



# RAJASTHAN STATE MINES & MINERALS LTD

(A Government of Rajasthan Enterprise)

## PROJECTS DIVISION

4, Meera Marg, Udaipur – 313 004, Rajasthan, India

Phone : 0294 2428738, 2428744, Fax : 0294 2428790 / 2428768

E-mail : [project@rsmm.com](mailto:project@rsmm.com), website <http://www.rsmm.com>

RSMM/CO/PROJ/KC/2015-16/233

Dated 16.07.2015

### Detailed Notice Inviting Expression Of Interest

Notice Inviting Expression of Interest (EOI) for 'Consultation for defining future course of action for rehabilitating Kasnau Mines suggesting various options and techno-commercial evaluation of every option to facilitate proper decision'.

Keenness Money for participating in this Expression of Interest: Rs. 10,000 (Rupees Ten Thousand Only) in the form of Demand Draft drawn in favour of RSMML payable at Udaipur.

Details of the project proposal are provided in the "Detailed Notice Inviting Expression of Interest" for which kindly visit our website: "[www.rsmm.com](http://www.rsmm.com)" or contact at the above address. A Pre-offer Submission meeting will be held on **03<sup>rd</sup> August 2015 at 11 AM** and offers against EOI will be accepted up to **3.00 PM on 17<sup>th</sup> August 2015** at Corporate Office, Udaipur.

Keep visiting our website for updated information, if any, before the closing date of EOI.

**Advisor & Head (Projects)**



# RAJASTHAN STATE MINES & MINERALS LTD

(A Government of Rajasthan Enterprise)

## PROJECTS DIVISION

4, Meera Marg, Udaipur – 313 004, Rajasthan, India  
Phone : 0294 2428738, 2428744, Fax : 0294 2428790 / 2428768  
E-mail : [project@rsmm.com](mailto:project@rsmm.com), website <http://www.rsmm.com>

RSM/CO/PROJ/KC/2015-16/233

Dated 16.07.2015

### Detailed Notice Inviting Expression Of Interest

Notice Inviting Expression of Interest (EOI) for 'Consultation for defining future course of action for rehabilitating Kasnau Mines suggesting various options and techno-commercial evaluation of every option to facilitate proper decision'.

Keenness Money for Participating in this Expression of Interest: Rs. 10,000 (Rupees Ten Thousand Only) in the form of Demand Draft drawn in favour of RSMML payable at Udaipur.

#### A. GENERAL INFORMATION

##### **Location:**

The Kasnau Lignite Mine is located in Tehsil Jayal, at a distance of about 40 km. east of district head Nagaur in Rajasthan. The main approach to the mines is via village Farrod, on Nagaur – Didwana State Highway No.60. Logistically, the location of this mine is very favorable to the user industries.

The Kasnau Matasukh lease area is bounded by Latitude N 27°03'00" - 27°07'00" and Longitude E 74°02'40" - 74°04'55". The nearest Railway Station is Marwar-Mundwa which is situated at a distance of 25 km. on Merta Road – Nagaur BG Section of N-W Railway. The nearest airport is at Jodhpur which is located at a distance of 175 km from the mines.

##### **Physiography:**

This area is characterized by a more or less flat terrain with alluvial cover. However, gently undulating terrain with low sand dunes is also not uncommon. The maximum difference in elevation variation is about four meters. The general topographical level of this area is +301 MRL. No prominent drainage system exists in and around the deposit area.

##### **Climate:**

This area experiences arid type of climate. May and June are the hottest months with temperature ranging around 45°C, while December and January are the coldest months with a mean temperature of 6-8°C. The average annual rainfall is 300 mm. with maximum precipitation during SW monsoon between July and September. However, in the recent past there have been incidences of heavy rain fall on a single day. In general, the relative humidity of this area is low at around 30-40% only in most of the seasons except in monsoon.

The general wind direction of this area is SW to NE. The wind velocity in summer months of the year exceeds 15 km/hr while in winter, the wind velocity ranges from 6 to 8 km/hr. Occasional dust storms are prevalent in summer months.

