HINATUAN MINING CORPORATION

Tagana-an Nickel Project

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Sir,

Respectfully submitting herewith the company profile/ historical background of HINATUAN MINING CORPORATION-TAGANA-AN NICKEL PROJECT including the supporting documents for your perusal.

For your information and reference.

Very truly yours,

ENGR. ARNILO C. MILAOR
Resident Mine Manager

Cc: File

HINATUAN MINING CORPORATION – TAGANA-AN NICKEL PROJECT

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Attachment

Permit To Operate (2007-2015)

Water Discharge Permit (2007-2015)

Attachment

Permit To Operate (2007-2015)
Water Discharge Permit (2007-2015)
CCO for PCB
CCO for Mercury and Mercury Compounds
MMT Report (Aug 9 2013)
MMT Report (March 12-14 2014)
MMT Report (July 9-11 2014)
MMT Report (October 15-17 2014)
MMT Report (May 27-29 2015)
MMT Report (October 12-14 2015)
MMT Report (April 26-28 2016)
CMVR Feb 9-11 2009
CMVR Nov 7-9 2012
CMVR Mar 12-14 2014
CMVR Mar Jul 9-11 2014
CMVR May 27-29 2015
AEPEP Accomplishment Report 2012
AEPEP Accomplishment Report 2013
AEPEP Accomplishment Report 2014
AEPEP Accomplishment Report 2015
AEPEP Plan 2016 Revised
MPSA
Certificate of Non-Coverage
Environmental Compliance Certificate ECC-CO-1312-0044

1. PROJECT DESCRIPTION

The Tagana-an Nickel Mining Project of Hinatuan Mining Corporation (HMC) has been in operation since February of 1981 with the start of site preparations at the mine site. The first test shipment of wet ore to Japan was made in November 1981 and the first commercial shipment was made in June 1982. Since the project was implemented prior to 1982, which is considered by the DENR as the start of the implementation of the PEISS, the project was issued a Certificate of Non-Coverage on August 10, 1998 (Annex 1.0.1). Subsequently, the mineral lease rights of HMC were converted into a Mineral Product Sharing Agreement (MPSA) on July 25, 2007. Considering that the annual production capacity of HMC has already exceeded the threshold limit for projects not covered by the EIA system, DENR-EMB Region XIII required HMC to secure an ECC (Annex 1.0.2). Last Feb 15 2015 Environmental Compliance Certificate of Hinatuan Mining Corporation-Tagana-an Nickel Project released by DENR-EMB Central Office under ECC-CO-1312-0044.

1.1 PROJECT LOCATION AND AREA

1.1.1 Location

The Tagana-an Nickel Mining Project of HMC is located in Hinatuan Island, Brgy. Talavera in the Municipality of Tagana-an, Province of Surigao del Norte. The island is situated at approximately N9°45'11.62" to N9°48'46.97" and E125°41'45.71" to E125°44'27.33". Hinatuan Island is located approximately 23 kilometers east of Surigao City. The island is bounded by the Hinatuan passage on the north, a waterway for both inter-island and international shipping, Banug Strait on the southwest, a busy commercial route for boats plying between Surigao and Davao and by the Philippine Sea on the east. Figure 1.1.1 shows the location and vicinity of Hinatuan Island.

Hinatuan Island has an approximate total land area of 1,275.00 hectares. It was designated as part of the Surigao Mineral Reservation (Parcel II). Around 773.77 hectares of the island is covered by an approved Mineral Product Sharing Agreement (MPSA No. 246-2007-XIII SMR) executed by and between HMC and the Philippine Government in 2007 (Annex 1.1.1). The MPSA area covers two parcels, Table 1.1.1 and Table 1.1.2 shows the tabulated coordinates of HMC Parcel 1 and Parcel 2 MPSA area. Figure 1.1.2 shows the extent of MPSA area within Hinatuan Island and the mining developments of Tagana-an Nickel Mining Project.

Table 1.1.1 HMC MPSA Parcel 1 geographic coordinates of boundaries

Corner	Latitude	Longitude
1	N 9° 45' 29.22"	E 125° 43' 18.82"
2	N 9° 45' 38.02"	E 125° 43' 12.29"
3	N 9° 46' 00.57"	E 125° 43' 04.00"
4	N 9° 46' 12.15"	E 125° 43' 02.99"
5	N 9° 46' 18.00"	E 125° 42' 56.12"
6	N 9° 46' 14.07"	E 125° 42' 48.70"
7	N 9° 46' 09.43"	E 125° 42' 46.92"

Table 1.1.1 Continuation . . .

Corner	Latitude	Longitude
8	N 9° 46' 11.14"	E 125° 42' 37.44"
9	N 9° 46' 09.56"	E 125° 42' 30.76"
10	N 9° 46' 02.32"	E 125° 42' 27.16"
11	N 9° 46' 01.79"	E 125° 42' 03.97"
12	N 9° 46' 23.33"	E 125° 42' 04.59"
13	N 9° 46' 38.50"	E 125° 42' 09.56"
14	N 9° 46' 46.72"	E 125° 42' 07.65"
15	N 9° 46' 52.73"	E 125° 41' 56.70"
16	N 9° 47' 04.51"	E 125° 41' 55.70"
17	N 9° 47' 20.85"	E 125° 41' 49.88"
18	N 9° 47' 38.05"	E 125° 41' 48.35"
19	N 9° 47' 25.54"	E 125° 42' 03.10"
20	N 9° 47' 31.21"	E 125° 42' 18.33"
21	N 9° 47' 28.41"	E 125° 42' 22.78"
22	N 9° 47' 31.71"	E 125° 42' 35.28"
23	N 9° 47' 37.79"	E 125° 42' 37.93"
24	N 9° 47' 49.00"	E 125° 42' 46.53"
25	N 9° 47' 39.41"	E 125° 42' 50.06"
26	N 9° 47' 22.20"	E 125° 42' 49.74"
27	N 9° 47' 13.77"	E 125° 42' 58.31"
28	N 9° 47' 14.21"	E 125° 43' 10.92"
29	N 9° 47' 08.75"	E 125° 43' 20.76"
30	N 9° 47' 15.09"	E 125° 43' 30.09"
31	N 9° 47' 20.31"	E 125° 43' 40.54"
32	N 9° 47' 07.32"	E 125° 43' 41.53"
33	N 9° 46' 57.62"	E 125° 43' 48.80"
34	N 9° 46' 59.79"	E 125° 44' 06.87"
35	N 9° 46' 58.37"	E 125° 44' 09.25"
36	N 9° 46' 45.69"	E 125° 44' 04.75"
37	N 9° 46' 48.23"	E 125° 43' 55.52"
38	N 9° 46' 45.75"	E 125° 43' 46.41"
39	N 9° 46' 34.95"	E 125° 43' 37.69"
40	N 9° 46' 24.80"	E 125° 43' 31.22"
41	N 9° 46' 13.97"	E 125° 43' 28.73"
42	N 9° 46' 06.44"	E 125° 43' 15.14"
43	N 9° 46' 00.46"	E 125° 43' 10.32"
44	N 9° 45' 48.69"	E 125° 43' 11.54"
45	N 9° 46' 43.17"	E 125° 43' 18.53"
46	N 9° 46' 26.64"	125o 43' 21.10"

MPSA 246-2007-XIII-SMR, HMC Tagana-an Nickel Mining Project.

