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1 EXECUTIVE SUMMARY

1.1 Introduction and Background

The Pagna Soapstone mine Deposit mine area is agricultural land of, village: Pagna, Tehsil: Bageshwar, District: Bageshwar, State: Uttarakhand over an area of 4.944ha. for the production capacity of 47782TPA(Top Soil-2629,Mineral-14557& Waste-30596).Coordinates for the lease area are Latitude: 29°47'2.18"N to and longitude: 79°48'32.68"E

The letter of intent for grant of mining lease in Village Pagna, Tehsil & Dist Bageshwar (Uttarakhand) in Khasra no. 1932,1942,1950 and others was issued vide letter no. 1825/VII-1/2018/121/Kh/14 on dated 31/08/2018.

As per EIA Notification dated 14th September 2006 and subsequent amendments/Order dated 04.09.2018 & 13.09.2018 passed by Hon'ble NGT in O.A No. 17382016 & 186/2016 in the matter titled "Shri Sudarsan Das V/s State of West Bengal & Ors" and "Shri Satendra Pandey V/s MOEF & CC and respectively MOEF&CC Vide letter No. 11011/175/2018-IA-II(M) of dated 12.12.2018 directed that all mine lease area from 5 to 25ha falling under Category B2 will be considered as B1 by SEIAA/SEAC as well as for cluster situation therefore, EIA, EMP and Public Considered for areas 5 to 25 Ha is required, the project comes under B1 Category with cluster situation.

The proposal falls in projects activity no 1 (a) of schedule of the EIA Notification, 2006 and as the lease area is less than 100 ha. It falls under category B1 vide amendment EIA notification dated 14.08.2018. and the proposal will be appraised and requiring prior environmental clearance by SEIAA, Uttarakhand.

The studies were undertaken by The Consultant namely, Overseas Min-Tech Consultants ('OMTC'). OMTC is a National Accreditation Board for Education and Training (NABET) Accredited Consultant Organization (ACO) and is qualified to prepare EIA reports for Project / Activity 1(a) (Mining of Minerals), a mandatory requirement for agencies submitting such studies to regulators for the purpose of seeking EC.

The EIA study report has been based upon the following :-

- Field data collection on different aspects of environment including air, soil, water, land, meteorology, noise, flora, fauna, agriculture and socio-economy in the study area of 10 km radius with mine as its center.
- Study of opencast mining methodology, water requirement, source of pollutants and pollution control strategy.
- Ecological Prospective and Green Belt Development.

The EIA study evaluates the impact on the present environmental scenario and check out the environmental management plan incorporating further step to mitigate the adverse impacts of air, noise, water, land pollution on environment.

1.2 Location and Communication

Table 1-1: Location and Communication from ML area

S.No.	Particulars	Details
A.	Nature of the Project	Proposed Pagna Soap Stone Deposit
B.	**Size of the Project**	
1.	Mine area	4.944 Hect.
2.	Production Capacity	47782TPA(TopSoil-2629,Mineral-14557& Waste-

		30596)
C	**Location Details**	
1.	Village	Pagna
2.	Taluka	Bageshwar
3.	District	Bageswar
4.	State	Uttrakhand
5.	Toposheet Numbers	53O/13
		Latitude: 29°47’2.18”N to 29°47’5.98”N Longitude: 79°48’32.68”E to 79°48’28.46”E

1.3 Project Chronology till Date

1. Pagna Soap Stone deposit of Shree Bharat Singh Bhakuni S/o Shri Anand Singh Bhakuni submitted relevant documents, namely Form-1 (as per the EIA Notification 2006, as amended till date) along with a Pre-feasibility Report, Approved Mining plan and proposed Terms of References (ToR) for carrying out environmental studies to the State Environment Impact Assessment Authority, Uttarakhand, with vide proposal no SIA/UK/MIN/37881/2019 on dated 23rd September 2019.
2. A presentation to the SEAC, Uttarakhand, to finalize the ToR for the EIA study before SEAC was held on 23rd October 2019.
3. The SEIAA prescribed ToR file No. 126/SEAC on dated 18th November 2019.
4. OMTC carried out monitoring studies during the October ,November and December presented the findings in draft EIA report.

