ANNEX –A

SECRETARY'S CERTIFICATE

REPUBLIC OF THE PHILIPPINES)
CITY OF MAKATI) S.S.

MINES AND GEOSCIENCES BUREAU
RECEIVED
APR 03 2003 TIME 8:40 AM
REGIONAL OFFICE NO
ENR

DUPLICATE

SECRETARY'S CERTIFICATE

I, ROBERTO V. SAN JOSE, of legal age, Filipino and with business address at The Valero Tower, 122 Valero St., Salcedo Village, Makati City, under oath depose and say that:

I am the duly elected Corporate Secretary of ERAMEN MINERALS, INC. (the "Corporation"), a corporation duly organized and existing under the laws of the Philippines with principal office and place of business at 4th Flr., Beneficial Life Building, Solana corner Beaterio Sts., Intramuros, Manila.

I hereby certify that at a special meeting of the Board of Directors of the said Corporation held at its principal office on September 23, 2002, the following resolution was unanimously approved:

> "RESOLVED, that the Board of Directors of ERAMEN MINERALS, INC. (the "Corporation") authorize, as it hereby authorizes, the Corporation to file with the relevant government agencies mining related applications, including but not limited to applications for Financial or Technical Assistance Agreements, Mineral Production Sharing Agreements, Exploration Permits, Special Exploration Permits, Prospecting Permits, Area Clearances and other related licenses or authorizations.
>
> RESOLVED FURTHER, that the President, **Mr. Enrique C. Fernandez,** be authorized, as he is hereby authorized, to negotiate, sign and execute an assignment agreement and all other documents, and do all acts necessary to effect the foregoing resolution."

IN WITNESS WHEREOF, I have hereunto set my hand this 3rd day of October, 2002 at Makati City.

ROBERTO V. SAN JOSE
Corporate Secretary

SUBSCRIBED AND SWORN to before me this OCT 04 2002 day of October, 2002 at Makati City, affiant exhibited to me his Comm. Tax Cert. No. 11889694 issued at Makati on February 1, 2002.

NINI PRISCILLA D. SISON
NOTARY PUBLIC
UNTIL DECEMBER 31, 2002
PTR NO. 6724642/MAKATI/01-04-02
IBP NO. 547427/01/02-02/QUEZON CITY CHAPTER

Doc. No. 230;
Page No. 46;
Book No. VII;
Series of 2002.

Zap:Sec.Cert.[Eramen Minerals-bureau of mines]

(14) 14

ANNEX – B

LOCATION MAP
OR
SKETCH PLAN

AMENDED

SKETCH MAP

OF APPLICATION FOR MINERAL PRODUCTION SHARING AGREEMENT

AS PREPARED FOR

ERAMEN MINERALS, INCORPORATION

SITUATED IN THE

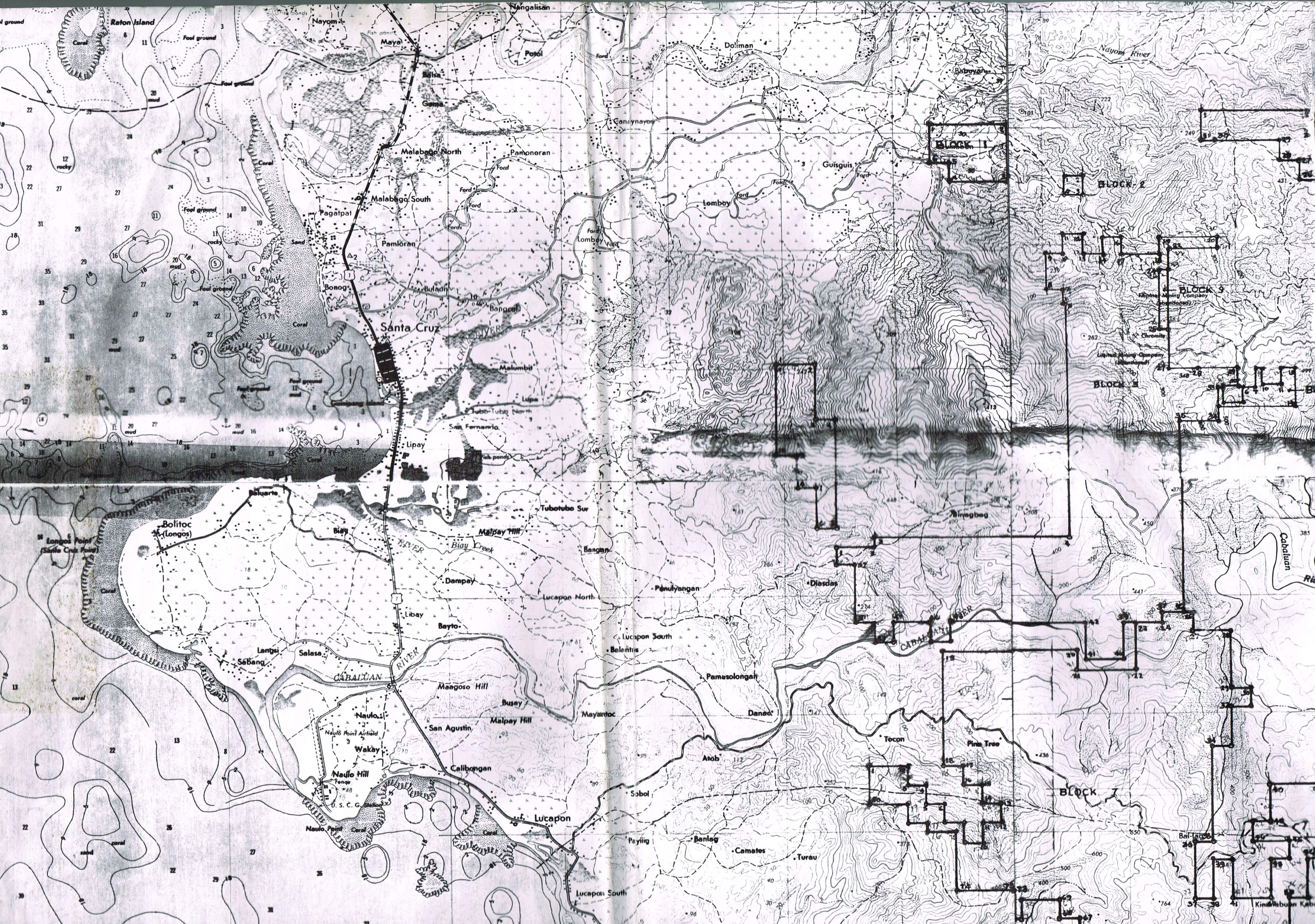
Municipality of: CANDELARIA AND STA CRUZ
Province of: ZAMBALES
Island of: LUZON
Containing an Area of:4,622.878 Has.

PREPARED BY:

REGINO L. SOBREVINAS, JR.
Geodetic Engineer
PRC NO. 996 Date: 1-06-66
PTR NO. 1394730 Date:1-20-03

ATTACHMENT "A"

MINES AND GEOSCIENCES BUREAU
RECEIVED
OCT 07 2008
REGIONAL OFFICE NO. 3
DENR


Raton Island
Nayom
Maya
Balsa
Gama
Nangalisan
Pocol
Doliman
Canaynayan
Malabago North
Malabago South
Pamonoran
Guisguis
Lomboy
Pagatpat
Pamloran
Bonog
Bulaon
Santa Cruz
Bangcol
Malumbil
Lipay
Fish ponds
Tubotubo Sur
Malpay Hill
Biay Creek
Bangan
Panulyangan
Dampay
Lucapon North
Lucapon South
Balentis
Bayto
Libay
Biay
Baluarte
Bolitoc (Longos)
Longos Point (Santa Cruz Point)
Langui
Sabang
Salasa
CABALUAN RIVER
Maagoso Hill
Busay
Mayantoc
Pamasolongan
Danac
San Agustin
Naulo
Naulo Point Airfield
Wakay
Naulo Hill
Naulo Point
Calibongan
Lucapon
Atob
Sabol
Payling
Banlog
Camates
Turau
Tocon
Pine Tree
Diasdas
Binagbag
Cabaluan
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 7
BLOCK 9
Nayom River
Coral
Foul ground
Sand
mud
rocky

BLOCK 1	
CORNER	LATITUDE
1	15-48-04.444
2	15-48-04.444
3	15-47-35.162
4	15-47-35.162
5	15-47-44.823
6	15-47-44.823

Area=[illegible] Has

BLOCK 2	
CORNER	LATITUDE
1	15-47-35.162
2	15-47-35.162
3	15-47-25.401
4	15-47-25.401

Area=[illegible] Has

BLOCK 6	
CORNER	LATITUDE
1	15-46-02.823
2	15-46-02.823
3	15-45-33.841
4	15-45-33.841
5	15-44-35.078
6	15-44-35.078
7	15-44-54.595
8	15-44-54.595
9	15-45-14.12
10	15-45-14.12

Area=162.053 Has

BLOCK 9	
CORNER	LATITUDE
1 = 23	15-46-47.0[illegible]
2 = 24	15-46-47.0[illegible]
3 = 25	15-46-17.0[illegible]
4 = 26	15-46-17.0[illegible]

Area=7.9248 H[illegible]

BLOCK 8	
CORNER	LATITUDE
1 = 1	15-45-38.03[illegible]
2 = 2	15-45-47.80[illegible]
3 = 3	15-45-47.80[illegible]
4 = 4	15-45-38.60[illegible]
5 = 5	15-45-38.60[illegible]
6 = 6	15-45-47.79[illegible]
7 = 7	15-45-47.79[illegible]
8 = 8	15-45-57.58[illegible]
9 = 9	15-45-57.58[illegible]
10 = 10	15-45-48.36[illegible]
11	15-45-48.36[illegible]
12 = 12	15-45-57.56[illegible]
13 = 13	15-45-57.56[illegible]

BLOCK 3

CORNER	LATITUDE	LONGITUDE
1	15-48-09.202	120-01-43.831
2	15-48-09.202	120-02-41.178
3	15-47-54.683	120-02-41.178
4	15-47-54.683	120-02-51.258
5	15-47-44.923	120-02-51.258
6	15-47-44.923	120-03-21.498
7	15-47-54.863	120-03-21.498
8	15-47-54.863	120-03-31.576
9	15-48-04.444	120-03-31.576
10	15-48-04.444	120-03-41.605
11	15-48-14.105	120-03-41.605
12		
13		
14	15-48-04.444	120-04-21.963
15	15-47-54.863	120-04-21.963
16	15-47-54.863	120-04-11.985
17	15-47-45.103	120-04-11.985
18	15-47-45.103	120-04-01.807
19	15-47-35.501	120-04-01.807
20	15-47-35.501	120-03-51.279
21	15-47-25.302	120-03-51.279
22	15-47-25.302	120-03-41.95
23	15-47-23.452	120-03-41.95
24	15-47-23.452	120-02-54.221
25	15-47-33.185	120-02-54.221
26	15-47-33.185	120-02-34.168
27	15-47-42.954	120-02-34.168
28	15-47-42.954	120-02-24.601
29	15-47-52.505	120-02-24.601
30	15-47-52.505	120-01-50.582
31	15-47-52.505	120-01-43.831

Area= 49.364 Has.

