacific Enterprises Ltd. is itself 82% held by Canadian Pacific Ltd. (Montreal, Quebec), a private Canadian company directly involved in various transportation services.

The corporate structure of Cominco Ltd., including its subsidiaries and affiliates, reveals a high degree of both vertical and horizontal

FIGURE A-1

COMINCO LTD. CORPORATE STRUCTURE



integration. It encompasses vertically linked operations that include exploration and reconnaissance, mining, smelting and refining, fabrication, product development and research, direct specialty hardware supply and sales. Its horizontal dimension is revealed by its many associated mining and smelting operations (including, beyond metals, the mining of coal, diamonds, potash, et al.), chemical and fertilizer production facilities, steel plants, electronics plants and network of hydroelectric power plants.

Overall, the associated companies of Cominco Ltd. participate in three broad industry segments or markets. These include mining and integrated metals, chemicals and fertilizers, and a range of "other operations" which includes the previously mentioned steel, electronics and hydroelectric plants, etc. (See Table A-1.) Among these three corporate segments, mining and integrated metals consistently has been the greatest contributor to Cominco Ltd's total revenues. It has consistently also been the greatest contributor to the company's operating profits, except during 1982, when low base metal prices and softening demand produced the company's first overall loss in fifty years. (See Table A-2.) However, it appears that mining and integrated metals operations will once again be the major contributor to its profits in the coming years, due to the potential of the Red Dog Mine, and the expected future improvement in world metal market conditions. (See Table A-3.)

3. MINING HOLDINGS AND OPERATIONS

a. Amalgamated Divisions and Operating Subsidiaries

Cominco Ltd. amalgamated (i.e., merged) in late 1982 with Bethlehem Copper Corporation and Copper Valley Mines Ltd., previously two wholly owned subsidiaries, under the name of Cominco Ltd.[4] The operations of these companies and Green Valley Mines continue as divisions of Cominco Ltd. Figure A-2 depicts the corporate linkage of these divisions and Cominco Ltd.'s operating subsidiaries, in which Cominco Ltd. ownership is greater than 50%. (See Figure A-2.)

TABLE A-1

COMINCO LTD.
SCOPE OF OPERATIONS AND MARKET PARTICIPATION

INDUSTRY SEGMENT	PRINCIPAL INVOLVEMENTS	MAJOR FACILITIES
1. Mining & Integrated Metals	Mining, processing smelting and refining of zinc, lead, copper, silver, gold, tin, et al.	*14 major mines *4 major smelting facilities
2. Chemicals & Fertilizers	Production of sulphuric acid, sulphur dioxide, potash, ammonia, urea, phosphates and nitrates	*3 mines *5 processing plants (all in Canada and USA)
3. Other Operations	Fabrication of metal products, steel, high purity metals, semiconductors and electronic components, electrical power distribution.	*3 steel plants *1 metal fabricating plant *2 electronics plants *4 hydroelectric plants (all in Canada and USA)

Source: Office of Management and Budget, State of Alaska, December, 1983.

TABLE A-2

CONTRIBUTIONS OF COMINCO LTD.
OPERATING SEGMENTS, 1978-1982

	1982 Contributions		5-Year Average Contributions	
	To Total Revenues	To Operating Profits (Losses) *	To Total Revenues	To Operating Profits (Losses)
Mining and Integrated Metals	53%	($31 million)	56%	61%
Chemicals and Fertilizers	33%	$30 million	30%	29%
Other Operations	14%	$17 million	14%	10%

* U.S. Dollars

Source: Based on data from Cominco Ltd. 1982 Annual Report and report by the Canadian investment firm Levesque, Beaubien, Inc. (July, 1983).

TABLE A-3

FORECASTED CONTRIBUTIONS OF COMINCO LTD.
OPERATING SEGMENTS, 1983-1985

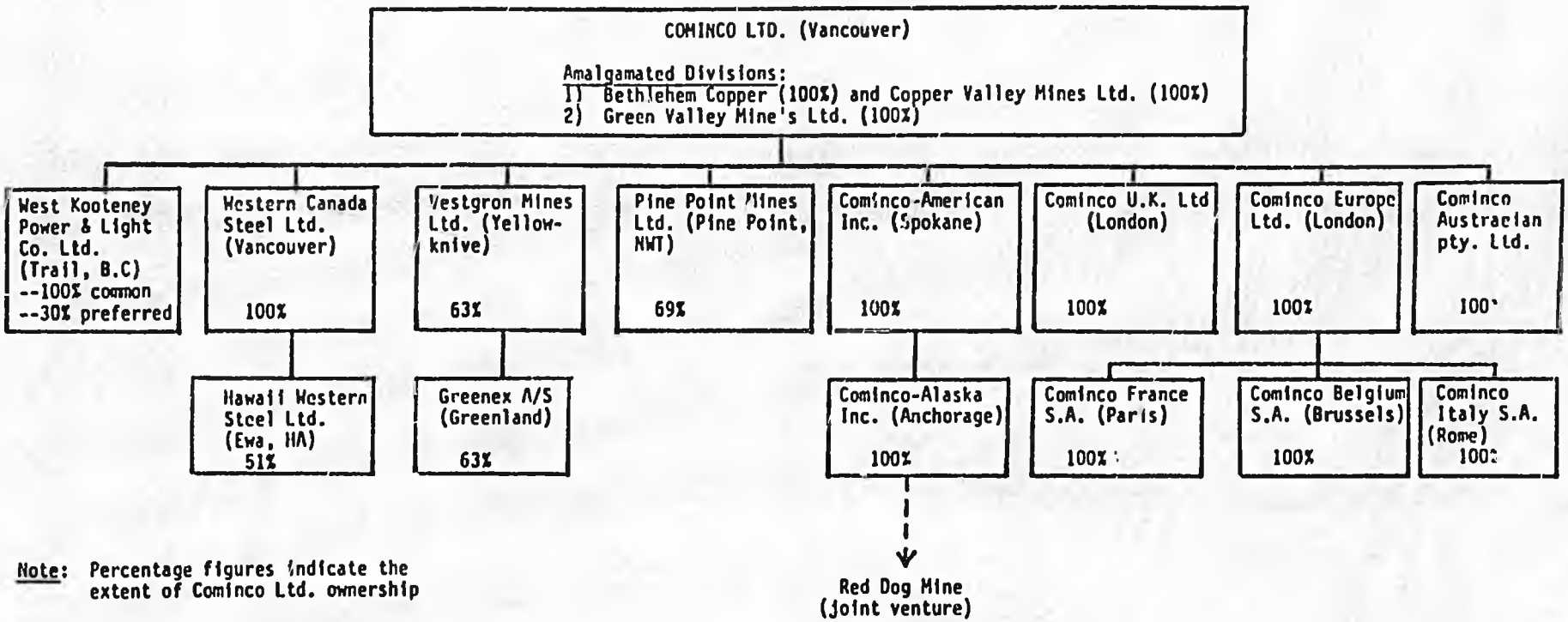
	Contributions To Total Revenues				Contributions To Operating Profits			
	1984E	1984E	1985E	(Avg.$_5$)*	(Avg.$_5$)*	1983E	1984E	1985E
Mining and Integrated Metals	57%	61%	62%	(56%)	(61%)	56%	76%	79%
Chemicals and Fertilizers	30%	27%	27%	(30%)	(29%)	19%	17%	15%
Other Operations	13%	12%	11%	(14%)	(10%)	25%	7%	6%

*Avg.$_5$= 5-year average contribution, 1978-82.

