

## 5.0 **ADDITIONAL STUDIES**

### 5.1 **PUBLIC CONSULTATION**

#### 5.1.1 **During Field Study**

Peoples' perception regarding the project is an important issue. An opinion poll was conducted as part of field survey. The results of this poll are furnished in **Table 5.1**. It is observed that about 71% of the respondents are optimistic about the project because of the employment opportunity, specifically, the direct and indirect jobs for the local people in the expansion project. 61% of them are optimistic about peripheral development. Development in business activities is another important point raised by the respondents (around ~23%).

So far disadvantages are concerned, 45% of the respondents are worried about the problem due to mining activities. About ~26% of respondents have opined about possibility of health hazards. 49% of the respondents complained about the facilities provided by HCL.

**Table 5.1: Peoples' Perception Regarding the Project**

Sl. No.	Perception	Respondents (%)
<b>A</b>	<b>Advantages</b>	
1.	More employment opportunity	71.0
2.	Better business prospects	22.6
3.	Peripheral development	61.3
<b>B</b>	<b>Disadvantages</b>	
1.	Pollution	45.2
2.	No facility from HCL	49.0
3	Damage to health	25.8

#### 5.1.2 **During Environmental Public Hearing**

Public Hearing was held on 27.12.2013 at Rajeev Gandhi Sewa Kendra, Gram Panchayat: Nanu Wali Bawdi; Tehsil: Khetri; Dist: Jhunjhunu for the above unit in the chairmanship of Shri J.P.Meena, Chief Executive Officer, Jhunjhunu Zila Parisad. On behalf of Rajasthan Pollution Control Board Shri Pradeep Bhardwaj, Regional officer, Sikar has participated in this hearing.

Public Hearing points raised and commitment of the project proponent on the same along with time bound action plan to implement the same has been given in **Annexure 5.1**

## **5.2 SOCIAL IMPACT ASSESSMENT**

As discussed in chapter 3 (under clause 3.8) a socio-economic survey was undertaken in the study area. Sample size, data etc have been presented in chapter 4. Survey was conducted on Composition and size of family, educational status, homestead, information on agricultural situation (holding size, Land use, cropping pattern, productivity, net return etc.), employment (sources of employment), income (income from various sources, information on family budget, Consumption and saving, family asset base and respondents' perception about the project.

Analysis of various aspects of the study amply reveals that the proposed expansion activities are not going to create adverse impact on the socio-economic conditions of the people in the study area. There will be no displacement of population due to expansion of the project. Item-wise predicted impacts are given below:

### **5.2.1 Impact on Agricultural Situation**

Overall assessment of the agricultural situation leads to the conclusion that the project will help agriculture by higher investment out of the income to be generated from supplementary sources (i.e., non-farm sources) due to the project. Hence, the project is likely to have beneficial impacts of the project on agriculture situation. No agriculture land would be used under the expansion programme of the mining project.

### **5.2.2 Impact on Pattern of demand**

With the implementation of the project and further development of the locality new type of demand pattern may emerge which is likely to place more importance on modern consumer goods and quality products. Hence, the impact of the project on the pattern of demand can be reasonably predicted as a shift from food to non-food items i.e., a consumer behaviour which may closely follow the Engel law. This is not a bad indication provided considerable income is earned by them; otherwise, if the shift is a substitution of necessary food requirements then it is not desirable in true socio-economic sense.

### **5.2.3 Employment and Income effect**

As mentioned in Chapter 2 (Clause 2.11), at present the mine employs 674 persons, and there shall be no increase in manpower due to the expansion phase. It may be noted that most of the mine workers are local people. Increased production at the mine is likely to increase the employees' income by way of increased productivity linked variable pay. Besides direct employment, mine expansion shall generate substantial indirect employment. The indirect employment and income effects are much larger than the direct effects of the project.

Overall assessment of the employment and income effects indicates that the project has strong positive direct as well as indirect impact on employment and income generation.

#### 5.2.4 Consumption Behaviour

To investigate the consumption behaviour of the respondents in detail, Marginal Propensity to Consume (MPC) is calculated by fitting the consumption function. The results of the regression analysis performed for fitting the consumption function are presented in **Table 5.2**. It is observed that the function gave uniformly good fit to data because  $R^2$  is high (0.936%) and parameters are also found to be statistically significant at 1% level. The MPC worked out on the basis of the fitted consumption function is 0.482.