BLOCK 4

CORNER	LATITUDE	LONGITUDE
1	15-47-15.641	120-03-44.717
2	15-47-15.641	120-04-01.807
3	15-47-25.402	120-04-01.807
4	15-47-25.402	120-04-11.885
5	15-47-35.162	120-04-11.885
6	15-47-35.162	120-04-21.963
7	15-46-56.12	120-04-21.963
8	15-46-56.12	120-04-01.807
9	15-46-46.359	120-04-01.807
10	15-46-46.359	120-03-44.717

Area= 108.794 Has.

BLOCK 5

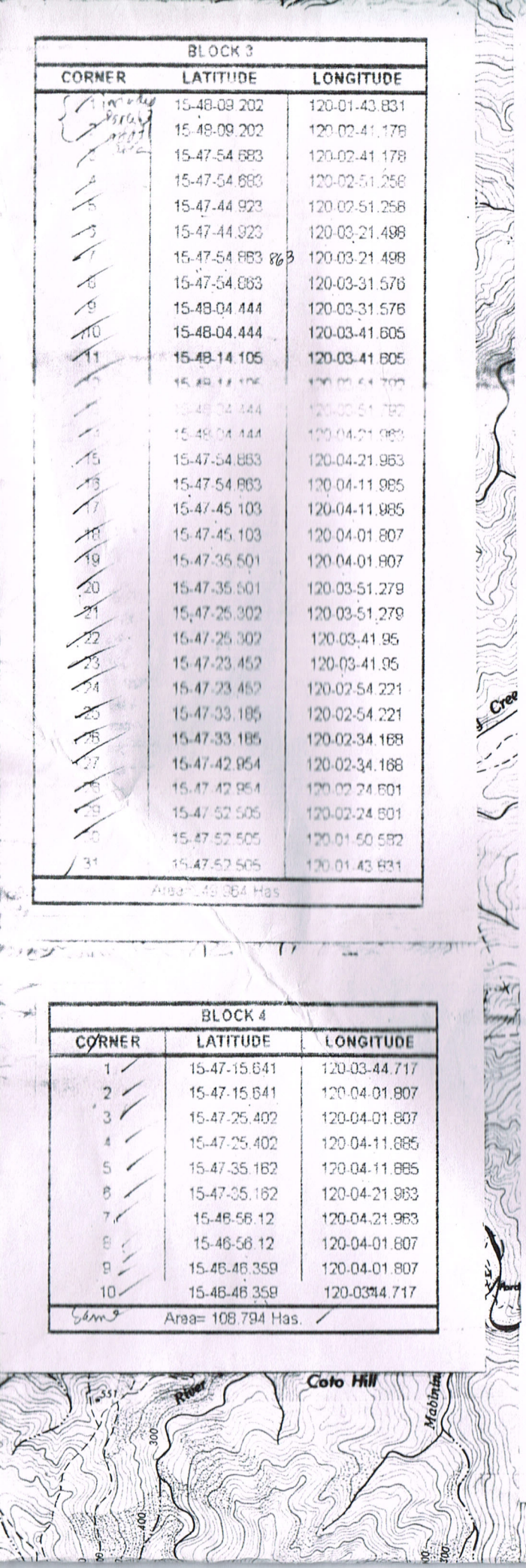
CORNER	LATITUDE	LONGITUDE
1	15-44-25.317	119-58-27.11
2	15-44-25.317	119-58-47.217
3	15-44-29.79	119-58-47.217
4	15-44-29.79	120-00-30.887
5	15-46-29.79	120-00-30.887
6	15-46-29.79	120-00-30.156
7	15-46-36.799	120-00-30.156
8	15-46-36.799	120-00-20.077
9	15-46-56.12	120-00-20.077
10	15-46-56.12	120-00-30.156
11		
12		
13	15-46-56.126	120-00-40.235
14	15-46-56.126	120-00-50.314
15	15-47-03.903	120-00-50.314
16	15-47-03.903	120-01-00.323
17	15-46-56.12	120-01-00.323
18	15-46-56.12	120-01-20.55
19	15-47-03.903	120-01-20.55
20	15-47-03.903	120-01-50.786
21	15-46-57.863	120-01-50.786
22	15-46-57.863	120-01-24.22
23	15-46-47.01	120-01-24.22
24	15-46-47.01	120-01-20.55
25	15-46-17.083	120-01-20.55
26	15-46-17.083	120-01-24.22
27	15-45-57.563	120-01-24.22
28	15-45-57.563	120-01-40.71
29		
30		
31		
32		
33		
34	15-45-30.00	120-01-50.788
35	15-45-30.00	120-01-30.00
36 =	15-43-50.672	120-01-30.00
37 = 52	15-43-50.672	120-01-18.448
38 = 53	15-43-46.277	120-01-18.448
39 = 54	15-43-46.277	120-00-58.291
40 = 55	15-43-26.756	120-00-58.291
41 = 56	15-43-26.756	120-00-38.134
42 = 57	15-43-46.277	120-00-38.134
43 = 58	15-43-46.277	119-58-27.584
44 = 59	15-43-36.516	119-58-27.584
45 = 60	15-43-36.516	119-58-17.505
46 = 61	15-43-46.277	119-58-17.505
47 = 62	15-43-46.277	119-58-57.348
48	15-43-36.516	119-58-57.348
49	15-43-36.516	119-58-47.269
50 = 65	15-43-46.277	119-58-47.269
51 = 66	15-43-46.277	119-58-37.19
52 = 67	15-44-15.559	119-58-37.19
53 = 68	15-44-15.559	119-58-27.11

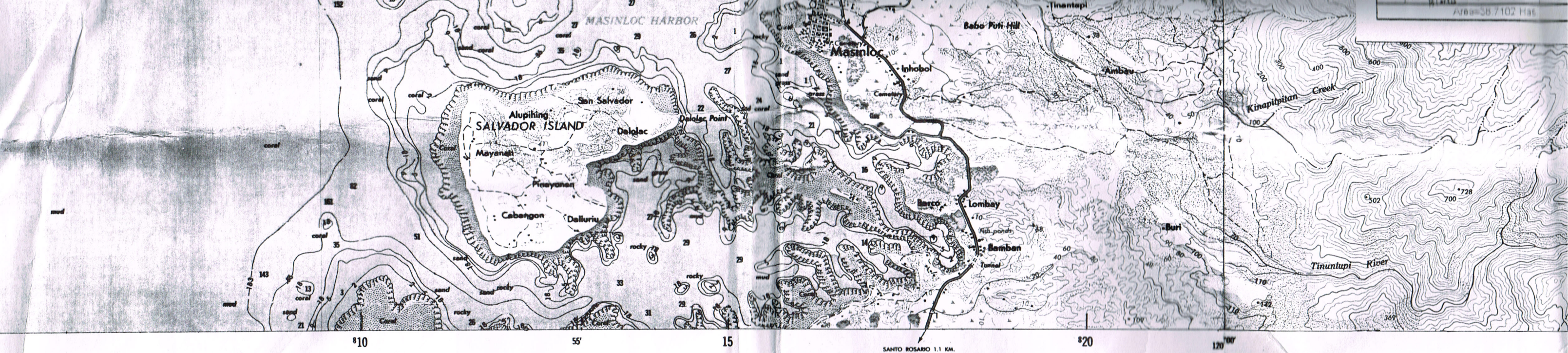
Area= 1,609.32 Has.

