Proposed Extraction of Silica Sand at Village Kukreda and Bhakwad, Tehsil Mori, District – Uttarkashi, Uttarakhand

MINE LEASE AREA – 35.944 HA.

PROPOSED CAPACITY –1,75,017.00 TONNES / ANNUM

PROJECT SUMMARY

Project Proponent

Shri Ratan Singh Aswal S/o Shri Abadayal Singh Aswal

215, South Vansthly, Siv Mandir Lane, Ballupur Chowk, Dehardun, Uttarakhand

SUMMARY & CONCLUSION

INTRODUCTION OF PROJECT & PROPONENT

The Lease has been granted in favour of Mr. Ratan Singh Aswal vide **G.O. No. 341/VII-1/ 2015/187-Kha/2007 dated 26-02-2016** for 50 Years which will be effective from the date of the lease deed. Proposed Mine is an individual firm, having registered Office at Village: Kukreda and Bhakwad , Tehsil- Mori, District – Uttarkashi, Uttarakhand. (Copy of Letter of Intent attached as **Annexure–I)**.

The project has been proposed for the Extraction / Collection of Silica Sand from the Government land (33.723 Hectare) and uneven Agricultural Land (2.221 Hectare) by open cast mechanized method. The area falls in the inner Lesser Himalaya. The topography of the area is rough and rugged. The area is sloping towards the south west. The applied area 35.944 Ha. In Govt. wasre land, soyam lands, nap land and benap land and gads. The presently agricultural area is 2.221 Ha. In nap land and surroundings forest land the species standing are bang, kokat, simbhal, pine amla etc. the forest density is less than 0.1 percent. Almost entire area is covered with soil grey to brown fine to medium grained clay soil. Thickness of soil is 0.3 to 0.5 m in different places..

The Silica will be exploited by mechanized open cast mining by forming banches of 6 m height and width more than 6 m in 1 pit during mining plan period of mining. Overburden handling will be done by excavator and dumper. The extacted/ collected Silica will be sold to different industrial use.

As per the MoEF, New Delhi Gazette dated 14th September 2006 and subsequent amendments, the proposed mining project is categorized as category 'B-1' project.

LOCATION

The proposed Silica Mine lease area falls at Village- Bhakwad, Tehsil Mori District- Uttarkashi in the uttarakhand state. The mining lease / proposed project area falls within the Survey of India Toposheet No. 53F/13. The co-ordinates of the mine lease area are:

Latitude	30^0 57'37.1" N

Longitude	77^0 54'39.7" E
Nearest Railway Station	Dehradun – 72.74 Km S (Aerial)
Nearest Airport	Jolly Grant Airport: 89.48 Km SE
Nearest Highway	NH-72- 5.52 Km W SH-1- 0.30 Km SE

LEASEHOLD AREA DETAILS

The entire Mining Lease area of 35.994 ha is a Govt. waste & Agricultural land .Project proponent has obtained No Objection Certificate from the individual land owners for the exploration of Silica in their respective land. Scheme of mining was approved under Uttarakhand notification no. 844/VII-1/2015/68-Kha/2015 dated 31.07.2015 and notification no. 1589/VII-1/2015/68/Kha/2015 dated 07.10.2015 vide letter no. Mukhya Khaniz/Ma. Pla.-56/Bhu. Khani. E/2016-17 dated 06.02.2017 enclosed as **Annexure-3.**

Table 1: Land Details of Lease hold area

Forest Land	**Area(ha)**	**Non Forest Land**	**Area(ha)**
Forest (specify)	Nil	(i) Govt.waste land,	33.723
		(ii) Agriculture land,	2.221
Total	Nil	Total	35.994

Target production of Silica Sand in the proposed mine is envisaged to be 4,87,432 MT. Life of the mine with the proposed production will be 5 years. The project cost is estimated Rs. 50.0 Lacs.

FACILITIES & BASIC AMENITIES WITHIN THE STUDY AREA

Road: The applied area is located in village Bhakwad which is about 1 Km from Mori to Dehradun Road.

Water: Government has provided water supply scheme to most of the household in the nearby villages and there is also provision of sources like springs & river water.

Electricity: Most of the houses in the villages are electrified.

