

W.H. CRUTCHFIELD, JR.  
Mining Engineer

PRELIMINARY REPORT  
on the  
MINNESOTA- CONNOR MINES  
OF  
Chloride, Arizona

by

R. C. Jacobson, E. M.

(Registered Engineer, Arizona  
Certificate #56, Kingman, Arizona)

June, 1923

RAKE OF SHOOTS  
& INTERSECTIONS →

MINNESOTA- CONNOR MINE

W.M. CRUTCHFIELD, JR.  
Mining Engineer

Briefly: In my judgment you are very well warranted in expending from \$20,000.00 to \$ 80,000.00 in the further prospective development of the Minnesota-Connor property and an additional sum for the purely prospective development of the Manzanita-Uncle Abe vein systems.

The past history of the Minnesota-Connor property alone, when taken into consideration with that of the nearby producing properties in identical geological formations, would induce the above conclusion. But, when considering the fact that a most carefully prepared plan of systematic development having the recommendation and approval of experienced and practicable engineers, has almost reached the objective sought; and that by comparatively little expenditure you may take advantage of upwards of a \$100,000.00 worth of sound development whereby you may reach that same objective for but a fraction of the original estimate; the project becomes greatly enhanced and one that I can heartily recommend.

My report follows in detail:

At present the holdings of the Minnesota-Connor Company comprise nine mining claims covering about 140 acres of valuable mineral land situated less than a mile in a southeasterly direction from the town of Chloride, in the Wallapai Mining District of Mohave County, Arizona, and more particularly in Sections 2 and 11 in Township 23 North, Range 18 West, of the Gila and Salt River Base & Meridian, and are on record as follows:

Acres

20 Minnesota,	Recorded in Book 55 of Mines,	Page 468
12½ Pluto	" " " " " "	" 466
9 Mother Lode	" " " " " "	" 463
18 Wallapai	" " " " " "	" 471
18 Manzanita	" " " " " "	" 464
19 Uncle Abe	" " " " " "	" 465
20 General Grant	" " " " " "	" 468
14 Connor	" " " " 13 of Deeds	" 239
8 Pluto Ext.	" " " " of Mines	" 45

The Connor is a patented claim and held by deed from the U.S. Land Office; the remaining eight are held by amended location and annual assessment, sufficient work having been done on each, however, to permit of applying for patent.

The location, geology, development and production of the group are most ably discussed by Mr. Fox in the appended report, and I have little to add. However, from past experience and familiarity with the ore deposits of the Cerbat range, especially in this section, I have generally found the ore shoots to uniformly dip at rather flat angles to the North, and to be materially influenced by crossing or intersecting veins and dykes, or in fact by any post fissure disturbance whereby the

E-W intersections -  
→

CLAIM SKETCH  
MAP →

top of ore  
shoot exposed?

re-circulation of underground solutions would occur, forming a reconcentration of the mineral content, especially silver, lead and zinc. All these characteristics appear in well defined form on the Minnesota-Connor-Pluto ground and will likely show in the Manzanita fracture as well. I judge the gulch which heads about at the common end lines of the Minnesota and Connor claims on their eastern boundary and runs westerly to the valley thru the Pluto and Mother Lode veins, to be probably the surface trace of an east and west fault or movement plane very common further South in the Cerbat Range, and invariably associated with the better ore shoots found in Mineral Park, Todd Basin and Cerbat. To the North, the big ore shoot of the Tennessee seems to make or comes to the surface at a point where the fracture splits under a similar surface condition. This ore shoot on the Tennessee is one of the most important deposits of the district, and shows no depreciation in the winze below the 1000 foot level, except that in its rake to the North it passed beyond the end line of the Tennessee claim, which fact led to the abandonment by the U.S. Co and later to litigation. This fact I have in good authority from Mr. Bennett, the U.S. CO, 's mine foreman who was in charge of the later work. Mr. Bennett informs me that the hanging wall of the Tennessee was broken and hard to hold while the foot wall was very close to and often composed of a wide, hard, pegmatite dyke. This corresponds to the description of the Minnesota by Mr. Fox. The ores are about the same by analysis and from records of my office.

From the various maps and survey notes found in the mine office I have reconstructed a sketch map of the claims, also a plan and section of the 700 foot new shaft, and endeavored to trace the relation to the vein systems, the last may not be accurate, but I believe the information derived the best obtainable. You will note the very decided flattening of the vein at the 600 foot level, the corresponding straightening at the 700, indicating pressure from the east at this point, which in view of the fact that the ore was badly broken at the 600, will indicate a decided change below this influence if found to be more than of local occurrence, and may mean a better grade of ore when the vein assumes its normal dip.

The Independence vein evidently crossed or joined the Minnesota vein above the 280 foot level, as Mr. Virgin says no vein was encountered in the cross cut to the old works.

This being the case, it likely had a decided influence as shown in the width and value of the ore shoot at this point. So also it may be reasonable to suppose the intersection or crossing of the Pluto vein with the Minnesota, so if such be the case, will prove even of greater benefit, and an immense ore body may result. The relative position of the Pluto to the Minnesota on the 700 foot level should be ascertained.

The development of the 600 foot level to the North did not show mill ore for the width of the vein (so I am informed) but only in stronger and narrow widths in either wall. The best ore was encountered in the bottom of the drift in irregular lenses, usually apexing about 2 feet above the floor. This may mean the top of an ore shoot that will extend below the disturbed portion of the vein at this level.

W.H. CRUTCHFIELD, JR.  
Mining Engineer

Drifting in the 700 will likely show some improvements, and it might be well to raise to the 600 on one of the best showings with an occasional cross cut to the walls. Failing here to find the ore shoot of the same characteristics of that above, and after a careful mapping of the formation, it may be found that, in view of the evident disturbance in the foot wall resulting in the flattening of the vein, that the ore shoot, or even the entire formation of the upper levels, has been thrown to the North, and the lower portion may be found by drifting to the south to the presumed fault, traced in the gulch. However, this is only conjecture, but can be worked out by prospecting south on the 700 foot level.

Mr. Virgin, who has unwatered the mine twice, estimates this cost at \$4500.00 with the present equipment. But, as the condition of the shaft below water level, or more important, just at water level, has not been definitely ascertained, and as even the best of used machinery after standing idle 6 years may need unexpected repairs, I believe \$5,500.00 should be provided for this work, and, if any amount of lateral work is contemplated on the 700 foot level, the sump should be cleaned and deepened 10 to 20 feet. New air, water and steam columns will likely be required, all of which should not be smaller than 3 inch and galvanized, the water columns of extra strength. The several old pumps will be sufficient to control the water for your present undertaking.

Mr. Fox figures \$40.00 per foot for sinking, and \$16.05 for lateral work, and such was very close to our standard at that time. However, every item has increased since, except that of fuel oil, and that is off set by the 100 percent raise in timber. I judge, by consulting with operators of the district, that by adding 25 percent to the figures of Mr. Fox you will arrive at a very close approximation of the actual cost. \$50.00 per foot for sinking, and \$18.00 per foot for lateral work if sinking at the same time, and \$20.00 per foot if but 2 shifts only. I would recommend at least 500 feet of lateral work on the 700 foot level and 150 to 750 feet of raising, best determined after the drifts have been extended into the vein, and at least one cross cut to the Pluto vein from a point as near the 700 foot station as possible, and a cross cut to the north east to explore the foot wall will give valuable information.

The drifting should consist of at least 300 feet to the north or perhaps 400, as the rake of the ore shoot as shown on the old maps is quite flat. The rhyolite dyke might be made the objective of this drift, unless the formation encountered points to a more definite one. And, at least 150 feet of drift to the south, better 200 should encounter any fault plane if existing below the gulch. I believe the work should be done on the foot wall as that seems the only logical way to hold the ground, and the work should be kept as straight as possible, to avoid expense later, should the opening be needed for mining. Information as to other parts of the vein can be obtained by cross cuts at regular intervals. If the work is to be kept open the drifts will have to be well timbered.

E-W Dorothy vein

ALTALTA US  
MINNESOTA

Tennessee

" - - now about the only property  
worked below the 100' level."

The work outlined should give a reasonable basis for the geologists to work from, and for the engineer to outline a further development, and, unless a profitable ore body has been opened, \$1500.00 should be set aside at this period of the operation for a most thorough mapping and geological survey of the property which should determine the advisability and location of further exploration of the Minnesota vein.

I find on the estate 2 other veins that should be prospected thoroughly, the General Grant-Mother Lode vein and the Manzanita-Uncle Abe vein. A surface indications appear nearly as favorable to the existence of profitable ore shoots and on the Manzanita much longer than appear on the Minnesota-Connor ground, with the decided advantage that, if such shoots are opened, you may mine them from the surface down, taking full advantage of the entire output, making the richer upper levels pay for the deeper development, as your predecessors on the Minnesota should have done.

On my sketch map of the claims you will note the trace of a vein striking into the Mother Lode claims from the west, marked Dorothy vein. This is a small vein found by good prospecting and located on 2 small fractures between your holdings and the Altata property. The Altata is reported to have produced nearly as much as the Minnesota in early times from a series of short, very rich lenses, milling as high as 2000 silver ounces per ton, quick money, easily spent, without thought to its economic reinvestment in deeper development. The Dorothy appears also to be several small lenticular ore bodies along about the strike as sketched. At this writing the owners report finding a new ore shoot nearer the Manzanita in trenching; but its extent is yet undetermined. However, this fracture should cross the Mother Lode and perhaps make the ore body so long sought for, which, if found, would likely make the vein to the north of the gulch into the General Grant ground decidedly favorable prospecting. Mr. Fox reports the workings on all 4 claims mostly inaccessible, but we both find sulphide ore that undoubtedly came from below water level, carrying good mill value, which fact, taking into consideration the strength and extreme length of the outcrops, ~~justify~~ justify much more extensive prospecting. All 4 of these claims should be carefully examined at the time of the geological examination of the Minnesota 700 level.

In my opinion, they should make a valuable property, regardless of the Minnesota, and are worthy of just as energetic prospecting.

As mentioned before, the past production of the district has been enormous, considering the shallow workings, nearly all of the properties could, I believe, now be working had the original operators conserved their profits and set aside a systematic share for deeper development, and followed conservative business methods. The nearest property to your holdings so worked is the Tennessee Mine which was operated by the United States Smelting and Refining Company for a period of years (1911-1918) and worked with their customary energy, foresight and thoroughness, and is now about the only property worked below the 100 foot level. Its production is variously estimated from \$2,000,000.00 to \$10,000,000.00. However, knowing the U.S. Company's methods it is safe to say that it was never worked at a loss.

The mineral deposits of the Cerbat Range are nearly continuous from Chloride south to beyond Cerbat Canyon, a distance of over 10 miles, and are confined to a belt about 2 miles in width. About midway of this belt is an intrusion of porphyritic granite from which dykes, or fingers, extend several miles northwest and southeast, which are accompanied with sympathetic parallel fracturing, giving opportunity for the mineralization of the district. With the exception of 2 or 3 east and west systems near the main intrusion, the ore bodies are so closely related and bear such exact resemblance to each other that often ores found several miles apart seem identical. Some 4 miles south of the Minnesota the next deep workings are found, where the old Golconda Mined and almost similar ore body to the 1100 foot level, operating at a profit a 150 ton mill until burned---some say by sabotage --during 1917, which hasn't been rebuilt. This property was controlled by the Amster interests of Globe, with the American Metals Company owning the minority interest. Reported to have produced over \$1,500,000.00 in gold, lead and zinc. Between the Minnesota and Golconda are a dozen other mines with no production reports available in exact figures, but safe to say the majority have shipped several hundred thousand ounces of silver from above the 200 levels. With these two exceptions, there are no deep workings in the district, and no other large corporations have operated in a systematic campaign, and so I base my argument, that the Minnesota at this writing has no known rich oxidized ore reserves from which to pay the cost of deep development. You are fortunate to be able to take advantage of some \$100,000.00 worth of sound development and equipment whereby you have an equal theoretical opportunity to open a similar ore body on an equal economic basis with the two deepest mines of the district.

Respectfully submitted,

(Signed) R. C. Jacobson

Registered Professional Engineer

A S S A Y S

W.H. CRUTCHFIELD, JR.  
Mining Engineer

Record of samples assayed from various claims.

Sample Date	No.	Place	Metals				Total value all metals
			Ounces		Per cent		
			Au.	Ag.	Pb.	Zn.	
1912							
Jan. 8	1	Silver Bar, surface	.05	3.1			\$ 2.55
	2	" " "	.02	1.3			1.05
	3	Uncle Abe, breast tun.	.03	2.0			1.60
	4	Moth. Lode, 4" streak	.3	50.2			31.10
10	1	Sil. Bar tunnel, 8" wide	.05	2.75	3.5		6.00
	2	Same, 12" wide	.04	2.8	1.2		3.60
	3	Same, 18" "	.03	3.6	3.2		5.60
	4	Same, 6" "	.02	6.8	17.5		21.30
Mch. 19	1	Manzanita, so. shaft dump, coarse rock	.49	31.5			25.55
	2	Same place, fine rock	.4	20.4			18.20
	3	Sil. Bar, E. vein crop.	Tr.	2.0			1.00
	4	Manzanita, north shaft 125 ft. down, so. drift,	.02	11.7			
	5	Same place, 100 ft. down	.04	12.0			
	6	" " 30 " "	.21	72.6			
	7	Un. Abe dump, fine rock	.03	4.0			
	8	" shaft, 150 dft	.02	5.0			
May 25	1	Manzanita, north shaft 35 ft. down	.02	54.0			27.
	2	Same,	Tr.	28.9			14.40
	3	" "	"	38.0			19.00
Sept. 30	1	Pluto, S. W. Xcut,	"	23.8	4.1	1.55	20.75
	2	Same	"	1.2	.7	2.5	5.20
	3	Same	.02	1.8	.4	7.0	12.54
Oct. 10	4	Pluto, north drift,	.11	12.4			9.64
11	5	Minn. N. E. Xcut,	.04	10.0			6.80
	6	Same, zinc ore,	.04	7.2		23.15	28.50
	7	Pluto, S. W. Xcut,	.02	2.6		3.5	5.40
17	8	" South drift,	.05	6.0	.35	4.2	10.00
24	9	Independence, ( Vogt )	.04	6.0			4.40
25	10	Pluto, No. drift, 25ft.	.04	6.4	3.1	27.4	48.20
1913							
Mch. 19	11	Sil. Bar, lower tunnel,	.03	3.1	6.1		7.85
	12	Same (both in breast)	.02	2.6	8.0		9.00
	13	Manzanita, south shaft, Dump, coarse rock,	.25	48.95	9.4	7.5	49.80
	14	Same, fine rock,	Tr.	24.2		6.4	21.20
	15	Minn. 300 level old workgs., picked up from muck pile,	.03	21.4	25.2	10.3	47.60
May 17	16	Manzanita - Prospect hole	.02	2.6	Tr		1.76
Sept. 3	17	Sil. Bar - new tunnel	.05	3.0	8.75		8.90

THE MINNESOTA-CONNOR MINE

( Report on Preliminary Examination made by R. Kemp Welch, E. M., 1910 )

TELEGRAM :

Sent from Chloride, Arizona,  
April 16, 1910.

THE PROPERTY IS A VERY VALUABLE ONE, WELL PLACED FOR ECONOMIC DEVELOPMENT AND WORKING. SPLENDID ORE BODY, FAVORABLE TO A LARGE ECONOMICAL OPERATION AND A LARGE EXTRACTION. CAN SHIP 6 CARS OF ORE AT ONCE, FOLLOW WITH 10 CARS WEEKLY OF GOOD PAYING ORE. CONNOR DUMP HAS ~~XXX~~ 5000 TONS OF RICH TAILINGS THAT CAN BE SHIPPED AT ONCE.  
(Signed) R. KEMP WELCH.

PRELIMINARY REPORT :

Chloride, Arizona, April 17, 1910.

I have been down the Minnesota-Connor shaft "A" to the 200-foot level; the water is that high. Took samples from that level from 3 feet of ore, about 18 inches solid; was also down the Line Shaft "B" to water and secured samples of same sized ore body. There is 25 feet of ore in the bottom of Shaft "A" and the ore extends the full length of the lower level.

Was down in the south Connor shaft; it has 5 feet of fine ore.

Carbonates exposed in two places in the Manzanita shaft; there is a 3 to 4-foot ore body; took samples.

In the Mother Lode about the same rich ore. In the Uncle Abe, 5 to 10 feet of rich carbonate galena; took samples. Silver Bar claim has two veins, one 20 to 25 feet, one 3 to 5 feet; took samples. Will get down the Pluto and General Grant shafts tomorrow.

The Mineralization is very rich and strong right from grass roots, and strengthens in quality with depth, also maintains size of ore bodies.

The Mill, 5 stories, is as represented. Will require about 10 days overhauling, cleaning up and minor repairs. Good buildings and fine equipment. Electric light for mine, mill and all buildings.

There are two fine roads to Chloride, and the railroad station. This property can be made at once a great big producer of all classes of ore from soft carbonates to high sulphides.

The property without ore bodies is worth \$175,000.00. Will ship samples Tuesday.

