

URANIUM CORPORATION OF INDIA LIMITED

Status of Environmental Compliance of the Banduhurang Open Cast Mine as on March 2014

(MoEF No. No. J-11015/961/2007-IA.II (M) dated 13th May, 2008)

A. Specific conditions

- I. The project proponent shall obtain Consent to Establish from the State Pollution Control Board and effectively implement all the conditions stipulated therein.*

Consent to Establish from the State Pollution Control Board has been obtained vide no.G-784 dated 28.03.2011. Status of compliance report of all the conditions stipulated therein is being submitted to JSPCB.

- II. The environmental clearance is subject to approval of the State Landuse Department, Government of Jharkhand for diversion of agricultural land for non-agricultural use.*

District Land Acquisition Officer (DLAO), E. Singhbhum, Jharkhand has delivered the possession of land (agricultural land) of 305.2 acres dated 26.06.2005, 29.11.2007 & 17.07.2008 situated in Banduhurang village and Keruyadundri village in favor of Uranium Corporation of India Limited, for setting of Banduhurang uranium mine. In principal, agricultural land has been acquired for non-agricultural purpose. .

- III. The environmental clearance is subject to grant of forestry clearance. The project proponent shall obtain requisite prior forestry clearance under the Forest (Conservation) Act, 1980 for working in the forest area.*

The Ministry of Environment & Forest, Government of India has granted the forestry clearance of 130 ha forest land vide letter no. 8-138/2003-FC dated 07.04.2005 for Banduhurang Uranium Project and Turamdih Plant under the Forest (Conservation) Act, 1980. For the expansion project, no forest land is required.

- IV. The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any mining operations.*

No natural watercourse and/or water resources are present in lease area.

- V. The top soil should be stacked at earmarked site(s) only with adequate measures and it should not be kept unutilized for a period more than 3 years. The topsoil should be used for land reclamation and rehabilitation of mined out areas.*

The topsoil is stacked at earmarked site within mine premises to be used for reclamation & rehabilitation of waste dump. About 189893 m³ of available top soil has been used for progressive reclamation of waste dump slope.

- VI. The over burden generated shall be stacked at earmarked dump site(s) only and it should not be kept active for long period of time. The maximum height of the dump shall not exceed 35m, in two terraces of 20m and 15m each, so that the overall slope of dump should not exceed 28 degree. The OB dump should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. Backfilling shall start from the year 2018 and the entire backfilled*

area should be reclaimed and rehabilitated by plantation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.

The over burden generated is stacked at the earmarked site within mine lease area and slopes are being terraced. The maximum height of the dump shall not exceed 35m, with overall slope of dump of 28°. Progressive reclamation of slope of dump is being done. Top soil has been used to reclaim the slope of dump and subsequently the growth of natural vegetation has developed on slope as shown in photograph. Plantation on top and slope of the reclaimed dump has been done. Slope has been stabilized and no erosion is observed in rainy season. Therefore use of geo textiles for stabilization of the dump is not envisaged. As the part of total proposed area for waste dump is not available, the same has been re-located within mining lease. Photograph of the stabilized slope is as under:



- vii. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, soil, mineral and OB dumps to prevent run off of water and flow of sediments directly into the rivers. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted particularly after monsoon and maintained properly.*

Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the rivers and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.

About 2319 m garland drain around waste dump area has been constructed to collect the runoff water. Two number de-silting pond (*sedimentation pits*) of the total capacity about 100000 m³ have been constructed at eastern corner of the lease area. The run-off water from waste dump area is collected in the de-silting pond. The de-silted water is being utilized for industrial purpose. Photograph showing the de-silting ponds is as under:



- VIII. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rain fall data.*

Rainfall data of the area has been considered for design and evaluation of run-off quantity. Run-off water during rainy season from the waste dump (OB) area is channeled to desilting pond.

- IX. Suitable embankment of proper dimensions should be constructed to protect the area from flood water during rainy season.*

Flood water during rainy season is not expected as the average ground level (163 mRL) of the area is much higher than highest flood level (140 mRL). Therefore construction of embankment is not required for flood protection. About 2553 m storm water drain has been constructed to protect the area from flood water in rainy season.