Education: Primary school exists in the Village Bhakwad. For higher education students have to go to Tiuni or Mori which is approx. 7 to 10 Km away from the site area.

Medical facilities: Major medical facilities are available at Tiuni or Mori.

Post & Telegraph facilities: Post & telegraph facilities are available at Tiuni.

Railway station: Nearest railway station is available at Dehradun which is aerial distance of 72.74 Km.

Airport: Nearest airport is Jolly Grant at an Aerial distance of 90.62 Km.

MINERAL RESERVES

Category wise updated reserves with grade are as follows:

Classification	UNFC code	Quantity in million tons
A. Mineral Reserve		**2.10**
Proved Mineral reserve	**111**	
B. Total Remaining Resources		
Feasibility Mineral Resources	**221**	**18.36**
Measured Mineral Resources	**331**	**22.46**
Indicated Mineral resources	**332**	**9.2**
Total Resources B		**50.02**
Total Reserve + Resources		52.12illion Tones

METHOD OF MINING

The mining will be done by mechanized open cast mining by forming benched of 6 m height and width more than 6 m in 1 pit during mining plan period of mining. OB handling will be done by excavator and dumper.

SALIENT FEATURES OF MINING METHOD

1. Benches will be developed from higher level to lower levels.
2. Top soil will be scrapped and stacked at the stacking site proposed, safeguarded with constructing retaining walls at the toe of stacks.
3. Benches with height of 6 mts. and width 8 mts. with a slope of 700 will be formed.
4. Initially all benches will be connected by constructing approach road from crushing plant to mining pits and dump sites.

5. Occasional drilling and blasting will be done in only hard core rock strata as when required.
6. Excavator with dumper will be used for excavation.
7. Waste rock comprising of Ferruginous quartzite will be sorted out manually by engaging 2-3 workers.
8. Sorted mineral will be loaded on dumpers and transported to crushing plants.
9. Initially crushing plant will be connected by mule tracks to aerial ropeway, proposed to be motorized by the project proponent.
10. Mineral from ropeway will be further transported by the dumpers.
11. The existing road from purola to Tuini is being connected to village Bhakwad by the state government. The bridge for crossing the river has already been constructed and road work is going on. It is expected that the tar road will be completed in 2 years.
12. Management propose to extend this road to crushing plant and mining benches in next 2 years.
13. All the benches will be connected to approach road from crushing plant.
14. The cutting, filling and levelling work will be required after acquisition of land for crushing plant and also for connecting mining pit with crushing plant.
15. Large quantity of construction or masonary stone will be required for plant site. For the purpose mine waste will be used.
16. Initially soil and mine waste will be stacked near the mining pit and it will be rehandled as and when required for infrastructural development for operating the project.
17. Since the mineral occurs over steep topography and entire area is mineralized therefore all facilities will be developed in village Bhakwad near ML area.
18. The permission of mechanization will be obtained from DGMS, Ghaziabad under reg. 106, 2 (b).

GREEN BELT DEVELOPMENT

The plantation will be done in the 10 meters safety zones left between lease boundary on river Ton side. A long stretch of plantation area will be developed on slopes to safeguard the spread of mining waste/ mineral/ soil to be fallen into river Tons and to stabilize the slopes of the lease area from landslides or spreads. This will act as a barrier over the HFL of river Tons and mining lease to take care during flooding.

The plantation is also proposed to be carried out in the land which will developed for crushing plant along roads etc. in 5 Years.

The plantation program for which financial support will be given by us is given below:

Table 2: Green Belt Development

Year	Area	No. of Sapling	% of Survival
1	0.10	100	75%
2	0.10	100	75%
3	0.15	150	75%
4	0.12	120	75%
5	0.15	150	75%
Total	**0.62**	**620**	

WATER SUPPLY

The water required is mainly for dust suppression, green belt development, drinking and other domestic purpose during mining operations. The total water requirement will be 15.0 m^3/day; which will be met from natural spring resource as per availability & suitability for the purpose.

