ANNEX – C

TEMPORARY EXPLORATION PERMIT (TEP-III-004-2002)

May 16, 2003

MR. MODESTO B. BERMUDEZ
President
Crau Mineral Resources Corp.
No. 1-E Sta. Maria St., Brgy. Kapitolyo
Pasig City, Metro Manila

Dear Mr. Bermudez:

Subject: Availment of the Unused Period of Temporary Exploration Permit denominated as TEP-III-004-2002

This Office hereby grants your request, per Letter dated March 10, 2003, to avail of the unused period of eight (8) months under the Temporary Exploration Permit of Crau Mineral Resources Corp. (Crau) denominated as TEP-III-004-2002 effective this date, subject to the following conditions:

1. Such period of eight (8) months shall not constitute an extension of the term of the TEP;

2. Crau shall continue to comply with the obligations stipulated under the TEP during the said period of eight (8) months; and

3. Crau shall strictly implement the activities under the approved Work Programs and ensure that the conduct of the exploration activities in the area shall be carried out in a manner that will at all times safeguard the environment.

Thank you.

Very truly yours,

HORACIO C. RAMOS
Director

cc: The Regional Director
Mines and Geosciences Bureau
Regional Office No. III
Cleofers Bldg., Gen. Hizon Ave.
San Fernando, Pampanga

Kinloch Resources Limited
Unit 602 Vasquez Madrigal Plaza
51 Annapolis St., Greenhills
San Juan, Metro Manila

MGB Form No. 05-2TEP

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

DUPLICATE

TEMPORARY EXPLORATION PERMIT

Temporary Exploration Permit No.: **TEP-III-004-2002**
Permittee : **Crau Mineral Resources Corporation**
Address : **1-E Sta. Maria St., Brgy. Kapitolyo, Pasig City, Metro Manila**

This Temporary Exploration Permit (TEP) covering an area of 3,765.3853 hectares situated at Sta. Cruz and Candelaria, Zambales bounded by the following geographical coordinates:

CORNER	LATITUDE	LONGITUDE

(Please refer to attached Annex A: Technical Description and Annex B: Sketch Map marked "TEP No. III-004-2002")

is hereby granted to Crau Mineral Resources Corporation, having filed the applications for Mineral Production Sharing Agreement (MPSA) denominated as *MA-P-III-11-98* and said TEP in the Mines and Geosciences Bureau Regional Office No. III in accordance with Republic Act No. 7942, otherwise known as "The Philippine Mining Act of 1995" and all the pertinent implementing rules and regulations promulgated thereunder: *Provided*, That areas with conflict, within ancestral lands/domains without the free and prior informed consent by the concerned Indigenous Peoples, within adequately stocked forests/proclaimed watershed forest reserves/critical watershed, and/or classified under the NIPAS are excluded therefrom, and subject to the following **Terms and Conditions**:

1. The right to explore under the TEP shall be subject to valid and existing rights of any party(ies) within the Permit Area;

2. This TEP shall be for the exclusive use and benefit of the Permittee and shall, under no circumstances, be used for purposes other than mineral exploration: *Provided*, That the exercise of the rights thereunder by another entity/party shall be subject to the prior approval of the Department Secretary;

3. The term of the TEP shall be for a period of one (1) year from date of approval: *Provided*, That said term shall be deducted from the Exploration Period of the MPSA that may be approved in favor of the Permittee thereafter: *Provided, further*, That in the event that the MPSA application is disapproved by the Department Secretary, this TEP is deemed automatically cancelled;

4. The Permittee shall submit to the concerned Regional Office, copy furnished the Bureau Central Office, within thirty (30) calendar days after the end of each semester, a report under oath of the implementation and expenditures of the Exploration Work Program showing discrepancies/deviations, if any, and including the results of surveys, laboratory reports and geological reports/maps, subject to semi-annual inspection and verification by the Bureau at the expense of the Permittee;

5. The Permittee shall submit to the concerned Regional Office, copy furnished the Bureau Central Office, within thirty (30) calendar days from the end of six (6) months after the approval of the TEP, and at the end of the term of the TEP a report on the compliance with the Environmental Work Program (EWP);

6. The Permittee shall submit to the concerned Regional Office, copy furnished the Bureau Central Office, upon the expiration of the TEP, a final exploration report in a form and substance comparable to published reports of respected international organizations incorporating all the findings in the Permit Area, including locations of samples, assays and assessment of the mineral potential. Such report shall include complete detailed exploration expenditures incurred;

7. In case of core drilling, the Permittee shall, upon request of the Director/concerned Regional Director, submit a quarter of the core samples which shall be deposited in the concerned Regional Office Core Library for safekeeping and reference;

8. The Exploration Work Program shall be carried out in a manner that will, at all times, safeguard the environment;

9. The Permittee shall allow the Department Secretary, Director, concerned Regional Director or their duly authorized representative/s to periodically review its performance, and shall not deny access to the Permit Area for purposes of such reviews and monitoring of field activities;

10. The TEP may be suspended by the Director in cases of *force majeure* as defined in the Philippine Mining Act of 1995;

11. The Director may, at any time, cancel this TEP for violation of the provisions of the Philippine Mining Act of 1995 and all the pertinent implementing rules and regulations or the terms and conditions of this Permit;

12. The Permittee shall strictly secure a written consent from any surface owners of the land/s, occupant/s and concessionaire/s within the Permit Area prior to entry or conduct of any form of exploration activities therein;

13. The Permittee shall submit to the Bureau Central Office a copy of the baseline environmental study, i. e., pedological and water quality, within six (6) months after the issuance of this TEP; and

14. The Permittee shall furnish a copy of the approved EWP to the Sangguniang Panlalawigan concerned.

Quezon City, Philippines, MAR 21 2002

HORACIO C. RAMOS
Director

I hereby accept the terms and conditions of this TEP as above stated.

CRAU MINERAL RESOURCES CORPORATION
Permittee

By:

PABLO R. AMISTOSO
Vice President-Operations
TIN 104-613-443

Signed in the presence of:

Michael Spadafora
(Signature over Printed Name)

LEO L. JAPITENO
(Signature over Printed Name)

MGB Form No. 05-2TEP

ACKNOWLEDGEMENT

Republic of the Philippines _____)
Quezon City _____) s. s.

SUBSCRIBED AND SWORN to before me, **HORACIO C. RAMOS,** with Community Tax Certificate No. 00010172 issued on February 20,2002 at Quezon City, in his capacity as **Director** of the **Mines and Geosciences Bureau** and **PABLO R. AMISTOSO**, with Community Tax Certificate No. 08998636 issued on January 2, 2002 at Marikina City, in his capacity as Vice President-Operations of **Crau Mineral Resources Corporation**, both known to me and to me known to be the same persons who executed the foregoing instrument consisting of **four (4)** pages, including this acknowledgement page, and acknowledged to me that the same is their voluntary act and deeds.

IN WITNESS WHEREOF, I have hereunto set my hand and affix my Notarial Seal, this MAR 21 2002 day of _____.

ATTY. ESTEBAN D. KAMPITAN
NOTARY PUBLIC
Notary Public
Until December 31, 2002
IBP No. 108209 did 2-12-02 at [illegible]
PTR No. 30340877 did 2-[illegible] at [illegible]

Doc. No. 429
Page No. 43
Book No. 141
Series of 2002

ANNEX-A
Technical Description of TEP Area
Of
CRAU MINERAL RESOURCES CORPORATION

Lot-1

Corner	Latitude	Longitude
1	15-44-00.00	120-03-00.00
2	15-44-30.00	120-03-00.00
3	15-44-30.00	120-03-15.00
4	15-44-15.00	120-03-15.00
5	15-44-15.00	120-03-45.00
6	15-44-30.00	120-03-45.00
7	15-44-30.00	120-04-00.00
8	15-42-45.00	120-04-00.00
9	15-42-45.00	120-04-15.00
10	15-43-00.00	120-04-15.00
11	15-43-00.00	120-04-30.00
12	15-41-30.00	120-04-30.00
13	15-41-30.00	120-04-00.00
14	15-38-30.00	120-04-00.00
15	15-38-30.00	120-03-30.00
16	15-39-30.00	120-03-30.00
17	15-39-30.00	120-03-18.40
18	15-39-38.00	120-03-18.40
19	15-39-38.00	120-03-08.40
20	15-39-47.70	120-03-08.40
21	15-39-47.70	120-03-30.00
22	15-40-00.00	120-03-30.00
23	15-40-00.00	120-03-00.00
24	15-40-30.00	120-03-00.00
25	15-40-30.00	120-02-30.00
26	15-40-00.00	120-02-30.00
27	15-40-00.00	120-02-45.00
28	15-39-45.00	120-02-45.00
29	15-39-45.00	120-03-00.00
30	15-39-38.00	120-03-00.00

31	15-39-38.00	120-03-08.40
32	15-39-08.70	120-03-08.40
33	15-39-08.70	120-03-00.00
34	15-39-00.00	120-03-00.00
35	15-39-00.00	120-02-48.20
36	15-38-57.30	120-02-48.20
37	15-38-57.30	120-03-00.00
38	15-38-30.00	120-03-00.00
39	15-38-30.00	120-02-00.00
40	15-38-40.70	120-02-00.00
41	15-30-40.70	120-02-10.00
42	15-39-00.00	120-02-10.00
43	15-39-00.00	120-02-00.00
44	15-38-40.70	120-02-00.00
45	15-38-30.00	120-02-00.00
46	15-38-30.00	120-01-30.00
47	15-40-55.80	120-01-30.00
48	15-40-55.80	120-02-05.70
49	15-41-06.00	120-02-05.70
50	15-41-06.00	120-02-25.60
51	15-41-25.50	120-02-25.60
52	15-41-25.50	120-02-35.60
53	15-41-45.00	120-02-35.60
54	15-41-45.00	120-02-45.60
55	15-42-00.00	120-02-45.60
56	14-42-00.00	120-02-45.00
57	15-42-04.00	120-02-45.00
58	15-42-04.00	120-02-57.00
59	15-43-00.00	120-02-57.00
60	15-43-00.00	120-02-46.80
61	15-43-21.20	120-02-46.80
62	15-43-21.20	120-03-00.00
63	15-43-40.35	120-03-00.00
64	15-43-40.35	120-02-57.00
65	15-43-30.00	120-02-57.00
66	15-43-30.00	120-02-30.00
67	15-42-30.00	120-02-30.00
68	15-42-30.00	120-02-00.00
69	15-42-00.00	120-02-00.00
70	15-42-00.00	120-02-05.00
71	15-41-25.00	120-02-05.00
72	15-41-25.00	120-01-55.00

73	15-41-44.65	120-01-55.00
74	15-41-44.65	120-01-45.00
75	15-41-25.00	120-01-45.00
76	15-41-25.00	120-01-35.00
77	15-41-54.40	120-01-35.00
78	15-41-54.40	120-01-45.00
79	15-42-43.40	120-01-45.00
80	15-42-43.40	120-01-55.10
81	15-42-52.90	120-01-55.10
82	15-42-52.90	120-02-05.00
83	15-43-12.50	120-02-05.00
84	15-43-12.50	120-01-55.00
85	15-43-30.00	120-01-55.00

Area of Lot-1 = 3,681.7837 Hectares

Lot-2

1	15-37-20.60	120-02-00.00
2	15-37-20.60	120-02-30.00
3	15-37-10.80	120-02-30.00
4	15-37-10.80	120-02-11.00
5	15-37-00.00	120-02-11.00
6	15-37-00.00	120-02-00.00

Area of Lot-2 = 37.8002 Hectares

Lot-3

1	15-38-00.00	120-02-50.00
2	15-38-10.00	120-02-50.00
3	15-38-10.00	120-02-30.00
4	15-38-20.00	120-02-30.00
5	15-38-20.00	120-03-10.00
6	15-38-10.00	120-03-10.00
7	15-38-10.00	120-03-00.00
8	15-38-00.00	120-03-00.00

Area of Lot-3 = 45.8014 Hectares

ANNEX– D

EXPLORATION WORK PROGRAM

EXPLORATION WORK PROGRAM

1.0 Name and Address of Company/Proponent/Contractors:

CRAU MINERAL RESOURCES CORP. ***and*** **KINIOCH RESOURCES LTD.**

1-E Sta. Maria Street, Bgy. Kapitolyo
Pasig City, Metro Manila
Tel. No. 631-5019

Unit 602 Vasquez MadrigalPlaza
51 Annapolis Street, Greenhills
San Juan Metro Manila
Telefax: No. 721-8587

2.0 Location of Project:

The mineral exploration project lies within the jurisdiction of Sitio Pasicar, Lucapon, Sta. Cruz, and Bo. Pinagrealan, Candelaria, Zambales.

The geographic coordinates of the areas concerned are as follows:

TECHNICAL DESCRIPTION

Lot-1

Corner	Latitude	Longitude
1	15-44-00.00	120-03-00.00
2	15-44-30.00	120-03-00.00
3	15-44-30.00	120-03-15.00
4	15-44-15.00	120-03-15.00
5	15-44-15.00	120-03-45.00
6	15-44-30.00	120-03-45.00
7	15-44-30.00	120-04-00.00
8	15-42-45.00	120-04-00.00
9	15-42-45.00	120-04-15.00
10	15-43-00.00	120-04-15.00
11	15-43-00.00	120-04-30.00
12	15-41-30.00	120-04-30.00
13	15-41-30.00	120-04-00.00
14	15-38-30.00	120-04-00.00
15	15-38-30.00	120-03-30.00
16	15-39-30.00	120-03-30.00
17	15-39-30.00	120-03-18.40
18	15-39-38.00	120-03-18.40
19	15-39-38.00	120-03-08.40
20	15-39-47.70	120-03-08.40
21	15-39-47.70	120-03-30.00
22	15-40-00.00	120-03-30.00
23	15-40-00.00	120-03-00.00
24	15-40-30.00	120-03-00.00
25	15-40-30.00	120-02-30.00
26	15-40-00.00	120-02-30.00
27	15-40-00.00	120-02-45.00
28	15-39-45.00	120-02-45.00
29	15-39-45.00	120-03-00.00

30	15-39-38.00	120-03-00.00
31	15-39-38.00	120-03-08.40
32	15-39-08.70	120-03-08.40
33	15-39-08.70	120-03-00.00
34	15-39-00.00	120-03-00.00
35	15-39-00.00	120-02-48.20
36	15-38-57.30	120-02-48.20
37	15-38-57.30	120-03-00.00
38	15-38-30.00	120-03-00.00
39	15-38-30.00	120-02-00.00
40	15-38-40.70	120-02-00.00
41	15-30-40.70	120-02-10.00
42	15-39-00.00	120-02-10.00
43	15-39-00.00	120-02-00.00
44	15-38-40.70	120-02-00.00
45	15-38-30.00	120-02-00.00
46	15-38-30.00	120-01-30.00
47	15-40-55.80	120-01-30.00
48	15-40-55.80	120-02-05.70
49	15-41-06.00	120-02-05.70
50	15-41-06.00	120-02-25.60
51	15-41-25.50	120-02-25.60
52	15-41-25.50	120-02-35.60
53	15-41-45.00	120-02-35.60
54	15-41-45.00	120-02-45.60
55	15-42-00.00	120-02-45.60
56	14-42-00.00	120-02-45.00
57	15-42-04.00	120-02-45.00
58	15-42-04.00	120-02-57.00
59	15-43-00.00	120-02-57.00
60	15-43-00.00	120-02-46.80
61	15-43-21.20	120-02-46.80
62	15-43-21.20	120-03-00.00
63	15-43-40.35	120-03-00.00
64	15-43-40.35	120-02-57.00
65	15-43-30.00	120-02-57.00
66	15-43-30.00	120-02-30.00
67	15-42-30.00	120-02-30.00
68	15-42-30.00	120-02-00.00
69	15-42-00.00	120-02-00.00
70	15-42-00.00	120-02-05.00
71	15-41-25.00	120-02-05.00
72	15-41-25.00	120-01-55.00
73	15-41-44.65	120-01-55.00
74	15-41-44.65	120-01-45.00
75	15-41-25.00	120-01-45.00
76	15-41-25.00	120-01-35.00
77	15-41-54.40	120-01-35.00
78	15-41-54.40	120-01-45.00
79	15-42-43.40	120-01-45.00
80	15-42-43.40	120-01-55.10
81	15-42-52.90	120-01-55.10
82	15-42-52.90	120-02-05.00

83	15-43-12.50	120-02-05.00
84	15-43-12.50	120-01-55.00
85	15-43-30.00	120-01-55.00

Area of Lot-1 = 3,681.7837 Hectares

Lot-2

1	15-37-20.60	120-02-00.00
2	15-37-20.60	120-02-30.00
3	15-37-10.80	120-02-30.00
4	15-37-10.80	120-02-11.00
5	15-37-00.00	120-02-11.00
6	15-37-00.00	120-02-00.00

Area of Lot-2 = 37.8002 Hectares

Lot-3

1	15-38-00.00	120-02-50.00
2	15-38-10.00	120-02-50.00
3	15-38-10.00	120-02-30.00
4	15-38-20.00	120-02-30.00
5	15-38-20.00	120-03-10.00
6	15-38-10.00	120-03-10.00
7	15-38-10.00	120-03-00.00
8	15-38-00.00	120-03-00.00

Area of Lot-3 = 45.8014 Hectares

3.0 Area or size of coverage (Hectares):

The total area covered by the mining agreement application consists of three (3) lots, namely Lot-1, Lot-2 and Lot-3 with an aggregate area of 3,765.3853 hectares.