Table 1.1.2 HMC MPSA Parcel 2 geographic coordinates of boundaries

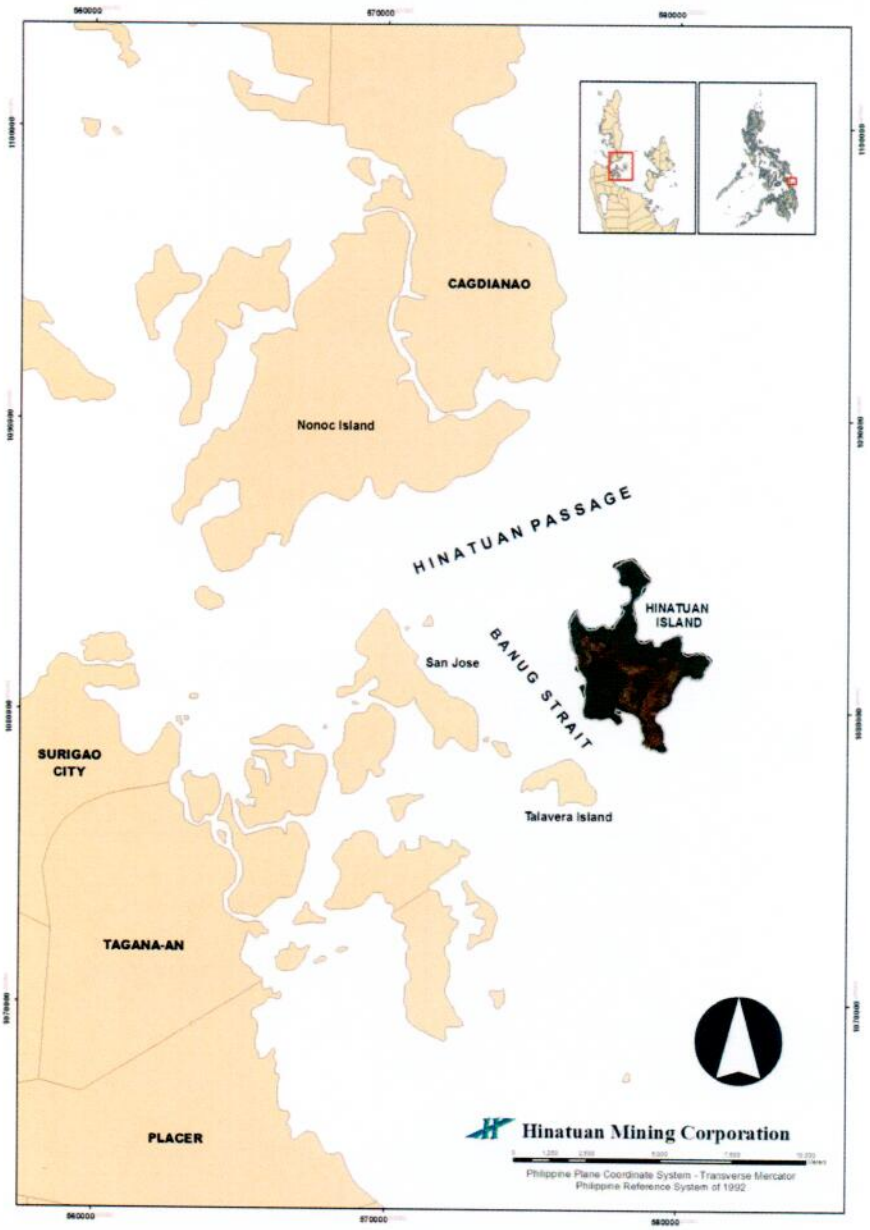
Corner	Latitude	Longitude
1	9o 48' 20.28"N	125o 42' 55.41"E
2	9o 48' 27.00"N	125o 42' 50.17"E
3	9o 48' 27.97"N	125o 42' 43.38"E
4	9o 48' 42.02"N	125o 42' 42.30"E

5	9o 48' 43.68"N	125o 42' 50.58"E
6	9o 48' 27.31"N	125o 43' 01.70"E

1.1.2 Accessibility

The major mode of transportation in reaching the project site is by sea. There are no available roads and bridges to connect the island to the surrounding islands. Access and haulage roads for both service vehicles and heavy equipment were established by HMC to connect the mine pit to the beaching areas.

Figure 1.1.1. Location map of Hinatuan Island and Tagana-an Nickel Mining Project



Employees residing in the neighboring islands of San Jose, Talavera and Bagong Silang are ferried daily to and from the mine site using two (2) pump boats owned by the company.

1.2 PROJECT RATIONALE

The Philippines is situated along a well-defined belt of volcanoes called the Circum-Pacific Rim of Fire where the processes of volcanism and plate convergence resulted in the formation of abundant and important metallic mineral deposits. Due to this, the Philippines is richly endowed with metallic resources and has the potential to be among the top 10 largest mining powers in the world. In terms of occurrence per unit area, it ranks third in gold, fourth in copper, fifth in nickel, and sixth in chromite.
In 2010, the majority of metal exports was composed of nickel (Table 1.2.1):

Table 1.2.1 FOB value of exports of metals, 2010

Category	Mineral	FOB (in million USD)	% of total Volume
Precious Metals	Gold	16.62	5.35
Silver		2.55	0.82
Base Metals	Copper	7.41	2.39
Iron and Ferro-Alloy Metals	Nickel	276.42	89.06
Chromite		7.39	2.38

Source: Bureau of export trade promotion

The 1987 Constitution provides that all lands of the public domain, waters, minerals, coal, petroleum, and other natural resources are owned by the State and their exploration, development, and utilization shall be under the full control and supervision of the State. These activities may be directly undertaken by the State, or the State may enter into Co-production, Joint venture or MPSA with Filipino citizens, or Filipino cooperatives, partnerships, corporations, or associations. This was later strengthened through Republic Act no. 7942 or the Philippine Mining Act of 1995, which authorized the DENR to enter into MPSAs in furtherance of the objectives of the Government and the Constitution. With the strong mining policy of the previous administration, the Hinatuan Mining Corporation applied for conversion of its mineral claim to an MPSA and was eventually approved in 2007. Such an agreement allows for better sharing and reporting of mineral extraction to the government and converts the mining lease it previously operated to one which is covered by existing laws.

The area is sparsely vegetated by second degree forest growth, comprising mostly of shrubs, ferns and small trees. Prior to HMC mining operation, the island was uninhabited, although fisherfolks from nearby islands used the northwestern portion of the island as transient area when fishing. After HMC began to operate in the island, some miners began to inhabit in an area located southeast of the island now known as Sitio Campandan who now benefits from the HMC operation.

It is vital to the nation's thrust that mining opportunities are exploited and being used for the benefit of its people. About 17.2 million WMT of ore has already been extracted and exported from the Hinatuan Island mining operations since its start in 1981 and there is

potential to extract more than 15 million more tons of ore containing about 120,000 tons of nickel within the next nine (9) to 12 years under the MPSA with exploration still ongoing. This may be worth anywhere from US$2 to US$4 Billion depending on the price of nickel, which has fluctuated from US$7 to US$8 per pound today from US$15 per pound five (5) years ago.

