ANNEX "A"

CORPORATE SECRETARY'S CERTIFICATION

Republic of the Philippines)
City of Davao .....) S.S.

DENR-MGB-XIII, SURIGAO CITY
RECEIVED
JUL 01 2004
BY: TIME: 2:05 P.M.

SECRETARY'S CERTIFICATE

I, Jesimil P. Obon, Filipino, of legal age, married and residing at Davao City Philippines duly sworn in accordance with law do hereby depose and state:

1. That I am the duly elected Corporate Secretary of **Philsaga Mining Corporation** with principal office at Ernora Grand building, 74A Bonifacio St., Davao City (hereinafter referred as the "Corporation");

2. That the special stockholders meeting of the corporation was held on April 24, 2004 at the principal office of the corporation, attended by majority of the stockholders;

3. That in the said meeting the following resolutions were approved/resolved:

   "RESOLVED FURTHER, that the Corporation's President **Samuel G. Afdal,**,is hereby authorized to file, sign and execute relevant documents in relation to the filing of/filed mining tenements applications, i.e. Mineral Production Sharing Agreement, Exploration Permit, Special Mines Permit and Small Scale Mining Permit, and to accept the terms and conditions/execute the mining tenements that may be granted/issued;

   "RESOLVED FINALLY, that the authority herein granted to the above-mentioned officer shall hold and continue in full force and effect until a subsequent resolution be issued revoking and modifying the same."

4. That each and every statement mentioned are being true and correct.

IN WITNESS WHEREOF, I have hereunto affixed my signature on this _____ day of _____ in _____.

JESIMIL P. OBON
Corporate Secretary

SUBSCRIBED AND SWORN to before me at the place aforesaid on this 04 MAY 2004 day _____. The ffiant, _____, in her capacity as Corporate Secretary of Philsaga Mining Corporation, exhibited to me her community Tax certificate No. 07340738 issued on January 15, 2004 in Davao City.

JOSEPH R. FLORES
Notary Public
Until December 31, 2005

DENR-MGB-XIII, SURIGAO CITY
RECEIVED
JUN 11 2003
BY: [signature] TIME: 10:00 am

SECRETARY'S CERTIFICATE

KNOW ALL MEN BY THESE PRESENTS:

I, **JESIMIL P. OBON**, Filipino citizen, of legal age and with office address at 74 Bonifacio St., Davao City, Philippines; being duly elected and qualified Corporate Secretary of **Philsaga Mining Corporation** do certify that at a Meeting of Directors of the Corporation held on 10th April, 2003, the following resolution was among approved:

"**RESOLVED**, that the Board of Directors of **Philsaga Mining Corporation** authorizes as it does hereby authorize **Col. SAMUEL G. AFDAL (Ret.)** to sign and/or submit any and all papers and documents in relation to the MPSA application/s and to receive, accept and/or execute the MPSA that may be granted including its terms and conditions as set forth therein."

IN WITNESS WHEREOF, I have signed this Certificate this 23rd day of May, 2003, in the City of Davao, Philippines.

JESIMIL P. OBON
Corporate Secretary

REPUBLIC OF THE PHILIPPINES)
DAVAO CITY . . . . .) s.s.

SUBSCRIBED AND SWORN to before me this 02 JUN 2003 day of May, 2003 at Davao City, Philippines; affiant exhibited to me her Community Tax Certificate No. 09078175 issued on Jan 16, 2003, Davao City.

Notary Public

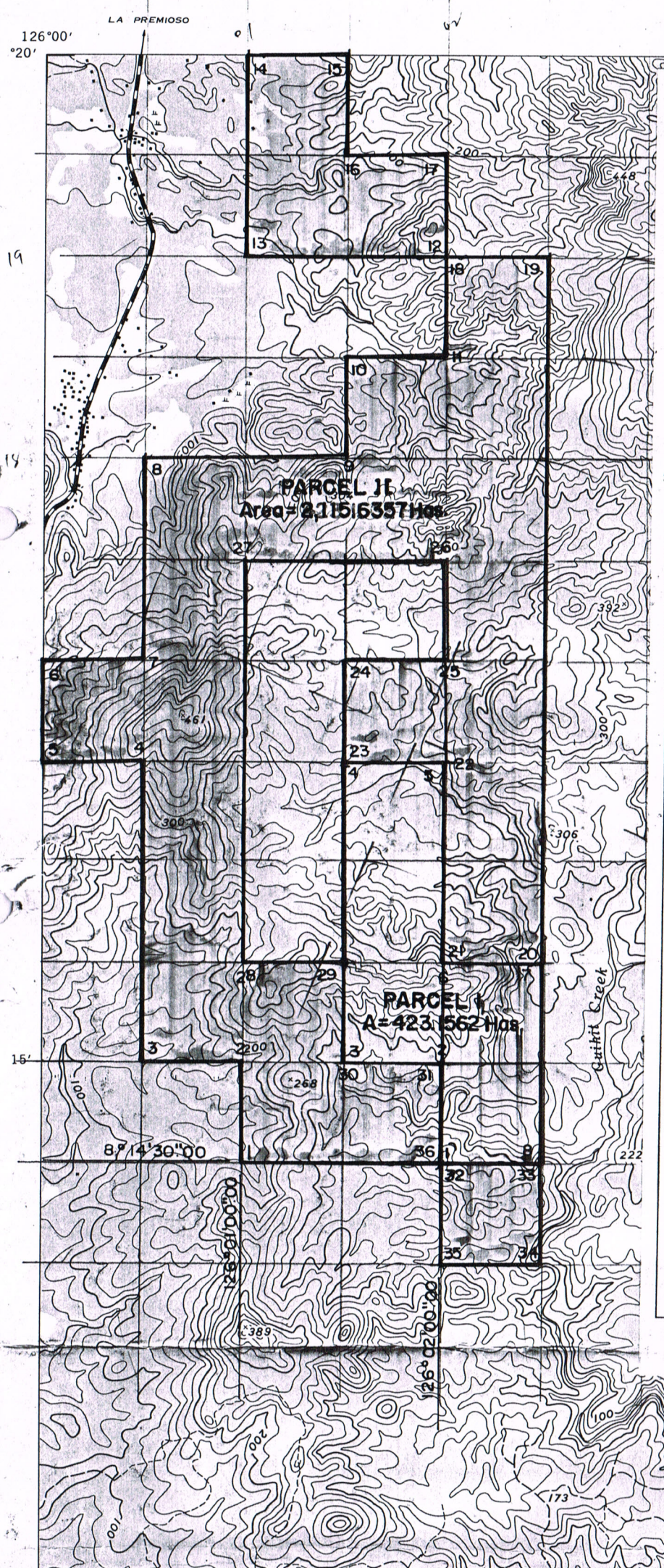
Doc. No. 113;
Page No. 23;
Book No. II;
Series of 2003.

cf:pmccert1file

JOSEPH R. FLORES
Notary Public
Until December 31, 2003
PTR No. 1005611 1-2-03 D.C.
IBP No.557912 12-23-02 D.C.
TIN 123-472-317

ANNEX "B"

Location Map/Sketch Plan
on
1:50,000 scale NAMRIA Map



TECHNICAL DESCRIPTION

PARCEL I

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 02' 00"
2	8° 15' 00"	126° 02' 00"
3	8° 15' 00"	126° 01' 30"
4	8° 16' 30"	126° 01' 30"
5	8° 16' 30"	126° 02' 00"
6	8° 15' 30"	126° 02' 00"
7	8° 15' 30"	126° 02' 30"
8	8° 14' 30"	126° 02' 30"

Area = 423.1562 Has.

PARCEL II

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 01' 00"
2	8° 15' 00"	126° 01' 00"
3	8° 15' 00"	126° 00' 30"
4	8° 16' 30"	126° 00' 30"
5	8° 16' 30"	126° 00' 00"
6	8° 17' 00"	126° 00' 00"
7	8° 17' 00"	126° 00' 30"
8	8° 18' 00"	126° 00' 30"
9	8° 18' 00"	126° 01' 30"
10	8° 18' 30"	126° 01' 30"
11	8° 18' 30"	126° 02' 00"
12	8° 19' 00"	126° 02' 00"
13	8° 19' 00"	126° 01' 00"
14	8° 20' 00"	126° 01' 00"
15	8° 20' 00"	126° 01' 30"
16	8° 19' 30"	126° 01' 30"
17	8° 19' 30"	126° 02' 00"
18	8° 19' 00"	126° 02' 00"
19	8° 19' 00"	126° 02' 30"
20	8° 15' 30"	126° 02' 30"
21	8° 15' 30"	126° 02' 00"
22	8° 16' 30"	126° 02' 00"
23	8° 16' 30"	126° 01' 30"
24	8° 17' 00"	126° 01' 30"
25	8° 17' 00"	126° 02' 00"
26	8° 17' 30"	126° 02' 00"
27	8° 17' 30"	126° 01' 00"
28	8° 15' 30"	126° 01' 00"
29	8° 15' 30"	126° 01' 30"
30	8° 15' 00"	126° 01' 30"
31	8° 15' 00"	126° 02' 00"
32	8° 14' 30"	126° 02' 00"
33	8° 14' 30"	126° 02' 30"
34	8° 14' 00"	126° 02' 30"
35	8° 14' 00"	126° 02' 00"
36	8° 14' 30"	126° 02' 00"

Area = 2115.6357 Has.

TOTAL AREA = 2538.7919 HAS.

SKETCH MAP

OF MINERAL PRODUCTION SHARING AGREEMENT APPLICATION

AS PREPARED FOR

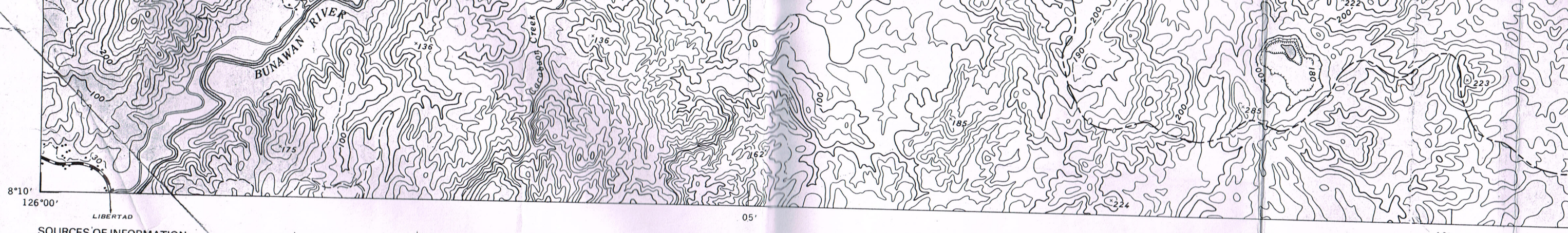
PHILSAGA MINING CORPORATION

SITUATED IN THE

BARANGAYS OF CONSUELO & BAYUGAN III
MUNICIPALITIES OF BUNAWAN & ROSARIO
PROVINCE OF AGUSAN DEL SUR
ISLAND OF MINDANAO
CONTAINING AN AREA OF 2538.7919 Has.

PREPARED BY:

REGINO L. SOBREVIÑAS, JR.
GEODETIC ENGINEER
PRC No. 3961 / 06-66
PTR No. 1394730 / 1-2003



SOURCES OF INFORMATION:

Bureau of Coast and Geodetic Survey, US Army Map Series 711 Compiled in 1956 from 1947-1953 Photographs, Department of Public Highways and others.

Users noting errors or omissions on this map are requested to mark herein and refer directly to the NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY. Fort Andres Bonifacio, Makati

Scale 1:50,000

1 ½ 0 1 2 3 Statute Miles

1000 500 0 1000 2000 3000 4000 Meters

1000 500 0 1000 2000 3000 4000 Yards

1 ½ 0 1 2 3 Nautical Miles

CONTOUR INTERVAL 20 METERS WITH SUPPLEMENTARY CONTOURS AT 10 METER INTERVALS

RELIEF PARTIALLY SHOWN BY FORM LINES

VERTICAL DATUM: MEAN SEA LEVEL

TRANSVERSE MERCATOR PROJECTION

HORIZONTAL DATUM: LUZON DATUM

LEGEND

ROADS

- All weather, hard surface, two or more lanes wide
- All weather, loose or light surface, two or more lanes wide
- All weather, hard surface, one lane wide
- All weather, loose or light surface, one lane wide
- Fair or dry weather, loose surface
- Cart track; trail
- Route markers: National; Provincial

RAILROADS

- Normal gauge, single track, 1.07 M (3′6″)
- Normal gauge, double track, 1.07 M (3′6″)
- Broad gauge, single track — 1.44M (4′8½″)
- Broad gauge, double track — 1.44M (4′8½″)
- Narrow gauge, single track — .61M (2′)
- Narrow gauge, double track — .61M (2′)
- Power transmission line

- Built-up area
- Church; Chapel; Shrine or wayside cross
- School; Windmill; Water mill
- Lighthouse; Anchorage
- Levee; Wall
- Earthen dam; Masonry dam
- Horizontal control point on Church
- Horizontal control point; Bench mark
- Spot elevations in meters: Checked; Unchecked
- Salt evaporator
- Woods-brushwood; Scrub
- Tropical grass; Orchard
- Rice paddy; Swamp
- Nipa; Mangrove
- Vineyard

Published by
Department of Environment and Natural Resources
NATIONAL MAPPING & RESOURCE INFORMATION AUTHORITY
Fort Bonifacio, Makati

ANNEX "C"

EXPLORATION WORK PROGRAM

MGB Form No. 5-2

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

EXPLORATION WORK PROGRAM

1.0 NAME AND ADDRESS OF THE PROPONENT

Name	:	**PHILSAGA MINING CORPORATION**
Head Office	:	Ernora Gran Building, 74A Bonafacio Street Davao City
Field Office	:	Bayugan III, Rosario, Agusan del Sur
Contact Persons/ Title	:	**Col. SAMUEL G. AFDAL (Ret.)** President **Engr. FERDINAND A. CORTES** Liaison Officer/Safety Engineer
Tel./Fax No.	:	(085) 859-3442

2.0 LOCATION OF PROJECT

The Project Area, subject of this EWP, is a portion of the 2,538.7919-hectare applied area covered by an application for Mineral Production Sharing Agreement (amendment/combination of MPSAA Nos. XIII-010 and XIII-011, formerly under the name of Base Metals Mineral Resources Corporation) located in the Barangays of Consuelo and Bayugan III, Municipalities of Bunawan and Rosario, Province of Agusan del Sur.

The Project Area is bounded by the following geographical coordinates:

Corner	Latitude	Longitude
1	8°14'30"	126°01'00"
2	8°15'00"	126°01'00"
3	8°15'00"	126°00'30"
4	8°16'30"	126°00'30"
5	8°16'30"	126°00'00"
6	8°17'00"	126°00'00"
7	8°17'00"	126°00'30"
8	8°18'00"	126°00'30"

9	8°18'00"	126°01'30"
10	8°18'30"	126°01'30"
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18	8°19'00"	126°02'00"
19	8°19'00"	126°02'30"
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23	8°16'30"	126°01'30"
24	8°17'00"	126°01'30"
25	8°17'00"	126°02'00"
26	8°17'30"	126°02'00"
27	8°17'30"	126°01'00"
28	8°15'30"	126°01'00"
29	8°15'30"	126°01'30"
30	8°15'00"	126°01'30"
31	8°15'00"	126°02'00"
32	8°14'30"	126°02'00"
33	8°14'30"	126°02'30"
34	8°14'00"	126°02'30"
35	8°14'00"	126°02'00"
36	8°14'30"	126°02'00"

Please refer to Annex A for Location Map/Sketch Plan.