The original applied area was 8,100 hectares, but was reduced and/or amended with the exclusion of subsisting, legal and valid mining rights and a watershed / reservation at the northwest portion.

4.0 Project Area Description

4.1 Terrain/Physiography:

The application area is generally characterized by moderate to rugged terrain indicative and inherent to ultramafic-mafic rock units here and also typical of similar geological milieu around the world.

Elevation fluctuates from less than 200 m to over 1000 m within the area of interest. In the north, the 699 m Mount Matalisbong is a prominent

topographic high while the Mount Lanat, a 1004 m promontory, lords it over in the south of the MPSA area.

Westward are gradational decreases of elevation until it becomes low-lying to flat physiography at sea datum several kilometers further from the project site.

4.2 Accessibility:

The mining project is accessible northward from Metro Manila traversing through the sealed highway route of Bulacan-Pampanga-Bataan-Zambales with a distance of about 250 km up to Bo. Lucapon South, of the town of Sta. Cruz, or through the Bulacan-Pampanga-Tarlac-Pangasinan-Zambales highway route, which is a longer distance up to Bo. Lucapon. From there, travel is eastward through old mining/ barangay roads of about 37 km (27 km in straight line) up to the old Acoje mining community. At Acoje proper there are several networks of mining and logging roads within the project area.

Another access to the project at its north end is from the National Road at Sta. Cruz and eastward travel towards Bo. Guisguis, then following old logging/mining roads to the site. In the southern portion of the prospect, access is at the National Road junction at the north end of Lawis Bridge, where one travels eastward through Bo. Pinagrealan, then through logging roads and trails to the project site.

Travel time by car from Metro Manila to the site is 6-7 hours.

4.3 Drainage Systems:

There are two major waterways, namely the Cabaluan River in the north and the Lawis River south of the project. Both rivers drain towards the South China Sea which is located further west.

With the rivers as the loci of correlation, the creeks, and tributaries as noted within the area are typically pseudo-dendritic as a drainage system, evidently influenced by the lithologic variance and structural geologic features present.

4.4 Vegetation:

The area in general is veneered by first to second order plants with, some logged over portions mantled by cogon grasses and other forest growth. Endemic flora such as orchids, ferns and other wild species are found, especially in those areas rarely reached by men.

Some relatively low-lying and flat areas, mainly within and peripheral to the old mine community, are cultivated by those local residents who opted to stay when the mine closed in the early 1990's. Rice, banana, fruit-bearing trees, vegetables and agoho trees are common.

4.5 Land Use:

The entire application area is good prospecting ground for metallurgical chromite, nickel (sulfides and laterites), platinum group metals (PGM's) with associated base metal alloys, and also minor amounts of gold.

Some portions of the area are ideal for grazing grounds and for agricultural purposes.

The logged over terrain needs reforestation to enhance the ecosystem and wildlife.

5.0 Description of Exploration Program

5.1 Research Works

5.1.1 Survey of Previous Works on the Area

5.1.1.1 Nature and Type of Study or Undertaking

Reliance on all available geologic data, and technical information and various studies on a regional level, the area of interest included shall be considered. This includes the collation of information from the DENR/ Mines and Geosciences Bureau, from existing records of open and closed mining operations, private investigative reports and likewise from the undersigned who made extensive studies of the region while working as Chief Geologist of the Acoje Group of Companies and as a consultant to several mining exploration companies.

5.1.1.2 Duration

Research and study of all available past data shall be initially done during the 1st Quarter of the program of work in line with the concept of exploration that is to be carried out in the project.

5.1.1.3 Coverage

The studies will be on the geology and paragenesis of the mineralization within the region such as chromite, nickel and copper/gold and their attendant features and lithological variances.

5.1.1.4 Proponent

This discipline shall become an integral part of the policy of mine and exploration management to ensure that some conclusion can be arrived at as data are gathered in the field, and also confirmed and collated with previously gathered regional/ local data.

5.1.1.5 Results/ Conclusions arrived at

The research work is intended to augment knowledge of the exploration in the conduct of the ore search campaign, notably chromite and nickel/PGM's, and to acquaint mine management with a layman's grasp on the geology and related input as desired.

5.1.2 Data Compilation/Collation

5.1.2.1 Geochemical/Geophysical Data

Geochemical and geophysical studies adapted and implemented within the region, with special emphasis on those made by the previous operator of the mining project, shall be studied. Trace elements considered geochemically anomalous and ascribed to chromite and/ or nickel/PGM mineralization shall be studied and consulted with respect to the exploration work program. The same is true with the geophysical data which, when made available to the proponent, shall be studied likewise with the end in view of correlating/collating this geophysical data with the attempt to delineate an economic nickel sulfide/PGM deposit. Previous geophysical work done on the mining project, such as magnetics, SP, Afmag and Induced Polarization (IP) surveys shall be consulted and reinterpreted, as these geophysical anomalies are believed indicative of underlying ore mineralization.

5.1.2.2 Lithological Data

Regional geological milieu with special emphasis on the Acoje geology and environs shall be obtained and consulted as the exploration work commences.

The Zambales Pangasinan mountain ranges have been well documented both by government and private investigators. Some geologists and other technicians, including this writer have made extensive research on the geological juxtaposition of the region and the Acoje Grid in particular and have obtained better glimpses on the postulate and possibilities of the geologic formation here.

Studies of the different massif such as Coto, Acoje, Cabangan and San Antonio Ultramafics shall be re-evaluated for research and influence building purposes. The over all concept is to use these lithological data in the light of the Acoje milieu.

As expected throughout the world where upwelling/thrusting of magmas upwards into the earth crust, ophiolite rock complexes are well defined here including the attendant ore mineralization. The

sequences are the base peridotite complex-transition harzburgite-lherzolite-dunite, clinopyroxenite-gabbroic zone–dioritic-basaltic/pillowy lavas, and stratiform massive sulfide/chert filled volcanic-sedimentary rock formations located further north of the mine exploration area.

5.1.2.3 Mineralization/ Alteration Studies

Geological/technical data on the ore mineralization in the region shall be consulted. As noted, several mineralized fringes have been delineated here, namely the metallurgical chromite/ nickel sulfide/ PGM ore deposits of Acoje, the Coto refractory chromite ores, chromite ore positions in Cabangan San Felipe, Iba and San Antonio towns, the Dizon/Benguet porphyry copper in San Marcelino and Kuroko type stratiform massive copper ore in Dasol Pangasinan. All these and some undetected deposits all fall within the realm and sphere of the Ophiolite rock complex mantling the region.

5.1.2.4 Various Thematic Maps Covering the Target Area

Acoje and its environs have over 65 years of mining history and field investigations by operators and competent field men. All these maps are to be collated, if available, for reference and correlation purposes. With the experience of this writer as head of the Acoje Group of Exploration Division, his experience and knowledge shall be expended including Acoje's old files, if still available since the Acoje management ceased operation many years ago and the geologic data has not been traced.

5.1.2.5 Estimated Cost

The expected expenditure for this kind of work is variable and tedious but expenses are not expected to exceed P100, 000.

5.2 Reconnaissance/Regional Survey/Studies

Not applicable as a stage of exploration by the proponent. This is so because the target area is not raw ground but instead has had a long history of exploration, development and exploitation, as well as mineral marketing. Given these conditions, the intended exploration stage bypasses any reconnaissance/ regional work and study.

5.3 Semi-detailed Survey or Follow-up Studies

5.3.1 Geological Mapping/ Alteration Studies:

Semi-detailed geological investigations shall be carried out during the campaign with the objective of redefining rock assemblages, variation, features, characteristics and the geologic structures such as faults, flowage and shears.

When outcrops are located, the attendant alteration suites such as serpentinization shall be noted including the behaviour and tenor of the mineralized zones. Alteration zoning and patterns as related to chromite and nickel sulfide mineralization, and the degree of laterization shall be studied.

If circumstances so warrant, diagnostic sequences of nickel/PGM/Au/Cu values are to be made from the findings of values from the nickel sulfide outcrops. This data shall be oriented with the old Acoje ore deposits' features and characteristics in order to have a workable knowledge of ore deposition in space and time as the case may be.

5.3.1.1 Coverage

The area of investigation shall be the entire application area.

5.3.1.2 Duration

The semi-detailed geological mapping/alteration studies shall be within a period of 9 months when areas for more detailed work shall have been defined and delineated.

5.3.1.3 Manpower Complement

To implement the program, the following tentative technical personnel are required: One (1) geological consultant; two (2) geologists well experienced in ore being sought for; three (3) geological mappers; six (6) geological aides; one (1) draftsman/utility man.

5.3.1.4 Estimated Cost

A tentative budgetary outlay of P3 Million is intended to cover the salaries and wages of the personnel involved in this campaign. The same does not include food supplies, materials and medicine and contingency funds as may be required during the work.

5.3.1.5 Output

The work when carried out to the hilt is expected to re-establish rock boundaries/contacts, alteration suites, mineralization fringes and other geological features inherent in the area.

Elements to be analyzed are for chromite and its associated elements (MgO, Si203, Al203, Fe203, CaO) and nickel sulfides (total Ni, recoverable Ni, PGM's, Cu, Au, etc.) and for laterites (Ni, Fe, Co etc.).

5.3.2.6 Manpower Complement

The personnel to be involved in this discipline shall be those involved in the geological campaign (semi-detailed & detailed), and the work shall coincide with the geological campaign activity, for obvious reasons.

5.3.2.7 Estimated Cost

The costing for geochemical survey work is just for the sampling collection tools, sample bags, handling, transport and analyses. Personnel wages and salaries are covered under the preceding item on geological work.

To date, the estimated analysis cost for the following is as follows:

1. For Cr and Ni- P273/element plus additional P40/element associated desired such as Fe, MgO
2. CaO/SiO2 (by wet method) P570/determination.
3. Pt/Pd – P847/ element desired by AAS; detection limit – 0.01ppm.
4. Au – P215/ element; plus P40 for Cu/etc.

A budget of P1 Million well serves this endeavor.

5.3.2.8 Output

When the geochemical survey is carried out, geochemically anomalous ground is defined which can be subjected to further detailed studies and collaborates the geological data that is obtained.

5.3.3 Geophysical Surveys

Geophysical surveying work is not applicable to date in the search for chromite ore bodies in view of the identical features, and density of the ore and associated rock. At least this is so in the Acoje Ultramafic Massif.

In the case of nickel sulfides, geophysics is tenable for this kind of mineralization and associated elements because of its susceptibility to detect conductive and magnetic bodies when

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In the case of nickel sulfides, geophysics is tenable for this kind of mineralization and associated elements because of its susceptibility to detect conductive and magnetic bodies when

using geophysical instruments such as magnetometers and induced polarizaion (IP) equipment. This includes sulfides (pyrite) and magnetic pyrrhotite or pentlandite.

5.3.3.1 Nature and Type

In the search for nickel sulfides and associated metals, induced polarization (IP) and magnetic surveys shall be done for the reason as above cited.

5.3.3.2 Duration

These surveys should take 3 months during the first year.

5.3.3.3 Coverage

The areas to be studied by geophysical methods shall be those subjected to detailed geological work and geochemical surveys. Those areas with surface indications of potential mineralization and those with geochemically anomalous readings shall be targeted for this discipline.

5..3.3.4 Manpower Complement

The actual geophysical work shall be contracted to a competent geophysical company with experience in the search for similar types of nickel deposits.

In coordinating with consulting geophysicists, the geophysical lines and separation shall be laid out in the field by the geological crew under the direct supervision of the exploration management.

5.3.3.5 Estimated Cost

The cost shall be for the geophysical consultation and instrument handling/measurement with the lines to be made by local crews. Expenses are expected to be P1 Million.

5.3.3.6 Output

The geophysical surveys aim is to delineate geophysically anomalous zones possibly attributable to subsurface ore deposition. The same shall be used as guides in locating sites for test pitting/trenching and drilling, if all indicators point to that direction.

5.3.4 Subsurface Investigations

5.3.4.1 Type

Test pitting/trenching shall possibly be implemented after data of potential importance or significance that are possible indications of mineralization within the subsurface environment have been located.

Test pits are vertical openings driven from surface down to the saprolitic bedrock suspected of being mineralized. The dimensions are usually 1m x 1m wide, while trenches, which trace lateral continuity of mineralization found within any test pits, usually have dimensions of 1 m wide x the possible lateral dimension of the target of interest.

5.3.4.2 Duration

These investigations should take approximately 3 months during the first year.

5.3.4.3 Number and over all length or depth of the trenches and pits

The number is variable depending upon the result of the previous work preparatory to this discipline, but would probably be around 20. It is expected that the average depth for each pit/trench to be sunk will be about 4 meters, which is normal in the Acoje ore horizon, and widths should average 1-2 m. The lengths will also vary, depending upon initial pit/trench results from which any continuation of mineralization can be followed up along its apparent strike.

5.3.4.4 Estimated Number of Samples

The number of pit and trench samples are variable and totally dependent upon the result of initial findings. However, samples shall be collected every meter depth up to the bedrock. Assuming 20 test pits at 5 m deep, that gives a total of 100 samples.

5.3.4.5 Mode of Analysis/Target Elements

Analysis and target elements shall be as those of the geochemical means. Those to be analyzed are consistent whether the suspected area are chromite prone or nickel sulfide zones or lateritic zones.

5.3.4.6 Manpower Complement

The test pitting/trenching campaign shall utilize those of the geological field men when warranted. Essentially, the idea of work performance for the discipline is by

contract only utilizing local, but able bodied, residents of the old mine community.

5.3.4.7 Estimated Cost

At the estimate cost of P50-100 per meter trench driven/test pit sunk, and assuming about 2000 m of trench sunk/driven, the tentative cost is P100, 000 to 200,000.

Including materials, transport and sampling cost, a budget of P500, 000 is deemed sufficient for this type of activity.

5.3.4.8 Output

At the conclusion of this kind of work, the lateral and linear continuity of mineralized fringes are established and thus become the basis for further detailed studies.

5.4 Topographic Surveys

Topographic surveys shall be carried out in two phases and intensity. One, is to define the mining claim boundary in consonance with the mandate of R.A. No. 7942 and its implementing guidelines under DAO No. 96-40, Series of 1996. The other part, is the delineation of the grid system for the general exploration work, which uses as reference points those grid lines/stations earlier used during a particular survey of work desired.

Corollary to the same, data that has been obtained from the previous works such as old development workings, triangulation points, old diamond drill sites, road systems, community set-up, open pit areas, mined out areas that need further due diligence work and re-investigation, all of these need detailed surveys.

5.4.1 Coverage

The boundary area survey shall encompass the area granted for tenure and some areas for any needed development/infrastructure works. This is in line with the existing DENR Mines & Geoscience policy using the services of a deputized Geodetic Engineer. The boundary survey cost is estimated at P400, 000 at the outset.

The survey lines and those detailed surveying works within the exploration area and within the old mine workings needing due diligence work are also to be defined by detailed transit/plane table surveying works that includes possibly underground surveys as the case may be. The budget here is P1 ½ Million to cover salaries & wages and supplies.

5.4.2 Duration

The boundary area survey should take 3 months at the end of the 2nd year.

Detailed surveying will be ongoing for the first 18 months of the 2 year work program.

5.4.2 Scale and Contour Intervals

Survey scales will be within the ranges of 1:20,000; 1:10,000; 1:5,000; 1:1000; 1:100 and 1:50 depending upon the details and information desired from a particular working place.

Contour intervals will be within the ranges of 20m, 10m and 5m as the desired results are indicated.

5.4.3 Manpower Complement

Surveying work is to be done by contract for the boundary survey as mandated by existing mining laws, and the detailed works to be done likewise by contract or through in-house surveying works as conditions so warrant.

For the work, one (1) licensed geodetic engineer, two (2) Asst. geodetic engineers, four (4) survey helpers, one (1) draftsman/computer required.

Surveying is a continuing process during the exploration campaign.

5.4.4 Output

After the boundary survey, the MPSA area retained by the proponent shall have been established following the detailed exploration campaign.

The detailed survey will establish reference points and determine exact locations of desired drill holes, development workings, ore positions and other data from previous work conducted, especially within those worked for years by the old Acoje mining management.