BASE LINE DATA

The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to proposed mining for:-

(a) Air

(b) Noise

(c) Water

(d) Soil

(e) Ecology and Biodiversity

(f) Socio-economy

Baseline Environment Status

Attribute	**Baseline status**

Land Environment	Landuse surrounding 10 Km from the project site comprises mainly of Forest Land and some waste land. A detailed study was carried out to assess Landuse pattern surrounding the 10 km radius of the site. The land use pattern study reveals that the 10 km environment is predominantly Forest followed by agriculture with some open waste land, water bodies and very few settlements. The table below shows the total land use cover of the study area.
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{10} for all the 8 AAQ monitoring stations were found to be 43.20 µg/m^3 at AQ-1 and 81.33 µg/m^3 at AAQ-7, respectively while the minimum & maximum concentrations of $PM_{2.5}$ was found to be 15.40 µg/m^3 at AQ-1 and 38.14 µg/m^3 at AQ-3, respectively. As far as the gaseous pollutants SO_2 and NO_x are concerned, the prescribed CPCB limit of 80 µg/m^3 for residential and rural areas has never surpassed at any station. The minimum & maximum concentrations of SO_2 were found to be 5.30 µg/m^3 at AQ-1 & 13.88 µg/m^3 at AQ-3 respectively. The minimum & maximum concentrations of NO_x were found to be 9.01 µg/m^3 at AQ-1 & 21.68 µg/m^3 at AQ-7 respectively. CO levels are also within the prescribed range of 2 mg/m^3. The air environment around this area is also affected by agriculture & other mining activities in the area.
Noise Levels	Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 55.3 dB (A) at NQ-2 & 41.3 dB (A) at NQ-1 respectively. The maximum & minimum noise levels at night time were found to be 42.2 dB (A) at NQ-7 & 37.3 dB (A) at NQ-4 respectively. Though the study area is quite calm and noise levels are well below the prescribed limits but there are several other sources in the 1 km radius of study area, which may contribute to the local noise level of the area. Traffic activities as well as activities in nearby villages and agricultural fields can significantly add to the ambient noise level of the area.
Water Quality	7 Groundwater samples were analyzed and concluded that:

	The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.
Soil Quality	Samples collected from identified locations indicate the soil is Sandy Loam type and the pH value ranging from 6.74 to 8.17, which shows that the soil is acidic to slightly alkaline in nature. Nitrogen is found to be from 75.6 mg/kg to 272.0 mg/kg.
Ecology and Biodiversity	There are no Ecologically Sensitive Areas present in the study area, but many reserved forests regions surround the project area
Socio-economy	The implementation of Silica sand mining project at Village: Bhakwad, Tehsil: Mori, District: Uttarkashiwill throw opportunities to local people for both direct and indirect employment. The study area is still lacking in education, health, housing, etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

LAND USE PATTERN

Proposed project is a new mine lease with some exploratory pits and already existing foot tracks. Landuse pattern of the lease hold area for pre-operational, operational & Post-operational stage is as follows:

Table 3 : Land use pattern of the mine lease area

At the beginning of the mining	**Area (ha)**	**During life of mining**	**Area (ha)**	**Reclamation at the end of the mining**	**Area (ha)**
Agricultural and other land where mining permitted	**35.944**	Mining	31.7379	Plantation on ultimate benches	25.6779
				Backfilling/ plantation	5.46

		Mule track/road Vacated	0	Mule track/ road	0.5
				Infrastructure	0.1
		Green belt	4.2061	Sub total	31.7379
				Green Belt	4.2061
ML Area	**35.944**	**Total**	**35.944**	**Total**	**35.944**

WASTE MANAGEMENT

The top soil having average thickness 0.2m to 0.3 m lies all over the applied area. The top soil & interburden shall be removed by means of an excavator, filled into tippers & dump on earmarked dump area.the soil and inter burden waste of weathered quartzites will be stacked on the earmarked dump area. The rate of generation of interburden waste is expected around 10% of ROM which will be used in construction of roads, infrastructure, etc (50%) and 50% will be dumped.

The quantities of soil and overburden waste material to be generated during first five years is given below:

Table 4 : Waste generated during the first five years

Year	Pit No.	Top Soil mt	WASTE mt 10%
1st	1	2302	3957
2nd	1	2608	6684
3rd	2	4571	8888
4th	2	3357	11713
5th	2	3663	17502
	Grand Total	**16501**	**48744**

Soil & waste stacked separately near the working pits. The waste dump & top soil stacked near the mining pit will be temporary in nature. Therefore soil stack & inter burden material have not proposed to be dumped separately. The excavated pits would be restored by the back filling.