3.0 AREA OR SIZE OF COVERAGE

The Project Area covers an area of **Two Thousand One Hundred Fifteen and 6357/10000 (2,115.6357) hectares.**

4.0 PROJECT AREA DESCRIPTION

4.1 Terrain/Physiography

Large part of the Project Area is characterized by moderately sloping to hilly topography with high peaks of not more than 461 meters above sea level. To the east is characterized by steep hills and mountains with high peaks of 616 masl.

Generally, the central mountainous terrain is cut by rectangular drainage systems controlled by multiple fracture patterns. The Agsao

River is apparently controlled by a NS trending fault and supplied by angular branching tributaries draining east.

Northern portion is karstic topographic highland of limestone characterized by sinkholes, depressions, irregular outlines of steep cliffs particularly in the western rims. Rounded knob of resistant limestone are surrounded by elongated depressions drained by deeply incised streams.

A relatively flat topography on the western side is dominated by wide alluvial terrace gravel. Gently sloping alluvial fan covers periphery of mountainous ridges and is probably produced from rapid deposition of sediments by the river systems. Rectangular drainage system connects to meandering mainstreams towards the western lowlands.

4.2 Accessibility

The proposed Project Area can be reached through well-maintained logging roads from National Highway to the mining operation located in Sitio Co-o, Barangay Consuelo, Municipality of Bunawan, Province of Agusan del Sur.

Agusan del Sur does not have its own airport facility/ies. Davao City and Butuan City are the nearest airport facilities. Bunawan is about two (2) hours drive (110 km.) from Butuan and about three (3) hours from Davao City. These Cities are serviced daily by Philippine Airline, Air Philippines and Cebu Pacific from Manila.

Considering Agusan del Sur is located in the Central Part of Mindanao, there are no port facilities. The ports of Davao and Butuan (Nasipit) are serviced by passenger and cargo ships to Manila and other ports of destination and vice versa.

4.3 Drainage System

The Agsao River and its tributaries serves as the main drainage in the area following a southeast flow and draining to one of the principal drainage south of the area – the Bunawan River. West is the Sumilao River which empties its load to Agusan River. Other tributary streams and minor creeks within the area are intermittent and are waterlogged only during the rainy season.

During the months of the rainy season, particularly during nearby rains, the waters in the major drainage swell and sometimes developed into minor floods. All the waters of the rivers and its tributaries were drained into the sea. All these are the factors which contribute to the complete process of the never-ending hydrologic cycle in the area resulting to an excellent climate and the abundant and continuous water supply of the surrounding barangays and neighboring localities.

4.4 Vegetation

Thick vegetation covers most of the area except in some isolated logged-over portions. The limestone-dominated areas are mostly thick primary forests with few occurrences of large timber trees in isolated patches.

Cogonal grass abound in rolling and flat lying topographies in Sinu-ang, while rice crops are grown in the western lowlands. Several clusters of march foliage in the western grow in the western lowland particularly within water saturated areas.

Tall "falcata" trees are cultured and grown in most places by Paper Industries Corporation of the Philippines (PICOP for brevity).

4.5 Land Use

The applied area is a portion of the expired Timber License No. 43 but under an application for Integrated Forest Management Agreement of PICOP. The timber concession is a source of basic raw materials for PICOP's integrated pulp and paper mill situated in Bislig, Surigao Del Sur. As such, tall "falcata" trees are cultured and grown in most places by PICOP

Those gradual slopes are being cultivated and planted with cash crops.

Most of the houses and dwelling are found along the main water channels and in areas where the slopes are more favorable and closer to the access road.

Further, the area does not contain scenic, historical features, breeding grounds for rare and endangered animal or plant species worth protection and preservation.

5.0 DESCRIPTION OF EXPLORATION WORK PROGRAM

5.1 Survey of Previous Work/s on the Area

5.1.1 Geology[1]

5.1.1.1 Regional Geology

The Philippine Fault, a major strike-slip system, runs 1,200km north-south through the central portion of the mobile belt from Luzon in the north to Mindanao in the

[1] Excerpt from *Co'o Gold Project final report by Antonio T. Fernandez and Paul B. Azarcon. July, 1988.*

south, passing just east of Banahaw. Sinistral displacement along the fault exceeds 200 km.

The Philippines has a significant history of mining and metals production, principally copper and gold, with lesser nickel, molybdenum and silver. All the major deposits are found along mobile orogenic belts, commonly in clusters and are predominantly the products of epithermal mineral associated with episodic magmatism and intrusive rock emplacement, either into breccia or shear structures or in the form of porphyry deposits. The mineralizing events have been dated from Early Cretaceous (110My) to Miocene (20My).

The Project lies at the central portion of Eastern Mindanao Highlands forming the Diwata Mountain Ranges. Rocks consist largely of ophiolitic piles of Paleogene age, overlain by andesitic rocks, plutons and sedimentary sequences of Neogene age as described by Caldwell, et al, (1980); and McCaffrey et al, (1980) (in UNDP, 1984 Geology of Northern Agusan Mindanao). Many epithermal gold and porphyry copper type mineral are hosted within these units running from Surigao to Davao.

Some 200 kilometers east of these highlands is the west dipping-east verging Philippine Subduction System considered by Hamilton (1979) and Moore (1980) as a young morphological feature of probable Pliocene age and consisting of imprecated sheets of ophiolite and sedimentary rocks accreted from a subducting ocean floor.

West of the Eastern Mindanao Highlands lies the Agusan-Davao trough, a NS trending sedimentary basin of pre-Eocene age dividing the Eastern Mindanao Highlands from the Central Mindanao Cordillera. Central Mindanao Cordillera encompasses a broad, geologically complex region consisting of multiple east-dipping thrust sheets that overlie Cretaceous-Paleogene metamorphic rocks.

To the south lies the Pujada peninsula, a terrane of ophiolitic rocks with folded metamorphic rocks at the sole of west dipping thrust sheets dated Cretacious-Paleogene, and correlatable with the serpentinites and related ophiolites in Agusan del Norte (by UNDP, 1980) and in Central Bukidnon (by Santiago, A.B., 1982).

Southwest of the area includes a north-trending magmatic ridge occupied by active and dormant

andesitic stratovolcanoes probably Miocene to recent in age.

5.1.1.2 Local Geology

Andesitic flows and volcaniclastic rocks intruded by dykes and sills of feldspar andesite porphyry are the oldest rock units in the area. These intercalated layers of rocks have a general NW strike and SW dip. Andesitic flows consist mainly of hornblendephyric to plagiophyric varieties. In fresh outcrops, they are light gray with a matrix of feldspar and hornblende microlaths with short stubby feldspar and hornblende phenocrysts. Where propylitization has affected the rock, chlorite replaces hornblende rendering a greenish coloration. Flow structure is obvious in andesites as shown by the parallel alignments of feldspar and hornblende.

Volcaniclastic rocks of andesitic origin vary from wacke to mudstone with occasional beds of intertongued flow breccia. Bedding laminations are faintly visible and are exhibited only in the finer sediments while graded bedding is well displayed in wacke and mudstone.

A large diorite pluton intrudes the southwest part of the area, and several small diorite epophyses are found in the central portion. The diorite is massive but exhibits blocky fracturing. Flow structures are shown as parallel alignments of phenocrysts while some rocks exhibit equigranular texture with phenocrysts of randomly oriented feldspar. Quartz occurs as a varietal component (2% of the rock.). Dissemination of black minerals, probably magnetite, gives the rock a "peppered" appearance. Chlorite and epidote occur as fracture fillings and as replacement of hornblende. Quartz veinlets cut the diorite in places suggesting the hydrothermal fluid effect on the rock. Minor aplitic dykes cut the volcanic hosts.

Limestone crops out in the far NE portion of the area, as small isolated bodies. This limestone lies stratigraphically over the volcanics and related rocks as an erosional remnant. The limestone is cream-colored and displays karst topography featuring numerous sinkholes and depressions. The basal part consists of calcisiltite and marl grading upward to massive coralline algal limestone.

Widespread occurrence of loosely consolidated gravel dominates the western part of the area. These sediments are made up of horizontally lying beds of thick

gravel, silt, mud with clasts of various compositions. The gravel uncomformably cover older rock units. This is the youngest lithologic unit found in the area.

The known mineral and former operating mines are concentrated within the northern leasehold portion over a 5-km strike length. The central portion of the tenements is largely covered by the younger lithic tuff sequence and there are few outcrops of the agglomerate horizon. To the south of the area, mineralized silicified agglomerate is again an exposed and additional prospects and mine occur.

5.1.1.3 Structure

North to northeast trending structural lineaments cut the Greater Co'o area most prominent is Buan fault striking N45°E and dips steeply to the NW. A wrench fault, which rotated the downthrown block to the west, and cuts the limestone exposed 3 kilometers southwest from Buan Plant. Sharp, triangular faceted ridges and offset streams characterize the footwall of this fault and up northeast the fault cuts andesites and related sediments.

Several NE trending lineaments traverse the southeastern sector, in an en echelon manner, and interpreted as a result of extensional stresses initiated by the sinistral movements of the Philippine 'Master Fault' ten kilometers west of the area.

Several major faults cross the mine working that currently extends over a strike length of about 600m. From east to west, the faults are "Oriental Fault" (100/80 – Dip direction/dip angle), "Irak Fault" (300/70 on 150m level flattening to 300/45 on the 220m level), "No Name Fault" (280/70), "Tinago Fault" (300/65), "Joe's Fault" (270/90) and the westernmost "Unnamed Fault" (270/90). All faults are at least locally mineralized.

The overall structural vein trend and supplementary splits obviously define multiple cymoidal structural patterns generally trending E-W. At least three major veins appear linked by supplementary vein splits generally in a 200 meters zone, about 900 meters in length. (Figure 3.3).

The veins exhibit "pinch and swell" characteristics, with sinous curves and inflections recognizable in underground openings and drill cores. Vein dips are generally NE in surface trenches and confirmed by diamond drilling.

Veins dip steeply to the north with some splits having reversed dips that re-connect with the main veins at depth. The veins in the south, however, dip 45° to vertical towards the east.

The Agsao River draining south is controlled by a NNW trending fault.

Bedding in sedimentary rocks is well displayed with NW strike and NE to SW dips indicating folding. Where silicification has altered the rock, bedding is obscured.

5.1.1.4 Mineralization and Alteration Zoning

Mineralized structures exhibit irregular but persistent alteration selvages, most common is sericitic clay defining a narrow zone enveloped by silicified zones. Veins display multiple branching and an anastomising mesh-pattern, central to a 300 meter-wide zone of sericitic alteration grading spatially to propylitic alteration. (Figure 3.4).

Veins are mainly quartz, calcite and barite, occurring as irregular masses within the main quartz body. Quartz appears as massive or cryptocrystalline in irregular bands and open fractures. Pervasive silicification within the enclosing country rocks is displayed as total replacement of the host lithology and grades of sericitic alteration. Contact is gradual and irregular.

Argillic (sericitic) alteration occurs as narrow selvages parallel to the veins and laterally dispersed to tens of meters. Some irregular stockworking of quartz veinlets and stringers cut the argillic alteration probably as late stage silica flooding.

Widely distributed of propylitic alteration is peripheral to main mineralized zones. Chloritization is pervasive within the host lithologies and commonly alters ferromagnesian minerals in andesite. Epidote is commonly associated as fracture or cavity filling.

1. **Quartz + Illite ± Pyrite ± Barite ± Calcite**

   Quartz is the most dominant mineral, about 90% of vein material. Breccia textures are characterized by angular to surrounded silicified rock and quartz fragments surrounded by masses of fine quartz, interstitial illite fibers, pyrite and sphene. Feldspar as relict traces is completely

replaced by illite or illite-smectite and admixtures of quartz and pyrite. Early quartz is surrounded by streaks of illite threads.

Theoretically, quartz is stable between 200°C to 300°C, however fluids inclusion analysis of quartz sampled from veins yielded liquid-vapor homogenization temperature measurements within 200° C to 260° C.

Barite and calcite occur en masse associated, but formed later than quartz, perhaps due to mixing of ascending dilute hot neutral chloride fluid with descending sulphate and carbonic acid condensates.

2 **Illite + Quartz + Pyrite ± Calcite ± Smectite ± Leucoxene ± Allophane**

Wide argillic alteration surround and envelope veins consisting of illite ± quartz ± pyrite ± calcite ± smectite ± leucoxene ± allophane mineral assemblage.

Narrow zones envelop the veins as clays with fine quartz grains and pyrite occurring as dissemination's. Quartz -calcite stringers cut some portions, about 60% illite, quartz the remaining 40%. The original feldspar is replaced by fibrous smectite. The assemblages represent a temperature range of 180° C to 220° C.

Leucoxene is minor and is an alteration product of ilmenite, sphene and probably a byproduct of primary ferromagnesian minerals altered to chlorite.

3. **Epidote + Chlorite + Quartz + Illite ± Pyrite ± Calcite**

This assemblage is distributed in a regional scale and likely to have originated from a regional flow of geothermal fluids circulating within the first 5 kilometers from the paleosurface, and suggest a 200° C temperature range. Epidote forms at around 235° C to 250° C, illite forming around 220° C. Chlorite, pyrite and quartz and calcite are ubiquitous and stable under a wide range of temperature.

5.1.2 Result or conclusions arrived at

The Proponent is under operation by virtue of Small-Scale Mining Permits and extracting 50 Metric Tonnes of gold ores per day. The bases of operation was the above geological investigation. Based on that, the Proponent has high respect that the said information was accurate. As such, the above information is very reliable as bases of further exploration activities within the Project Area.

In this regard, the proponent will no longer undertake the Reconnaissance/Regional Survey.

5.2 Semi-Detailed Survey or Follow-up Studies

5.2.1 Geological Mapping or Follow-up Studies

5.2.1.1 Nature or Type of Survey

This activity is a semi-detailed mapping of outcrops along creeks and other exposures. The work will be done to accurately map and delineate, but not limited to, rock types, alteration mineralogy and structures such as faults, folds, and dip of strata in prospective areas. Base maps to be used will be topographic maps at 1:10,000 scale.

5.2.1.2 Coverage

The coverage of this activity is the whole Project Area which is 2,115.6357 hectares.

5.2.1.3 Duration

Considering that the area can be easily accessed due to presence of logging roads of PICOP, this activity can be undertaken for five (5) months.

5.2.1.4 Manpower Complement

One (1) Mining Engineer/Geologist and three (3) locally hired geologic aide/laborer will undertake the activity.

5.2.1.5 Estimated Cost

The estimated cost for the semi-detailed geological study is **₱238,000.00.**

5.2.1.6 Output

A geologic map on a scale of 1:10,000 and a report is expected at the completion of the mapping.

5.2.2 Geochemical Survey

5.2.2.1 Nature or Type of Survey

Specific areas identified/delineated during the interpretation of regional geochemical data will be re-sampled into a closer density. Drainage anomalies will be traced to their source areas by semi-detailed stream sediment sampling, float identification/sampling or ridge-and-spur soil geochemical survey. Base maps to be used will be 1:10,000 topographic maps.

5.2.2.2 Coverage

The coverage of this activity is the whole Project Area which is 2,115.6357 hectares.

5.2.2.3 Duration

The survey will be undertaken simultaneously with the semi-detailed geological mapping program.

5.2.2.4 Sampling Media

Minus 80-mesh stream sediment, heavy mineral pan-concentrate and rock chip/float rock samples will be collected.