Potential data for the preparation of the feasibility studies such as mill sites, tail disposal sites, community sites and others shall have been affirmed and established in the ground.

Potential confirmatory drill sites are also established by this method for accuracy and confidence building.

5.5 Detailed Surveys or Studies

Detailed work shall be concentrated at the outset at the old Acoje Mine area and its immediate environs where substantial investigation/exploration has been conducted, be it geological,

geochemical, test pit, trenching, drilling and/ or development/exploitation. The main focus is to re-evaluate available information through due diligence work to affirm and confirm the ore deposits already delineated with more emphasis on the nickel sulfide/ PGM ore horizons.

5.5.1 Detailed Geological Mapping

5.5.1.1 Nature and Type of Surveys

Detailed surface geological mapping shall be carried out using compass and tape surveys. Reference points shall be those already established within the old mine sites and reestablished by previous survey work.

5.5.1.2 Coverage

The the initial area subject to detailed geological activity will be the Acoje mine proper area, which is about 600 hectares in size. Additional areas within the tenured area will be detailed mapped as required.

5.5.1.3 Duration

The detailed work shall be for two (2) years, depending upon the results of the due diligence works being done.

5.5.1.4 Manpower Complement

The entire personnel involved in the semi-detailed work shall coordinate in the execution of this kind of activity and its completion.

5.5.1.5 Estimated Cost

To cover the salaries and wages of the personnel excluding food supplies, medicines and sundry expenses, the amount of P2 Million is deemed sufficient for the purpose.

5.5.1.6 Output

The outcome of the detailed survey within the area earlier pinpointed augurs well to delineate/define/ delimit the nickel/PGM/chromite horizons as they were known at the ceasing of the mining operations of the Acoje Mining Company.

These surface data shall be validated, interpreted and evaluated based on standard geological practices in the examination of similar deposits elsewhere. The same information, if found reliable and confirmed by this program and previous work, shall be used in the preparation of pre and full feasibility studies for the purpose of development/exploitation at a later date.

5.5.2 Detailed Geochemical Surveys

This type of geoactivity shall not be employed to any great extent within the old Acoje mine area and its immediate environs. The same, however, may be employed at later dates to check the semi-detailed geochemical work made within the entire application area where promising anomalies have been detected.

5.5.3 Subsurface Investigations

5.5.3.1 Drilling

The drilling campaign is to be carried out initially within the defined nickel horizon in the old minesite to confirm the extent of the deposit, as reported. This is part of the confidence building measure about the extent and potentialities of the nickel sulfide/PGM areas.

Drilling, if warranted, shall be carried out outside the old Acoje area and its immediate vicinity, particularly on those horizons where semi-detailed geological and geochemical surveys, geophysical work and trenching/ test pitting have shown possibilities for significant mineralization below the surface.

5.5.3.1.1 Type

Diamond drilling (coring) and percussion drilling, as required, is to be employed in examining mineralization continuity at depth.

5.5.3.1.2 Duration

Exploration drilling is expected to last for 9 months, commencing at least during the 2nd quarter of the 1st year.

5.5.3.1.3 Number and Depth of Drill Holes

The number initially envisaged is 10 targeted at the old minesite proper for a total of 2,000 m total meterage with depths ranging from about 200 m to 250 m per drill hole.

Another initial 5 holes totaling 1000 m of drilling may also be considered at the areas outside of the old Acoje mine proper and defined by previous works as earlier mentioned. The depth of these holes will also vary, but it should be the same magnitude as the above.

5.5.1.4 Estimated Number of Samples

The number of samples will vary, depending upon the number of mineralized intercepts encountered during the drilling campaign. Split samples shall be analyzed at 1 m or less intervals. Assuming mineralized intercepts of 4-5 m, something on the order of 50+ samples should be collected from the drilling at the old minesite proper, 25+ from outside.

5.5.1.5 Estimated Cost

The drilling campaign, as envisioned by the proponent, shall be by contract only utilizing competent drill contractors from within the country with proven experience.

Estimated all-up costs per meter today is about P4,000-5,000 per meter.

For the initial targeted 3,000 m, the contracting cost is calculated about P15 Million.

5.5.3.2 Trenching/Test pitting:

Not to be carried out within the old mine section and immediate environs. Only checking at the surface the pits/trenches done by the previous operators, if technical data and the pits/ trenches are still intact for inspection.

5.5.3.3 Tunneling or aditing

Aditing may be carried out to check existing ore horizons as indicated from previous old technical maps, either through rehabilitation of existing ones, or driving new openings, whichever is more economical, without sacrificing intended outcomes for information.

If made accessible by this method, old ore positions will be remapped and analyzed for nickel/PGM's and other metals at a suitable interval through channel sampling.

This technique is more to see the physical condition of the ore deposits at the present time and its possible continuity on both ends.

Re-opening or driving new adits are also has the potential, for underground drilling purposes, of finding ore continuity at depth within ground not yet known to mineralized.

In those areas where old workings need rehabilitation for examination and access purposes, but can be reached by diamond drilling from the surface, aditing can be initially shelved in favor of drilling instead. This consideration will to be made in the light of time saved vs. the cost of tunneling. Drilling cost per meter is P5, 000 per meter while aditing is about P25, 000 to P30, 000 per meter.

5.5.3.3.1 Duration

Assuming an advance a little more than one (1) meter per day in aditing/rehabilitation, this work could be completed within one (1) year.

5.5.3.3.2 Number of Tunnels/Adits

Initially, one adit/tunnel is being considered within the old Acoje mine workings targeted towards the nickel sulfide horizon.

5.5.3.3.3 Over all length and cost of adit/tunnel

The adit/tunnel to be re-opened is still subject to further review by the exploration management. But if it is to be carried out, such activities should be done within the prescribed period as mandated by the exploration time of two (2) years or less.

If carried out, the length must be within the magnitude of 400m. At P30, 000 per meter for the intended 400 m adit, the total cost is P12 Million.

This discipline encompasses the scope of the preparation of a feasibility study ideal for the project.

6.0 Pre-Feasibility and Feasibility Works and Studies

Since the difference between the pre and full feasibility works and studies is usually a matter of detail in assessing a project's viability, they are discussed here within this one section.

Competent local and internationally recognized contractors or in-house personnel would be used in the conduction of these works and studies.

Pre-feasibility works will commence only if exploration results are indicatively positive during the detailed technical studies and surveys. The bulk of these activities would probably commence not sooner than the 2nd year of exploration and would probably be ongoing for a 9 month period.

These studies would concentrate largely on the total project's projected economics existing at any particular time, and initially address a broad scope of issues, including technical, social, political, environmental subjects, etc.

A full feasibility study would then commence once a resource of potentially economic size and grade has been defined, and would be undertaken to determine the project's total viability. This will include detailed ore reserve calculations, engineering studies on mining plans, water and power supply, access roads, dumping areas, service areas, plant site and design, and environmental monitoring and rehabilitation. These studies will necessitate further potential ore definition drilling, metallurgical testing, and geotechnical measurements. A time frame of 3 months has been allocated for this at the end of the 2nd year.

A total costing for these studies is estimated to be P26 $^{1}/_{2}$ Million.

7.0 Total Estimated Exploration Costs (Pesos)

For an overview of projected exploration expenditures, please refer to the schedule presented in section 8.0.

Over all Total..... P63 Million **

** The total costing shall be subject to revision/change as conditions obtained from the performance of field works so warrant. The cost includes feasibility studies and mobilization costs. It does not include overhead expenses, transportation and communications, sundry expenses related to the exploration and contingency funds.

8.0 Schedule of Activities (Gantt Chart) Please refer to the attached sheet marked as Annex "A"

9.0 Map Attachment: Please refer to the amended Sketch Plan NAMRIA Topographic Map in Scale 1:50,000, of Crau Mineral Resources Corporation dominated MA-P-P-III-II-98.

10.0 General Comment/ Information

This Exploration Work Program compliments the Exploration Work Program (for chromite) submitted with the DENR Mines & Geosciences, Region No. 3, San Fernando, Pampanga on June 05,1998.

11.0 Signatures of Proponents or person preparing the Exploration Work Program (EWP):

RODRIGO U. PARINGIT
Consulting Geologist & Mining Engineer
Reg. No. 352 & 670
PTR Nos. 1447537 & 1447536
Issued at Candelaria,Zambales
On February 09, 2000

Noted:

PABLO. R. AMISTOSO
V. P. Operations
CRAU Mineral Resources Corp.

MICHAEL SPADAFORA
General Manager
Kinloch Resources Ltd.

FACTS ABOUT THE EWP PREPARER

Mr. RODRIGO U. PARINGIT is a registered and licensed geologist and mining engineer with many years of professional experience in mine exploration, project feasibility study preparation, environmental assessment work, mine engineering and valuation and related subjects.

He has a varied interest in the preparation of this Exploration Work Program and looks forward to the re-opening of the former Acoje mining concession and its environs . He worked with Acoje Mining Company Inc. for over ten (10) years. And was Chief Geologist of the Acoje Group of Companies involving the Sta. Cruz metallurgical chromite and nickel mines, the copper-pyrite mine in Dasol, Pangasinan and all of the company's mining interests from 1970 up to 1977 when he went on indefinite leave from said corporation.

Aside from his vast experience in chromite exploration, he pioneered the extensive exploration for nickel sulfide deposits which is unique in the Philippine geologic setting. These works include geological, geochemical, geophysical, drilling and development/exploitation phases. A 600 TPD beneficiation plant was installed in the mine in 1971 and operation was up to 1975 when the Japanese end-user of the nickel concentrates suspended their smelter operation for various reason. The nickel operation never resumed operation since then until Acoje finally ceased its chromite operation a few years back.

The geological investigation of nickel sulfide deposition encompassed the immediate surroundings before he left Acoje, and thus in a position to apprise the mine prospects. He has authored technical papers dealing on the exploration for chromite and nickel sulfides and duly published in the Philippine Geological Journal in 1975.

His professional expertise include copper exploration (massive/porphyry) nickel (sulfide/laterite), gold, other base metals and non-metals such as white clay deposits, feldspar and limestone, among others.

Todate, he is a consultant on call to different mining exploration companies and heads Citygroup Philippine Corporation and Harvest Geomineral Resources Inc., mining companies which are title holders of mine prospects for chromite, white clay, rock aggregates and gold deposits (vein/placer).

RODRIGO U. PARINGIT

GANTT CHART
Annex "A"

EXPLORATION WORK PROGRAM

Chromite-Nickel Project.
Sta. Cruz/ Candelaria, Zambales

SCHEDULE OF ACTIVITIES

Particulars	Year- 1				Year-2				
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Est. Cost (PHP)
1. Research work and data compilation									100,000
2. Semi Detailed Studies									
a. Geological work									3,000,000
b. Geochemical Surveys									1,000,000
c. Geophysical Surveys									1,000,000
d. Subsurface Investigation (Trenching/ Testpitting)									500,000
3. Topographic Surveys									
a. Mine Boundary Surveys									400,000
b. Detailed Surveys									1,500,000
4. Detailed Surveys/Studies									
a. Geological Mapping									2,000,000
b. Drilling Program									15,000,000
c. Aditing/ Tunneling									12,000,000
5. Pre- Feasibility and Feasibility Works and Studies									26,500,000

Total P63,000,000

Noted by:

PABLO R. AMISTOSO

MICHAEL J. SPADAFORA

Prepared by:

RODRIGO U. PARINGIT

ANNEX – E

ENVIRONMENTAL WORK PROGRAM

CRAU MINERAL RESOURCES CORP.
1-E Sta. Maria St., Bgy Kapitolyo
Pasig City, Metro Manila
Tel: 631-5150

ADDENDUM

This is an addendum to the approved Environmental Work Program of Crau Mineral Resources Corp. (CRAU) in connection with its application for Mineral Production Sharing Agreement denominated as MA-P-III-11-98 covering certain areas located in Sta. Cruz and Candelaria, Zambales.

As CRAU is committed to conduct in depth baseline environmental studies in the area of interest which includes assessment of the old mine workings/abandoned mined areas and other development/production facilities of the former mining concession to ascertain their usefulness for any economically viable mining operation in the future, CRAU hereby declares that it will assume the environmental responsibility of such identified areas/facilities that are deemed to be necessary to any proposed mining operation. Further, CRAU will also endeavor, to the best of its capability, to rehabilitate areas outside of any proposed operation on environmentally disturbed sites that will be identified by the baseline surveys.

This addendum will form part of the approved Environmental Work Program for the first two (2) years of the exploration activities in the area of interest.

PABLO R. AMISTOSO
Vice President-Operations
Crau Mineral Resources Corp.

Republic of the Philippines
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU
North Avenue, Diliman, Quezon City, Philippines
Tel. No. (+63 2) 928-8642 Fax No. (+63 2) 920-1635 E-mail: mgbcentral@mines-denr.ph

PTMA Action. for further action. plr.
29 Jan 02

January 22, 2002

MEMORANDUM

FOR	:	**THE OFFICER-IN-CHARGE** Mining Tenement Management Division
FROM	:	**THE CHIEF** Mining Environment and Safety Division
SUBJECT	:	**REVISED ENVIRONMENTAL WORK PROGRAM (EWP) OF CRAU MINERAL RESOURCES CORP.**

Anent the above-cited subject, the EWP has substantially complied to the requirement stipulated in MGB Form 16-1 and is hereby **APPROVED**.

Please advise the proponent on the following:

1. That the approved program is subject to environmental audit/monitoring by our Office/Regional Office in the near future;
2. That the proponent shall furnish our office a copy of the baseline environmental study (i.e. pedological and water quality) to be conducted within six (6) months after the permit has been granted;
3. That the Proponent shall furnish a copy of the approved EWP to the concerned Sangguniang Panlalawigan; and
4. That the Proponent shall submit status reports as to compliance with the approved EWP to the Regional Office copy furnish our office every six (6) months after its approval.

For your information and appropriate action.

MICHAEL V. CABALDA

cc **CRAU MINERAL RESOURCES CORP.**
1-E Sta. Maria St.,
Brgy. Kapitolyo, Pasig City

Ref: 2002-012-EWP-6-6

"MINING SHALL BE PRO-PEOPLE AND PRO-ENVIRONMENT IN SUSTAINING WEALTH CREATION AND IMPROVED QUALITY OF LIFE."

CRAU MINERAL RESOURCES CORP.

ENVIRONMENTAL WORK PROGRAM
Sta. Cruz, Zambales

September 2001

HATCH ASSOCIATES (Philippines) INC.
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HATCH

CRAU MINERAL RESOURCES CORP.
ENVIRONMENTAL WORK PROGRAM

STA. CRUZ, ZAMBALES

Prepared by :

Environmental Department

Reviewed by :

Michael P. Carlos

Approved for
Release by :

Ian Moller

Tech No. : Tech-549, Rev. 1

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1	9/11/01	1,2,3,4,7,9	MPC

CRAU MINERAL RESOURCES CORP.
ENVIRONMENTAL WORK PROGRAM
Sta. Cruz, Zambales
TABLE OF CONTENTS

1. NAME AND ADDRESS OF THE APPLICANT/ PERMITTEE

CRAU MINERAL RESOURCES CORPORATION

- Manila Office
  1-E Sta. Maria St., Bgy. Kapitolyo
  Pasig City, Metro Manila
  Telefax: (02) 631-5019
  Contact Person: Engr. Pablo Amistoso, Vice President, Operations

- Field Office
  Acoje Mine Site, Bgy. Lucapon
  Sta. Cruz, Zambales
  Emergency Satellite Phone: (0918) 918-9325
  Contact Person: Jovenal Gonzalez, Project Geologist

2. TYPE AND NATURE OF PROJECT

2.1 Project Description

The applicant desires to explore mineral resources found in the subject area and delineate an economic deposit.

The project timetable is approximately two (2) years with the Schedule of Activities/Gantt Chart shown in **Annex 1**.

The total estimated exploration cost is PhP 63,000,000.00, of which approximately PhP 6,300,000.00 or 10% of exploration cost is appropriated to the Environmental Work Program and associated measures (**Annex 3**, Matrix of Environmental Effects and Mitigating Measures).

2.2 Type and Nature of Mineral Deposits

The mineral deposits of interest are chromite, nickel, platinum group, and any other significant concentrations of base/precious metals. Economic occurrences of chromite, nickel and jade have already been mined in the area at various times over the past 65 years.

3. GENERAL LOCATION AND AREA TO BE COVERED BY THE PROPOSED PERMIT/CONTRACT AREA

3.1 Location and Accessibility

The MPSA application area is located in the municipalities of Sta. Cruz and Candelaria in Zambales Province of Luzon Island (**Figure1**). Sta. Cruz Municipality is about 180 aerial kilometers northwest of Manila and is accessible to all types of vehicle via first class roads. The main access to the project site is by land vehicle from the National Highway in Lucapon (Sta. Cruz/Candelaria boundary). The area is about 27 kilometers to the east via all-weather, unpaved roads through Barangay Lucapon. The old Acoje mine road (from Lucapon) has numerous branches within the old Acoje mine area, providing adequate access to any exploration work.