NB: Forecast assumes inclusion of Red Dog Mine costs.

Source: Based on report by Canadian investment firm Levesque, Beaubien, Inc. (July, 1983)

COMINCO LTD.
OPERATING SUBSIDIARIES AND AMALGAMATED DIVISIONS
(MINING AND INTEGRATED METALS SEGMENT)



Note: Percentage figures indicate the extent of Cominco Ltd. ownership

Source: Office of Management and Budget, State of Alaska, December, 1983

b. Affiliates

The corporate affiliates of Cominco Ltd., in which a 50% or less ownership interest is held, include the following: (percentages indicate the extent of Cominco Ltd. ownership)

* Canada Metals Co. Ltd. (50%)
  Toronto: lead refining and metals products

* Mitsubishi Cominco Smelting Co. Ltd. (45%)
  Tokyo: smelter products, refined lead, concentrates from Pine Point Mines Ltd.

* Cominco Binani Zinc Ltd. (40%)
  Calcutta: electrolytic zinc smelting and refining

* Fording Coal Ltd. (40%)
  Calgary: coal mine

* Aberfoyle Ltd. (47%)
  Melbourne: minerals exploration in Australia and Tasmania, 6 tin and lead/zinc mines, metals production

* EXMINESA S/A (48%)
  Madrid: minerals exploration, zinc/lead mine

*Panarctic Oils Ltd. (7.4%)
  Undetermined: oil and gas exploration

c. Other Holdings (Unidentified)

References to a number of additional Cominco Ltd. holdings in the mining and integrated metals area have been located, but could not be

investigated due to time constraints. These include the following: (percentage figures indicate the extent of Cominco Ltd. ownership)

* Vol Mines Ltd (66.7%)
* Baffinland Iron Mines Ltd. (4.5%)
* Stikine Copper Ltd. (5%)
* Sunloch Mines Ltd. (84%)
* Sunro Mines (77%)
* Cominco Holdings, N.V. (-?-)
* Cominco GmbH, Germany (100%)
* Mayak Ltd., U.K. (50%)
* Arvik Mines Ltd., Canada (100%)
* Abminco NL (38%)

d. Principal Mining Facilities

The principal mining facilities of Cominco Ltd. include 9 major mines in North America and Greenland, and the giant integrated smelting and refining complex at Trail, British Columbia, which also includes part of Cominco Ltd.'s fertilizer and chemical processing operations. These facilities, along with their approximate levels of employment as of December 31, 1982, are described below: (percentage figures indicate the extent of Cominco Ltd. ownership)

* Trail Complex (100%)
  Trail, B.C.: integrated smelting and refining complex for lead, zinc, silver, et al.; chemical and fertilizer plant; 4,036 employees

* Sullivan Mine (100%)
  Kimberly, B.C.: lead/zinc/silver mine; pig iron plant; chemical and fertilizer plant; 959 employees

* Valley Mine and Jersey Mine (100%)

Logan Lake, B.C.: Copper mines; 360 employees

* Polaris Mine (100%)
  Little Cornwallis Island NWT: Zinc/lead mine; 244 employees

* Con Mine (100%) and Rycon Mine (76%)
  Yellowknife, NWT: gold mines; arsenic recovery plant; 309 employees

* Pine Point Mine (69%)
  Great Slave Lake, NWT: Lead/zinc mine; 583 employees

* Black Angel Mine (63%)
  Maarmorilik, Greenland: Lead/zinc/silver mine; 324 employees

* Magmont Mine (50%)
  Bixby, Missouri: Lead/zinc mine and concentrator; 186 employees

4. FINANCIAL STRUCTURE

Unless otherwise specified, all figures presented below are based on the 1980-1983 annual reports of Cominco Ltd. All dollar amounts shown are in Canadian dollars for 1982. (For purposes of conversion or comparison, the average conversion rate during 1982 was: $1.234 CAN=$1.00 USA.)

a. Assets and Net Worth

As of year end 1982, the consolidated assets of Cominco Ltd. totalled approximately $2.1 billion. The larger portion (65%) was in fixed assets such as land, buildings, equipment and developed mineral properties, with

a total book value of some $1.36 billion. Investments in affiliated and unaffiliated companies totalled nearly $128 million, while current assets stood at more than $575 million (over 27% of total assets). Net worth for the company as of December 31, 1982, was approximately $834.9 million. This comprised some $145 million in preferred shares, $136 million in common shares and approximately $554 million in earnings reinvested in the company. (See Table A-4.)

b. Capitalization

Capitalization for Cominco Ltd. as of the end of 1982 was approximately $1.52 billion. This comprised long-term debt of some $688 million, reinvested earnings of approximately $554 million, $145 million in preferred stock, and $136 million in common stock. (Some 5.8 million shares of preferred stock and 18.8 million shares of common stock were outstanding at the end of 1982, approximately 54% of the total value of which was held by Canadian Pacific Enterprises Ltd.) If $38 million in minority interests and $175 million in deferred income taxes are included as representing long-term debt, total capitalization for the company was actually approximately $1.74 billion.

The company's financial leverage ratio (long-term debt to total long-term capital), was 0.52 at the end of 1982, and its debt-equity ratio was 1.08, down from 1.44 earlier in the year.

The capital structure underlying Cominco's $688 million in long-term debt for 1982 included $46.8 million in notes, $101 million in debentures, $533.4 million in bank loans (approximately three-quarters of which are at variable rates, with the remainder at fixed rates of 5-3/4% to 10-3/8%), $5.4 million in bonds, and $1.4 million in other debt. The company has moved recently to reduce its reliance on bank debt through the application of some $100 million raised from a 2.2 million common share offering in April of 1983. (Canadian Pacific Enterprises Ltd. purchased 1.2 million shares of this offering, to preserve its 54% interest in the company). This was in addition to an earlier issue of 2 million preferred redeemable shares, which brought proceeds of approximately $50 million in 1982. A

TABLE A-4

COMINCO LTD.
CONSOLIDATED BALANCE SHEET
1981 - 1982

	1982	1981
	(thousands)	
Current Assets		
Cash and short-term investments	$ 31,279	$ 48,887
Accounts receivable	182,573	243,624
Inventories	352,156	334,181
Prepaid expenses	9,732	7,317
	575,740	634,009
Investments		
Associated companies	95,929	95,458
Other companies	31,941	34,614
	127,870	130,072
Fixed Assets		
Land, buildings and equipment	1,562,144	1,396,081
Less accumulated depreciation	518,682	463,791
	1,043,462	932,290
Mineral properties and development	417,975	402,365
Less accumulated depreciation	101,645	92,291
	316,330	310,074
	1,359,792	1,242,364
Other Assets	28,142	21,379
TOTAL ASSETS:	$ 2,091,544	$ 2,027,824
Current Liabilities		
Bank loans and notes payable	$161,633	$ 140,007
Accounts payable and accrued liabilities	141,411	171,220
Income and resource taxes	16,206	19,268
Long-term debt due within one year	30,457	11,509
	354,707	342,004
Long-Term Debt	687,975	566,677
Income Taxes Provided, Not Current Payable	175,520	219,155
Minority Interests	38,397	45,449
Shareholder's Equity		
Capital	280,531	232,229
Earnings Reinvested in the business	554,414	622,310
	834,945	854,539
TOTAL COMMITMENTS AND LIABILITIES	$ 2,091,544	$ 2,027,824