(Signed) R. KEMP WELCH, E. M.

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Explanatory Note :

The Silver Bar Claim, referred to by Mr. Welch, was subsequently sold separately and development work on it opened an ore shoot of consequence. The 5-story mill was dismantled in 1930 and the machinery stored in sheds. While much of it is obsolete, some is still usable.

THE MINNESOTA-CONNOR MINE

**LOCATION.** The Minnesota-Connor Mine, one of the more important properties of the district, is about  $1\frac{1}{2}$  miles southeast of Chloride and half a mile south of the Payroll Mine, at an elevation of about 4400 feet. It lies at the head of an open gulch which drains southwestward into a Sacramento Valley. It is reached by good wagon roads of easy grade from the northwest and southwest.

**HISTORY AND OWNERSHIP.** The property is owned by the Phila. & Arizona Mining Company of Philadelphia, to which it was sold by John Barry about 1902. It consists of two claims, the Minnesota and Connor, joining each other end on. The property was located in the early eighties, since which time it has been a good producer, having yielded several hundred thousand dollars' worth of rich ore. In the early days the surface ores were worked by chloriders with handsome returns. Later the mine was leased to Kelley & McKennon, under whom it also was a prolific producer. During the last few years the property has been leased to a new organization, the Lehigh-Arizona Mng. Company.

**VEIN AND ORE.** The country rock is the usual pre-Cambrian complex, which here consists mainly of pressed microlite-biotite schist, hornblende schist, gneiss and ayanite. It is cut by dikes of vogesite or kersanite, which locally occur on either wall, by dikes of pale pinkish permatite or aplite, and by seams of epidote  $\frac{1}{8}$  to  $\frac{1}{4}$  inch thick. The vein strikes N. 50 to 50 W. and dips 60 to 70 SW. It is known to extend through a horizontal distance of 2400 feet and varies from 5 to 20 feet in width. Where exposed on the surface and in the shallow shaft southeast of the mill it stands about vertical and is 5 feet in width, but it is reported to flatten and widen as it goes down, and in the deeper part of the mine it has in places a width of 20 feet of good ore. The gangue is quartz, with some calcite, which locally seems to replace the quartz. The ore contains pyrite and arsenopyrite, as well as some chalcopyrite. The principal value is in silver, which in part is in the form of ruby silver, but the ore also contains some gold. Part of it is very rich, some large bodies running \$200 or more to the ton. The production is reported to be about \$100,000.00. (Refers to Lehigh-Arizona Company only) The property is developed to a maximum depth of 570 feet by four shafts and four levels, containing about 2500 feet of drifts and other work approximately as shown in Figure 9. The principal equipment is a very complete mill and hoists.

Owing to a suspension of operations and the presence of water, the mine was not accessible at the time of visit, except the Connor shaft southeast of the main workings. Here on the 50-foot level fair bodies of rich ore were found for a distance of 360 feet to the southeast of the shaft. ( See Figure 9 showing Plan of Workings. )

**NOTE :** At the time Mr. Schrader made the above report in 1909 there were but two claims but later the company acquired adjoining property of importance and built up a large group which has been held intact since.

Mr. Schrader spent several months making a thorough study of Mohave County mines and mineralized areas which he describes and illustrates more or less in detail in his Bulletin.

MINE ASSAYS - MINNESOTA-CONNOR MINE Mining Engineer

Where taken	Gold OUNCES	Silver OUNCES	Copper %	Lead %	Zinc %
	Au.	Ag.	Cu.	Pb.	Zn.
<b>ANZANITA CLAIM :</b>					
Vein outcrop, pink quartz,	1.2	7.4			
South shaft, coarse,	.49	31.5			
" " " "	.25	48.9		9.4	7.5
" " 100' level, coarse,	.2	25.0		12.1	6.2
" " " " "	.14	52.7	6.0		
" " " " fines,	.4	20.4			
North " 35' down,	.21	72.6			
" " " "	.02	54.0			
<b>UNCLE ABE CLAIM :</b>					
South shaft, coarse, from dump,	.02	23.7		4.5	
" Tunnel, lead ore,	.02	8.0		30.4	
" " " "	.22	4.5		8.3	
<b>MOTHER LODE CLAIM :</b>					
Tunnel, 4" Streak, shallow,	.3	50.2			
Prospect hole, 8" streak,	.04	58.0			
Shaft, 100' down, chalcopryite,	.1	38.6	19.5		
" drift,	.1	22.3			
<b>CONNOR CLAIM :</b>					
South shaft, open cut, dump, fines,	5.73	15.3	.4		
" " " "	1.13	31.0	1.2		
Coarse,	.03	70.0	8.8		
Lead ore,	.04	55.1	1.0	24.1	
"C" Shaft, 65' level, 7' wide,	.1	6.8		.8	3.4
Average of sorted ore (1902)	2.96	337.0			
<b>MINNESOTA CLAIM :</b>					
New shaft, 600 level, No. drift,	.08	14.8			
Zinc ore,	.08	43.2			15.9
700' Level, footwall,	.6	4.2			6.2
<b>Pluto Claim :</b>					
Crosscut on 280' level, zinc ore,	.04	6.4		3.1	27.4
" " " "	Tr	23.8		4.1	
<b>MINNESOTA-CONNOR DUMPS :</b>					
Average of several piles, 1914 cobbing,	.08	17.7			
Around Line Shaft ( See "B" on map)	1.6	60.4			
" " " "	.4	18.6			
Copper ore, massive sulphide ore,	.1	129.6	18.2		
" " " "	.26	23.7	2.3		
Average of cobbled pile,	.44	20.0		1.8	3.0
Average of 67 samples of low grade ore from these dumps was \$17.72 at December, 1926, prices, as sampled by Needles Smelter.					

W.H. CRUTCHFIELD, JR.  
Mining Engineer

(Above assays date from 1912 to 1933)

**THE MINNESOTA-CONNOR MINE - what the experts say about it:-**

W.H. CRUTCHFIELD, JR.  
Mining Engineer

- F. M. KURIE, E. M., Philadelphia.** Formerly general manager and consulting engineer of the famous Portland Mine, Cripple Creek, Colorado.  
"I am certain the property will make good. Have never seen anywhere so many good strong veins outcropping in so small a space. It will prove to be an immensely profitable venture, and can be put on a paying basis for very little money." (From report when examining mine in 1911).
- R. KEMP WELCH, E. M., Philadelphia.** (From report made in 1910).  
"The property is a very valuable one, well placed for economic development and working. Splendid ore bodies, but even without the ore it is worth the price asked. The Mineralization is very rich & strong right from grass roots."
- WILLIAM TOVOTE, E. M.,** Field engineer for Phelps-Dodge Company, 1916.  
"A great mine. This vein (Minnesota-Connor) will never quit. I worked on the 400 level during E. T. Loy's management and was frequently all through the mine. The size of that ore shoot and its richness made a lasting impression on me." (From personal inspection of vein on 700 level in 1916 just prior to closing down for lack of funds. As a young engineer just out of Freiberg and seeking practical experience, Tovote had worked in the mine during production)
- E. T. LOY, General Manager Phila. & Ariz. Mng. Co., 1899-1905.** (From old correspondence)  
"We have a wonderful body of Ore, rich in silver and running well in gold. At one place it resembles a jewelry shop. Our mill is working steadily and we have picked a winner in the Minnesota-Connor."
- R. C. JACOBSON, E. M., Kingman.** (From his report of 1923. Having spent a lifetime at Kingman in professional work, Jacobson knows Mohave County mines and their ores).  
"You are fortunate to be able to take advantage of some \$100,000 worth of sound development and equipment whereby you have an equal theoretical opportunity to open a similar ore body on an equal economic basis with the two deepest mines of the district (Tennessee and Goleconda), and the project is one that I can heartily recommend."
- H. L. McCARN, E. M., Kingman, 1928.** Former superintendent of Rainbow and other mines near Minnesota and who often visited the latter property on trips of careful inspection of the big vein systems and workings.  
"The Minnesota-Connor has a splendid record, for it is a great mine. Deeper development should be carried out, not only on the Minnesota-Connor vein itself, but on the other large vein systems as well. That Uncle Abe vein especially looks good to me; it should develop into a large ore shoot if your people will sink on it."
- E. M. BIND, E. M.,** Chloride, 1919. Manager of Emerson property which adjoins Minnesota on the south. Bind was over the Minnesota-Connor ground every day during 1917-1919. Had mined extensively all over the West and Mexico.  
"I like this property; one of the best I have ever seen. Such big, strong veins; no wonder they had a great ore body in those old workings. If they will go on down with that shaft and tap the ore at depth they will have a bigger mine than ever."
- J. H. MacDONALD,** foreman of Portland Gold Mine at Cripple Creek and Ray Consolidated Mine at Ray, Arizona, then superintendent of Minnesota-Connor 1911-1916.  
"The Minnesota-Connor vein at 600 feet is 25 feet wide and looks exceptionally good; it is just like it is where I have seen it in the old workings above. We should sink to the junction of the Minnesota and Pluto veins and, based on the past history of the mine, we can reasonably expect- and I'm sure we will find- an enormous ore body from the junction of two such strong veins."

W.H. CRUTCHFIELD, JR.  
Mining Engineer

01' Diggin's

( Extracts from mining news of 30 years ago as taken from original files of Mohave County Miner. These news items now being re-printed in current issues under above named caption. The following refer to the Minnesota-Connor Mine.)

The bottom of the Minnesota shaft has reached into a new ore body that is reported to be large and very rich in silver. This strike has had its effect on all the mines of the big lead camp and there are few, if any, miners not now employed at good wages. The Minnesota has reached to the 600' level and shows the possibility of deep work in the Chloride mines. April, 1902.

At the 400 level of the Minnesota-Connor mine at Chloride a 4-foot body of ore has been entered that runs 4½ ounces gold and 300 ounces silver. The ore as it comes to the surface shows a mat of silver glance that is beautiful to look at. July 15, 1902.

On the 400 level of the Minnesota mine at Chloride a strike of ore has been made that is said to average better than 12 feet in width and that has an average value of better than \$50. Streaks through the ore body will average up in the hundreds of dollars, but the whole mass will carry sufficiently high to make the ore a big paying proposition. Supt. Loy, who has been getting the mine in shape for production the past year, is jubilant over the strike. July 22, 1902.

Everyone believed the Minnesota mine to be a silver property in toto, but the recent sales of ore from the property show better than two ounces gold and 320 ounces silver. The ore body is large and on every side of the great stope is the same character of ores. No larger ore body was ever found in the mine and the shipments are made direct without assorting, giving the property a wonderful value. August 12, 1902.

On the 500 level of the Minnesota mine a station is being cut, preparatory to crosscutting the vein and drifting on the vein. This is one of the very important properties of the Chloride section, having produced a great tonnage of exceptionally rich ore, the content being silver. Gold ore has been found along the upper levels and it is expected that betterment of gold will be found on the lower level. October 7, 1902.

A new electrical plant is being installed at the Minnesota-Connor mine at Chloride to facilitate the work of sinking the new shaft below the old levels, where a big tonnage of silver ore was extracted during the past several years. Some nice gold ore has been opened up in the mine and the mill is now capable of turning out a fine grade of concentrates. Dec. 24, 1902

An immense ore body has been opened up on the 500 level of the Minnesota mine at Chloride. The 400 level shows no diminution in size and the same is apparently true where the 500 levels are being carried off. These drifts show the best ore the mine has ever opened and that is going some.

John Barry was in town this week and was happy over the returns of a shipment of ore made to Pueblo Smelter for the lessees of the Minnesota-Connor Mines. The shipment netted them \$4000.00. ( From item under caption of "FIFTY YEARS AGO " dated August 1, 1888. )

MINNESOTA-CONNOR MINE - Smelter Settlements.

Average shipments selected at random from original record of smelter settlements covering 110 cars of raw ore and concentrates shipped during 1901-1904 by Philadelphia Company.

CAR NO.	WEIGHT lbs.	OUNCES		%		Value per Ton. \$	Net Proceeds \$	
		Gold	Silver	Copper	Lead			
20540	43041	1.22	62.6		3.4	55.28	1064.90	#
15648	39707	.87	41.6			36.13	491.95	#
17211	40230	1.45	47.3		1.5	48.77	643.63	#
	2560	.08	24.3		56.5	44.70	155.28	
13395	40857	1.47	147.5		2.2	100.32	1745.21	X
13591	41511	.19	31.2	3.0		20.28	240.62	X
14269	41481	1.39	112.3			81.30	1427.56	X
21909	62391	.3	27.0		2.3	11.86	319.30	#
18460	42963	.88	76.2	8.9		50.16	830.34	#
5559	41624	.41	32.3	.4		19.32	187.09	X
20064	44847	.36	46.5	4.2		29.73	434.36	X
13592	41481	.32	37.7	4.0		24.31	284.02	X
15528	41562	.55	51.8	1.0		31.27	455.89	#
17394	43510	.62	73.6			37.30	811.46	#
18604	45778	1.01	90.3			40.52	1017.86	X
20797	43974	.48	59.5		4.0	26.05	572.76	#
19478	43130	.55	76.1			38.29	825.72	#

NOTE 1

Cars marked # are concentrates, while those marked X are raw ore. In the above values gold was figured at \$19.00, silver around 50¢, lead 2 or 3 cents and 8¢ for copper, making the average value per ton in net proceeds about \$33.00 per ton. At 1940 values this is equivalent to around \$55.00 per ton net proceeds, and all of this material now takes a much lower freight and treatment charge. The above list includes high, low and average cars shipped.

W.H. CRUTCHFIELD, JR.  
Mining Engineer 1902

EL PASO, TEXAS,

Loy Gen Mgr Philadelphia Var. No. Co.  
Chloride ar. 27

This is to advise you of weight, moisture and assay of the following lots of ore shipped to  
El Paso Smelting Works

W.H. CRUTCHFIELD, JR.  
Mining Engineer

Smelter	CAR		WET WEIGHT	H2O		ASSAY		
	No.	Initial		%	Cont.	Au. Oz.	Ag. Oz.	Pb %
509	15216	A.T.	39050	1		0.65	78.20	
						0.68	77.50	
						0.72	80.00	
						0.70	80.00	

The Moisture is reported at 1%, it did not carry 1%, but the smelter charges 1% arbitrarily in case the moisture is less than 1%.  
I send you pulp by mail today.  
W.J. Taylor Agent.

RATES ON ORE  
PER TON

	VALUE	% OVER		% OVER		% OVER
	\$ 35	35	50	50	100	100
CHLORIDE PUEBLO	\$ 8.60	10.35		12.25		14.70
" KINGMAN	2.10	2.35		2.75		3.00
KINGMAN + PUEBLO	6.50	8.00		9.50		11.70

Shaft D - 100' deep - on top of the hill by the road.

28 oz. Ag.

2 or 3% Cu.

Between D shaft and end line outcropping showing Cu.

Between tunnel & 100' level about \$18. assay in Pb. & Cu.

---

Common shaft - 200'

not much lead in common - but zinc - & mostly Cu.

---

N. shaft in manzanita - 100' deep. short drift on 70' level

Fred worked on 40' level - about 40' drift - 25' other way Ag. & Cu. - oxidized Cu. smelter rock

---

Another lode - Cu. & Ag. Shaft 200'

---

Several traver  
tunnel about 300'

W.H. CRUTCHFIELD, JR.  
Mining Engineer

W.H. CRUTCHFIELD, JR.  
Mining Engineer

AUGUST, 1944

39

April 28, 1982

Minnesota-Connor

NOTES

NB. Need to acquire Altalta & Altalta Ext. on northwest extension of Uncle Abe and Uncle Abe extension.

Altalta & Altalta Ext. Produced: (Dings p.147)

<u>Au(oz)</u>	<u>Ag(oz)</u>	<u>Cu(#)</u>	<u>Pb(#)</u>	<u>Zn(#)</u>
382	36,024	136,616	7,691	---

Minnesota-Connor

2890	228,129	50,702	169,722	71,053
------	---------	--------	---------	--------

Need a BIM map showing patented claims

Johnny Bull - Shaft 88' Tennessee Vein

No drifting or stoping known

D.H. Hole #8 - See Bur. of Mines report RI=3998/1947  
and Dings P.160 for 1943 drilling.  
DH #8 only 100 ft. depth-top or Ore Body?

Altalta - Southernmost extension of Tennessee Vein.

Altalta Ext. on southeast extension of Tennessee Vein (?)  
which includes the Manzanita, Uncle Abe, Uncle  
Abe ext.

Dip of Veins

Commonly Steep - Strike commonly N30W to N60W  
Northern Group - 57% northeasterly  
25% southwesterly  
18% vertical

Wm. H. Crutchfield, Jr.

Tetter  
1930 Report P.S. ~~the~~ Virgin, Mgr.  
Spring on Wallepoi # 2 claim

" Minnesota ores contain enough copper  
to lower materially the treatment charge  
even when there is not enough copper  
content to be paid for "

Santa Fe Mining, Inc.

---

4775 Indian School Road N.E., Suite 100  
P.O. Box 3588  
Albuquerque, New Mexico 87190  
505/262-2211

January 10, 1984

76.0360-II  
- Chloride Project  
- Mippon Mining Co., Ltd.