**Demography and Site Facilities:**

Kasnau and Igyar with populations of 1734 and 1695 are two prominent villages located in the vicinity. Matasukh village has a population of around 1000 and has a middle school within the village area. A system of village roads and ponds exists in this area. The primary school education facilities are available both in Igyar and Kasnau villages. The banking and postal facilities are available only in Kasnau village. Arwar village located at 8-9 km east of the deposit area, has medical facilities.

**Cultivation:**

Most of the surrounding area is under active cultivation. At least two crops in a year are raised. The crops are mainly Bajra in the Kharif season and cash crops like mustard and gram in the Rabi season.

**Geology:**

The sediments belonging to Palana - Ganganagar shelf area extend as thin embayment in the southern direction and extend into Nagaur – Merta area.

The structural impress is not so severe. Lignite basin is covered by a thick alluvial cover. On the basis of exploration data, the lignite bearing sub basins near Igyar, Kasnau and Matasukh villages have been identified.

**Local Geological Succession**

Period	Formation	Description
Quaternary		Wind blown sand, strewn with pebbles, alluvial sand and silt
Tertiary (upper Palaeocene to lower Eocene)	Marh Sand-stone	Argillaceous friable sandstone at places ferruginous and occasional conglomerates
	Palana Shale	Grey White Variegated Clays, sandy clays, silt stone with bands of lignite and carbonaceous shales
<b>Dis-conformity</b>		
Cambrian Marwar Super Group	Nagaur Group	Red to brick red Sandstone, Siltstone, Claystone
	Bilara Group	Limestone, Dolomite, cherty Sandstone and laminated boulder bed Sandstone
	Jodhpur Group	Maroon shale, Claystone, Sandstone and Siltstone

**B. PREAMBLE**

Rajasthan State Mines & Minerals Limited (RSMML) is one of the leading and progressive undertakings of the Government of Rajasthan. It occupies a place of pride in production and marketing of non-metallic minerals of India. RSMML is multi-mineral and multi-location enterprise engaged in mining of Rock-phosphate, Lignite, SMS grade Limestone and Gypsum. RSMML is not only the leader in mining & selling of Rock-phosphate and Gypsum across the country but also global pioneer in technology in open cast mining and mineral beneficiation of Carbonate Rock-phosphate. Besides minerals, RSMML has also forayed

into energy sector. It has setup 106.3 MW installed capacity Wind Power Project at Jaisalmer and 5 MWp capacity Solar PV Power Plant at Bikaner, Rajasthan.

### **C. PROJECT BACKGROUND**

Excavation for Lignite commenced in both the Matasukh & Kasnau pits in the month of January 2003 and subsequent to the removal of overburden lignite production started in November, 2003. When the mining operations reached deeper levels (almost 50 m depth from surface) ground water intruded gradually into the mining pits resulting into temporary suspension of mining operation. On the advice of DGMS, Ajmer region, a scientific study of the Matasukh & Kasnau areas was carried out by Neyveli Lignite Corporation; CMPDI, Ranchi for understanding the hydro geological regime of the region and depressurization needs and rehabilitation techniques. Further, retired professors Dr D.M. Surana & Prof. Talwar of MBM Engineering College, University of Jodhpur, were approached for conducting geo-technical studies and evaluation of the strata conditions for safe mining under such heavy saturated conditions. Based on these studies DGMS allowed resumption of mining operations initially only for Matasukh pit which is being continued till date.

### **D. EXPLORATION**

This area was explored extensively by Directorate of Mines & Geology (DMG), Government of Rajasthan (GOR) during the year 1987-92. However, RSMML after obtaining Mining Lease carried out confirmatory drilling through DMG & Mineral Exploration Corporation Ltd (MECL) in years 2002-03. The exploration details are as below:

<b>Agency</b>	<b>Quantum of Exploratory Drilling</b>
By DMG in the Year 1987-92	15920.88 m in 124 Bore holes at 400 m X 400 m grid interval
Confirmatory drilling by MECL for RSMML	965 m in 8 Bore holes

#### **Attributes of Lignite Horizons:**

Based on geological exploration data, the lignite seams encountered at Kasnau Sub block are described as below:

