

**A. Project Fact Sheet**

The Itoгон-Suyoc Resources Inc. plans to increase the production capacity of Sangilo Mines Project from 200 tons per day (tpd) to 500 tpd. The project consists of an underground gold mine and mill plant.

The Project is covered by four patented mining claims namely: Taka, Sesame, Tabaan and King Fr. It has a total area of 35.26 hectares (ha). However, the existing project utilizes 25 ha only. The 200 tpd ECC was issued on 20 September 2018 by the EMB CAR Office.

The expansion project includes upgrading the existing 200 tpd to 500 tpd plant capacity, and increase in area from 25 ha to 35.26 h.



Project Name	Sangilo Mines Expansion Project
Project Type	Resource extraction and processing
Project Location	Barangays Ampucao and Poblacion, Itoгон, Benguet
Project Capacity/Size	200 tpd (68,200 tons per year) to 500 tpd (182,500tpy)
Project Area	25 ha to 35.26 ha
Project Cost	PhP507,140,000.00
Project Proponent	Itoгон-Suyoc Resources Inc. (ISRI)
Proponent's Address	
Mine Site:	Sangilo, Itoгон, Benquet, P.O. Box 463, Baguio City ,2600
Head Office:	Unit 3304 B- West Tower PSE Centre, Pasig City 1605, Philippines
Contact Person/Designation	Mr. Eric S. Andal, PhD Vice President for Geology and Exploration, OIC Resident Manager Ms. Marcela C. Lumbania MEPEO Manager & PCO
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The primary impact area identified for the project is the 35.26 ha area covered by the proposed amendment. Project activities and operations will be within the area of the proposed amended Environmental Compliance Certificate (ECC). In terms of socioeconomic impacts, barangays Ampucao and Poblacion were considered as primary impact areas and the municipality of Itoyon as secondary impact area.

Environmental studies focused on the identified project location of each component as the primary impact area. All information and data gathered were compiled and analyzed based on the Environmental Impact Assessment Guidelines of DAO 03-30. Field investigation was conducted, together with the secondary data gathered, and the critical parameters for the environmental conditions were established. Actual and applicable impacts were identified and the environmental efforts to be undertaken by the proponent to mitigate or enhance the impacts are recommended. The environmental management and monitoring plan (EMMoP) was prepared.

Environmental consultants and specialists from various disciplines were commissioned to conduct the necessary assessment for the EIA. The EIA team is composed of the following:

NAME	EMB Registration No.	MODULE
Rachel A. Vasquez	IPCO-280	Project Director/ Peer Reviewer
Rainier D. Reyes	IPCO-104	Project Manager
Emmanuel B. Cleofas	IPCO-277	Socio-Cultural, Economic and Political Environment
Anacleto Q. Suelto, Jr.	IPCO-459	Geology/ Geohazards
Roberto Pagulayan	IPCO-173	Freshwater Ecology
Franklin Ramonez		Hydrology
Elijah Dave V. Alderete	IPCO-506	Water Quality
Ronald Pahunang		Air Quality, ERA
Jan Paolo T. Pollisco	IPCO-276	Terrestrial Flora and Fauna

#### B. Summary of Baseline Characterization and Environmental Performance

Environmental Component		Baseline Characteristics and Baseline Performance
Land	Land Use/Land Classification	Majority of the land in the Municipality of Itoyon is devoted to woodland, grassland and mining/mineral zone. The project will not change the existing land use in the area and there will be no tenurial issue since the proposed expansion is within the mining patented area of the proponent.
	Geology/ Geomorphology	<p>Itoyon is generally mountainous with highest elevation of 2,086 meters above sea level located at Mount Ugo.</p> <p>The project area is underlain largely by igneous bodies of quartz, diorite, granodiorite and gabbro. The eastern portion of the claim is underlain mainly by moderately to strongly magnetic, medium to coarse-grained quartz diorite containing secondary biotite. This igneous body is correlated with the Central Cordillera Diorite Complex. The northern and southern portions of the tenement, on the other hand, are underlain mostly by the Lucluban Gabbro.</p> <p>The Balatoc Diatreme, also known as Balatoc Plug, occurs on the west boundary of the ISRI property. The diatreme is a multi-phase breccia pipe that is the youngest host to epithermal mineralization. It consists of an older, peripheral clast-supported breccia (old plug), partially surrounding an intensely altered, finely comminuted matrix-supported breccia (young plug) which is the major lithology within the diatreme. Portions of the old plug breccia which rims the eastern portion</p>