**Table 5.2 : Fitted Consumption Function**

Form of the fit	Regression parameters		
	a	B	R <sup>2</sup>
$C_j = a + b Y_j + U$	12809.9	0.482	0.936
Where, $C_j$ = Consumption of the $j^{\text{th}}$ respondent $Y_j$ = Gross income of the $j^{\text{th}}$ respondent		(20.60)*	

Figures in ( ) indicate t-values \* Significant at 1% level

Effort is taken here to work out the multiplier effect of investment on the people of the study area. The calculations are done using the following model:

Considering that the consumption behaviour of the respondents closely follow the following type of consumption function:

$$C = a + bY \quad (1)$$

In equilibrium,

$$Y = C + I \quad (2)$$

Where,  $Y$  = Gross income,  $C$  = Consumption and  
 $I$  = Investment

Putting (1) in (2),

$$Y = a + bY + I$$

$$\Rightarrow Y = (1 / (1-b)) * [a + I] \quad (3)$$

Where,  $1 / (1-b)$  is the multiplier.

Assuming that consumption behaviour of the people in the study area closely follows this fitted consumption function; one can easily see that existing size of the multiplier is 1.9. Hence, investment on this project and the consequent generation of additional income will have strong multiplier effect in raising average consumption.

The proposed project is going to have positive income effect and consequently, the multiplier effect is expected to lead to an overall increase in average consumption of the people of the study area. Therefore, one can conclude that the impact of the project on consumption behaviour of the local people is likely to be satisfactory and positive.

HCL has also undertaken socio-economic measures for the socio economic upliftment of the nearby villagers through CSR (explained in clause 8.8; Chapter 8).

In addition to the above HCL undertakes the following for local villagers' benefit:

- In case of direct manpower required for mining and mineral handling operations, local people are employed as much as possible subject to rules and procedures in vogue in HCL.
- Mining and mineral handling involve transportation activity for day to day operation. Substantial amount of revenue is generated by transportation activities along with employment e.g. labour, helper etc. Project authorities give preference to local people while engaging contractors for material transportation or at least for loading and unloading.

### 5.3 RISK ASSESSMENT

Risk assessment has been carried out for the proposed expansion of Kolihan mine, and based on the same; disaster management plan has been prepared which is as follows:

During the operation of the underground mine, following risks have been identified.

1. Roof fall in drives/ cross cuts
2. Mine inundation
3. Fly rock from blasting operations
4. Fire (electrical and oil).
5. Possible Danger due to storage and handling of explosives

#### 5.3.1 Roof Fall

Accidents due to roof-fall occur in mines due to:

- Excessive weight of superincumbent strata
- Relative directions of cleats and headings
- Inadequate support
- Workings approaching faults or other disturbed strata
- Zones of high concentration while working near worked out area

### Systematic Timbering

Following systematic methods are being used in supporting the roofs of mine workings.

Supports already installed during development in accordance with the support plan shall be suitably integrated into the support system envisaged under these rules so as to consolidate support and safety.

1. All levels, cross-cuts and draw point drivages within 30 m of advancing face or stoped out area including the stope development, sub level drivages shall be supported by chock mats set at a maximum interval of 3 m or by rock bolts in the following manner –
  - (a) No rock bolts shall be less than 1.5 m in length and 20 mm in dia.
  - (b) The rock bolts shall be provided in grid pattern, the distance between adjacent rock bolts in the same row and also between rows of rock bolts shall not be more than 1.5 m. The distance of a row of rock bolts from the side of the drive shall not be more than 1.5 m.  
Provided that if the width of the drive/X-cut is such that two rows of rock bolts cannot be provided in the manner specified above, two rows of rock bolts shall be provided at a distance of 1 m from either side of the drive.
  - (c) The rock bolts may be fixed by any method but it shall be ensured that they are properly put into the place with adequate anchoring strength.
2. All junctions within 30 m of the advancing face shall be supported by either cross bars set on cogs/chock mats or on props not more than 1.2 m apart or by means of rock bolts in the manner specified in clause 3.
3. The edges of the draw points shall be supported by cable bolts set at 1.5 m interval along the strike of the stope so as to effectively isolate the draw points from the advance effects of the stoping operation before starting stoping. The holes for cable bolting shall be at least 6 m in length and drilled in the direction of extraction drives at an angle of inclination of approx. 50° with the horizontal.