Number of Intersections	19
Depth of occurrence	
(a) Min. depth of roof	49 m.
(b) Max. depth of roof	105 m.
Cumulative Thickness of Seam	
(a) Min. thickness	3.2 m.
(b) Max. thickness	11.2 m.
Number of Seams	3 to 5

#### **Geological Reserves:**

Based on the exploration carried out in the area, geological reserves as per details given below have been computed:

Geological Reserves	<b>23.22 million MT</b>
Minable Reserves (As on 31.03.2012)	<b>12.59 million MT</b>

**Quality:**

Based on analysis of core samples obtained during the exploratory drilling, channel samples from lignite faces and R.O.M. samples, the range of different constituents in the proximate analysis of these samples has been worked out and is given below. The quality parameters given below indicate the general average quality of Lignite available in this deposit. However, some slight variation in the range of constituents indicated below may occur during actual mining of lignite.

Constituents	Value	Constituents	Value
Moisture (%)	48-52	Sulphur (%)	01 - 02
Ash (%)	05-10	Fixed Carbon (%)	18-22
Volatile Matter (%)	25-30	Gross Calorific Value (Kcal/kg)	2800-3200

**Hydrogeology:**

The most important hydro geological formation in the region influencing Lignite deposits is the Palana sandstone of the Tertiary period. It is underlain by Nagaur sandstone of the Marwar Super Group and overlain by the younger alluvium of the Quaternary age. The argillaceous fine grained sandstone occurring between 24 to 30 m forms the upper pheratic aquifer having TDS in the range of 2000-2500 mg/liter. The water discharge from such unconfined aquifer has little impact on Lignite mining. The upper arenaceous horizon of 30 m thickness is followed by a clay Lignite horizon.

The lower confined aquifer occurring below the clay Lignite horizon is in the form of fine, medium to coarse sand which is loosely cemented and is having clay bands at places. It is existing in a confined condition due to occurrence of impervious clay lignite horizon just above it. The lower aquifer is of highly saline nature having TDS in the range of 11000-12000 mg/liter.

**Technical Studies Conducted:**

RSMML commissioned the following studies for scientific evaluation of the issues related to ground water control, pit slope stability and for developing suitable method for safe mining of Lignite:

**a) Hydro Geological Study by Neyveli Lignite Corporation Ltd., (Tamilnadu):**

'A Report on De-Pressurization of Ground Water for Safe Lignite Mining in Matasukh – Kasnau Mines, Nagaur - November 2004'.

This Study was based on two stages of pump tests conducted in mine area and developed a suitable depressurization model (Ground Water Control Programme).

**b) Report on Revised Mining Scheme prepared by CMPDI, Ranchi:**

'A Rehabilitation plan of Kasnau and Matasukh Lignite Projects, District Nagaur, Rajasthan'.

This study incorporated the findings of geo-technical study by Prof. Surana and depressurization scheme developed by NLC.

**c) Geo-Technical Studies in Kasnau-Matasukh Lignite Mines:**

Report with under-mentioned title was prepared by Dr. D. M. Surana [former Professor of Mining, JNV University, Jodhpur] in August 2004. This Study carried out tests on shear strength of the strata and sensitivity analysis.

'Design of Safe High Wall Slopes for Kasnau – Matasukh Lignite Mine'.

### **Regional Hydro-geological Study:**

A study under the aegis of Central Ground Water Board, Western Region, Jaipur was conducted to understand the hydrological conditions and impact of long term pumping on ground water regime in and around Kasnau-Matasukh Lignite deposit. Based on the results of the study, clearance was obtained from Central Ground Water Authority (CGWA) for Matasukh block. In case of JV, the JV Partner shall be required to further undertake the detailed study so as to obtain the necessary clearance from Central Ground Water Authority for the Kasnau block and for planning/ execution of depressurization scheme.