BLOCK 7

CORNER	LATITUDE	LONGITUDE
1	15-42-33.402	119-58-43.586
2	15-42-33.402	119-59-03.743
3	15-42-23.642	119-59-03.743
4	15-42-23.642	119-59-13.822
5	15-42-13.881	119-59-13.822
6	15-42-13.881	119-59-23.90
7	15-42-04.121	119-59-23.90
8	15-42-04.121	119-59-33.979
9	15-41-54.20	119-59-33.979
10	15-41-54.20	119-59-44.057
11	15-42-04.121	119-59-44.057
12	15-42-04.121	119-59-54.136
13	15-42-13.881	119-59-54.136
14	15-42-13.881	119-59-44.057
15	15-42-23.642	119-59-44.057
16	15-42-23.642	119-59-33.979
17	15-42-33.402	119-59-33.979
18	15-42-33.402	119-59-23.90
19	15-43-31.999	119-59-23.90
20	15-43-31.999	120-00-04.35
21	15-43-22.205	120-00-04.35
22	15-43-22.205	120-01-04.886
23	15-43-46.275	120-01-04.886
24	15-43-46.275	120-01-18.447
25	15-43-50.67	120-01-18.447
26	15-43-50.67	120-01-34.922
27	15-43-41.726	120-01-34.922
28	15-43-41.726	120-01-55.079
29	15-43-12.445	120-01-55.079
30	15-43-12.445	120-02-05.158
31	15-43-02.684	120-02-05.158
32	15-43-02.684	120-01-55.079
33	15-42-43.163	120-01-55.079
34	15-42-43.163	120-01-45.001
35	15-41-54.36	120-01-45.001
36	15-41-54.36	120-01-34.922
37	15-41-25.079	120-01-34.922
38	15-41-25.079	120-01-45.001
39	15-41-44.80	120-01-45.001
40	15-41-44.80	120-01-55.079
41	15-41-25.079	120-01-55.079
42	15-41-25.079	120-02-15.237
43	15-41-44.80	120-02-15.237
44	15-41-44.80	120-02-25.315
45	15-41-54.36	120-02-25.315
46	15-41-54.36	120-02-05.158
47	15-42-04.121	120-02-05.158
48	15-42-04.121	120-02-15.237
49	15-42-23.642	120-02-15.237
50	15-42-23.642	120-02-45.47
51	15-42-43.163	120-02-45.47
52	15-42-43.163	120-02-55.548
53	15-42-04.121	120-02-55.548
54	15-42-04.121	120-02-45.47
55	15-41-44.80	120-02-45.47
56	15-41-44.80	120-02-35.284
57	15-41-25.079	120-02-35.284
58	15-41-25.079	120-02-25.201
59	15-41-44.80	120-02-25.201
60	15-41-05.557	120-02-25.115
61	15-40-55.797	120-02-05.158
62	15-40-55.797	120-01-24.844
63	15-40-46.036	120-01-24.844
64	15-40-46.036	120-00-24.372
65	15-41-05.557	120-00-24.372
66	15-41-05.557	120-00-34.35
67	15-41-15.318	120-00-34.35
68	15-41-15.318	120-00-24.372
69	15-41-25.079	120-00-24.372
70	15-41-25.079	120-00-34.215
71	15-41-15.318	120-00-04.215
72	15-41-15.318	120-00-00.00
73	15-41-30.00	120-00-00.00
74	15-41-30.00	119-59-30.00
75	15-42-00.00	119-59-30.00
76	15-42-00.00	119-59-13.822
77 = 85	15-42-04.121	119-59-13.822
78 = 86	15-42-04.121	119-59-03.743
79 = 87	15-42-13.881	119-59-03.743
80 = 88	15-42-13.881	119-58-43.586

Area= 2,240.042 Has.





Scale 1:50,000

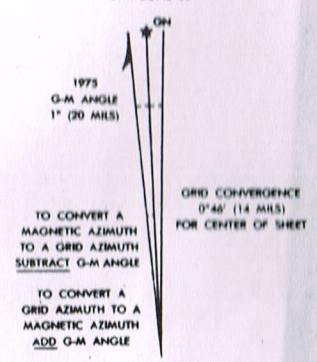
1000 500 0 1000 2000 3000 4000 5000 Meters
1000 500 0 1000 2000 3000 4000 5000 Yards
½ 0 1 2 3 Statute Miles
½ 0 1 2 3 Nautical Miles

CONTOUR INTERVAL 20 METERS
SUPPLEMENTARY CONTOURS 10 METERS

SPHEROID ..... CLARKE 1866
PROJECTION ..... TRANSVERSE MERCATOR
VERTICAL DATUM ..... MEAN SEA LEVEL
HORIZONTAL DATUM ..... LUZON DATUM
CONTROL BY ..... U. S. COAST AND GEODETIC SURVEY, 29TH ENGINEER BATTALION AND PHILIPPINE COAST AND GEODETIC SURVEY

DELINEATION OF INTERNAL ADMINISTRATIVE BOUNDARIES ON THIS MAP IS APPROXIMATE

UTM ZONE 50



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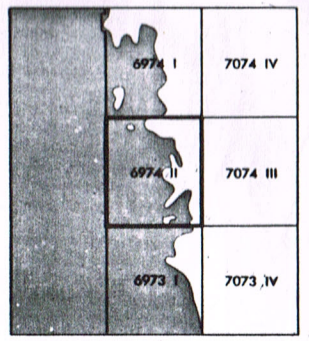
Department of Environment and Natural Resources
NATIONAL MAPPING & RESOURCE INFORMATION AUTHORITY
Fort Bonifacio, Makati
Metro Manila
JOSE G. SOLIS
Administrator

ELEVATION GUIDE

High
Medium
Low

ADJOINING SHEETS



BOUNDARIES

A. Zambales Province
1. Santa Cruz Municipality
2. Candelaria Municipality
3. Masinloc Municipality

LEGEND

MAP INFORMATION AS OF 1977

A LANE IS GENERALLY CONSIDERED AS BEING 2.4 METERS (

THERE ARE NUMEROUS IDENTICALLY NAMED VILLAGES PORTRA

Footbridge
, hard surface, divided highway with median strip ..... 4 LANES 6 LANES
, hard surface, two or more lanes wide ..... 3 LANES
, loose or light surface, two or more lanes wide ..... 3 LANES
, hard surface, one lane wide
, loose or light surface, one lane wide
weather, loose surface
ers: Primary; Secondary 8 24
S
ge, single track; multiple track; Station
rge, single track multiple track; Station 1.07 M. (3'6 1/8")
uge, single track; multiple track
ays; hard surface, loose surface
inistrative division
administrative division
ation boundary
Village
elegraph line
ssion line
crescent
or viaduct

Ferry
Ford
Masonry dam carry
Road on levee
Masonry dam; Ear
Large rapids
Large falls
Office: Province o
Cemetery: Christia
Located object
Church; Chapel; S
School; Hospital
Well; Tank
Mine; active, aban
Horizontal control
Bench mark
Spot elevation in
Salt evaporator
Lake or pond; Per
Woodland
Scattered trees
Marsh, swamp
Nipa
Mangrove

Reprinted by NAMRIA Janu

'074 III MOUNT LANAT

sponds to **PNTMS** SHEET 3032-III

Scale 1:50,000

1000 500 0 1000 2000 3000 4000 5000 Meters

1000 500 0 1000 2000 3000 4000 5000 Yards

1 ½ 0 1 2 3 Statute Miles

1 ½ 0 1 2 3 Nautical Miles

Ferry

Ford

BM×976

• 925 • 925

Orchard, plantation

Scrub

Tropical grass

Rice Field

Land subject to inundation

CONTOUR INTERVAL 20 METERS
SUPPLEMENTARY CONTOURS 10 METERS

SPHEROID	CLARKE 1866
PROJECTION	TRANSVERSE MERCATOR
VERTICAL DATUM	MEAN SEA LEVEL
HORIZONTAL DATUM	LUZON DATUM
CONTROL BY	U. S. COAST AND GEODETIC SURVEY, 29TH ENGINEER BATTALION AND PHILIPPINE COAST AND GEODETIC SURVEY

Published by
Department of Environment and Natural Resources
NATIONAL MAPPING & RESOURCE INFORMATION AUTHORITY
Fort Bonifacio, Makati
Metro Manila
JOSE G. SOLIS
Administrator

207 14

ANNEX – C

EXPLORATION WORK PROGRAM

MGB Form No. 05-4

Republic of the Philippines
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU
North Avenue, Diliman, Quezon City

TWO- YEAR EXPLORATION WORK PROGRAM

NICKELIFEROUS LATERITE DEPOSIT

MINES AND GEOSCIENCES BUREAU
RECEIVED
REGIONAL OFFICE NO
DENR

1.0 NAME AND ADDRESS OF COMPANY/PROPONENT

1.1 Name of Project : APSA – _____

1.2 Name of Company : **ERAMEN MINERALS, INC.**
4TH Floor, Beneficial Life Building,
Solana cor. Beaterio streets,
Intramuros, Manila

Tel. No. 528 – 1341
Fax No. 527 – 0761

Contact Persons : **ENRIQUE C. FERNANDEZ**
President

2.0 LOCATION AND SIZE OF THE PROJECT

The proposed contract area is situated within the Municipalities of Candelaria and Sta Cruz, Province of Zambales. It covers an aggregate area *of Four Thousand Six Hundred Nineteen and 6869/10,000 Hectares* (4,619.6869 has.) encompassing Barangays Lucapon North and South, Tubotubo North and South, Guinabon and Guisguis, Sta Cruz. The area is bounded within the following geographical coordinates:

Please see Annex – 1.

3.0 MINERAL COMMODITY APPLIED

Nickeliferous Laterite and other associated minerals.

(137) 14

4.0 DESCRIPTION OF THE PROJECT AREA

Below is a brief description of the project area and its vicinity focusing on the physiography, location and access, drainage system, vegetation and land use. Data used in the description is based on literature researches and through actual and or preliminary geological and topographic surveys.

4.1 Terrain and Physiography

The proposed contract area lies along the northwestern flank of the Zambales Range. One of the six (6) major terrains or tectonic elements delineated in the northern Philippines, having origins far from their present sites and having moved large distances with respect to adjacent terrains (Karig, 1981). The Zambales Range or better known now as the *Zambales Ophiolite Range* can be followed southwards from Subic Bay, beneath the sea floor on magnetic and gravity profiles, to Ambil Island in Mindoro and adjacent Islands where it is tipped up steeply, along a west-northwesterly strike and juxtaposed against the metamorphic terrain of Lubang and Northern Mindoro (Karig, 1981).

Gently rolling slopes to rugged topography generally characterizes the proposed contract area. Ground elevation varies between 900 meters to about 892 meters above mean sea level. Rugged topography at the eastern section is typified by deeply entrench valleys and moderate to steep waterfalls.

4.2 Accessibility

Municipalities of Candelaria and Sta Cruz are accessible to all types of vehicles using various road networks in going to this western section of Zambales. Victory Liner, a public bus transport has a frequent service between

Manila and Olongapo and Olongapo and Alaminos or between Alaminos, Pangasinan and Olongapo (five hours).

From Sta. Cruz Propoer, the area could be reach through any existing routes, the Guisguis-Guinabon Road in the north, the Biay-Tubo-tubo Road in the central section and the Acoje road in the south. The interior areas are readily accessible through several and previous exploration and logging road networks.

4.3 Drainage System

The drainage pattern of the area is strongly influenced by the existence of several peaks and broad inclined surfaces. Consequent streams which are arrange in a loose radial pattern around the peaks drain the area, while those situated along the inclined surfaces depicts dendritic to trellis pattern reflective of the overlying lithology. Furthermore, the nature of the underlying rocks, indeed determines the eroding characteristics of the rivers. Streams cutting through sedimentary and highly weathered ultramafic rocks are generally deeply incised and characterized by steep banks and cascades. However, streams traversing fresh and or un-weathered mafic suites rarely produce steep banks.