4. All faults, visible slips, breaks and other geological disturbances in the roof shall be supported by cogs at intervals of 2.4 m on either side of such disturbances and with cross bars across them at intervals not exceeding 1.2 m.
5.
  - (a) Props shall be set on solid floor and not on loose packing or material. They shall be kept tight against the roof. Where props are to be set on loose material, a flat base piece not less than 5cm thick, 25cm wide and 1.7m long shall be used.
  - (b) The lids and wedges used with the prop shall have a width not less than the dia. of props, a thickness not less than 8 cm and a length not less than 0.5 m.
6. Supports already set in accordance with these rules shall not be removed unless the same are replaced by other equally effective supports to ensure security of the roof and sides at the places where persons are recruited to work or travel.
7.
  - (a) No timber which is less than 15 cm in dia shall be used for the purpose.
  - (b) The sleepers used in construction of cogs and chock mats shall not be less than 1.5m in length and of size not less than 100mm x 100mm.

Additional supports shall be erected as and when necessary.

### **5.3.3 Inundation**

In an underground mine, inundation occurs due to:

- Weak ground below surface water body leading to water entering mine
- Work zone may be overlain by water bearing strata and pillar fractures and faulty roof may admit water
- Surface water may enter through inclines, shafts or adits
- Contact with old water logged workings in the vicinity

In case of Kolihan mine, the existing mine entries are located on a hill slope with necessary precautions for preventing storm water flowing down the hill slope from entering the mine. Since there is no perennial water source nearby and the mine entries are located at hill slopes (at higher altitude) possibility of inundation is ruled out. Relevant regulatory requirement is: Every entrance into the mine should be more than 3.5 m above the High Flood Level (HFL) at that point.

However following maintenance measures are adopted:

- Obstructions in normal drainage system etc. are checked regularly. During rainy season, blockage of drains may occur, which needs to be cleared.
- Standing orders for withdrawal of persons from mine in case of apprehended danger have been framed and enforced.
- The mine has adequate pumping capacity. Standby pumping arrangements are also available.

#### **5.3.4 Blasting related hazards at underground work zone**

All precautions related to blasting, as prescribed in Metalliferous Mines Regulation, 1961 and circulars issued from time to time by Director General of Mines safety (DGMS), will be followed before, after and during the blasting operations.

#### **5.3.5 Fire**

Spillage of HSD and resultant fire constitutes a potential risk. At the mine there are two HSD storage facilities.

Diesel powered HEMMs are used in underground for mining activities. The quantity of the maximum fuel oil which can spill is not much and can be easily controlled. Sufficient nos. of portable fire-extinguishers have been provided in office buildings, stores below ground machinery, electrical sub-stations and especially at strategic locations near the fuel store, and DG sets to take care of any eventuality. The distribution and selection of extinguishers has been done in accordance with the requirements of Bureau of Indian Standards (BIS): 2190-92. All areas have been covered by manual protection system i.e. portable extinguishers, sand buckets. If necessary additional fire fighting resources can be made available from KCC.

The Fire Station has following facilities:

- Fire Fighting agents
- Fire Fighting equipment
- Mobile Fire Fighting Equipment
- Safety equipments like fire shoes, fire blankets, breathing apparatus, portable detectors.
- Centralized Fire Alarm Panel
- Supervisory and control panels
- Emergency communication

As soon as any fire is reported the shift-in-charge shall assume the function of disaster controller. In case of serious fire and depending on the gravity of the situation, the Mines Manager / General Manager (Mines) may be summoned to assume charge. Personnel trained in dealing with fires will be summoned. Meanwhile

the hospital will be informed to standby to handle casualties. The fire area will be cordoned off till the fire is fully extinguished and remain so until all wreckage and debris is cleared away.

### **5.3.5 Danger due to Storage and Handling of Explosives**

An explosive magazine has been set up at Kolihan. Details of magazine are given clause no. 2.8.1.3; chapter 2. Adequate safety zones have been provided as per statutory requirements while locating the magazines. The magazines have been constructed as per plans approved by Department of Explosives. The following have been considered in the design of the magazines.

- All dry vegetation within a 15 m radius has been cleared.
- Lightning arrestor has been installed on the magazine roofs.
- A safety zone of prescribed width around the magazines has been created.
- In summer, the temperature inside the magazines is monitored to guard against spontaneous fire.
- The manufacturing dates of all explosives stored in the magazines are carefully recorded so that no explosive whose shelf life has expired is kept in stock.

All workers have been informed that in case of any fire, whoever notices the fire will sound the alarm and inform the shift-in-charge. The shift-in-charge will inform security personnel and arrange to evacuate all personnel, except those who are required for fire fighting, from the area. The fire brigade shall be summoned to deal with the emergency. Concerned district officials will be informed. The hospital will be informed to standby to handle casualties.

At Kolihan Mine a Pit Safety Committee (PSC) has been constituted to supervise safety issues. The composition of the PSC and its duties has been described in Chapter 4 (under Clause 4.6.2).