The coordinates of the exploration area are contained in the MPSA Application area clearance maps submitted to MGB Region III Office. The map is a 1:50,000 Sketch

Plan from NAMRIA Topographic Sheet No's 7074 III and 7074 IV titled Mt. Lanot and Bugallon and is included as **Figure 2.**

3.2 Total Area to be Covered by the Application

The area covered by the mining agreement application consists of three (3) lots, namely Lot-1 ((33681.7837 has.), Lot-2 (37.8002 has.) and Lot-3 (45.8014.), or a total of 3,765.3853 has.

The original MPSA application area was 8,100 has., but was reduced/amended to exclude legal, valid and subsisting mining permits, and rights and a watershed area/reservation within the northern portion.

The proponent, however, filed with the DENR/MGB a Letter of Inclusion for those mining right applications deemed abandoned and invalidated pursuant to present mining laws and regulations.

Kindly refer to the attached Amended Sketch Plan, **Figure 2** (NAMRIA topographic map in scale 1:50,000) for the geographic coordinates of the proposed mine exploration area.

4. DESCRIPTION OF EXISTING ENVIRONMENT WHERE WORK IS PROPOSED TO BE UNDERTAKEN

4.1 Land Environment

4.1.1 Topography/Physiography

The area consists of moderately rugged mountains with elevations ranging from slightly under 200 to slightly over 1,000 meters above sea level.

The two principal rivers draining the area - the Cabaluan and Lauis Rivers - flow westerly into the South China Sea.

4.1.2 Land Use/Capability

The MPSA application area was formerly the site of 65 years of mining by the Acoje Mining Co., Inc. until 1991.

To date, a portion of the old mining community and the immediate surroundings have been cultivated by the former workers and their families to upland rice and fruit bearing trees. The ***kaingin*** system is being employed by the locals to sustain their living disrupted by the termination of mining operations.

The entire area is within timberland/forestland with several ISF awardees granted by the DENR. Flat and gently rolling ground devoid of forest cover is ideal grazing ground, and the entire area is worthwhile for mineral prospecting.

4.1.3 Pedology

The rugged topography has limited the development of any thick soil cover over the predominantly ultramafic terrain. Lateritized ultramafic rock soil cover is present in some areas.

No field survey has been conducted to classify the pedology of the exploration area. This work will be conducted once the Mineral Agreement Application has been granted and CRAU has legal access to the area to conduct such studies.

4.2 Water Environment

4.2.1 Water Quality

As part of the due diligence process, a limited initial water quality sampling was conducted at the project area, the details of which are included as **Annex 2**. In regard to the baseline levels of the metals arsenic, cadmium, chromium (total),copper, lead, mercury and nickel; these are all within DENR applicable standards (DAO 34).

At this stage no detailed baseline sampling has been conducted to classify the Water Quality of the exploration area. This work will be conducted once the Mineral Agreement Application has been granted and CRAU has legal access to the area to conduct such studies.

4.2.2 Hydrology

The area is drained by the Lauis and Cabaluan River systems which flow westward to the South China Sea.

4.3 Climatology / Meteorology

The project locale falls under Type I of the Modified Coronas Classification, i.e., two pronounced seasons. The wet between May to October which coincides with the southwest monsoon season, and dry the rest of the year. Average annual rainfall is around 150 to 200 cm but may vary considerably from year to year depending upon prevailing local or regional conditions (El Nino/La Nina). The average mean day-time temperatures vary from 25°C (January) to 35°C (May).

At this stage, a site meteorological station and ambient air quality monitoring has not been installed at the exploration area. This work will be conducted once the Mineral Agreement Application has been granted and CRAU has legal access to the area to conduct such studies.

4.4 Geological/Geomorphological Environment

The mining agreement application area is a part and parcel of the vast Cretaceous ultramafic-mafic terrain that characterizes the Pangasinan-Zambales mountain ranges. Upwelling/thrusting brought about mountain building activity and ore mineralization.

Ophiolite rock complexes are well represented here as exposed such as the basement peridotite/harzburgite/lherzolite/dunite/clinopyroxenite/gabbroic/dioritic/basaltic zones with pillowy structures and massive stratiform sulfides and chert filled volcano-sedimentary formations. These spillites are located north and east of the mine exploration target area.

Locally, the area of interest is within what is termed as the Acoje ultramafic belt. Preponderant rocktypes are serpentinized dunite, pyroxenite (monoclinic type), serpentinite, harzburgite/lherzolite and the intruded gabbroic rock mass. Metallurgical chromite, nickel, platinum group metals and laterized variations are indicated, and their economic viability shall be the focus of the exploration.

4.4.1 Regional Geohazards

Information available from the Seismological Observation and Earthquake Prediction Division (SOEPD) of Philvoics is presented in **Figure 1**. This figure shows the possible seismic hazard sources (East Zambales Fault, Iba Fault, Philippine Fault Zone and Manila Trench), as well as the possible sources of volcanic hazards (Mt. Pinatubo) in the region. These information will be integrated with the local observations of geohazard events, landslips and sheet erosion and will

be consolidated into the geohazard database once CRAU geologists are able to complete detailed field assessments associated with the exploration program.

4.5 Biological Environment

4.5.1 Terrestrial Plants and Animals

Flora

Vegetation cover in the area may be classified into two main types:

- *Natural vegetation* - consisting mostly of secondary forest growth, grass/shrubs and sparse pine trees.

- *Cultivated vegetation* - which includes rice, coconut and fruit trees, and seasonal vegetable gardens. These crops are located mostly on the flatter areas.

The central (and major portion) of the area supports scanty secondary forest and grasses on the hill and mountain slopes, while the western margin's lower hills are covered with grasses. Previous commercial logging, slash and burn ground clearing, and the harvesting of trees for past mining activities (timber supports) resulted in the clearing of most of the primary vegetation.

The highly disturbed nature of the vegetation communities indicates a very low probability of the presence of any rare or endangered species.

Fauna

Much of the indigenous wildlife has been displaced to remote regions as the result of continuous mining over 50 years, or has been affected by human activities such as agriculture and/or destruction of natural habitats.

Domesticated animals (pigs, cows, dogs, cats, etc.) are observed to have taken over the ecological niche occupied by the native fauna living around areas of human habitation.

The highly disturbed nature of the environment suggests that there is a very low probability of the presence of rare or endangered wildlife.

4.5.2 Socioeconomic Environment

Almost (if not all) the population is located beside the old Acoje Mine. The village has a permanent population of around 1,000 with most of the older residents having been former employees of the mine. The people currently survive on subsistence farming and bamboo collection for sale.

A primary and secondary (high) school is present, as well as electricity (through a cooperative), tap water and television reception.

CRAU has not conducted any formal Perception Surveys or other socio economic studies as it is inappropriate to raise the expectations of the local community until the MPSA is approved and the Exploration program is commenced. Once the work is initiated, CRAU will be able to conduct community Needs Analysis and work with LGU's and Government agencies to develop a community assistance plan. This work will be reported in the periodic Progress Reports to MGB Regional Office III.

5. DESCRIPTION OF EXPLORATION WORK

Activities will be conducted by employing the services of contractors and experts and the resources of CRAU Mineral Resources Corporation and Kinloch Resources Limited. Kinloch is a multinational company with a regional or area headquarters duly registered with the Securities and Exchange Commission in the Philippines. CRAU have entered into an operating agreement with Kinloch which has been registered with the BMG Region III office.

5.1 Description of Exploration Methods and Equipment to be Used

The entire mining property involved includes the old mining concession of Acoje Mining Company Inc., which had over 65 years of continuous production through its 1,000 TPD metallurgical chromite mining and milling operations and a 400 TPD nickel mine/flotation mill operation, which ceased in 1975.

On a regional level, there were numerous geological research studies made on the lithologies and mineralization present. This information, both on file with the DENR/MGB and in the hands of any private individuals shall be researched and consulted and compiled as additional data to implement the Exploration Work Program.

The access of the exploration crew into the exploration area is enhanced through the existence of old mining and logging roads that meander throughout major portions of the property. Walking tracks also abound within the area, which will make access easier.

As the exploration program will consist of tape and compass surveys, surface sampling of rock/soil-sediment, geophysical surveys, test pitting/trenching, drilling, and aditing/tunneling, the effects to the prevailing ecosystem will be minimal. Any surface disturbance, such as drill pads, etc., will be rehabilitated.

The principal field office shall be within the old minesite community, where water, electricity and other amenities are available for the work force. Any field personnel who need to work in the remote areas of the property will utilize portable shelters for their accommodation, thus minimizing environmental disturbance.

The stages of exploration contemplated in the MPSA area once the permit is granted are detailed below:

5.1.1 Survey of Previous Works on the Area

The main activities to be carried out during this phase will be literature survey, data compilation and collation, research work and planning/design of the field survey to be subsequently carried out.

The area has had a relatively long mining history, primarily for chromite. The Acoje mine was more or less in continuous production from the mid-1930's until 1992, when it ceased operations. Unfortunately, much of the old mine/exploration data was lost due to a mine office fire in the late 1980's before mining ceased.

5.1.2 Geological Mapping

This discipline is to be conducted on a semi-detailed and detailed phase. The purpose of which is to define rock assemblages, structures, features and characteristics of ore mineralization sought for.

5.1.2.1 Semi-detailed Geological Mapping

Semi-detailed geological mapping and sampling will be carried out to identify the rock types in the areas and any significant mineralisation. Traverses will be made along stream channels, roads and suitable exposures where rock outcrops are found.

Rock, soil, and stream sediment samples will be taken for petrographic and chemical analyses. The acquired samples will not generally exceed 1 kg in weight. The samples will be analysed for chromite, nickel, platinum group elements, gold and base metals. The number of samples collected will be dependent upon ongoing results.

The output of the reconnaissance field survey covering the total contract area will be a comprehensive report containing a 1:20,000 (or other suitable scale) map. Areas showing indications of target minerals will be subjected to semi-detailed mapping. A map scale of 1:5,000 (or other suitable scale) map will be utilised in the semi-detailed work where denser sampling and additional geological mapping will be done.

An aerial photographic survey is planned over the area to assist in geologic mapping, surveying, land use, and other requirements as may prove necessary.

5.1.2.2 Detailed Geological Mapping

Detailed field surveys will be carried out using the compass and tape method with traverses being limited over a relatively small area (say 150 hectares) where target deposits are inferred. Mapping will give details on overburden, rock structures, fracture orientation and characteristics and chemistry variance (analytical results) using 1:1,000, or other appropriate scales.

During this stage, test pitting will be carried out at some sites to study thickness of overburden, regolith characteristics, and continuity of outcrops.

Also, sampling of rock faces vertically and horizontally will be conducted to study chemical variations.

These surveys will utilize grid lines as traverse routes.

5.1.3 Geophysical Methods

These methods will be employed in the search for the nickel sulfide deposits and the associated elements. Induced polarization (IP) and magnetic surveys will be used to help delineate deposits of this type.

These surveys will utilize existing grid lines done for geochemical geological surveys.

An internationally accredited contractor will be utilized.

5.1.4 Geochemical Methods

These surveys will be done over areas covered by semi-detailed geological mapping.

Rock, soil and stream sediment samples shall be collected in those areas defined as potential ore targets. Ridge and spur, grid, and stream junctions at various intervals determined applicable shall be accomplished.

Sample preparation and analyses will be conducted by accredited assay laboratories.

5.1.5 Subsurface Investigations

These are designed to define mineralized zones at depth. Among the methods to be used are:

5.1.5.1 Testpitting/Trenching

These will be excavated (and later rehabilitated) over specific targets when results from previous work warrants.

Test pits will consist of excavations, 1 x 1 m in diameter to a necessary depth to collect the relevant information.

Trenches will be done over warranted areas approximately 1 m wide and to a necessary depth and length.

The number of pits and trenches will be determined by initial exploration, and will be constructed by local hire.

5.1.5.2 Drilling

Once potential ore targets are delineated and as part of the technical information in the final assessment of the property, drilling will be done to confirm mineralization at depth.

An initial program of 2,000 m is anticipated, using qualified contractors who are aware of the necessity to protect the environment of their work sites. And this work would be monitored closely by the company management in collaboration with DENR/BGB personnel.

Additional drilling would be carried out if the initial program is successful in determining the presence of economic concentrations of mineralization.

Portions of the drill samples will be properly stored for future reference or re-evaluation. The drilling methods (diamond core/ reverse circulation, etc.) will depend on field conditions identified.

The drilling campaign is essentially confirmatory drilling at the outset to verify ore horizon extensions and their vertical continuity. Wireline type drills or its equipment shall be used using conventional coring and non-coring bits of variable diameters.

Though the drilling campaign is basically by contract with competent drilling contractors from Metro Manila, the initial number of drill Holes are 10 holes with a varied depth of 200m to 250m or a total of 2000m to 2500m drill holes length of varied inclination. For this type of drill equipment, the standard pad size is 3x4m. Sump size is usually about 1½ x 2m. The drill contractors may adjust these dimensions as appropriate to the site.

5.1.5.3 Others (tunneling/aditing)

Several old adits may be rehabilitated (or new ones constructed) to gain access for mapping, sampling and underground core drilling for determining the existing mineralization mined previously. A properly licensed contract miner will be used for this purpose, and all appropriate government-required and industry-standard safety measures will be adhered to.

At the present stage, and based upon the limited information available, an initial re-opening or new adit/tunnel of 400 m length and standard size (2.2 m x 2.2 m) is being considered. This is within area that has already been mined previously and will pose no problem to the existing environment.

5.1.6 Ore Reserve Estimation

Mineable resources will be estimated by combining mapping, sampling and drilling results, using industry-standard methods of calculation. Preliminary metallurgical testwork studies would also begin at this time.

5.1.7 Community Relations

Every effort will be made to establish a continuing dialogue with the local community regarding intentions and progress of the exploration program. Local residents will have 1st hire preferences for any employment that they are qualified for.

5.1.8 Environmental Baseline Study and Monitoring

A duly recognized company specializing in environmental base line studies and monitoring will be engaged to assure that all legal/social requirements are adhered to.

5.2 Additional Description of Exploration Methods and Equipment to be Used

5.2.1 Feasibility Study

Once a resource estimate of a potentially economic size has been defined, a mining feasibility study will be undertaken to determine the viability of the project. This will include detailed ore reserve calculations, engineering studies on mining plans, water and power supply, access roads, dumping area, service areas, plant site and design, environmental monitoring, and rehabilitation. These studies will necessitate further ore definition drilling, metallurgical testing, and geotechnical measurements.

At the same time an indicative economic feasibility study will be prepared for submission in the event the project appears technically and economically viable.

5.2.2 Topographic Survey

A boundary survey of the proposed Mining Area will be conducted to establish corner and intermediate monuments.

The topographic survey of the Mining Area will also be conducted to support detailed mine planning and resource estimation. The detailed topographic map produced will be at 1:200 (or other appropriate) scale, with a contour interval of 2 meters. This survey will also fix sampling points and drill sites.

5.2.3 Cadastral Survey

As a prerequisite to the approval of the mining feasibility and to establish the legal boundaries of the contract mining area, a cadastral survey will be conducted. The cadastral survey will primarily cover the area to be retained by the company for its mining project.

The company will seek the services of any MGB deputised geodetic surveyor to execute the cadastral survey.

5.2.4 Continuing Environmental Studies – Environmental Impact Assessment

Details of this are given in the Environmental Work Program, but this will be an ongoing activity.

5.2.5 Community Relations

A basic information and educational campaign will be undertaken to keep the local people familiar with the activities and plans of the company with regards to exploration and any mine development. This program will be broadened and deepened as the Work Program progresses into the 2nd and continuing years and as project viability becomes more defined.

5.3 Map Showing Location of Proposed Work Area

Attached is the amended MPSA Location Area in NAMRIA Topographic Map (Scale 1:50,000) indicating the old Acoje minesite, with accessibility roads, water resources and other relevant input (**Figure 2**).

5.4 Manpower Complement (field office only)

The tentative number of personnel to be engaged in the project are basically:

One (1) Geological Consultant

Two (2) Exploration geologists

Three (3) Geological Mappers

Six (6) Geological aids/ helpers

One (1) Draftsman/utility man

These personnel constitute the regular crew during the exploration campaign. Some local residents who are skilled or unskilled are to be hired on a contractual basis as the situation warrants. These are in the areas of camp preparation, trenching, testpitting, and geophysical and geochemical area surveys. Exploration aditing, drilling and other related endeavors such as sample value determination, geophysical survey/interpretation are to be done by competent companies/metalab on a contract basis.

5.5 Estimated Exploration Costs

An estimated budget of PhP 63 million is allocated for the two (2) year Exploration Work Program. A detailed program for this purpose has been submitted to the DENR/MGB pursuant to the mandate of R. A. No. 7942 and its implementing guidelines under DAO No. 96-40, series 1996.

