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1 EXECUTIVE SUMMARY

1.1 Introduction and Background

The Bajina Soap Stone Deposit Project of Shri Dinesh Singh Parihar is situated in Village-Bajina, Tehsil- Kanda, District-Bageshwar (Uttarakhand) over an area of 4.941 ha in Khasra No. 1544,154, 1546 and others. Coordinates for the lease area are Latitude: 29° 49' 36.8" to 29° 49' 35.0"N and longitude: 79° 54' 01.7" to 79° 54' 11.0""E.

Mining lease was granted in favor of Shri Dinesh Singh Parihar vide order no. 1825/VII-1/16/198-Kh/01 dated 15/12/2016 by govt. of Uttarakhand for a period of 25 years.

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, Uttrakhand.

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	Bajina Soap Stone Deposit Project
B.	**Size of the Project**	
1.	Mine area	4.941ha
2.	Production Capacity	17905TPA
C	**Location Details**	
1.	Village	Bajina
2.	Tehsil	Kanda

S. No.	Particulars	Details
3.	District	Bageshwar
4.	State	Uttarakhand
6.	Toposheet No.	53 O/13
D	**Communication**	
1	Nearest Town / City/village	Bageshwar 12.77km, West from mine site.
2	Nearest Railway Station	Nearest Railway station is Kathgodam about 71.14 Km. on Northern railway section on Delhi – Kathgodam broad-gauge.
3	Nearest Airport	Pantnagar Airport ~97.41 km in South-West direction from the mine site
4	State Boundary	No State boundary passes through the project site.

1.3 Project Chronology till Date

1. **Bajina Soap Stone Deposit** Project Mining Project (Shri Dinesh Singh Parihar) 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, Dehradun , Vide proposal no.SIA/UK/MIN/90374/2019 on dated 2nd January 2019.
2. The SEIAA prescribed ToR file No. 76/SEAC dated 1st June 2019
3. OMTC carried out monitoring studies during the Pre Monsoon Season (February, March, April) and 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	1.50KLD	4.5 KLD
			Sanitation	3.00KLD	
		Dust Suppression		611m^2area per	0.611KLD

			1.0 L	
		Greenbelt Development	1020 plants per 4 LPD	4.080 KLD
	Total			**9.191KLD**
2.	Man-Power Requirement		**100**	

1.4.3 Topography and Drainage

Topography: The general slope of the area is SE, which is sloping towards SE from 100 to 200. The topography of the area is rough and rugged. The area by and large has a gentle slope. Terraced paddy farming is carried out by the villagers on the slopes. The highest altitude recorded with in the area is 1506mRL toward NW of the area near pillar 2 and lowest altitude recorded is 1447mRL toward SE near pillar 19. On the north side of the area Ghadera& Houses of village Delmel& south side of the area granted area of Khimuli Devi and FaliyatGhadera& east side of the area, the applied area of Kailash Bhatt and west side of the area is village Bajina, agriculture fields and residential houses.

Drainage pattern: The seasonal nalla passes from NW to SE. A small Gul is also bifurcated & flowing within the lease area towards SE. The area is drained by first and second order streams which control flow of Saryu River flowing in southern side of the lease area. all these Gadheras are flowing in SE direction & ultimately falls in River Saryu SE side of the ML area about 6-7Km outside the ML area. The seasonal water flows from upper reaches down the slope and has curbed courses through erosion process over long geological period. The area is drained by first order seasonal drainage flows from NW to SE and takes a turn and flowing towards south west direction and meet the Sarayu River, which is main catchment of the area.

1.4.4 Mineable Reserve & Life of Mine

Table 1-3: Mineable Reserves

Total Reserves + Resources A + B	538465tonne
A. Mineral Reserve Proved Mineral Reserve 111	**66598**
Total	66598
B. Total Remaining Resources	
Feasibility mineral Resource 211 Prefeasibility mineral resource 221 and 222	196219
Measured mineral resource 331 Indicated mineral resource 332 Inferred mineral resource 333	221648
Total Resources B	471867
Total Reserves + Resources A + B	**538465tonne**

Life of Mine :-

Life of mine	~25 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

Sr. no.	Activities	Manual/ mechanization
1	Removal of top soil	By manual labour / excavator
2	Excavation and removal of OB re-handling of OB & back filling etc.	By manual labour / excavator
3	Excavation and sorting of mineral soapstone	By manual labour
4	Packing of mineral in bags	By manual labour
5	Transportation of mineral from pit head to nearest road point	By Khachhars / Manually to PWD road
6	Unloading of bags & stocking of bags at road stock yard	By manual labour
7	Loading of bags into the trucks at PWD road	By Manual labour
8	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 March to May are considered as hottest with increase in temperatures. June is generally the hot 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 is 34.2°C on 14th June 1974. From October, 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 (February, March & April 2019) is is East to West and second dominate direction is NE to SW.

1.5.3 Rainfall

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

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 Pre Monsoon season covering the months of (February, March & April) 2019. Meteorological data is collected for wind speed, wind direction, temperature, rainfall and cloud cover.