The headwaters and tributaries of Nayom and Sta Cruz River Systems drain the northern section of the proposed contract area. Whereas, the headwaters and tributaries of Cabaluan River System drain the central section, while Lauis River System drain the southern section of the area. All these river systems empty its load towards the South China Sea.

4.4 Vegetation

The area is characterized by secondary growth vegetation. It has been largely denuded of primary forest due to past commercial logging and subsequent slash-and- burn farming. Flatlands/lowlands some distant away from the applied area are seasonally planted to cash crops such as rice and vegetables. Other areas not devoted to seasonal crops are sparsely vegetated with second growth trees that can be found mostly in moderately elevated sedimentary formations. The ubiquitous cogon is present in most of the mentioned other areas.

Pine trees such as Agoho and Mindoro Pines grow in central and southeastern sections of the proposed contract area. These are the products of the reforestation initiatives of the previous mining and exploration activities in the area.

4.5 Land Use Classification

Based from the Municipal Planning and Development Offices of Sta. Cruz and Candelaria, through its 1996 Municipal Planning and Development Programs, the applied area is classified as *Forest Land.* Though a few numbers of families settled in the vicinity of the former Acoje Mines, there is still no other significant or observable land utilization in the area. The other portion of the applied area, especially at the low lying areas, are seasonally planted to cash crops and covered with cogon and other tropical grasses.

5.0 DESCRIPTION OF EXPLORATION PROGRAM

The program hereby presented outlined and details the schedule of activities, specific targets, objectives, outputs and budget requirements.

The main objective of this exploration program is to characterize and assess fully the nickel, cobalt and other associated mineral contents of the nickeliferous laterite deposit in the subject area in order to delineate a sizeable resource that can be economically developed as well as exploited in the near future. It also aims to geologically document the nature, type and depositional character of the said product of chemical weathering so that this can well serve as basis or model for further exploration work in other areas of similar geologic setting.

Specifically and ultimately, this program aims at defining an inferred resource potential through a drilling campaign at 200 meter x 200 meter grid interval. If the survey furthers warrants, where an inferred resource potential is subsequently delineated, then a 100 meter x 100 meter square grid drilling shall be carried-out to elevate the resource potential to an indicated resource category. Finally, a closely space grid of 50 m x 50m to 25 m x 25 m. pattern for a measured category.

5.1 Exploration Work Program

Below is the exploration work program intended to be carried-out within the proposed contract area and consists of the following phases:

5.1.1. Preliminary Exploration Activity

a. Literature/Research Work
b. Data collation and compilation

5.1.2. Reconnaissance Geological & Geo-chemical Soil Survey

5.1.3. Semi-Detailed Survey

a. Geological Mapping
b. Re-sampling of Old Workings
d. Hand Auger and Winkie Drilling

5.1.4. Topographic and Ground Control Survey

5.1.5. Follow-up / Detailed Survey
a. Geological Mapping
b. Geochemical Soil Survey
c. Trenching & Test Pitting
d. Hand Auger and Winkie Drilling

5.1.6 Project Feasibility Study, Volume & Reserve Estimation and Environmental Impact Assessment Study

5.1.1 Preliminary Exploration Activity

It is a common practice that prior to the commencement of actual fieldwork, compilation of all available data will be conducted to gather and gain more and better understanding of the geology, structure and mode of occurrence of the nickeliferous laterite and other associated mineral deposits in the area. Previous test pits and drilling data including location, geologic logs and corresponding assays, shall be reviewed. A re-assessment of the method used in the sampling and calculations of previous reserve is also important to be conducted. Preliminary topographic and base maps shall be prepared with promising sites and or targets shall be plotted. After all the necessary literature researches and data base have been accomplished, the supplies and materials for the field survey shall be prepared.

Below are the previous works carried out in the proposed area during and under the old tenement rights such as Commonwealth Act No. 137 and Presidential Decree No. 463:

In 1967, Global Mining Resources, Inc. (Global) laid claim to over 70 sq. kilometers of mineral land encompassing the proposed applied area for nickeliferous laterite deposit. Also in the 1960's, Benguet Consolidated, Inc. (BCI) through an operating agreements with several mining companies such as Zambales Chromite Mining company, Filipinas Mining Company and Consolidated Mines, Inc covering a total area of about 35 sq. kilometers conducted also extensive exploration activities at the northern section of Zambales. After extensive verifications by the Bureau of Mines on the mineralization and boundaries of certain claims, the same were approved and granted a mining right. During the years 1968 to 1972, extensive exploration works were undertaken by Global and BCI on their respective areas. Geological mapping, ground control surveys and subsurface investigations were conducted by both companies for the verification of the commercial content of the nickel deposit.

In 1976, after the necessary evaluation and assessment of all exploration data on the nickel deposit gathered by the said companies, Falconbridge Nickel Mines of Toronto, Canada (Falconbridge) signed up with Global and BCI to further explore the properties and came up with a feasibility study for the joint venture project. From 1977 to 1983, Falconbridge dug test pits on a 100-m center grid spacing in the more prospective areas

where nickel ore (laterite and saprolite) averages 1.7% Ni.

Falconbridge stopped the project in August 1983 due to low nickel metal prices, increasing operating costs and unstable political conditions in the country. BCI relinquished then its right to operate in the area and dropped or returned the mineral claims to the original claimowners.

As of May 1983, the aggregate total proven probable and possible reserves for all the properties explored was placed 56.9 Million DMT of 1.7% Ni (average grade). About 11.9 Million DMT of this is within the Insular Chromite Reservation Parcel 3.

5.1.2 Reconnaissance Geological and Geo-Chemical Soil Survey

On the basis of the data and information gathered and generated during the previous activity, a reconnaissance geological mapping and soil and when necessary, rock sampling shall be conducted. All the different rock types will be mapped out and characterize accordingly. Nickel laterite deposit which is the target commodity will be given the utmost consideration in the conduct of the survey. Likewise, rocks that are related or associated to nickel laterite deposition will also be given attention, since they can be utilized in further understanding of the laterite characterization in the area. Route (roads, rails) mapping and traverses along stream channels and on areas where suitable rock exposures can be noted will be carried-out. A topographic map of scale 1:50,000 will be used as base map. A sampling density of around two (2) samples per square kilometer will be implemented.

Rock samples of interest will be sent to the laboratory for chemical and petrographic analyses.

Simultaneous with geological site selection and sampling is a survey to orient the geochemical sampling medium or media and procedures. This activity shall be conducted purposely to check and verify the best sampling medium and the best soil horizon to sample. From the previous studies conducted by several private and government exploration groups in the early 80's, both soil and stream sediment having minus 80 mesh (BSS, 177 micron opening) fraction of both media was shown to provide adequate contrast. *The company is bent on using soil as the sampling medium for its geochemical survey.*

This activity shall be carried-out by a geochemist and two (2) geo-technicians or aides for a month. The density of base of slope and ridge soil geochemical sampling is 3 to 5 samples per square km. This sampling density may be increased to 7-10 samples in areas with widespread and thick laterite occurrences.

5.1.3 Semi-Detailed Survey

Data gathered from rapid reconnaissance and from previous data acquired during "Global" days shall be incorporated to come up with a survey design suited for a 1:25,000 to 1:10,000 scale mapping.

A total of 50 previously dug test pits (old workings) with elevated nickel values shall be rehabilitated and re-sampled. Channel sampling on excavated faces shall be implemented. Samples generated

from each sampling points shall include original/primary sample, duplicate and standard sample. These samples shall then be subjected to Quality Control Testing Procedures. Sampling shall be done in a systematic way so that possible trends in the chemical character of the deposit may be determined.

A hand auger drilling shall also be conducted as an advance drilling campaign to explore the soft laterite profile to delineate potential areas within the proposed tenement area. Drill holes with encouraging assay values are then to be deepened using *"winkie"* drill machine from soft laterite zone to the hard saprolite horizon. Around 2-3 kg of primary samples shall be collected for initial sample preparation.

Initial sampling preparations includes systematic logging and labeling, sun drying, crushing using mallet to approximately 5mm of about 2 kg of dried samples, blending/splitting (~1.7 kg for duplicate sample and 0.3kg for sample to be sent and analyzed in the laboratory, that requires further preparations), re-labeling and storage.

Approximately 100 samples will be analyzed for Ni, Fe, Co, Mg and Al by Atomic Absorption Spectrometry (AAS) to verify and better understand the quality or values of the commodities of interest.

5.1.4. Topographic and Location Surveys

A topographic and location survey of the delineated areas is indeed necessary in mine development planning and design and for the establishment of legal boundaries. The resulting topographic map is

useful in accurate design of grid pattern for test pits, trenches or simply random grab sampling. This is likewise necessary in planning the site for drill holes during drilling activity.

The specific survey activities to be carried-out are the following:

a. Establishment of grid lines or pattern for geochemical survey and geological mapping survey. The grid lines shall from 200 m x 200 m to 100 meters x 100 meters or 50 m. x 50 m. intervals. Based from the above grid lines, sampling points is normally set at either 50 meters or much closer apart at 25 meters, particularly on areas with nickel laterite enrichment;

b. Establishment of control (vertical and horizontal) baselines at various strategic areas of the proposed exploration site based from the cadastral and land survey control stations. Generation of topographic map for semi-detailed to detailed surveys in scale of 1:5,000 and 1:2,500, respectively with contour interval from 10 down to 2 meters;

c. Determination of the true geographic position, horizontal and vertical control and true elevation of mineralized areas, trenches, test pits and drill holes; and

d. Establishment of legal boundaries of the area applied for.

This activity shall be conducted for three (3) months by a team of surveyors and aides consists of two (2) Geodetic Engineers, five (5) surveying

aides and 3 guides/ brushers. A "Total Station" surveying instrument shall be used for this activity.