### **Studies on Utilization of Saline Water:**

**a. Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, Gujarat:**

A pilot RO plant having capacity of 2000 liter/hour of feed water was installed by CSMCRI at Kasnau-Matasukh Lignite mines which was later shifted to other unit. This institution also studied the possibility of production of salt from the saline water available in our mines. A model solar salt pan was also constructed with the guidance and expert advice of this institution. The production of salt was not possible due to lesser concentration of salt in the saline water.

**b. Study on use of Saline Water in Agriculture: Karnal Agriculture University:**

Possibility of using the saline water for agriculture purpose was also studied for agriculture purpose. Crops suggested by them were grown in the mines area.

**c. Study of Salt & Water Movement Water in Evaporation Ponds And Surrounding Areas:**

A study was conducted on the above subject by Maharana Pratap University of Agriculture & Technology, Udaipur.

### **D.G.M.S. Permission:**

- a) The Director of Mines Safety (DGMS), Ajmer Region vide letter No. Aj/DMS/2004/1635 dated 12.05.2004 allowed to carry out the mining operation at Matasukh Pit & Kasnau Pit using HEMM in accordance to regulation 98(1) and 98(3) of Coal Mines Regulation (CMR) 1957.
- b) DGMS reviewed the above permission letter after inundation of lignite floors at Matasukh Pit and Kasnau Pit and failure of overburden and lignite benches (circular failures) by revising bench parameters vide letter NO. AJ/DMS/2004/2671/1984, dated 22.11.2004 initially for Matasukh Pit only on the basis of geo-technical studies conducted by Retd. Prof. Dr. D. M. Surana & Co. and CMPDI, Ranchi respectively to carry out mining operations under regulations 98(1) & 98 (3) of Coal Mines Regulations 1957.
- c) Presently, DGMS permission for use of Heavy Earth Moving Machinery for removal of overburden and excavation of lignite at Kasnau block was withdrawn as mining operations were discontinued in March 2004. In case of JV, the JV Partner shall have to undertake all the necessary steps needed for obtaining the DGMS permission for resumption of mining operations.

### **Land Status:**

The present land status is as per following table:

*(Area in Bighas & Biswas)*

Name of Village	Khatadari Land	Government Land		Total
		Charagah	Siwaichak	
Matasukh	5196 – 03	556 – 18	7 – 03	5760 – 04
Kasnau Custodian	1635 – 00	-	0 - 11	1635 – 11

Igjar	469 – 13	-	-	469 – 13
<b>Total</b>	<b>7294 - 16</b>	<b>556 - 18</b>	<b>07 - 14</b>	<b>7865 - 08</b>

The land details given above are as per the Jamabandi (Check List) received from Sub Registrar Jayal.

The following land will be made available for working of the Kasnau block in a phased manner by RSMML:

**Land Required for Mining:**

As per the mine plan, total land required for reaching the ultimate pit limit for Kasnau block is 280 hectares. RSMML shall make available this land as per the progress of mine plan in a phased manner. Presently, some part of the land falling in ultimate pit limit of Kasnau block is being used as Bund No. 6 for storing pumped out water from the Matasukh mines and as Bund No. 5 (Solar Pond) for storing the reject water from the 20 MLD desalination plant being operated for treating saline water of Matasukh mine. RSMML shall continue to use aforesaid land for this purpose but will provide the land required mining as per progress of Kasnau mine.

**Land Required As Dump Area & Top Soil Dump:**

The overburden area planned as per the mine plan of 70 hectare and present top soil dump of 7 hectare shall be made available to JV Partner, in case of JV.

**Land Required For Processing of Saline Water or Establishing Treatment Plant:**

Around 10 hectare land at suitable place shall be made available to JV Partner for establishing the saline water treatment plant.

**Other Land:**

Land required for establishment of offices, canteen, rest shelters, camps, etc shall be provided to JV Partner.

RSMML shall continue to use the land needed for Matasukh mine operations. The JV partner shall have to arrange on its own the land required for processing, storage and disposal of saline water, laying out pipeline and processing of reject water.

**Existing Infrastructure:**

To develop mining and pumping activities, following infrastructure has been developed at the mine which includes acquisition of land.