Source: Cominco Ltd., 1982 Annual Report

TABLE A-5

COMINCO LTD. FINANCIAL POSITION
MARCH 31, 1983

	$ million	$/Share*	%
Assets:			
Working Capital (a)	161.6	8.60	
Net Fixed Assets	1,357.7	72.22	
Investments & Others	158.2	8.41	
	1,677.5	89.23	
Financed By:			
Long-term Debt (b)	667.1	35.48	39.8
Deferred Taxes	163.7	8.71	9.8
Minority Interests	36.9	1.96	2.2
Preferred Shares	144.7	7.70	8.6
Common Equity (a)	665.1	35.36	39.6
	1,677.5	89.23	100.0

* 18.8 million shares, raised to 21.0 million shares in April, 1983

(a) Increased by $100 million in April, 1983

(b) Of the $667 million in long-term debt, approximately $157 million is at fixed rates varying between 5 3/4% and 10 3/8% and the balance is at variable rates

Source: Levesque, Beaubian, Inc., Investment Research Report, July, 1983

major factor in Cominco Ltd.'s decision to issue more stock, presumably, was the 44% rise in the company's overall interest expense during 1982 to $90.4 million, up from $62.6 million at the end of 1981. (A more recent snapshot of Cominco Ltd.'s capitalization, as of March, 1983, is shown in Table A-5.)

c. Liquidity and Credit Rating

The company's current ratio (current assets to current liabilities) was 1.62 at the end of 1982. Its acid-test ratio (current assets less inventory to current liabilities) was 0.63. However, its cash ratio (cash plus short-term investments to current liabilities) was 0.09. The company had to sell off over 27,000 tons of its lead and zinc concentrate inventories in 1982 due to cash flow problems.[5]

During the first half of 1983, however, the company appears to have improved its liquidity position. Independent assessment of the company's operations in May of 1983 showed net working capital (current assets minus current liabilities) centered in accounts receivable and inventory, with satisfactory inventory turn-over, and adequate cash deposits and short-term investments for financing operations.[6] Analysis of the sources and uses of Cominco Ltd.'s funds during 1981 and 1982 also indicates that the company instituted an aggressive collections policy regarding receivables during 1982 (see subsection 5, below, "Sources and Uses of Funds"), helping to improve cash flow and liquidity.

Cominco Ltd.'s overall credit rating was very good as of mid-1983. Independent credit assessment of the company showed a high composite credit appraisal, a consolidated line of credit available without security to the high eight-figure range, excellent relations, and good conditions.[7] The same sources and uses analysis referred to above also shows that Cominco Ltd. started paying its own bills more promptly in 1982, which is undoubtedly responsible in part for the company's current good credit rating.

TABLE A-6

COMINCO LTD.
EARNINGS SUMMARY
1978-1982

	1978	1979	1980	1981	1982
				- - ($ millions)- -	
Mining & Integrated Metals					
Sales	515	789	850	732	641
Operating Costs	371	430	589	601	622
Depreciation & Amortization	34	40	44	52	57
Operating Profit	110	319	217	79	(38)
Fertilizers & Chemicals					
Sales	271	317	390	462	421
Operating Costs	213	239	273	342	362
Depreciation & Amortization	23	24	20	22	22
Operating Profit	35	54	97	98	37
Other Operations					
Sales	115	168	203	223	173
Operating Costs	100	138	163	181	145
Depreciation & Amortization	8	9	10	10	7
Operating Profit	7	21	30	32	21
Consolidated					
Sales	901	1274	1443	1417	1235
Operating Costs	684	807	1025	1124	1129
Depreciation & Amortization	65	73	74	84	86
Operating Profit	152	394	344	209	20
Exploration Expense	(7)	(10)	(13)	(20)	(15)
Interest Expense	(28)	(28)	(33)	(63)	(90)
Corporate Charges	(13)	(4)	(6)	(1)	(13)
Earnings Before Taxes	104	352	292	125	(98)
Income & Resource Taxes					
Current	(36)	(104)	(69)	(12)	(7)
Deferred	(9)	(30)	(50)	(39)	50
Total Taxes	(45)	(134)	(119)	(51)	43
Minority Interests	(6)	(23)	(14)	(10)	1
Equity Income	9	11	14	4	5
Currency Translation	8	(1)	(2)	(5)	(1)
Earnings Before Extras	66	205	171	65	(49)
Extraordinary Item	2	-	-	5	18
Earnings	68	205	171	70	(31)
Preferred Dividends	(6)	(7)	(8)	(8)	(10)
Net Income	62	198	163	62	(41)
EPS Before Extraordinary Item	3.51	11.57	9.54	3.04	(3.16)
EPS After Extraordinary Item	3.61	11.57	9.54	3.35	(2.20)
Cash Flow Per Share (a)	8.12	18.6	17.54	10.49	(0.96)
Average Shares Outstanding	17.0	17.1	17.1	18.4	18.8

(a) After preferred dividends

Source: Levesque, Beaubien, Inc., Investment Research Report, July 1983

d. Earnings

Cominco Ltd. president W.G. Wilson told stockholders in April of 1983 that 1982 was "one of the worst years in the company's history." [8] 1982 was indeed not a good year for Cominco Ltd., as the company suffered an overall net loss of approximately $31.2 million (a loss of $2.20 per share). This was a dramatic slump from net earnings of $70.3 million (a gain of $3.35 per share) in 1981, and is attributed to sagging metal markets and softening world demand over the past two years, resulting in falling metal prices. The loss of $31.2 million was on sales of products and services totalling approximately $1.24 billion, down almost 14% from 1981 sales. Earnings before interest and taxes for the company reflect the same decline, dropping to a loss of approximately $7.2 million in 1982 from earnings of over $189 million in 1981. (Actually, Cominco Ltd.'s net loss in 1982 would have been much larger than $32.1 million, but the company took some $49.9 million tax in credits during the year and its Cominco-American, Inc., subsidiary sold off its oil and gas properties for an after-tax gain of approximately $18.1 million).

The 1982 net loss was something of an exception for Cominco Ltd., however, representing the company's first overall loss in the past fifty years. It should not be taken as indicative of the company's solidity or prospects. Cominco Ltd. has extensive ore reserves, is already in 1983 nearly breaking even on its mining and integrated metals operations (with an operating loss of only $800,000 in the second quarter of 1983, down from $7.5 million in 1982), [9] and is in a position to improve its earnings performance in view of forecasts of an economic upturn. (For a summary of recent years' earnings, though with a slightly different data base than that used here, see Table A-6.)

e. Sources and Uses of Funds

A funds flow analysis was conducted for this report by examining the company's annual balance sheets. The major findings of this analysis include the following: (as of year-end 1982)

(1) the company was still relying on long-term debt, but was cutting that reliance back (i.e., increases in annual long-term debt outstanding slowed from 1980 to 1982);

(2) the company was still raising new capital through share issues, but at a slower rate than in the past (e.g., the share issues totaling $48.3 million in 1982 were only half of 1981's issues of $97.5 million);

(3) the company was still acquiring new land, buildings and equipment ($166 million in 1982), but less than in 1981 ($225 million);

(4) acquisition of mineral properties dropped dramatically during 1982 ($15.6 million) compared to the year before ($166 million);

(5) the company introduced a strong collections policy during 1982, cutting accounts receivable by $61 million as opposed to a $1 million increase during 1981 (this has been offset somewhat, however, by another new policy introduced during 1982 of paying off the company's own debts more quickly); and,

(6) the company has sharply cut back its payment of dividends to shareholders (e.g., from $83 million during both 1980 and 1981 to less than $35 million during 1982).