Mr. Mark A. Liggett  
Exploration Research Assoc.  
1701 Clinton Street  
Suite 212  
Los Angeles, CA 90026

Dear Mark:

Attached you will find my January 4, 1984 interval correspondence to Mr. R. G. Marvin recommending that serious consideration be given to your client, Nippon Mining Co., Ltd, re exploration of the Minnesota-Conner group at Chloride, Arizona.

Also attached is handwritten reply from Mr. R. G. Marvin, received January 9, 1984 giving me authority "to access all your Chloride data to Nippon". Also note the one-half interest proviso. Certainly a firm legal arrangement needs to be made before any exploration begins but I suggest Marvin's initial approval is sufficient at this point to enable you to consider approaching Nippon as to its interest.

I suggest that we discuss this matter during our Los Angeles meeting January 25-26, 1984.

Sincerely,



Wm. H. Crutchfield, Jr.  
Director - Exploration

WHC:law

Attachments (2)



EXPLORATION RESEARCH ASSOCIATES Incorporated

1701 Clinton Street  
Suite 212  
Los Angeles, California 90026  
Telephone [213] 483-5127

15 December 1983

Santa Fe Pacific Railroad Company  
4775 Indian School Road  
P. O. Box 3588  
Albuquerque, New Mexico 87190

RECEIVED

DEC 19 1983

Attn: William H. Crutchfield, Jr.  
Director of Exploration

WM. H. CRUTCHFIELD, JR.

Subject: Chloride prospect, Mohave County, Arizona

Dear Bill:

I am writing in response to our recent telephone conversation regarding Santa Fe's interest in seeking a lessee or joint venture partner for the Chloride prospect.

One of our clients is Nippon Mining Company, Ltd. which is currently interested in becoming involved in precious and base metal exploration and mining ventures in the United States. Although Nippon Mining is known in the U.S. primarily for its copper smelting operations, it operates several medium size underground mines in Japan.

Although I have not discussed any specifics of the Chloride prospect with Nippon Mining, it is my impression, as a result of extensive meetings with them, that Chloride closely fits many of their project criteria.

One possible stumbling block is Nippon's interest in working with an American or Canadian company which would serve as the operator/manager. I am not certain, however, that this requirement is necessary for an "exploration phase" project such as Chloride.

At Santa Fe's request, I will be pleased to make inquiries with Nippon Mining regarding their possible interest. However, it would be helpful to have some idea what sort of deal Santa Fe is looking for, and I think it is imperative that there is a clear understanding between Santa Fe and Exploration Research Associates regarding obligations, confidentiality, etc. Some considerations which come to mind are as follows:

1. Assuming that Nippon Mining Company (or any other prospective lessee or JV partner) has executed a suitable confidentiality agreement with Santa Fe, I think it is

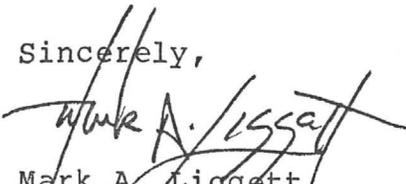
important that they have access to all available data on the Chloride prospect. I believe that any restrictions on data would be damaging to Santa Fe's credibility as well as ours.

2. In the event that Nippon Mining (or other lessee or JV partner) wished to employ Exploration Research Associates as a consultant on the Chloride project, I would expect that Santa Fe would give written clearance for us to do so. This clearance would relate specifically to the Chloride prospect, and would in no way limit our contractual obligations regarding confidentiality for any other portions of the Mohave Project Area.
3. In the event that Exploration Research Associates introduces a client to Santa Fe and subsequent negotiations result in a business relationship, I would expect that Exploration Research Associates would be entitled to any royalty interest or other form of finder's fee as may be required by our contractual agreement with that client. In short, we would be able to act as a free agent, subject to the general considerations of Paragraphs #1 and #2.

The above are preliminary thoughts, and although other business arrangements are certainly possible, I think that these considerations would provide for a straight-forward working relationship.

With your authorization, I will be pleased to discuss this matter with Nippon Mining to see whether further discussions appear warranted.

Sincerely,



Mark A. Liggett  
President

P.S.

Enclosed is an excerpt from Nippon Mining Company's 1983 annual report.

DRAFT

*MAL mailed revised  
copy to Nippon  
Feb 1/84*

*Revised in Los Angeles  
meeting MAL - WHC Jr  
January 25, 1984  
WHC*

20 January 1984

Mr. Hisashi Mizumoto  
General Manager  
Nippon Mining Co., Ltd.  
820-1100 Melville Street  
Vancouver, B.C. V6E 4A6  
Canada

**Subject: Silver-lead-zinc prospect controlled by Santa Fe Mining, Inc., Chloride mining district, Mohave County, Arizona**

Dear Mr. Mizumoto:

I am writing this letter to provide you with background information on the Chloride properties controlled by Santa Fe Mining, Inc., the exploration and mining subsidiary of Santa Fe Industries. We have been involved in geological evaluation of these properties for several years as consultants to Santa Fe, and feel that they represent a first-rate exploration prospect. However, because of budgetary constraints and management policy, Santa Fe has decided to seek a joint venture partner for further evaluation of the prospect.

Santa Fe controls one patented lode claim and 13 unpatented lode claims in the central portion of the Chloride mining district. The Chloride district is located in the west-central Cerbat Mountains approximately 20 miles north of Kingman, Arizona. The claims are located in Sections 3, 10, and 11 of T23N-R18W in the Chloride 7.5' quadrangle. The

approximate claim boundaries are shown in the accompanying map.

#### Historical Background:

Silver mining began in the Chloride mining district in the early 1870's and reached its peak in the late 1890's. This early production of high-grade silver and gold ores from the shallow oxidized portions of sulfide veins which had undergone extensive supergene enrichment. The principal ore mineral mined during this "bonanza" period was cerargyrite (AgCl) from which the Chloride district acquired its name.

As the high-grade ores were depleted, production of base metals took over in importance. Combined production records for mines in or immediately adjacent to the Santa Fe claims show that 4,146 ounces gold, 306,107 ounces silver, 223,775 pounds copper, 579,058 pounds lead and 515,878 pounds zinc were produced between 1901 and 1948 (Dings, 1951). Although grades were variable, the custom ore milled by Mineral Park Mining Company from 1945 to 1947 is estimated to have averaged 0.05 oz/ton gold, 3.5 oz/ton silver, 0.4% copper, 3.3% lead and 5.7% zinc (Thomas, 1949). These grades are believed to be representative of the sulfide ores of the district.

The Santa Fe claims cover three major vein systems known as the Minnesota-Conner, Pluto and Uncle Abe-Manzanita veins. These vein systems have a total strike length of over 15,000 feet.

The vein systems exposed at the surface vary from a few

inches to six feet in thickness but zones of intense alteration and silicification surrounding the veins are up to 100 feet in width. Some vein systems, such as the northwestern extension of the Manzanita system, consist of numerous thin veins forming zones up to several hundred feet in width. The veins are composed primarily of quartz with minor amounts of calcite, epidote, chlorite and clays. The most abundant sulfide minerals include galena, pyrite, sphalerite, chalcopyrite, and a variety of secondary minerals. Most surface exposures of the veins are oxidized and the depth to sulfide ore is variable throughout the district.

The host rocks for the veins consist of Precambrian amphibolite, quartzofeldspathic gneiss, muscovite-biotite schist and gneiss, pegmatite and alaskite, equigranular to porphyritic granite, quartzite (iron formation?), and garnetiferous fibrous silicate rock. Lamprophyre, aplite, and rhyolite dikes of Laramide(?) age are found along some of the veins systems.

Most of the old mines located within the Santa Fe claims worked shallow supergene mineralization; the deeper sulfide mineralization was generally not economic for small-scale mining ventures, and has not been adequately tested. No recent mining or significant exploratory drilling has been performed on the Santa Fe claims.

**Land Status:**

As with many old mining districts, the Chloride district is covered by a complex mosaic of patented and unpatented lode claims, many with overlapping boundaries and contested ownership. Santa Fe's property was acquired from a respected and successful miner who is a long-time resident of Chloride and who has worked on acquiring clear title to these particular claims over a period of nearly 30 years. The claim names and locations are as follows:

<u>Claim</u>	<u>Section</u>	<u>Status</u>
Conner	11	Patented
Conner Sideswipe	11 & 2	Unpatented
Conner Extension North (Minnesota)	2 & 11	"
Conner #4 (Pluto Extension)	2 & 11	"
Conner #5 (General Grant)	2 & 11	"
Conner #6 (Mother Lode)	11	"
Uncle Abe Lode	11	"
Uncle Abe Ext. (Manzanita)	11	"
Times Square Claim #1	11	"
Times Square Claim #2	11	"
Times Square Claim #3	11	"
Times Square Claim #4	11	"
Times Square Claim #5	11	"
Times Square Claim #6	11	"

Note that Santa Fe does not control those portions of the Conner Sideswipe, Conner Extension North, Conner #4 and Conner #5 claims which are located in Section 2 (an Arizona state section).

### Applicable Proprietary Reports:

Santa Fe Mining, Inc. has agreed to release to prospective joint venture partners, upon execution of a suitable non-disclosure agreement, all data in its possession regarding the Chloride properties. The following is a listing of the applicable proprietary memoranda and reports prepared by Exploration Research Associates Inc.:

10 May 1982: Miscellaneous dump samples from Chloride mining district, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 2 p.

October 1982: Minnesota-Connor Mine; collection of correspondence and data held by C.G. Patterson, and compiled by William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 45 p.

14 January 1983: Map showing approximate claim boundaries in the Chloride district, Cerbat Mountains, Arizona, Section 2, 3, 10, & 11, T23N-R18W; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 2 p.

14 January 1983: Preliminary geologic map of the Minnesota-Conner mine area, Chloride district, Cerbat Mountains, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 2 p., Explanation to accompany preliminary geologic map, 2 p.

17 January 1983: Description and assay results from samples collected 21-23 November 1982 in the Chloride district, Cerbat Mountains, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 5 p.

1 February 1983: Sample descriptions and analytical results for samples collected from 17 to 23 November 1982, Secret Pass area, and the Chloride district, Black Mountains and Cerbat Range, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 7 p.

- 17 February 1983: Description and assay results from samples collected on 21 November 1982 in the Chloride district, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 3 p.
- 7 March 1983: Descriptions and analytical results for samples collected by L. Bradfish, 7-8 February 1983, in the Chloride district, Cerbat Mountains, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 2 p.
- 7 March 1983: Emission spectrographic analyses of selected samples from the Chloride mining district, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 2 p.
- 23 March 1983: Analytical results for samples collected between 7 February and 10 February 1983, Secret Pass prospect area, Black Mountains and Chloride district, Cerbat Mountains, Mohave County, Arizona. Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 9 p.
- 1 April 1983: Geologic maps of the Secret Pass and Chloride prospect areas; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 1 p.
- 12 April 1983: Memorandum from L. Bradfish regarding new activity in the Chloride district; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 1 p.
- 27 April 1983: Chloride Phase I drilling proposal (draft); Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 5 p.
- 6 May 1983: Preliminary cross sections and plan maps of proposed drill holes for veins on the Patterson claims in the Chloride district, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 1 p.
- 25 May 1983: Analytical results for samples collected in the Chloride district, Cerbat Mountains, Mohave County,

Arizona, 4-5 April 1983; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 4 p.

27 June 1983: Information and results from VLF survey in the Chloride district, 6-11 June 1983; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 3 p.

8 July 1983: Preliminary estimates of inferred ore reserves for the Patterson Group of Claims, Chloride mining district, Mohave County, Arizona; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 9 p., 4 tables.

11 July 1983: Geological sketch map of the Manzanita-Uncle Abe vein system showing positions of VLF survey lines: Interpretation and Inferences; Memorandum to William H. Crutchfield, Jr., Director of Exploration, Santa Fe Pacific Railroad Company; 9 p.

#### Published References:

Bastin, E.S., 1925, Origin of Certain Rich Silver Ores near Chloride and Kingman, Arizona: U.S. Geological Survey Bulletin 750B, p. 17-39.

Dings, McClelland G., 1951, The Wallapai Mining District, Cerbat Mountains, Mohave County, Arizona: U.S. Geological Survey Bulletin 978-E, p. 123-163.

Eidel, J.J., Frost, J.E., and Clippinger, D.M., 1968, Copper-Molybdenum Mineralization at Mineral Park, Mohave County, Arizona: in Ore Deposits in the United States 1933/1967, John D. Ridge, editor, AIME, Inc., New York, p. 1258-1281.

Hernon, M., 1938, Cerbat Mountains: University of Arizona, Arizona Bureau of Mines Bulletin 145, p. 110-117.

Schoder, Jacob, and Allsman, Paul T., 1939, Mining and Milling Methods and Costs at the Tennessee-Schuylkill Corporation Mine, Chloride, Arizona: U.S. Bureau of Mines Information Circular 7077, 20 p.

Schrader, Frank C., 1909, Mineral Deposits of the Cerbat Range, Black Mountains and Grand Wash Cliffs, Mohave County, Arizona: U.S. Geological Survey Bulletin 397, 226 p.

- Schrader, Frank C., 1917, Geology and Ore Deposits of Mohave County, Arizona: Transcripts from the American Institute of Mining Engineering, Bulletin 119, p. 1935-1967.
- Schrader, Frank C., 1917, Geology and Ore Deposits of Mohave County, Arizona: Am. Inst. Min. Engineering Bulletin, no. 56, p. 195-236.
- Tainter, Stanton L., 1947, Johnny Bull-Silver Knight Lead-Zinc Property, Cerbat Mountains, Mohave County, Arizona: U.S. Bureau of Mines Report of Investigation RI3998, 14 p.
- Tenney, J.B., 1929, History of Mining in Arizona: University of Arizona, Arizona Bureau of Mines Open-File Report, 514 p.
- Thomas, Blakemore E., 1949, Geology and Ore Deposits of the Wallapai District, Arizona: Ph.D. thesis, California Institute of Technology, Pasadena, California, 187 p.
- Thomas, Blakemore E., 1949, Ore Deposits of the Wallapai District, Arizona: Economic Geology, vol. 44, p. 663-705.
- Thomas, Blakemore E., 1953, Geology of the Chloride Quadrangle, Arizona: Geological Society of America Bulletin, vol. 64, p. 391-420.
- Wilkinson, William H., Jr., Vega, Luis A., and Titley, Spencer R., 1982, Geology and Ore Deposits at Mineral Park: in Advances in Geology of the Porphyry Copper Deposits, Southwestern North America, Spencer R. Titley, Editor, University of Arizona Press, Tucson, p. 523-541.

**Business Relationship:**

Santa Fe management has expressed interest in negotiating a joint venture agreement with a qualified partner under which the partner would earn a 50% interest in the Chloride properties in exchange for funding further exploration to the point of an engineering and feasibility study. The specific terms and conditions of such a joint venture agreement are negotiable.

In the event that you feel that this opportunity may be of interest to Nippon Mining Company, Ltd., I suggest that we execute a non-disclosure agreement in order to clear the way for you to review the available proprietary data. Following such a review, it will be a pleasure to arrange a field trip and a meeting with Santa Fe management.

In the meantime, I will be happy to loan you copies of published references on the Chloride mining district.

Best regards,

Mark A. Liggett  
President

cc: P.W. Allen

"Nippon Mining Company, Limited is Japan's largest non-ferrous metal producer and a major petroleum refiner and petrochemical producer with a history of 70 years.

93984

~~The largest~~

~~producer~~

In addition to holding first rank in copper production, sulfuric acid, cobalt, and brass mill products the Company also maintains a leading position in the production of zinc, gold, silver, ferro-nickel, and nickel.

1905 opens Hitachi Mine

1983 Copper - <sup>mining operations in</sup> Zaire



EXPLORATION RESEARCH ASSOCIATES Incorporated

1701 Clinton Street  
Suite 212  
Los Angeles, California 90026  
Telephone [213] 483-5127

15 December 1983

Santa Fe Pacific Railroad Company  
4775 Indian School Road  
P. O. Box 3588  
Albuquerque, New Mexico 87190

RECEIVED

DEC 19 1983

Attn: William H. Crutchfield, Jr.  
Director of Exploration

WM. H. CRUTCHFIELD, JR.