5.2.2.5 Sampling Density/Number of Samples

Sampling density will be one sample for every 300 meters grid interval for –80 mesh stream sediment and pan-concentrate heavy mineral samples. Minor tributaries and creeks will be the target for sampling. Rock samples will be collected at a density of one sample per 500 meters grid interval. As such, the expected number of samples to be collected are as follows:

-80 mesh samples	=	245 samples
heavy mineral samples	=	245 samples
rock samples	=	88 samples
Total		578 samples

5.2.2.6 Mode of Analysis/Target Elements

The samples will be undertaken in the in-house laboratory of the proponent. The mode of analysis will be fire assaying for its gold and silver content.

5.2.2.7 Manpower Complement

The same personnel, who will conduct the semi-detailed geologic mapping, will undertake this activity.

5.2.2.8 Estimated Cost

Since this activity shall be conducted simultaneously with the semi-detailed geologic mapping, only the sample analysis cost in amount of **₱173,400.00** is the estimated cost for this activity.

5.2.2.9 Output

A semi-detailed geochemical map at a scale of 1:10,000 and a geological report is expected at the end of the semi-detailed geochemical mapping and geochemical survey.

5.2.3 Subsurface Investigation

5.2.3.1 Type

The subsurface program to be used is the trenching/test pitting method. It will be based on the result of semi-detailed geological and geochemical mapping or survey. Surface alteration and mineralization zones and outcropping veins and stockworks and other interesting geological features are possible targets for trenching or test pitting. The main objective is to determine the lateral and vertical extent of the targets by exposing them (excavating of the overburden) for geologic mapping and sampling.

The depth of the overburden or soil and the width of the mineralized zones or structures control the width, depth and length of a trench/test pit.

The dimension of a trench normally measure 1 meter wide, 1-3 meter deep (depends on the thickness of overburden) and several meters long, oriented across the mineralized zones/structures and at spacing 100 meters depending on the nature of mineralization.

5.2.3.2 Coverage and Duration

Work coverage will depend on the extent of surface mineralization. The nature and depth of overburden is a big factor on the coverage and duration.

For planning purposes, it is assumed that the accumulated length for trenches is 500 and for test pit is also 500 meters. The activity will be undertaken for five (5) months following the semi-detailed geochemical survey.

5.2.3.3 Estimated Number of Samples to be Taken

It is assumed that one samples will be collected for all 1-meter sections of the trenches and testpits. As such, 1,000 samples will be collected and submitted to fire assay laboratory for gold analyses.

5.2.3.4 Mode of Analysis/Target Elements

The samples will be undertaken in the in-house laboratory of the proponent. The mode of analysis will be fire assaying for its gold and silver content.

5.2.3.5 Manpower Complement

One (1) Geologist/Mining Engineer and at least five (5) locally hired laborers will conduct the trenching or test pitting works.

5.2.3.6 Estimated Cost

The estimated cost for the semi-detailed geological study is **₱726,000.00.**

5.2.2.7 Output

A map showing all trenches and test pits with geologic data and assay results (grade plotted at scale of 1:1,000)

5.3 Topographic Survey

Topographic survey will be undertaken to determine where the actual exploration activities will be undertaken. Survey controls will be necessary to the conduct of detailed survey works. As such, a licensed Geodetic Engineer, duly deputized by the Mines and Geosciences Bureau, will be contractually hired to undertake the Topographic Survey.

5.3.1 Coverage

The activity will cover the significant result of the semi-detailed geological and geochemical surveys that will be the main target for detailed survey (assuming that total anomalous area is 200 hectares) and the following are the specific work:

- Located all drill hole collars, test pits, access routes and existing trails or road traversing the project area; and
- Located several tie points for all geologic data (outcrops, lithologic contacts, structures, etc.) and plot same on 1:2,000 map.

5.3.2 Duration

This activity shall be undertaken for three (3) months.

5.3.3 Scale and Contour Intervals

Survey control will be necessary to facilitate the information gathered down to scales of 1:1,000. This will allow contouring at an interval of 5 meters.

5.3.4 Manpower Requirement

This activity will be undertaken by Geodetic Engineer, Transit man, tapeman, laborers, etc. (The exact requirement shall be determined by the contractor).

5.3.5 Estimated Cost

It is estimated that the Contractual Price is **₱225,000.00**.

5.3.6 Output

1. Established survey control points and layout tie points for detailed mapping;
2. Established base and grid lines for proposed test pitting and drilling activities;
3. Topographic Map in a scale of 1:1,000 with a contour interval of 5 meters; and
4. Topographic Map showing the grid locations on ground.

5.4 Detailed Survey or Studies

5.4.1 Detailed Geochemical Survey

5.4.1.1 Coverage and Nature or Type of Survey

The geochemically anomalous catchment areas determined in the semi-detailed geological and geochemical surveys will be the main target for detailed survey. Soil grid geochemical sampling method will be applied over the said areas. It is assumed that 400 hectares are total anomalous areas. If the consequent soil geochemical map indicates anomalous zonations, as limited and systematic trenching and/or test pitting activity may do over some important and strategic soil geochemical anomalies in order to gain understanding on the nature of dispersion patterns. This information will guide us in our future drilling program.

5.4.1.2 Duration

The activity will be conducted in about four (4) months.

5.4.1.3 Sampling Media

Minus 80-mesh stream sediment, heavy mineral pan-concentrate and rock chip/float rock samples will be collected.

5.4.1.4 Sampling Density/Number of Samples

One soil/rock sample for every grid of 100 meters by 100 meters will be collected (400 samples). Rock and soil characteristics of outcrops encountered will also be noted.

5.4.1.5 Mode of Analysis/Target Elements

The samples will be undertaken in the in-house laboratory of the proponent. The mode of analysis will be fire assaying for its gold and silver content.

5.4.1.6 Manpower Compliment

One exploration Geologist/Mining Engineer and at least three (3) locally hired laborers will undertake the detailed geochemical survey.

5.4.1.7 Estimated Cost

The estimated cost for the detailed geological study is **₱310,400.00.**

5.4.1.8 Output

Technical report with detailed geological and geochemical maps at 1:1,000 scale showing the results of soil grid geochemical sampling. It also pinpoints the possible sites of drilling activity.

5.4.2 Subsurface Investigation (Drilling)

5.4.2.1 Type of Survey

If the results of the above studies warrant for further subsurface investigation, drilling will be undertaken. The first stage of drilling is commonly termed as reconnaissance drilling.

5.4.2.2 Number and Depth

For reconnaissance drilling, it is estimated that twenty (20) drill holes will be driven with a depth of 50 meters each or an aggregate depth of about 1,000 meters.

5.4.2.3 Estimated Number of Samples

At a density of 1 sample for every 1 meter depth, a total of around 1,000 core samples will be submitted to Assay laboratory for gold and silver analysis.

5.4.2.4 Duration

The drilling activity will be conducted in about six (6) months.

5.4.2.5 Estimated Cost

The estimated cost for the drilling activity is **₱2,470,000.00.**

5.5 Evaluation/Preparation of Reports

Compilation and collation of all results of exploration activities and detailed evaluation will be undertaken. This will determine if the results are encouraging that warrants a further exploration activities/program is necessary.

This activity will be undertaken for the last month of the two-year Exploration Period of the MPSA that may be issued. It is estimated that an amount of **₱60,000.00** will be spent.

6.0 SCHEDULE OF ACTIVITIES AND DETAILED EXPLORATION COST

See Annexes B and C.

7.0 SIGNATURE OF THE PREPARER

RAUL B. CEZAR
Mining Engineer
PRC License No. 1709
TIN: 139-191-690
PTR No. 5841963 A
Issued in Prosperidad, Agusan Del Sur
Issued on January 16, 2003

8.0 CONFORME

Col. SAMUEL G. AFDAL (Ret.)
President
PHILSAGA Mining Corporation

ANNEX B

DETAILS OF EXPLORATION COST

1.0 Semi-Detailed Survey or Follow-up Studies

1.1 Geological Mapping or Follow-up Studies — ₱ 238,000.00

Salary/Wages		
Mining Engineer/Geologist @ ₱20,000.00/mo.	=	₱ 100,000.00
Laborers (@₱200.00/day x 130 days x 3)	=	78,000.00
Field Supplies and Materials	=	20,000.00
Transportation/Communication	=	20,000.00
Other Expenses	=	20,000.00
Total		₱ 238,000.00

1.2 Geochemical Survey — ₱173,400.00

578 sediment/rock samples @ ₱300/samples	=	₱173,400.00

1.3 Subsurface Investigation — ₱726,000.00

Salary/Wages		
Mining Engineer/Geologist @ ₱20,000.00/mo.	=	₱ 100,000.00
Laborers (₱200.00/day x 130 days x 6)	=	156,000.00
Field Supplies and Materials	=	30,000.00
Timber Supports*	=	100,000.00
Transportation/Communication	=	20,000.00
Analyses (1,000 x ₱300.00)	=	300,000.00
Other Expenses	=	20,000.00
Total		₱ 726,000.00

* Depending on the period that an excavation will be used. The timber shall be bought from local hardware stores and suppliers.

2.0 Topographic Survey — ₱225,000.00

Contractual Price	=	₱225,000.00

3.0 Detailed Survey or Studies

3.1 Detailed Geochemical Survey — ₱310,400.00

Salary/Wages		
Mining Engineer/Geologist @ ₱20,000.00/mo.	=	₱ 80,000.00
Laborers (₱200.00/day x 104 days x 3)	=	62,400.00
Field Supplies and Materials	=	16,000.00
Transportation/Communication	=	16,000.00
Analyses (400 x ₱300.00)	=	120,000.00
Other Expenses	=	16,000.00
Total		₱310,400.00

3.2 Subsurface Investigation (Drilling) — ₱ 2,470,000.00

Salary		
Mining Engineer/Geologist	=	₱ 120,000.00
Drilling Cost		
(Contract basis: 2,000/meter @ 1,000 meters total depth)	=	2,000,000.00
Analyses (1,000 x ₱300.00)	=	300,000.00
Other Expenses	=	50,000.00
Total		₱ 2,470,000.00

4.0 Evaluation/Preparation of Reports — ₱ 60,000.00

Salary		
Mining Engineer/Geologist @ ₱20,000.00/mo.	=	₱ 20,000.00
Other Expenses	=	40,000.00
Total		₱ 60,000.00

GRAND TOTAL ₱ 4,202,800.00

ANNEX C

SCHEDULE OF EXPLORATION ACTIVITIES

ACTIVITY	YEAR 1													YEAR 2											
	1	2	3	4	5	6	7	8	9	10	11	12	COST (₱)	1	2	3	4	5	6	7	8	9	10	11	12	COST (₱)
ni-Detailed Geologic Mapping																										
Geological Mapping/Follow-up tudies													238,000.00													
Geochemical Survey													173,400.00													
Subsurface Investigation (Testpitting and Trenching)													726,000.00													
ographic Survey													150,000.00													75,000.00
iled Survey or Studies																										
etailed Geochemical Survey																										310,400.00
Subsurface Investigation Drilling)																										2,470,000.00
uation/Preparation of Reports																										60,000.00
TOTAL COST													**1,287,400.00**													**2,915,400.00**

ANNEX B

ble 1. **SLOPE CATEGORY**

Slope (%)	Description	Area (Has.)	% Total
0-3	Level to nearly level	20,846.8770	40.70
3-8	Gently sloping	1,563.3060	3.05
8-18	Moderately sloping to rolling	3,566.0305	6.96
18-30	Rolling to hilly	19,019.8393	37.14
30-50	Steep hills & mountains	5,742.3610	11.21
50 & above	Very steep hills & mountains	479.6115	0.94
Total		**51,218.0106**	**100**

Source: Comprehensive Land Use Plans of Bunawan

ble 2. **EROSION POTENTIAL CATEGORY**

Description	Area (Has.)	% Total
No apparent erosion	18,274.2661	35.68
Slight erosion	20,643.3196	40.31
Moderate erosion	7,801.0063	15.23
Severe erosion	- - - -	8.78
Total	**51,218.0106**	**100**

Source: Comprehensive Land Use Plans of Bunawan

able 3. **FLOODING HAZARD CATEGORY**

Description	Area (Has.)	% Total
No flooding hazard	29,880	58.34

Slight flooding	7,362	14.38
Moderate flooding	522	1.02
Severely flooded	2,860	5.58
Very severely flooded	10,594	20.68
Total	**51,218**	**100**

Source: Comprehensive Land Use Plans of Bunawan

able 4. CRUDE BIRTH RATE (CBR) AND CRUDE DEATH RATE (CDR)

Year	CBR Per 1000 Population		CDR Per 1000 Population	
	No.	Rate	No.	Rate
1990	12,606	29.96	- - -	- - -
1991	10,629	24.17	1,071	2.43
1992	10,884	23.60	1,187	2.57
1993	10,355	- - -	803	- - -
1994	9,510	18.95	1,080	2.13
1995	10,672	20.31	1,078	2.02
1996	10,781	19.68	1,143	2.08
1997	10,735	18.75	1,302	2.27

Source: Department of Health, Caraga Regional Office

able 5. MATERNAL MORTALITY RATE (MMR) AND INFANT MORTALITY RATE (IMR)

Year	MMR Per 1000 Live Births		IMR Per 1000 Live Births	
	No.	Rate	No.	Rate
1990	18	1.67	201	18.69

1991	17	1.60	164	15.40
1992	15	1.38	1,479	13.74
1993	12	- - -	99	- - -
1994	19	1.99	133	13.15
1995	21	1.97	140	13.10
1996	15	1.39	103	9.55
1997	22	2.04	105	9.78

Source: Department of Health, Caraga Regional Office

able 6. LEADING CAUSES OF MATERNAL DEATHS

Cause	1992-1996			1997		
	No.	Rate/1000 livebirths	Rank	No.	Rate/1000 livebirths	Rank
Postpartum Hemorrhage	185	4.54	1	35	0.88	1
Pre-eclampisa/Eclampsia	15	0.37	2	10	0.25	2
Placenta Previa	1	0.02	4	5	0.13	3
Postpartum Sepsis	2	0.05	3	4	0.10	4
Abruption Placenta	1	0.02	4	2	0.05	5

Source: Department of Health, Caraga Regional Office

able 7. LEADING CAUSES OF INFANT DEATHS

Cause	1992-1996			1997		
	No.	Rate/1000 livebirths	Rank	No.	Rate/1000 livebirths	Rank
Pneumonia	155.6	3.82	1	145	3.65	1
Pre-Post Maturity	20.6	0.51	4	42	1.06	2

Asphyxia Neonatorum	12.4	0.30	6	32	0.81	3
Diarrhea	35.6	0.87	2	30	0.76	4
Congenital Anomalies	14.2	0.35	5	24	0.60	5
Septecemia	21.4	0.53	3	27	0.60	5
Unknown	- - -	- - -	- - -	14	0.35	6
Early Neonatal Bleeding Acute Respiratory Disease	- - -	- - -	- - -	13	0.33	7
Syndrome	11.0	0.27	7	12	0.30	8
Malnutrition	4.2	0.10	8	9	0.23	9
Meningitis	2.4	0.06	10	8	0.20	10
Neonatal Tetanus	3.4	0.08	9	2	0.05	11

Source: Department of Health, Caraga Regional Office

ble 8. LEADING CAUSES OF MORTALITY

Cause	1992-1996 (Five Year Average)			1997		
	No.	Rate/100,000 population	Rank	No.	Rate/100,000 population	Rank
Coronary Artery Disease	177.6	9.07	6	825	38.85	1
Hypertensive Vascular Disease	627.6	32.06	2	768	38.16	2
Pneumonia	659.2	33.68	1	758	35.70	3
Accident	325.4	16.62	4	582	27.40	4
Tuberculosis, all forms	346.2	17.69	3	435	20.48	5
Cancer	183.0	9.35	5	385	18.13	6
Kidney Disease	48.0	2.45	11	153	7.20	7
Liver Disease	71.2	3.64	9	142	6.68	8
Diarrhea	130.6	6.67	7	110	5.18	9
Stab/Gunshot Hack wounds	39.0	1.99	12	92	4.33	10
Septicemia	57.4	2.93	10	70	3.29	11