1.4 Project Description

1.4.1 Study Area at a Glance

The study area is taken in accordance with the provisions of sector specific EIA guidance manual for Mining of Minerals manual, published by Ministry of Environment and Forests, during 2010. The study area for the Soapstone Mining Project was as follows:

- The proposed project area (M. L. area) is considered as ‘Core Zone’.
- 10 km radius from the boundary limits of the M.L. area is considered as ‘Buffer Zone’.

1.4.2 Utilities

Table 1-2: Requirement for the mining

S.No.	Requirements			Quantity and Nos.	
1.	Water Requirement	Domestic Propose	Drinking	0.61KLD	3.19 KLD
			Sanitation	2.74KLD	
		Dust Suppression		451 m^2. area per 0.2 L	0.092 KLD
		Greenbelt Development		2089 plants per 1.0LPD	2.08KLD
	Total				**4.91 KLD**

2.	Man-Power Requirement	71

1.4.3 Topography and Drainage

Topography: - The general slope of the area is towards East direction. Which is sloping towards East from 25° to 30° .The topography of the area is rough and rugged. The area by and large has a mild slope. The highest altitude recorded with in the area 948 m RL towards South of the area near Pillar A and lowest altitude recorded is 817m RL towards North near pillar I. .

Drainage Pattern: -In this lease area two guls are flowing from SW to NE and S to N the safety zone of 5m is left surrounding Guls. Retaining walls will be constructed on both sides of the Guls where mining is done to prevent flow of water in the mining pits during rains from Guls. One Gadhera is flowing from south to north outside the lease area in the western part at distance of 30 to 50m.

Regional Geology

Surface geological plan and section at 100m interval on the scale of 1:1000 showing local lithology, structure features, mineralized zone and cross sections from boundary has been shown plate no.IV with contour interval of 10mts.

1. Showing disposition of all lithological units with clear nomenclature and their description is discussed below and shown on the geological plan.
2. Contacts of litho units/rock types as outcrops or inferred.
3. Attitudes like strike, dip at places.
4. Structural features like joint faults,etc shown.
5. Delineation of mineralized zone with definite demarcation as observed /inferred during prospecting.

1.4.4 Mineable Reserve & Life of Mine

Table 1-3: Mineable Reserves

Total Reserves + Resources A + B	**400514tonne**
A. Mineral Reserve Proved Mineral Reserve 111	60779.5
Total	**60779.5**
B. Total Remaining Resources	
Feasibility mineral Resource 211 Prefeasibility mineral resource 221 and 222	161965.5
Measured mineral resource 331 Indicated mineral resource 332 Inferred mineral resource 333	180071.5
Total Resources B	**342037**
Total Reserves + Resources A + B	**400514tonne**

Life Of mine	Mineable reserve/ Average annual production
	267294/14557
	= 18 years

1.4.5 Mining Method

- The proposed method of Mining will be Open-cast semi-mechanized mining method by forming benches of 3.0 m height and width more than height using JCB excavator on contract.
- The mining benches will be formed along the contours, the height of the benches will be kept of 3m and width more than 4m initially to facilitate separation of soapstone and remove the mineral and interburden and soil by mules.
- Drilling and blasting is not Proposed.
- All the benches will be connected by mule track, so that mule can reach to the working faces the slope of the benches will be kept 70^0 but for exploitation of mineral benches will be steepened and width will be reduced and average slope of the faces will be kept 65^0-70^0