Subject: Chloride prospect, Mohave County, Arizona

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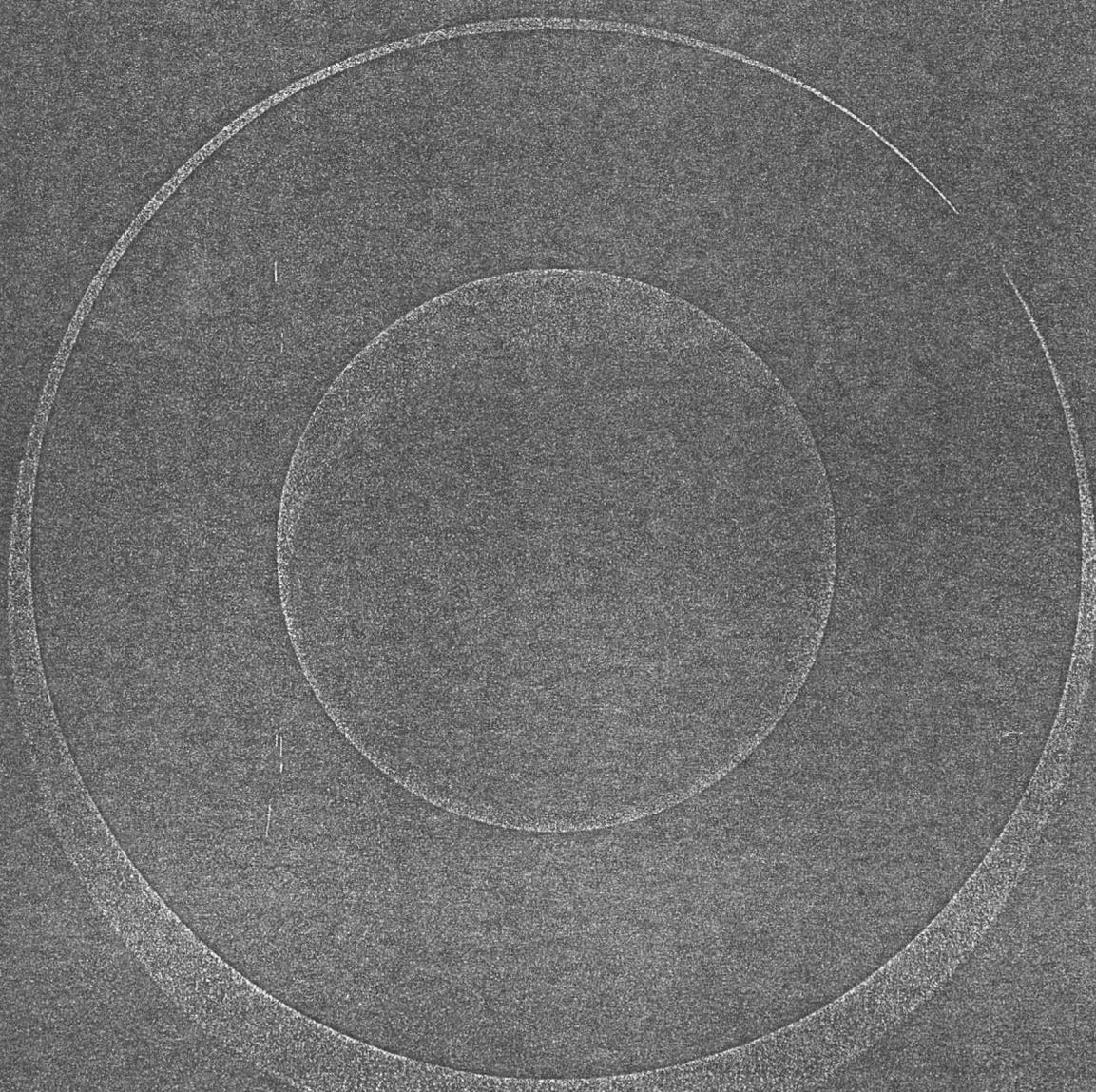


Mark A. Liggett  
President

P.S.

Enclosed is an excerpt from Nippon Mining Company's 1983 annual report.

**NIPPON MINING COMPANY, LIMITED**  
**ANNUAL REPORT 1988**



## Profile

**Nippon Mining Company, Limited is Japan's largest nonferrous metal producer and a major petroleum refiner and petrochemical producer with a history of seventy-eight years.**

**The Company ranks first in Japan in the production of copper, sulfuric acid, cobalt, and brass mill products. The Company also maintains a leading position in the production of zinc, gold, silver, ferro-nickel, nickel, etc. In the field of petroleum refining, the Company maintains about 6% of the oil refining share in Japan, and is the foremost shareholder of Kyodo Oil Company, the third largest oil marketing concern in Japan.**

**In addition to a unique combination of nonferrous metal and petroleum processing as its main pillars of business, the Company is geared to dynamic and diversified operations ranging from brass milling and natural gas production to a rapidly growing electronic and specialty metals production. The Company also continues actively to pursue technological development in the fields of electronics materials and new energy sources.**

**The activities of the Nippon Mining Group of companies, which currently number 104 in Japan and abroad, extend beyond those mentioned above to oil-drilling, petrochemical production, mining, land and marine transportation, machinery, engineering, information processing and trading. All of these companies work in a close and harmonious relationship to achieve an integrated growth as the Nippon Mining Group of companies.**

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## Brief History

- 1905 Fusanosuke Kuhara opens Hitachi Mine
- 1908 Smelting and refining plants built in Hitachi
- 1912 Kuhara Mining Co. established to incorporate these previous activities
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- 1929 Nippon Mining Company established within NISSAN, a continuation of the reorganization of Kuhara Mining Co.
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- 1939 Oil refining business added with the purchase of the Funakawa Oil Refinery
- 1949 Technical Research Center established in Saitama Prefecture
- 1950 Metal fabrication launched at the Kawasaki Plant
- 1959 Production of natural gas from the Nakajo Gas Field begins
- 1961 Mizushima Oil Refinery begins operation
- 1964 Brass mill operations inaugurated at the Kurami Works
- 1965 Mitsuichi Smelter acquired
- 1966 Marketing branch of the petroleum operation transferred to new Kyodo Oil Co.
- 1969 Sodegaura Lubricant Plant begins operation
- 1972 Musashi Mine (Zaire) begins production of copper concentrate; Tomakomai Chemical Co. established
- 1973 Abu Dhabi Oil Co. (U.A.E.) commences crude oil production
- 1977 Lubricants and Petroleum Products Laboratory opened
- 1978 Nikko Nickel Cobalt Refining Co. begins commercial production
- 1979 Chita Oil Co. (former Toa Kyoseki) acquired
- 1981 Nikko Gold Foil Co., Ltd. and Nikko Waterlime Inc. (U.S.A.) established
- 1983 Copper mining operation in Zaire ceded to the Zairian Government; Business of Chita Oil Co. transferred to Nippon Mining

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# Highlights of the Year

NIPPON MINING COMPANY, LIMITED

## Consolidated

For years ended March 31	Yen in millions (except per share data)		U.S. Dollars* in thousands (except per share data)	
	1983	1982	1983	1982
	(FY 1982)	(FY 1981)	(FY 1982)	(FY 1981)
Net sales .....	¥1,400,337	¥1,316,576	\$5,834,738	\$5,485,733
Net income .....	4,982	(8,377)	20,758	(34,904)
Net income per share .....	6.98	—	0.029	—
<b>As of March 31</b>				
Total assets .....	972,348	1,018,957	4,051,450	4,245,654

## Consolidated

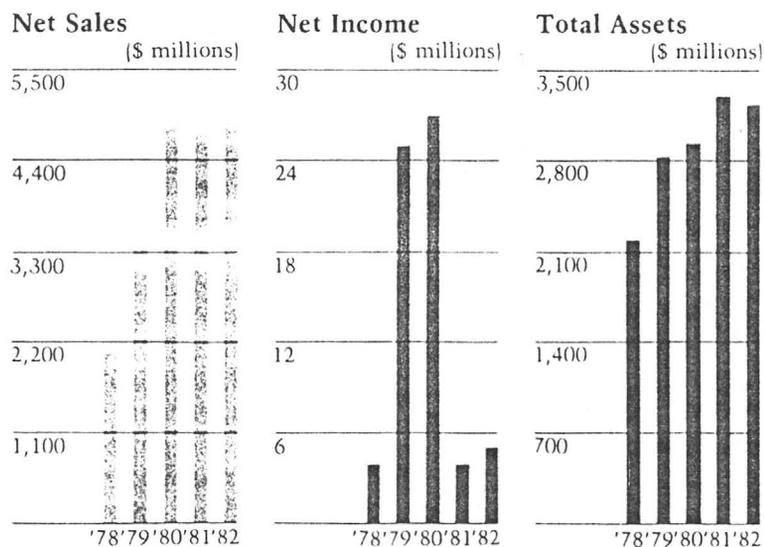
Sales in \$ millions (percentage of total sales)

Product	1983	(FY 1982)	1982	(FY 1981)
Petroleum Products .....	\$4,584	(78.6%)	\$4,219	(76.9%)
Copper .....	443	( 7.6 )	455	( 8.3 )
Fabricated Metal Products.....	202	( 3.5 )	236	( 4.3 )
Zinc.....	112	( 1.9 )	114	( 2.1 )
Electrolytic Gold.....	107	( 1.8 )	86	( 1.6 )
Sulfuric Acid .....	83	( 1.4 )	78	( 1.4 )
Ferro-Nickel.....	68	( 1.2 )	64	( 1.2 )
Electrolytic Silver.....	63	( 1.1 )	50	( 0.9 )
Electronic and Specialty Metals.....	48	( 0.8 )	36	( 0.7 )
Cobalt.....	22	( 0.4 )	30	( 0.5 )
Nickel.....	19	( 0.3 )	25	( 0.4 )
Natural Gas.....	13	( 0.2 )	20	( 0.4 )
Lead.....	10	( 0.2 )	11	( 0.2 )
Other** .....	61	( 1.0 )	62	( 1.1 )

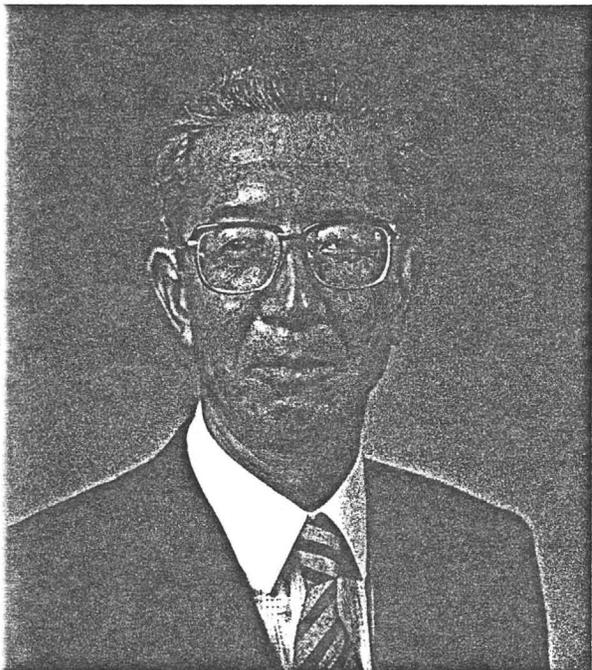
Notes: \* Yen amounts are translated into U.S. dollar amounts at ¥240 = \$1.

\*\* Internal sales within the Company are deducted in the entry "Other".

## Non-Consolidated



## Message from the President



During fiscal 1982 (April 1, 1982—March 31, 1983), the condition of the Japanese economy as a whole worsened under the influence of the worldwide recession, while the nonferrous metal market remained sluggish and the demand for petroleum further declined.

### Financial Results

Under these adverse circumstances, the Company endeavored to improve its business performance with an intensive company-wide drive to raise profitability. As a result, net sales totaled ¥1,161,188 million (US\$4,838 million), an increase of 1.6% over the previous year, but net income was confined to ¥1,307 million (US\$5 million) in spite of proceeds from the sale of securities and fixed assets due to provision for doubtful accounts of overseas mining operations. Dividends per share were decreased one yen to ¥4 (1.67 ¢) or 8% per annum.

### Review of Operations

The following is a summary of the business performance of each operating group of the Company, on a non-consolidated basis except as otherwise noted.

In the Metals Group, domestic copper prices remained low, reflecting international market trends, but demand remained relatively stable, though it somewhat weakened towards the latter half of the period. The volume of sales increased slightly over the previous year to 274,600 tonnes, but net sales decreased to ¥106,329 million (US\$443 million) due to a decline in prices. The sales volume of zinc was at a low level similar to fiscal 1981, and because of the price decline, the business performance of this branch of operations continued to be depressed. Gold and silver showed favorable results due to the recovery of prices towards the latter half of the fiscal year. The business results of ferro-nickel and nickel division plunged due to the decline in the international market prices. Sulfuric acid sales were in general fair. Renovation and expansion projects of copper electrolytic refining and sulfuric acid plants at the Saganoseki Smelter and Refinery in Oita Prefecture were completed by January 1983, increasing copper production capacity to 25,000 tonnes per month.

In metal fabrication, the demand for brass mill products and special alloy products remained flimsy throughout the fiscal year due to a decline in demand from client industries, such as automobile and electrical appliances. Exports also suffered due to the worldwide economic recession. As a

result, the total volume of sales fell below that of the previous year to 67,600 tonnes and net sales also fell considerably to ¥48,011 million (US\$200 million) because of the drop in sales volume as well as prices.

In the field of petroleum operations, domestic demand for gasoline, kerosene and gas oil was nearly the same as the previous year, but the demand for naphtha and B and C heavy fuel oils plunged. The total demand for the Company's petroleum products was, therefore, down by approximately 6.4% from the fiscal 1981. Crude oil prices in terms of U.S. dollars fell due to a worldwide oil glut, yet in terms of the Japanese yen, they increased due to the weakening of the yen against the dollar. However, this cost increase could not be fully incorporated into the marketing prices of Company products due to aggravated competition in the face of further decline in demand for petroleum products. This sluggish market condition continued through most of the fiscal year.

Under these circumstances, the Company's sales volume remained at a level of 12,510 thousand kiloliters, but net sales increased slightly over the previous period to ¥887,692 million (US\$3,699 million) due to some adjustments in sales prices. The business performance of the Group during the period improved somewhat because of foreign exchange gains made towards the latter half of the period, decline in usance rates, and other factors. In addition to the reinforcing project completed at the Mizushima Oil Refinery in Okayama Prefecture to meet changes in the demand struc-

ture for petroleum products, construction of underground crude oil storage tanks to better accommodate the diversification of crude oil supply sources was begun in July 1982.

In July 1983, the business of Chita Oil Company, which had effectively been under our management, was formally transferred to the Company for the purpose of integrating functions such as the management of Chita Oil Refinery, procurement of crude oil and financing, thus strengthening the petroleum operations of the Company.

As a result of strenuous efforts made by the Electronic and Specialty Metals Group in the development and marketing of new products, net sales of the Group during the fiscal year increased considerably to ¥11,592 million (US\$48 million). The construction of an electrodeposited copper foil production plant in Hitachi (Ibaraki Prefecture) for Nikko Gould Foil Company, a joint venture with Gould Inc. (U.S.A.), which has a monthly production capacity of one million meters, was completed in September 1982 and is now operating at near full capacity.

In the field of resources development, natural gas production at the Nakajo Gas Field in Niigata Prefecture fell below that of the previous year due to a decline in demand from major customers. The Musoshi and Kinsenda mines located in the Province of Shaba in the Republic of Zaire, in which Nippon Mining had, in collaboration with other Japanese concerns, played a major management role, were entirely ceded to the Government of Zaire in June 1983 through an amicable agreement with the

Government.

The consolidated settlement of accounts for fiscal 1982, as in the previous year, covers a total of 11 out of 66 subsidiary companies in which Nippon Mining holds more than 50% equity. Net sales on a consolidated basis totaled ¥1,400,337 million (US\$5,835 million) and net profit ¥4,982 million (US\$21 million).

### **Business Outlook**

The nonferrous metal market, although by nature unpredictable, is nevertheless expected to recover gradually from its prolonged depressed condition towards the latter half of fiscal 1983. In the petroleum market, severe business conditions still continue at present due to a further drop in demand and the continuing decline in product prices. However, it is anticipated that the reduction in crude oil prices made in March 1983 by the oil producing countries will eventually contribute to the reduction of refiners' costs.

Although there are other uncertain factors, such as the yen-dollar exchange rate, which has a significant impact on the Company's business performance, Nippon Mining and its consolidated subsidiaries are aiming to achieve net sales of ¥1,200,000 million (US\$5,000 million) and net income of ¥2,000 million (US\$8 million) on a consolidated basis for fiscal 1983.

On June 30, 1983, I assumed the office of president, and I intend to follow the basic management policy laid down by my predecessors. That is to say, metals and petroleum operations will continue to be inseparable as the two main

pillars of the Company's business. The basic business areas of metals, petroleum and resources will be reinforced in their competitiveness in both domestic and overseas markets by an overall reorganization of the company structure and maximization of efficiency, including improvements and modifications in production processes. At the same time, product development will be pursued aggressively in electronics materials, biochemistry, metal fabrication and specialty metals, by making full use of the combined applications of expertise in both metals and petroleum operations. To achieve these objectives at a faster pace than in the past in an environment where rapid changes are taking place, is, I believe, the task given to me and the challenge the Company faces for the near future.

It is the sincere wish of the management that our shareholders, clients and associates will continue to give us their full understanding and support, that we may meet successfully the challenges that lie ahead.