This pattern of retrenchment also is reflected in recent announcements by the company that : (1) capital investment spending was reduced by $710 million during 1981-82, after the company spent more than $1 billion on new projects over the preceding five years; (2) modernization of the Trail, B.C., smelting complex was being delayed; (3) completion of mechanization for the complex at Kimberly, B.C., was being delayed; (4) sustaining capital was being reduced throughout the company to low but acceptable levels; (5) exploration expenditures were being reduced; and, (6) some 2,200 company employees had been laid off during the 15 months prior to June, 1983.[10]

5. CONCLUSION

Its 1982 set-back notwithstanding, Cominco Ltd. appears to be a sound company with a firm economic footing and good overall prospects. The company is backed by a large reputable parent (Canadian Pacific Ltd.), has a strong mining and metals position worldwide, and is well diversified across several broad markets. It also reportedly has excellent managers who evidently are orienting the company towards more conservative spending policies and stronger earnings performance. In these respects, Cominco Ltd. appears able to provide a solid corporate base for development and support of the Red Dog Mine project.

FOOTNOTES

1 Standard & Poor's Corporation, Standard ASE Stock Reports, Vol. 18, No. 66, Sec. 11, August 18, 1983; p. 7541.

2 Ibid.

3 Canadian Mines Handbook, 1982-83; p. 88.

4 Dun & Bradstreet Canada Ltd., Business Information Report, May 2, 1983; p.2.

5 Cominco Ltd., ORBIT: The Cominco Quarterly, June, 1983; p.18.

6 Dun & Bradstreet, op. cit.; p. 3.

7 Ibid.; pp. 1-3.

8 Cominco Ltd., op. cit.; p. 17.

9 Dun & Bradstreet Canada Ltd., Business Information Report, August 18, 1983; p. 1.

10 Cominco Ltd., op. cit. p. 2.

B. CORPORATE PROFILE OF NANA REGIONAL CORPORATION, INC.

This corporate profile describes the operations and relationships of NANA Regional Corporation, Inc., which has joined with Cominco-American, Inc., to develop the Red Dog Mine near Kotzebue.

1. BACKGROUND

NANA Regional Corporation, Inc. (NANA), is one of twelve Alaska Native regional corporations which were formed under the Alaska Native Claims Settlement Act of 1971. (A thirteenth corporation was also formed for Alaska Natives no longer residing in the State.) Company records indicate that NANA represents some 4,800 Inupiaq shareholders, [1] of whom some 4,000 or more reside in the NANA Region.[2]

The Alaska Native Claims Settlement Act of 1971 (ANCSA) provides that the regional corporations formed under it are to share jointly a settlement comprising $962.5 million in cash and 40 million acres of land; the former is distributed through the Alaska Native Fund, and the latter through federal government land conveyances. As of June of 1983, NANA had received approximately $46.3 million as its cash settlement, and interim conveyance of 945,469 acres of surface estate and 766,816 acres of subsurface estate. NANA's total land entitlement under the terms of ANCSA is approximately 1.9 million acres of land including both surface and subsurface estates, and title to subsurface estate rights only on approximately 365,000 additional acres. [3]

ANCSA provisions also govern the division of NANA's stockholders into two groups, based on village or regional affiliation. The corporation's stockholders accordingly are divided into those enrolled as residents of one of the eleven NANA Region villages (Class A common stockholders), and those enrolled as NANA Region residents but not as residents of any particular village (Class B common stockholders). Under the Act's terms, NANA is required to issue 100 shares of the appropriate class of stock to

each Native enrolled in the Region.[4] The Corporation's stock generally cannot be sold or otherwise transferred except by death beneficiary until 1991, also under ANCSA provisions.

A final major ANCSA requirement[5] is that a part of NANA's resource earnings must be pooled with those of the other regional corporations similarly created and then redistributed among all twelve corporations serving resident shareholders. Under this requirement, 70% of the net revenues received by NANA from development of its timber resources and subsurface estate (notably, mineral resources) enter the pool. These are then distributed proportionally to the twelve corporations, including NANA, based on the number of shareholders enrolled in each corporation. Of the amount that NANA receives from this distribution, 50% is required under ANCSA to be distributed proportionally to nonvillage stockholders and the village corporations within NANA's designated boundaries.[6]

2. CORPORATE STRUCTURE AND BUSINESS OPERATIONS

The corporate activities of NANA comprise both non-profit and profit-oriented operations. Non-profit activities include a variety of Native culture, education, and vocational development programs. The profit-oriented side of NANA is centered in the company's single, wholly owned operating subsidiary, NANA Development Corporation, Inc.

NANA Development Corporation, Inc., is the focus for NANA's several joint venture projects and has six separately incorporated subsidiaries. These include NANA Oil Field Services (provides housing for oil field personnel at Prudhoe Bay), Arctic Utilities (supplies electrical power generation for Prudhoe Bay operations and camps), and Purcell Services (provides industrial security systems for Sohio at Prudhoe Bay). A fourth division, NANA Construction Company, Inc., was discontinued during 1982 due to losses.

NANA's operating divisions and joint ventures, as described in the company's financial report for the year ending June 30, 1983 (YE1983),

included the following: (percentage figures indicate extent of NANA ownership, where given)

* 2 Reindeer Breeding Companies (100%, 20%)

* Bank Holding Company (11% in YE1983, 17% in YE 1982)

* Oil drilling and lease partnership with Sohio and four other Native regional corporations, Beaufort Sea

* Jade Mining and Exploration

* Surveying and Engineering Services, with Bell Herring Associates of Anchorage

* NANA Mannings (food service and camp operations)

* NANA Coates (minerals exploration and drilling)

* Lease for oil exploration on NANA lands

* Vehicle maintenance venture

* Nul-Luk-Vik Hotel (Kotzebue)

* Construction joint venture at Prudhoe Bay, with Morrison-Knudsen, Inc. (on a job-by-job basis)

* Red Dog Mine development project

NANA's published annual reports for prior years (i.e., the years ending at June 30 for 1980-1982) provide little additional information regarding the company's holdings, investments and joint ventures. The only reasonable conclusions which can be formed on the basis of these documents are: (a) many different ventures have been undertaken in the past four years, most of which were generally similar in nature to those

listed above; and, (b) most of the ventures suggest a placement of company resources intended to achieve long-term employment benefits to NANA shareholders and other regional residents.

It is not possible to provide an accurate summary of the performance or contributions of NANA's business operations (or joint ventures) over the past few years, as the amounts shown in the company's financial statements have been reclassified in each of the two most recent years (YE1983 and YE1982). NANA's financial report for YE1983, however, does allow comparison by broad line of business for the past two corporate fiscal years. This comparison indicates that NANA's oil field and support services have by far contributed most to NANA's earnings from joint ventures (99% of all joint venture earnings in YE1983, and 73% of all joint venture earnings over the past two fiscal years). (See Table B-1) Among NANA's continuing operations, the greatest contributors to overall operating revenues both in YE1983 and over the past two fiscal years have been NANA's camp and hotels (23.7% in YE1983 and 23.3% over the past two years) and the company's contracted services operations (23.6% in YE1983 and 21.0% over the past two years).