The exploration budget covers expenses in the conduct of exploration such as geological mapping, geochemical/geophysical works, subsurface investigations such as drilling, testpitting/trenching and aditing/tunneling and other related expenses such as pre-feasibility studies, government permit acquisition, and full feasibility studies. This budget is subject to continuous revisions depending upon the results of exploration activities.

For details, see the Exploration Work Program. A detailed summary is included in a Gantt Chart in section 8.0 (Annex "A").

Particulars	**Cost**
1. Research (Geological/Geochemical/Geophysical)	P100,000.00
2. Semi-detailed Studies	
a. Geological Work	P3,000,000.00
b. Geochemical Surveys	P1,000.000.00

c. Geophysical Surveys	P1,000.000.00
d. Subsurface Investigations (trenching/testpitting)	P500,000.00
e. Topographic Surveys	P1,900,000.00

Detailed Studies

a. Geological mapping	P,2,000,00.00
b. Subsurface Investigations	
Contract drilling, 3,000m @ P5,000/m	P15,000,000.00
Exploration aditing (400m)	P12,000,000.00
Pre-feasibility studies	P15,000,000.00
Final feasibility studies	P26,500,000.00

The total cost is **P63,000,000**, subject to revisions depending upon exploration results. Contingency funds are not included.

6. IDENTIFICATION OF POTENTIAL ENVIRONMENTAL EFFECTS

The summary of the potential environmental effects and the corresponding mitigation measures are presented as a matrix in **Annex 3**.

The Mitigating Measures presented in the Matrix are considered to be Commitments by CRAU in regard to environmental protection during the exploration program. Additional aspects of the environmental protection activities will be reported to MGB Regional Office III periodically.

6.1 On Land

Access

Establishment of new access routes to drill sites are required. However, existing roads and tracks will be utilized to the fullest possible extent. These existing road and track networks need only minimal rehabilitation and repair.

Minimal siltation and /or erosion from road use and repair is considered not detrimental to the ecosystem as this is already an established community, and things like dust pollution, etc., will be addressed by regular sprinkling of the access roads with water during dry periods.

Field Surveys

Minor brushing or removal of undergrowth maybe undertaken to better expose outcrops, but this will be minimal and will not result to any large-scale clearing of vegetation cover. Traverses will be limited to drainage channels, roads and trails.

Test pits will be excavated, but this will cause only slight and temporary change in the land form. The excavated material will be stockpiled adjacent to the pit and back filled once sampling and mapping is completed.

Drilling

During the drilling stage some surficial disturbance may arise during the transport of drilling equipment to the site as some clearing of the routes and preparation of a drill platform may be required.

Fuel and oil spills (if any) may cause slight contamination of the ground surface in the immediate area of the drill site, but this will be temporary.

Excavations such as mud pits or water impoundments will be undertaken as part of the educational training of the crews on environmental protection and enhancement. Any disturbed land surfaces will be restored/reforested.

6.2 On Hydrology and Water Quality

Access

There will be insignificant disturbances on drainage channels during stream traverses and sampling.

Field Surveys

Except for small amounts (milliliters) of nitric acid and potassium dichromate (which will be added to water samples for environmental studies) no chemical reagents or toxic materials will be utilised during the program.

Drilling

Spillage of oil and additives may go into the local drainage system. However, sumps, pits and bunds at the drill pad will substantially reduce the risks and impacts of any spill.

6.3 On the Ecology

Drilling

Noise from drilling activities.

6.4 On Socioeconomics

Access, Field Surveys and Drilling

Labor opportunities will be available to skilled and unskilled workers in the area.

Schedule Of Activities and Mitigating Measures.

The general Schedule of Activities or Gant Chart is presented in **Annex 1** to indicate the time line of Exploration Activities and the associated environmental components.

7. ENVIRONMENTAL MANAGEMENT MEASURES INCLUDING TOTAL COST

CRAU Mineral Resources Corp., in collaboration with Kinloch Resources Ltd. are committed to pursue its intended two (2) year Environmental Work Program through measures that will be adopted to minimize and effectively mitigate any potential effects the program might have on the environment and the local community. It should be noted, however, that mineral exploration is, by and large, environmentally benign, giving rise to generally minimal impact on the environment and the people living in the area of operations.

The proponent/contractors anticipate that more than 10% of the total estimated exploration cost of P63 million, or P6.3 million, considering community relations and enhancement, will go towards environmental measures. This is in line with the government's policy to protect the

ecosystem. Community assistance programs that CRAU/Kinloch will undertake would probably be in the form of cooperatives and livelihood projects to sustain the benefits derived from the exploration program. At this time, it is premature to indicate the exact breakdown of community assistance until tenure is granted.

7.1 Progressive Rehabilitation/Restoration

- Excavated areas will be restored after sampling
- Mud pits or sumps used for drilling will be restored after completion of drilling.

7.2 Maintenance of Roads to Minimize Dust

- Watering of unpaved roads, particularly along, in and close to settlement areas to suppress dust during dry periods.

7.3 Proper Handling of Toxic and Hazardous Materials, if any

- Disposing in an appropriate manner of any solid and liquid wastes. Storage sites for oil, lubricants and fuel utilised during the exploration and drilling programs will be on ground prepared to prevent contamination of the local surface and groundwater systems. This will be done by lining the surface with an impervious materials to prevent spilled fluids from seeping into the ground. Solid waste will be buried at acceptable site(s).

7.4 Minimization of Noise and Emissions

- Maintaining vehicles and equipment utilised during the program in good working condition to reduce noise and limit emission of noxious gases.

7.5 Alternative Plans if Special Habitats of Flora and Fauna are Affected

- Minimising removal of vegetation. Survey/grid lines will be established in such a way as to go around or skip areas of thick cover.

7.6 Socioeconomic Mitigating Measures

- Encouraging environmental awareness among the local community by providing information and direct experience on how an exploration program - like the one to be carried out - can be accomplished without any adverse effect on the environment.

- Employing local unskilled labor. Only technical and supporting skilled workers will be sourced externally to carry out the program. These workers will be made aware of the importance in respecting the customs and rights of the local people, particularly in regard to access and use of the area. Any damage or loss to crops, plantations or domestic livestock as a consequence of the company's activities shall be properly recompensed in a form acceptable to any aggrieved party.

- Ensuring the program is self-sustaining

8. PLAN(S) OF THE PROPOSED OPERATIONS SHOWING LOCATIONS OF THE AREA(S) SUBJECT TO EXPLORATION

Please refer to the NAMRIA topographic map in scale 1:50,000 showing the entire MPSA application area which also covers those to be explored, including information on the old mine site, road network, and the general terrain.

Details will be supplied when exploration commences.

9. NAME AND SIGNATURE OF APPLICANT OR PERSONS PREPARING THE EWP

The Environmental Work Program (EWP) has been prepared by Hatch Associates Inc. (Hatch) on behalf of CRAU Mineral Resources Corp. The comprehensive CV's of the signatories are attached as **Annex 4**.

Ms. Lilli Beth S. A Yazon – Director, Operations

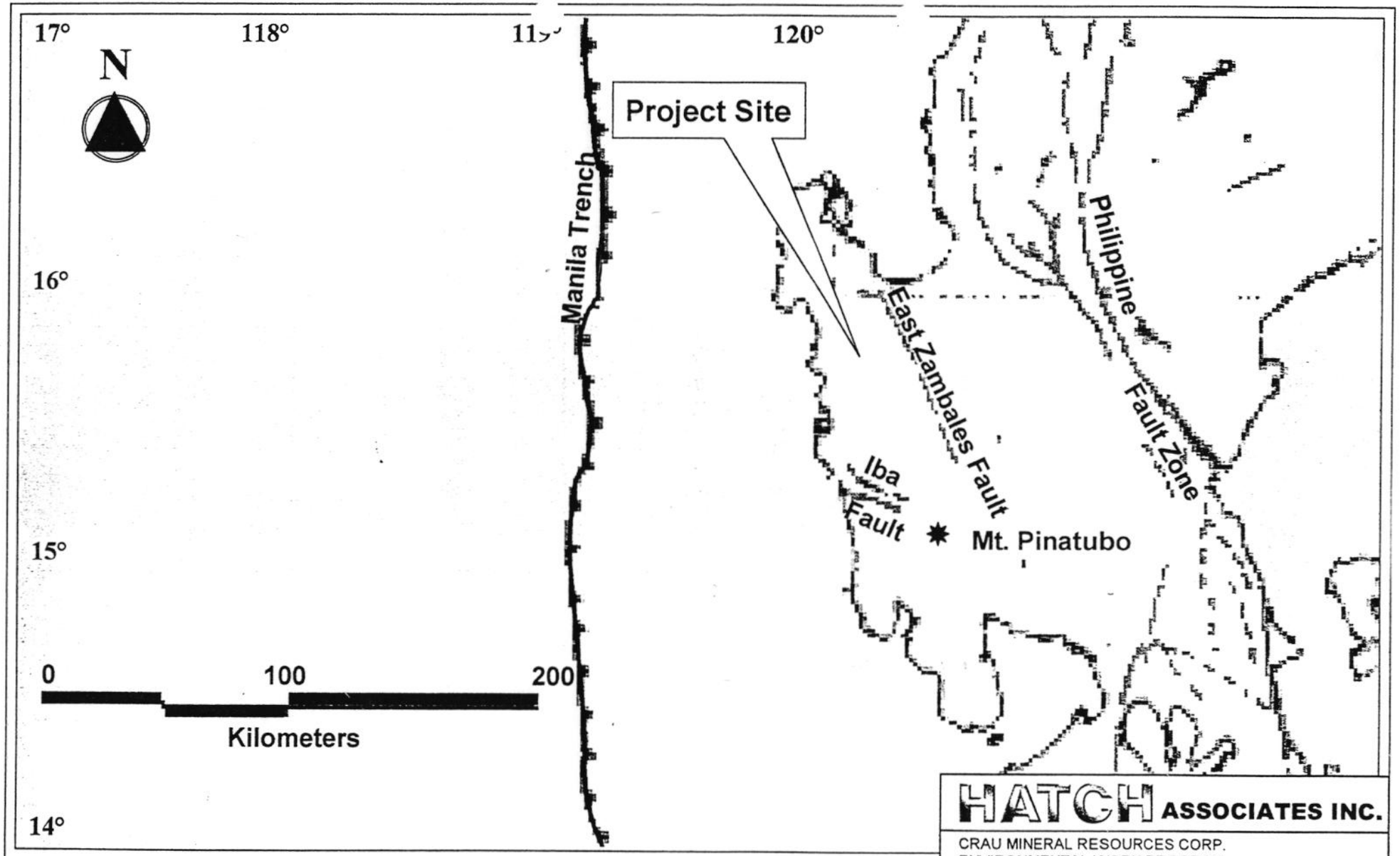
Mr. Ian M. Moller – Director, Business Development

Noted/Conforme:

Pablo R. Amistoso
V. P. Operations
CRAU Mineral Resources

Michael Spadafora
General Manager
Kinloch Resources Ltd.

Figures



SOURCE: PHIVOLCS

FIGURE 1

HATCH ASSOCIATES INC.

CRAU MINERAL RESOURCES CORP.
ENVIRONMENTAL WORK PROGRAM
SEISMIC AND VOLCANIC HAZARDS MAP
STA. CRUZ, ZAMBALES

DRAWN BY	DATE	JOB NO.	REV.
GCS	11.09.2001	P443	0

Annexes

Annex 1

Schedule of Activities/Gant Chart

ANNEX 1

SCHEDULE OF ACTIVITIES

ENVIRONMENTAL MITIGATING MEASURES	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Mobilization/Studies	XXXX							
Pre-Exploration/Info. Campaign	XXXX							
Access Road Maintenance	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Erosion Control: Test Pits, Drill Pads & Sumps, Trenching		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Establish on-site Nursery	XX	XXXX						
Rehabilitation of disturbed sites			XXXX	XXXX	XXXX	XXXX	XXXX	
Community employment opportunities	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Community Livelihood Projects				XXXX	XXXX	XXXX	XXXX	XXXX
Environ. Monitoring/Info.Campaign	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

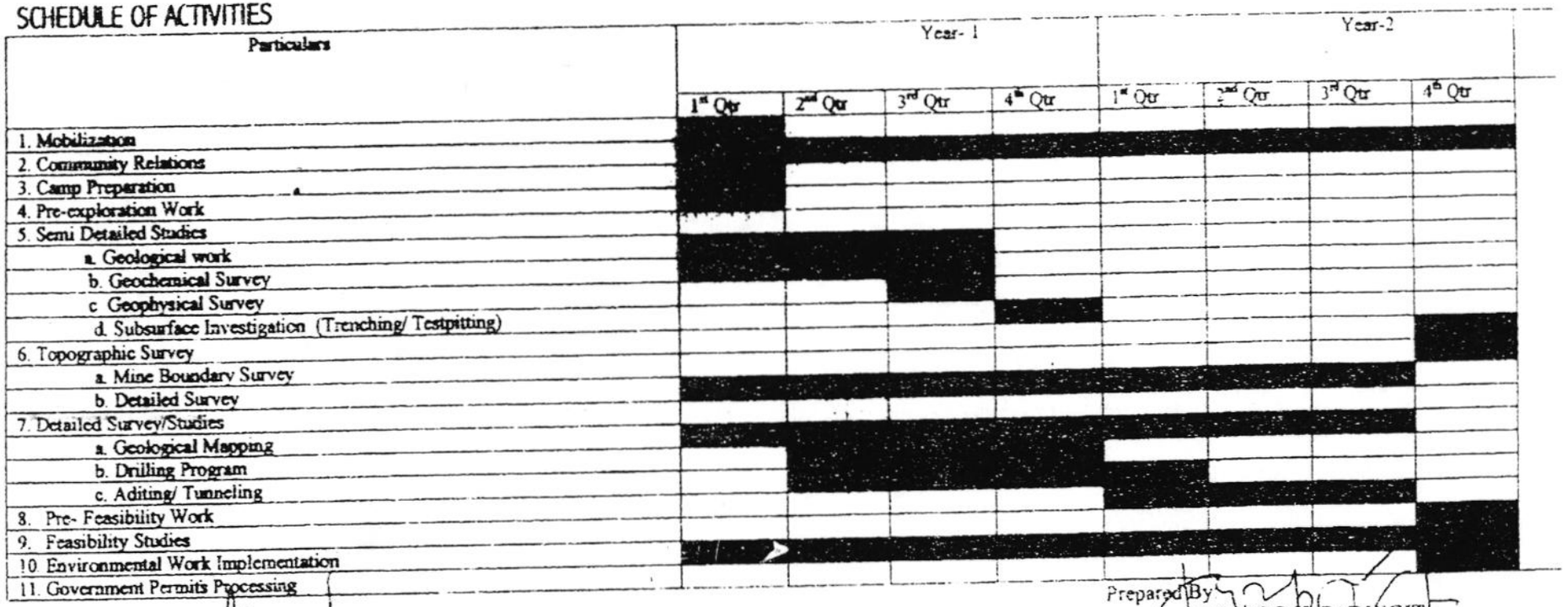
GANTT CHART

Annex "A"

EXPLORATION WORK PROGRAM

Chromite-Nickel Project
Sta. Cruz/ Candelaria, Zambales

SCHEDULE OF ACTIVITIES



Prepared By:

RODRIGO V. PARINGIT
Consulting Geologist & Mining Engineer

Noted by:

PABLO R. AMISTOSO

MICHAEL J. SPADAFORA

Annex 2

Initial Water Quality Sampling

KINLOCH RESOURCES LTD.

INITIAL WATER QUALITY SAMPLING
Sta. Cruz, Zambales

TECH-546
Rev. 0, July 13, 2001

HATCH ASSOCIATES (Philippines) INC.
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HATCH

CRAU MINERAL RESOURCES CORP.
ENVIRONMENTAL WORK PROGRAM

STA. CRUZ, ZAMBALES

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Ian Moller

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KINLOCH RESOURCES LTD.
INITIAL WATER QUALITY SAMPLING
Sta. Cruz, Zambales

TABLE OF CONTENTS

1. INTRODUCTION

Kinloch Resources Ltd. (KRL) is currently conducting due diligence studies while awaiting the release of DENR permits to explore the old Acoje Mine site and adjacent sectors for mineral deposits. Prior to the start of the exploration proper, KRL contracted the services of Hatch Associates, Inc. (Hatch) to conduct an initial water quality sampling and testing as part of the due diligence process. This report details the results of the study conducted in June 2001.

2. METHODOLOGY

The proposed KRL exploration area trends roughly north-south across the old Acoje Mine Camp for about 13 kms. Two (2) river systems are traversed by this exploration belt, viz., the Cabaluan and Lauis (**Figure 1**).