Yukio Kasahara  
President

## Metals Group

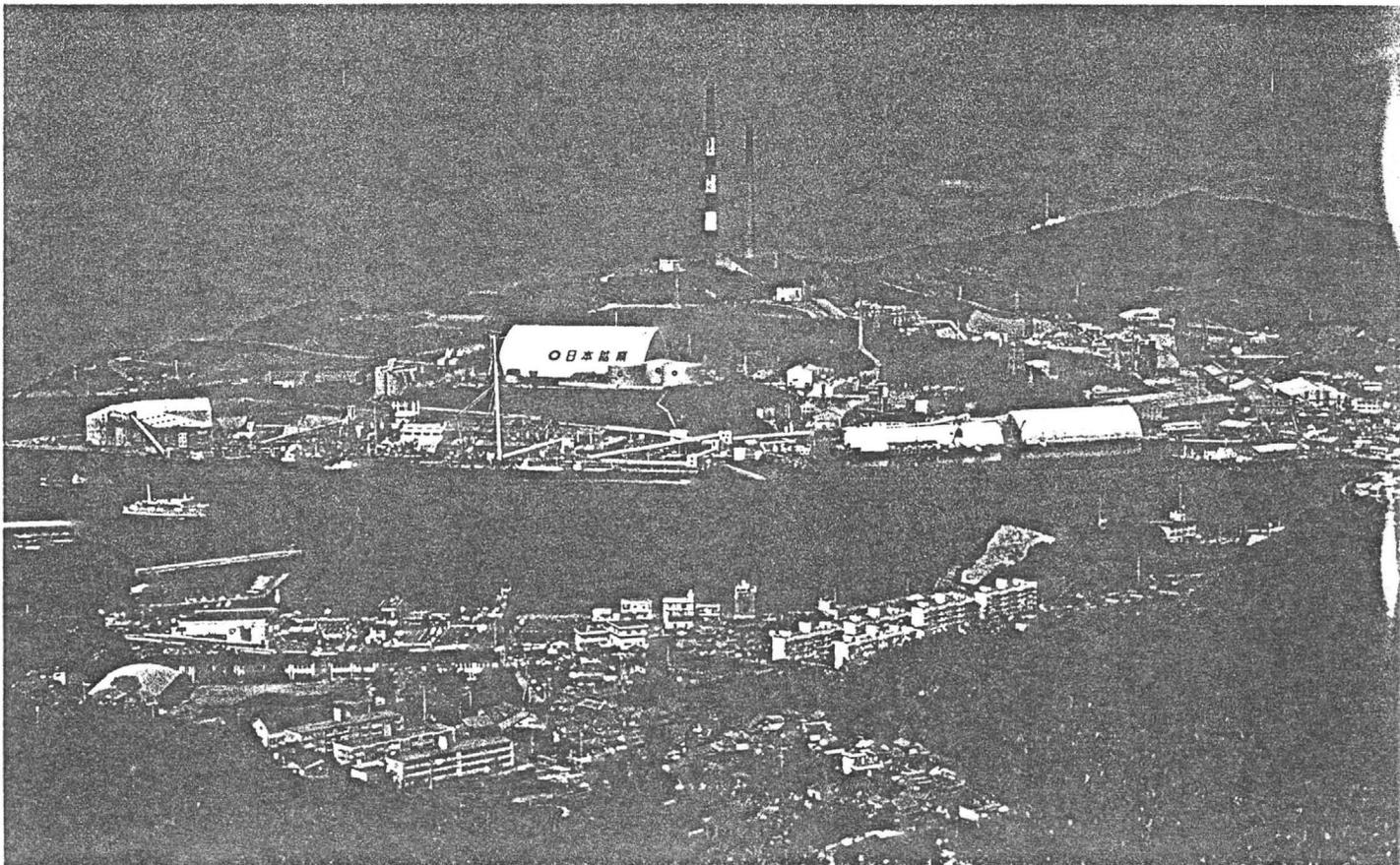
*Electrolytic Copper, Electrolytic Lead, Prime Western Zinc, Special High-Grade Zinc, Ferro-Nickel, Nickel, Cobalt, Electrolytic Gold, Electrolytic Silver, Sulfuric Acid, Chemical Products*

The Metals Group is one of the two major wings of the Company's operations, the Petroleum Group being the other. Almost all kinds of nonferrous metals are produced and marketed by the Company, including copper, for which the Company acts as the price leader in Japan. Moreover, the Company occupies the foremost position in Japan as an integrated producer of nonferrous metals. Almost all raw materials the Company purchases as a custom smelter, except those from the Company's domestic subsidiary mines, are imported from overseas mines and are processed at six metallurgical sites including those under the management of subsidiary companies.

**Saganoseki Smelter and Refinery** (Oita Prefecture) is the largest consolidated nonfer-

rous metal smelting and refining complex in Japan and one of the largest seaboard plants of its kind in the world. In order to achieve still higher competitiveness in the international market, a series of rationalization and renovation projects ranging from the expansion of the copper smelting capacity to the replacement of a part of the electrolytic refining facilities was completed by January 1983. The complex now has a monthly copper concentrate smelting capacity of 25,000 tonnes in copper content, employing Outokumpu flash smelting furnaces improved by the combination of high temperature blast and oxygen enrichment, a process developed by Nippon Mining engineers. The metallurgical complex also has a refining plant with a monthly produc-

*Saganoseki Smelter and Refinery*



tion capacity of 15,000 tonnes of electrolytic copper, a ferro-nickel plant with a monthly production capacity of 1,300 tonnes in nickel content, and an electrolytic lead refining plant with a monthly capacity of 3,000 tonnes. It is also equipped with sulfuric acid plants with a total monthly production capacity of 76,400 tonnes and a by-product plant producing electrolytic gold, silver, bismuth, tellurium, selenium, and other rare metals.

**Hitachi Smelter and Refinery** (Ibaraki Prefecture) currently operates an electrolytic refinery with a monthly production capacity of 13,000 tonnes of electrolytic copper and a by-product plant producing electrolytic gold and silver and other rare metals. Operations of the smelter, which has a monthly copper concentrate treating capacity of 7,000 tonnes in copper content, and the related sulfuric acid plant, with a monthly production capacity of 22,000 tonnes, have been suspended for the purpose of company-wide production cost reduction, and smelter operations have been concentrated at the Saganoseki metallurgical complex.

**Mikkaichi Smelter** (Toyama Prefecture), a zinc smelter employing an electrothermic process, has a monthly production capacity of 10,000 tonnes of distilled zinc, including 6,000 tonnes of special high-grade zinc. An auxiliary plant at Tsuruga in Fukui Prefecture roasts zinc concentrates for shipment to the Mikkaichi smelter and produces 16,500 tonnes of sulfuric acid monthly.

**Nikko Nickel Cobalt Refining Co., Ltd.** (Ibaraki Prefecture) employs solvent extraction technology developed by Nippon Mining experts and has a monthly production capacity of 300 tonnes of nickel and 100 tonnes of cobalt.

**Tomakomai Chemical Co., Ltd.** (Hokkaido) operates as a pyrites roasting center and has a monthly production capacity of 36,000 tonnes of sulfuric acid.

The production of the main products of the Metals Group during fiscal 1982 generally exceeded the levels of the previous year as shown in Table I below. The Company's share in Japan for its main products during the fiscal year in terms of volume of production is shown in Table II. However, the business performance of the Group during the fiscal year remained sluggish despite fairly stable sales of copper and precious metals, because of the decline in demand and depressed prices of nickel, zinc and cobalt.

Business activity in the nonferrous metals industry has recently been plagued by continued low metals prices, ever increasing costs, and a decline in demand. The industry is still confronted by the worst

business conditions in decades. To meet this challenge, the Metals Group intends to improve profitability levels and strengthen its competitiveness by promoting the following policies: securing stable supplies of raw materials and reinforcing the market position of its products; introducing further technological improvements for saving energy and manpower to further reduce production costs; and intensifying research and development in the processing of complex raw materials, the recovery of rare and precious metals, and the diversification of products. As to copper, the Company intends to increase smelter production, including processing under toll arrangements, by making full use of the rationalized and expanded facilities at the Saganoseki metallurgical complex.

Table II Production Share

Main Products	Share (%)
Copper .....	25.3
Lead .....	4.8
Zinc .....	16.1
Gold .....	23.2
Silver .....	14.5
Ferro-nickel .....	16.0
Nickel .....	11.1
Sulfuric Acid .....	13.9
Cobalt .....	71.4

Table I Production in 1982 and 1981 Fiscal Years

Products	Quantity		Change (%)
	1982	1981	
Copper.....	274,417t	263,183t	104
Lead.....	10,250t	9,812t	104
Zinc.....	87,780t	89,057t	99
Nickel .....	11,673t	13,973t	84
(including Ferro-nickel)			
Gold.....	9,293kg	8,907kg	104
Silver .....	195t	173t	113
Cobalt .....	1,348t	1,267t	106
Sulfuric Acid .....	921,557t	848,921t	109

## Electronic and Specialty Metals Group

**Metal Powders:** *Copper Powder, Compound Powder, Cobalt Powder*

**High-Purity Metals:** *Selenium, Tellurium, Indium, Molybdenum*

**Coating Materials:** *Silver Plating Chemical, High-Purity Copper Sulfate, other Base Metals for Plating*

**Electronic Materials:** *Target Materials for Vapor Deposition and Sputtering (Gold Plate, Platinum Plate, Indium-Tin Plate, Indium Oxide Plate), Indium Ring, Platinum-Rhodium Thermocouple Wire*

**Fabricated Products of Cobalt:** *Cobalt Soap, Cobalt Sulfate*

**Copper Foils:** *Electro-deposited Copper Foil, Rolled Copper Foil*

To better cope with the changing market in an age of materials revolution, this Group is positively developing its business as a reliable manufacturer of basic materials in the fields of electronics and specialty metals. Its products include metals, organic and inorganic materials, compound products of these materials, and the composite materials listed at left. Production is carried out mainly by the New Specialty Materials Department at the Hitachi Refinery compound in Ibaraki Prefecture.

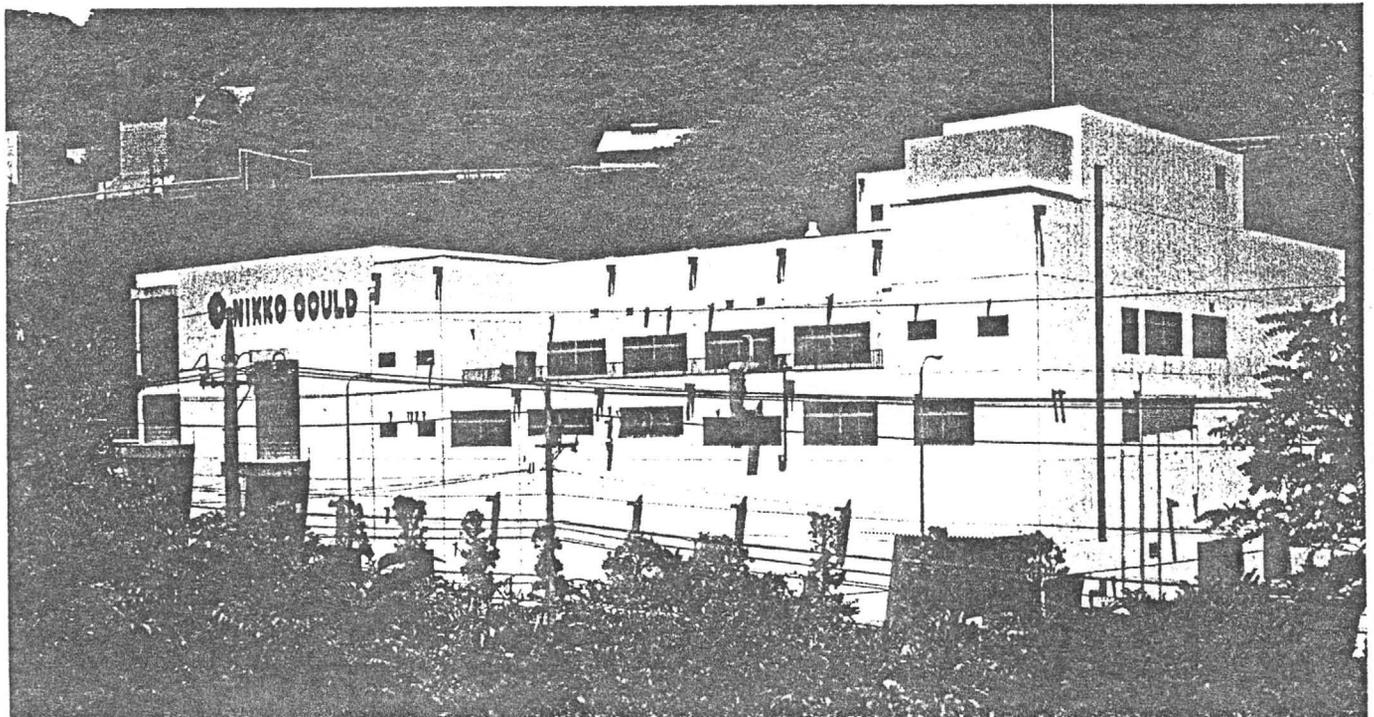
Remarkable progress has been made in the production of such products as special high-purity selenium and tellurium for sensitizing drums of dry type copiers, high-purity indium for use in compound semi-conductors, indium-tin oxide for use in liquid crystal display devices, electro-deposited copper foil for high-density printed circuit boards, rolled copper foil and high-purity copper sulfate.

Nikko Gould Foil Co., Ltd.,

a joint venture with Gould Inc. (U.S.A.), completed in September 1982 construction of a new plant in Hitachi (Ibaraki Prefecture), with a monthly production capacity of 1 million meters of electrodeposited copper foil, and the plant is now operating at near full capacity, producing mainly 35- and 18-micron gauges.

Research and development of new products is carried out mainly at the Technical Research Center in Saitama Prefecture, making full use of a wide range of technological and production know-how in the field of nonferrous metal refining and processing and production of petroleum related products which the Company has accumulated over decades. Various kinds of high-purity metals, polycrystals and single crystals for compound semi-conductors such as indium phosphide crystals and cobalt-nickel alloy are successively entering into the phase of commercial production.

*Hitachi Plant, Nikko  
Gould Foil Company*



## Resources Development Group

Exploration and development of mineral resources form the very roots of the Company. At present the Company operates eight mines in Japan in the form of subsidiaries, as listed below with their locations and types of ore produced. Most of these subsidiaries suffered severe financial difficulties during fiscal 1982, with the exception of those which receive substantial revenues from the sale of gold and silver.

However, the mining operation itself remained fairly stable, and the total crude ore production of these mines was 1.17 million tonnes, up from the 1.15 million tonnes produced during the previous year. During the fiscal year strong emphasis was made on prospecting work, and satisfactory results were obtained in the discovery of new mineral resources.

**Toyoha Mine** in Hokkaido — lead and zinc concentrates

**Oh-e Mine** in Hokkaido — manganese, lead and zinc concentrates

**Inakuraishi Mine** in Hokkaido — manganese ore

**Namariyama Mine** in Akita — copper, lead and zinc concentrates

**Shakanai Mine** in Akita — copper, lead and zinc concentrates

**Hanawa Mine** in Iwate — copper, lead and zinc concentrates

**Fujigatani Mine** in Yamaguchi — tungsten concentrates

**Kasuga Mine** in Kagoshima — siliceous ore containing gold

In the field of development of petroleum and natural gas, the Company has a history of more than 69 years, dating back to 1914. At present the Company produces natural gas at the Nakajo Gas Field in Niigata Prefecture, and supplies the product to nearby customers, including a chemical plant. The total production during fiscal 1982 was 58.03 million Sm<sup>3</sup>. The reserves are diminishing gradually, as it has been more than twenty years since the gas field started production.

Therefore, exploratory drillings are regularly conducted in the southwestern part of the Company's oil concession at Nakajo to ascertain the extent of new oil and gas reserves.

Major overseas projects in operation are as follows:

Abu Dhabi Oil Co., Ltd., which was established as a joint venture with two other Japanese companies, has maintained stable production since May 1973 at the Mubarraz Oil Field, offshore in the Arabian Gulf. The business performance of the company was satisfactory with the production of 6.70 million barrels of crude oil in 1982 (January to December).

Mubarraz Oil Co., Ltd., which was set up in August 1979 with the same partners as the Abu Dhabi Oil Company, completed drilling of five test wells by May 1983 in the offshore oil concession to the west of the Mubarraz Oil Field, and

in all cases the existence of oil reserves was confirmed with satisfactory discoveries of oil. As a result, appraisal wells are now in the process of being drilled.

In order to pursue opportunities for exploration and development of mineral resources overseas, the Company maintains offices in Chile, Canada and in the Philippines to facilitate exploration activities and collection of information.

In June this year, the management of the Musoshi Mine and the Kinsenda Mine, both in the Province of Shaba in the Republic of Zaire, which the Company had been operating as a joint venture with other Japanese copper producers, was wholly ceded to the Zairian Government. The crude ores produced since the beginning of the operation of the Musoshi Mine in October 1972 totaled 14 million tonnes (330 thousand tonnes in copper content).

## Nippon Mining Group of Companies

At present the Nippon Mining Group of companies consists of 66 subsidiaries and 38 affiliated companies in Japan and overseas. Consolidated subsidiaries and major affiliates are shown in the table below, classified according to line of business.