Peptic Ulcer	- - -	- - -	- - -	60	2.83	12
Malaria	88.0	4.49	8	65	3.06	13
Measles	4.0	0.20	13	20.4	0.96	14

Source: Department of Health, Caraga Regional Office

ble 9. LEADING CAUSES OF MORBIDITY

Cause	1992-1996 (Five Year Average)			1997		
	No.	Rate/100,000 population	Rank	No.	Rate/100,000 population	Rank
Acute Respiratory Infection (ARI)	44,828	2,301.80	1	25,792	1,214.68	1
Pneumonia	16,287	836.30	4	25,485	1,200.23	2
Diarrhea	20,625	1,059.04	2	24,060	1,133.11	3
Bronchitis/Broncholitis	20,396	1,047.28	3	20,833	981.14	4
Influenza	12,773	655.36	6	19,678	926.74	5
Malaria	4,222	216.80	13	7,782	366.50	6
Upper Respiratory Tract Infection	2,624	135.30	15	5,780	272.21	7
Animal Bite	1,250	63.73	17	3,166	145.24	8
Hypertension	4,090	208.51	14	3,084	140.12	9
Tuberculosis, Respiratory	2,864	146.01	16	2,046	124.61	10
Skin Disease	13,504	693.41	5	- - -	- - -	- - -
Parasitism	12,266	629.80	7	- - -	- - -	- - -
Anemia	10,832	556.20	8	- - -	- - -	- - -
Nutritional Deficiency	9,644	495.18	9	- - -	- - -	- - -
Accidents/Wounds	8,694	446.39	10	- - -	- - -	- - -
Gastro-Intestinal Disorder	6,470	332.24	11	- - -	- - -	- - -
Schistosomiasis	4,242	217.82	12	- - -	- - -	- - -

Source: Department of Health, Caraga Regional Office

able 10. NUMBER OF DISABLED PERSONS BY SEX AND TYPE OF DISABILITY, 1996

Type of Disability	Number of Disabled Person	*Percent to Total*	Male	Female	% *Male*	% *Female*
Total	**20,768**	***100.00***	**11,502**	**9,266**	***55***	***44.62***
Total Blindness	922	*4.44*	453	469	*2.18*	*2.26*
Partial Blindness	2,304	*11.09*	1,261	1,043	*6.07*	*5.02*
Low Vision	4,161	*20.04*	1,899	2,262	*9.14*	*10.89*
Total Deafness	571	*2.75*	331	240	*1.59*	*1.16*
Partial Deafness	1,783	*8.59*	1,047	736	*5.04*	*3.54*
Poor hearing ability	485	*2.34*	270	215	*1.30*	*1.04*
Muteness	1,078	*5.19*	593	485	*2.86*	*2.34*
Speech defect	1,015	*4.89*	568	447	*2.73*	*2.15*
Loss of one or both arms/hands	373	*1.80*	300	73	*1.44*	*0.35*
Loss of one or both Legs/feet	420	*2.02*	311	109	*1.50*	*0.52*
Paralysis of one arm and one leg	452	*2.18*	299	153	*1.44*	*0.74*
Paralysis of one or both arms	1,513	*7.29*	962	551	*4.63*	*2.65*
Paralysis of one or both legs	927	*4.46*	567	360	*2.73*	*1.73*
Paralysis of all four limbs	351	*1.69*	225	126	*1.08*	*0.61*
Mental retardation	1,507	*7.26*	810	697	*3.90*	*3.36*
Mental illness	1,069	*5.15*	518	551	*2.49*	*2.65*
Others	1,837	*8.85*	1,088	749	*5.24*	*3.61*

Source: 1995 Census of Population, National Statistics Office

Table 11. NUMBER OF MUNICIPALITIES AND BARANGAYS AND INCOME CLASS OF AGUSAN DEL SUR, 1997

Municipalities	Income Class 1997	No. of Barangays
1. Bayugan	1st	43
2. **Bunawan**	**3rd**	**11**
3. Esperanza	1st	45
4. La Paz	2nd	15
5. Loreto	1st	17
6. Prosperidad	2nd	32
7. **Rosario**	**4th**	**11**
8. San Francisco	1st	27
9. San Luis	2nd	25
10. Sibagat	3rd	24
11. Sta. Josefa	5th	11
12. Talacogon	4th	15
13. Trento	1st	16
14. Veruela	2nd	20
14	**1st**	**314**

Source: Provincial Planning Development Office of Agusan del Sur

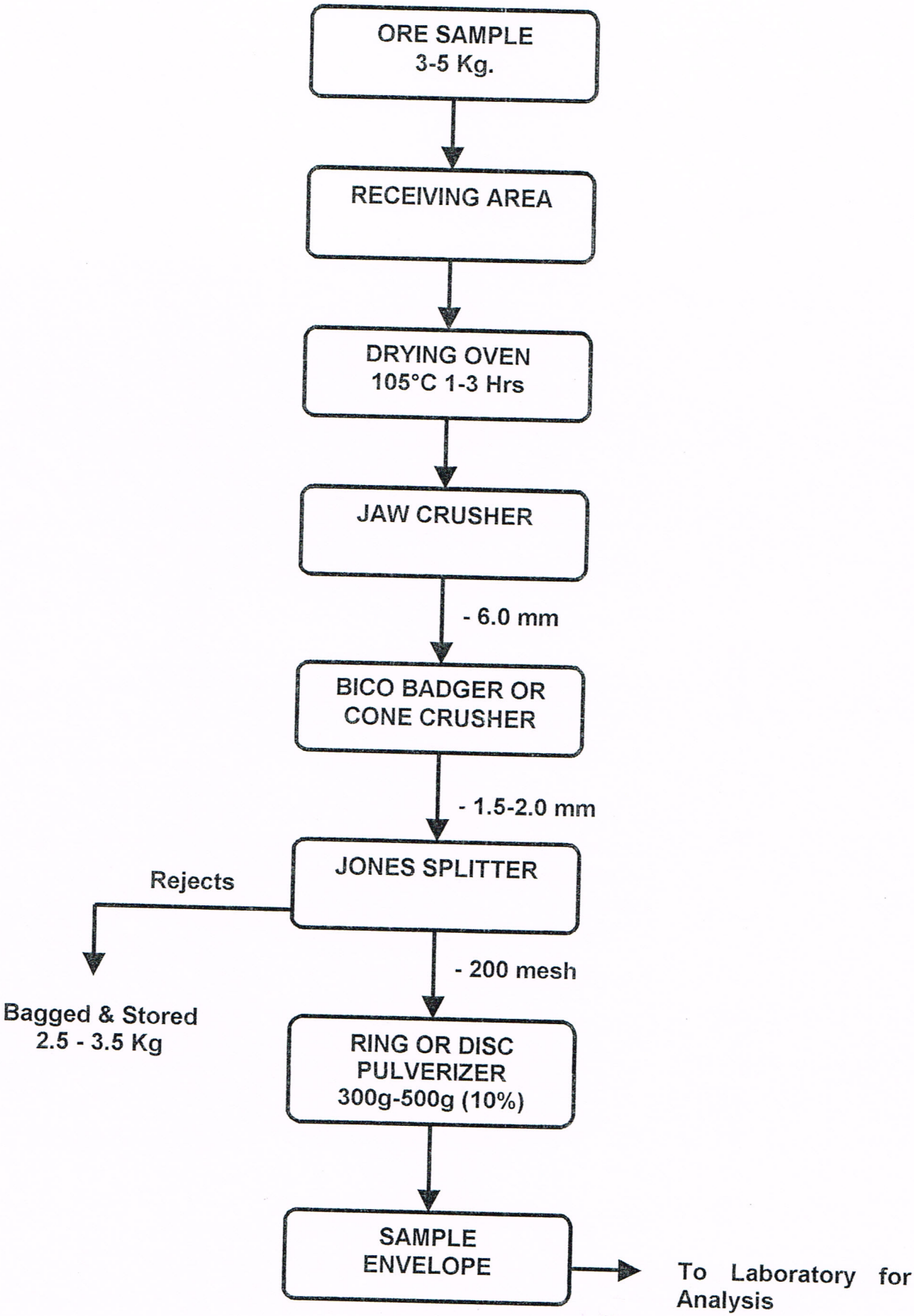
able 12. ROAD INVENTORY OF AGUSAN DEL SUR

Road Administrative Classification	Total Road Length	Road Density (km./sq.km.)	Road Length by Type of Surface			
			Concrete Road Length (km.)	Asphalt Road Length (km.)	Gravel Road Length (km.)	Earth Road Length (km.)
National	305.6970		186.7810	0.1500	118.7660	
Provincial	238.6450		22.3000		186.8450	29.5000
Municipal	89.8510		5.1020		67.2600	17.4890
Barangay	990.1230		32.2780		706.9100	250.9350
Total	**1,624.3160**	**0.1812**	**246.4610**	**0.1500**	**1,079.7810**	**297.9240**

Source: Department of Public Works and Highways Provincial Engineers Office of Agusan Del Sur

ANNEX C-1

SAMPLE PREPARATION



ANNEX C-2

SAMPLE PREPARATION

Sample preparation is a very important step in the methods of assaying. If proper preparation is not used, the analysis will not be valid.

1. **General Drying Of Samples**

   Safety glasses, hard hat, respirator, ear protection must be worn while operating crusher and pulverizer.

   Exhaust fan must be on while operating crusher and pulverizer.

   Sample pans are washed with water and stiff brush after use and left stacked upside down to dry.

2. All sample brought to the lab must be completely dry before they are to be prepared.

   Geology sampler are placed in sample pans along with corresponding tag and placed in drying oven. There they should stay for between 1-3 hours. Muck chips or sludge sampler will take more times drying as their moisture content it much higher.

   Mill filter cakes day shift are usually dry in the morning, however, the night shift samples are still wet as they out usually around 5:00AM. To quicken the drying of these samples, the pulp can be broken up and mashed in their respective pans and dry in the hot plate to speed drying.

   Carbon samples can be placed on hot plate to finish drying.

   Temperature of drying oven should be get approximate 105°C-120°C, too high temperature may cause some roasting.

3. **Crushing**

   When dry, samples are taken out and cooled. The samples should be placed in sequence order to minimize sample mix-ups. The samples should be crushed on primary crusher to the smallest size possible, approximately ¼" then put through the secondary crusher, crusher entirely samples into 1 1/2mm-2mm. Paper bags marked with corresponding numbers and the appropriate tag placed inside. Remember to carry tags along with samples during processes.

   Note: Crusher should be well cleaned between each sample with compressed air to prevent contamination.

4. **Riffling or Splitting**

The crushed sample can be placed back in original pan or riffled immediately after crushing. The purpose is to reduce the sample size to 300-500g. The rejects are stored in the pans and stack up in the shelve. The oldest are thrown out to make room for the most recent on daily basis, usually about 4 days retention is kept. The Diamond drill core samples are put it back in the original plastic bag and kept for 3 month or more them discard (inform geology before discard).

Mill pulps are broken up with spatula, roll on a mat and 500-600g are cut with spatula. At this point, the marked bag containing tap is placed in pan and sample is ready for next step.

Note: Riffle should be well cleaned with compressed air and checked for bits or rock stuck in bafflers between each sample.

5. **Pulverizing**

All samples are pulverized in right pulverizer or Bico disc pulverizer, they should be 100% minus-200. Pulverized samples have to be mixed to ensure that they are homogenous, sample is ready for next step.

6. **Rolling**

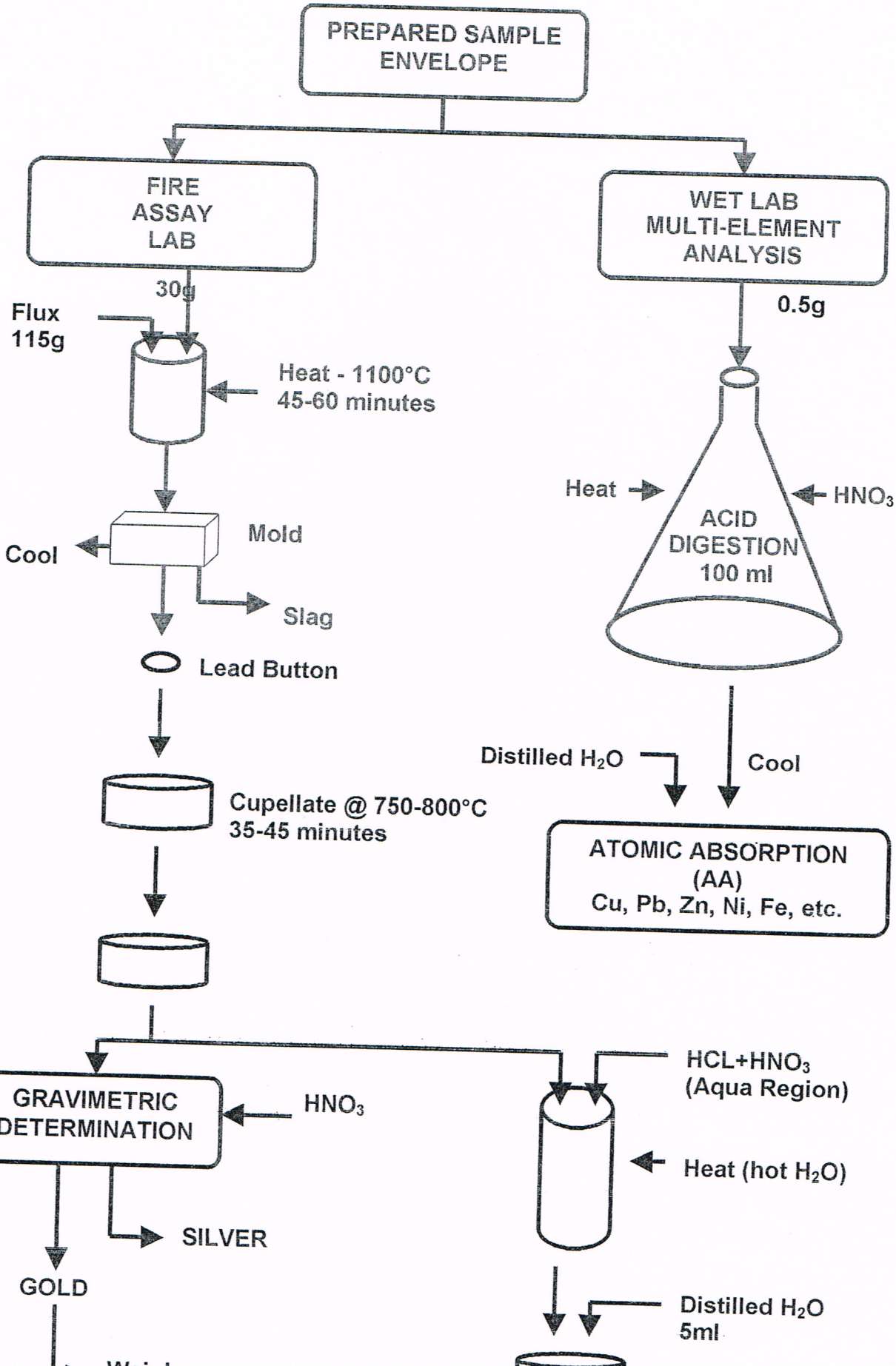
Rolling is a very important step in sample preparation. It is done to assure that the sample will be homogenous before assaying.