Environmental Component		Baseline Characteristics and Baseline Performance
		<p>of the young plug extends inside the ISRI property between 23 vein and 96 vein.</p> <p>High grade disseminated gold mineralization is found where epithermal veins cut across collapse and intrusive breccias around the outer perimeter of the Balatoc Diatreme. These bodies referred to as the GW breccia pods resulted from the high permeability of clast-supported breccia which allowed the fluids from epithermal veins to permeate through the surrounding breccia, altering the matrix and depositing gold and other sulfides. This is a potential underground GW-breccia target.</p>
	Natural Hazards	Based on the Landslide and Flood Susceptibility Map of Baguio City Quadrangle, the project area is generally located in an area with high susceptibility to landslide.
	Pedology/Soils	<p>The soil type at Ampucao consisted mainly of clay loam and sandy clay loam. Poblacion is overlain with loam, silt loam and sandy loam soils.</p> <p>The project area is underlain with Bakakeng clay which has dark reddish brown to red color. Bakakeng clay soil texture is from clay loam to silty clay.</p> <p>The project will not change the soil fertility/quality of the area.</p>
	Terrestrial Ecology	<p>In general, the assessed areas were mostly mixed pine forests to pine forests, scrublands and grasslands. Overall, diversity is Very High at <math>H' = 3.08</math>, with evenness very high at <math>J' = 0.85</math>. On a per plot basis, diversity ranges from <math>H' = 1.07</math> to <math>H' = 1.97</math> which are very low to low, respectively. The lowest can be observed in TFL 4 which is characterized as a grassland. This habitat is mostly dominated by grasses such as <i>Paspalum conjugatum</i> (carabao grass), which mostly dominates the whole area. On the other hand, the highest can be observed in TFL 5 and TFL 7 with <math>H' = 1.97</math> and <math>H' = 1.92</math>, respectively, since the mixed pine forest exhibits different species as compared to a pure pine forest stand.</p> <p>In total, 188 individuals were listed during the wet and dry seasons. Within the 10 plots assessed, there were 38 species and 31 families. Abundance of species show that <i>Tithonia diversifolia</i> (wild sunflower) ranks 1<sup>st</sup>, with 34 individuals, while <i>Justicia gendarussa</i> (tuhod manok) ranks 2<sup>nd</sup>, with 22 individuals each. <i>Pinus kesiya</i> (Benguet pine) ranks 3<sup>rd</sup> with 16 individuals and followed by <i>Paspalum conjugatum</i> (carabao grass) with 15 individuals</p> <p>Importance value ranks flora species based on the relative values of abundance, frequency and dominance. In this assessment, trees are the dominant species in the area. <i>Pinus kesiya</i> (Benguet pine) ranked first in terms of Importance value due to higher frequency and dominance values, despite having lower abundance counts compared to other species. <i>Pterocarpus indicus</i> (Narra) ranks 2<sup>nd</sup> and <i>Mangifera indica</i> (Manga) ranks 3<sup>rd</sup>. These trees cover more basal area compared to shrubs and grasses.</p>