Line of Business	Number of Companies
Nonferrous metal mining.....	7
Smelting and refining.....	3
Metal fabrication.....	7
Oil extraction.....	1
Chemical production.....	13
Manufacture of equipment and tools.....	2
Construction and engineering.....	7
Land and marine transportation and stevedoring.....	17
Trading.....	7
Marketing of oil products.....	16
Real estate and services.....	4
Information processing.....	1
Insurance.....	1
Others.....	18

All these companies are engaged in operations related in one way or the other to the essential activities of Nippon Mining, for example, the extraction of mineral resources and the application of technology acquired in different fields of the Company's operations. Although each of these companies is operated under an independent management, they work in close and harmonious relationship with the Company and with each other for the further growth of the Nippon Mining Group of companies.

Name	Line of Business	Company's Equity Percentage as of March 31, 1983
<b>Consolidated Subsidiaries</b>		
Nikko Shoji Co., Ltd. ....	Trading and marketing	100.00
Nikko Consulting & Engineering Co., Ltd. ....	Engineering, planning, surveying and consulting	100.00
Toyoha Mines Co., Ltd. ....	Mining (gold, silver, lead, zinc)	100.00
Shakanai Mines Co., Ltd. ....	Mining (gold, silver, copper, lead, zinc)	100.00
Tomakomai Chemical Co., Ltd. ....	Production of sulfuric acid and other inorganic industrial products	100.00
Nikko Liquefied Gas Co., Ltd. ....	Import, storage and sales of LPG	51.00
Nikko Oil Sales Co., Ltd. ....	Marketing of petroleum products	66.67
Nippon Marine Co., Ltd. ....	Marine transportation	96.50
Nippon Mining (Bermuda), Ltd. ....	Marketing of crude oil and petroleum products	100.00
Chita Oil Co., Ltd. ....	Marketing of aromatic petrochemical products	100.00
<b>Major Affiliates</b>		
Kyodo Oil Co., Ltd. ....	Marketing of petroleum products	47.09
Toho Titanium Co., Ltd. ....	Manufacture of titanium sponge and ingot	46.75
Maruun, Ltd. ....	Land transportation	39.36
Koyo Iron Works and Construction Co., Ltd. ....	Design and construction of petroleum tanks, plants, etc.	37.72
Tatsuta Electric Wire and Cable Co., Ltd. ....	Manufacture and marketing of coated electric wire and cable	25.14
Nissho Shipping Co., Ltd. ....	Marine transportation	30.06
Abu Dhabi Oil Co., Ltd. ....	Production of petroleum	25.57
Petrocokes Co., Ltd. ....	Manufacture of calcined coke	25.50
Sanyo Petrochemical Co., Ltd. ....	Manufacture of petrochemical products	40.00
Nikko Gould Foil Co., Ltd. ....	Manufacture of copper foil	50.00

# Consolidated Balance Sheet

NIPPON MINING COMPANY, LIMITED March 31, 1983 and 1982

ASSETS	Japanese Yen (millions)		U.S. Dollars (thousands)	
	1983	1982	1983	1982
<b>Current assets</b>				
Cash and time deposits .....	¥128,825	¥ 125,515	\$ 536,771	\$ 522,979
Marketable securities .....	30,042	27,311	125,175	113,796
Trade receivables—Note 5				
Notes .....	45,287	41,193	188,696	171,638
Accounts .....	65,252	34,415	271,883	143,396
Unconsolidated subsidiaries and affiliates .....	130,381	180,119	543,254	750,496
Less: Allowance for doubtful accounts .....	(2,181)	(2,717)	(9,088)	(11,321)
Inventories .....	252,635	311,660	1,052,646	1,298,583
Other current assets .....	56,146	19,547	233,942	81,446
Less: Allowance for doubtful accounts .....	(17,400)	—	(72,500)	—
Total current assets .....	688,987	737,043	2,870,779	3,071,013
<b>Investments and long-term loans</b>				
Investment securities—Notes 3 and 5 .....	29,412	34,006	122,550	141,692
Investments in unconsolidated subsidiaries and affiliates—Notes 4 and 5 .....	23,530	20,997	98,042	87,488
Long-term loans:				
Unconsolidated subsidiaries and affiliates .....	11,278	10,765	46,992	44,854
Other .....	6,429	8,535	26,788	35,563
Less: Allowance for doubtful accounts .....	(10,172)	(3,303)	(42,384)	(13,763)
Other investments .....	3,804	3,159	15,850	13,162
Total investments and long-term loans .....	64,281	74,159	267,838	308,996
<b>Property, plant and equipment—Note 5</b>				
Land .....	49,805	49,949	207,521	208,121
Buildings and structures .....	120,734	109,333	503,059	455,554
Machinery and equipment .....	239,863	215,985	999,429	899,937
Construction in progress .....	7,987	15,185	33,279	63,271
	418,389	390,452	1,743,288	1,626,883
Less: Accumulated depreciation .....	(209,827)	(196,210)	(874,279)	(817,541)
Net property, plant and equipment .....	208,562	194,242	869,009	809,342
<b>Cost in excess of net assets of subsidiaries</b> .....	5,499	8,248	22,912	34,367
<b>Translation adjustment</b> .....	43	112	179	466
<b>Other assets</b> .....	4,976	5,153	20,733	21,470
<b>Total assets</b> .....	¥972,348	¥1,018,957	\$4,051,450	\$4,245,654

The Notes of this Annual Report are an integral part of these financial statements and should be read in conjunction with them.

LIABILITIES AND SHAREHOLDERS' EQUITY	Japanese Yen (millions)		U.S. Dollars (thousands)	
	1983	1982	1983	1982
<b>Current liabilities</b>				
Short-term borrowings—Note 5 .....	¥426,642	¥385,853	\$1,777,675	\$1,607,721
Current portion of long-term debt—Note 5 .....	35,658	31,847	148,575	132,696
Trade payables				
Notes .....	17,426	116,236	72,608	484,317
Accounts.....	98,509	86,795	410,454	361,646
Unconsolidated subsidiaries and affiliates .....	33,432	33,826	139,300	140,942
Accrued liabilities.....	14,986	19,983	62,442	83,262
Accrued income taxes.....	1,581	1,144	6,588	4,766
Other current liabilities .....	26,021	34,734	108,421	144,725
Total current liabilities .....	<u>654,255</u>	<u>710,418</u>	<u>2,726,063</u>	<u>2,960,075</u>
<b>Long-term liabilities</b>				
Long-term debt—Note 5 .....	239,111	224,853	996,296	936,888
Accrued severance benefits—Note 1 .....	11,138	10,693	46,408	44,554
Total long-term liabilities .....	<u>250,249</u>	<u>235,546</u>	<u>1,042,704</u>	<u>981,442</u>
<b>Special Taxation Measures Law reserves—</b>				
Note 6 .....	—	7,062	—	29,425
<b>Minority interests in consolidated subsidiaries .....</b>	<b>341</b>	<b>327</b>	<b>1,421</b>	<b>1,362</b>
<b>Shareholders' equity—Notes 7 and 9</b>				
Common stock, par value ¥50 per share				
Authorized—1,040,000 thousand shares				
Issued and outstanding—713,400				
thousand shares.....	35,670	35,670	148,625	148,625
Capital surplus.....	8,645	8,645	36,020	36,020
Legal reserve .....	5,034	4,665	20,975	19,438
Retained earnings .....	18,155	16,624	75,646	69,267
Less: common stock held by the company .....	(1)	—	(4)	—
Total shareholders' equity .....	<u>67,503</u>	<u>65,604</u>	<u>281,262</u>	<u>273,350</u>
<b>Commitments and contingent liabilities—</b>				
Note 8				
<b>Total liabilities and shareholders' equity .....</b>	<b><u>¥972,348</u></b>	<b><u>¥1,018,957</u></b>	<b><u>\$4,051,450</u></b>	<b><u>\$4,245,654</u></b>

NIPPON MINING COMPANY, LIMITED

# Consolidated Statement of Income and Retained Earnings

NIPPON MINING COMPANY, LIMITED Years ended March 31, 1983 and 1982

	Japanese Yen (millions)		U.S. Dollars (thousands)	
	1983	1982	1983	1982
<b>Net Sales</b> .....	<b>¥1,400,337</b>	<b>¥1,316,576</b>	<b>\$5,834,738</b>	<b>\$5,485,733</b>
Cost of sales .....	<u>1,302,984</u>	<u>1,206,896</u>	<u>5,429,100</u>	<u>5,028,733</u>
<b>Gross profit</b> .....	<b>97,353</b>	<b>109,680</b>	<b>405,638</b>	<b>457,000</b>
Selling, general and administrative expenses .....	<u>38,358</u>	<u>35,546</u>	<u>159,825</u>	<u>148,108</u>
<b>Operating income</b> .....	<b>58,995</b>	<b>74,134</b>	<b>245,813</b>	<b>308,892</b>
Other income (expenses):				
Interest income .....	7,465	9,754	31,104	40,642
Interest expenses .....	(69,059)	(80,468)	(287,746)	(335,283)
Dividends received.....	2,926	3,111	12,191	12,962
Exchange gain (loss) .....	11,645	(23,564)	48,521	(98,183)
Other—net .....	<u>7,108</u>	<u>3,381</u>	<u>29,617</u>	<u>14,087</u>
<b>Income (loss) before special items</b> .....	<b>19,080</b>	<b>(13,652)</b>	<b>79,500</b>	<b>(56,883)</b>
Special profit (loss):				
Profit on sales and disposals of property.....	2,896	2,327	12,067	9,696
Profit on sales of investment securities .....	5,429	4,842	22,621	20,175
Provision for doubtful accounts .....	(24,000)	(3,000)	(100,000)	(12,500)
Reversals (provisions) under the Special Taxation Measures Law—Note 6.....	6,047	3,481	25,196	14,504
Other—net .....	<u>116</u>	<u>1,338</u>	<u>483</u>	<u>5,575</u>
<b>Income (loss) before income taxes</b> .....	<b>9,568</b>	<b>(4,664)</b>	<b>39,867</b>	<b>(19,433)</b>
Income taxes .....	(1,821)	(949)	(7,588)	(3,954)
Minority interests in earnings of consolidated subsidiaries.....	(15)	(14)	(63)	(59)
Amortization of cost in excess of net assets of subsidiaries .....	<u>(2,750)</u>	<u>(2,750)</u>	<u>(11,458)</u>	<u>(11,458)</u>
<b>Net income (loss)</b> .....	<b>4,982</b>	<b>(8,377)</b>	<b>20,758</b>	<b>(34,904)</b>
<b>Retained earnings at beginning of the year</b> .....	<b>16,624</b>	<b>26,501</b>	<b>69,267</b>	<b>110,421</b>
Reversal of special reserves—Note 6 .....	606	—	2,525	—
Appropriations:				
Cash dividends.....	(3,567)	(1,230)	(14,862)	(5,125)
Bonuses to directors and statutory auditors .....	(121)	(123)	(504)	(512)
Transfer to legal reserve .....	(369)	(154)	(1,538)	(642)
Translation adjustment.....	—	7	—	29
<b>Retained earnings at end of the year</b> .....	<b>¥ 18,155</b>	<b>¥ 16,624</b>	<b>\$ 75,646</b>	<b>\$ 69,267</b>
	Japanese Yen		U.S. Dollars	
	1983	1982	1983	1982
<b>Net income per share</b> .....	<b>¥ 6.98</b>	<b>¥ —</b>	<b>\$ 0.029</b>	<b>\$ —</b>

The Notes of this Annual Report are an integral part of these financial statements and should be read in conjunction with them.

SAMPLE  
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76.0360 II  
CHLORIDE PROJECT  
AGREEMENTS  
— FELMONT OIL

CONFIDENTIALITY AGREEMENT

This Confidentiality Agreement is made and entered into by and between  
Santa Fe Mining, Inc. (hereinafter called SFM)  
and Rocky Mountain Energy (hereinafter called RME).

WITNESSETH THAT:

WHEREAS, SFM has an interest in the NEBRASKA URANIUM PROJECT located in SIOUX COUNTY, NEB, more specifically described in Exhibit A attached hereto and by reference made a part hereof; and

WHEREAS, SFM has developed and obtained certain maps and geological data (hereinafter called "Proprietary Information") with respect to the evaluation of the NEBRASKA URANIUM PROJECT; and

WHEREAS, RME desires to review the Proprietary Information for the purpose of determining whether to negotiate further with SFM for the purpose of acquiring an interest in or a possible business arrangement regarding the NEBRASKA URANIUM PROJECT

NOW, THEREFORE, in consideration of SFM furnishing the Proprietary Information to RME, RME hereby agrees as follows:

1. RME agrees to keep in confidence and to use its best efforts to prevent disclosure to others of all proprietary information submitted to it by SFM including verbal communications between RME and SFM and reports and data prepared by SFM RME based upon Proprietary Information and to utilize such information only for internal evaluation and for the determination of the extent of its interest in acquiring an interest in the NEBRASKA URANIUM PROJECT. Copies of any such information shall not be made without prior written consent of SFM.

2. RME will disclose the Proprietary Information only to its employees and consultants on a "need to know" basis and will inform such persons of its obligation under this Agreement and require such persons to have knowledge of and be bound by and to its obligations hereunder.

3. The obligations stated herein will terminate three years from the date of this Agreement. Such obligations shall not apply to the contents of the Proprietary Information which are (a) presently in the possession of RME; (b) presently in the public domain; or (c) disclosed by SFM to the public.

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4. RME agrees that for a period of 2 years / 2 mile perimeter three years from the date of this Agreement that RME will not acquire directly or indirectly

Give copy to Expt. Research

property interests, including but not limited to mineral rights, within the NEBRASKA URANIUM PROJECT, unless an agreement is consummated between RME and SFM, or unless SFM'S written consent is obtained prior to the acquisition.

5. If negotiations are terminated and no agreement between SFM and RME is consummated, RME shall immediately return to SFM all Proprietary Information furnished to it without retaining any copies thereof.

6. This Agreement constitutes the entire understanding between the parties hereto with respect to the subject matter indicated above and its terms may not be changed or amended except by an instrument in writing.

7. The agents of SFM and RME who sign this Agreement represent and warrant that they have full corporate authorization to execute this Agreement on behalf of their respective employer corporations.

IN WITNESS WHEREOF, the parties have executed this instrument effective as of the \_\_\_ day of JANUARY, 1984.

\_\_\_\_\_  
by: \_\_\_\_\_  
its: \_\_\_\_\_

\_\_\_\_\_  
by: \_\_\_\_\_  
its: \_\_\_\_\_



WBC

MINING LEASE AND PURCHASE OPTION

THIS LEASE is made effective as of the 23 day of April, 1982, by and between C.G. PATTERSON, AND GARDEN B. PATTERSON husband and wife (hereinafter designated as "OWNER" whether one or more), and SANTA FE MINING, INC., a Kansas corporation, (hereinafter designated as "LESSEE"):

*[Handwritten initials and signatures]*

WITNESSETH:

WHEREAS, LESSEE wishes to acquire from OWNER, and OWNER wishes to grant to LESSEE, a mining lease of the "Leased Premises" (hereinafter defined) pursuant to which LESSEE shall have the exclusive right to explore, develop and mine the "Leased Premises"; TOGETHER with the exclusive option to purchase the same, all on the terms and conditions hereinafter set forth;

NOW, THEREFORE, for a valuable consideration paid to OWNER by LESSEE, the receipt and sufficiency of which is hereby acknowledged, and in consideration of the covenants hereinafter set forth, OWNER and LESSEE agree as follows:

1. The "Leased Premises"

The Leased Premises shall mean all of the property and interests in property described in Exhibit A attached hereto and made a part hereof (whether consisting of unpatented mining claims, patented mining claims or other real property, or any combination thereof) together with all of the ores, minerals and materials thereon and thereunder, and all right, title and interest of OWNER in and to the surface of said property, and all water, water rights, easements and rights-of-way now and hereafter owned or held by OWNER in, upon or under the said property, or in any way pertaining thereto.

2. Warranties and Representations

OWNER represents and warrants to LESSEE: (i) that subject to the matters specifically set forth in Exhibit A, and subject to the matters set forth below with respect to unpatented mining claims, if any, OWNER owns and has the exclusive possession of the Leased Premises; and (ii) that OWNER has the full right, power and capacity to enter into this Lease upon the terms set forth herein. If the Leased Premises includes any unpatented mining claims, OWNER additionally represents and warrants to LESSEE: (iii) each of the unpatented lode mining claims described in Exhibit A has been validly located, filed and recorded in the office of the Clerk or Recorder of the county in which the claims are located in compliance with the laws of the United States and of the state in which the claims are located as they relate to location and recordation of such claims; (iv) OWNER has timely complied with all of the filing provisions of the Federal Land Policy and Management Act (43 U.S.C. § 1744) as they pertain to the claims described in Exhibit A; and (v) OWNER has performed assessment work upon the claims described in Exhibit A through the assessment year ending September 1, 1982, and has recorded and filed proof thereof, all of which work, recordings and filings have been completed in accordance with the applicable state and federal statutes pertaining to assessment work.