1.3 PROJECT ALTERNATIVES

This section describes the elements of the final preferred option for the Hinatuan Mining Corporation. HMC was registered with the Securities and Exchange Commission (SEC) on October 9, 1979. It is a 100% owned subsidiary of Nickel Asia Corporation (NAC), and is primarily engaged in the exploration, mining and exporting of nickel ore located in Hinatuan Island, Tagana-an, Surigao del Norte.

Since the project is ongoing, the project design alternatives evaluated for the HMC include:

- Stop operation with full mine abandonment procedures; and
- Continued operation as to the proposed expansion plan.

1.3.1 Stop operation, with abandonment

The mine site has been declared a long time ago as part of Parcel II of the Surigao Mineral Reservation being rich in nickel ore deposit and other associated minerals. When the island is abandoned, economic benefits from the available resources will not be maximized. Considering the investment of HMC, the company will likely lose more. However, with its commitment in the Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP), HMC is committed to rehabilitate according to environmentally sound procedures; HMC is expected to stabilize its mine slope and the top soils will be replaced to provide growing medium for reforestation species.

Topsoil is the most important factor in a successful rehabilitation program and will be replaced by HMC along the contour whenever possible. This will help in erosion control by reducing water flow down slope and increasing water storage. This will also allow the revegetation of the area.

The re-shaping and grading of a site will be an essential aspect of rehabilitation of the area by HMC. The final landform will be made hydrologically compatible with the surrounding area. Slopes will be made stable and will have a similar gradient to other high areas in the area that are not mined or mined out. Stability and drainage density shall be considered in the final design of landforms.

Control of erosion shall also be an important factor in designing the rehabilitation around disturbed and denuded areas, even in areas that are inactive to mining operations. This will be done by the establishment of vegetation to stabilize the site. Aside from planting of forest trees (reforestation), HMC is also expected to plant nitrogen fixing species like kakawate (Glerisedia sepium) and Flemengia as contour hedgerows in denuded areas.

The end result of such would be the following:

a. There will be no more mining at Hinatuan Island and the government and HMC will fail to attain the objectives of the MPSA;

b. Very minimal siltation will happen along the waterways, and flora and fauna will once again re-establish on the island;

c. Hinatuan island will be redesigned and revegetated, however, since the soil is lateritic, no agricultural crops can be grown;

d. Hinatuan will become uninhabited because all economic activities will cease in the area; and

e. The government will lose from US$100 to US$ 500 million in taxes.

1.3.2 Continued operation with the expansion plan

Continued operation, HMC shall still pursue surface mining method until the nickel reserves are exhausted or until the remaining reserves are not economically extractable. This usually means a percentage of nickel in the ore of 2% or less.

It is more plausible that Hinatuan Island will be more leveled and not undulating once the island is mined out. HMC would carry out the same kind of rehabilitation as in the previous alternative but with less problems with slope and erosion controls since most of the hills of the island will be excavated and quarried. Topsoil will be replaced into mined areas and plants and trees will be planted. The area may also be populated; such population, however, will have to turn to fishing or rely on the mainland for food and other necessities since agriculture will not thrive in the soil of the island.

The government would also have benefitted from the mining of the area, with the government share in the income of the mining going up to more than a billion US$. The local government would have prospered with the taxes gained from the activity; there will, however be about a thousand workers and their families who will be displaced once the mining ends.

1.3.3 Comparison of the Project Alternatives

It is no doubt that it would provide more benefits to more people and to the government for the project to continue according to the terms stipulated under the MPSA. Foremost of this is the fact that the mining area is a sparsely inhabited island with lateritic soil, which means that the area is, foremost, suited for mining and not for any other activity. Any other activity would not maximize the potential of the area for the Philippine government as a whole and for the local population. It is necessary that the company does not deviate much from its environmental programs and allow for gradual rehabilitation of mined out sites. It is imperative that some of the mining revenues are set aside for the eventual rehabilitation

and abandonment of the island, to insure that enough funds is on hand to restore the island to some use.

1.4 PROJECT COMPONENTS

1.4.1 Existing Operation

Ore Reserve and Mineable Resources

As of 2012, HMC has shipped 21.09 million WMT of nickel ore. It has been shipping nickel ore to Japan since 1982, to Australia since 2005, and to China since 2005. As of December 2012, HMC still has an estimated (measured and indicated) mineral resource of 31,560 kWMT of nickel ore with an additional inferred resource of 4,409 kWMT. Table 1.4.1 shows the HMC ore reserve. HMC is still conducting exploration and drilling on the northern portion of the island specifically along Parcel II to determine additional ore reserve to increase the life of mine. With the recovery of nickel ore from previously stockpiled low grade nickel ores which is estimated at 1.09 million WMT, the life of mine will be extended further.

Table 1.4.1 Summary of Computerized Reserve Estimate of Hinatuan Island Deposit

HMC Ore Reserves Estimate	**Reserve Year-end 2012**			
	kDMTs	**kWMTs**	**%Ni**	**%Fe**
LIMONITE				
High Iron Ore (>48%Fe, regardless Ni)	9,607	14,750	0.89	48.94
1.45%Ni, >20%Fe	350	537	1.43	32.63
HPAL (1.3%Ni,>20%Fe)	1,051	1,614	1.24	20.08
1.2%Ni, >40%Fe	144	221	1.20	41.68
Sub Total / Average	**11,152**	**17,123**	**0.94**	**45.61**
SAPROLITE				
Type 4 (1.50%Ni,<20%Fe)	3,623	5,563	1.50	13.17
Sub Total / Average	**3,623**	**5,563**	1.50	13.17
Total Ore Reserves / Average	**14,775**	**22,685**	**1.08**	**37.66**
WASTE				
Saprolite (<1.0%Ni)	9,309	14,293		11.19
Limonite (<1.0%Ni)	1,324	2,033		25.25
Sub Total / Average	10,633	16,326		12.94

Production Capacity and Mining Operation

As of 2012, HMC has an annual production capacity of 2.3 Million WMT utilizing surface mining method – bench/contour mining to extract nickel ore. HMC operation is concentrated in Parcel I of the MPSA Area. Due to the distinct climatic weather conditions in the mine site, HMC opted to vary mine operations. During the months of November to February (off-peak), HMC is extracting and stockpiling ores, while from March to October, HMC is doing ore extraction, hauling to beaching areas and loading to LCT and deep draft vessels.