Sample is rolled from corner to corner on rolling cloth, making sure that the entire sample goes past the center point each time, when rolling is complete. Sample is then placed in marked (numbered) bag is ready for weighing.

Note: Clean off cloth each time.

ANNEX C-3

SAMPLE PROCEDURE



ANNEX C-4

SAMPLE PROCEDURE

Fire Assay

Is one of the methods to determine gold and silver on ores and metallurgical product by Fire Assay.

Flux mixture
Sample weight and charge preparation
pulps
carbon
slag's

fusion procedure
cupellation procedures
parting and weighing procedure
fire assay/AA
bullion
slag's

1. Flux mixture composition

A flux consisting of litharge (PbO), sodium carbonate (Na_2CO_3), borax ($Na_2B_4O_7$) and silica (SiO_2) is used along with a weighed amount of prepare sample and fused at 2000°F to create a lead button containing the precious metals. It is impossible to give a charge that would be satisfactory in every mines, therefore each mine should prepare their own stock flux suitable for the operation.

Example:

Pulp flux
Litharge (PbO) = 25 kg
Soda ash (Na_2CO_3) = 10.7 kg
Borax ($Na_2B_4O_7$) = 4.25 kg
Silica = 0 kg
Flour = 1.5 kg
Carbon Flux – Litharge (PbO) 143 kg
Soda ash (Na_2C_o3) 37.7 kg
Borax ($Na2B_4O_7$) 36.4 kg
Silica 10.5 kg

2. Sample weight and charge preparation

To a 30 gram crucible add approximately 110-120 g of premixed flux and weight 30 g pulps sample into crucible, mix well then $AgNO_3$ added depends on concentration of Au in sample. A slight cover borax is added at this point and sample are ready for fusion.

Carbon samples

inquartation, sample are ready for fusion, cupel, part anneal and weigh the gold heads in microbalance.

NOTE:

Gloves and dust mask should be worn when handling flux due to the toxicity of head. For convenience, flux is not usually weighted. It is measured by volume and the assayer is expected to familiarize with how much volume in a scoop is the proper cut

Calculation

Since g/t and ug/g are the same a gold bead weighs 3000 us on a 2g sample is equal to 3000 /2 = 1500 g/t on loaded carbon run duplicate sample ore for dore bead to calculate Ag.

Ag assay = Dore weight – Au weight

3. Fusion

When all samples properly prepared, they are placed in fire assay furnace which has been preheated to 2000 0 degree F. Be careful not to let temperature in furnace drop to much while loading. It is advisable to put the pots in rows of four starting with the last row going in front and the first row going in last. The samples are then fused for approximately 45 minutes to 1 hour.

When fusion is complete, the crucibles are taken out one at a time with tongs and poured into cast iron conical molds. Pouring should be done fairly show so that molten lead will not splash on side of mold. They are then allowed to cool for 5-10 minutes. When cooled, the slag is broken off with banner. (Safety glasses must be worn for this). The lead button is then hammered into the shape of cube. This will clean all slag from button and make for better handling with tongs. The cubed lead is then placed on lead button tray making sure that the order is kept throughput.

4. Cupellation

A suitable amount of cuples are placed in furnace and allowed to heat for 5-10 minutes. At that time, the lead cubes are placed in respective cupels and allowed to melt. This takes only a few minutes as the melting point of lead is low. Then the lead has melted and has opened (when black scum has cleared), the temperature in furnace is lowered to 17500F, the door is opened slightly and piece of rebar is placed under the door. This allows air into the furnace to oxidize the molten lead. This usually takes 45 minutes – 1 hour. When all the lead has been oxidized or absorbed into the cupel, the silver bead will flash marking the end of cupellation. The cupel are then removed from the furnace with cupel fork, placed on steel table under fume hood allows to cool.

5. Parting

When dore beads are cooled, they are taken out one at a time with pliers, placed on steel anvil and hammered flat. Each flattened bead is then placed

ANNEX D-1

SCHEDULE OF ENVIRONMENTAL ACTIVITIES

ACTIVITY	YEAR 1												YEAR 2												COST (₱)
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
vironmental Activities																									
Setting up of Nursery inc. maintenance and propagation of seedlings.		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Construction and Maintenance of Settling Ponds						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Slope Stabilization (rip-rap, slope reduction…)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Backfilling of test pits																									
Maintenance of excavated materials						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Rehabilitation/revegetation/reforestation								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Other Mitigating measures		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Monitoring and Maintenance of Environmental Activities			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
EC Campaign	■	■											■												
Training of Staffs/laborers	■					■					■			■				■							310,000.00
seline Data Gathering																									
Water Quality	■						■						■						■					■	40,000.00
Air Quality	■						■						■						■					■	25,000.00
Hydrology Study		■																						■	25,000.00
Flora and Fauna	■						■						■						■					■	25,000.00
Community Study		■																						■	25,000.00
Total Cost																									**450,000.00**

ANNEX D-2

IDENTIFICATION OF ENVIRONMENTAL EFFECTS AND MITIGATING MEASURES

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST (PhP)
ide of the ect Area	➢ Construction or upgrading of the access/pilot roads	➢ loss of vegetation	➢ Use of existing and established access or pilot roads to prevent clearing.	20,000.00
		➢ siltation due to road upgrading or construction of certain roads, if needed	➢ Provision of settling ponds and/or sediment traps in drainage canals to collect the silts prior to exiting to identified natural drainage.	
		➢ erosion due to loss of vegetation	➢ Minimizing height of muck stockpile/s along slopes. ➢ Provision of proper drain channels and direct the flow to siltation/sediment traps. ➢ Minimize stockpiling and accumulation of unwanted debris or waste ➢ Promotion of the growth of grasses/shrubs along roadsides and over the stockpiles to prevent it from erosion. ➢ Conduct regular road maintenance	
		➢ disturbance of natural habitat of animals	➢ A continuing study will be undertaken to identify a more suitable habitat available in the project area ➢ Proper and cautious approach will be observed prior to entry of any area	

ECIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST(PhP)
hin the ect Area	➢ Clearing and/or Upgrading of Trail/Existing Access Roads/Walkways	➢ loss of vegetation	➢ Use of existing and established access or pilot roads to prevent clearing.	20,000.00
		➢ siltation due to road upgrading or construction of certain roads, if needed	➢ Provision of settling ponds and/or sediment traps in drainage canals to collect the silts prior to exiting to identified natural drainage.	
		➢ erosion due to loss of vegetation	➢ Minimizing height of muck stockpile/s along slopes. ➢ Provision of proper drain channels and direct the flow to siltation/sediment traps. ➢ Minimize stockpiling and accumulation of unwanted debris or waste. ➢ Promotion of the growth of grasses/shrubs along roadsides and over the stockpiles to prevent it from erosion. ➢ Conduct regular road maintenance	
		➢ Disturbance of natural habitat of animals	➢ A continuing study will be undertaken to identify a more suitable habitat available in the project area ➢ Proper and cautious approach will be observed prior to entry of any area	

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST(PhP)
	➢ Setting-up of Stations and Survey Lines	➢ Loss of vegetation	➢ Cleared area will be temporarily planted with fast-growing specie of grass. Then after stabilization of ground, a more suitable and significant plant specie will be planted.	10,000.00
		➢ Disturbance of natural habitat of animals	➢ A continuing study will be undertaken to identify a more suitable habitat available in the project area ➢ Proper and cautious approach will be observed prior to entry of any area	
	➢ Ground Disturbance during Surface Investigation	➢ minor erosion using the hand pick	➢ minor disturbed ground will be immediately rehabilitated by re-vegetation or by installing temporary enclosure until disturbed ground is again stabilized.	10,000.00
		➢ siltation	➢ This effect is possible only if ground breaking takes place near a body of water. Necessary enclosure to provide for enough time for stabilization, such as ripraps will be installed.	
		➢ Disturbance of natural habitat of animals	➢ A continuing study will be undertaken to identify a more suitable habitat available in the project area ➢ Proper and cautious approach will be observed prior to entry of any area	

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST (PhP)
	➢ Construction of Temporary Camps	➢ Loss of vegetation	➢ Cleared area will be temporarily planted with fast-growing specie of grass. Then after stabilization of ground, a more suitable and significant plant specie will be planted.	20,000.00
		➢ Erosion/siltation	➢ Temporary or makeshift camps will be constructed with peripheral canal with a suitable silt traps. ➢ After abandonment, the area will be re-vegetated and cultivated to loosen compacted soil.	
		➢ Pollution and contamination of existing environment due to man-generated waste	➢ Temporary canals will be established, where at some point, traps will be constructed with plastic liner to prevent contamination of natural drainage. ➢ Proper waste disposal system will be observed at all times. Consideration and treatment to biodegradable and non-biodegradable materials will also be observed	

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	
	➢ Testpitting, trenching, drilling and sample collection and preparation	➢ Depressions may occur on selected area	➢ Immediate backfilling and re-vegetation immediately after abandonment. ➢ Ripping shall be conducted at compacted areas. ➢ Revegetation or reforestation after project completion but before abandonment to give ample time for rehabilitation measures maintenance.	40,000.00
		➢ Animal/human entrapment	➢ Open excavations will be fenced off. For convenience, all excavated materials shall be sacked and will serve as temporary fence while excavations are still in use. ➢ Markers and warning signs will be installed as safety reminders to by-passers. ➢ Immediate backfilling of excavations upon work completion	
		➢ Disturbance of natural habitat of animals	➢ A continuing study will be undertaken to identify a more suitable habitat available in the project area ➢ Proper and cautious approach will be observed prior to entry of any area	

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	
		➢ Siltation/Erosion	➢ The topsoil shall be stockpiled separate from the subsoil for proper backfilling and revegetation and each stockpile shall be maintained at considerable heights and low angles. ➢ Peripheral canals and silt traps will be constructed in stockpiles or erosion prone areas. ➢ As much as possible the stockpile shall be put at the low-prone erosion areas or at the upper side of the excavations so that whatever will be eroded goes back to the excavated portion. ➢ Enclosure of stockpile.	20,000.00
		➢ Loss of vegetation	➢ Encourage the growth of natural vegetation by spreading the stockpiled topsoil. ➢ As much as possible, the natural specie of the area will be maintained. ➢ Cleared area will be temporarily planted with fast-growing specie of grass. Then after stabilization of ground, a more suitable and significant plant specie will be planted. ➢ Maintain and/or establish a nursery during the exploration program for progressive rehabilitation.	20,000.00

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	
Hydrology Water ity	➢ Excavations	➢ Siltation	➢ Immediate backfilling of testpits and trenches and plugging of drill holes immediately after the desired samples are taken or after the study are completed. ➢ Test pits and trenches during its active state will be provided with a canvass roof not only to prevent water from going into the excavations and disrupt the work schedule but also to protect the health of the workers.	20,000.00
	➢ Clearing of vegetation	➢ Siltation/turbidity	➢ Sediment traps and settling ponds will be constructed to prevent infiltration of washed-out materials ➢ Encourage the growth of natural vegetation by spreading the stockpiled topsoil. ➢ As much as possible, the natural specie of the area will be maintained. ➢ Cleared area will be temporarily planted with fast-growing specie of grass. Then after stabilization of ground, a more suitable and significant plant specie will be planted. ➢ Maintain and/or establish a nursery during the exploration program for progressive rehabilitation.	20,000.00

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST(PhP)
	➢ Introduction of human activities	➢ Water and soil contamination	➢ Camps will be constructed at least 100 meters from known water bodies/natural drainage and will be provided with proper latrine facilities. ➢ Human related waste will be segregated and collected for proper disposition ➢ Encounters with aquifers will be recorded and documented for future study and beneficial use	
	➢ Use of drilling chemicals	➢ Water and soil contamination	➢ Biodegradable drilling fluids shall be used as much as possible. ➢ Refueling areas shall be provided with bunds and lined with impervious materials to prevent soil contamination. ➢ Contaminants will be contained and disposed of properly to prevent infiltration to environment ➢ Water recycling shall be implemented through provision of water tanks/ponds in each drill site.	20,000.00

ECIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST (PhP)
Ecology	➢ Clearing of vegetation and noise generation	➢ Displacement/loss of flora and fauna	➢ Clearing will be avoided as much as possible and noise generation will be kept to the barest ➢ Proper planning of approach will be observed to avoid disturbance	
		➢ loss of rare species of flora and fauna	➢ Areas identified as special habitat to rare and endangered species will be preserved and reported to proper government agency	
	➢ Waste generation	➢ Foul odor, health problem, water pollution, visual nuisance, may displace 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 while the inorganic waste will be collected and taken out of the site for possible recycling or disposal to Municipal dumpsite.	10,000.00

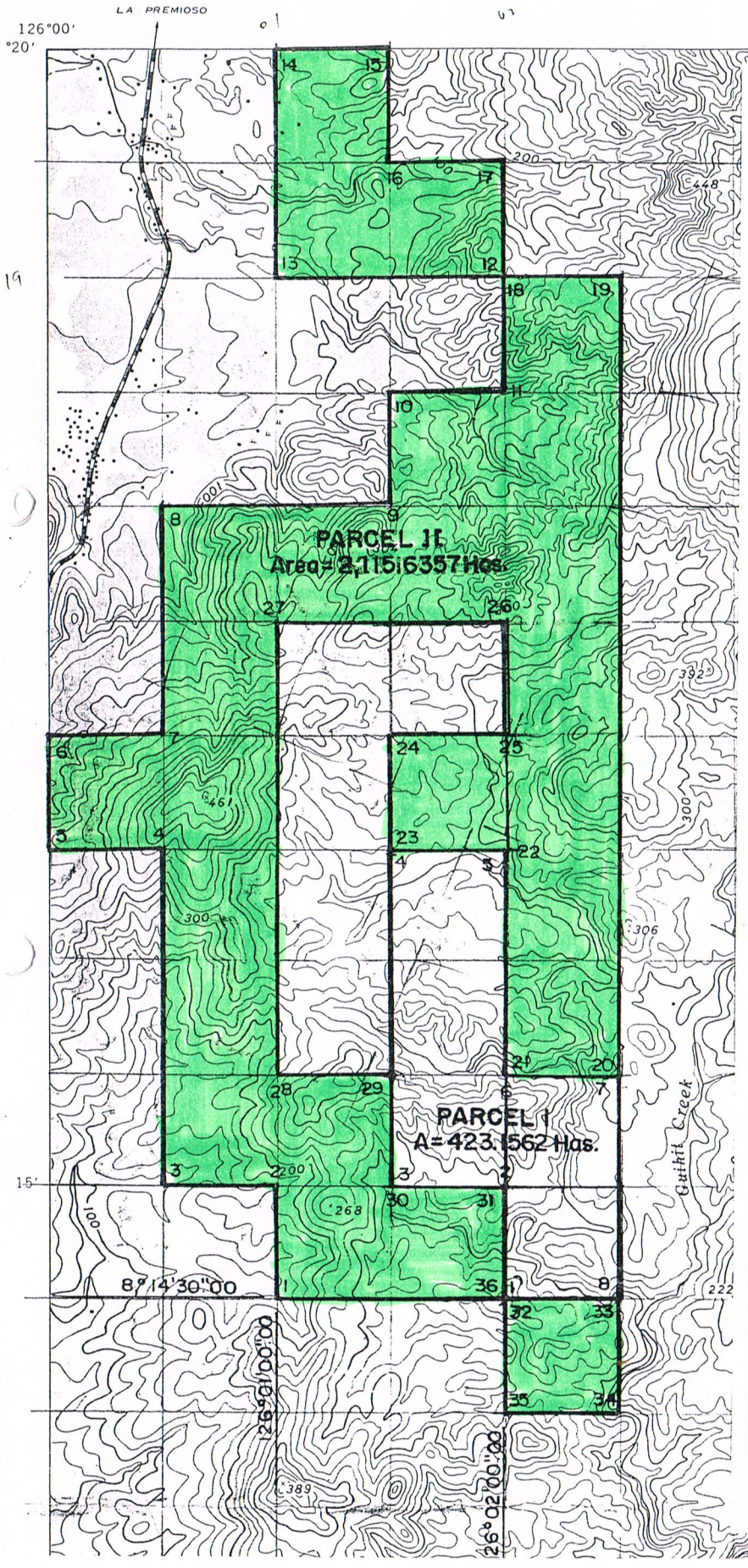
CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST (PhP)
Socio-omic ition	➢ Implementation of the proposed project	➢ Displacement of socio economic activities	➢ Promote employment opportunities by giving local residents priority on job available in relation to this project. ➢ Provide a just compensation to private property owners that may be disturbed by the project.	
	➢ Misinformation on Project Implementation	➢ Confused perception due to misinformation of project implementation	➢ IEC campaign will be regularly conducted among the local residents prior and during the implementation. ➢ Interactive and cooperative atmosphere will be encourage. ➢ Local traditions and practices will be respected at all times.	30,000.00
		➢ Disharmonious relationship between the residents and the Contractor	➢ Keep an open communication with the community through a conduct of regular meetings to give an update on the status of the Project. ➢ Encourage attendance by local residents during the reporting of updates and status of the Project.	
	➢ Increase of migration	➢ Unwanted migration due to wrong speculations	➢ Limit the hiring of non-resident workers to technical personnel. ➢ Priorities for employment shall be given to all residents of the concerned Municipalities/Province.	
		➢ Disharmonious relations with residents and loss of traditions/culture		