TABLE B-1

NANA JOINT VENTURES
EARNINGS (LOSS) SUMMARY BY LINE OF BUSINESS
YEARS ENDING JUNE 30, 1983 and 1982

	YE 1983		YE 1982		
	Earnings (Loss)	%	Earnings (Loss)	%	Two-Year Contribution (%)
Oilfield & Support Services	$1,788,373	99.7%	$975,883	49.2%	73.2%
Construction	212,779	11.9	952,767	48.1	30.9
Surveying	62,126	3.5	9,183	0.5	1.9
Sales	(402,378)	(22.4)	(144,808)	(7.3)	(14.5)
Catering	133,916	7.5	189,421	9.6	8.6
Total Earnings (Loss):	$1,794,816	100.2%*	$1,982,446	100.1%*	100.1%*

*Does not total due to rounding

Source: Based on data from NANA Regional Corporation, Consolidated Financial Statements: June 30, 1983 and 1982, September 30, 1983.

3 FINANCIAL STRUCTURE

a. Assets and Net Worth

As of June 30, 1983, the consolidated assets of NANA totaled approximately $68.7 million. The greatest portion (36.9%) of these assets were investments and marketable securities, with more than two-thirds of the latter (approximately$8.0 million of a total $11.7 million) representing the purchase costs of common and preferred stocks. NANA's combined property and equipment holdings represented another 24.1% of total assets, while its current assets stood at approximately $17.4 million, or 25.2% of total assets. NANA's joint ventures had a combined asset value to the company of some $9.06 million (13.2% of total assets), representing the combined equity allocable to NANA from those ventures. (See Table B-2)

TABLE B-2

NANA REGIONAL CORPORATION, INC.
AND SUBSIDIARY

Consolidated Balance Sheets

June 30, 1983 and 1982

Assets	1983	1982
Current assets:		
Cash and temporary investments	$ 2,388,705	$ 2,748,878
Current portion of notes receivable	7,753,487	8,149,697
Receivables	5,114,907	7,106,099
Inventories	1,843,702	2,218,290
Other current assets	328,366	370,682
Total current assets	17,429,167	20,593,646
Note receivable	7,258,430	7,679,029
Investment in Beaufort Sea lease partnership	2,467,542	2,237,225
Marketable securities	11,715,201	9,359,468
Investment in bank holding company	2,103,614	2,103,614
Investment in joint ventures	9,058,137	5,947,541
Raw jade at processing plant	657,470	597,488
Property and equipment, at cost	25,808,506	25,200,941
Less accumulated depreciation	9,223,976	8,000,842
Net property and equipment	16,584,530	17,200,099
Other assets, less amortization of $110,695 in 1983 and $63,821 in 1982	1,446,972	1,886,023
	$68,721,023	$67,604,133

TABLE B-2
(Continued)

Liabilities and Stockholders' Equity	1983	1982
Current liabilities:		
Note payable	$ 11,578,000	$ 12,933,881
Current installments of long-term debt	858,263	846,314
Trade payables	2,097,748	4,270,441
Accrued payroll and other liabilities	2,032,119	2,048,068
Due to village corporation and at large stockholders	78,868	84,956
Resource revenues distributable to others	732,868	--
Total current liabilities	17,377,866	20,183,660
Long-term debt, excluding current installments	2,412,208	2,751,262
Deferred income taxes	60,000	--
Stockholders' equity: Class A common stock of $.01 par value. Authorized 2,000,000 shares; issued and outstanding 704,700 shares	7,047	7,047
Class B common stock of $.01 par value. Authorized 500,000 shares; issued and outstanding 29,400 shares	294	294
Additional paid-in capital - Alaska Native Fund distributions	43,582,871	43,582,871
Retained earnings	5,280,777	2,248,735
Unrealized loss on marketable equity securities	--	(1,169,736)
Total stockholders' equity	48,870,989	44,669,211
Commitments and contingencies		
	$68,721,063	$67,604,133

Source: NANA Regional Corporation, Inc. Consolidated Financial Statements: June 30, 1983 and 1982.

It is not currently possible to estimate NANA's actual net worth, because the company has not ascribed a value to its land rights (surface and subsurface). Also, neither its Class A common stock nor its Class B common stock can be assigned market value until at least 1991 (the earliest time when NANA's shares can be generally sold or transferred, under the terms of ANCSA). NANA's common stock is currently assigned a par value of $0.01 per share, with a total of 734,100 shares outstanding from a total of 2.5 million shares authorized. The company did report some $5.3 million in retained earnings during YE1983 (up 135% from the previous year), however, and showed a total of approximately $43.6 million in paid-in capital from Alaska Native Fund distributions.

b. Capitalization

A true statement of value of NANA's overall capitalization cannot be made, again due the fact that the company's outstanding common stock will not have a meaningful market value until at least 1991. Excluding NANA's shareholder equity and the value of NANA's overall minerals holdings, however, it can be said that NANA's reported capitalization as of YE1983 totaled approximately $7.8 million. This total comprised approximately $2.4 million in long-term debt outstanding (current portion excluded), retained earnings of approximately $5.3 million, and some $60,000 in deferred income taxes.

It would be difficult at best to say whether NANA's YE1983 debt level represents a large or small amount of debt for the company to be carrying. The current artificial value of NANA's shares, and the absence of a meaningful basis for comparing NANA with other corporate entities, combine to make any such assessment necessarily speculative at the present time.

Given NANA's current inability to raise additional share capital before 1991, it is to be expected that the company's capital structure should consist primarily of long-term notes payable. NANA's non-current long-term debt outstanding of approximately $2.4 million at YE1983, in fact, consisted entirely of such notes, carrying interest rates ranging

from 7-1/2% to 18% and payable primarily to financial institutions. Approximately 77% of NANA's total long-term debt (including the current portion) was secured by property and equipment holdings with a combined depreciated cost (sic) of approximately $6.3 million.

c. Liquidity

The company's current ratio (current assets to current liabilities) at YE1983 was 1.003, while its quick ratio (current assets less inventory to current liabilities) was 0.897. The company's YE1983 statements also show a cash ratio (cash plus short-term investments to current liabilities) of 0.137. NANA did, however, have an unused line of credit at YE1983 for approximately $4.9 million.

The financial ratios for NANA indicated above are correct as taken from NANA's financial statements. It should be noted, however, that the company is currently in the process of converting some of its short-term debt (notes payable) into longterm debt. This should improve the company's liquidity in the future, particularly over the short run.

d. Earnings

Two conclusions regarding earnings are immediately clear from NANA's consolidated earning statements. One is that the company's overall net income and earnings per share have risen steadily over the last eight corporate years (and ahead of overall revenue increases), particularly since YE1981. The second is that the most recent year, YE1983, was NANA's most profitable year ever, showing corporate net income up by 147% over the company's previous best year in YE1981. (See Table B-3.)

TABLE B-3

NANA REGIONAL CORPORATION, INC.
EARNINGS SUMMARY
YEAR ENDING AT JUNE 30, 1976-1983

	1983	1982	1981	1980	1979	1978	1977	1976
Revenues [1]	30.69 [2]	54.38	43.47	19.72	31.44	27.69	30.34	26.77
Net Income [1]	3.95	1.32	1.60	0.21	0.64	0.48	0.38	0.16
Assets [1]	68.72	67.60	64.94	66.77	59.14	61.84	58.31	26.94
Stockholders' Equity	48.87	44.67	44.75	43.97	45.20	44.93	44.57	12.08
Earnings per share	$5.38	$1.80	$2.18	$0.28	$0.87	$0.67	$0.53	$0.21
Dividends paid per share	$1.50	$1.25	$0.75	$0.75	$0.50	-	-	-

[1] Figures shown are in $ millions.

[2] Revenues from continuing operations only.

Source: Compiled from NANA Regional Corporation, Inc. published Annual Reports.