Environmental Component		Baseline Characteristics and Baseline Performance
		<p><i>Corvus macrorhynchos</i> (large-billed crow) exhibited the highest number of individuals with 53. This species may be found in groups, contributing to the increased number of individuals. Next in rank is the <i>Zosterops montanus</i> (mountain white-eye), and then third in rank is <i>Hypsipetes philippinus</i> (Philippine Bulbul). Other lesser ranked avifaunal species are Swifts, Bulbuls and Flower peckers. Migrant species observed during the Dry season include <i>Hirundo rustica</i> (Barn swallow) and <i>Lanius schach</i> (Long-tailed shrike).</p> <p>Seventeen flora and fauna species were listed as endemic species. Majority belong to terrestrial fauna at 14 bird species and 1 herp. Flora species only amount to 1 which is <i>A. blancoi</i> (Antipolo).</p>
<b>Water</b>	Water Quality	Records from the 2015-2020 Self Monitoring Report show compliance to DENR Water Quality Guidelines for the monitored parameters of Total Suspended Solids, Cyanide, Arsenic, Lead, Zinc, Lead, Nitrate, pH, Oil and Grease, Total coliform, E. coli, and Fecal coliform.
	Freshwater Ecology	<p>The existing project has no monitoring data on freshwater ecology for the concerned creeks and river. For this report, primary data gathering was conducted for both dry and wet season. Sampling was done in Sangilo Creek, Tolbing Creek and Ambalanga River.</p> <p>Very few macro-invertebrates were observed in the sites during the sampling activity. Of the eight (8) taxa indicated, the adult backswimmers which are usually surface swimmer but rest on stone/rock or surface/undersurface vegetation are mostly observed. They are usually regarded as pollution-tolerant organisms.</p> <p>Dragonflies and damselflies were also observed. Damselfly larvae are reported to be moderately tolerant to very tolerant of pollution, while the dragonflies may be sensitive to tolerant depending on the genus or species.</p> <p>No fish was caught during the sampling time. Tadpole larvae were also part of the collection in Tolbing Creek, as frogs spend part of their life stage in water.</p> <p>Nineteen genera of phytoplankton were noted in the four sites collectively. Diatoms are the dominant group with twelve (12) genera. The blue-green and green algae were relatively few in Sangilo and Tolbing Creeks, indicating a possibly low level of organic loading in these sites. As to the Sangilo-Tolbing Creek, only 1 genus of diatom was present. For Ambalanga River, there were more blue-green and green algae than are diatoms, an opposite from that of Sangilo and Tolbing. This may indicate the presence of organic pollution contributions to the river. The Ambalanga sampling site is located in the vicinity of Itogon town and has resorts along the riverbanks. No zooplankton was observed in the water samples of all sites. They may be present but probably the density is so low to be detected in the rapid sampling done.</p>
<b>Air</b>	Meteorology	The project area belongs to Type I Climate based on the Modified Coronas Climate Classification (1951 to 2010) This type of climate has pronounced dry season from November to April and wet for the rest of the year.

Environmental Component	Baseline Characteristics and Baseline Performance	
Ambient Air Quality	Ambient Air Quality	<p>Air quality data are taken from 2016 to 2020 Self-Monitoring Reports. Sampling in the said period involved monitoring of one-hour average concentrations of PM<sub>10</sub>, TSP, SO<sub>2</sub>, and NO<sub>2</sub> at total of nine (9) locations.</p> <p>TSP levels range from 3.6 to 110.2 µg/Nm<sup>3</sup>. Only one (1) data was reported in 2020. Results were within the ambient air quality standard set for TSP at 300 µg/Nm<sup>3</sup>.</p> <p>Measured PM<sub>10</sub> range from 20.9 to 190.6 µg/Nm<sup>3</sup>. Results were within the ambient air quality standard set for PM<sub>10</sub> at 200 µg/Nm<sup>3</sup>.</p> <p>NO<sub>2</sub> levels were mostly undetected with measured maximum concentration of 8.7 µg/Nm<sup>3</sup>, lower than the ambient standard set for NO<sub>2</sub> at 260 µg/Nm<sup>3</sup>.</p> <p>SO<sub>2</sub> was not detected at all sampling stations at the time of monitoring.</p> <p>Ambient air monitoring conducted on July 13 to 15, 2021. Pollutants monitored were TSP, PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>2</sub>, and metals in air (Pb, As, Sb, and Cd). All results were within the DENR Standards.</p>
	Ambient Noise	<p>Noise monitoring data based on the SMR from 2016 to 2020 were compared with the ambient daytime noise standards set heavy industrial areas at 75 dBA in which four (4) of the monitoring stations (Ore yard/mill crushing area, ball mill area, and fronting of assay laboratory). Stations within the mill plant had noise level slightly above the noise standard.</p>
People	Demography	<p>Overall, the Municipality experienced an increase in population between 2015 and 2020. The Municipality's population grew by 2.18% from a population of 59,820 in 2015 to a population of 61,498 in 2020.</p> <p>Barangay Ampucao registered a population of 11,118 in 2015 and 10,924 in 2020. This represents a 1.74% decrease in 2020. Barangay Poblacion experienced a higher increase in population. From its population of 3,663 in 2015, the barangay registered a population of 4,221 in 2020 or 15.23% increase.</p>
	Income and Employment	<p>The project area is within an enclosed compound with no settlers. Therefore, there will be no displacement of settlers.</p>
	Health Resources	<p>The proposed expansion of the Project is not expected to affect public health and safety negatively.</p>
	Access to Basic Services	<p>The proposed expansion of the Project is not expected to affect access to transportation negatively. The Proponent maintains its own fleet of vehicles and a fleet of service vehicles-for-hire. Also, the project maintains its own power and sups.</p>