5.1.5 Follow-Up/Detailed Survey

After pinpointing/delineating potential target area encountered during the previous activities, a detailed or follow-up survey shall be designed and conducted. A smaller map scale shall be used for the purpose depicting more details of the findings or data gathered. A 1:5,000 and a 1:2,500 map scale shall be utilized.

This time, the focus of survey will be concentrated only on areas with the most promising deposits. Unlike the previous survey it covers the entire area and its vicinity. Sites having good exposures will be sampled in greater detail using transit in grid pattern.

The sampling will be done in a systematic way so that a possible trend in the nickel values may now be accurately determined.

Geochemical Soil Survey

Together with the conduct of geological mapping is the geochemical survey. The sampling medium of this survey is soil. Soil samples are normally taken from pits dug in the ground. The depth of sampling horizon is based from the orientation survey to be conducted prior to the full exploration activities. But normally, it is being taken at the B Horizon – the zone of metal accumulation. The most appropriate sampling will be from base-of-slope, ridge, and spurs. Sampling shall be carried out at intervals of 50 m to 100 m or at change in lithology.

The sampling is being conducted using either a shovel or a sample pick.

If the depth of sampling cannot be tackled by a shovel, then a hand auger shall be used.

A pre-numbered, high- wet-strength kraft paper envelope measuring about 10 cm x 20 cm. shall be used to keep the samples. In order to reduce weight during sampling, a wet-sieving procedure (approx. 30 mesh BSS) shall be used during the traverse.

During this phase, test pitting and trenching shall be carried out in a number of sites to determine the lateral and subsurface continuity and character of nickel enrichment/mineralization. On this stage, sampling will be done horizontally and vertically to identify any appreciable changes or variation in the essential chemical constituents of the materials of interest. In-fill drillings using auger and "winkie drill machines shall also be carried out.

Grid mapping and closely space sampling shall be undertaken on areas where the physical and chemical character appears too variable. All samples taken will be analyzed for petrographic and ASS.

Approximately 1,500 soil samples and about fifty rock samples shall be collected. The same field sampling preparation procedures as presented under item Semi-Detailed Phase shall also be implemented.

A team of 2 exploration geologists and a geochemist, 6 geo-technicians/geologic aides and

varying numbers of support personnel (locals) shall compose the exploration team.

5.1.6 Feasibility Studies

After the deposits have been block accurately, a resource estimation and a mine feasibility study shall be undertaken to determine the economic viability of the project. This will be followed by a mine planning and design. Simultaneous with the preparation of the mine feasibility study, is the Environmental Impact Assessment Study (EIA) which, gather and establish baseline information on various critical environmental aspects and to better safeguard and support the proposed project.

6.0 PROPOSED SCHEDULE OF WORK

ACTIVITIES	YEAR 1				YEAR 2			
	1st QTR.	2ND QTR.	3RD QTR.	4TH QTR.	1ST QTR.	2ND QTR.	3RD QTR.	4TH QTR.
1. Research Work								
2.Reconnaissance Geol. & Geo-chemical Surveys								
3.Semi-Detailed Survey								
4. Topographic/Location Survey								
5. Follow-up/Detailed Survey								
6. Test Pitting /Trenching								
7. Drilling								
8.Resource Estimation, Feasibility Study Preparation & EIA Study								

7.0 TOTAL ESTIMATED EXPLORATION COST

Below is the total budgeted cost for the proposed two -year exploration work program for Nickeliferous Laterite and other associated mineral deposits and summarized as follows:

YEAR 1	COST
Literature Research	P 5,000.00
Reconnaissance Survey	
•Geological Mapping	100,000.00
•Geo-Chem. Soil Survey	100,000.00
•Rock & Soil Sampling	30,000.00
Semi-Detailed Survey	
•Geological Mapping	300,000.00
•Geochemical Soil Survey	700,000.00
•Test Pitting/Trenching	630,000.00
•Auger & Core ("Winkie") Drilling Including Laboratory Analyses	2,100,000.00
Topographic, Ground Control &Location Surveys	300,000.00
Detailed Survey	
•Geological Mapping	350,000.00
•Geochemical Soil Survey	650,000.00
•Test Pitting/Trenching	750,000.00
•Auger & Core ("Winkie") Drilling including Laboratory Analyses of samples	2,750,000.00
	PHP 8,765,000.00

YEAR 2	COST
Follow-Up/Detailed Survey	
•Geological Mapping Survey	350,000.00
•Geochemical Soil Survey	650,000.00
•Test Pitting/trenching	750,000.00
•Auger & Core ("Winkie") Drilling Including Laboratory Analyses of Samples	1,500,000.00
Topographic, Ground Control &Location Surveys	300,000.00
Volume and Reserve Computation	150,000.00
Mine Feasibility Study	1,500,000.00
Environmental Impact Assessment (EIA) Study	2,000,000.00
	PHP7,200,000.00
Grand Total for Year 1&2	**PHP15,965,000.00**

8.0 SIGNATURE OF PROPONENT

I hereby certify that all facts and information contained herein to support our application for Mineral Production Sharing Agreement relative to the above-mentioned project are true and correct to the best of my knowledge and belief.

Done this _____ day _____ 2002 at _____, Metro Manila.

Prepared By:

SAMUEL F. DECLARO
Geologist
P.R.C. License No. 000576
PTR No. 18768688
Issued on: January 3, 2002
Issued at : Quezon City

Conforme:

ERAMEN MINERALS, INC.

ENRIQUE C. FERNANDEZ
President

(123) 12

ANNEX– D

ENVIRONMENTAL WORK PROGRAM

MGB Form No. 16-1

Republic of the Philippines
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU
North Avenue, Diliman, Quezon City

MINES AND GEOSCIENCES BUREAU
RECEIVED
APR 03 2003 TIME 1A
REGIONAL OFFICE NO. 3
DENR

ENVIRONMENTAL WORK PROGRAM

NICKELIFEROUS LATERITE DEPOSIT

1.0 NAME AND ADDRESS OF COMPANY/PROPONENT

1.1 Name of Project : APSA No.

1.2 Name of Company and Address : **ERAMEN MINERALS, INC.**
4th Floor, Beneficial Life Building
Solana cor. Beaterio Streets,
Intramuros, Manila

Tel. No. 528 – 1341
Fax No. 527 – 0761

Contact Persons : **ENRIQUE C. FERNANDEZ**
President

2.0 TYPE AND NATURE OF PROJECT

The proposed project that is intended for Mineral Agreement with the Government is a metallic resource extractive project. It is basically aim at exploring, developing, and exploiting the nickel, cobalt and other associated mineral/metal content in a Nickeliferous Laterite deposits within the subject area.

As part of the mandatory requirement in the MPSA application, an Environmental Work Program is necessary and becomes a vital link in defining possible impacts the proposed project might have on the environment wherein mitigating measures and commitments will be presented to assure that the possible adverse effects are being addressed.

3.0 GENERAL LOCATION AND AREA TO BE COVERED

The proposed contract area is situated within the Municipalities of Candelaria and Sta Cruz, Province of Zambales. It covers an area *of Four Thousand Six Hundred Nineteen and 6869/10,000 Hectares* (4,619.6869 has.) encompassing Barangays Lucapon North and South, Tubotubo North and South, Guinabon and Guisguis, Sta Cruz, Zambales and Barangay Uacon of Candelaria Zambales. The area is bounded within the following geographical coordinates:

Please refer to Annex- 1.

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Municipalities of Candelaria and Sta Cruz are accessible to all types of vehicles using various road networks in going to this western section of Zambales. Victory Liner, a public bus transport has a frequent service between Manila and Olongapo and Olongapo and Alaminos or between Alaminos, Pangasinan and Olongapo (five hours).

From Sta. Cruz Proper, the area could be reached through any of the existing routes, the Guisguis-Guinabon Road in the north, the Biay- Tubo-Tubo Road in the central section and the Acoje Road in the south. The interior areas are then readily accessible through several and previous exploration and logging road networks.

4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section describes the environmental setting and some baseline environmental conditions in the area of the proposed project and is divided into six sub-sections vis; 4.1- Land, 4.2- Water; 4.3 Air; 4.4-Geology/Geomorphology (physical environment) 4.5-Biological Environment; 4.6-People (Socio-economic environment).

4.1. Land Environment

This sub-section presents the environmental conditions of the project area and its vicinity focusing on the following parameters: *Topography/Physiography, Land Use/Capability, Soils/Pedology.*

4.1.1 Topography/Physiography

The proposed contract area is generally characterized by a gently rolling slopes to rugged topography. Ground elevation varies between 10 meters to about 892 meters above mean sea level with gradients between 5% to 30 % . The site is part of the Zambales Ophiolite Range; one of the six (6) major terrains or tectonic elements delineated in the northern Philippines.

Rugged topography amidst Sta Cruz eastern area is typified by deeply entrenched valleys and moderate to steep waterfalls. Dendritic to trellis pattern reflective of the overlying lithology characterizes the drainage system. Draining the northern areas are tributaries of the west southwest- flowing Nayom and Sta Cruz River System. While headwaters and tributaries of Cabaluan River system drain the central section, whereas, Lauis River System drains the southern section.

4.1.2 Land Use/Capability

Based from the Municipal Planning and Development Offices of Sta. Cruz and Candelaria through its 1996 Municipal Planning and Development Programs, the applied area is classified as *Forest Land.* Though a few numbers of families settled in the vicinity of the former Acoje Mines,

there is still no other significant or observable land utilization in the area.

Moderately lying topography in the western and some portions in the eastern section of the proposed contract area are seasonally planted to cash crops such as upland rice, fruit –bearing trees and vegetables. Other areas not devoted to seasonal crops are sparsely vegetated with second growth trees, which can be found mostly in moderately elevated rock formations.

4.1.3 Soils/Pedology

At present, there is no available data yet to present but the soil sampling and analysis will be immediately and simultaneously conducted with the regional survey. Result of which will be included on the status report of the exploration work program.

4.2 Water Environment

This sub-section presents the environmental conditions in the project area with respect to water.

There are plenty of waterways in the project area and its vicinity. They are characterized as perennial streams. Nayom and Sta. Cruz River in the north, Cabaluan River System in the central portion and Lauis River System are the major river systems in the project area. Among these river systems, only Lauis River was already classified by the DENR as Class B River.