CIFIC AREA	SOURCE	POTENTIAL EFFECT	MITIGATING MEASURES	COST (PhP)
	➢ Unsafe working condition	➢ Compromised safety of workers	➢ All employees shall be provided with protective equipment and proper medical attention will be accorded to them regularly. ➢ All workers prior to hiring will be required to submit to a medical examination as an assurance that they are indeed fit to work. ➢ Training on safety and proper equipment handling shall be provided to all personnel.	20,000.00
	➢ Movement of vehicles	➢ Dust generation	➢ Vehicular traffic shall be restricted to existing roads as much as possible and their speed will be regulated specially at populated areas. ➢ Roads shall be sprayed with water during the summer period. ➢ Road maintenance shall be conducted regularly. ➢ Table drains at water prone areas shall be provided and growth of vegetation shall be encouraged to prevent erosion. ➢ Trees shall be planted at roadsides deemed to be used even after the life of the Project.	30,000.00
		TOTAL COST		**310,000.00**

MINDANAO 1:50,000

NAMRIA

PANUSUGON RIVER



TECHNICAL DESCRIPTION

PARCEL I

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 02' 00"
2	8° 15' 00"	126° 02' 00"
3	8° 15' 00"	126° 01' 30"
4	8° 16' 30"	126° 01' 30"
5	8° 16' 30"	126° 02' 00"
6	8° 15' 30"	126° 02' 00"
7	8° 15' 30"	126° 02' 30"
8	8° 14' 30"	126° 02' 30"

Area = 423.1562 Has.

PARCEL II

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 01' 00"
2	8° 15' 00"	126° 01' 00"
3	8° 15' 00"	126° 00' 30"
4	8° 16' 30"	126° 00' 30"
5	8° 16' 30"	126° 00' 00"
6	8° 17' 00"	126° 00' 00"
7	8° 17' 00"	126° 00' 30"
8	8° 18' 00"	126° 00' 30"
9	8° 18' 00"	126° 01' 30"
10	8° 18' 30"	126° 01' 30"
11	8° 18' 30"	126° 02' 00"
12	8° 19' 00"	126° 02' 00"
13	8° 19' 00"	126° 01' 00"
14	8° 20' 00"	126° 01' 00"
15	8° 20' 00"	126° 01' 30"
16	8° 19' 30"	126° 01' 30"
17	8° 19' 30"	126° 02' 00"
18	8° 19' 00"	126° 02' 00"
19	8° 19' 00"	126° 02' 30"
20	8° 15' 30"	126° 02' 30"
21	8° 15' 30"	126° 02' 00"
22	8° 16' 30"	126° 02' 00"
23	8° 16' 30"	126° 01' 30"
24	8° 17' 00"	126° 01' 30"
25	8° 17' 00"	126° 02' 00"
26	8° 17' 30"	126° 02' 00"
27	8° 17' 30"	126° 01' 00"
28	8° 15' 30"	126° 01' 00"
29	8° 15' 30"	126° 01' 30"
30	8° 15' 00"	126° 01' 30"
31	8° 15' 00"	126° 02' 00"
32	8° 14' 30"	126° 02' 00"
33	8° 14' 30"	126° 02' 30"
34	8° 14' 00"	126° 02' 30"
35	8° 14' 00"	126° 02' 00"
36	8° 14' 30"	126° 02' 00"

Area = 2115.6357 Has.

TOTAL AREA = 2538.7919 HAS.

SKETCH MAP

OF MINERAL PRODUCTION SHARING AGREEMENT APPLICATION

AS PREPARED FOR

PHILSAGA MINING CORPORATION

SITUATED IN THE

BARANGAYS OF CONSUELO & BAYUGAN III
MUNICIPALITIES OF BUNAWAN & ROSARIO
PROVINCE OF AGUSAN DEL SUR
ISLAND OF MINDANAO
CONTAINING AN AREA OF 2538.7919 Has.

PREPARED BY:

REGINO L. SOBREVIÑAS, JR.
GEODETIC ENGINEER
PRC No. 996-1-06-66
PTR No. 1394730-1-2003

RECEIVED
MAR 11 2008

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

ENVIRONMENTAL WORK PROGRAM

1.0 THE PROJECT PROPONENT

Name	:	**PHILSAGA MINING CORPORATION**
Head Office	:	Ernora Gran Building, 74A Bonafacio Street Davao City
Field Office	:	Bayugan III, Rosario, Agusan del Sur
Contact Persons/ Title	:	**Col. SAMUEL G. AFDAL (Ret.)** President **Engr. FERDINAND A. CORTES** Liaison Officer/Safety Engineer
Tel./Fax No.	:	(085) 859-3442

2.0 TYPE AND PURPOSE OF THE PROJECT

The objective of the project/exploration work is to assess the minerals present in the area especially gold, silver and other associated minerals.

This document, an Environmental Work Program (EWP) for exploration, is designed to mitigate/minimize the identified impacts of exploration activities.

3.0 GENERAL LOCATION AND AREA COVERED

The Project Area, subject of this EWP, is a portion of the 2,538.7919-hectare applied area covered by an application for Mineral Production Sharing Agreement (amendment/combination of MPSAA Nos. XIII-010 and XIII-011, formerly under the name of Base Metals Mineral Resources Corporation) located in the Barangays of Consuelo and Bayugan III, Municipalities of Bunawan and Rosario, Province of Agusan del Sur.

The Project Area covers an area of 2,115.6357 hectares and is particularly bounded by the following geographical coordinates:

Corner	Latitude	Longitude
1	8°14'30"	126°01'00"
2	8°15'00"	126°01'00"
3	8°15'00"	126°00'30"
4	8°16'30"	126°00'30"
5	8°16'30"	126°00'00"
6	8°17'00"	126°00'00"
7	8°17'00"	126°00'30"
8	8°18'00"	126°00'30"
9	8°18'00"	126°01'30"
10	8°18'30"	126°01'30"
11	8°18'30"	126°02'00"
12	8°19'00"	126°02'00"
13	8°19'00"	126°01'00"
14	8°20'00"	126°01'00"
15	8°20'00"	126°01'30"
16	8°19'30"	126°01'30"
17	8°19'30"	126°02'00"
18	8°19'00"	126°02'00"
19	8°19'00"	126°02'30"
20	8°15'30"	126°02'30"
21	8°15'30"	126°02'00"
22	8°16'30"	126°02'00"
23	8°16'30"	126°01'30"
24	8°17'00"	126°01'30"
25	8°17'00"	126°02'00"
26	8°17'30"	126°02'00"
27	8°17'30"	126°01'00"
28	8°15'30"	126°01'00"
29	8°15'30"	126°01'30"
30	8°15'00"	126°01'30"
31	8°15'00"	126°02'00"
32	8°14'30"	126°02'00"
33	8°14'30"	126°02'30"
34	8°14'00"	126°02'30"
35	8°14'00"	126°02'00"
36	8°14'30"	126°02'00"

Please refer to Annex A for Location Map/Sketch Plan.

The proposed Project Area can be reached through well-maintained logging roads from National Highway to the mining operation located in Sitio Co-o, Barangay Consuelo, Municipality of Bunawan, Province of Agusan del Sur.

Agusan del Sur does not have its own airport facility/ies. Davao City and Butuan City are the nearest airport facilities. Bunawan is about two (2) hours drive (110 km.) from Butuan and about three (3) hours from Davao City.

These Cities are serviced daily by Philippine Airline, Air Philippines and Cebu Pacific from Manila.

Considering Agusan del Sur is located in the Central Part of Mindanao, there are no port facilities. The ports of Davao and Butuan (Nasipit) are serviced by passenger and cargo ships to Manila and other ports of destination and vice versa.

4.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 Land Environment

4.1.1 Topography/Physiography

Large part of the Project Area is characterized by moderately sloping to hilly topography with high peaks of not more than 461 meters above sea level. To the east is characterized by steep hills and mountains with high peaks of 616 masl.

Generally, the central mountainous terrain is cut by rectangular drainage systems controlled by multiple fracture patterns. The Agsao River is apparently controlled by a NS trending fault and supplied by angular branching tributaries draining east.

Northern portion is karstic topographic highland of limestone characterized by sinkholes, depressions, irregular outlines of steep cliffs particularly in the western rims. Rounded knob of resistant limestone are surrounded by elongated depressions drained by deeply incised streams.

A relatively flat topography on the western side is dominated by wide alluvial terrace gravel. Gently sloping alluvial fan covers periphery of mountainous ridges and is probably produced from rapid deposition of sediments by the river systems. Rectangular drainage system connects to meandering mainstreams towards the western lowlands.

4.1.2 Land Use/Capability

The Project Area is a portion of the expired Timber License No. 43 but under an application for Integrated Forest Management Agreement of Paper Industries Corporation of the Philippines (PICOP for brevity). The timber concession is a source of basic raw materials for PICOP's integrated pulp and paper mill situated in Bislig, Surigao Del Sur. As such, tall "falcata" trees are cultured and grown in most places by PICOP

Those gradual slopes are being cultivated and planted with cash crops.

Most of the houses and dwelling are found along the main water channels and in areas where the slopes are more favorable and closer to the access road.

4.1.3 Pedology

There are five kinds of soil in the Province. These are the Kidapawan loam, Butuan loam, Hydrosol, Mambutay sandy loam and the undifferentiated mountain soil.[1]

The Proponent will undertake further study to determine the physical and chemical characteristics of soils in the Contract Area during the environmental studies.

4.2 Water Environment

4.2.1 Water Quality

There is no bacteriological study has been collated nor initially undertaken by the proponent. As such, the proponent will undertake water quality study to classify the water class as per DENR standards during the environmental studies.

4.2.2 Hydrology

The Agsao River and its tributaries serves as the main drainage in the area following a southeast flow and draining to one of the principal drainage south of the area – the Bunawan River. West is the Sumilao River which empties its load to Agusan River. Other tributary streams and minor creeks within the area are intermittent and are waterlogged only during the rainy season.

During the months of the rainy season, particularly during nearby rains, the waters in the major drainage swell and sometimes developed into minor floods. All the waters of the abovementioned rivers and its tributaries were drained into the sea. All these are the factors which contribute to the complete process of the never-ending hydrologic cycle in the area resulting to an excellent climate and the abundant and continuous water supply of the surrounding barangays and neighboring localities.

4.3 Climatology/Meteorology[2]

The Philippines has a tropical climate, with a mean annual lowland temperature of about 27°C (80°F). The climate over any particular locality in the Philippines is due to the so-called climate controls acting with various intensities and in different combinations. These climate

[1] Excerpt from the Comprehensive Land Use Plan of Bunawan

[2] Excerpt from the Comprehensive Land Use Plan of Bunawan

controls are topography and geography of the place, the prevailing wind regimes (the Northeast monsoon, the Southwest monsoon and the North Pacific trades), the semi-permanent cyclones and anti cyclones which produce the wind regimes over the country, ocean current, various linear systems and tropical cyclones affecting the country.

Its climate has been describe in terms of classification is the Modified Coronas. With the use of the average monthly distribution of rainfall of different stations, four types of rainfall distribution in the Philippines are defined.

The Province of Agusan del Sur falls in the second type of climate in the tradition classification, which is characterized with no pronounced dry season by with a very pronounced wet season with heavy precipitation from the month of December to early part of March.

Throughout the year, a northerly wind prevails over the Province with varying average wind speed. In January, the average wind speed is 5 knots. It slows down to 4 knots in April and still slower in July and October to 3 knots. The recorded annual average rainfall of the Province is 150.35 mm.

4.4 Geological/Geomorphological Environment

4.4.1 Geology[3]

4.4.1.1 Regional Geology

The Philippine Fault, a major strike-slip system, runs 1,200km north-south through the central portion of the mobile belt from Luzon in the north to Mindanao in the south, passing just east of Banahaw. Sinistral displacement along the fault exceeds 200 km.

The Philippines has a significant history of mining and metals production, principally copper and gold, with lesser nickel, molybdenum and silver. All the major deposits are found along mobile orogenic belts, commonly in clusters and are predominantly the products of epithermal mineral associated with episodic magmatism and intrusive rock emplacement, either into breccia or shear structures or in the form of porphyry deposits. The mineralizing events have been dated from Early Cretaceous (110My) to Miocene (20My).

The Project lies at the central portion of Eastern Mindanao Highlands forming the Diwata Mountain

[3] Excerpts from Co'o Gold Project Final Report by Antonio T. Fernandez and Paul B. Azarcon. July, 1988.

Ranges. Rocks consist largely of ophiolitic piles of Paleogene age, overlain by andesitic rocks, plutons and sedimentary sequences of Neogene age as described by Caldwell, et al, (1980); and McCaffrey et al, (1980) (in UNDP, 1984 Geology of Northern Agusan Mindanao). Many epithermal gold and porphyry copper type mineral are hosted within these units running from Surigao to Davao.

Some 200 kilometers east of these highlands is the west dipping-east verging Philippine Subduction System considered by Hamilton (1979) and Moore (1980) as a young morphological feature of probable Pliocene age and consisting of imprecated sheets of ophiolite and sedimentary rocks accreted from a subducting ocean floor.

West of the Eastern Mindanao Highlands lies the Agusan-Davao trough, a NS trending sedimentary basin of pre-Eocene age dividing the Eastern Mindanao Highlands from the Central Mindanao Cordillera. Central Mindanao Cordillera encompasses a broad, geologically complex region consisting of multiple east-dipping thrust sheets that overlie Cretaceous-Paleogene metamorphic rocks.

To the south lies the Pujada peninsula, a terrane of ophiolitic rocks with folded metamorphic rocks at the sole of west dipping thrust sheets dated Cretacious-Paleogene, and correlatable with the serpentinites and related ophiolites in Agusan del Norte (by UNDP, 1980) and in Central Bukidnon (by Santiago, A.B., 1982).

Southwest of the area includes a north-trending magmatic ridge occupied by active and dormant andesitic stratovolcanoes probably Miocene to recent in age.