Existing Mining Components, Buildings and Equipment

To complement the mining operations in the island, HMC established mine facilities, buildings and support facilities. The company also brought heavy equipment and machineries for utilization in the continued mining operation. Shown below (Table 1.4.2) is the list of major components of Tagana-an Nickel Mining Project:

Table 1.4.2 Major mine components of Tagana-an Nickel Mining Project

Mine Component	Total Area (m2)	Remarks
Mine Pits	825,259	based on Land Use Map Dec 2012; Area 1-3, 5-9 and 11
Mine Campsite	23,033	based on Land Use Map Dec 2012
Contractor's Yard	46,894	based on Land Use Map Dec 2012; Area of Tombo, Germar and Rio Grande
Access and Haul Roads	371,922	based on Land Use Map Dec 2012
Stockyards	351,290	based on Land Use Map Dec 2012
Beaching Areas	58,448	based on Land Use Map Dec 2012
Waste Dumps	72,402	based on Land Use Map Dec 2013
HMC Access Pier	728	based on Land Use Map Dec 2012

The major buildings that have been built as part of the mining operations are as follows:

Table 1.4.3 Major buildings of Tagana-an Nickel Mining Project

Major buildings of Tagana-an Nickel Mining Project Building	**Area (m2)**
Administration Building	125
Mechanical Shop	270
Assay Laboratory	84
Warehouse	175
Guesthouse	1200
Sr. Staff House	250
Jr. Staff House	390
Recreation Hall	120
Bunkhouse	2,110
Commissary Building	50
Powerhouse	50
Wash Rack	60

Utility Support Facilities

The support facilities established by HMC for the Tagana-an Nickel Mining Project are the following:

Table 1.4.4 Support facilities of the Tagana-an Nickel Mining Project

Support Facility	Capacity	Description
Water Distribution Facility	Treating capacity is 125 gallons per hour	The company has a level III water supply sourced from a creek in the island. The supply is directed to a water purification plant recently established in the mine site.
Power Distribution Facility	Total generating capacity is 856.5 kVA	Utilizes 2 units of 69kVA Caterpillar, 1 unit 93.5 kVA Komatsu, and 1 unit 625 kVA Caterpillar generator sets all powered by diesel engines.
Fuel Storage and Handling	Total storage capacity is 426,000 liters of fuel.	HMC maintains 7 fuel storage tanks with varying capacity. Fuel delivery is via fuel tankers all with bund walls.

Major Machinery and Equipment

HMC hires contractors to augment the operation in terms of ore extraction, hauling and ore loading all the way to the deep draft vessels. The major machinery and equipment used in the Tagana-an Nickel Mining Project include the following:

Table 1.4.5 Major machinery and equipment of Tagana-an Nickel Mining Project

Equipment	No. of Units	
	HMC	Contractors
Dump Trucks	57	60
Excavators	17	15
Breaker Attachment	1	3
Bulldozers	15	7
Payloaders	4	7
Road Graders	3	8
Vibratory Compactors	4	7
Water Trucks	6	4
Fuel Trucks	6	6
Fire Truck	1	-
Service Vehicles	6	14
Tractors	0	-
Light Towers	4	9
LCT's	6	-
Service Boats	15	-
Vibro Drill	3	-
MMDsizer	1	-

Storm Water and Run-off Management

Three (3) major water discharges were identified; two (2) are coursed through Hinatuan passage, and one (1) through Banug Strait. Runoff water from the southeast portion will be contained at Magkahuyog silt pond before it is discharged to the receiving water body.

Runoff waters from the southwest area shall be collected and contained at settling pond number 1 and 2 and finally discharged towards the Hinatuan passage. Run-off waters from the Cortes area shall be contained at settling pond number 4 before discharge to Banug Strait. Thus, the project constructed 11 major settling ponds, silt collector sumps and rock armoring. The total volume capacity of settling ponds is about 109,374 cu.m.

1.4.2 Proposed Expansion

Production Capacity Increase

HMC intends to increase its annual production capacity to 4 Million WMT with an annual extraction rate of 6 Million WMT to answer for and take opportunity of the promising demand and good price for nickel.

The increase in production capacity will require additional heavy equipment and machineries. Shown in Table 1.4.6 is the projected type and quantity of heavy equipment and machineries that HMC will utilize in the expansion phase for mining and road maintenance operation:

Table 1.4.6 Projected machinery and equipment needed for Tagana-an Nickel Mining Project expansion

Equipment	Units
Dump Trucks	191
Excavators	41
Breaker Attachment	6
Bulldozers	16
Payloaders	13
Road Graders	13
Vibratory Compactors	13
Water Trucks	14
Fuel Trucks	11
Fire Truck	1
Service Vehicles	57
Tractors	9
Light Towers	17
LCT's	10
Service Boats	11
Vibro Drill	4

Possible Mining Sequence

There are four (4) main recoverable and explored deposits of nickel in the island apart from those already mined. Figure 1.4.1 shows the location of remaining deposits that will be mined.

a. *Hilltop East (61 has.)* – Located on the eastern margin of the north pit. The hilltop east is divided into sub-deposits namely area 4 & 6.

b. *Western deposit (47 has.)* – At present, the previous western pit mined was mined-out and is still undergoing condemnation drilling. It is observed that it extends towards eastern side of the pit.

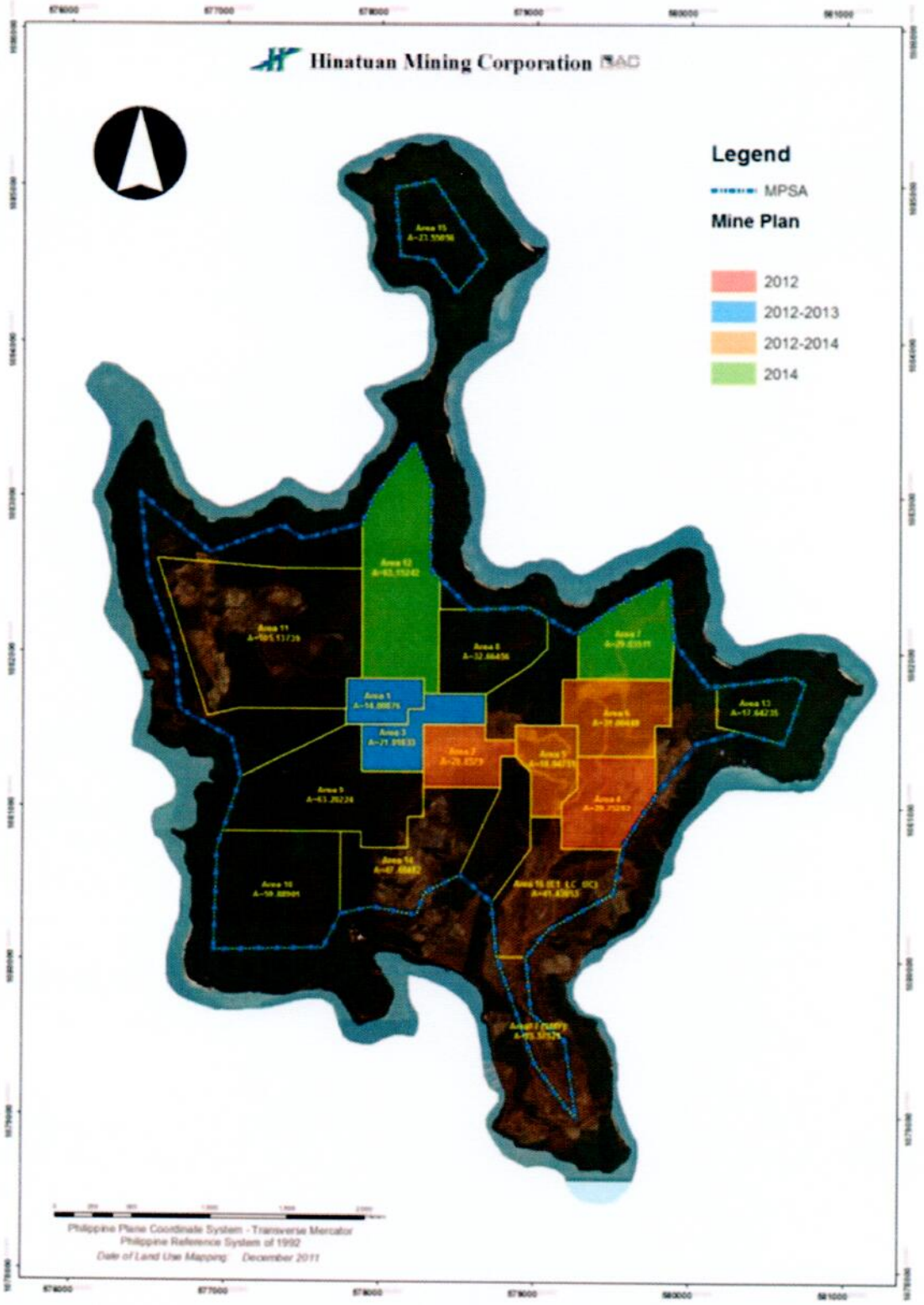
c. *Cortes deposit (105 has.)* – At present, the Cortes pit was already mined-out. Limonite deposit can be mined by extending its peripheral limit by 100-200 m particularly from the northern and southern edge of the pit.