Table 1-4: Extent of Opencast Mechanized

Activities	Manual/ mechanization
Removal of top soil	By manual labour / excavator
Excavation and removal of OB re-handling of OB & back filling etc.	By manual labour / excavator
Excavation and sorting of mineral soapstone	By manual labour
Packing of mineral in bags	By manual labour
Transportation of mineral from pit head to nearest road point	By Khachhars / Manually to PWD road
Unloading of bags & stocking of bags at road stock yard	By manual labour
Loading of bags into the trucks at PWD road	By Manual labour
Transportation of mineral from road point to Haldwani	By Trucks

1.5 Meteorology Long Term Meteorology (Secondary Data)

Information presented in subsequent paragraphs is from the Indian Meteorological Department (IMD), Long Term Climatological Tables, 1971-2000, Joshimath. These tables give useful information about a region's weather, since it was collected over a period of 30 years.

1.5.1 Temperature

The month from April to July are considered as hottest with increase in temperatures. June is generally the hottest month with a mean daily maximum temperature of about 24.8°C and mean daily minimum of about 16.3°C. The highest temperature recorded at Joshimath 34.2°C on 14th June 1974. From November, both day and night temperatures start decreasing rapidly. January is generally the coldest month with the mean daily maximum temperature at about 11.0°C and mean daily minimum at about 2.0°C. Minimum temperature sometimes drops down to subzero temperatures and the lowest temperature recorded -15.1°C on 15th January 1974.

1.5.2 Wind

Long- term wind direction data indicates that the predominant wind during the study period indicates that the predominant wind during the study period (Post Monsoon Season October to December) 2018 is East to West (First Dominant) & Second dominant direction SE to NW

1.5.3 Rainfall

As per IMD station at Joshimath the rainfall in region was observed to be 1104.1mm in a year, bulk of rainfall was received in monsoon months from June to September. Maximum cloud cover was observed in the months of June to September.

1.5.4 Relative Humidity

Most humid conditions were found in the monsoons, followed by post-monsoons, winter and summer in that order. Mornings were more humid than evenings and humidity ranged from a high of 83-90% in monsoon mornings to a low of 52-55% in winter evenings..

1.5.5 Site Specific Meteorology

Environmental monitoring was carried out for Post- Monsoon season covering the months of (October ,November & December) 2019. Meteorological data is collected for wind speed, wind direction, temperature, rainfall and cloud cover.

1.6 Existing Environment Scenario

1.6.1 Land Use

Land Use of the Study Area

The land use land cover map of the study area has been prepared using recent Landsat satellite image, area and distance calculations have been carried out using GIS software after geo- referencing and interpretation. Total Land covers an area of 32630.7 ha. Out of which Agriculture land 8919.2(27.33%), Built up land 2203.8(6.75%), Hill Area 20931.7(64.15%), Metal Road 95.1(0.29%), Rivers 396.4(1.21%), Waste Land 84.5(0.26%).

1.6.2 Soil Quality

The soils of study area are predominantly Sandy loam in texture. The pH of the soil is ranges from 7.92 to 7.52. The soil being of friable consistency, the bulk density of the soil is in the range of 1.72 to 1.62 g/cm3 whereas the porosity and water holding capacity are in the range of 36.92 to 34.35 % and 31.24 to 26.58 % respectively. It was observed that the Values of bulk density, porosity and water holding capacity varied according to the soil texture. Density of soils was found to be in definite range as per the texture, porosity and water holding capacity was found in marginal range rather poor water holding capacity as per the texture.

1.6.3 Ambient Air Quality

The above analysis report shows that since this mine is not operating and traffic on the National Highway is also less, population in the village is not more PM10 (65.33-42.26),

$PM_{2.5}$(35.43-18.46), NO_2(27.41-16.98), SO(17.77-11.15), Free Silica(1.96-1.6) The baseline ambient air quality was found to be within the permissible limits of NAAQS.

1.6.4 Noise

Ambient noise samples were collected from 6 locations in the study area; samples were collected from residential as well as industrial area (Mine site).

Day time Noise Levels (Leq day)

The day time (Leq day) noise levels observed in the range of 52.4 to 42.6 dB (A) in residential area.