**Roads:**

- i. 7 m wide & 3.5 km long approach road to the Project for connection with State Highway No.60.
- ii. 7 m wide, 8.30 km long and 3.75 m wide, 1.8 km long peripheral roads have been constructed. Hence the peripheral road is 10.10 km.

**Buildings:**

- i. One Office building having an area of 101.32 Sq meters (plinth area) has been constructed for the Mines Manager.
- ii. Two Weighbridges of 60 MT capacity each and having a room of plinth area 63.49 square meter on each Weighbridge.

**Power:**

- i) 33 kV dedicated Overhead Power Line from 132 kV GSS of Rajasthan Vidyut Prsaran Nigam Ltd at Kuchera to 33/11 kV, sub-station vide 3150 kVA transformer.

- ii) Two km long 11 kV overhead line from 33/11 kV substation for electric supply of 11 kV/440 V for the operation of 20 numbers tube wells at Matasukh pit.

**Other Mining Related Infrastructure:**

- i) Five numbers Earthen Bunds, comprising 506 hectare area for storage of saline pumped out water from the mines. Out of which 220 hectare has been earmarked for storage of reject water of R.O. Plant, being set up by the Nagaur Water Supply Ltd.
- ii) Internal haulage roads for the movement of HEMM to surface OB dumps and also WBM motor able roads for internal movement.
- iii) A 20 MLD capacity RO plant is in operation which is producing 13 MLD potable water to PHED for onward distribution of the same to 120 villages in Nagaur district.

The above mentioned infrastructure facilities are a part of the Lignite mining operations and other allied activities related to Matasukh Block only. However, the infrastructure facilities for the Kasnau block will have to be evaluated, developed and if possible, dovetailed with this existing infrastructure.

**E. MAJOR ISSUES RELATED TO LIGNITE MINING**

1. The occurrence of confined aquifer below the lignite seams and depth continuity of the seams up to 90 to 100 meters in this block makes the mining operations in this block a very challenging task. This will require induction of advanced and sophisticated mining technology to extract lignite under the prevailing hydro-geological conditions. A certain extent of risk is involved in these operations.
2. The quantity of water and its highly saline nature will necessitate its processing to make it suitable for use in drinking water, agriculture or for industrial purposes. Hence will require waste stretches of land for Disposal of Brine having a high TDS of about 25,000 mg/liter (based on the 20 MLD plant in operation at Matasukh sub block) generated on account of desalination.
3. Disposal of a huge quantity of saline water 12,000 mg/liter, if not desalinated, will once again require land, permission from MOEF/RSPCB.
4. The setting up of a desalination plant for processing of this highly saline ground water by suitable technology will require infusion of large capital in plant, building, and development of other infrastructural facilities.
5. The difficult mining operations on account of prevailing hydro-geological conditions, makes it imperative that ingenious and advanced technologies of mining, depressurization and processing of saline water will have to be adopted.
6. Possibility of setting up of a thermal power plant based on the lignite and methods of mining will have to be evaluated. However, it may be kept in mind that as per statutory advice of Central Electricity Regulatory Commission (CERC), Clause 5.1 of the Tariff Policy provides that from January 2011 onwards all future procurement of power by distribution licensees should be done through tariff based competitive bidding even from Government/ State owned entities.

Besides the large capital investment required for undertaking this kind of a multi disciplinary project, a flexible working environment having considerable freedom of adopting suitable and advanced technology, is of prime importance.



## **F. STATUS OF STATUTORY APPROVALS/ CLEARANCES**

<b>MINING LEASE</b>	
Date of sanction of mining lease	25.08.2001
Area of Mining Lease	1063.35 hectare
Period of Mining Lease	Up to 24.08.2021
<b>MINING PLAN</b>	
Date of Approval of Mining Plan by Ministry of Coal	09.01.1998
Mine Capacity Approved	10 lac MT p.a.
Period for which Mining Plan has been approved.	Project life of 24 yrs.
<b>MOEF CLEARANCE</b>	
Date of Environment Clearance from MOEF	19.07.2000
Period for which Environment Clearance is effective	Project life of 24 yrs
Consent to operate from RSPCB, GOR	09.01.2004 & renewed up to 30.09.2014. Applied for extension.
<b>CLEARANCE FROM CENTRAL GROUND WATER AUTHORITY</b>	
Date of C.G.W.A. Clearance	01.08.2011