- X. The project proponent shall develop effective emergency response procedure to ensure appropriate risk management measures in the public domain, if any, due to the project.*

As far as project is concerned, no risk is associated to public domain during mining operation. All activities are confined within mining lease only hence risk in the public domain is insignificant. However we have emergency preparedness plan for eventuality, if any. Guidelines of DGMS & AERB are being followed.

- XI. Plantation shall be raised in an area of 127.9ha including a 7.5m wide green belt in the safety zone around the mining lease, over burden dump site, backfilled area, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.*

Progressive greenbelt/ tree plantation is continued. Total 24975 tree plantation has been done which cover about 15 ha area. About 4000 tree plantation shall be done during monsoon of 2014.

- xii. *Regular water sprinkling should be carried out in critical areas prone to air pollution and having high levels of SPM and RPM such as haul road, loading and unloading points, transfer points and other vulnerable areas. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.*

Sprinkling of water on haul road and dusty area is done. RCC haul road of length about 2150 m has been constructed for ore transportation. Ambient air quality monitored during October 2013 to March 2014 at three locations in core zone in terms of PM₁₀, PM_{2.5}, SO₂, NO_x, Pb and Ni parameters are found within the permissible standards. Detailed report have submitted to the ministry.

- xiii. *The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.*

Rainwater water harvesting ponds of total capacity 100000 m³ have been constructed. Rain water from waste dump area and mining pit is collected in desilting cum rain water harvesting pond. Desilted water is being utilized for industrial purpose. Map showing rainwater harvesting cum desilting pond has been submitted.

- xiv. *Regular monitoring of ground water level and quality should be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment and Forests and its Regional Office, Bhubaneswar, Central Ground Water Authority and Regional Director, Central Ground Water Board.*

Regularly monitoring of ground water level of the existing well around the project is done. Water levels during November 2013 and January 2014 varies as 0.46 to 9.32 m and 0.54 to 9.78 m from existing ground level respectively. The water quality from above three locations in terms of pH, Total Dissolved Solid, Turbidity, Chloride, Sulphate, Total Hardness as CaCO₃, Total Alkalinity, Nitrate Nitrogen, Calcium, Magnesium, Nitrate and heavy metals (Cu, Fe, Mn, Pb, Zn) meet the drinking water quality as per IS:10500. Uranium and radium values in 4 ground water samples during January 2014 are well within drinking water standards (U- 60 µg/l and ²²⁶Ra - 300 mBq/l).

Monitoring of ground water level and quality is regularly sent to the Regional Director, Central Ground Water Board, Patna (ref: UCIL/ENV/BND/CGWB/01/13 dated 28.04.2013).

- xv. *The project authorities should obtain prior approval of the competent authority for drawl of surface water and ground water, if any, required for the project.*

No groundwater withdrawal has been planned at Banduhurang mine. Mine discharge water is being used for industrial activities e.g. dust suppression, drilling, washing etc. Water supply network of adjacent Turamdih establishment of UCIL is used for drinking water supply to Banduhurang Mine. Agreement has been made with Water Resource Department, Govt. of

Jharkhand and UCIL for withdrawal of surface water from kharkhai river @12000 m³/d for Turamdih establishment which is sufficient for the above requirement.

- xvi. *The project proponent shall submit data generated on pre-project community health status within a radius of 1km of this mine to this Ministry and its Regional Office Bhubaneswar, within three months.*

Pre-project community health status report with respect to the existing capacity has been submitted vide our letter no. UCIL/ENV/BND/20/09 dated 20.05.2009.

- xvii. *The mineral handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.*

Not applicable as mineral handling plant is not envisaged.

- xviii. *Consent to operate should be obtained from SPCB before starting enhanced production from the mine.*

Consent to operate has been obtained from JSPCB vide Memo no. 4415 dated 07.10.2010 which was valid till 30.06.2011. Renewal applications for year 2013 and 2014 have been applied vide our letter dated 22.02.2012 and 19.02.2013 respectively.

- xix. *Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. Overloading of trucks should be avoided to stop spillage. The loaded trucks should be covered with tarpaulin sheets to prevent spillage of ore.*

Vehicular emissions are monitored regularly and maintenance of vehicles is practiced. 22 number transport vehicles (tipper- Scania make) have got PUC certificates. Overloading of trucks is avoided to prevent the spillage. Transportation of ore from Banduhurang Mine to adjacent ore processing plant at Turamdih don't pass through public domain.