Mean average temperature recorded during study period was 26.5°C with mean maximum temperature of 26.5°C and mean minimum of 18°C.

Average wind speed recorded was 2.56 m/sec

Rainfall is not recorded during the study period.

1.6 Existing Environment Scenario

1.6.1 Land Use

Land Use of Mine Lease Area

At present, there is a pit in the area. It is proposed to work the deposit of Soapstone e in next five years by developing the mine by formation of proper benches, each of 3m height. At the conceptual stage, the mined out pits will acquire 10.963 ha will be backfilled.

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. Crop land covers about 8277.22 ha. This is 25.37 % of the total land.

1.6.2 Soil Quality

The soils of study area are predominantly Sandy loam in texture. The pH of the soil is ranges from 7.52 to 7.78. The soil being of friable consistency, the bulk density of the soil is in the range of 1.66 to 1.72g/cm3 whereas the porosity and water holding capacity are in the range of 34.62 to 36.64% and 30.12 to 32.56% respectively. It was observed that the Values of bulk density, porosity and water holding capacity varied according to the soil texture.

1.6.3 Ambient Air Quality

The major contribution to the air pollution is dust and other pollutant present in the air are SO2 and NO2. To assess the pre mining condition ambient air monitoring was carried out.

The regional PM10 level at the proposed mining site ranges from 51.31 to 51.34 ug/m^3,PM2.5 ranges from 18.56 to 21.54 ug/m^3, SO2 ranges from 17.82 ug/m3 to 21.36 ug/m3 and NOx ranges from 11.24 to 14.62 ug/m3. 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 5 locations in the study area; samples were collected from residential as well as industrial area (Mine site).

- **Residential area:** The day time (Leq day) noise levels observed in the range of 50.4 to 46.4 dB dB (A) in residential area. The night time (Leq night) Noise levels observed in the range of 48.6 to 42.6 dB (A) which is within the prescribed limit of 45 dB (A) in residential area.
- **Industrial Area:** The noise levels at the mine site were found to be 50.4dB (A) during day time and 48.6dB (A) during night time.

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 Gujarat 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 and GW5, ranged from 7.76 to 7.44 indicating slightly alkaline in nature. The TDS (Total Dissolved Solids) were found to be in the range 184.0 mg/l to 246.0 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 194.0-204.0 mg/l which is within permissible limit. Alkalinity indicates better buffering capacity of water and ranges between 88.0- 112.0 mg/l.

Fluoride content varies from 0.16 mg/l – 0.38 mg/l which is within permissible limit. The overall ground water quality in the study area was found to be mineralized with respect to chloride (52.6 mg/l to 72.0 mg/l), sulphate (28.4 mg/l to 44.6mg/l) and hardness.

Surface Water Resources

The seasonal nallas passes from south to north. one seasonal Gadhera near outside eastern lease boundary is flowing from north to south which ultimately falls in River Saryu.

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 7.78 to 8.04which indicate that surface water is alkaline in nature, TDS was found to be 412 mg/l to 744. Dissolve oxygen were found about 1.5 to 2.0 mg/l. It is seen that the physicochemical analysis of other parameters like chloride, calcium, magnesium, nitrate and fluoride were found within the desirable limit. The overall surface water quality of the available sources within the study area was found to be good Physico-Chemically with respect to all the parameters. There is no organic load-observed in the sources monitored indicating no pollution load in the source.

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 45 villages within the 10 km. radius with a total population 7376 forming **1845** household as per census 2011.In the study area about 5155 of the total population is literates. As per census 2011, about 3413 of the total are main workers, 603 are marginal workers.

1.6.8 Anticipated Environmental Impact and Mitigation Measure

1.6.9 Topography

The general slope of the area is SE, which is sloping towards SE from 100 to 200. The topography of the area is rough and rugged. The area by and large has a gentle slope.

Terraced paddy farming is carried out by the villagers on the slopes. The highest altitude recorded with in the area is 1506mRL toward NW of the area near pillar 2 and lowest altitude recorded is 1447mRL toward SE near pillar 19. On the north side of the area Ghadera& Houses of village Delmel& south side of the area granted area of Khimuli Devi and FaliyatGhadera& east side of the area, the applied area of Kailash Bhatt and west side of the area is village Bajina, agriculture fields and residential houses.

1.6.10 Drainage

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1.6.11 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.

1.6.12 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.

1.6.13 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.

1.6.14 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 Quantity

Groundwater will be used for mining activities, only 1.5 KLD water will be used during mining operation; and only fresh water will require for drinking propose which will be sourced from nearby river.

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

The mining pit will be below the general surface level of the surrounding area which will be 1506 m RL.

The water level in post monsoon season will be 40 m below the surface depending upon the relief of the area and in dry season it goes to 50 m below the surface.

1.6.15 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.

1.6.16 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.

1.6.17 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. 0.63 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. 3.0 Lakhs/- 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.