Since, there are still no accurate water quality and hydrology data that can be presented, determination of which will be conducted during the EIA baseline information gathering. Results of these will be incorporated in the status report of the exploration work.

4.3 Climatology/Meteorology

This sub-section presents the environmental condition in the project area and surrounding sites focusing on the *Climate and Air Quality Aspects.*

4.3.1 Climate

The Climate of Zambales Province, where the proposed project is located, is classified as Type I on the Modified Coronas System of Philippine Climates on which the basis is the temporal rainfall distribution. This type of climate has no pronounced dry season and rainfall is more or less evenly distributed throughout the year.

Based on the 30-year record of the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), the average rainfall in the area is

(117)

1,770.4 mm. The average monthly temperature in the Province ranges from a high of 32°C in the month of April to a low of 22.2°C during the months of February and January. Data on relative humidity (RH) indicate that the monthly values do not vary very much. The lowest RH is in the month of April at 79% and the highest during the months of June and July at 83%. The average annual relative humidity is 82%.

4.3.2 Air Quality

From the actual observation, and since, there is still no industry in the area, the air quality is generally good. No data on the ambient air quality can be presented yet, however, gathering of baseline information on this aspect will be undertaken at the start of the exploration work in compliance to the environmental monitoring requirement.

It is equally worth mentioning too, that based from the Philippine Environmental Quality Report of the EMB-DENR covering the year 1990 to 1995, the country is still saddled with air quality problems specially urban centers as well as sub-urban areas. Particulate matter (PM) concentration in ambient air, primarily dust, metallic particles and smoke has been increasing. In the 1980's, the highest level of particulate matter recorded is at 250 micrograms/NCM or 3 times the allowable standard of 90 micrograms/NCM. This figure shoot up to 322 microgram/NCM in 1994, and this is attributed to massive land development and industrialization.

Roads and building constructions, *quarrying and other earth movement activities* significantly affect and or contribute to the air pollution of a particular area with regards to particulate matter emission.

They account for 82% of the total PM and 73 % of total PM-10 emissions.

4.4 Geological/Geomorphological Environment

The proposed contract area lies in the so-called Zambales Range/Zambales Ophiolite Range that comprises a complete ophiolite sequence. This includes tectonized peridotite, cumulatelayered gabbro, diabased dikes and sills, pillow basalts, silicic plutonic rocks, and overlying sediments (Evans and Hawkins, 1982).

This huge tectonic unit may be subdivided into at least two (2) separate units, believed to be derived from different geologic settings (Evans and Hawkins, 1982). The northern unit comprises the Acoje Block, on which the proposed exploration area is situated and the southern unit, the Coto-East side block, which is structurally more complex and exposes a complete section from west to east of tectonized

peridotite, gabbro, diabased and minor silicic bodies, pillow basalts and pelagic sediments.

The said ophiolite sequence is evidently capped with its weathering derivations notably nickeliferous laterite deposits. These are well observed in the proposed contract area. These are reddish brown earth material made up of oxides of silicon with other associated mineral or metals such as nickel and cobalt. Laterization in the proposed area suggests relative stability of the region.

4.5 Biological Environment

Vegetation and fauna survey of the project site and vicinity was initially conducted through an ocular survey.

Vegetation analysis revealed that the area and vicinity can be classified into two vegetation types: (1) secondary forest, and (2) grassland. The secondary forest is comprised mostly of ipil-ipil (Leucaena leucocephala), while the grassland, with the occurrence of ipil-ipil, second- growth tree species, and fruit bearing trees are sparsely scattered in the area.

The identification of fauna within the site was based on the actual sightings of the species and on secondary data gathered from the residents in the area.

Secondary Forest

a. Overstory/Canopy Layer. The overstory layer is dominated by ipil-ipil (L.leucocephala), which occurs either in small patches or in pure stand.

   The associated secondary forest tree species consisted of binuga (Macaranga tanarius), anabiong (Trema orientales), and figs(*ficus spp.*). These species are remnants of primary forest, which occur as patches along steep slopes.

b. Intermediate Layer . The dominant species identified at the intermediate layer are the saplings of ipil-ipil (*L.leucocephala*) and coronitas (*Lantana camara*).

c. Ground Layer. The most noticeable species identified at the ground layer are kulape (*Paspalum conjugatum*) ooko, and other ruderal seedlings, herbs, grassses, and vines.

Grassland

The grassland area is dominated by hagonoy (*Chromolaena odorata*) which grows well in the area. It is co-dominated by para-grass (*Brachaiara mutica*), makahiya (*M.invisa*) and other ruderal herbs, grasses, and vines.

Fauna

The existing vegetation of the project site harbors various wildlife species, which are the main focus of the survey. Some of these species encountered include pipit (*Gerygone sulphurea simplex*), layang- layang (*Hirundo rustica gutturalis*), and lower forms of animals such as butterflies (*Papilio sp.*) and dragonfly (*cf. Colias sp.*).

4.5 Socio-economic Environment

The project area is devoid of any residential settlement. But a few houses were noted along the existing macadam road some 100 meters away from the subject area and most of them are engaged in charcoal making and subsistence farming.

Existing facilities and infrastructures for health, education, social services, water supply, telephone and electricity are confined within the town centers and far from the project site itself.

5.0 DESCRIPTION OF EXPLORATION WORK

The program of work hereby presented outlined and details the schedule of activities, specific targets, objectives, outputs and budget requirements.

The main objective of this exploration program is to characterized and assess fully the nickel, cobalt and other associated mineral contents of the nickeliferous laterite deposit in the subject area in order to delineate a sizeable resource that can be economically developed as well as exploited in the near future. It also aims to geologically document the nature, type and depositional character of the said product of chemical weathering so that this can well serve as basis or model for further exploration work in other areas of similar geologic setting.

Specifically, this program is aiming at defining an inferred resource potential through a drilling campaign at 200 meter x 200 meter grid interval. If the survey further warrants, where an inferred resource potential is subsequently delineated, then a 100 meter x 100 meter square grid drilling shall be carried-out to elevate the resource potential to an indicated resource category and finally to a closely space grid pattern to a measured category.

5.1 Exploration Work Program

Below is the exploration work program intended to be carried-out within the proposed contract area and consists of the following phases:

5.1.1. Preliminary Exploration Activity
   a. Literature/Research Work
   b. Data Collation and Compilation

(114) BV

5.1.2. Semi-Detailed Survey
   a. Geological Mapping
   b. Re-sampling of Old Workings
   c. Topographic and Ground Control Survey
   d. Hand Auger and Winkie Drilling

5.1.3. Follow-up or Detailed Survey
   a. Geological Mapping
   b. Ground Control Survey
   c. Hand Auger and Winkie Drilling

5.1.4 Topographic and Ground Control Surveys

5.1.5 Volume and or Reserves Computation Activity

5.1.6 Project Feasibility Studies
   a. Mine Feasibility Study
   b. Environmental Impact Assessment Study

5.1.1 Preliminary Exploration Activity

It is a common practice that prior to the commencement of actual fieldwork, compilation of all available data will be conducted to gather and gain more and better understanding of the geology- mode of occurrence of the Nickeliferous Laterite and associated mineral deposits in the area, structure, previous test pit and drilling data, that is location, lithologic log and corresponding assays. A review or re-assessment of the method use in the samplings and calculations of previous reserve are likewise, important to note. A preliminary topographic and geological map will be prepared and the possible promising sites and or targets will be determined/identified and delineated having these as basis. After all the required literature researches have been accomplished, supplies and materials for the actual field survey are prepared.

5.1.2 Semi-Detailed Survey

On the basis of the data and information gathered and generated during the previous activity, a simultaneous geological mapping and selected test pit re-sampling will be conducted. All the different rock types and or lithologies will be mapped out and characterized accordingly. Nickeliferous Laterite deposit shall be given the utmost consideration in the conduct of the survey. Likewise, rocks that are related or associated to laterization shall also be given attention, since; they can be utilized in the further understanding of the laterite characterization of the area. Route (roads, trails) mapping and traverses along stream channels and on areas where suitable rock exposures can be noted will be carried-out. A topographic maps of scales 1:50,000 and 1:10,000 will be used as base maps.

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A total of 50 previously dug test pits (old workings) with elevated nickel values shall be rehabilitated and be re-sampled. Channel sampling on excavated faces shall be implemented. Samples generated from each sampling points shall includes original sample, duplicate and standard sample. These samples shall then be subjected to Quality Control Testing Procedures. The sampling will be done in a systematic way so that a possible trend in the chemical character of the deposit may be determined.

A hand auger drilling shall also be utilized as an advance drilling campaign in the soft laterite profile to delineate potential areas within the proposed tenement area. Drill holes with encouraging assay values are then to be deepened up by *winkie* drill machine from soft laterite zone to the hard saprolite horizon.

All samples will be analyzed using Atomic Absorption Spectometry (AAS) in a laboratory to better understand the quality of the commodities of interest.

5.1.3 Follow-Up or Detailed Survey

Having gathered several data during the previous survey programs, a detailed or follow-up survey of the most important or significant blanket deposits will be implemented. The aim of this program is to fully assess, characterize and establish further the extent of nickel enrichment/mineralization. The program will be carried-out using compass and tape traverse method in grid pattern.

During this phase, hand auger test pitting or trenching might be carried out in a number of sites to determine the lateral and subsurface continuity as well as the character of nickel enrichment. This will also give an idea on the thickness of weathered or laterite materials, which will be used later in the design and planning during the development stage. On this stage also, sampling will be done horizontally and vertically to identify any appreciable changes or variation in the essential chemical constituents of the materials of interest.

Grid mapping and closely space sampling will be undertaken on areas where the physical and chemical character appears too variable. All samples taken will be analyzed for AAS studies.

5.1.4 Topographic and Ground Control Surveys

These surveys shall be simultaneously conducted with the pertinent mappings and subsurface investigations. This activity aims to

establish ground control and base line to be tied to a known reference survey point within certain municipality. A Topcon Total Station and GPS shall be utilized for this purpose. In laying out various or alternative grid patterns such as 200 m x 200 m or 100 m x 100 m grid, a brunton compass, GPS, Theodolite and Topcon total Survey instruments shall be use.