AIR ENVIRONMENT

ANTICIPATED IMPACTS AND EVALUATION

The proposed mining is for excavation of mineral at the rate 0.18 million TPA by opencast mining method. For reaching the targeted production, heavy mechanization will be needed in mineral exploitation, in different phases.

The extant of land degraded and extent of mechanization proposed will be of high magnitude, it will definitely disturb the ambient air quality of the surroundings.

- The excavation by machines, transportation by dumpers, will generate dust which will speead in the air environment and will be deteriorate the air quality.
- The fumes and emissions generated by operation of machines will be added to the air environment and thus will deteriorate the air quality.
- Though blasting proposed is very limited but still it will generate fumes and dust, thus will deteriorate the quality of the air.

Since the area is a hilly terrain and the mining is proposed top to bottom, along slope of hill upto the depth of 35-40 mts. The spread of air pollution will be maximum at ground level and the extent will be to a wider area. But as the mining pits reaches down below the ground the spread and extent of air pollution generated will be limited to pits and its surroundings.

So it is predicted that at the initial stage during development of pits at ground level the impacts on air environment will be maximum and at the stage where pits are fully developed up to the final depth of mineralization reached and targeted production achieved the impacts will be minimized and will be limited to pits and its surroundings. At this stage the impacts on the air environment will be stabilized and needs to be monitored regularly.

MITIGATION MEASURES

The dust suppression measures like water spraying will be done on the roads. This will decrease the dust emission by 75%. Utmost care will be taken to prevent spillage from the trucks. Overloading will be prevented. Plantation activities along the roads will also reduce the impact of dust in the nearby villages.

WATER ENVIRONMENT

In this project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water from the river. There will not be any adverse impact on surface hydrology and ground water regime due to this project. Project proponent will adhere to all guidelines and rules for proper and scientific method of mining during the period of extracting the Silica sand. Thus, the project activities shall not have any adverse effect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

The impact on water quality will be confined to increased suspended solids during rain. The dumps to be generated will be temporary in nature & used for the purpose of backfilling by the end of third year onwards in pit I & third year onwards in pit II& pit III & from fourth year onwards from pit IV. The dumps will be secured with toe walls and rainy water will not carry significant suspended material. However water sprinkling on the foot track shall be carried out during summer month to suppress the dust.

Mining of Silica sand does not have any significant impact on the water quality and parameters as the mining does not intercept with the ground water level.

NOISE ENVIRONMENT

ANTICIPATED IMPACTS AND EVALUATION

This is a proposal of exploiting silica sand mineral by excavating huge amount of ROM by opencast mechanizes mining method. The proposed targeted production is 0.18 MTPA

In the initial stage of operations during development of mines at ground level, deployment of earthmoving machines and dumpers for handling overburden will increase the noise levels in the surroundings. At this level the noise levels will be effected maximum. As the operation of mines stabilized with production of mineral achieved at below ground level, the noise levels will also be stabilized and will be restricted to pits and surroundings.

MITIGATION MEASURES

On-site

As mining will be done by mechanized method, so hearing protection shall be given to the miners during use of excavators and other machines .Other than this, no other activity generates so much noise that requires special arrangements for protection.

Off-site

The off-site receptors are not significantly affected as they are located far away from the mine site. Plantation will be done along the roadsides, civic amenities, etc. which will more or less dampen the off-site noise level.

BIOLOGICAL ENVIRONMENT

It was found that the mining activity will not have any significant impact on the biological environment of the region. Since mining activity is carried out only during the day time, the movement of animals during the night will not be hindered. Proper mitigative measure will be taken by the contractor, in consultation with local NGOs working in the study area.

TRAFFIC ANALYSIS

The traffic density due to transportation of mineral will increase in the area. Around 15000 transportation vehicle of capacity 9 tonns will be required for transporting mineral in a year or say approx. 50 trucks daily.

ANALYSIS OF ALTERNATIVES

Silica sand mining is a site specific project depending upon the geological set up and mineable area. The land being uneven and non-suitability of land for any other purpose makes it suitable for mining as the land will become suitable for agriculture purpose at the end of mine life. This will also generate employment to the nearby villagers. Hence, there is not much scope for site alternative.