Overall net earnings for NANA during YE1983 were approximately $3.95 million, based on operating revenues totaling some $30.68 million. The company's major sources of income beyond operating revenues included approximately $2.25 million in interest income, $988 thousand in resource revenues received from other regions under ANCSA, and a $380 thousand tax benefit representing a net operating loss carry forward from the year before.

Regarding NANA's joint venture operations, the company earned a total of $1.79 million on revenues of $117 million in YE 1983. This represents NANA's total allocable share of earnings across all of its joint ventures, based on the company's combined equity investments of approximately $9.06 million.

e. Sources and Uses of Funds

Analysis of the sources and uses of NANA corporate funds over the past four years, based on the company's balance sheets for the period YE1980-YE1983, primarily shows two general trends. One, already described, is the steady expansion of NANA's overall base of operations (including assets, revenues and profits) as company activities increased. The second, which appears to indicate an emerging priority of the corporation, is the increasing proportion of corporate resources devoted to the sponsorship of joint ventures. Specifically, from YE1979 through YE1983, NANA increased its commitment to joint ventures from approximately $2.6 million to $9.06 million, representing an increase in the proportion of total corporate assets pledged to such ventures from some 4.4% in YE1979 to over 13% during YE1983. (See Table B-4)

TABLE B-4

NANA REGIONAL CORPORATION, INC.
JOINT VENTURE INVESTMENTS, 1979-1983

Year Ending June 30:	Joint Venture Investments	Total Assets	Per cent of Total Assets
1979	$2,624,354	$59,139,664	4.4%
1980	3,653,895	66,768,938	5.5
1981	4,311,939	64,939,741	6.6
1982	5,947,541	67,604,133	8.8
1983	9,058,137	68,721,063	13.2

Source: Office of Management and Budget, State of Alaska
(based on NANA Regional Corporation, Inc.,
Annual Reports, 1980-1983.)

CONCLUSION

Overall, NANA appears to be a solvent and increasingly profitable corporation. Its growing involvement in joint business ventures within the northwest Alaska area indicates a marked attempt to provide both general economic and long-term employment benefits to residents of the region. NANA's participation with Cominco-American, Inc., to develop the Red Dog Mine appears in these respects consistent with the purposes and past activities of the corporation.

FOOTNOTES

1 NANA Regional Corporation, Inc., NANA Regional Corporation Inc., and Subsidiary Consolidated Financial Statements: June 30, 1983 and 1982: September 30, 1983. (Hereafter cited as NANA Financial Statements.) Estimate of shareholders based on comparison of stockholders equity data shown in consolidated balance sheets with information given in Note (1) of consolidated statements.

2 Based on 1980 U.S. Census data and Alaska Department of Community and Regional Affairs 1983 population estimates for the NANA Region.

3 Figures for cash and land distribution and entitlements are from NANA Financial Statements, Note (1).

4 NANA Financial Statements, Note (1).

5 Public Law 92-203, Alaska Native Claims Settlement Act of 1971, Sections No. 7(i), (j).

6 NANA Financial Statements, Note (1).

7 Consolidated Statement of Earnings, NANA Financial Statements.

C. DIRECT AND INDIRECT ECONOMIC IMPACTS WITHIN THE STATE OF ALASKA

INTRODUCTION

This analysis estimates the direct and indirect economic impacts which are likely to occur within Alaska due to the development of the Red Dog Mine, located in northwest Alaska near Kotzebue.

1. PRINCIPAL ASSUMPTIONS

The principal characteristic of the Red Dog Mine project is that its scope and scale, as a whole, depend on the successful merging of the joint goals of Cominco-American, Inc. (Cominco), and the NANA Regional Corporation, Inc. (NANA). It is important to note in this regard that these parameters, the project's ultimate scope and scale, are not fixed at the present time. According to the project sponsors, these items will be fixed only after a joint agreement is reached between Cominco and NANA regarding the project's feasibility. The sponsors expect this agreement to be reached within the next several months.

Until agreement is reached, it appears that NANA will have a greater influence than Cominco in determining the ultimate size of the mining operation and its attendant work force.[1] NANA specifically sought this provision in its contractual agreement with Cominco, for two reasons.[2] One was to guarantee that the project could not become so large that its work force requirements might result in the employment of an excessive number of people from outside of the NANA region. The other reason was to allow NANA to attain its primary goal in supporting the project, which is to extend the project's employment benefits over the longest time possible by avoiding rapid depletion of the Red Dog Mine resources.[3]

In view of this arrangement, it seems reasonable to assume that the pace and scale at which Red Dog Mine development is set (in the future feasibility agreement) will be highly subject to NANA's perceptions

between now and then as to how well the project appears to be meeting NANA's expectations and long-term objectives. It is worth noting that this is quite different from a conventional business arrangement, where market and profit considerations normally are paramount. In the present case, however, the determining factors for NANA would appear to be considerations such as: (a) the extent to which vocational training efforts are likely to be successful in increasing regional residents' participation in the mine work force, both in terms of the number of NANA-region residents employed at the mine, as well as in terms of the number and type of higher-paying positions obtained; (b) the extent to which regional residents' employment at the mine appears likely to mesh acceptably with established regional subsistence patterns and lifestyles; (c) the extent to which adverse social and economic impacts deriving from the project are likely to be mitigated or avoided within the region; and, (d) the extent to which NANA's general long-term goals are likely to be accommodated by an agreement on project scope and scale which, once set, will become binding.

If NANA perceives that these concerns are likely to be met, it would seem reasonable to assume that the feasibility agreement between NANA and Cominco will set Red Dog Mine operations generally at the scale and along the timeframes projected currently by Cominco. Should there be any perception, however, that these concerns may be addressed in anything but the most successful fashion, it would seem equally reasonable to assume that development of the project may entail both a smaller scale and a more elongated timeframe than is currently projected. It is thus worth emphasizing that, at the present time, there is no firm basis for assuming that everything will go exactly as planned or hoped by NANA and Cominco--i.e., that the most successful scenario should be assumed.

In view of this, prudence would seem to require taking a somewhat conservative view of the project's scale over the long term. This analysis, consequently, assumes that Cominco's projection of total mine employment at 420 full-time equivalent (FTE) jobs is optimistic, and that a

range of 350-400 FTE jobs over the life of the mine incorporates more reasonably the uncertainties described above.

A similar prudence would also seem to require acknowledging that, because there are no employment guarantees in the sponsors' contractual agreement, no adequate basis is available at present for assuming a maximum participation rate for NANA regional residents in the project's long-term work force. On this basis, therefore, the analysis assumes that regional residents are unlikely to obtain less than 50% of the total FTE mine jobs available over the life of the mine, and are likely to obtain a reasonable maximum of approximately 75% (with an indeterminate but limited probability that their participation rate might become higher over the years.

2. EMPLOYMENT

Direct employment associated with the Red Dog project will comprise the total number of jobs at the mine site, as well as eight company jobs available at the project's accounting and data processing office in Anchorage. Additional jobs will be created through the indirect employment effects of company expenditures for services and supplies, and of mine employees' spending when off site. Secondary employment, in turn, will be created through the expenditures of the employees (and their families) who take these indirectly created new jobs, the mine jobs, and the mine office jobs in Anchorage.

a. Direct Employment (Annual)

Employment at the Red Dog Mine site is planned to occur in three phases. The construction phase (including related pre-construction activities) is scheduled for the period July 1, 1985, to December 31, 1987. The initial production phase begins at start-up of the mine's operations on or about January 1, 1988, and is planned to continue through December 31, 1992. A full production phase starting on or about January 1, 1993,

is thereafter planned as a steady-state operation continuing throughout the mine's estimated life of forty years.