d. *Hilltop deposit (74 has.)* – The area is located at the north of northern, central, southern and western deposits and immediately southeast of Cortes deposit. The hilltop is divided into sub-deposits namely area 1, 2, 3, & 5.

e. *Exploration areas (290 has.)* – HMC is currently conducting exploration drilling with initial distance of 100 x 100 meters. Development drilling will further be conducted in delineated areas that show potential marketable ore deposits. The exploration areas include areas 7, 8, 9, 10, 12, 13 & 15.ok

Condemnation drilling is also being done along mined-out areas to determine additional resources of marketable low grade limonite.

Figure 1.4.1. Mining sequence of Tagana-an Nickel Mining Project



Life of Mine

With the measured and inferred ore resource data, it is projected that the life of mine is only nine (9) years. However, the changing economic landscape could mean that ores with lower percent nickel may prove to be recoverable in the future. HMC may still be mining the island for several more years. This will depend on the mineral exploration of the island by HMC and on the financial economics of nickel extraction and export.

1.5 PROCESS/TECHNOLOGY OPTIONS

The nickel deposits at Hinatuan Island are only about 5m to 30m thick from the surface. HMC operates using bench or contour mining techniques, which results to low cost production. This method only requires the use of excavators, tractors, and dump trucks and does not require specialized equipment, explosives, chemicals or complex waste handling.

HMC's mining and beneficiation operations require no processing plant, thereby requiring a simple and minimal infrastructure. Unlike the copper and gold industries, beneficiation of lateritic nickel ore undergoes simple physical processes from extraction to marketing. No major use of chemical and reagents is involved in the process.

In addition, the mines are located near tidewater loading areas, enabling easy hauling to barges. Further, since the mine pits are shallow, making the rehabilitation of mined-out areas a simple and straightforward process.

1.6 PROJECT SIZE

The project will be limited to the area provided under the MPSA of 773.77 hectares and an annual production rate of 4,000,000 WMT of saprolite and limonite. Table 1.6.1 shows the comparison of current operation and the proposed expansion:

Table 1.6.1 Comparison between current operation and the proposed expansion

Particulars	**Year 2012**	**Proposed Expansion**
MPSA Land Area	773.77 hectares	SAME
Estimated Mineral Resource	16.3 milliona WMT	31.6 millionb WMT
Saprolite and Limonite Annual Production Capacity	1.5 million WMT	4 million WMT
No. of vehicles and heavy equipment involve in production	300	427
No. of LCT	12	19
DSO Destination	Japan and China	THPAL in Claver, SdN, Japan and China
No. of Mining Contractors	3	5
Mode of ore transport	Conventional hauling	SAME
Fuel consumption	4,666,645	7,000,000
No. of Beaching Areas	3	SAME
Total annual wharf capacity	WMT	WMT

No. of manpower involved during off season	377	400
No. of manpower involved during peak season	680	821
Support Facilities	3	SAME
Annual production cost	Php 1,344,727,153.00	Php 2,151,563,445.00

Note: a – measured resource as of December 2012; b – measured and indicated resource as of 2012

1.7 DESCRIPTION OF PROJECT PHASES

HMC is already using the mining method of bench/contour mining in its actual operation. For the expansion phase, the same method will be implemented. All the activities covered in the pre-construction phase such as surveying and geological mapping were already undertaken by HMC except for some additional exploration and condemnation drilling.

1.7.1 Pre-Construction Phase

In the actual experience of HMC, vibro drilling is first undertaken to determine the presence of an economically viable nickel deposit. Simultaneously, the vertical and horizontal extents of the deposit were known and serve as guide in the design and planning of the succeeding stripping and mining operations.

Exploration drilling is carried out at 100m interval then reduced to 50m and consequently to 25m for detailed drilling and for blocking of the ore. The assay and tonnage of the ore reserves, thickness of overburden and ore deposits and other basic fundamental data concerning the deposit are determined by detailed drilling. HMC has already conducted exploration drilling except blocking the extent of mineral reserves on some of the mine block areas.

1.7.2 Construction Phase

During the construction phase, the activities that will be undertaken by HMC is the preparation of mine pit by clearing of vegetation and removal of overburden.
Clearing / Stripping

After delineating the ore body by 25m x 25m grid interval development drilling, the area is cleared and grubbed of vegetation using crawler tractors prior to overburden stripping. The area to be cleared is properly marked along its borders and corners by mine surveyors.

After clearing the area, bench forming will follow using bulldozers which will establish guides for the hydraulic excavators (backhoe) and hauling trucks (dump trucks) during stripping operations. Following the stripping plan, benches of 3-m high are excavated until it reaches the saprolite zone where mining starts.

The stockpile of topsoil is separated from the laterite. This will be utilized in the mining rehabilitation. The laterite materials will be delivered and stockpiled to the designated

laterite dumps, which will be appropriately contoured and maintained for future reclamation/restoration or backfilling of the mined out areas.

An average of 10m to 15m of berm width is maintained in an active bench to allow for traffic during hauling operations. Final berm width is designed into 3m to 4m to maintain the pit slope and to serve as an access road during pit rehabilitation.

1.7.3 Operation Phase

Ore Extraction

The main purpose of stripping activities is to expose the ore. Once the ore is already exposed, mining activities will then follow. The pit design should be of sufficient volume to include the volume of overburden and mineable ore, access road, drainage, stripping, and mining limits.

The ore is continually sampled vertically from the bench face at 5m interval, which will serve as a guide to loaders in segregating the materials being hauled. The working bench is excavated in slices of 3m only. Each material is classified as to assay value and will be excavated and loaded to haulage trucks separately. The load is separated according the classification as per assay.

Transferring / Beneficiation

The beneficiation area consists of an embankment, 10-15m high, 150m long with a back of almost one hectare. In level with the toe of the embankment is the ore breaking ground of approximately two (2) hectares in surface area including the area occupied by the manual crushers.

Based on the actual analysis of each pile, the individual piles are hauled to their respective piling areas at the back of the embankment where the ore is slowly pushed down the slope by a bulldozer. By gravity, the boulders roll down the slopes and accumulate at the toe. The oversized boulders are harvested by a wheel loader then spread at the breaking area for subsequent manual breaking.