4.4.1.2 Local Geology

Andesitic flows and volcaniclastic rocks intruded by dykes and sills of feldspar andesite porphyry are the oldest rock units in the area. These intercalated layers of rocks have a general NW strike and SW dip. Andesitic flows consist mainly of hornblendephyric to plagiophyric varieties. In fresh outcrops, they are light gray with a matrix of feldspar and hornblende microlaths with short stubby feldspar and hornblende phenocrysts. Where propylitization has affected the rock, chlorite replaces hornblende rendering a greenish coloration. Flow structure is obvious in andesites as shown by the parallel alignments of feldspar and hornblende.

Volcaniclastic rocks of andesitic origin vary from wacke to mudstone with occasional beds of intertongued flow breccia. Bedding laminations are faintly visible and are exhibited only in the finer sediments while graded bedding is well displayed in wacke and mudstone.

A large diorite pluton intrudes the southwest part of the area, and several small diorite epophyses are found in the central portion. The diorite is massive but exhibits blocky fracturing. Flow structures are shown as parallel alignments of phenocrysts while some rocks exhibit equigranular texture with phenocrysts of randomly oriented feldspar. Quartz occurs as a varietal component (2% of the rock.). Dissemination of black minerals, probably magnetite, gives the rock a "peppered" appearance. Chlorite and epidote occur as fracture fillings and as replacement of hornblende. Quartz veinlets cut the diorite in places suggesting the hydrothermal fluid effect on the rock. Minor aplitic dykes cut the volcanic hosts.

Limestone crops out in the far NE portion of the area, as small isolated bodies. This limestone lies stratigraphically over the volcanics and related rocks as an erosional remnant. The limestone is cream-colored and displays karst topography featuring numerous sinkholes and depressions. The basal part consists of calcisiltite and marl grading upward to massive coralline algal limestone.

Widespread occurrence of loosely consolidated gravel dominates the western part of the area. These sediments are made up of horizontally lying beds of thick gravel, silt, mud with clasts of various compositions. The gravel uncomformably cover older rock units. This is the youngest lithologic unit found in the area.

The known mineral and former operating mines are concentrated within the northern leasehold portion over a 5-km strike length. The central portion of the tenements is largely covered by the younger lithic tuff sequence and there are few outcrops of the agglomerate horizon. To the south of the area, mineralized silicified agglomerate is again an exposed and additional prospects and mine occur.

4.4.2 Slope[4]

The slope of the Municipality of Bunawan is dominantly board to level to nearly level land or 0-3% slope and located at the western side of the Municipality, while the eastern side shows 8% and above slope located in Barangay Imelda which is Mount Saugon with and elevation of 441 meter above sea level with the slope of 50% and above. Refer to Table 1 under Annex B.

4.4.3 Erosion Potential[5]

Almost 40.31% of the areas were severely eroded. The erosion ranges from 30-50%. Fifty percent (50%) and above are slope areas. These comprises the Barangays near Simulao river, namely Bunawan Brook and Barangay Imelda, which are highly susceptible to erosion due to the rise and fall of water level during rainy season. Refer to Table 2 under Annex B.

4.4.4 Flooding[6]

Almost 58.34% of the area of the Municipality of Bunawan are not susceptible to flooding, while 20.68% of the area are almost flooded throughout the year especially the swampy and marshy areas and 20.98% of the area are severely to moderately flooded due to creek and river flow. The situation varies with the slope and elevation of the area. Refer to Table 3 under Annex B.

A detailed study on geological hazard in the Contract Area will be conducted during the conduct of Environmental Impact Assessment (EIA).

4.5 Biological Environment

4.5.1 Terrestrial Plants and Animals

4.5.1.1 Plants

Thick vegetation covers most of the area except in some isolated logged-over portions. The limestone-dominated areas are mostly thick primary forests with few occurrences of large timber trees in isolated patches.

Cogonal grass abound in rolling and flat lying topographies in Sinu-ang, while rice crops are grown in the western lowlands. Several clusters of march foliage

[4] Excerpt from the Comprehensive Land Use Plan of Bunawan
[5] Excerpt from the Comprehensive Land Use Plan of Bunawan
[6] Excerpt from the Comprehensive Land Use Plan of Bunawan

in the western grow in the western lowland particularly within water saturated areas.

Tall "falcata" trees are cultured and grown in most places by PICOP.

4.5.1.2 Animals

Several domesticated animals such as carabaos, horses, pigs and chicken could be found in the area, but limited since the place is not an agricultural lands and only very few residents till their lands for farming purposes.

Further, the area does not contain scenic, historical features, breeding grounds for rare and endangered animal or plant species worth protection and preservation. Wildlife such as deer, wild boar, monitor lizard and monkeys are no longer encountered in the area.

Detailed study will be carried out to further determine the kinds of animals present in the Project Area.

4.5.2 Aquatic Plants and Animals

The area is located in the central part of Mindanao. There may be fish species in the muddy water along the river. The absence of any residents catching for fish show that if ever there are fishes, they are just few and not edible for human consumption.

However, detailed study/ies will still be carried out on the aquatic plants and animals on Agsao River and its tributaries.

4.6 Socio-economic Environment[7]

4.6.1 Social Environment

4.6.1.1 Education

4.6.1.1.1 Schools

As of the school year 1997-1998, the Province of Agusan del Sur had a total of 392 public (first in the Caraga Region) and 14 private elementary schools (second in the Region), 19 public (third in the Region) and 17 private secondary schools (first in the region), 10 secondary school annexes (first in the region) and 1 vocational school. In

[7] Caraga Region Socio-Economic Profile, 1997

general, it ranks first embracing 26% of the total elementary and secondary schools of the Caraga Region.

The Province has a total of 9 Higher Education Institutions (HEIs) comprising of 8 private and 1 State College. The said State College is located in the Municipality of Bunawan.

4.6.1.1.2 Enrollment

For school year 1997-1998, the Province of Agusan del Sur had a total of 101,901 enrollees in elementary schools, of which 100,277 (51,142 male and 49,135 female) students or 98.41% were enrolled in public schools while 1,624 students (874 male and 750 female) or 1.59% were enrolled in private schools. In the secondary level, out of 27,071 enrollees, 21,940 (9,858 male and 12,082 female) or 81.05% were enrolled in public schools while 5,131 (2,469 male and 2,662 female) or 18.95% were enrolled in private schools.

4.6.1.2 Health and Nutrition

4.6.1.2.1 Health Indicators

Crude Birth Rate (CBR) and Crude Death Rate (CDR)

All of the vital health indicators from 1990-1997 showed a decreasing trend except for maternal morality rate. Crude Birth Rate (CBR) decreased from 29.96 in 1990 to 18.75 in 1997 and Crude Death Rate (CDR) also decreased from 2.43 in 1991 to 2.27 in 1997 as shown in Table 4 under Annex B.

Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR)

Maternal Mortality Rate (MMR) increased from 1.67 in 1990 to 2.04 in 1997 although the MMR rates had been erratic. While Infant Mortality Rate (IMR) had been decreasing from 18.69 in 1990 to 9.78 in 1997 as clearly shown in Table 5 under Annex B.

Maternal and Infant Deaths

In the Caraga Region, postpartum hemorrhage ranked number one in the leading causes of maternal deaths from 1992-1997. Meanwhile, pneumonia was on top in the list of the list of leading causes of infant deaths over the same period. Refer to Tables 6 and 7 under Annex B.

Mortality

In the Region, pneumonia was that leading cause of mortality from 1992-1996, registering a rate of 33.68 per 100,000 population. For 1997, coronary artery disease ranked as number one with the rate of 38.85 per 100,000 population. See Table 8 under Annex B.

Morbidity

In the Region, all the leading causes of morbidity from 1992-1997 showed a reduction of rates except for pneumonia, diarrhea, influenza and malaria. Causes were diarrhea and other communicable diseases like acute respiratory infection, pneumonia and influenza. Acute respiratory infection ranked as the leading cause of morbidity for 1992-1997. See Table 9 under Annex B.

The region is faces with problems of endemic diseases like malaria and schistosomiasis. Although there were slight reductions on its prevalence rates for the past three years, still Caraga ranked number two in schistomiasis and number 6 in malaria nationwide.

4.6.1.2.2 Nutritional Status of Pre-School Children

In 1995, malnutrition was prevalent in the Province of Agusan del Sur only 46.63% of pre-school children were considered free from nutritional deficiency. Malnutrition rate is posted at 53.37% where 1.54% were severely underweight, 11.18% moderate and 36.17 mildly underweight.

4.6.1.2.3 Hospitals and Health Centers

The Province has 11 hospitals, of which 6 were government hospitals and 5 were private. Out of the 6 government hospitals, 9 were primary and 1

each for secondary and tertiary. The 5 private hospitals were all primary.

The Region has 73 main health centers and 489 barangay health stations manned by 76 doctors, 147 nurses, 35 medical technologists, 52 dentists, 35 dental aides, 608 midwives and 137 sanitary inspectors.

The proponent has its own clinic manned presently by one (1) doctor and one (1) nurse.

4.6.1.2.4 Water and Toilet Facilities

Out of the 86,413 families in the Province, 23,155 or 26.90% had no access to potable and safe sources of water and 16,891 or 19.54 had no sanitary toilets.

4.6.1.3 Social Welfare

4.6.1.3.1 Social Welfare Facilities

As of 1996, the Province had 190 welfare facilities, of which 188 were Day Care Centers, 1 Productivity Skills Capability Building for Disadvantaged Women Center, and 1 Halfway Home for Improved Mental Patients.

4.6.1.3.2 Disabled Persons

Most of the disabled persons in the Caraga Region either had low vision or totally or partially blind. Of the total number of disabled persons, 55% were male and 45% were female. See Table 10 under Annex B for further details.

4.6.1.4 Protective Services

4.6.1.4.1 Crime and Police Force Statistics

Total crime volume of the Province for 1995 was 425. Physical injury recorded the highest for crimes versus persons at 95 while theft recorded the highest for crimes versus property at 27 and crimes versus chastity (i.e. rape) at 42.

In 1996, the Province had 431 police forces. The said number compared to the Province's population, 1:1,194, was slightly below the standard of 1:1,000.

4.6.1.4.2 Firefighting Personnel and Facilities

There were 28 firefighters 6 fire trucks in the Province as of 1996.

4.6.1.5 Housing

The 1990 NSO statistics showed that the Province had unique housing profile. While other areas complain of housing shortage, a significant number of houses were vacant. However, the available statistics do not give the current number of housing backlog and magnitude of substandard units to be replaced. Out of the total housing units of 76,463, occupied housing units were 72,398 only.

4.6.2. Economic Environment

4.6.2.1 Family Income Class

The average income in 1994 for families in the Caraga Region was ₱59,009.00 while average expenditure was ₱46,325.00. Agusan del Sur has an average income of ₱46,264.00 and average expenditure of ₱40,064.00.

About 34% of the families in Caraga earned less than ₱30,000.00 annually. Some 72% have annual income less than ₱60,000.00 and only 10% earned more than ₱100,000.00.

4.6.2.2 Poverty Incidence

In 1994, Agusan del Sur was the highest poverty incidence in Caraga Region at 67%, the six highest in the country. The poverty threshold of ₱7,925.00, the lowest in the region, is much lower than the country's ₱8,885.00.

Agusan del Sur belonged to 1995's Club 20 of the depressed provinces, which ranked as 11th in the ranking of provinces according to the Minimum Basic Needs (MBN) index.

4.6.2.3 Wage Rates

For 1998, the nominal wage rates for non-agriculture sector was ₱144.00 per day. For the agriculture Sector, the minimum wage rate for plantation workers was ₱131.00 per day while the non-plantation was ₱111.00 per day.

4.6.2.4 Income Classification

The income classification of the Caraga Region's Provinces and Cities as of 1997 were as follows:

- **First Class – Agusan del Sur**, Butuan City and Surigao City;
- Second Class – Surigao del Norte and Surigao del Sur; and
- Third Class – Agusan del Norte

Agusan del Sur had the most number of first class municipalities at 5 (out of 14 municipalities). See Table 11 under Annex B for further details.

In terms of average income from 1992 to 1995, Agusan del Sur was the highest at ₱158 million.

4.6.2.5 Employment Status

In 1995, the Labor Force Participation Rate (LFPR) in Agusan del Sur was recorded at 64.5%. Agusan del Sur have the highest employment rate in the Carage Region at 97% with 166,000 employed while unemployment was 2.92%.

4.6.3 Infrastructure

4.6.3.1 Irrigation

Agusan del Sur had 6,466 hectares of irrigated land and potential irrigable area of 87,460 hectares. There were 29,105 farmers benefiting from the irrigation projects in the Province.

4.6.3.2 Roads and Bridges

As of 1995, total road length of the Province of Agusan del Sur 1,624.3160 kilometers and road density of 0.1812. There were 305.6970 classified as national road, 238.6450 as provincial road, 89.8510 as municipal road and 990.1230 as barangay road. See Table 12 under Annex B for further details.

The Province had bridges with the combined length of 2,768.828. This are all classified as national bridges.

4.6.3.3 Power

As of December 1996, of the 73 municipalities and cities of Caraga Region that the electric cooperatives cover,

sampled into a closer density. Drainage anomalies will be traced to their source areas by semi-detailed stream sediment sampling, float identification/sampling or ridge-and-spur soil geochemical survey. Base maps to be used will be 1:10,000 topographic maps. This activity covers the whole Project Area which is 2,115.6357 hectares and will be undertaken simultaneously with the semi-detailed geological mapping program.

5.1.1.3 Subsurface Investigation

The subsurface program to be used is the trenching/test pitting method. It will be based on the result of semi-detailed geological and geochemical mapping or survey. Surface alteration and mineralization zones and outcropping veins and stockworks and other interesting geological features are possible targets for trenching or test pitting. The main objective is to determine the lateral and vertical extent of the targets by exposing them (excavating of the overburden) for geologic mapping and sampling.

The depth of the overburden or soil and the width of the mineralized zones or structures control the width, depth and length of a trench/test pit.

The dimension of a trench normally measure 1 meter wide, 1-3 meter deep (depends on the thickness of overburden) and several meters long, oriented across the mineralized zones/structures and at spacing 100 meters depending on the nature of mineralization.

It is assumed that the accumulated length for trenches is 500 and for test pit is also 500 meters. The activity will be undertaken for five (5) months following the semi-detailed geochemical survey.

5.1.2 Topographic Survey

Topographic survey will be undertaken to determine where the actual exploration activities will be undertaken. Survey controls will be necessary to the conduct of detailed survey works. As such, a licensed Geodetic Engineer, duly deputized by the Mines and Geosciences Bureau, will be contractually hired to undertake the Topographic Survey.

The activity will cover the significant result of the semi-detailed geological and geochemical surveys that will be the main target for detailed survey. It is assumed that the total anomalous area is 200 hectares and the following are the specific work:

- Locate all drill hole collars, test pits, access routes and existing trails or road traversing the project area; and
- Locate several tie points for all geologic data (outcrops, lithologic contacts, structures, etc.) and plot same on 1:2,000 map.

This activity shall be undertaken for three (3) months.

5.1.3 Detailed Survey or Studies

5.1.3.1 Detailed Geochemical Survey

The geochemically anomalous catchment areas determined in the semi-detailed geological and geochemical surveys will be the main target for detailed survey. Soil grid geochemical sampling method will be applied over the said areas. It is assumed that 400 hectares are total anomalous areas. If the consequent soil geochemical map indicates anomalous zonations, as limited and systematic trenching and/or test pitting activity may do over some important and strategic soil geochemical anomalies in order to gain understanding on the nature of dispersion patterns. This information will guide us in our future drilling program. This activity will be conducted in about four (4) months.