It also aims to establish three (3) triangulation stations to be used later in determining the geographic/grid coordinates for certain drill hole sites.

5.1.5 Volume and Reserve Computation Activity

The subsurface information derived from this drilling program will give factual data to be used in volume or reserve computation. Likewise, the information gathered will be used in later design and planning activities for mine development.

A theoretical resource estimate shall be conducted based on the drill intercepts with a 0.9% Ni cut-off grade.

5.1.6 Feasibility Studies

After the deposits have been block accurately, a mine feasibility study will be undertaken to determine the economic viability of the project. This will be followed by mine planning and design.

Simultaneous with the preparation of the mine feasibility study, an Environmental Impact Assessment Study may also commence to gather and established baseline information on various critical environmental aspects and to better safeguard and support the proposed project.

5.2 Preliminary Processing of Samples

Samples taken from outcrops, test pits, from hand auger drills and winkie drill shall initially and immediately process by drying (sun), quartering and packing for delivery to company's accredited mineral laboratory.

Rock chip samples shall be sun dried and properly labeled. Channel samples taken along walls of test pits or trenches shall be sun dried and quartered. Samples taken on every site shall be carefully plotted on a map and given proper description. All these steps shall be taken properly before the sample are submitted to the laboratory. For core samples, every sample taken shall be systematically labeled and placed in a core boxes. Logging of which are made through proper geological observations in terms of structures, lithology/facie change, degree of fracturing , etc.

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Primary data gathered during sampling are material type that is , limonite, saprolite-transition material, and hard rock/bed rock; material color and core recovery.

Channel samples from test pits will be analyzed for density measurement, metal and moisture content analyses.

5.3 A NAMRIA map with a scale of 1:250,000 show the regional location of the proposed work area in relation to readily identified geographic and environmental features.

See Attached NAMRIA TOPOGRAPHIC MAP (1:250,000 Scale).

5.4 Estimated Exploration Cost

Below is the total budgetary cost for the proposed two –year exploration work program and summarized as follows:

YEAR 1		COST
Literature Research	**PHP**	5,000.00
Aerial Photo Study		50,000.00
Reconnaissance/Orientation Survey		
•Geol. Mapping		150,000.00
•*Rock & Soil Sampling*		30,000.00
Semi-Detailed Survey		
•Geological Mapping		380,000.00
•Test Pitting/*Sampling*		950,000.00
•Auger Drilling		1,100,000.00
•Core (Winkie)Drilling		1,300,000.00
Topographic and Ground Control Survey		250,000.00
Detailed Survey		
•Geological Mapping		300,000.00
•Test Pitting/Trenching		1,100,000.00
•Auger Drilling		1,350,000.00
•Core (winkie) Drilling		1,500,000.00
•Laboratory Analyses (All Samples)		300,000.00
	PHP	**8,765,000.00**

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YEAR 2	COST
Detailed Survey	
•Geological Mapping	300,000.00
•Test Pitting/Trenching	1,200,000.00
•Auger Drilling	1,500,000.00
•Core (winkie) Drilling	2,100,000.00
•Laboratory Analyses (All Samples)	500,000.00
Volume and Reserve Computation	150,000.00
Mine Feasibility Study	1,500,000.00
	PHP 7,200,000.00

Grand Total for Year 1&2	**PHP**	**15,965,000.00**

x-x-x-x-x-x-x-x

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6.0 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS

6.1 On Land

6.1.1 *Surface Disturbance Off the Mineral Property*

Exploration activities do not normally produce great surface disturbance especially off the mineral property. The only logical activity to be undertaken on the surrounding areas of the proposed contract area is access to and from the target site. Since, this is only and exploration period, only existing paths or trails will be used.

6.1.2 *Surface Disturbance On the Mineral Property*

Reconnaissance or regional mapping activity in the subject area is not expected to create any serious impact on the environment. Geological mapping is merely noting down of geological observations and rock sampling. Gathering of observations or traverses will be conducted or limited along stream channels, trails and roads/road cuts where outcrops are found.

The instruments to be used are very simple such compass, sample picks, hand lens, GPS, etc. that cannot create adverse environmental effects.

The same activity will also be carried-out for semi-detailed and detailed exploration activity, only that the point of observations is relatively closer and the areas are much smaller.

Test pitting shall be conducted on pre-designated sampling point. However, off setting of certain sampling points shall be carried out if adverse impact on the environment is perceived. Immediately upon completion of the activity, backfilling of the disturbed materials will be undertaken to minimize and restore the subject area.

Drilling

Drilling activity shall consist of auger and core drilling. It is not expected to have considerable impact on the environment, since; it will only be limited or concentrated on a very small portion during the drilling activity. Disturbance is projected during the transport of the drilling equipment especially when the drilling target is still inaccessible. Areas or portions to be used as temporary roads or access will certainly be disturbed. But this is too minimal to create adverse impact since, the maximum width to allow easy passage of drilling equipment is around 1.5 m. or will not exceed 2.5 meters. Trees encountered during that passage would be avoided to minimize tree cutting.

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Waste generated from the activity will be disposed properly on site Disposal of wastes includes burying of organic matters, segregation and classification of inorganic matters for resale or reuse when applicable. Excavations for mud pit or water impoundments will be backfilled as soon the drilling operation is completed.

Erosion rate is expected on areas disturbed due to loss of vegetation, but are negligible due to the size of the affected area.

6.2 On Hydrology and Water Quality

6.2.1 Potential Generation of Acid Mine

Acid Mine or Acid Rock generation may likely occur especially in eastern section of the proposed area where minor concentration of nickel sulphide deposits is present.

The proposed exploration activity may generate acid mine during test pitting or even during drilling. Potential sites therefore, are mineralized outcrops subject of subsurface study. Stockpiled materials having sulphide minerals or have suphidic ores coming from the outcrops may generate acid run-off when exposed to air and water. Oxidation is the main chemical reaction and reason for an acid drainage. It is highly acidic and can contain dissolved heavy metals. These are toxic to aquatic life and have great impact on the surrounding environment.

These sites tend to be few in numbers and are approximately limited to the outcrop itself. Normally, outcrops in the project site do not exceed 5 meters long and 3 meters wide.

6.2.2 Siltation and Pollution of Surface Waters

Siltation is very common especially on areas without much vegetation. Disturbed areas during the activity will increase the erosion rate that necessitates measures.

6.2.3 Changes in Hydrology

With the very limited surface work area and shallow excavations, significant change on hydrology is not expected. The drainage pattern, the flow rate and the capacity of stream channels will not be affected with this exploration work.

6.3 On Ecology

The eco-system will certainly not be affected in relation to the degree of exploration work being proposed.

Effects of noise on the ecology is likewise nil as the use of drilling machines will be managed by providing rubber pads to minimize vibrations, appropriate muffler to regulate noise level and proper lubrications of all moving parts.

6.4 On Socio-economic Effects

The proposed contract area is located some 500 to 800 meters above mean sea level. Site inspection revealed that the proposed area is devoid of any permanent settlement or inhabitants. Makeshift houses numbering an average of three for every two- kilometers, were noted along logging road some 100m from the proposed area. The proposed exploration work, indeed will not in anyway affect the said residents. The proposed exploration activities can however, provide positive impacts, since, local employment maybe made during the actual field surveys.

Interviews conducted on dwellers of the said makeshift houses revealed that most of them are charcoal makers and subsistence farmers.

7.0 ENVIRONMENTAL MANAGEMENT MEASURES INCLUDING COSTS

From the preceding discussions it was clearly predicted and identified the possible impacts of the exploration activities. From such prediction and identification the proponent likewise prepared and laid-out corresponding mitigating measures to minimize if not totally eliminate all the impacts the project may generate. From the facts presented, it can be noted that most are of short- term duration.

Below are the following measures that the proponent will undertake:

7.1 Progressive Rehabilitation of Disturbed Land

Based from the previous discussion, the most likely and necessary to have rehabilitation are those areas with disturbed surfaces. These are the test pits, temporary roadways with appreciable disturbances, and the drilling site itself. Test pits are being conducted with a span of time, which during its active state may serve as death traps to both people and animals alike in the field. Right after the observations and measurements are made on greater number of test pits and interpretations were carried-out, backfilling of the excavations followed. During the backfilling activities, the sub-soil shall first be returned as it was before and the top soil shall be the last in order that the

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rehabilitation process on every disturbed areas can easily return and adopt to its original state.

Areas affected by makeshift roads (due to drilling equipment stationing/positioning) will be turnover to the concerned Barangay. If not possible, it will be replanted with fast growing trees together along areas with unstable portion such as Gmelina, kakawate and ipil-ipil as it was common in the area. These temporary roadways will surely be a small portion, since, for drill site that are located with high gradient, the drilling equipment will be disassembled and be drawn by a number of carabaos as being done by other drill contractors.

In drilling sites, drill sumps shall be constructed to effect water recycling and more importantly to prevent drilling fluids from contaminating the surface water as well as the surface itself. The drilling fluids and mud to be used will be a non-toxic and water-based and has passed the EMB lists of regulated and approved chemical materials as per R.A.6969.

7.2 Maintenance of Soil Stockpile

It is important that the excavated soil shall be stockpiled properly in order not to be eroded and cause siltation upon reaching surface waters. The sub-soil and the top soil shall be properly separated for easy and proper backfilling. Small drainage canal shall be constructed to divert running water in coming to the stock file materials.

7.3 Maintenance of Roads to Minimize Dust

Dust emissions on roads are maybe confined outside the proposed contract area. The site is traversed with network of trails that are more than enough to conduct geological mapping and rock sampling. These trails are partly vegetated with tropical grasses that serve and prevent dust emissions. Established roadways can only be found at the approached of the claim area, however, this roads will be sprayed with water to minimize dust, especially during the height of dry season which can truly affects local residents.