Hauling of Beneficiated Ores to the Pier Stockyards

Using loaders and dump trucks, beneficiated ores are hauled to the pier and at their respective piles. Soft and hard ores are stockpiled separately. During the process of hauling, ore materials are again sampled at three (3) truckload intervals. Obtained assays serve as the basis in the preparation of mixing ratios to meet the final requirements of the customer. Usually the volume of materials hauled to the pier is good for one (1) shipment plus an allowance of 20%. After stockpiling, the piles are covered with canvas to prevent sedimentation when rain comes.

Shiploading / Marketing

Due to the moisture content restrictions, shiploading is scheduled during the summer months. Foreign ore carriers are of 27,000 to 42,000 metric ton capacities and are equipped with clamshells to grab the ore materials from the holds of LCTs.

1.7.4 Abandonment Phase

HMC shall practice progressive rehabilitation of all areas which are undisturbed but denuded. There are currently no mined areas at present, although the process of rehabilitation shall be instituted as soon as a mined out condition exists in an area. The rehabilitation will include:

a. Pre-Mining preparation

The proper definition of the deposit allows for less land to be reformed and rehabilitated later.

b. Land Form Design and Construction

The reshaping and grading of a site is an essential aspect of rehabilitation. The final landform must be hydrologically compatible with the surrounding area. Slopes will be less obtrusive if they have a similar gradient to natural slopes.

c. Erosion Control

A major objective is the establishment of an adequate cover of vegetation to stabilize the area. This will necessarily mean that the topsoil cover must be replaced.

d. Removal of structures

The buildings shall be removed and the area revegetated.

e. Revegetation

As much as possible the species selected for revegetation will be native to the area.

1.8 MANPOWER

The current operation of Tagana-an Nickel Mining Project requires a maximum manpower of 737 personnel. Table 1.8.1 and Table 1.8.2 shows that tabulated manpower requirement of the company during the peak and off-peak season.

Table 1.8.1 Manpower requirement of HMC during peak season

Department	Company	Contractor	Total
Production	44	234	277

Mine Engineering	15	66	81
Technical Services	31	66	97
Administration	30	72	102
Assay Laboratory	12	25	37
MSHED/ORMM	24	62	86
Total	**156**	**525**	**680**

Table 1.8.2 Manpower requirement of HMC during off-peak season

Department	Company	Contractor	Total
Production	44	-	44
Mine Engineering	15	41	56
Technical Services	31	**66**	97
Administration	30	**68**	98
Assay Laboratory	12	-	12
MSHED/ORMM	24	**46**	70
Total	**156**	**221**	**377**

Once Tagana-an Nickel Mining Project increases the production capacity, it is expected that additional manpower will be needed to complement the target production increase. Table 1.8.3 and Table 1.8.4 is the projected manpower requirement of HMC once production capacity increases.

Table 1.8.3 Projected peak season manpower requirement of HMC once production capacity increases

Department	Company	Contractor	Total
Production	46	-	46
Mine Engineering	17	45	62
Technical Services	33	75	108
Administration	30	68	98
Assay Laboratory	16	-	16
MSHED/ORMM	24	46	70
Total	166	234	400

Table 1.8.4 Projected off-peak season manpower requirement of HMC once production capacity increases

Department	Company	Contractor	Total
Production	46	325	371
Mine Engineering	17	75	92
Technical Services	33	75	108
Administration	30	80	110
Assay Laboratory	16	35	51
MSHED/ORMM	24	65	89
Total	**166**	**655**	**821**

Existing Mining Components, Buildings and Equipment

To complement the mining operations in the island, HMC established mine facilities, buildings and support facilities. The company also brought heavy equipment and machineries for utilization in the continued mining operation. Shown below (Table 1.4.2) is the list of major components of Tagana-an Nickel Mining Project:

Table 1.4.2 Major mine components of Tagana-an Nickel Mining Project

Mine Component	Total Area (m2)	Remarks
Mine Pits	825,259	based on Land Use Map Dec 2012; Area 1-3, 5-9 and 11
Mine Campsite	23,033	based on Land Use Map Dec 2012
Contractor's Yard	46,894	based on Land Use Map Dec 2012; Area of Tombo, Germar and Rio Grande
Access and Haul Roads	371,922	based on Land Use Map Dec 2012
Stockyards	351,290	based on Land Use Map Dec 2012
Beaching Areas	58,448	based on Land Use Map Dec 2012
Waste Dumps	72,402	based on Land Use Map Dec 2013
HMC Access Pier	728	based on Land Use Map Dec 2012

The major buildings that have been built as part of the mining operations are as follows:

Table 1.4.3 Major buildings of Tagana-an Nickel Mining Project

Major buildings of Tagana-an Nickel Mining Project Building	**Area (m2)**
Administration Building	125
Mechanical Shop	270
Assay Laboratory	84
Warehouse	175
Guesthouse	1200
Sr. Staff House	250
Jr. Staff House	390
Recreation Hall	120
Bunkhouse	2,110
Commissary Building	50
Powerhouse	50
Wash Rack	60

Utility Support Facilities

The support facilities established by HMC for the Tagana-an Nickel Mining Project are the following:

Table 1.4.4 Support facilities of the Tagana-an Nickel Mining Project

Support Facility	Capacity	Description
Water Distribution Facility	Treating capacity is 125 gallons per hour	The company has a level III water supply sourced from a creek in the island. The supply is directed to a water purification plant recently established in the mine site.
Power Distribution Facility	Total generating capacity is 856.5 kVA	Utilizes 2 units of 69kVA Caterpillar, 1 unit 93.5 kVA Komatsu, and 1 unit 625 kVA Caterpillar generator sets all powered by diesel engines.
Fuel Storage and Handling	Total storage capacity is 426,000 liters of fuel.	HMC maintains 7 fuel storage tanks with varying capacity. Fuel delivery is via fuel tankers all with bund walls.

Major Machinery and Equipment

HMC hires contractors to augment the operation in terms of ore extraction, hauling and ore loading all the way to the deep draft vessels. The major machinery and equipment used in the Tagana-an Nickel Mining Project include the following:

Table 1.4.5 Major machinery and equipment of Tagana-an Nickel Mining Project

Equipment	No. of Units	
	HMC	Contractors
Dump Trucks	57	60
Excavators	17	15
Breaker Attachment	1	3
Bulldozers	15	7
Payloaders	4	7
Road Graders	3	8
Vibratory Compactors	4	7
Water Trucks	6	4
Fuel Trucks	6	6
Fire Truck	1	-
Service Vehicles	6	14
Tractors	0	-
Light Towers	4	9
LCT's	6	-
Service Boats	15	-
Vibro Drill	3	-
MMDsizer	1	-

Storm Water and Run-off Management

Three (3) major water discharges were identified; two (2) are coursed through Hinatuan passage, and one (1) through Banug Strait. Runoff water from the southeast portion will be contained at Magkahuyog silt pond before it is discharged to the receiving water body.

Runoff waters from the southwest area shall be collected and contained at settling pond number 1 and 2 and finally discharged towards the Hinatuan passage. Run-off waters from the Cortes area shall be contained at settling pond number 4 before discharge to Banug Strait. Thus, the project constructed 11 major settling ponds, silt collector sumps and rock armoring. The total volume capacity of settling ponds is about 109,374 cu.m.

1.4.2 Proposed Expansion

Production Capacity Increase

HMC intends to increase its annual production capacity to 4 Million WMT with an annual extraction rate of 6 Million WMT to answer for and take opportunity of the promising demand and good price for nickel.