- xx. *Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneswar.*

Digital processing of entire mine lease area using remote sensing technique has been submitted to MoEF vide letter no. UCIL/ENV/BND/MoEF/16/08 dated 08.08.2008. Updated high resolution digital processing map of lease area using remote sensing technique will be submitted after completion of job. High resolution data has been acquired from National Remote Sensing Centre, Hyderabad.

- xxi. *The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna such as giant squirrel, Indian elephant, pangolin, sloth bear, python etc. spotted in the study area in consultation with the concerned forest officials. Action plan so prepared for conservation of flora and fauna shall be implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. Copy of action plan shall be submitted to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar within 3 months.*

Endangered fauna are not spotted in the lease area. Authentication for schedule-I fauna from Divisional Forest Officer has been obtained. UCIL has submitted the action plan for conservation of endangered fauna, if spotted in the area, to the ministry vide letter dated 08.08.2008.

- xxii. *Monitoring of background radiation levels in water, soil and ambient air should be carried out periodically in the study area (core and buffer zone) of the project.*

Monitoring of background radiation levels in water, soil & ambient air (Gamma Radiation Survey) is carried out by Health Physics Unit of BARC in core & buffer zone of the project. Water analysis report has been furnished in condition no. XIV. Soil analysis of 10 sample from adjoining area of the mine for U (Nat) , Ra-226, Po-210 and Th-(α) revealed that values are within natural variation of this background. The environmental Gamma radiation survey conducted during March 2014 in core & buffer zone shows the variation 0.05 to 0.15 μGy/hr.

- xxiii. *The plants growing in the area, soil invertebrate animals and local agricultural produce should be analyzed to check the build up of radioactivity levels, if any.*

Radiochemical analysis of the plants, aquatic vegetation & agricultural produce, growing in the area has been done. Results have been submitted vide our letter no. UCIL/ENV/BND/MoEF/20/09 dated 20.05.2009.

- xxiv. *Discharges from the treatment plant and settling pits should be constantly monitored for concentration of radio nuclides.*

Treatment plant at Banduhurang is not envisaged. Water from de-settling pond is used for industrial purpose within mine premises. The surplus water is sent to Turamdih ore processing plant for reuse. No water is discharged to environment due to mining operation.

- xxv. *Sludge from the treatment plant and settling pit should be transported to the tailing pond of Turamdih Ore Processing Plant in safe containment.*

Sludge from de-settling tank shall be contained in tailings pond of Turamdih plant.

- xxvi. *The project proponent shall have an emergency response plan to ensure that all potentially affected people understand the possible causes and consequences of radiation and other project related activities.*

Banduhurang is an opencast mine of very low grade of uranium ore. In mining of such a low grade ore, radiological emergency doesn't arise. However, for the radiological surveillance, Health Physics Unit of BARC monitors the various parameters around the project on periodical basis. Atomic Energy Regulatory Board (AERB) periodically reviews the observations.

- xxvii. *Land oustees and land losers shall be compensated as per the National Policy on Resettlement and Rehabilitation of project Affected Families (NPRR), 2003/State Government norms.*

Private lands of 305.2 acres have been acquired for Banduhurang Mining project. Total amount of compensation paid is Rs. 3,65,69,533.00 and 385 employments have been provided upto year 2011.

- xxviii. *Wet drilling and water spraying on muck should be practiced to reduce generation of silica and low level of radioactivity in the work place. The external radiation dose should be monitored quarterly to ensure that workers engaged in the work place are not over exposed.*

Wet drilling & water spraying on working area and haul road is practiced to reduce the fugitive dust. The external radiation dose rate from 17 locations of the work place during October 2013 to February 2014 shows that it vary from 0.1 to 2.51 $\mu\text{Gy/hr}$ (Permissible value 8 $\mu\text{Gy/hr}$).

- xxix. *Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.*

Complied with. Blasting operation is carried out in day time. Necessary measures are taken to control the blast parameters in consultation with CMRI & DGMS.

- xxx. *A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.*

A Final Mine Closure Plan will be submitted to MoEF before 5 years of mine closure.

B. General Conditions

- I. *No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.*

No change in mining technology & scope of working has been made without prior approval of the Ministry of Environment & Forest.