In view of the preponderance of the full production phase (35 of the 40 years) in determining the economic benefits of the mine, this analysis focuses only on the Construction Phase (CP) and the Full Production Phase (FPP). (The fact that the weighted average for total employment over the forty years is within five jobs of Cominco's estimate of the full production phase total employment level confirms that this approach is reasonable.)

Cominco estimates that construction of the mine will provide 10-250 jobs at varying points within the Construction Phase. Inspection of Cominco's project charts shows that the manpower projections and timeframes underlying this range represent 143 full time equivalent (FTE) jobs for the period. Since this appears reasonable, and as no other estimates have been made, 143 jobs has been accepted as the total employment during this phase.

Three estimates have been used for the likely NANA-region resident participation rate in the Construction Phase work force: 33%, 43% and 45%.[4] Since two of them appear to be Cominco estimates, and the third an extrapolation therefrom, none is viewed as superior. Consequently, this analysis assumes that the average of the three estimates, or approximately 40%, represents the proportion of the Construction Phase jobs that will be obtained by NANA-region residents.

Cominco estimates that the mine's accounting and data processing office in Anchorage will employ eight people during the Full Production Phase of the mine's life. These include a controller, paymaster-senior accounting clerk, accountant, purchasing agent, buyer-expediter, data processing supervisor, data entry clerk, and clerk typist. This estimate of eight employees has been accepted in the analysis.

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The following assumptions govern the annual direct employment estimates made in this report:

(1) total mine employment during the Construction Phase (CP) of the project will be 143 jobs (FTE);

(2) approximately 40% of those jobs will go to NANA-region residents;

(3) total mine employment during the Full Production Phase (FPP) of the project will be between 350 and 400 jobs (FTE);

(4) approximately 50% to 75% of these jobs will go to NANA-region residents;

(5) NANA-region residents will receive mine jobs in direct proportion to their populational distribution within the region; i.e., 46% will be residents of Kotzebue and 54% will be residents of the other ten communities within the region, distributed on a pro rata basis;[5] and,

(6) during both phases of the mine operation, mine employees who are not NANA-region residents will comprise the following: 40% of them will be from the Anchorage area, 40% of them will be from other parts of Alaska, and 20% of them will be from outside Alaska. (Thus, during both phases, 10%-20% of the total mine work force will be from the Anchorage area, another 10%-20% of the total mine work force will be from other parts of Alaska, and 5%-10% of the total mine work force will be from outside of Alaska.) It is assumed that all of these out-of-state mine employees will move to the Anchorage area.

Based on these assumptions, the estimated direct annual employment from the Red Dog Mine project is shown in Table C-1, below. (See Table C-1.)

TABLE C-1

RED DOG MINE

ESTIMATED DIRECT ANNUAL EMPLOYMENT

	Participation Rate		Number of Jobs Per Phase (FTE)			
	CP%	FPP%	CP	FPP@350	FPP@400	Average of FPP Range Mid-Points
NANA Region	40%	50-75%	57	175-263	200-300	235
Anchorage**	24	10-20	35	35-70	40-80	56
Other Alaska	24	10-20	34	35-70	40-80	56
Out of State	12	5-10	17	17-35	20-40	28
TOTALS:	100%	100%	143	350	400	375

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

* Kotzebue proportion of totals shown = 46%.
** Does not include personnel at financial office in Anchorage.

Source: Office of Management and Budget, State of Alaska

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Direct annual employment estimates for the Red Dog project during the Construction Phase (CP) can therefore be summarized as follows:

- total mine employment will be approximately 143 employees;
- approximately 57 NANA-region residents will be employed, 26 (46%) of whom probably will be from Kotzebue and 31 (54%) of whom probably will be village residents;
- approximately 69 residents of other locations in Alaska will be employed, 35 of whom probably will be from the Anchorage area; and,
- approximately 17 mine employees will be hired from outside of Alaska.

Direct annual employment estimates for the Red Dog project during the Full Production Phase (FPP) can therefore similarly be summarized as follows:

- total mine employment probably will range between 350-400 employees;
- approximately 235 NANA-region residents will be employed, 108 (46%) of whom probably will be from Kotzebue and 127 (54%) of whom probably will be village residents;
- approximately 112 residents of other locations in Alaska will be employed, 56 of whom probably will be from the Anchorage area;
- additionally, 8 employees will be hired at the project's financial office in Anchorage; and,
- approximately 28 mine employees will be hired from outside of Alaska.

b. Indirect and Secondary Employment (Annual)

Indirect and secondary employment will be generated in several different locations by the direct employment at the Red Dog Mine. The locations and causes of these additional jobs are summarized in Figure C-1 below. (See Figure C-1.)

Certain assumptions were used to estimate the magnitude and distribution of indirect and secondary employment from the mine. These assumptions include the following:

(1) mine employees who are not residents of the NANA Region will commute directly between the mine and Anchorage (as stipulated in the Cominco/NANA agreement), and therefore will not impact Kotzebue or the regional villages;

(2) regional-resident mine employees will be hired proportionately from locations within the NANA Region; i.e., 46% from Kotzebue, and 54% from the region's villages;

(3) 50% of the village-resident mine employees will each spend an average of $500 per month in Kotzebue for purchases and recreation;

(4) local residents will take 50% of all new jobs created locally by the mine's effects, except in NANA-Region villages where the percentage will be 75%;

(5) 50% of local residents hired for newly created local jobs will have been unemployed prior to hiring;

(6) within the NANA Region, residents hired for local jobs who were previously unemployed probably will not be replaced by unemployed in-migrants (i.e., there will be a tangible effect on local unemployment rates in the region);

FIGURE C-1

RED DOG MINE
INDIRECT AND SECONDARY EMPLOYMENT
SOURCES AND DISTRIBUTION

Location	Jobs: Indirect	Jobs: Secondary	Cause of Jobs
Kotzebue	X		spending of village-resident mine employees in Kotzebue during two weeks off from mine
		Y	spending of employees (and their families) who take new indirect jobs, above
		X	spending of Kotzebue-resident mine employees (and their families)
Villages		X	spending of village-resident mine employees and their families), adjusted for Kotzebue spending
Anchorage	X		Cominco expenditures for mine resupply
		X	spending of employees (and their families) who take new indirect jobs, above
		X	spending of 8 Cominco-office employees (and their families)
		X	spending of Anchorage-resident mine employees (and their families) including those hired from outside of Alaska who relocate to the Anchorage area
Other Alaska		X	spending of other Alaska mine employees (and their families) across the State
Out of State		X	spending of out of State employees (and their families) outside of Alaska

(7) outside the NANA Region, residents hired for local jobs who were previously unemployed probably will be replaced by unemployed in-migrants (i.e., there will be little or no effect on local unemployment rates);

(8) during both phases of the project, mine employees hired from outside of Alaska will move to the Anchorage area; only during the Full Production Phase, however, will their families accompany them.

(9) 25% of local residents' spending will go toward wages and salaries in generating new indirect jobs; for Cominco expenditures the percentage will be 50%; every $25,000 so generated will create one additional indirect job.

(10) job multipliers for the Construction Phase (CP) and the Full Production Phase (FPP) are assumed as follows:[6]

	CP	FPP
NANA Region	0.4	0.45
Anchorage	1.0	1.0
Other Alaska	0.5	0.5

(11) the statewide population multiplier is assumed to be 2.1 new residents per new employee hired.