3. Term

Unless sooner terminated as hereinafter provided or unless LESSEE sooner exercises its option to purchase the term of this Lease shall be for a period of twenty (20) years commencing on the effective date hereof and for a continuing term as long thereafter as any mining, development or processing is being conducted hereunder on a continuous basis. For purposes of this Section 3, such operations shall be deemed as being conducted on a continuous basis unless and until, after the end of the initial term, a period of three hundred sixty-five (365) consecutive days elapses during which no mining or development or processing is conducted; excluding, however, periods of force majeure and suspensions of operations due to economic causes, both hereinafter defined. The term "development" shall mean work or construction in preparation for mining or processing a proven or possible reserve, including further development drilling of such a reserve but excluding exploration drilling. Unless otherwise specified, all references to the "term" of this Lease shall mean and include both the initial term and the continuing term.

4. Grant

OWNER hereby grants, demises, leases and lets the Leased Premises exclusively unto the LESSEE, its successors and assigns, with the exclusive right and privilege to explore for, develop, mine (by open pit, strip, underground, solution mining or any other method, including any method hereafter developed), extract, mill, store, remove and market therefrom all ores, minerals and materials of whatsoever nature or sort (herein designated as "Leased Substances") and to use and consume so much of the surface thereof as may be necessary, useful or convenient for the full enjoyment of all of the rights herein granted; TOGETHER WITH the exclusive right, privilege and option as more fully set forth in Section 15 below to purchase the Leased Premises at any time prior to termination or expiration of this Lease. LESSEE is hereby further granted the exclusive right to use structures, facilities, equipment, roadways, haulageways, and all other appurtenances installed on the Leased Premises for the additional purpose of producing, removing, treating or transporting metals, ores, minerals or materials from adjoining or nearby property owned or controlled by LESSEE, and the right to mine and remove Leased Substances from the Leased Premises through or by means of shafts, openings or pits which may be made in or upon adjoining or nearby property. LESSEE's operations hereunder and in its mining of adjoining or nearby lands may be conducted upon the Leased Premises or upon such other lands as a single mining operation, to the extent as if the Leased Premises and all such other properties constituted a single tract of land. After Leased Substances from the Leased Premises have been sampled and weighed or measured by volumetric survey, truck factors, or any other manner as will permit the computations of royalty to be paid hereunder, LESSEE may mix the same with ores, materials or products from other lands. LESSEE shall have the right, at any time during the term hereof, to stockpile any material mined or produced from the Leased Premises at such place or places as LESSEE may elect, either upon the Leased Premises or upon any other lands owned or controlled by LESSEE. The rights of OWNER in and to any such material stockpiled on other lands shall not be

divested by the removal thereof from the Leased Premises, but shall be the same in all respects as though such materials had been stockpiled on the Leased Premises. If such other lands are not owned by LESSEE, LESSEE shall obtain from the owners thereof a properly executed instrument under which the owners of the other lands agree to recognize the interest of OWNER in materials stockpiled on such other lands. The stockpiling of materials from the Leased Premises on other lands shall not be deemed a removal or shipment thereof requiring payment of royalty thereon. LESSEE shall have the further right, at any time during the term hereof, to stockpile on the Leased Premises any ore or material mined or produced by LESSEE or its affiliate companies from other lands. OWNER agrees to recognize the rights and interests of others in such ores and materials stockpiled on the Leased Premises and to permit the removal thereof by LESSEE at any time during the term of this Lease, or by the owners thereof for a reasonable time after termination of this Lease all without liability or expense to OWNER. All stockpiles on the Leased Premises shall be placed so as not to interfere with mining operations on the Leased Premises. Waste, overburden, surface stripping and other materials from the Leased Premises may be deposited off the Leased Premises and may be deposited on the Leased Premises only if the same will not interfere with mining operations on the Leased Premises.

5. Payments to OWNER

A. Advance Royalty: Within 30 days from the date of this Lease, Lessee shall pay to OWNER the sum of \$15000.00 for the first year of this Lease; provided, however, that during that period of 30 days LESSEE may terminate this Lease by notice to OWNER and avoid payment of the \$15000.00 if LESSEE determines that OWNER does not have the title to the property which OWNER represents in Section 2 of this Lease; and provided further that LESSEE's payment of the first year's payment shall not constitute a waiver of, or in any way effect LESSEE's rights under Section 11 of this Lease in the event a title defect in the Property is ever discovered, whether or not such defect exists at any time during the first 30 days of this Lease. As to the payments set forth in Schedule I attached hereto and made a part hereof, LESSEE agrees to make each such payment to OWNER, the due date of which occurs prior to termination of this Lease; it being expressly understood that should this Lease be terminated, LESSEE shall have no obligation to make any of the payments, the due dates of which occur after such termination. Each sum of advance royalty paid shall be applied against and reduce the amount of any production royalty payments thereafter payable to OWNER pursuant to paragraph B of this Section 5 whether accruing to OWNER in the same year or in any year thereafter.

B. Production Royalty: In the event LESSEE mines and markets Leased Substances from the Leased Premises, LESSEE shall pay to OWNER as a production royalty five percent (5%) of the "Net Returns" from the sale of Leased Substances so mined and marketed. "Net Returns" as used herein shall mean the total returns from the smelter or other purchaser less:

- (i) custom smelting costs, treatment charges and penalties, including but without being limited to, metal losses, penalties for impurities and charges for refining, selling and transportation from smelter to refinery and from refinery to market; provided, however, in the case of leaching operations, all processing and recovery costs incurred by LESSEE beyond the point at which the metal being treated is in solution shall be considered as treatment charges (it being agreed and understood, however, that such processing and recovery costs shall not include the cost of mining, crushing, dump preparation, distribution of leach solutions or other mining and preparation costs up to the point at which the metal goes into solution);
- (ii) costs of transporting Leased Substances from the Leased Premises to a concentrator or other place of treatment;
- (iii) costs of transporting Leased Substances from the concentrator to a smelter or other place of treatment; and
- (iv) production taxes, severance taxes and sales, privilege and other taxes measured by production or the value of production.

Production royalty payments shall be made within thirty (30) days after the end of the calendar quarter and calculated on the Net Returns actually received by LESSEE during such calendar quarter. Net Returns for Leased Substances processed at a smelter owned, operated or controlled by LESSEE or treated on a toll basis for LESSEE shall be computed in the above manner, with deductions for all charges and items of cost equivalent to the deductions set forth above. With respect to any mill tailings or other residues remaining after processing of Leased Substances, it is hereby agreed that OWNER shall have no responsibility for or interest in such tailings or residues, and LESSEE is deemed to be the owner of such materials and shall be responsible for disposal thereof in any manner as it shall see fit; provided, however, that any tailings not removed from the Leased Premises within one (1) year from the date of termination of this Lease shall become the property of OWNER. All such sums of advance and production royalty actually paid to OWNER shall be applied against and reduce the total purchase price in the event LESSEE elects to purchase the Leased Premises.

C. Weights and Analyses: LESSEE shall measure ore, weigh other product and take and analyze samples thereof in accordance with sound mining and metallurgical practice, and keep accurate records thereof as a basis for computing royalty payments, which records shall be available for inspection by OWNER in accordance with Section 6.

D. Method of Payment: All payments required to be made by LESSEE to OWNER may be made in currency, or by draft or by check, at the option of LESSEE, and said payments may be mailed or delivered to OWNER at the address specified in Section 14, or to OWNER's credit in the Valley National Bank, which bank and its successors shall continue as the depository for said payments regardless of changes in the ownership of the Leased Premises. Upon making any payment as described above, LESSEE shall be relieved of any responsibility for the distribution of such payment to OWNER or to OWNER's successors in interest. The delivery or the deposit in the mail of any payment hereunder on or before the due date thereof shall be deemed timely payment hereunder.

R. M.  
C. S. P.  
L. B. F.

Kingsboro Arizona

E. Adverse Claims; Disputes: In case of any suit, adverse claim, dispute or question as to the ownership of the Leased Premises or concerning advance or production royalties or any interest therein payable under this Lease, LESSEE shall not be deemed to be in default in payment thereof until final disposition of such suit, claim, dispute or question and LESSEE may withhold payments due OWNER hereunder with respect to the portion of the Leased Premises involved in such dispute and deposit the same in an interest-bearing account until there is a final adjudication or other determination of such dispute. LESSEE shall make such payments together with any interest earned thereon within thirty (30) days after being furnished with the original or certified copies of instruments disposing of such suit, claim or dispute in OWNER's favor, or after delivery to LESSEE of proof sufficient in LESSEE's opinion to settle such question in OWNER's favor.

6. Inspection

OWNER, or its authorized agents, at OWNER's risk and expense may enter upon the Leased Premises to inspect the same at such times and upon such notice to LESSEE as shall not unreasonably or unnecessarily hinder or interrupt the operations of LESSEE. OWNER, or its authorized agents, shall have the right to inspect the accounts and records used in calculating production royalty paid to OWNER hereunder, which right may be exercised, as to each quarterly payment of production royalty, at any reasonable time during a period of one (1) year from and after the date on which the quarterly payment of production royalty was paid by LESSEE. OWNER agrees to treat all information received hereunder as confidential and hereby covenants and agrees that it shall not, without having first obtained the written consent of LESSEE as to the form and content, disclose any information it may obtain hereunder nor issue any press releases concerning operations on the Leased Premises.

7. Conduct of Operations; Protection from Liens

LESSEE agrees to comply with valid and applicable local, state and federal laws and regulations governing its operations hereunder. LESSEE shall pay all expenses incurred by it in its operations on the Leased Premises and shall allow no liens arising from any act of LESSEE to remain upon the interest of OWNER in and to the Leased Premises; provided, however, that if LESSEE, in good faith, disputes the validity or amount of any claim, lien or liability asserted against it with respect to the Leased Premises, it shall not be required to pay or discharge the same until the amount and validity thereof have been finally determined. If authorized by applicable statute, OWNER may post a notice of non-liability and LESSEE shall keep such notice posted during the term of this Lease. LESSEE shall carry workman's compensation or industrial insurance coverage to the extent required by the laws of the state in which the Leased Premises are situated.

8. Taxes

LESSEE shall pay all taxes, assessments and other governmental charges imposed upon the Leased Premises and upon any equipment and improvements placed by it thereon for the periods that this Lease are in effect. OWNER

agrees to promptly transmit to LESSEE all notices pertaining to such taxes, assessments and charges which OWNER may receive. If this Lease is terminated other than by exercise by LESSEE of its option to purchase, such taxes shall be prorated between LESSEE and OWNER for the tax year in which such termination occurs. LESSEE shall have the right to contest, in the courts or otherwise, in its own name or in the name of OWNER, the validity or amount of any such taxes or assessments if it deems the same unlawful, unjust, unequal or excessive, or to take such steps or proceedings as it may deem necessary to secure a cancellation, reduction, readjustment or equalization thereof before it shall be required to pay the same, but in no event shall LESSEE permit or allow title to the Leased Premises to be lost as the result of non-payment of any taxes, assessments or other such charges. LESSEE shall not be liable for any taxes levied or measured by income or taxes applicable to OWNER based upon advance or production payments to OWNER under this Lease.

9. Assessment Work

In the event the Leased Premises includes unpatented mining claims, LESSEE agrees that, commencing with the annual assessment year beginning the 1st day of September, 1982, it shall perform annual assessment work required to maintain such claims and timely record, file and furnish to OWNER affidavits of such performance for any assessment year in which this Lease has not expired or been terminated prior to sixty (60) days before the end of any annual assessment work year. OWNER agrees that in the event LESSEE acquires by location, purchase, lease or option, the right to explore claims or groups of claims adjacent to the Leased Premises, LESSEE shall have the right to perform assessment work required hereunder pursuant to a common plan of exploration or development for all of the claims or groups of claims, whether performed on or off the Leased Premises. LESSEE shall not be liable on account of holdings by any court or governmental agency that the effects of work so elected and performed by LESSEE do not constitute the required annual assessment work for purposes of preserving title to such claims, provided that the work so done is of the kind generally accepted as assessment work and that LESSEE has expended a total amount sufficient to meet the minimum requirements with respect to all of the unpatented claims.

10. Amendment, Relocation and Patent of Claims

In the event the Leased Premises includes unpatented mining claims, LESSEE shall have the right to amend or relocate any of OWNER's unpatented mining claims which LESSEE, in its sole discretion, deems advisable to so amend or relocate. LESSEE shall not be liable to OWNER for any act (or failure to act) by it or any of its agents in connection with the amendment or relocation of claims so long as such act (or omission) is not made in bad faith. Upon request by LESSEE, OWNER shall apply for a patent to any of the unpatented mining claims so designated by LESSEE and shall execute all necessary applications and documents in connection therewith and shall cooperate fully with LESSEE in securing such patents. All expenses incurred or authorized by LESSEE in connection with such patent proceedings shall be borne by LESSEE. The right of LESSEE under this Lease shall extend to any of the amended, relocated or patented mining claims.

11. Title Matters

A. Title Documents: Upon written request of LESSEE at any time during the term hereof, OWNER shall promptly deliver to LESSEE all abstracts of title to and copies of all title documents affecting the Leased Premises which OWNER has in its possession, together with copies of all plats and field notes of surveys of the Leased Premises which OWNER has in its possession.

B. Title Defects, Defense and Protection: If (i) in the opinion of LESSEE's counsel, OWNER's title to any of the Leased Premises is defective or less than as represented in Section 2, or (ii) OWNER's title is contested or questioned by any person, entity or governmental agency, and if OWNER is unable or unwilling to promptly correct the defects or alleged defects in title, LESSEE may attempt, with all reasonable dispatch, to perfect, defend, or initiate litigation to protect OWNER's title. In that event, OWNER shall execute all documents and shall take such other actions as are reasonably necessary to assist LESSEE in its efforts to perfect, defend or protect OWNER's title. If title is less than as represented in Section 2, then (and only then) the costs and expenses of perfecting, defending or correcting title (including, but without being limited to, the cost of attorneys' fees and the cost of releasing or satisfying any mortgages, liens and encumbrances), shall be a credit against payments thereafter to be made to OWNER under the provisions of Section 5 and Schedule I and against the total purchase price if LESSEE exercises its option to purchase unless the encumbrance or dispute arises from LESSEE's failure to perform its obligations hereunder (in which case such costs shall be borne by LESSEE).

C. Lesser Interest Provisions: If the title and interest granted hereunder are less than the full undivided title and interest in and to the Leased Premises, all payments to be made to OWNER hereunder shall be reduced to the same proportion thereof as the undivided title and interest owned by OWNER bears to the entire undivided title and interest granted hereunder.

D. General: Nothing herein contained and no notice or action which may be taken under this Section 11 shall limit or detract from LESSEE's right to terminate this Lease in the manner provided in Section 12.B.

12. Termination; Removal of Property

A. Termination by OWNER: In the event of any default by LESSEE in the performance of its obligations hereunder, OWNER shall give to LESSEE written notice specifying the default. If the default is not cured within thirty (30) days after LESSEE has received the notice, or if LESSEE has not within that time begun action to cure the default and does not thereafter diligently prosecute such action to completion, OWNER may terminate this Lease by delivering to LESSEE written notice of such termination, subject to LESSEE's right to remove its property and equipment from the Leased Premises, as hereinafter provided. OWNER shall have no right to terminate this Lease except as set forth in this Section 12.A.

B. Termination by LESSEE: LESSEE shall have the right to terminate this Lease at any time prior to exercise by LESSEE of its option to purchase upon giving written notice thereof to OWNER. Upon the giving of notice in the

manner hereinafter provided, all right, title and interest of LESSEE in and to the Leased Premises shall terminate and LESSEE shall not be required to make any further payments nor to perform any further obligations hereunder except as to payments or obligations, if any, which have accrued prior to the termination date. LESSEE may terminate this Lease with respect to any unpatented mining claims included within the Leased Premises by notice to OWNER at any time, provided that such termination shall not relieve LESSEE of its obligations, if any, with respect to annual assessment work as provided for in Section 9 hereof. LESSEE's termination of this Lease with respect to less than all of the Leased Premises shall not reduce the amount of LESSEE's annual advance royalty payments under Section 5A nor the total purchase price under Section 15.

C. Removal of Property: Upon any termination or expiration of this Lease, LESSEE shall have a period of one (1) year from and after the effective date of termination in which to remove from the Leased Premises all of its machinery, buildings, structures, facilities, equipment and other property of every nature and description erected, placed or situated thereon, except supports placed in shafts, drifts or openings in the Leased Premises. Any property of LESSEE not so removed at the end of said one year shall become the property of OWNER.

D. Obligations of LESSEE Upon Termination: If this Lease is terminated other than by exercise by LESSEE of its option to purchase, or if this Lease expires, LESSEE shall:

- (i) upon written request given by OWNER within thirty (30) days of such termination or expiration, furnish to OWNER within a reasonable time thereafter copies of all available non-interpretive exploration data pertaining to the Leased Premises and prepared by or for LESSEE and permit OWNER at OWNER's expense to pick up any available core from the Leased Premises; provided, however, that LESSEE shall in no event be liable to OWNER for the loss of any core from the Leased Premises;
- (ii) execute and deliver to OWNER a release and surrender of this Lease and all of LESSEE's interests in the Leased Premises, the same to be in a recordable form; and
- (iii) comply with all valid and applicable local, state or federal regulations as such relate to surface reclamation.