- II. *No change in the calendar plan including excavation, quantum of mineral uranium ore and waste should be made*

No change in the calendar plan including excavation and quantum of mineral has been made.

- III. *At least four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO₂, NO_x, and CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO₂, NO_x, and CO) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board/Central Pollution Control Board once in six months.*

Ambient air quality was monitored during October 2013 to March 2014 at four locations in core and buffer zones in terms of PM₁₀, PM_{2.5}, SO₂, Nox, Pb and Ni. All the parameters are found within the permissible standards. Detailed report has submitted to the ministry.

- IV. *Fugitive dust emission from all the sources be controlled regularly mentioned and data recorded properly. Water spraying arrangements of haul roads, wagon loading, dumps loading & unloading points should be provided and properly maintained.*

Fugitive dust emission is controlled by wet operation of drilling with dust extraction system and water spraying arrangement on haul roads, loading & unloading points. Water tankers with water sprinkling arrangement are used. Respirable dust is monitored in work zone which vary from 0.3 to 0.78 mg/m³. The values are within the permissible limits (0.8 mg/m³).

- V. *Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and drilling operations of HEMM, etc., should be provided with ear plugs/muffs.*

Personnel protective equipment (ear muffs/plug) is provided to workers. HEMM is equipped with glass enclosure cabin for operator to reduce the noise impact during operation. Noise levels vary from 50 to 73 db (A) which is within the permissible limits.

- VI. *Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop.*

Mine water discharge during mining operation is collected in de-silting ponds. De-silted water is sent to Turamdih processing plant for treatment and reuse.

- VII. *Acid mine water, if any has to be treated and disposed of after confirming to the standard prescribed by the competent authority*

Not applicable.

- VIII. *Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.*

Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to radioactive mineral dust and take corrective measures, if needed. The same programme may be extended to adjoining villages also.

Personnel working in dusty area are provided with PPE. Use of PPE is monitored. Vocational Training Officer (VTO) conducts various programs e.g. initial, refresher, special & development trainings on occupational health & safety and other topics as per the certified schedule of DGMS.

Occupational health surveillance:

- Medical teams visit surrounding villages periodically and medicines are supplied free of cost.
- Pre employment medical examination for lung function, x-ray, & audiometric test, pathological test, ECG & physical tests.
- Periodical medical examination of all employees.
- Medical facility is provided for all employees and their dependent.

During 2013, total 4 employees were medically examined and 44 number of person have been provided vocation training.

- IX. *Environmental laboratory should be established with adequate number and type if pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.*

Environmental engineering laboratory has been set up at Turamdih to cater the need of UCIL's operation in Jharkhand. Apart from this, Environmental Surveillance Laboratory of Bhabha Atomic Research Centre at Turamdih has started functioning for environmental and radiological monitoring.

- X. *A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior Executive, who will report directly to the Head of the organization.*

Environmental Engineering Cell (EEC) has been set up at Turamdih. EEC is under direct supervision of General Manager (Safety, Environment & Training) who report to the head of the organization. The manpower available at EEC is Sr. Environmental Engineer-1, Environmental officer – 2, Chemist – 1, Lab Assistant -1, Helper -2.

Note: One environmental engineer and one Graduate Operational Trainee will be added in above list during 2014.

- XI. *The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.*

Fund for environmental protection measure is made available. About Rs. 78 lakh has been incurred for laying of pipeline from de-silting pond to ore processing plant of Turamdih for reuse of mine discharge water. Recurring cost for environmental protection is Rs.4.5 lakh /annum.

- XII. *The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.*

The competent authority has approved the financial sanction for capacity enhancement. Land development work for enhancement of production is not applicable as no additional land has been envisaged. Only rate of production of the existing mine will be enhanced.

- XIII. *The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.*

Uranium Corporation of India Ltd. is committed to take action of any requirement/suggestion of the Ministry for safeguard of environment. We have extended our full cooperation to officials of Regional Office of MoEF, Bhubneshwar during their visit.

- XIV. *The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board.*

Being Complied.

- XV. *A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal*

Not applicable as no suggestion / representation had been received while processing the proposal.

- XVI. *State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.*

Complied with by State Pollution Control Board, Ranchi.

XVII. *The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <http://envfor.nic.in> and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubaneswar.*

UCIL had advertised in two local newspapers widely circulated on 18.05.2008.