On the basis of these assumptions, the number and distribution of jobs likely to be created by the project through indirect and secondary employment effects is estimated as shown in Table C-2, below. (See Table C-2.)

It should be noted that Table C-2 does not include any indirect or secondary employment effects resulting from Cominco annual supply

TABLE C-2

RED DOG MINE
ESTIMATED INDIRECT AND SECONDARY ANNUAL EMPLOYMENT
TOTAL NUMBER OF JOBS

	CP	FPP@350*	FPP@400*	Average of FPP Range Mid-Point
Kotzebue	12	40-60	46-69	54
Villages**	11	38-58	44-66	52
Anchorage***	52	60-113	68-128	92
Other AK.****	17	18-35	20-40	28
TOTALS:	92	156-266	178-303	226

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

* Ranges shown indicate number of jobs if NANA proportion of total work force = 50% - 75%.

** Indirect and secondary job totals shown during FPP reflect a 9.4% reduction to offset spending in Kotzebue by 50% of village residents ($500 per month X 12 months X 0.5/$32,000 = 9.4%).

*** Includes 8 personnel at Cominco office in Anchorage during FPP.

**** Distributed across the State.

Source: Office of Management and Budget, State of Alaska

expenditures, as those expenditures have not been estimated by the company. (Under the NANA/Cominco agreement, long-term resupply for the mine will occur via the proposed port facility and short-term supplies will be purchased in Anchorage.) Under the assumptions made here, however, it can be estimated that every $1 million (1983 dollars) of annual Cominco expenditures made in Anchorage will create 20 indirect jobs and 20 secondary jobs, or a total of 40 new jobs in the Anchorage area.

Indirect and secondary employment effects within Alaska of the Red Dog Mine operation during the Construction Phase (CP) of the project can therefore be summarized as follows:

- total indirect and secondary employment generated in Alaska by the project will be approximately 92 jobs;
- approximately 23 (25%) of those jobs will be in the NANA Region, divided almost equally between Kotzebue and the other regional communities; and,
- approximately 69 (75%) of those jobs will be in other communities in Alaska, including 52 (57%) in the Anchorage area and 17 (18%) distributed among other Alaskan communities.

The indirect and secondary employment effects of the mine during the Full Production Phase (FPP) can therefore similarly be summarized as follows:

- total indirect and secondary employment generated in Alaska by the project will be approximately 226 jobs;
- approximately 106 (47%) of those jobs will be in the NANA Region, divided almost equally between Kotzebue and other regional communities;

- approximately 120 (53%) of those jobs will be in other communities in Alaska, including 92 (41%) in the Anchorage area and 28 (12%) distributed among other Alaskan communities; and,
- for every $1 million (in 1983 dollars) that Cominco spends in Anchorage to resupply the mine, approximately 40 additional indirect and secondary jobs will be created in the Anchorage area.

3. INCOME

Direct income will be generated by the Red Dog Mine in the form of wages and salaries paid by Cominco to the mine employees. The indirect and secondary jobs created by the project also will generate new income, in the form of wages and salaries received by the employees who take those new jobs. This section of the report estimates the magnitude and distribution of these new income gains within the State of Alaska.

a. Direct Income (Annual)

Cominco originally estimated that it would pay mine employees through annual gross payrolls of approximately $23 million in 1983 dollars during the mine's Construction Phase (CP) and $13.5 million in 1983 dollars during the Full Production Phase (FPP). Later, Cominco apparently revised its total work force estimate for the project; no revision was available, however, for the company's annual gross payroll estimate.

This analysis, consequently, estimates annual direct income on the basis of pro rata adjustments to Cominco's earlier payroll estimates, using the following assumptions:

(1) the average annual gross payroll for mine employees during the Construction Phase (CP) will be less than $23 million by an amount proportional to Cominco's revised (FTE) estimate of total

work force employment for this phase; therefore, average annual gross payroll for the phase will be approximately (143/372 X $23 million =) $8.84 million; and,

(2) the average annual gross payroll for mine employees during the Full Production Phase (FPP) will similarly be less than $13.5 million by an amount proportional to this analysis' estimate of total work force employment for this phase; therefore, average annual gross payroll for the phase will be approximately (350/420 X $13.5 million =) $11.25 million if the total work force is 350 employees, or approximately (400/420 X $13.5 million =) $12.86 million if the total work force is 400 employees.

Based on these assumptions, the direct annual income from the Red Dog Mine project (excluding the eight employees at the Company's financial office in Anchorage) is estimated as shown in Table C-3. (See Table C-3.)

Direct annual income estimates for the Red Dog project during the Construction Phase (CP) can therefore be summarized as follows:

- total annual direct income will be approximately $8.84 million in 1983 dollars;

- NANA-Region residents will receive approximately $3.54 million (40%) of this total, with approximately 46% ($1.63 million) of that going to Kotzebue residents and 54% ($1.91 million) to residents of other NANA Region communities;

- residents of other Alaskan communities will receive approximately $4.24 million (48%) of the $8.84 million, divided nearly equally between residents of the Anchorage area and residents of other communities in the State; and,

- mine employees hired from outside of Alaska will receive approximately $1.06 million (12%) of the total $8.84 million.

Direct annual income estimates for the mine's Full Production Phase (FPP) can therefore be similarly summarized as follows:

- total annual direct income will range between $11.25 million and $12.86 million in 1983 dollars (with a mid-point of $12.06 million);

  NANA-region residents will receive approximately $7.54 million (62.5%) of this total, with approximately 46% ($3.47 million) of that going to Kotzebue residents and 54% ($4.07 million) to residents of other NANA-Region communities;

- residents of other Alaskan communities will receive approximately $3.62 million (30%) of this total, divided nearly equally between residents of the Anchorage area and residents of other communities in the State;

- if the 8 employees at the mine's Anchorage office receive $35,000 per year, this would represent an additional $280,000 in direct annual income for residents of the Anchorage area; and,

- mine employees hired from outside of Alaska will receive approximately $900,000 (7.5%) of the total annual direct income generated by the mine.

TABLE C-3

RED DOG MINE
ESTIMATED DIRECT ANNUAL INCOME
(Millions--1983 Dollars)

	Participation Rate					
	CP%	FPP%	CP	FPP@350	FPP@ 400	Average of FPP Range Mid-Points
NANA Region*	40%	50-75%	$3.54	$5.63-8.44	$6.43-9.65	$ 7.54
Anchorage**	24	10-20	2.12	1.13-2.25	1.29-2.57	1.81
Other Alaska	24	10-20	2.12	1.12-2.25	1.29-2.57	1.81
Out of State ***	12	5-10	1.06	0.56-1.12	0.64-1.29	0.90
TOTALS:	100%	100%	$8.84	$ 11.25	$ 12.86	$12.06
Average Annual Earnings Per Job:			$62,000	$32,000	$32,000	$32,000

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

* Kotzebue Proportion of total shown = 46%.
** Does not include personnel at financial office in Anchorage.

*** Out of state employees who relocate to the Anchorage area.

Source: Office of Management and Budget, State of Alaska

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b. Indirect and Secondary Employment Income (Annual)

There is no convenient way to estimate the different wage levels and salaries received by Alaska employees in the various service and support industries. The annual income from the indirect and secondary jobs created in Alaska by the Red Dog Project has therefore been estimated on the basis of a fixed $25,000 per year for each such job created. The magnitude and distribution of these estimated income gains is shown in Table C-4. (See table C-4.)