### C. Summary of Alternatives Considered

Alternative sitings are considered for the selection of quarry sites. There are seven possible quarry sites identified. Among the criteria for selection of quarry site is the volume and quality of materials, susceptibility of the area to landslide and possible impact to terrestrial flora and fauna.

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Different types of mining method are considered for the underground mining operation. The mining method selection is based on the type and nature of mineral deposit, the type of equipment to be used that will operate efficiently.

The considered mining methods to be employed are cut-and-fill stoping for wide veins and rill stoping for narrow veins with competent wall rock. Conventional operation will be used for narrow veins. It includes drilling using rock drill, blasting, scraping and filling. Jumbo Drill Machine and LHD will be used for wide veins. Locomotive mine cars, slushier and mucking machines will still be used on the existing operating levels while LHD, underground trucks and Jumbo Drill will be used in the additional production levels.

#### **D. Summary of the Main Impacts and Residual Effects After Applying Mitigation**

The main impacts related to the expansion of the project capacity from 200 tpd to 500 tpd are:

Main Impacts	Mitigation to be Applied	Residual Effects
Increased extraction of ore	Extraction shall be within the patented claim	Depletion of mineral resources
Increased waste production of mine and mill plant	Provision of adequate mine waste rock storage facility, tailings storage facility, MRF and hazardous waste facility	Waste rock storage facility and TSF will require rehabilitation after project decommissioning; Alteration of topography
Increased manpower requirement which results to influx of people	Provision of quarters and bunkhouses Provide security Implement health and safety protocols	Increase in population

#### **E. Risk and Uncertainties Relating to the Findings and Implication for Decision-Making**

The conduct of the EIA study was guided by the best available information at the time of preparation. The identified impacts of the existing project, impacts and proposed mitigation of the proposed amendment were identified using information from modelling, trends analysis and information provided by the local community. The study will serve as a guide and tool for project proponent in the management of the project's impact. In addition, the study can also serve as guide for local government units in making decision related to the project.

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**F. Key Environmental Impacts Management and Monitoring Plan**

## Impact Management Plan

Project Phase / Key Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact / Wastes / Issues	Options for Prevention or Mitigation or Enhancement
I. PRE-CONSTRUCTION PHASE			
II. CONSTRUCTION PHASE / CIVIL WORKS			
Land clearing	Topography	Vegetation loss Alteration of natural topography	Removal of vegetation shall be restricted to the development footprint. The construction footprint shall be clearly demarcated. The clearing boundaries are to be shown to machinery operators with the instruction that machinery is not allowed to operate outside the boundaries. Soil-erosion and sediment-control measures will be constructed in stages to minimize the area of unstable or unprotected soil surfaces; Enhancement of existing vegetation using endemic species
Use of heavy equipment and service vehicles	Air Quality	Air pollution	Maintenance of vehicles, engines and generators used in connection with the construction to limit exhausts
		Increase in total suspended particulates during dry and windy condition	Observation of speed limits especially within the project site Cleaning of paved roads and wetting of unpaved roads Dust suppression along roads
	Soil	Contamination of soil due to improper disposal of used oil	Proper storage and full containment of used oil; Disposal through Department of Environment and Natural Resources (DENR)-recognized treatment/disposal facilities
	Noise	Noise generation	Minimize construction activities involving heavy equipment during evening to daytime especially in areas within hearing distance from existing communities Provide ear plugs or ear muffs to workers exposed to high noise levels
	Water Quality	Contamination of creek due to disposal of used oil and fuel	Surface runoff from fuel and oil storage areas, workshop and vehicle parking areas is to be directed into an oil and water separator (OWS). All OWS are to be regularly cleaned every week of regular PM and housekeeping, every once a month of irregular (at most 1x/ week) PM; Use, handling, storage and disposal shall follow provisions under RA 6969, its IRR and Safety Data Sheet (SDS). Settling ponds are to be installed downstream of the disturbed area to hold surface run-off long enough for suspended sediment to settle out before discharging to the stream; Effluent discharge permits shall be applied for prior operation of the pollution control facility;
People	Threat to workers safety	Implement Road Transport Safety Program Regular inspection of equipment; mine safety and health standards	