5.1.3.2 Subsurface Investigation (Drilling)

If the results of the above studies warrant for further subsurface investigation, drilling will be undertaken. The first stage of drilling is commonly termed as reconnaissance drilling.

It is estimated that twenty (20) drill holes will be driven with a depth of 50 meters each or an aggregate depth of about 1,000 meters.

51.4 Evaluation/Preparation of Reports

Compilation and collation of all results of exploration activities and detailed evaluation will be undertaken. This will determine if the results are encouraging that warrants a further exploration activities/program is necessary.

This activity will be undertaken for the last month of the two-year Exploration Period of the MPSA that may be issued.

For further details of the Exploration Activities, please refer to the Exploration Work Program.

5.2 Processing of Samples

The analysis of the samples will be undertaken in the in-house laboratory of the Proponent. The mode of analysis will be fire assaying for its gold and silver content.

For further details of the processing of samples, please refer to Annex C.

5.3 Map showing the location of the proposed work area in relation to readily identified geographic and environmental features.

Location Map/Sketch Plan duly plotted in a NAMRIA topographic Map is attached as Annex A.

5.4 Exploration Costs

5.4.1	Semi-Detailed Survey or Follow-up Studies	
1.	Geological Mapping or Follow-up Studies	₱ 238,000.00
2.	Geochemical Survey	173,400.00
3.	Subsurface Investigation	726,000.00
5.4.2	Topographic Survey	225,000.00
5.4.3	Detailed Survey or Studies	
1.	Detailed Geochemical Survey	310,400.00
2.	Subsurface Investigation (Drilling)	2,470,000.00
5.4.4	Evaluation/Preparation of Reports	60,000.00
	TOTAL	**₱ 4,202,800.00**

For further details of the Exploration Costs, see Annex B of the Exploration Work Program.

6.0 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS

6.1 On Land

6.1.1 Surface Disturbance due to Trail Access Construction (Outside of Project Area)

The following are some of the activities to be undertaken and their corresponding potential effects to the environment:

1. The existing well-maintained logging roads of PICOP will be utilized. If certain roads will still be necessary to be constructed or upgrading of the access roads, the following are expected effects to the environment
   - loss of vegetation during clearing
   - siltation during minor upgrading/construction of access roads
   - erosion due to loss of vegetation
   - disturbance of natural habitat of animals

2. No other facilities will be constructed. Almost all facilities were located in the Municipality of Bunawan covered by different mining application wherein the effects to the environment are addressed in the Environmental Protection and Enhancement Program.

6.1.2 Surface Disturbance due to Exploration and other related Activities (Within the Project Area)

The following are some of the activities to be undertaken and their corresponding potential effects to the environment:

1. Clearing and/or Upgrading/Construction of Access Roads/Walkways
   - loss of vegetation during clearing
   - siltation during minor upgrading/construction of access roads
   - erosion due to loss of vegetation
   - disturbance of natural habitat of animals

2. Setting-up of Stations and Survey Lines (during topographic survey)
   - loss of vegetation
   - disturbance of natural habitat of animals

3. Ground Disturbance during Surface Investigation
   - minor erosion using the hand pick
   - siltation
   - disturbance of natural habitat of animals

4. Construction of Temporary Camps
   - loss of vegetation during clearing
   - erosion
   - siltation
   - disturbance of natural habitat of animals
   - pollution and contamination of existing environment due to man-generated waste

5. Testpitting, trenching, drilling and Sample Collection and Preparation
   - depression of selected areas
   - entrapment of stray animals
   - erosion
   - siltation
   - soil contamination from drilling fluid additives, fuels, etc.
   - loss of vegetation
   - disturbance of natural habitat of animals

6.2 On Hydrology and Water Quality

6.2.1 Potential generation of acid mine drainage

During exploration, there will be no generation of acid mine drainage. However, during the mining stage, if warranted, there may be a possibility of acid mine drainage formation and measures will be installed to prevent its formation.

6.2.2 Siltation and pollution of surface waters

Some of the potential environmental effects identified are as follows:

- water contamination due to human waste
- siltation due to excavations and clearing of vegetations
- soil contamination due to human related waste.
- Drilling fluids and cuttings may also contaminate the surface waters if not properly handled.

6.2.3 Changes in hydrology

Negligible changes in water availability and quality and in the drainage patters is expected due to exploration activities.

6.3 On the Ecology

Although minimal in extent, there is still a possibility that the exploration activities and other related human activities may have a significant effect to the existing ecological balance within the area. Some of these effects are identified as follows:

- displacement of flora and fauna due to clearing of vegetation.
- Noise and waste generation.

6.4 On Socio-economic Environment

The introduction of exploration activities over the Project Area may have very little significant effect to the socio-economic condition of the area considering that the extent of work to be done is relatively small. Only a number of locally hired residents may be benefited during exploration activities. These are some of the identified effects on the socio-economic conditions in the project area and its vicinity:

- Displacement of socio-economic activities
- confused perception by local residents due to misinformation of project implementation
- dust generation
- safety of workers during the excavation of testpits may be compromised
- migration into the project area due to wrong speculations.

7.0 ENVIRONMENTAL MANAGEMENT MEASURES INCLUDING TOTAL COST

7.1 Progressive rehabilitation/reforestation on areas subject of exploration

Areas affected by exploration activities such as stripped lands due to drill path and drill site construction will be replanted/re-vegetated. This will prevent landslides and mitigate soil erosion. Ripraps on potential slide areas shall be constructed. During exploration, ensuring minimum standards as to track and grid line widths can minimize vegetation removal.

7.2 Management of stockpile of excavated and removed earth, if any, to prevent dust and siltation problems and reduce the impact of topographic changes

Only a limited number of trenches and testpits will be dug and the removed soil and rocks will be saved and the same shall be used as backfill materials immediately after sampling and mapping. Care will be exercise that diggings will be backfilled first with sulphides laden spoils followed by the upper layer of the removed earth. This prevents the sulphides form being exposed and later dissolved/leached, which may lead to the formation of acid mine drainage. The refilled excavation sites will then be replanted. Disposal areas of removed earth shall also be re-vegetated and drainage canals will be provided whenever necessary.

7.3 Maintenance of roads to minimize dust

Roads shall be sprayed with water regularly specially during the summer months when excessive dust is generated.

7.4 Handling of Toxic and hazardous materials, if any including an Emergency Response Program

To protect ground water from being contaminated by drilling effluents, one or two settling pits will be constructed to contain and precipitate the sludge. These pits will be backfilled by earth/soil immediately after drilling. Aside from diesel, petrol and drilling mud, no other hazardous chemical will be used during the Exploration Period. Fuel storage sites shall be provided with bunds lined with impervious materials to prevent contamination of the soil in case of spillage.

7.5 Accommodation of other economic activities in the area

As the need arises, the establishment of a community/cooperative or even a wet market shall be encouraged for procurement of food and other necessities for the employees. Livelihood seminars will also be sponsored to teach employees and nearby residents new skills and alternative sources of income.

7.6 Alternative plans if special habitat of flora and fauna are affected

No special habitat of flora and fauna will be affected during the Exploration Period.

7.7 Socioeconomic mitigating measures

7.7.1 Plans for information and education campaign and dialogue between the company and population regarding project plans including compensation measures, if necessary

A field coordinator will be appointed from the local community to facilitate communication between the company and the people. Part of his/her responsibilities will be to conduct and information education campaign/inform the Barangay, Municipal and Provincial authorities such as but not limited to

- Nature of work programs and duration thereof as well as reporting of updates and status of the project.
- Alternatives for the development of infrastructure required for exploration (e.g. access tracks or water supply) which may have ongoing beneficial uses for the local community.
- Strategies to avoid or mitigate the adverse environmental impacts due from exploration activities.
- Local cultural and heritage issues shall be taken into account.
- Maintain regular contact with the stakeholders to ensure that potential problems are quickly recognized and resolved with general consent.

Salaries and wages will be according to the government approved standard rates for the region.

7.7.2 Working environment and protection measures for employees

Hired regular employees shall be accorded the benefits mandated by law. Adequate protective equipment and gadgets shall be provided such as rain boots, raincoats, hard hats, and other specialized items (eye goggles for samplers, ear muffs for core cutter, etc.)

7.8 Abandonment

Replanting/re-vegetating drill paths and sites, campsites, and other clearings will rehabilitate affected areas. All excavations will be backfilled to their original condition and likewise replanted. Before abandonment, all non-biodegradable waste materials will be removed for proper disposal outside of the site.

7.9 Total Cost

A total budget of **Four Hundred Fifty Thousand Pesos (₱450,000.00)** is committed to be spent for the implementation of the environmental activities aimed at mitigating identified impacts of exploration activities.

See Annex D for details/breakdown of the said budget.

8.0 NAME AND SIGNATURE OF PERSON PREPARING THE PROGRAM

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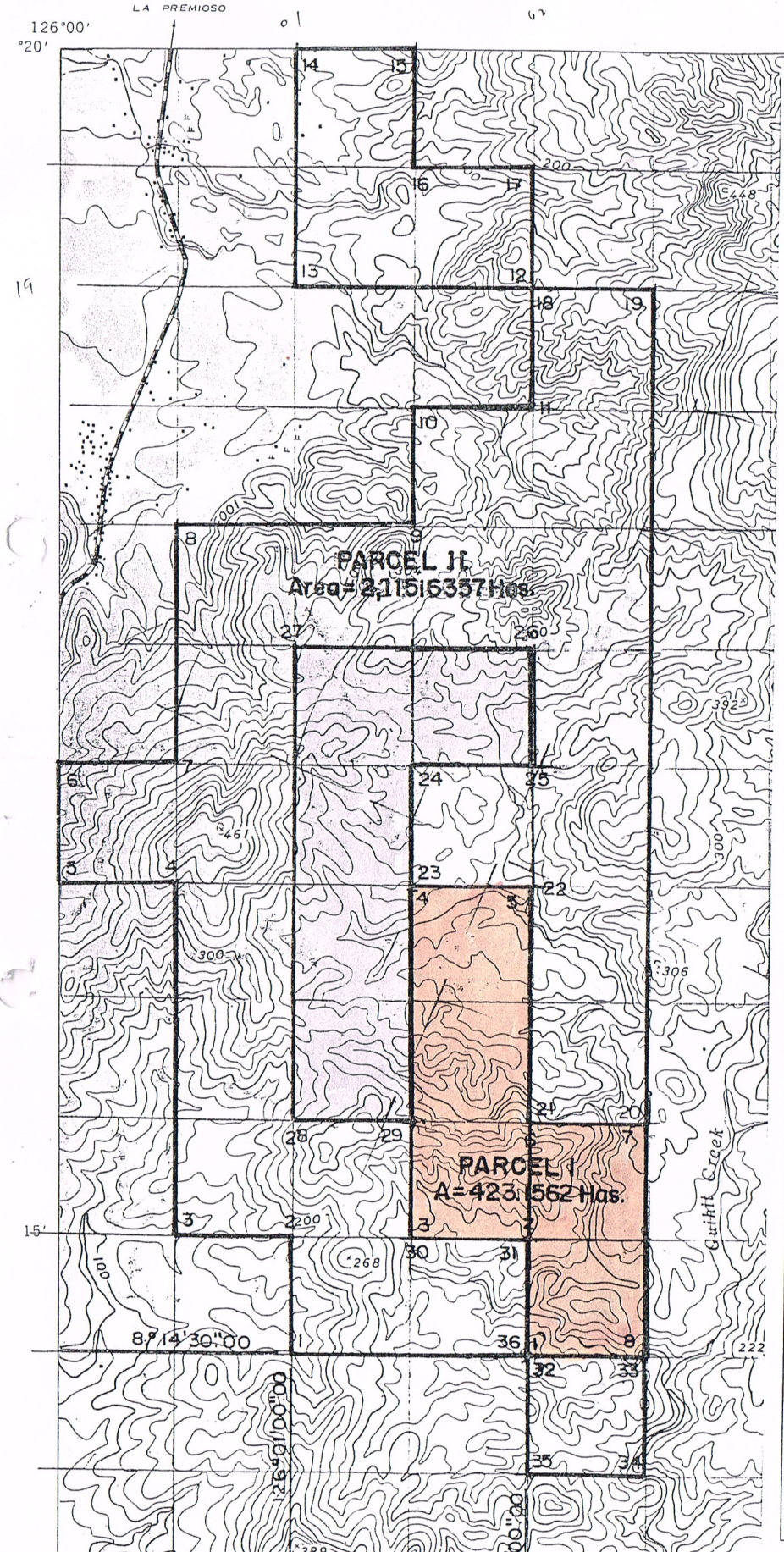
Mining Engineer
PRC License No. 1709
TIN: 139-191-690
PTR No. 5841963 A
Issued in Prosperidad, Agusan Del Sur
Issued on January 16, 2003

9.0 CONFORME

Col. SAMUEL G. AFDAL (Ret.)
President
PHILSAGA Mining Corporation



TECHNICAL DESCRIPTION

PARCEL I

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 02' 00"
2	8° 15' 00"	126° 02' 00"
3	8° 15' 00"	126° 01' 30"
4	8° 16' 30"	126° 01' 30"
5	8° 16' 30"	126° 02' 00"
6	8° 15' 30"	126° 02' 00"
7	8° 15' 30"	126° 02' 30"
8	8° 14' 30"	126° 02' 30"

Area = 423.1562 Has.

PARCEL II

Cor.	Latitude	Longitude
1	8° 14' 30"	126° 01' 00"
2	8° 15' 00"	126° 01' 00"
3	8° 15' 00"	126° 00' 30"
4	8° 16' 30"	126° 00' 30"
5	8° 16' 30"	126° 00' 00"
6	8° 17' 00"	126° 00' 00"
7	8° 17' 00"	126° 00' 30"
8	8° 18' 00"	126° 00' 30"
9	8° 18' 00"	126° 01' 30"
10	8° 18' 30"	126° 01' 30"
11	8° 18' 30"	126° 02' 00"
12	8° 19' 00"	126° 02' 00"
13	8° 19' 00"	126° 01' 00"
14	8° 20' 00"	126° 01' 00"
15	8° 20' 00"	126° 01' 30"
16	8° 19' 30"	126° 01' 30"
17	8° 19' 30"	126° 02' 00"
18	8° 19' 00"	126° 02' 00"
19	8° 19' 00"	126° 02' 30"
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22	8° 16' 30"	126° 02' 00"
23	8° 16' 30"	126° 01' 30"
24	8° 17' 00"	126° 01' 30"
25	8° 17' 00"	126° 02' 00"
26	8° 17' 30"	126° 02' 00"
27	8° 17' 30"	126° 01' 00"
28	8° 15' 30"	126° 01' 00"
29	8° 15' 30"	126° 01' 30"
30	8° 15' 00"	126° 01' 30"
31	8° 15' 00"	126° 02' 00"
32	8° 14' 30"	126° 02' 00"
33	8° 14' 30"	126° 02' 30"
34	8° 14' 00"	126° 02' 30"
35	8° 14' 00"	126° 02' 00"
36	8° 14' 30"	126° 02' 00"

Area = 2115.6357 Has.

TOTAL AREA = 2538.7919 Has.

SKETCH MAP

OF MINERAL PRODUCTION SHARING AGREEMENT APPLICATION

AS PREPARED FOR

PHILSAGA MINING CORPORATION

SITUATED IN THE

BARANGAYS OF CONSUELO & BAYUGAN-III
MUNICIPALITIES OF BUNAWAN & ROSARIO
PROVINCE OF AGUSAN DEL SUR
ISLAND OF MINDANAO
CONTAINING AN AREA OF 2538.7919 Hgs.

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