2.1 Sampling Locations

A total of 18 sampling points have been identified, four (4) for the Cabaluan River system, 13 for the Lauis River system and one (1) control point from a separate watershed but also of the Lauis River network (**Figure 1**). **Table 1** is the summary of the sampling station details.

Table 1
Sampling Station Details

	Station No.	Details
1)	KC-1	Cabaluan River tributary
2)	KC-2	Cabaluan River tributary
3)	KC-3	Cabaluan River tributary
4)	KC-4	Main Cabaluan River
5)	KL-1	Lauis River tributary from old mine offices
6)	KL-2	Lauis River tributary from residential areas
7)	KL-3	Lauis tributary upstream of old tailings dam
8)	KL-4	Lauis tributary downstream of old tailings dam
9)	KL-5	Western headwaters of Lauis River
10)	KL-6	Lauis River tributary
11)	KL-7	Lauis River tributary
12)	KL-8	Main Lauis River (downstream of KL-1 to KL-7)
13)	KL-9	Lauis River tributary
14)	KL-10	Lauis River tributary
15)	KL-11	Lauis River tributary
16)	KL-12	Lauis River tributary
17)	KL-13	Main Lauis River
18)	KL-14	Eastern headwaters of Lauis River (control point)

2.2 Field Sampling and Lab Testing

One (1) liter of water was retrieved per sampling point. This was done by washing/rinsing a pre-cleaned sampling vessel (lab provided) with water from the sampling point, three (3) times. After cleaning, the vessel is submerged 15 cm. below the water's surface and the specimen retrieved. To preserve the samples, these were treated with concentrated nitric acid (HNO_3) and put in cold storage.

The water samples were sent to a DENR accredited analytical laboratory (CRL Environmental Corp.) for testing of seven (7) heavy metals. The lab testing is summarized in **Table 2**.

Table 2
Lab Analysis Summary

	Parameter	Analytical Method
1)	Arsenic	ASTM D2972-84 Using Silver Diethyl-Dithiocarbarnate
2)	Cadmium	EPA 213.1 Atomic Absorption Spectro-photometer (AAS – direct Aspiration)
3)	Chromium (total)	EPA 218.1 AAS – direct Aspiration
4)	Copper	EPA 220.1 AAS – direct Aspiration
5)	Lead	EPA 239.1 AAS – direct Aspiration
6)	Mercury	EPA 7470A AAS – direct Aspiration
7)	Nickel	EPA 249.1 AAS – direct Aspiration

3. RESULTS AND ANALYSIS

The results of the lab analysis compared vis-à-vis the relevant Dept. of Environment and Natural Resources (DENR) standards (DAO 34) are shown in **Table 3**. Based on Memorandum Circular No. 07 of the Environmental Management Bureau of the DENR (EMB-DENR), the Lauis River is classified as Class B (1977). This means that the beneficial use of the waters of the river are under Recreational Water Class I, i.e., can be used for primary contact recreation such as bathing and swimming. The Cabaluan River, on the other hand, has not been classified by the EMB-DENR.

In this analysis, since one of the river networks has not been classified and the other's classification has been determined in 1977 (and may have been reclassified), we have compared the results to Classes B and C. Class C standards are less stringent than Class B, and are categorized as either Fishery Waters for the propagation of fish and other aquatic resources, or Recreational Water Class II (Boating, etc.), or Industrial Water Supply Class I (for manufacturing processes after treatment).

It was noted that the field sampling and subsequent lab testing were effected at the onset of the rainy season in the area. Rains were a daily occurrence especially during the afternoon.

For Arsenic, none was detected in any of the 18 sampling points at the minimum detection limit of 0.005 mg/L.

Cadmium was detected at stations KL-6 and KL-13 at concentrations very much less than the DENR Class B and C standards.

Table 3
Laboratory Test Results

Sample No.	PARAMETERS (mg/L)						
	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel
KL-1	ND	ND	0.14	ND	ND	ND	ND
KL-2	ND	ND	0.10	ND	ND	ND	ND
KL-3	ND	ND	0.06	ND	ND	ND	ND
KL-4	ND	ND	0.07	ND	ND	ND	ND
KL-5	ND	ND	0.04	ND	ND	ND	ND
KL-6	ND	0.00016	ND	ND	0.0084	ND	ND
KL-7	ND	ND	ND	ND	ND	ND	ND
KL-8	ND	ND	0.04	ND	ND	ND	ND
KL-9	ND	ND	0.07	ND	ND	ND	ND
KL-10	ND	ND	ND	ND	ND	ND	ND
KL-11	ND	ND	ND	ND	ND	ND	ND
KL-12	ND	ND	ND	ND	ND	ND	ND
KL-13	ND	0.00012	ND	ND	ND	ND	ND
KL-14	ND	ND	ND	ND	ND	ND	ND
KC-1	ND	ND	ND	ND	ND	ND	ND
KC-2	ND	ND	ND	ND	ND	ND	ND
KC-3	ND	ND	ND	ND	ND	ND	ND
KC-4	ND	ND	ND	ND	ND	ND	ND
MDL*	0.005	0.0001	0.04	0.02	0.006	0.002	0.03
DENR Class B	0.05	0.01	-	-	0.05	0.002 (total)	-
DENR Class C	0.05	0.01	-	0.05 (dissolved Cu)	0.05	0.002 (total)	-

* minimum detection limit

Total Chromium was perceptible at stations KL-1 to KL-5 (**Table 1**) which are all located at the western headwaters of the Lauis River system (**Figure 1**). This sector is where the former mine offices, tailings impounding structures and residential areas are mainly situated. Chromium was also monitored at stations KL-8 and KL-9 which are along the main Lauis River channel and tributary, respectively (**Figure 1**). For the rest of the stations, this heavy metal was not present at the minimum detection limit of 0.04 mg/L. There is no maximum limit set by the DENR for Total Chromium.

Copper was not detected at the minimum detection limit of 0.02 mg/L in any of the stations of the study area.

Lead was detected at 0.0084 mg/L and greater than the minimum detection limit in station KL-6, but significantly less than the DENR Class B and C standards.

For the metals Mercury and Nickel, these were not detected at their respective minimum detection limits of 0.002 and 0.03 mg/L in any of the 18 sampling points.

Station KL-14, the control point away from any potential mine activities has consistently exhibited relatively untainted waters vis-à-vis the heavy metal parameters tested.

The details of the lab results are shown in **Annex 1**.

4. CONCLUSIONS AND RECOMMENDATIONS

For this baseline study, the waters of the Lauis and Cabaluan River systems are categorized as relatively clean, in regard to the specific parameters tested, vis-a-vis DENR Class B and C criteria.

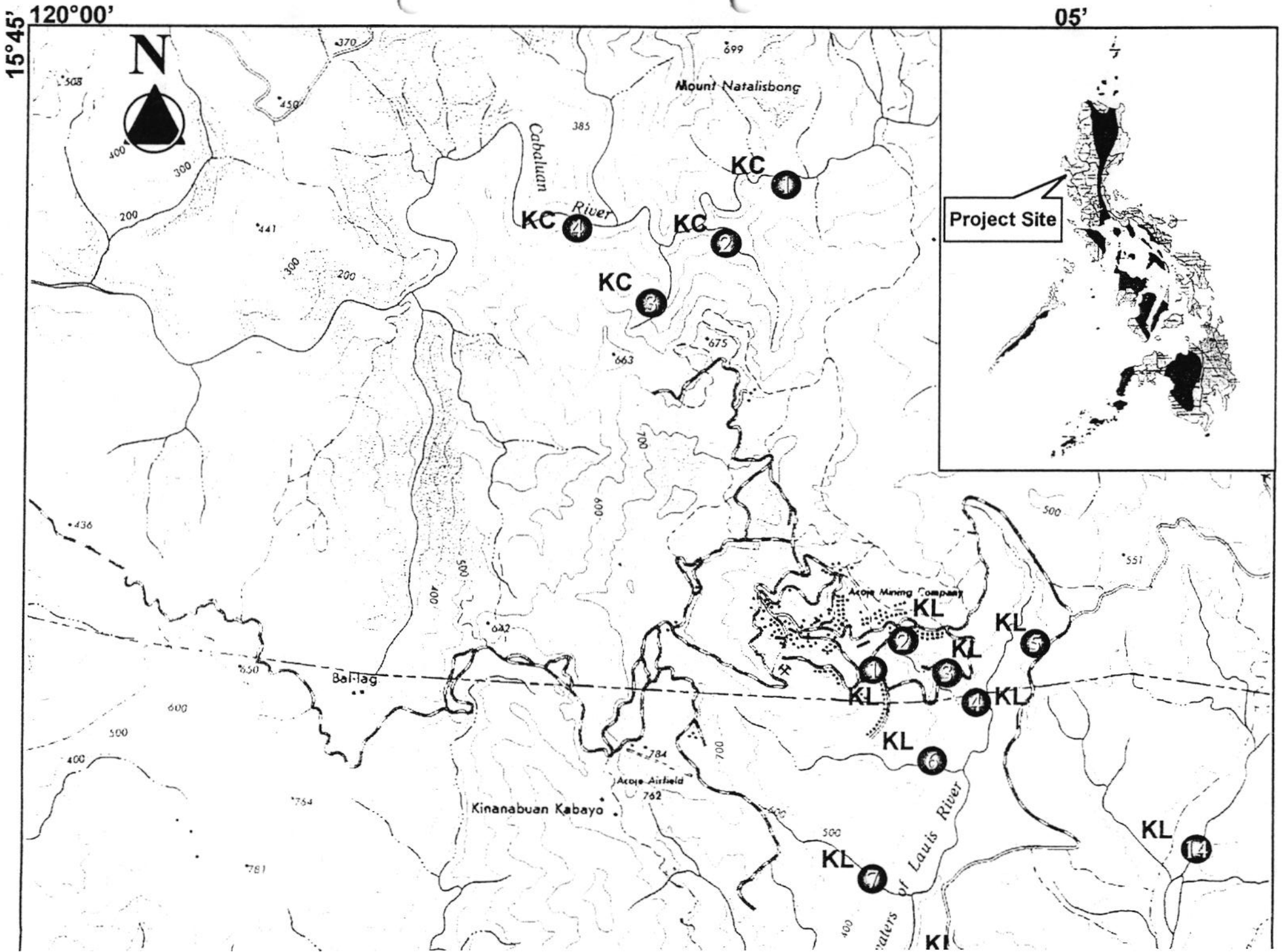
Trace levels of the metal Cadmium were detected in stations KL-6 and KL-13, as well as Lead in station KL-6. Moreover, these were much less than their corresponding standard maximum limits, in the order of 1 in 100 for Cadmium and 1 in 10 for Lead.

Another round of sampling should be conducted for the wet season to confirm the results of the initial sampling. Likewise, two sets of samplings should be done for the dry season.

Hexavalent chromium, a more significant pollutant, should be included in the sampling and testing program. This parameter however, has to be tested within 24 hours, so special arrangements need to be made to deliver the samples to a laboratory on a priority basis.

In addition, a sample for the determination of bacterial contamination will also need to be delivered on a priority basis.

Figure


15°45'
120°00'
05'
N
Project Site
Mount Natalisbong
Cabaluan River
KC 1
KC 2
KC 3
KC 4
Acoje Mining Company
KL 1
KL 2
KL 3
KL 4
KL 5
KL 6
KL 7
KL 14
Bal-lag
Acoje Airfield
762
Kinanabuan Kabayo
Laus River

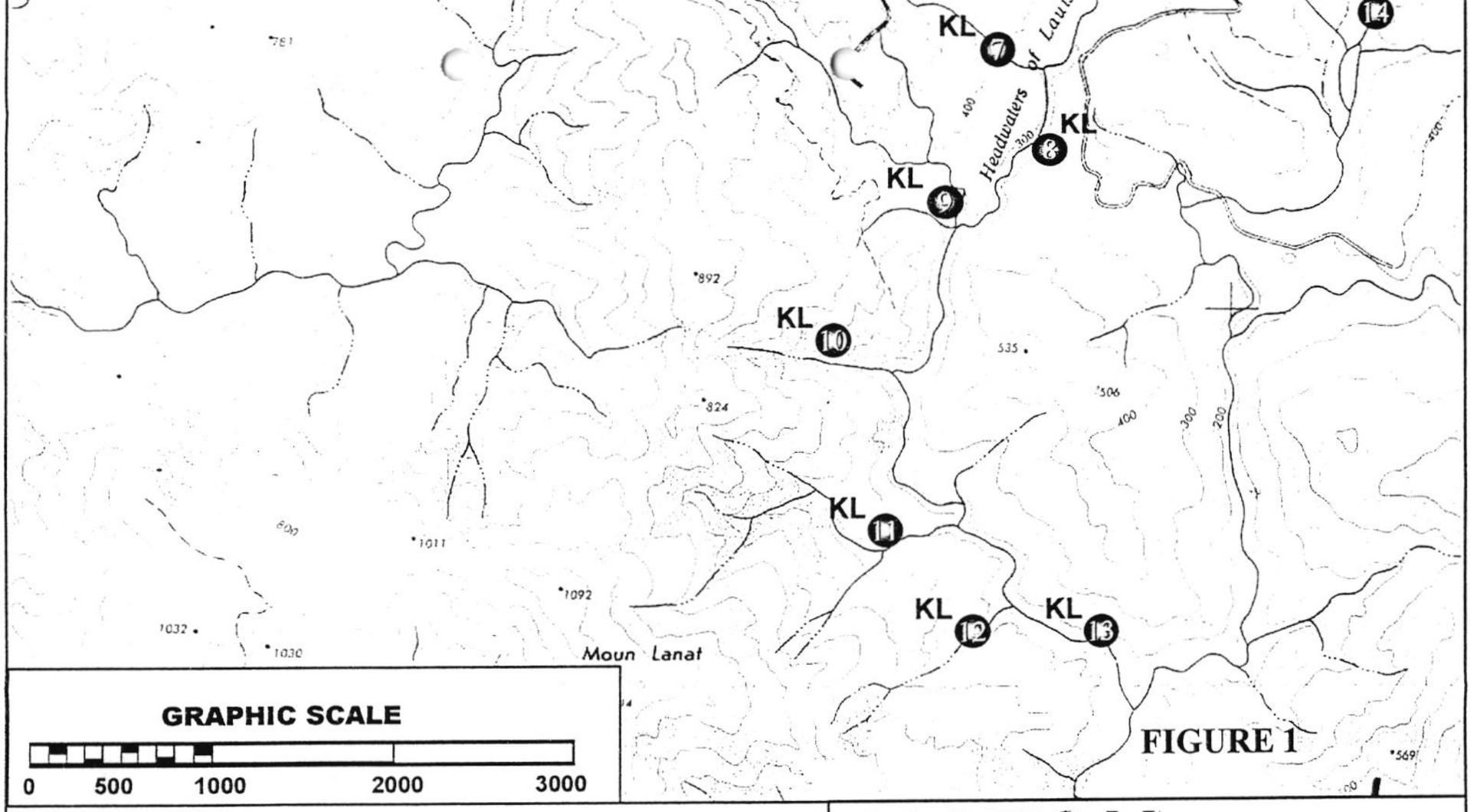


FIGURE 1

HATCH ASSOCIATES

KINLOCH RESOURCES LTD.
ACOJE, STA. CRUZ, ZAMBALES
INITIAL WATER QUALITY SAMPLING

DRAWN BY:	DATE:	JOB NO.	REV:
GCS	20.06.2001	P443	1

Annex

ANNEX 1

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 21-Jun-01
Analyst: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-002	KL 2	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-003	KL 3	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-004	KL 4	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-005	KL 5	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-006	KL 6	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-007	KL 7	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-008	KL 8	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-009	KL 9	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-010	KL 10	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-011	KL 11	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-012	KL 12	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-013	KL 13	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-014	KL 14	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-015	KC 1	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-016	KC 2	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-017	KC 3	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005
2826-018	KC 4	ASTM D2972-84 (Arsenic)	ND	Water, mg/L	0.005	0.005

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: _____ Date: 6/27/01
Jose A. Tenorio Jr.

Reviewed By: _____ Date: 6/27/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 6/27/01
Maria Carmela Q. Capule
Laboratory Administration

The cover letter is an integral part of this analytical report.

CRL Environmental Corporation
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Lab Fax : (6345) 599-3963
Office Tel : (632) 840-4071
Cellphone : (0917) 892-1171
Office Fax : (632) 816-0329

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 28-Jun-01
Analyst: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-002	KL 2	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-003	KL 3	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-004	KL 4	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-005	KL 5	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-006	KL 6	EPA 213.2 (Cadmium)	0.16	Water, ug/L	0.1	0.1
2826-007	KL 7	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-008	KL 8	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-009	KL 9	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-010	KL 10	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-011	KL 11	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-012	KL 12	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-013	KL 13	EPA 213.2 (Cadmium)	0.12	Water, ug/L	0.1	0.1
2826-014	KL 14	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-015	KC 1	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-016	KC 2	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-017	KC 3	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1
2826-018	KC 4	EPA 213.2 (Cadmium)	ND	Water, ug/L	0.1	0.1

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: _____ Date: 7/04/2001
Jose A. Tenorio Jr.