### 13. Suspension of Operations

A. Force Majeure: LESSEE shall not be liable for failure to perform any of its obligations hereunder during periods in which performance is prevented by any cause reasonably beyond LESSEE's control, which causes hereinafter are called "force majeure." For purposes of this Lease, the term "force majeure" shall include acts of God, fire, flood, undue shortage of power, strikes, insurrection or mob violence, requirements or regulations of government and other causes of a similar nature which are beyond the control of LESSEE. LESSEE shall notify OWNER of the date of commencement and cause of each period of force majeure and shall also notify OWNER of the time of removal of such cause.

B. Suspensions Due to Economic Causes: If at any time during the term hereof and after expiration of the initial 20-year portion of such term, mining, developing and processing operations are determined by LESSEE to be uneconomic due to unavailability of a suitable market for Leased Substances,

prevailing costs of mining, developing or processing with respect to prices available for Leased Substances, unavailability of equipment or of competent labor, or imposition of governmental statutes, requirements or regulations making it impractical to carry out such operations, LESSEE shall have the right, from time to time, to temporarily discontinue operations hereunder for a cumulative period not to exceed three (3) years. In each such event, LESSEE shall, within thirty (30) days of expiration of each lease year in which such temporary discontinuance occurs, notify OWNER of the total period of each such discontinuance during such year.

C. Obligations During Suspensions of Operations: During any suspension of operations under either paragraph A or B of this Section 13, LESSEE shall: (i) continue to pay all property and other taxes, assessments and charges payable by LESSEE described in Section 8 as and when they become payable as therein provided; (ii) comply with all requirements of this Lease relative to maintaining the status and title of the Leased Premises in good standing; and (iii) continue to make payments to OWNER as required under Section 5.

#### 14. Notices

Any notice or communication required or permitted hereunder shall be effective when personally delivered or shall be effective when addressed:

If to OWNER: C.G. PATTERSON  
P.O. Box 37  
Chloride, Arizona 86431

If to LESSEE: SANTA FE MINING, INC.  
P.O. Box 3588  
Albuquerque, New Mexico 89190

and deposited, postage prepaid, certified or registered, in the United States mail. Either party may, by notice to the other given as aforesaid, change its mailing address for future notices hereunder.

#### 15. Option to Purchase; Escrow

At any time during the term of this Lease, LESSEE shall have the exclusive right and option to purchase the Leased Premises by giving written notice thereof to OWNER in the manner hereinabove set forth. If LESSEE elects to purchase the Leased Premises, the total purchase price shall be the sum of ONE Hundred Thousand DOLLARS (\$100,000.00). The total purchase price shall be reduced by all payments made to OWNER under the provisions of Section 5 and shall be further reduced by any applicable credits or deductions as provided in Section 11. The total purchase price less all such credits and deductions is hereinafter called the "net purchase price" and in the event LESSEE exercises its option to purchase, the net purchase price shall be payable through escrow upon delivery to LESSEE of a Warranty Deed conveying to LESSEE good and merchantable title to the Leased Premises as evidenced by an Owner's Standard Form Title Insurance Policy paid for by OWNER and issued by a title insurance company authorized to issue title insurance policies in the state where the Leased Premises are situated. Such policy shall insure LESSEE's title thereto in the amount of the total purchase price (except in the case of unpatented mining claims, title insurance for which shall not be required) and

*Handwritten initials:*  
C.G.P.  
B.B.P.

shall be subject only to the matters set forth in Exhibit A. OWNER shall pay the cost of all applicable state and federal stamp or deed taxes. Upon closing of the escrow, this Lease shall terminate. Either party may elect at any time to establish an escrow for collection and disbursement of funds payable under this Lease and for deposit of appropriate deeds and releases. If such an escrow has not been established prior to exercise by LESSEE of its option to purchase, LESSEE shall designate and appoint a bank or title insurance company as escrow agent to receive and distribute all payments and to deliver the deed to the Leased Premises. The costs of any such collection, holding or closing escrow shall be borne one-half by LESSEE and one-half by OWNER.

16. Binding Effect; Assignment

Subject only to the provisions of Section 15, the rights of either party hereunder may be assigned in whole or in part and the provisions hereof shall inure to the benefit of and be binding upon its heirs, executors, administrators, successors and assigns, but no change or divisions in the ownership of the Leased Premises or payment hereunder, however accomplished, shall operate to enlarge the obligations or diminish the rights of LESSEE hereunder. No such change or division in the ownership of the Leased Premises shall be binding upon LESSEE for any purpose until the first day of the month next succeeding the month in which such person acquiring any interest shall furnish LESSEE, at the address set forth in Section 14, with the instrument or instruments, or certified copies thereof, evidencing such change, transfer or division in ownership.

17. Memorandum

The parties to this Lease agree to execute and record a memorandum or short form of this Lease in a form sufficient to constitute record notice to third parties of the rights granted hereunder, which may be recorded with the County Clerk or Recorder of the county or counties in which the Leased Premises are situated.

18. Construction; No Implied Covenants

This Lease and the rights and obligations of the parties hereunder shall be governed by the laws of the state in which the Leased Premises are situated. Section headings herein are for convenience only and shall not be considered a part of this Lease nor used in its interpretation. All of the agreements and understandings of LESSEE and OWNER with reference to the Leased Premises are embodied in this Lease, which supersedes all prior agreements and understandings between LESSEE and OWNER with reference to the Leased Premises. The compensation herein provided shall be deemed to be full payment to OWNER for any damages which may be caused to the Leased Premises by LESSEE's operations hereunder so long as LESSEE conducts such operations in a reasonable and prudent manner without negligence on the part of LESSEE. No implied covenants or conditions whatsoever shall be read into this Lease relating to the prospecting, developing or mining of the Leased Premises or any operations of LESSEE hereunder, or as to the time therefor or measure of diligence thereof, it being expressly agreed and understood that any operations conducted by

LESSEE upon the Leased Premises shall be conducted at such time and in such manner as LESSEE in its sole discretion deems advisable, subject only to the express provisions of this Lease.

19. Counterparts; Joinder

This Lease may be executed in any number of counterparts and any party who executes a counterpart need not execute the same counterpart as any other party. Each of such counterparts shall be deemed to be an original, all of which counterparts together shall constitute one and the same Lease. Execution hereof by the spouse of any OWNER is with the intent and for the purpose of releasing and waiving any and all dower, homestead exemption, community property rights and all other rights conferred upon or reserved to such spouse by the laws of the state in which the spouse resides and by the laws of the state in which the Leased Premises are situated, together with all rights which such spouse has or hereafter obtains (while this Lease is in effect) in and to the Leased Premises.

IN WITNESS WHEREOF, the parties have executed this MINING LEASE AND PURCHASE OPTION effective as of the date first above set forth.

GLADYS B. PATTERSON OWNER C.G. PATTERSON  
X Gladys B. Patterson C. G. Patterson

LESSEE SANTA FE MINING, INC.  
by: R. D. Mawm  
its: Vice President-Exploration

STATE OF ARIZONA )  
COUNTY OF MOHAVE ) ss.

On the 23<sup>rd</sup> day of May, 19 83 personally appeared before me, a Notary Public, C. G. PATTERSON AND BRADYS B. PATTERSON who acknowledged that he executed the above instrument.

IN WITNESS WHEREOF, I have set my hand and seal as of the date first above written.

Renee K. Young  
Notary Public

My commission expires:

SEPT. 18, 1983

STATE OF )  
COUNTY OF ) ss.

On the \_\_\_ day of \_\_\_\_\_, 19\_\_\_ before me, a Notary Public, personally appeared \_\_\_\_\_ and \_\_\_\_\_, known to me to be the persons who executed the foregoing instrument as \_\_\_\_\_ and \_\_\_\_\_ of \_\_\_\_\_, who executed the above instrument, and acknowledged to me that such corporation executed the same for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

\_\_\_\_\_  
Notary Public

My commission expires:

\_\_\_\_\_

STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) ss.

The foregoing instrument was acknowledged before me this 2nd day of June, 1983 by R. G. Marvin, Vice President-Exploration of SANTA FE MINING, INC., a Kansas corporation, on behalf of said corporation.

My Commission Expires:

9/19/85



OFFICIAL SEAL  
Signature: Renee K. Young  
NOTARY PUBLIC - NEW MEXICO  
Notary Band Filed with Secretary of State  
MY COMMISSION EXPIRES: 9/19/85

SCHEDULE I

SCHEDULE I to Mining Lease and Purchase Option between C.G. PATTERSON, *C.G.P.*  
*AND GRADYS E. PATTERSON, HUSBAND and WIFE*  
 (as "OWNER") and SANTA FE MINING, INC., a Kansas corporation, *S.F.M.*  
 (as "LESSEE"). *R.P.M.*

Advance Royalty Payment Schedule (See Section 5.A)

LESSEE agrees to make payment to OWNER of each of the following payments, the due date of which occurs prior to termination of the Lease to which this Schedule is attached.

<u>Anniversary Dates of the Execution of this Agreement</u>	<u>Amounts of Annual Advance Royalty Payment</u>
1st anniversary	\$3,600.00
2nd anniversary	\$3,600.00
3rd anniversary	\$3,600.00
4th anniversary	\$3,600.00
5th anniversary	\$3,600.00
6th anniversary	\$3,600.00
7th anniversary	\$3,600.00
8th anniversary	\$3,600.00
9th anniversary	\$3,600.00
10th anniversary	\$3,600.00
11th anniversary	\$7,200.00
12th anniversary	\$7,200.00
13th anniversary	\$7,200.00
14th anniversary	\$7,200.00
15th anniversary	\$7,200.00
16th anniversary	\$7,200.00
17th anniversary	\$7,200.00
18th anniversary	\$7,200.00
19th anniversary	\$7,200.00

Initial for Identification

*C.G.P.*  
*S.F.M.*  
*R.P.M.*

EXHIBIT A

EXHIBIT A to Mining Lease and Purchase Option by and between C.G. PATTERSON, *C.G.P.*  
*AND GLADYS B. PATTERSON husband and wife* *G.B.P.*  
and SANTA FE MINING, INC., a Kansas corporation, and pertaining to *R.P.M.*  
those certain patented mining claims situated in Mohave County, Arizona, the U.S.  
patents of which are of record in the office of the Clerk or Recorder of said  
county, the names of which and the U.S. Patent Numbers and/or U.S. Mineral Sur-  
vey Numbers of which are as follows:

<u>Patented Mining Claim Name</u>	<u>Mineral Survey No.</u>	<u>U.S. Patent No.</u>
Conner	3444	218

all as more fully described in the patents thereto, which descriptions  
are incorporated hereby by references.

Subject to:

1. Taxes, if any, which constitute a lien, but which are not yet due and payable.
2. Rights-of-way, if any, for roads, telephone and telegraph lines and pipe lines of record in the office of the Clerk or Recorder of the county in which the above described property is situated; and
3. Reservations contained in the United States Patents thereto.

and also pertaining to the following described unpatented lode mining claims situated in Mohave County, Arizona, the location notices of which are of record in the office of the Clerk or Recorder of said county as follows:

<u>Unpatented Mining Claim Name</u>	<u>Docket</u>	<u>Page</u>	<u>BLM Serial No.</u>
<i>Times Square #6</i>	<i>4-C</i>	<i>261</i>	<i>90050</i>
Times Square #1	4-C	123	90045
Times Square #2	4-C	124	90046
Times Square #3	4-C	125	90047
Times Square #4	4-C	126	90048
Times Square #5	4-C	260	90049
Uncle Abe Lode	55	465	80804
Uncle Abe Ext.	3-J	346	80805
Conner #4	3-J	348	80806
Conner #5	3-J	349	80807
Conner #6	3-J	350	80808
Conner Ext. North	3-J	351	80809
Conner Sideswipe	3-J	352	80810

Located in Township 23 North, Range 18 West, Sections 2 and 11,  
Mohave County, Arizona.

together with any fractional claims or rights now owned or hereafter acquired by OWNER while this Lease is in effect, any portion of which is situated within the exterior boundary of the claims described above, and together with any additional unpatented mining claims now owned or hereafter acquired by OWNER while the said Lease is in effect and within a distance of three miles of the exterior boundaries of the claims described above, provided, however, that LESSEE shall have no obligations with respect to such additional claims until 30 days from and after the date on which LESSEE receives notice from OWNER as to the existence and exact location thereof.

Initial for Identification

*C.G.P.*

*G.B.P.*  
*R.P.M.*



EXPLORATION RESEARCH ASSOCIATES Incorporated

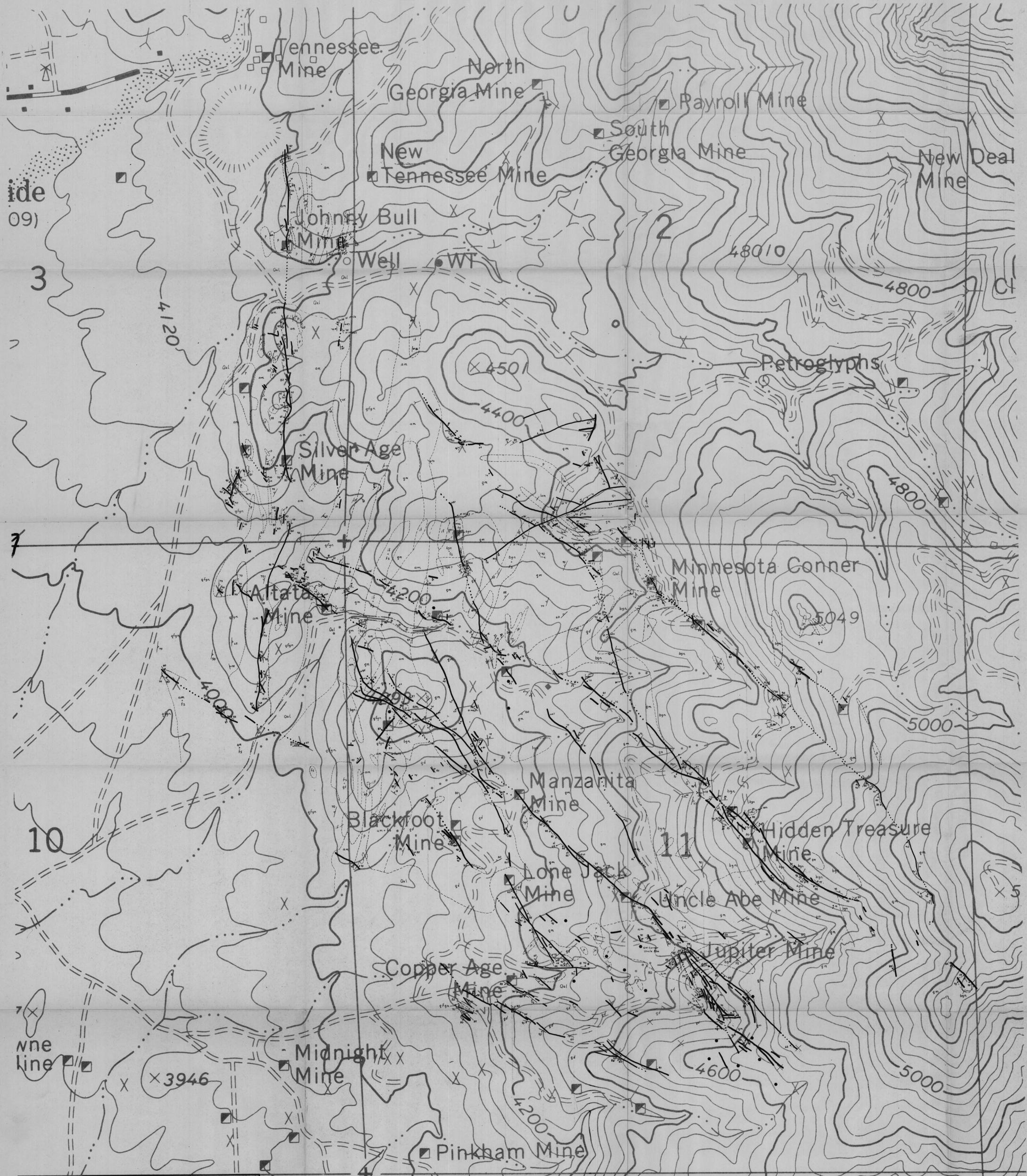
Preliminary Geologic Map of the Minnesota-Conner Mine Area

Chloride District, Chloride 7.5' Quadrangle, Cerbat Mountains, Mohave County, Arizona

Approximate Scale: 1 inch = 250 feet

Prepared for: Santa Fe Pacific Railroad Company

14 January 1983



EXPLORATION RESEARCH ASSOCIATES Incorporated  
 Preliminary Geologic Map of the Minnesota-Conner Mine Area  
 Chloride District, Chloride 7.5' Quadrangle, Cerbat Mountains,  
 Mohave County, Arizona  
 Prepared for: Santa Fe Pacific Railroad Company  
 14 January 1993  
 Revised 23 March 1993