The increase in production capacity will require additional heavy equipment and machineries. Shown in Table 1.4.6 is the projected type and quantity of heavy equipment and machineries that HMC will utilize in the expansion phase for mining and road maintenance operation:

Table 1.4.6 Projected machinery and equipment needed for Tagana-an Nickel Mining Project expansion

Equipment	Units
Dump Trucks	191
Excavators	41
Breaker Attachment	6
Bulldozers	16
Payloaders	13
Road Graders	13
Vibratory Compactors	13
Water Trucks	14
Fuel Trucks	11
Fire Truck	1
Service Vehicles	57
Tractors	9
Light Towers	17
LCT's	10
Service Boats	11
Vibro Drill	4

Possible Mining Sequence

There are four (4) main recoverable and explored deposits of nickel in the island apart from those already mined. Figure 1.4.1 shows the location of remaining deposits that will be mined.

a. *Hilltop East (61 has.)* – Located on the eastern margin of the north pit. The hilltop east is divided into sub-deposits namely area 4 & 6.

b. *Western deposit (47 has.)* – At present, the previous western pit mined was mined-out and is still undergoing condemnation drilling. It is observed that it extends towards eastern side of the pit.

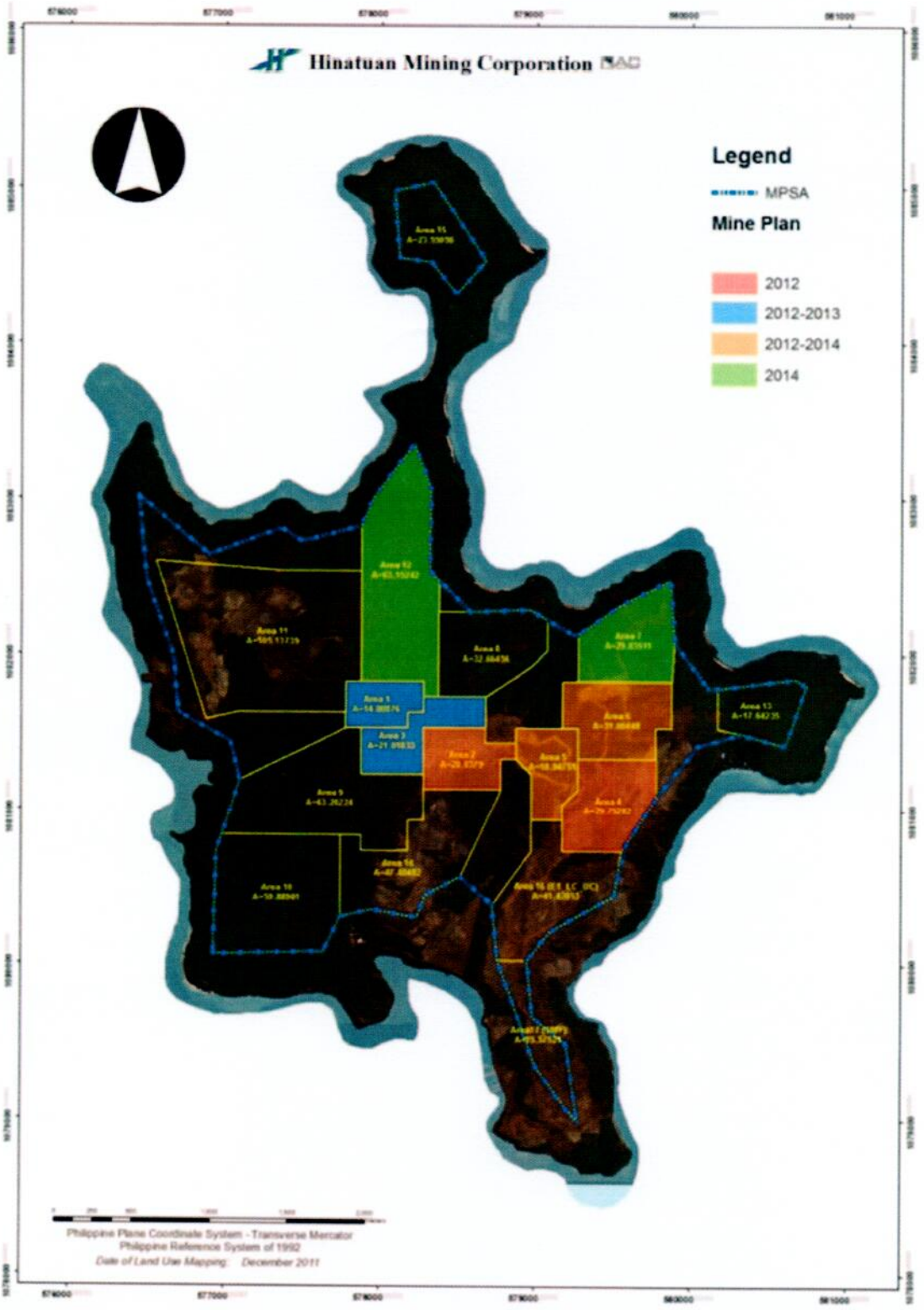
c. *Cortes deposit (105 has.)* – At present, the Cortes pit was already mined-out. Limonite deposit can be mined by extending its peripheral limit by 100-200 m particularly from the northern and southern edge of the pit.

d. *Hilltop deposit (74 has.)* – The area is located at the north of northern, central, southern and western deposits and immediately southeast of Cortes deposit. The hilltop is divided into sub-deposits namely area 1, 2, 3, & 5.

e. *Exploration areas (290 has.)* – HMC is currently conducting exploration drilling with initial distance of 100 x 100 meters. Development drilling will further be conducted in delineated areas that show potential marketable ore deposits. The exploration areas include areas 7, 8, 9, 10, 12, 13 & 15.ok

Condemnation drilling is also being done along mined-out areas to determine additional resources of marketable low grade limonite.

Figure 1.4.1. Mining sequence of Tagana-an Nickel Mining Project



Life of Mine

With the measured and inferred ore resource data, it is projected that the life of mine is only nine (9) years. However, the changing economic landscape could mean that ores with lower percent nickel may prove to be recoverable in the future. HMC may still be mining the island for several more years. This will depend on the mineral exploration of the island by HMC and on the financial economics of nickel extraction and export.

1.4 PROCESS/TECHNOLOGY OPTIONS

The nickel deposits at Hinatuan Island are only about 5m to 30m thick from the surface. HMC operates using bench or contour mining techniques, which results to low cost production. This method only requires the use of excavators, tractors, and dump trucks and does not require specialized equipment, explosives, chemicals or complex waste handling.

HMC's mining and beneficiation operations require no processing plant, thereby requiring a simple and minimal infrastructure. Unlike the copper and gold industries, beneficiation of lateritic nickel ore undergoes simple physical processes from extraction to marketing. No major use of chemical and reagents is involved in the process.

In addition, the mines are located near tidewater loading areas, enabling easy hauling to barges. Further, since the mine pits are shallow, making the rehabilitation of mined-out areas a simple and straightforward process.