Reviewed By: _____ Date: 7/4/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 7/4/01
Maria Carmela Q. Capule
Laboratory Administration

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Cellphone : (0917) 892-1171
Office Fax : (632) 816-0329

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 22-Jun-01
Analysts: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 218.1 (T. Chromium)	0.14	Water, mg/L	0.04	0.04
2826-002	KL 2	EPA 218.1 (T. Chromium)	0.10	Water, mg/L	0.04	0.04
2826-003	KL 3	EPA 218.1 (T. Chromium)	0.06	Water, mg/L	0.04	0.04
2826-004	KL 4	EPA 218.1 (T. Chromium)	0.07	Water, mg/L	0.04	0.04
2826-005	KL 5	EPA 218.1 (T. Chromium)	0.04	Water, mg/L	0.04	0.04
2826-006	KL 6	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-007	KL 7	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-008	KL 8	EPA 218.1 (T. Chromium)	0.04	Water, mg/L	0.04	0.04
2826-009	KL 9	EPA 218.1 (T. Chromium)	0.07	Water, mg/L	0.04	0.04
2826-010	KL 10	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-011	KL 11	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-012	KL 12	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-013	KL 13	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-014	KL 14	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-015	KC 1	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-016	KC 2	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-017	KC 3	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04
2826-018	KC 4	EPA 218.1 (T. Chromium)	ND	Water, mg/L	0.04	0.04

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: _____ Date: 6/27/01
Jose A. Tenorio Jr.

Reviewed By: _____ Date: 6/27/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 6/27/01
Maria Carmela Q. Capule
Laboratory Administration

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Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 22-Jun-01
Analyst: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-002	KL 2	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-003	KL 3	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-004	KL 4	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-005	KL 5	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-006	KL 6	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-007	KL 7	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-008	KL 8	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-009	KL 9	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-010	KL 10	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-011	KL 11	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-012	KL 12	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-013	KL 13	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-014	KL 14	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-015	KC 1	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-016	KC 2	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-017	KC 3	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02
2826-018	KC 4	EPA 220.1 (Copper)	ND	Water, mg/L	0.02	0.02

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: _____ Date: 6/27/01
Jose A. Tenorio Jr.

Reviewed By: _____ Date: 6/27/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 6/27/01
Maria Carmela Q. Capule
Laboratory Administration

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Cellphone : (0917) 892-1171
Office Fax : (632) 816-0329

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 28-Jun-01
Analyst: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-002	KL 2	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-003	KL 3	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-004	KL 4	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-005	KL 5	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-006	KL 6	EPA 239.2 (Lead)	8.4	Water, ug/L	6.0	6.0
2826-007	KL 7	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-008	KL 8	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-009	KL 9	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-010	KL 10	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-011	KL 11	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-012	KL 12	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-013	KL 13	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-014	KL 14	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-015	KC 1	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-016	KC 2	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-017	KC 3	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0
2826-018	KC 4	EPA 239.2 (Lead)	ND	Water, ug/L	6.0	6.0

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: Jose A. Tenorio Jr. Date: 7/04/2001

Reviewed By: Chas C. Arroyo, Laboratory Supervisor Date: 7/4/01

Approved By: Maria Carmela Q. Capule, Laboratory Administration Date: 7/4/01

The cover letter is an integral part of this analytical report.

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Office Tel : (632) 840-4071
Cellphone : (0917) 892-1171
Office Fax : (632) 816-0329

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 19-Jun-01

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-002	KL 2	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-003	KL 3	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-004	KL 4	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-005	KL 5	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-006	KL 6	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-007	KL 7	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-008	KL 8	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-009	KL 9	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-010	KL 10	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-011	KL 11	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-012	KL 12	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-013	KL 13	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-014	KL 14	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-015	KC 1	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-016	KC 2	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-017	KC 3	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002
2826-018	KC 4	EPA 7470A (Mercury)	ND	Water, mg/L	0.002	0.002

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Reviewed By: _____ Date: 6/22/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 6/27/01
Maria Carmela Q. Capule
Laboratory Administration

The cover letter is an integral part of this analytical report.

CRL Environmental Corporation
Bldg. 7457 Jose Topacio St.
Clark Field (CSEZ) Pampanga, Philippines
U.S.A.: (562) 989-4045
Lab Tel : (632) 740-6219
Lab Tel : (6345) 599-3943
Lab Fax : (6345) 599-3963
Office Tel : (632) 840-4071
Cellphone : (0917) 892-1171
Office Fax : (632) 816-0329

Client: Hatch Associates, Inc.
Attn: Michael P. Carlos

Client's Project: KRL Preliminary Water Sampling (P443)

Date Sampled: N/S
Date Received: 15-Jun-01
Date Analyzed: 22-Jun-01
Analyst: AIAG / JAT

Lab No.	Sample I.D.	Analysis	Results	Matrix, Units	MDL	DLR
2826-001	KL 1	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-002	KL 2	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-003	KL 3	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-004	KL 4	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-005	KL 5	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-006	KL 6	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-007	KL 7	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-008	KL 8	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-009	KL 9	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-010	KL 10	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-011	KL 11	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-012	KL 12	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-013	KL 13	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-014	KL 14	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-015	KC 1	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-016	KC 2	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-017	KC 3	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03
2826-018	KC 4	EPA 249.1 (Nickel)	ND	Water, mg/L	0.03	0.03

MDL = Method Detection Limit
DLR = Detection Limit for Reporting (MDL x Dilution Factor)
ND = Not Detected
N/S = Not Supplied

Checked By: _____ Date: 6/27/01
Jose A. Tenorio Jr.

Reviewed By: _____ Date: 6/27/01
Chas C. Arroyo
Laboratory Supervisor

Approved By: _____ Date: 6/27/01
Maria Carmela Q. Capule
Laboratory Administration

The cover letter is an integral part of this analytical report.

CRL Environmental Corporation
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Annex 3

Matrix of Environmental Effects and Mitigating Measures

ENVIRONMENTAL WORK PROGRAM
IDENTIFICATION OF ENVIRONMENTAL EFFECTS AND MITIGATING MEASURES

AREA	SOURCE	POTENTIAL EFFECTS	MITIGATING MEASURES (COMMITMENT)	EST. COSTS
Outside the Project Area	Maintenance of access route from National Highway to project site	Noise and emissions from heavy equipment	Proper maintenance of heavy equipment for efficient burning of fuel to minimize emissions	P500,000
		Generation of solid wastes from work crews	Proper housekeeping at work sites	P200,000
		Generation of labor opportunities	Hiring of work personnel per locality of work site	P400,000
		Livelihood generation (economic ripple effect)	Encourage workers to patronize local business ventures	P1,500,000
Inside the Project Area	Excavations for test pits, drilling pads, drilling sumps	Depression of selected areas due to excavation	Excavated areas will be backfilled after target completion	P100,000
		Proliferation of insects particularly mosquitoes due to ponded water	Proper drainage will be provided to prevent accumulation of water from test pits and drilling pads	P200,000
		Entrapment of stray animals or accidents to passersby	Fencing of excavations using rope and branches Provide warning signs/ devices for passersby Immediate backfilling after work completion	P300,000
		Erosion of excavated materials	Stockpiles will be enclosed to prevent erosion Stockpiles will be provided with drain channels to prevent erosion	P150,000
		Loss of vegetation	Encourage the growth of natural vegetation by spreading the stockpiled soil Establish a nursery during the exploration program for progressive rehabilitation	P500,000
Inside the Project Area	Ingress and egress of exploration vehicles	Generation of dust	Unpaved roads will be watered, especially near settlement areas, to minimize dust	P200,000
Hydrology and Water Quality	Stream traverses and sampling	Siltation	Effects are deemed minimal. Vegetation clearing will be minimal to allow access only for people. Surface sampling sites will be reinstated for any disturbed soil cover.	P50,000
		Toxic chemicals	Nitric acid and potassium dichromate (to be used for environmental studies – water sample preservatives) are the only chemicals to be used and in small amounts (milli-liters). Hence, contamination from toxic chemicals is highly unlikely.	P50,000
	Excavations at sampling sites	Siltation	Immediate backfilling of test pits and trenches and plugging of drill holes immediately after sample retrieval	P50,000
	Drilling	Siltation from drilling activities	Sumps, pits, settling ponds and bunds will greatly reduce any silt-laden run-off from going into the natural drainage systems	P100,000
		Oil and additives spillage	Sumps, pits, settling ponds and bunds will substantially reduce risks and impacts from any spillage.	P100,000
		Generation of solid wastes by work crews	Proper housekeeping at work sites	P300,000
Terrestrial Ecology	Drilling	Emissions and noise	Impacts will be temporary Engines will be provided with mufflers to minimize noise Engines will be properly maintained to minimize emissions	P50,000
Socio-economic	Drilling	Emissions and noise	Impacts will be temporary Engines will be provided with mufflers to minimize noise Engines will be properly maintained to minimize emissions	P50,000
		Labor opportunities	Local workers will have priority on labor opportunities	P1,500,000

Total expenditure.....P6,300,000

Annex 4

Comprehensive CV's

Lilli Beth S. A. Yazon
Director, Operations

Education

Bachelor of Science in Marine Biology
University of the Philippines, 1979

National Science Dev. Board Scholar

M.S. Units, M.S. Marine Science
University of the Philippines

Professional Affiliations

Member, U.P. Marine Biological Society

Member, Philippine Environmental Industry Association, Inc.

Member, Water Environment Association of the Philippines

DENR Accreditation - Environmental Professional - 1998

Summary of Experience

Over 15 years experience in marine surveys and environmental impact assessments. Involvements include conduct of environmental assessments for a wide range of projects including power projects, mining, golf courses, water supply and tourism development projects. Expertise in project control work, inter-disciplinary coordination and integration, and quality assurance.

As Director of Operations, she handles both Engineering and Environmental departments of Hatch Associates, Inc. Responsible for managing both the engineering and environmental department, its business and its clients; market their services; maintain quality assurance of outputs and ensure delivery of services on time, budget quality and safely.

Relevant Experience

PNOC Petrochemical Development Corp. **Project Manager.** Engineering Services for the rehabilitation of the jetty facilities. On-going.

Raytheon – Batangas. **Project Manager.** Engineering Documents Review. On-going.

Raytheon – Pangasinan. **Project Manager,** Source Inspection. On-going.

Hatch – Shanghai. **Project Manager.** Engineering Services. On-going.

McConnell Dowell. **Project Manager.** Seismic and Liquefaction Study. On-going.

First Philippine Holdings Corp. **Project Manager.** CNC for Eye Institute. On-going.

NOKIA Philippines, Inc. **Project Manager.** Acquisition of Environmental Compliance Certificate/Certificate of Non-Coverage (ECC/CNC) for various cell sites nationwide of Globe Telecoms, Inc.

Woodward Clyde, **Project Manager.** Rapid Environmental Site Assessment and Environmental Impact Assessment - Marine Component for the Mindoro Nickel Project. On-going.

Bauang Private Power Corp., Bauang, La Union, Philippines. **Project Manager.** Marine Resources Monitoring for the 215 MW Bauang Power Plant, on-going (since 1995).

Joint Oil Companies Aviation Storage Plant (JOCASP), NAIA Compound, Pasay City, Philippines. **Project Manager.** Environmental Impact Study for the Relocation of the JOCASP plant, on-going

McConnell Dowell Phils. Corp., Batangas City, Philippines. **Project Manager.** – Development and Implementation of the Environmental System for a gas pipeline, 2000.

BHP Minerals, Claver, Surigao del Norte, Philippines. **Project Manager.** Socio-Political Assessment of Surigao Nickel Project, 1999.

Mindex, Pinamalayan, Mindoro Oriental, Philippines. **Project Manager.** Rapid Environmental Assessment – Biological and Water Quality Aspects for Nickel Project in Mindoro, 1999.

Southern Energy Quezon, Inc., Pagbilao, Quezon, Philippines. **Project Manager.** Thermal Plume Validation Study for the 700 MW Coal-Fired Thermal Power Plant, on-going.

Sual Power Station, Sual, Pangasinan, Philippines. **Project Manager.** Air Dispersion Validation Study for the 1200 MW Sual Coal-Fired Thermal Power Plant, on-going.

Sual Power Station, Sual, Pangasinan, Philippines. **Project Manager.** Various Permitting Works for the 1000 MW Sual Coal Fired-Thermal Power Plant, on-going.

Sual Power Station, Sual, Pangasinan, Philippines. **Project Manager.** Environmental Monitoring Studies (Air and water quality, terrestrial vegetation and wildlife, marine resources and public health modules) for the 1000 MW Sual Coal Fired Thermal Power Plant, 1999.

James Hardie Phils. Inc., Cabuyao, Laguna, Philippines. **Project Manager.** Fiber Cement Board Factory Project - Various Environmental Studies (air and water quality, agricultural and public health), 1999.

James Hardie Phils. Inc., Cabuyao, Laguna, Philippines. **Project Manager.** Various Permitting Works for the Fibre-Cement Board Factory Project, 1999.

Alstom, Sual, Pangasinan, Philippines. **Project Manager.** Various permitting Works for the 1000 MW Sual Coal-Fired Thermal Power Plant, on-going.

FGP Corp., Sta. Rita, Batangas, Philippines. **Project Manager.** Environmental Impact Study for 500 MW Combined Cycle Power Plant, 1999

AFP - Retirement and Separation Benefit System. Iloilo City, Philippines. **Project Coordinator.** Presidio Royale Golf and Country Club EIA, , 1998

Barili Golf Course and Mountain Resort EIA, Barili, Cebu. Active Realty Development Corporation, 1998.

San Fernando Marina and Resort Complex EIA, San Fernando, Cebu. **Project Coordinator.** Active Realty Development Corporation, 1998.

Hopewell Crown Infrastructure, Inc., Alabang, Metro Manila, Philippines. **Project Manager.** Air Quality and Noise Monitoring along the South Superhigh-way from Alabang to Calamba, 1998.

Sual Power Station, Sual, Pangasinan, Philippines. **Project Manager.** Environmental Compliance Audit for 1000 MW Sual Coal Fired Thermal Power Plant, 1998.

Southern Energy Quezon, Inc., Pagbilao, Quezon, Philippines. **Project Manager.** Environmental Compliance Audit for 700 MW Pagbilao Power Plant,1998.

Fort Bonifacio Development Corporation. Philippines. **Project Coordinator.** *Fort Bonifacio Global City Environmental Impact Assessment, 1996*

Philippine National Oil Corporation. Philippines. **Project Coordinator.** Mt. Labo Environmental Risk Assessment.. 1996.

Alliance of Anglo-Philippines and Brown & Root. Bohol and Cebu, Philippines. **Project Coordinator.** Bohol-Cebu Water Supply Project Environmental Impact Assessment. 1995-1996

Sual Power Station, Sual, Pangasinan, Philippines. **Responsible Engineer.** 1,000 MW Sual Coal-Fired Thermal Power Plant Environmental Impact Study, Sual, Pangasinan, Hopewell Power (Phils.) Corp., 1995.

Southern Energy Quezon, Inc., Pagbilao, Quezon, Philippines. **Project Manager.** Environmental Audit for the, 1995.

BHP Petroleum Pty. Ltd. (Dai Hung), Dai Hung, Vietnam. **Responsible Engineer (Marine Sector).**Dai Hung Oil Exploration Statistical Study, 1995.

BHP Petroleum (Dai Hung) Pty. Ltd., Dai Hung, Vietnam, **Responsible Engineer (Marine Sector)** Dai Hung Environmental Baseline and Monitoring Program, 1995.

Hopewell Power (Phils.) Corp., Pagbilao Grande Island, Quezon, Philippines. **Responsible Engineer.** Marine Studies for the 700 MW Quezon Coal-Fired Thermal Power Plant, 1994.