Night time Noise Levels (Leq night)

The night time (Leq night) Noise levels observed in the range of 42.6 to 34.4 dB (A) which is within the prescribed limit of 45 dB (A) in residential area.

1.6.5 Water Environment

Groundwater Resources

The Ground Water Resources and Irrigation Potential of the district were estimated during 2011 in collaboration with the Government of Uttarakhand using the methodology suggested by "Ground Water Estimation Committee (GEC-97)".

Groundwater Quality

The analysis results shows that the pH for the ground water samples GW1, GW2,GW3, GW4, GW5 & GW6ranged from 8.20 to 7.44 indicating slightly alkaline in nature. The TDS (Total Dissolved Solids) were found to be in the range 320 mg/l to 208 mg/ l which is within the permissible limit of 2000 mg/l. Total Hardness of Ground water samples in the study area was found to be 252.0-216.0 mg/l which is within permissible limit. Alkalinity indicates better buffering capacity of water and ranges between 156.0-110.0 mg/l.

Fluoride content varies from 0.52 mg/l – 0.26 mg/l which is within permissible limit. The overall ground water quality in the study area was found to be mineralized with respect to total dissolved solids (320.0 mg/l to208.0 mg/ l), chloride (84.56 mg/l to 31.99 mg/l), sulphate (36.60mg/l to 16.80mg/l).

Surface Water Quality

Surface water samples were collected, analyzed and compared with Indian standard for drinking water 10500:2012, pH value was found to be 7.74 which indicate that surface water is alkaline in nature; TDS was found to be 210 mg/l. Dissolve oxygen were found about 6.2mg/l..

Biological Environment

Ecological study is essential to understand the impact of industrialization and urbanization on existing flora and fauna of the study area.

There is no wildlife sanctuary, National park, Biosphere reserve, Wildlife corridors, Tiger/ Elephant reserve within 10 km radius of the mining lease.

1.6.6 Cropping Pattern

Crop	Name	Season
Rabi	Massar, Gram, Mustard Seeds, Potatoes, Onions	September-April
Kharif	Maize, Paddy, Mash, Rice	June – September

1.6.7 Socio Economic Status

The study area includes 175 villages within the 10 km. radius with a total population 57130 as per census 2011.In the study area about 41599 (73%)of the total population is literates & 15531(27%) .As per census 2011, about Working Population (23921) 9794 of the Main Cultivator, 411are Main Agriculture Labour, 287 are Main Household Industries, 6311 are Main Other Working, 3242 are Marginal Cultivator, 1780 are Marginal Agriculture Labour, 250 are Marginal Household Industries,1846 are Marginal Other Working..

1.6.8 Anticipated Environmental Impact and Mitigation Measure

1.6.9 Impact on Air Environment

- Water sprinkling will be done twice during the day in summer season and once during the day in winter season for settling of dust particles.
- Sharp drill bits will be used for drilling and they will be maintained periodically to reduce the generation of dust.
- Transportation of mineral will be done on Kaccha road which will generate dust and rest of the distance will be on National Highway will not cause air pollution.
- Drilling machines will have bag filters attached to them also to prevent the dust to get air borne.

1.6.10 Impact of Traffic Density:

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Existing traffic on these roads was compared with the carrying capacity of these roads as per IRC guidelines and it was found that the roads are capable of handling the additional traffic/load.

1.6.11 Impact on Noise Environment

The expected noise levels in the working environment are compared with standards prescribed by occupational safety and health administration (OSHA-USA) & CPCB-NEW DELHI, the noise levels are expected to be in the acceptable range.

1.6.12 Impact on Water Environment

Impact on Surface Water Quantity

Surface water will not be utilized and impact on surface water quantity is not anticipated due to the proposed activity.