Project Phase / Key Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact / Wastes / Issues	Options for Prevention or Mitigation or Enhancement
Domestic waste from construction workers	Health and Sanitation	Threat to health and sanitation	Implement proper waste segregation Disposal of wastes to designated disposal areas Provision of portalets
Generation of mine waste	Water quality	Siltation of water bodies	Mine wastes are to be stockpiled in designated waste dump area and are to be used later for backfilling of mined out stopes, TSF raising fill material, road ballaster, slope stabilization material and other stabilized and non-pollutive projects; Waste dump area is to be installed with proper drainage and settling pond;
Generation of wastewater from mining and milling	Water quality	Pollution of water bodies	Periodic inspection and maintenance of the Tailings Storage Facility (TSF) and its amenities; Regular monitoring of effluent discharge;
Use of water for processing	Water resources	Depletion of water resource due to plant's water consumption	Implementation of water minimization program Installation of rainwater harvesting facility Re-circulation of process water
Underground mining	Land	Occurrence of subsidence	Backfilling of mined out stopes, voids and unused mine openings (Progressive rehabilitation as a mining method);
Generation of solid waste	Soil	Land pollution	Proper implementation of solid waste management in accordance to RA 9003 and it applicable IRR;
Generation of hazardous waste (used acid, containers, medical waste)	Soil/Water Quality	Land / Water pollution	Proper implementation of hazardous waste management (from generation, storage, transport and disposal). Implement safety standard procedure in handling hazardous waste;
	People	Threat to health	Provide and impose use of PPE Implement Safety Standard Procedure
Emission of particulates, SO <sub>x</sub> and NO <sub>x</sub> from heavy equipment, heavy metals from furnace	Air quality	Air pollution	Work out compliance to RA 8749 and its applicable IRR; Proper maintenance of heavy equipment and air pollution control installations;
Use of water for processing	Water	Depletion of water resource	Implementation of water minimization program; Re-circulation of process water;
Excessive noise Blasting/drilling (underground mining)	People	Noise generation	Use of proper Personal Protective Equipment (PPE) ; Provide adequate training to workers in handling and charging of explosives; Install warning devices and implement standard operating procedures (SOPs) relating to blasting activities Regulated and controlled blasting in near-surface working areas



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Project Phase / Key Environmental Aspect	Environmental Component Likely to be Affected	Potential Impact / Wastes / Issues	Options for Prevention or Mitigation or Enhancement
Dust generation during handling of ore and waste materials, crushing and grinding	Air quality	Air pollution	Crushing equipment should have air pollution control installation (APCI) to minimize dust emission; Maintenance of dust cover and good housekeeping
	People	Threat to health	Provide and impose use of PPE
Noise from Handling Equipment	People	Threat to health	Provide and impose use of PPE
Delivery of supply materials	People	Traffic congestion	Implement proper Traffic Management and Logistics Obey local traffic rules and regulations
Land Disturbance due to quarrying	Land	Precedent of landslides; Damage to biodiversity and habitat;	Rehabilitation through civil works such slope stabilization; Rehabilitation through combination of vegetative and tree planting; Rehabilitation through combined techniques of civil and tree/ vegetative planting;
Damage to biodiversity and habitat;	Flora, fauna, animals	- Threat to habitat	- Minimize area of disturbance; - Delienate the actual area;
<b>V. ABANDONMENT</b>			
Closure and full abandonment of plant facilities, office buildings, housing and other admin facilities	Land	Open opportunity for local government to use the area for its intended purpose in coordination with DENR-EMB as the environmental regulatory body	Properly demolish condemned facilities and rehabilitation of the site to ensure safety and address other issues to make possible the intended use of the area based on early agreements among the parties concerned
Lay-off of personnel hired during operations phase	People	Loss of income	Provide separation pay and opportunity to be hired to other plant of the company