## **G. RISKS AND ASSUMPTIONS**

All evaluations involve some risks and assumptions that need to be addressed at the beginning of the assessment of the project so that they can be minimized as much as possible. The scope of this project is to design and develop the risk, preparedness and readiness models based on our past experience of operating the Matasukh pit. Before the models can be used, it is recommended that they be calibrated to ensure that the models produce accurate, consistent and meaningful results. The consultant has to develop a deployment strategy which, once deployed, can be immediately tested to ensure that the trends resulting from a series of assessments can be accurately interpreted and the various models adjusted accordingly.

## **H. BIDDER'S ELIGIBILITY & PRE-QUALIFYING CRITERIA**

The consultant should have past experience of preparing DPR of at least two open cast mining projects.

## **I. TIME SCHEDULE**

Time is the essence of the contract & Consultant shall complete the entire Scope of Work covered under the contract within six (6) months from the date of acceptance of work order.

Consultant will furnish within 15 days from the date of issuance of the EOI, based on a Time bound program of work, week wise preparation and completion of the project report for acceptance by the Owner. This shall become the basis for assessing the actual progress of work. The bidder will however furnish the proposed PERT chart indicating all major activities.

Subsequently, the schedule will be discussed with RSMML and the Consultant for finalization of the schedule and other technical details.

#### **J. SCOPE OF WORK & DELIVERABLES**

The Consultant will be required to accomplish the following work:

- (i) To define future course of action for rehabilitating Kasnau Mine by suggesting various alternatives. A few alternatives are as under, but the consultant may suggest more:
  - (a) Mining of Lignite for mercantile sale
  - (b) Mining of Lignite for feeding to Power Plant
  - (c) Sale of Lignite with Sale of Water (Raw/Treated/Reject)
  - (d) Lignite Sale + Water Sale + Power Plant
- (ii) 'Techno Economic Evaluation' of all the suggested alternatives. Compare merits & demerits of alternatives with justifications and recommend the best one to facilitate proper decision.
- (iii) To suggest appropriate business model/ strategic alliance/ joint venture/ development agreement for rehabilitating Kasnau Mine, keeping in view their legal implication.

Expected deliverables include:

- 'Techno Economic Evaluation Report' as per (i) to (iii) above: Four hard copies and one set of electronic copies including plates and drawings.
- Data presentation and analysis forming the basis of final report.

#### **K. CONFIDENTIALITY STATEMENT**

All data and information received from RSMML for the purpose of this assignment are to be treated confidentially and are only to be used in connection with the execution of awarded consultancy work. All intellectual property rights arising from the execution of awarded consultancy work are assigned to RSMML. The contents of written materials obtained and used in this assignment may not be disclosed to any third parties without the expressed advance written authorization of the RSMML.

#### **L. DETAILS TO BE FURNISHED BY CONSULTANT ALONG WITH PROPOSAL**

- (1) The consultant will provide a detailed scheme for carrying out the work as mentioned under scope of work.
- (2) Consultant shall furnish organisation chart indicating specialists to be engaged for the above work along with their qualifications.
- (3) Consultant shall furnish a detailed bar chart indicating the schedule for all major activities to be performed by them to complete the job as per Scope of Work and time schedule.

**PRO FORMA FOR PROPOSAL AGAINST EOI**

**1. Consulting Firm/ Individual Details**

- Name of the firm/ consultant
- Address
- Contact Person
- Contact Telephone Number/ Mobile Number
- E-Mail Address

**2. Criteria for Assessing Expression of Interest (EOI)**

Past experience of successfully preparing DPR of at least two open cast mines.

**3. Organizational structure, in case of firm.**

**4. Any other relevant information consultant desires to furnish.**

**Closing Date for Submission of Proposal:**

This proposal together with the requisite supporting documents must be submitted on or before **17.08.2015 by 3.00 PM** (IST) to the address specified in the EOI.