Impact on Surface Water Quality

The proposed opencast mining operation may cause water pollution. The sources of pollution generally are:

Wash off from dumps
Soil Erosion

Mitigation Measures

In open cast mining pits as well as on dumps, it is necessary that the rainwater falling outside the edge limit of the working areas will not be allowed to enter into the pit and working areas. Therefore it is proposed to develop garlands drains around the mining pits and dumps to arrest the surface runoff water and divert it to lower synclines without any contact with the mining operations.

In the lease for proper drainage of water, a set of garland drainages will be made in the mining lease area and the water will be accumulated at the lower most gradient by constructing siltation tanks which will act as water storage in the area as well as collection of silts. Silts will be regularly cleared regularly.

Impact on Groundwater Quality

Since water table is very deep & mining will be carried out much above the water table & therefore there will be no impact on ground water. The impact of mining on groundwater is not anticipated as the mining will be done till 3m only & not going to encounter the groundwater table.

Mitigation Measures of Groundwater

Since water table is very deep & mining will be carried out much above the water table & therefore there will be no impact on ground water. The mining is proposed maximum up to 12 m below the surface during the life of the mine .No working id expected below the water table will be about 40-50m below the bottom of the pit.

1.6.13 Impact on Flora and Fauna

As the mining activities will be confined to core zone only, no adverse impact is foreseen on the flora & fauna in the core zone. To prevent the entry of wildlife animals from entering the lease area proper fencing will be done all around the lease area.

1.6.14 Impact on Top Soil

During mining activity Soapstone is exposed on the surface itself hence no mineral reject & top soil will be generated during this scheme period (five years). This will in turn result in minor changes of topsoil structure.

Mitigation Measures for Top Soil

However, the project design will take into account the preservation of the top soil and its subsequent use during the restoration of the site.

1.6.15 Impact on Socio Economic Status

Socio-economic survey was conducted in five villages within the study area located in all directions with reference to the project site.

The respondents were asked for their awareness/opinion about the project and their opinion about the impacts of the project, which is an important aspect of socio-economic environment, viz. job opportunities, education, health care, transportation facility and economic status.

1.7 Environment Monitoring Program

The monitoring of pollutant in mine will be carried out for air, water, soil and noise. It takes care of all monitoring needs of the mine. Additionally ambient air and work zone monitoring in mine will be conducted in every season near mining operation, loading and transportation (haul road) areas by Government approved private agency. The analysis results of air monitoring will be properly recorded and submitted to the statutory authorities from time to time. Noise measurement of mine equipment will be done once in a year, ambient air monitoring will be done once in one season at three locations (1 in upwind, 1in downwind, 1 in lease area. Ambient noise monitoring will be carried out at 3 locations, 1 within the lease area, and 2 locations of nearest habitation to the lease. Water quality monitoring will be done once in season at two locations& soil quality monitoring will be done

once in a year at 2 locations within the study area. A total of Rs. 0.20 lakhs/- every year will be spent on monitoring of environmental parameters.

1.8 Additional Studies

1.8.1 Risk Assessment and Disaster Management Plan

The following natural /industrial problems may be encountered during the mining operation are:

Inundation-filling of the mine pit due to excessive rains.
Slope failures at the mine faces or stacks.

Water table will not be encountered during proposed working. No high risk accidents like landslides, subsidence flood etc. have been apprehended. But possibility of accidental disaster is also not ruled out. Therefore, all the statutory precautions will be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR- 1961 and the Rules of MCDR-1988.

1.9 Environment Management Plan

The environment management plan is prepared with a view to facilitate effective environmental management of the project. Apart from having an Environmental Management Plan, environment management cell consisting of mines manager, safety officer and environmental officer is constituted. A total of Rs. 2.50Lakhs/- would be spent on environment management activities every year.

1.10 Project Benefits

The surrounding inhabitants around the mine lease area are mainly agricultural oriented. Opportunities for jobs activities will be created and mining will serve as a source of permanent livelihood. The mine will create employment directly or indirectly. Additional, certain works like transportation will be outsourced on contract. So, overall effect of mining is expected to be positive.