1.5 PROJECT SIZE

The project will be limited to the area provided under the MPSA of 773.77 hectares and an annual production rate of 4,000,000 WMT of saprolite and limonite. Table 1.6.1 shows the comparison of current operation and the proposed expansion:

Table 1.6.1 Comparison between current operation and the proposed expansion

Particulars	**Year 2012**	**Proposed Expansion**
MPSA Land Area	773.77 hectares	SAME
Estimated Mineral Resource	16.3 milliona WMT	31.6 millionb WMT
Saprolite and Limonite Annual Production Capacity	1.5 million WMT	4 million WMT
No. of vehicles and heavy equipment involve in production	300	427
No. of LCT	12	19
DSO Destination	Japan and China	THPAL in Claver, SdN, Japan and China
No. of Mining Contractors	3	5
Mode of ore transport	Conventional hauling	SAME
Fuel consumption	4,666,645	7,000,000
No. of Beaching Areas	3	SAME
Total annual wharf capacity	WMT	WMT

No. of manpower involved during off season	377	400
No. of manpower involved during peak season	680	821
Support Facilities	3	SAME
Annual production cost	Php 1,344,727,153.00	Php 2,151,563,445.00

Note: a – measured resource as of December 2012; b – measured and indicated resource as of 2012

1.7 DESCRIPTION OF PROJECT PHASES

HMC is already using the mining method of bench/contour mining in its actual operation. For the expansion phase, the same method will be implemented. All the activities covered in the pre-construction phase such as surveying and geological mapping were already undertaken by HMC except for some additional exploration and condemnation drilling.

1.7.1 Pre-Construction Phase

In the actual experience of HMC, vibro drilling is first undertaken to determine the presence of an economically viable nickel deposit. Simultaneously, the vertical and horizontal extents of the deposit were known and serve as guide in the design and planning of the succeeding stripping and mining operations.

Exploration drilling is carried out at 100m interval then reduced to 50m and consequently to 25m for detailed drilling and for blocking of the ore. The assay and tonnage of the ore reserves, thickness of overburden and ore deposits and other basic fundamental data concerning the deposit are determined by detailed drilling. HMC has already conducted exploration drilling except blocking the extent of mineral reserves on some of the mine block areas.

1.7.2 Construction Phase

During the construction phase, the activities that will be undertaken by HMC is the preparation of mine pit by clearing of vegetation and removal of overburden.
Clearing / Stripping

After delineating the ore body by 25m x 25m grid interval development drilling, the area is cleared and grubbed of vegetation using crawler tractors prior to overburden stripping. The area to be cleared is properly marked along its borders and corners by mine surveyors.

After clearing the area, bench forming will follow using bulldozers which will establish guides for the hydraulic excavators (backhoe) and hauling trucks (dump trucks) during stripping operations. Following the stripping plan, benches of 3-m high are excavated until it reaches the saprolite zone where mining starts.

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The buildings shall be removed and the area revegetated.

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1.8 MANPOWER

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Table 1.8.1 Manpower requirement of HMC during peak season

Department	Company	Contractor	Total
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Administration	30	72	102
Assay Laboratory	12	25	37
MSHED/ORMM	24	62	86
Total	**156**	**525**	**680**

Table 1.8.2 Manpower requirement of HMC during off-peak season

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Technical Services	31	**66**	97
Administration	30	**68**	98
Assay Laboratory	12	**-**	12
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Total	**156**	**221**	**377**

Once Tagana-an Nickel Mining Project increases the production capacity, it is expected that additional manpower will be needed to complement the target production increase. Table 1.8.3 and Table 1.8.4 is the projected manpower requirement of HMC once production capacity increases.

Table 1.8.3 Projected peak season manpower requirement of HMC once

production capacity increases Department	Company	Contractor	Total
Production	46	-	46
Mine Engineering	17	45	62
Technical Services	33	75	108
Administration	30	68	98
Assay Laboratory	16	-	16
MSHED/ORMM	24	46	70
Total	166	234	400

Table 1.8.4 Projected off-peak season manpower requirement of HMC once production capacity increases

Department	Company	Contractor	Total
Production	46	325	371
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Technical Services	33	75	108
Administration	30	80	110
Assay Laboratory	16	35	51
MSHED/ORMM	24	65	89
Total	**166**	**655**	**821**

2. PERMIT AND CLEARANCES

2.1 Permit To Operate

Table 2.1 Permit To Operate

DATE ISSUED	PERMIT/CLEARANCE	STATUS (DATE OF EXPIRY)
Apr 14 2016	2016-POA-D-1367-023	Apr 14 2021
Jul 13 2015	2015-POA-G-1367-179	Jul 31 2020
Dec 08 2014	2014-POA-L-1367-271	Dec 08 2019
Jun 27 2014	2014-POA-F-1367-108	Jun 27 2019
Dec- 08 2014	2014-POA-L-1367-272	Dec 08 2019
Jan 13 2013	2013-POA-C-1367-058	Jan 13 2018
Jan 13 2013	2013-POA-C-1367-058	Jan 13 2018
Jan 13 2012	2012-POA-A-1367-010	Jan 13 2013
Jun 21 2010	2010-POA-D-1367-101	Apr 21 2011
Nov 22 2010	2010-POA-K-1367-187	Nov 22 2011
May 15 2007	2007-POA-D-1367-053	Apr 18 2008

2.2 Water Discharge Permit

Table 2.2 Water Discharge Permit

DATE ISSUED	PERMIT/CLEARANCE	STATUS (DATE OF EXPIRY)
Apr 6 2015	2015-WDP-D- 1367-076	Apr 6 2020
Apr 6 2015	2015-WDP-D-1367-078	Apr 6 2020
Apr 6 2015	2015-WDP-D-1367-074	Apr 6 2020
Apr 6 2015	2015-WDP-D-1367-077	Apr 6 2020
Apr 6 2015	2015-WDP-D-1367-075	Apr 6 2020
Jun 27 2014	2014-WDP-F-1367-204	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-205	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-209	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-203	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-207	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-206	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-208	Jun 27 2015
Jun 27 2014	2014-WDP-F-1367-210	Jun 27 2015
Jan 8 2014	2014-WDP-F-1367-005	Jan 8 2015
Jan 8 2014	2014-WDP-F-1367-006	Jan 8 2015
Jan 8 2014	2014-WDP-F-1367-004	Jan 8 2015
Jan 8 2014	2014-WDP-F-1367-002	Jan 8 2015
Jan 8 2014	2014-WDP-F-1367-003	Jan 8 2015
Jul 18 2013	2013-WDP-G-1367-96	Jan 13 2014
Aug 28 2012	2012-WDP-H-1367-108	Aug 28 2013
May 23 2011	2011-WDP-E-1367-053	May 23 2012
Jun 10 2010	2010-WDP-D-1367-050	Apr 21 2011
May 15 2007	2007-WDP-D-1367-028	Apr 18 2008
Aug 13 2007	2007-WDP-G-1367-045	Jul 23 2008

2.3 CCO Registration Certificates

Table 2.3 CCO Registration Certificates

DATE ISSUED	PERMIT/CLEARANCE	STATUS (DATE OF EXPIRY)
Oct 07 2013	CCO 13-0006Hg	
Nov 11 2004	CCO-PCB-04-01-000144	

2.4 CNC/ECC

Table 2.4 CNC/ECC

DATE ISSUED	PERMIT/CLEARANCE	STATUS (DATE OF EXPIRY)
Aug 10 1998	Certificate of Non-Coverage	
	ECC No.: 1367-2007-1226-124	
Feb 05 2015	ECC-Co-1312-0044	