Western Mining Corp. (Phils.), Inc., Tampakan, South Cotabato, Philippines. **Responsible Engineer.** Environmental Studies for the Tampakan Exploration Project, 1994

Kosei (Asia) Pacific, Inc., Laguna, Philippines. **Responsible Engineer.** Project Description for a Wheel Manufacturing Plant. 1994

Hopewell Power (Phils.) Corp., Pagbilao Grande Island, Quezon, Philippines. **Responsible Engineer.** Agricultural Resources Baseline Studies for the 700 MW Quezon Coal-Fired Thermal Power Plant, , 1994

Light Industry and Science Park of the Philippines (Phases 3 and 4), Cabuyao, Laguna,, Philippines. **Responsible Engineer.** Environmental Impact Study, 1994

Chase Resources Corporation, Taysan, Batangas, Philippines. **Responsible Engineer.** Environmental and Pre-Feasibility Issues Study for the Taysan Copper Project, 1993

Climax Mining Ltd., Kasibu, Nueva Vizcaya, Philippines. **Responsible Engineer.** Didipio Project Environmental Impact Study, 1993

First Private Power Corporation, Bauang, La Union, Philippines. **Responsible Enigneer.** 215 MW Bauang Power Plant Environmental Impact Study, 1993

Enron Power Corp.-U.S., Subic Bay, Olongapo City, Philippines. **Responsible Engineer.** 108 MW Subic Bay Power Plant Environmental Impact Study, , 1993

Enron Power Corp.-U.S., Pinamucan, Batangas, Philippines. **Responsible Engineer.** 105 MW Batangas Power Plant Environmental Impact Study, , 1993

Hopewell Power (Phils.) Corp. Pagbilao Grande Island, Quezon, Philippines. **Responsible Engineer.** 700 MW Quezon Coal-Fired Thermal Power Plant Environmental Impact Study, 1992

China Cement Co. (HK) Ltd., Hong Kong. **Responsible Engineer.** Air Quality Studies for Clinker Unloading Study, 1992

Carmelray Development Corporation, Canlubang, Laguna, Philippines. **Responsible Engineer.** Carmelray Industrial Park Environmental Impact Study, , 1991

Ayala Agricultural Development Corporation, Davao, Philippines. **Responsible Engineer.** Ayala Darong Industrial Park Environmental Impact Study, Davao, 1991

Pilipinas Shell Petroleum Corporation, Tabangao, Batangas, Philippines. **Responsible Engineer.** Environmental Studies for Marine Science Institute, 1986

Career History

March 2000 – to present	***HATCH Associates, Inc., Philippines.*** Director, Technical Services.
1997 – Mar 2000	***BHP Engineering Philippines, Inc.*** Manager, Environmental Services.
1995 – 1997	***Seastems, Inc., Philippines.*** Consultant/Project Coordinator.
1991 – 1995	***BHP Engineering Phils., Inc., Philippines.*** Senior Environmental Specialist
1989 – 1991	***National Power Corporation, Philippines.*** Principal Biologist.

1987 – 1989	*International Center for Living Aquatic Resources Management (ICLARM), Philippines.* Technical Assistant.
1986 – 1987	*University of Sto. Tomas, Philippines.* Instructor.
1985 – 1986	*University of the Philippines, Philippines.* Senior Research Assistant.
1983 – 1984	*University of the Philippines, Philippines.* Senior Research Assistant / Diver

Professional Development

Mining, Safety and Environment Symposium – 46th Annual National Mine Safety and Environmental Conference, Benitez Hall, Teacher's Camp, Baguio City, Philippines. Philippine Mine Safety and Environment Association, Philippines Society of Mining Engineers. 35-37 November 1999.

Operationalizing the Clean Air Act – 18th National Conference, Riverbank Center, Marikina City, Philippines. 20-22, 1999.

Special Forum on Incineration System. Air and Water Management Association – Philippine Section, Occupational Safety and Health Center, Diliman, Quezon City, Philippines. 26 January 1999.

International Tropical Marine Ecosystems Management Symposium, Townsville, Australia. November 19998.

Preparing and Delivering High Impact Presentation, Professional Systems Synergy, Inc., 16 February 1998

1998 International Toxic and Hazardous Waste Congress, February 1998

Ecological Risk Assessment, DOST Industrial Technology Development Institute and International Organization for Migration, January 1998

1997 Philippine International Wastewater Treatment Congress, September 1997

Industrial Estates and Economic Zones : New Visions in the 21st Century, August 1997

Team Congruence Workshop, Congruence, Inc., June 1997

US-Asia Environmental Partnership Grant recipient, Novato, California, September 1994

Tel-A-Train's Managing Employee Safety and Health, , Western Mining Corp., June 1994

Conference on Economic Growth with Clean Production, CSIRO Australia and UNIDO, Melbourne, Australia, February 1994

Negotiating Successfully, Guthrie Jensen, 1993

Responsible Engineer Training Program, BHP, 1993

PSI Seminar, Development Academy of the Philippines, 1993

Certified PADI Open Water Diver, 1982

Closed-Cycle Culture of *P. monodon*, CNEXO, Tahiti, French Polynesia, 1981

Languages

English

Filipino

Basic French

IAN McLELLAN MOLLER
Director – Business Development

Education

Associate Diploma of Applied Biology, Royal Melbourne Institute of Technology, 1976

Bachelor of Applied Science (Applied Biology), Royal Melbourne Institute of Technology, 1978

Graduate Diploma in Management, University College of Central Queensland, 1989

Masters of Arts – Science and Technology, Deakin University, 1993 - Current

Summary of Experience

Mr. Moller's key experience and training is in the field of environmental impact assessment of major industrial, infrastructure and development projects. From an initial background in land management and extensive experience in the aluminium industry, he has over twenty-five years experience in environmental management within Australasia and South East Asia. His fields of specialty include land management, industrial processes and emissions monitoring, ambient environmental impact monitoring, industrial and environmental health, facility auditing, geographical information systems, waste management, impact assessment studies, integrated catchment management and social impact of science and technology transfers.

This diverse background is now applied to the management of multi-disciplinary projects, especially major developments associated with mining, energy and manufacturing facilities, infrastructure and natural resource utilization. In South East Asia, current long term projects include project management of feasibility studies and Environmental Impact Assessments for major copper, gold, nickel polymetalic and coal mines and many studies in the petrochemical industry throughout the Philippines. From 1993 to 2000, as a consultant with URS (Dames & Moore), Mr. Moller has worked on projects focussing on environmental impact assessment processes across a broad range of industries and topics.

Relevant Experience

December 2000 – **J P Kenney Pty Ltd.** Preliminary feasibility study for a natural gas pipeline, southern Luzon, Philippines

May 2000 –: **Shell Exploration Philippines BV (SPEX)** Corporate environmental advice

April 200 –: **Philippine Recyclers Inc.** Project manager for the preparation of Environmental Impact Assessment of lead acid battery plant.

Feb 2000 –: **Anglo American Exploration** Baseline environmental sampling for exploration program at several sites in Philippines

Jan 2000 –: **Phelps Dodge Exploration Corp.** Baseline environmental sampling for exploration program at several sites in Philippines.

July – August 1999 : **QNI Philippines Inc.** Preparation of an environmental manual for best practice exploration in laterite soils.

June 1999 –: **Genrale Des Eaux**. Environmental Baselines studies leading to EIS for a proposed water supply projects in Bagio.

July 1998 – Aug 2000: **Mindex Resource Development**. (**Crew Development Corp.**)Environmental Baselines studies leading to EIS and Feasibility study for a proposed nickel mine, refinery, port and power plant in Mindoro Oriental.

Dec 1998 – Aug 2000: **Lafayette Philippines**. Environmental Baselines studies leading to EIS and Feasibility Study for a proposed polymetallic mine, refinery, port and power plant in Rapu Rapu Island, Alby.

June 1999 – Aug 2000t: **Filsystems:** Environmental Baselines studies leading to EIS for a coal mine in Zamboanga del Norte.

February 1998 – August 1998: **Lepanto Mining Corporation**, Environmental Audit of gold/copper mining and milling facilities and development of an ISO 140000 Environmental Management System.

September 1997 – December 1997: **United Nations Conference on Trade and Development.** Environmental Specialist for the preparation of a scoping study to characterize the environmental risks and impacts associated with the operation of a metals recycling facility in Metro Manila, especially the disposal of solid wastes.

August 1997 – : **Minoro Mining**, Project Manager for the preparation of final feasibility studies associated with the rehabilitation and proposed re-start of the former Atlas mine at Toledo, Cebu.

August 1997 – : **Sino Mining International**, Environmental Specialist team member for the preparation of scoping studies associated with a proposed open cut copper/gold mine in the province of Jiangxi, China.

April 1997 – current: **Taiwan Overseas Mining Company**, Environmental Impact Assessment leading to statutory Environmental Compliance Certificate for the re-development of the Malangas Coal Mines, Zamboanga, Philippines

January 1997 – July 1998:, **International Pursuit** - Project manager for the preparation of an environmental assessment and prefeasibility study report for a proposed copper mine on Negros Island Philippines. Aspects include physical and biological environments and the associated socio-economic issues.

September 1996 – May 1997: **General Electric Aircraft Engines**, Phase I and Phase II Environmental, Health and Safety Audit of aircraft servicing facilities at Philippine Airlines NAIA, Manila

September 1996 – January 1997: **Kvaerner Davy**, Project manager for the preparation of an environmental prefeasibility study report for Western Mining Corporation's Tampakan Copper Project, Mindanao Island Philippines

March 1996 – current: **Western Mining Corporation**. Environmental review of the exploration program of WMC's Tampakan Copper Project in Mindanao, Philippines. Tasks included assessment of the baseline monitoring program, vegetation survey and progress toward the establishment of an ISO 14000 Environmental Management System.

June 1996 – Aug 2000: **Philnico, Philippines,** Environmental advisor to Philnico in regard to the proposed rehabilitation of the Nonoc nickel mine and refinery. Tasks include environmental status assessment and due diligence audit, preparation of statutory documents: Environmental Work Plan, Environmental Protection and Enhancement Program.

May 1996 – 2 months : **Command Petroleum,** Environmental due diligence audit of the Raava oil and gas project Bay of Bengal India.

September 1995 –2 months: **Minenco,** Project manager for the conduct of environmental and due diligence audits of the national facilities (six sites) of Comalco Aluminium Products.

July 1995 –1997: **Pasminco,** Corporate environmental auditor for the mining and processing sites worldwide (12 sites), of Pasminco's lead, zinc and associated metals facilities. Ongoing role as advisor and initiation of a corporate environmental information management system

January 1995 – 12 months : **Seal Rocks Victoria,** Strategic environmental advice to a major ecotourism development project consortium centered on the largest Australian colonies of fur seals and penguins. The site currently receives 750,000 visitors each year and the development infrastructure is constrained by the need to protect the natural values of the area.

January 1995 – 18 months: **Optus Vision,** Project Manager for the environmental compliance of the installation of the Optus Vision cable television and telephone cables across 500 km of the city of Melbourne metropolitan area.

January 1995 – 4 months: **Pasminco Corporate,** Project manager and environmental specialist for the preparation of impact assessment and feasibility studies for alternative mine waste treatment technologies involving wastes of heavy metal refining and smelting for the world's largest integrated lead/zinc refineries.
December 1994 – 3 months: **BHP Petroleum,** Project manager for the impact assessment and feasibility studies for alternative gas pipeline routes within Australia, across the states of Victoria, new South Wales and South Australia. These studies involved several projects and totaled over 2000 km of easements across the country. The tasks included the development of assessment criteria for construction impacts and long term maintenance of the pipeline easement. The project included the application of Geographic Information Systems (GIS) to the route selection and issues associated with the offshore gas/oil developments and associated coastal site utilities and plant infrastructure.

August 1994 – 5 months: **Comalco Smelting,** Project manager for the preparation of environmental impact assessment documentation for submission to the US EPA in Washington. The document formed the basis of an application to accredit an Australian process as Best Demonstrated Available Technology (BDAT) under the US Resource Conservation and Recovery Act (RCRA) for the treatment and disposal of hazardous industrial waste.

May 1994 – 6 months: **USAID,** Environmental Specialist (expatriate) for the strategic planning and preparation of an environmental policy agenda for the *Development Framework Plan for Mindanao Island - Mindanao 2000.* US AID/Philippine Government project assignment over three months. Tasks included an assessment of the physical environment, current institutional structures and recommendation of reforms appropriate to ecologically sustainable development of the Island. With the project team, he conducted the presentation of the environmental workshop papers for the *Technical Workshops* at Davao, Cagayan de Oro and Cotabato City. In addition he attended the NEDA Region XII Mindanao Watershed and Irrigation Summit in Cotabato City as an invited Panelist.

January 1994 – 6 months: NCPA, Key environmental specialist for a pilot project to assess the environmental policy and strategy development of the La Trobe Valley Region in Victoria for the Australian Government's National Capital Planning Authority's *Strategic Assistance for National Priority Areas* program. The program focussed on the environmental, social and infrastructure constraints to re-development of sub-economic regions of Australia.

Career History

Sept 2000 – present	***Hatch Associates, Inc.,*** *Manila, Philippines.* Director – Business Development
Nov 1999 – Sept 2000	***URS Corp., Manila, Philippines,*** Principal Consultant.
Concurrent	***Dames &Moore, Philippines,*** Environment Executive – Asia
Nov 1993 – Nov 1999	***Environmental Technology, Melbourne, Australia.*** Principal.
Sept 1992 – Nov 1993	***CRA : Boyne Smelters Expansion Project Specialist,*** Environmental Scientist.
1987 – Sept 1992	***CRA : Comalco Aluminum – Boyne Smelters,*** Specialist, Environmental Scientist.
1984 – 1987	***CRA : Comalco Aluminium – Boyne Smelters;*** Supervisor, Environmental and Medical Services.
1981 – 1984	***CRA : Comalco Aluminium – Boyne Smelters;*** Supervisor, Environmental Services
1978 – 1981	***CRA : Comalco Aluminium (Bell Bay) Limited, Tasmania,*** Land Management Officer
1971 – 1978	***Forest Commission of Victoria,*** Technical Officer, Research Brand
1971	***Egg and Egg Pulp Marketing Board of Victoria,*** Microbiology Assistant

Technical Papers

Flinn, D. W., Moller, I. M., and Hopmans, P. 1979. "Sustained Growth Responses to Superphosphate Applied to Established Stands of Pinus radiata." New Zealand Journal of Forestry Science, 9 (2), 201-211.

Flinn, D. W., Hopmans, P., Moller, I. M., and Tregonning, K. 1979. "Response of Radiata Pine to Fertilisers Containing N and P Applied at Planting." Australian Journal of Forestry, 42 (2), 125-131.

Moller, I. M. 1991 "Development of an AutoCAD Based Mapping System." Proceedings of QCADS 1991. Queensland CAD Show. CAD Source International, Brisbane.

Moller, I. M. and Forth, J. 1991 "Environmental Management at Boyne Smelters." The Second International and Sixteenth Annual Environmental Workshop, Australian Mining Industry Council. (Pub) AMIC, Canberra.

Moller, I. M. and Brown, R. 1991 "Application of the Predictive Noise Model ENM at Boyne Smelters." Proceedings of Inter-noise 91. Anita Lawrence Ed. Australian Acoustical Society, Sydney.

Riese, R. H. and Moller, I. M. 1992. "Effects of gaseous emissions from Boyne Smelters Limited on the growth responses of three selected Eucalyptus species". In, Proceedings of the 11th International Conference of the Clean Air Society of Australia and New Zealand, Brisbane, 1992, Volume 1, pp 297-306.

Moller, I.M. 1993 "Cleaner Production in the Aluminium Industry". In, Proceedings of the Commonwealth Environment Protection Agency (CEPA) Regional Cleaner Production Seminar. Gladstone Queensland, June 1993.

Gwyther, D. and Moller, I. M. 1994. Coastal Zone Management - Philippine Examples: Implications for Australia". Proceedings of the National Environmental Law Association, Annual Conference, Melbourne.

Doley, D. and Moller, I. M. 1994. Evaluation of 10 Years Monitoring of Vegetation at an Industrial Buffer Zone. In: Proceedings of the 12th International Clean Air Conference, Perth, Western Australia.

Moller, I. M. 1997. World Class Minerals Operations in the Context of the Philippine Environment. In: Proceedings of Mining Philippines '97. PIEC, Inc. Manila, July 1997.

Moller, I.M.1998. Inorganic Hazardous Waste Treatment. In: Proceedings of the 1998 Philippine International Toxic and Hazardous Waste Congress. Manila, February 1998.:

Moller, I.M. 1999. Best Environmental Practice for Exploration in Lateritic Soils. In Proceedings of: State of the Art in Mining Environmental Management. Chamber of Mines of the Philippines, Manila August 1999.

Professional Development

Kepner Tregoe Management Course, Launceston, 1980

National Safety Council of Australia. Accident Control Course, Gladstone, 1982

Media Skills Training Course, Roger Fry and Associates, Brisbane, 1984

Louis Allen Management Training Course, Gladstone, 1985

The Clean Air Society of Australia and New Zealand, Air Pollution Control Course, Newcastle, 985

Communications Skills Course, Rostrum Australia, Gladstone, 1988

Environmental Auditing Short Course, Bond University, Gold Coast, 1990

Environmental Risk Assessment Short Course, Hollingsworth Dames and Moore, Brisbane, 1990

Situational Leadership, Australian Institute of Management, Brisbane, 1990

AutoCAD Drafting, CADSource International, Brisbane, 1990

Environmental Planning and Pollution Law, Blake Dawson Waldren, Brisbane, 1991

Environmental Law Short Course, Queensland University of Technology, Brisbane, 1993

Languages

English – Excellent

Filipino - Basic