As per mine plan; most efficient and least polluting technologies have been prescribed. Hence, no alternative technology has been adopted. Thus it will have more acceptability and help in socio economic upliftment of the area.

TABLE 05: ENVIRONMENT MONITORING PROGRAMME

S.No.	Description of Parameters	Schedule and Duration of Monitoring
1	**Air Quality** a) In the vicinity of the mine b) In the vicinity of the transportation network	24 hourly samples twice a week for one month in each season except monsoon.
2	**Water Quality** Water quality of surface and groundwater around the site Drinking water must conform to drinking water standards	Once in a season for 4 seasons in a year
3	Ambient Noise Level	Once in each of the 4 seasons in a year
4	Soil Quality	Once in two years on project monitoring area
5	Inventory of Flora(tree plantation, survival etc)	Once in two years on project monitoring area
6	Socio-economic condition of local, population, physical survey	Once in two years

SOCIAL IMPACT ASSESSMENT, REHABILITATION & RESETTLEMENT (R&R) ACTION PLAN

There will be no resettlement or rehabilitation involved in the project as the site area does not involve any settlement or housing.

The implementation of the Silica sand mining project in village – Bhakwad, Tehsil- Mori, district Uttarkashi.,will throw opportunities to local people for both direct and indirect employment. As the project proponent is the rightful lessee of the mine lease area, hence the Silica sand mining operation will be legalized and it will fetch income to the state exchequer. The project will also provide impetus to industrialization of the area. It is likely the intending entrepreneurs will venture to set up micro and small scale units in the near future making the area a mixed society, dependent on industry, trade and business. At present agriculture is the

main occupation of the people as 78 percent of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

The study area is still lacking in education, health, housing, etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

BENEFITS OF MINING

The opening of the proposed project will enhance the socio-economic activities in the adjoining areas. This will result in following benefits:-

- ✓ Improvements in physical infrastructure.
- ✓ Improvements in Social Infrastructure.
- ✓ Increase in Employment Potential
- ✓ Contribution to the Exchequer.
- ✓ Prevention of illegal mining.
- ✓ During and Post-mining enhancement of green cover.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan are proposed for “Silica sand” mining project to mitigate the impact during the mining operation.

- ✓ Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- ✓ Prior to mining, short awareness program will be conducted for labours to make them aware to way of working.
- ✓ If some causality or injury to animal occurs, it should be informed to forest department and proper treatment should be given.
- ✓ No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed.
- ✓ Corridor movement of wild mammals (If exists) should be avoided

- ✓ Care should be taken that noise produced during vehicles movement is within the permissible noise level.
- ✓ If wild animals are noticed crossing the river bed, it should not be disturbed or chased away, instead the labours should move away from their path.

ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Keeping the utility of monitoring results in the implementation of the environmental management program in view, a team will be prepared for proper implementation of EMP.

The said team will be responsible for:

- ✓ Collecting water and air samples from surrounding area and work zone monitoring for pollutants.
- ✓ Analyzing the water and air samples.
- ✓ Implementing the control and protective measures.
- ✓ Co-coordinating the environment related activities within the project as well as with outside agencies.
- ✓ Collecting statistics of health of workers and population of surrounding villages.
- ✓ Monitoring the progress of implementation of environmental management program.
- ✓ Greenbelt development, etc.
- ✓ A suitably equipped laboratory for sampling/testing for various environmental pollutants.

✓ **Table 6: Cost of Environment Protection Measures**

S.No.	Measures	Capital cost	Annual recurring cost
1	Dust Suppression & Pollution Control (Fixed Type Sprinklers)	1,00,000	50,000
2	Pollution Monitoring	-	1,00,000
3	Occupational Health	50,000	25,000
4	Green Belt (Greenbelt will be developed around the lease area in statutory barrier	4,00,000	2,00,000
5	Reclamation / Rehabilitation of mined out area	2,00,000	50,000
5	Garland Drain and settling tank, fencing etc	2,00,000	1,00,000

6	Personal Protective Equipment	50,000	25,000
6	Others (specify)	50,000	20,000
Total		**Rs. 10,50,000**	**Rs. 5,65,000**

CONCLUSION

All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Thus implementing this project will have positive impacts.