7.4 Handling of Toxic and Hazardous Materials

Only during drilling that chemicals maybe used. As per previous discussion, the company will not be using toxic or hazardous chemicals in the conduct of drilling. An alternative water based fluids and mud will be utilized instead. Fuel and oil that will be used by the drill equipment will be properly stored away from water- courses to prevent contamination. A drain catch will be constructed so that in case a spillage happens it will be confined in certain area only. In addition, the drill machine is equipped with drill platform that can handle spillage of 3-5" of liquid.

7.5 Accommodation of other Economic Activities in the Area

With the exploration activities in the area, an initial livelihood program may be planned- out to help add income to the residents.

7.6 Alternative Plans, if Special Habitat of Flora and Fauna are Affected

Based from previous discussion on the Biological environment, the area of interest has some wildlife species but not the rare ones. This will also hold through with the floral system of the area. Plant nursery will be put up in certain area of the proposed site to support the rehabilitation program and reforestation of the disturbed areas.

7.7 Socio-economic Mitigating Measures

A courtesy call to the people in authority in the area shall be carried-out prior to any exploration activity in the area. Acquaintances and consultative meetings to discuss the proposed exploration work with the proper persons and the people of the community will be conducted.

Preference will be given to the local residents in hiring personnel during the entire program.

7.8 Abandonment

The progressive rehabilitation conducted during the exploration works will provide answer to the abandonment plan, since, it will readily and immediately rehabilitate the area. The adaptation period is very short, which in turn very effective and appropriate.

The following are the proposed measures and procedures in the conduct of an abandonment and rehabilitation programs affected by the exploration:

A. Camp Site:

All temporary facilities and or structures shall be removed and disposed off in a proper manner. Re-usable materials shall be kept or be donated for some noble use. Compacted surface area of the camp shall be cultivated and planted with appropriate vegetational covering common to the area. Temporary garbage pit for organic wastes shall be backfilled properly to restore disturbed surface.

B. Drill Site:

All drill sites shall be restored in an environmentally acceptable manner. Sedimentation ponds or drill sumps shall be back-filled. Disturbed soil shall be restored and re-vegetated.

Empty drums or containers shall be removed, returned or resale to suppliers for further use if applicable. Safe containers can be donated to the local community.

Oil spillages is projected to be nil or minimal due to the drill platform that will be employed. It is capable of collecting 3-5 inches of spilled liquid within the influence of drill equipment.

Disturbed surfaces after each drilling activity, shall be re-vegetated immediately to adapt promptly to the local surrounding.

C. Access Road:

Haul roads for drill machine and its accessories contributes largely to areas projected to be disturbed during detailed stages of exploration. Drill machine shall be carried-out along sledge pulled by several number of carabaos. Sledge trails shall be re-vegetated after being used.

D. Unstable slopes:

The proposed project area has an approximate slope gradient between 5-10%. During the course of exploration study, any subsurface activity with resultant unstable slopes shall be immediately remedied with a geotechnical engineering works and replanted with fast growing trees and other vegetative covers to ensure stability. Significant areas having unstable slopes not related the exploration shall be noted and appropriately informed authorities of its potential risk.

E. Control Measures for Acid Mine/Rock Drainage

In the exploration period, sources of acid run-off are outcrops subject to subsurface investigation such as test pits, trenches and even drill holes. The following are the control measures in the generation or occurrence of an acid rock drainage.

1. In trenches or test pits:

Stockpiled materials having sulphide minerals or have suphidic ores coming from the outcrops may generate acid run-off when exposed to air and water. Oxidation is the main chemical reaction and reason for an acid drainage. To control occurrence, is to neutralize potential acid materials (*pam*) with lime or limestone. Other measures intended to be carried-out is to bury or isolate *pam* with clay cover to prevent entry of air and water. But the best measure to be implemented is the immediate back filling and

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restoration of these ground openings before any significant chemical reaction take place.

2. In Drill Holes:

All drill holes after an extensive study shall be appropriately plugged to prevent contact of sulphidic ores with air and water. Selected holes for future study shall be properly cemented and inserted with plastic pipe with cap. These holes may serves as monitoring well and avenues for several studies to be conducted in the future specially in the conduct of an environmental impact assessment.

8.0 ESTIMATED BUDGETARY COST FOR ENVIRONMENTAL MANAGEMENT MEASURES

ACTIVITIES	Salary/Wages	Supplies/Mat'ls	Total
1. Nursery Operation Maintenance	P250,000.00	P350,000.00	600,000.00
2. Backfilling /restoration of test pits, drill and survey stations			100,000.00
3. Slope Stabilization of disturbed surface (By contract at P2,000/site for 100 sites			300,000.00
4. Planting and Maintenance			600,000.00
			P 1,600,000.00

9.0 Name and Signature of Applicant or Person preparing the Environmental Work Program

SAMUEL F. DECLARO
Geologist
Reg. No. 000576
PTR. No. 18768688
Date: January 3, 2002
Issued at: Quezon City

Conforme:

ERAMEN MINERALS, INC.

ENRIQUE C. FERNANDEZ
President

TWO-YEAR ENVRONMENTAL WORK PROGRAM

SCHEDULE OF ENVIRONMENTAL ACTIVITY								
ACTIVITY	YEAR 1				YEAR 2			
	1ST Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1.Land Environment Study & Monitoring a. Pedology								
2. Water Environment Study & Monitoring a. Water Quality b. Hydrology								
3. Climatology & Meteorology								
4. Geological and Geomorphological Environment a. Geologic Hazards								
5. Biological Environment Study & Monitoring a. Flora & Fauna								
6. Socio-economic Information Plans								
7. Progressive Rehabilitation/restoration (Activities mentioned in Section 8 hereof)								
7. Data Compilation & Report Writing								
8. Submission of Report								

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ERAMEN MINERALS, INC.

Nickeliferous Laterite and Other Associated Mineral Deposits

SUMMARY MATRIX IMPACT AND MITIGATING MEASURES

Activity	Impact	Mitigating Measures	Timing	Cost
Construction/restoration or upgrading of access roads	Loss of vegetation	• Use existing access tracks as much as possible		The amount of **PhP 1,600,000.00** representing more than the 10% cost of exploration is alloted for the implementation of this work program. The amount will be apportioned to each item of the work program.
	Siltation/Turbidity	• Put up settling ponds and/or sediment traps	Immediately upon implementation of earth works	
	Erosion	• Minimize slope stockpile • Provide drain tunnels • Minimize stockpiling and accumulation of unwanted debris or waste • Promote growth of grasses/shrubs over the stockpile to prevent erosion • Conduct regular road maintenance	- same as above-	
Excavations	Depression of selected areas due to excavation	• Backfill the area immediately after target completion	Implement after completion	
	Entrapment of stray animals or children	• Fencing off of excavations using ropes and twigs • Provide warning device and safety reminders to passersby	Immediate implementation upon start of activity	
	Erosion	• Topsoil should be stockpiled separate from subsoil and maintain low angles • Stockpiles or erosion prone areas should be provided with drain channels to	Implement as project progresses	

		prevent erosion • Stockpiled should be put at low prone erosion areas		
	Soil Compaction	• Ripping the contour to promote natural plant growth • Ensure that slope are stabilized to prevent erosion and loss of vegetation, moon scrapes is introduced	Done simultaneously with activity	
	Loss of Vegetation	• Encourage the growth of natural vegetation by spreading the stockpiled topsoil • Established a nursery during the exploration program for progressive rehabilitation • maintain the natural specie of the area	- same as above-	
Hydrology and Water Quality				
Excavation	Acid Rock drainage	• Immediate backfilling of test pits and plugging of drill holes after study is completed • Test pits and trenches will be provided with canvass to prevent water from seeping into the excavation and create adverse chemical reaction	Done simultaneously with on-going project	
Use of Drilling Chemicals	Water and Soil Contamination	• Will use biogradable fluids • Refueling areas shall be provided with bunds and lined with impervious	-same as above-	

		materials to prevent soil contamination		
Clearing of Vegetation	Siltation/Turbidity	• Provide silt/sediment traps • Provide temporary siltponds and permit the release of clear water only. Desiltation should be done regularly to make ponds efficient. Mixed silt materials with soil stockpiled	Done simultaneously with project	
Camping	Contamination of river due to generation of human waste	• Locate campsite at least 100 meters away from creek/river system and provide proper latrine • Introduce waste segregation scheme to encourage recycling and lessen volume of waste generation	Implement immediately upon start of operation	
Ecology				
Clearing of Vegetation and noise generation	Displacement of flora and fauna	• Vegetation clearing will be avoided and noise generation kept to barest minimum		
Waste generation	Foul odor, health problem, water pollution, visual nuisance, displaced sensitive flora and fauna	• A specific site away from any source of water will be designated for waste dumping, organic waste will be buried in pits, inorganic waste collected and taken out of site for possible recycling	Implemented immediately upon start of operation/program	
Site Clearing	Loss of rare specie of flora and fauna	• Areas identified as		

		special habitat of flora and fauna will be avoided and its existence will be reported to government agencies	-same as above-	
Socio-economic Effects				
Project Implementation	Displacement of socio-economic activities	• Promote employment opportunities by giving priority on available job • Provide just compensation to residents on private areas disturbed by the project		
Misinformation on project implementation	Disharmonious relatioship between the residents and contrators	• Conduct IEC activities before the project implementation to keep the personnel & staff, residents and LGU well informed of the programs of the company • Keep an open communication with the community through regular meetings to give an update on the project status • Meet the community after the project has been accomplished to give them information with regard to the findings and future company plans involving the area	Progressively implemented to keep abreast with the program	
Movement of Vehicles	Dust Generation	• Vehicular traffic shall be restricted to existing roads and speed regulated at populated areas	Implement as project progresses	

		• Road maintenance should be regularly done • Roads should be sprayed with water during summer period • Provide table drains at water prone areas to prevent erosion		
Unsafe working condition	Health hazards to workers	• Provide all employees with protective equipment and medical attention • All workers should be required to submit medical certificate prior to hiring so that they are fit to work	Implemented throughout the life of the project	
Increase of migration				
Increase of migration	Disharmonious relationship with residents and lost of tradition or culture	• Limit the hiring of non-resident workers to technical personnel • Priorities for employment shall be given to all resident of the concerned municipality		