Environment Occupational Health Safety and Social Action Plan Final Monitoring Report

Review of Partially Completed and in progress action Items in April 2016 Audit Report

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28 October 2016

Mr. Ramesh R Pai
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Kamalanga, Dhenkanal, Odisha.

Subject: *Certificate of Compliance on Environmental, Occupational Health & Safety and Social Action Plan (EOHS&SAP) implementation by GMR Kamalanga Energy Limited (a 1400 MW Thermal power plant), at Kamalanga, Dhenkanal district in the state of Odisha.*

ERM India Private Limited ("ERM") had prepared Environmental, Occupational Health & Safety and Social Action Plan (EOHS&SAP) for GMR Kamalanga Energy Limited (hereafter referred to as 'GKEL') as part of the Environment and Social Due Diligence (ESDD) in 2014. ERM during a previous assessment in April 2016 on status of EOHS&SAP implementation had observed significant progress on the action items; however there were a few partially completed and in progress action items.

ERM conducted this EOHS&SAP implementation assessment for GKEL between 3rd and 5th October 2016. Based on the field verification and review of the documents provided by GKEL, ERM observed all the partially and in progress action items under OHS and Environment has been closed by GKEL. So, all the 74 action items (48 under E&S and 26 under OHS) are now closed. The observations on each of these partially and in progress action points are available in the final Assessment Report.

The information presented in this document is subject to the scope, dependencies, qualifications and limitations, as stated in the Assessment Report. If, after reviewing the above, you have any questions, please call the undersigned at +91 124 4170 311.

Very truly yours,
ERM India Private Limited

Neena Singh

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1 PROJECT BACKGROUND

ERM India Pvt. Ltd. (ERM) had undertaken an Environmental, Occupational Health and Safety, and Social Compliance Audit in April 2014 for GMR Kamalanga Energy Limited (GKEL). This Audit was undertaken on behest of the investors (IIF and IDFC) to identify gaps in the environment, occupational health safety and social systems/practices of GKEL with reference to national/state regulatory requirements and India Infrastructure Funds (IIF's) Environment and Social Performance Standards. ERM prepared an Environment, Occupational Health and Safety, and Social Action Plan (EOHSAP) for GKEL in order to achieve compliance.

Thereafter, in April 2016, ERM undertook an EOHSAP monitoring of the progress on implementation of EOHSAP. This assessment found significant progress in several action points, though some of the items were in progress and were partially completed. GKEL focused on these partially completed and in progress items and after completion of these actions under EOHSAP, GKEL requested ERM in October 2016 to undertake final review of these remaining action points and inform IIF & IDFC on the status of compliance.

This report provides the compliance status of these 12 action items in related to environment and 7 action items related to occupational health and safety. Thus, the project is certified to achieve satisfactory compliance to the EOHSAP of April 2014.

1.1 APPROACH AND METHODOLOGY

ERM undertook a teleconference with the EHS team of GKEL as well as IIF to discuss the expected documents to be examined and field verification requirements. ERM requested copies of the reports/documents which were to be covered under the assignment to be made available to it for a desk based study ahead of their field visit. ERM sent a two member team comprising of Environment, social and OHS Expert to visit the plant site from 3rd to 5th of October 2016. The site assessment covered the following:

- Review of the implementation status of the partially completed and in-progress action items;
- Field visit and documentation based verification of all those actions which require on-site assessments as mentioned in the action plan;
- Review of the documentation oriented action items with respect to its adequacy and suggest improvements or modifications if any;
- Discussion with EHS team and the site Management on continuation of practices, internal monitoring review and improvements for the future.

1.2 AUDIT FINDINGS

Findings from this audit are presented in two distinct sub-sections below covering environment and occupational health and safety.

1.2.1 Environment

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1	Leakage of fly ash from the pneumatic conveying system of Unit 1 (conveying fly ash from boiler to ESP) needs to be rectified. Further it is to be ensured that all connections such as hoods, pipes, valves, stacks and chimneys are made leak proof. Regular inspection should be carried out to identify leaks if any and maintenance activities should be carried out to rectify the same. Also the coal composition testing should be done thoroughly to identify the ash content and the nature of the ash which enables in designing the conveyor system accurately.	Coal Composition testing carried out in June 2014, post ERM's audit. Separate Fly ash leakage check SOP has been developed. However, during the ERM's monitoring visit, it was observed that there were fugitive emissions from the fly ash silos for fly ash collection (from the hopper).Post ERM's monitoring visit, the chute below the silo was extended to control fugitive emissions to a maximum possible extent. Any spillage during truck loading is being cleaned by dedicated group engaged.	The extension of the chute below the silo was physically verified at the time of the on-site assessment. The site was perceived to be complying with the recommendation.
2	Leakage of coal dust from connection between coal bunker and coal mill of Unit 1 needs to be rectified. Further it is to be ensured that all connections such as hoods, pipes, valves, stacks and chimneys are made leak proof. Regular inspection should be carried out to identify leaks if any and maintenance activities should be carried out to rectify the same.	ERM undertook a physical verification of this gap. During the monitoring visit, it was observed that Unit –I was shut down for some maintenance activities technical repair work. However, Unit 2 & 3 were running, and significant fugitive emissions were observed from the coal mill. As a part of the SAP EHS process, departmental wise notification is raised for monitoring and identification of such issues. As per GKEL O&M team necessary modifications are in process in phased manner to control the fugitive emission. Moreover, the design team has to take into consideration the mill make and define the capital expenditure involved in the rectification of the leakage points.	Dispersion modelling study *(Reference: IN/ES-SAS/2015-044)* undertaken by M/s SGS India Private Limited, Kolkata has been completed. The final report for the study was available for review. The dispersion modelling study revealed that, the PM10 data at all sites except Burhapanka site show a decline in concentrations from 2007 levels. Since PM2.5 was introduced in 2009, the comparison was plotted against the 2011 values and were found to be declining at five sites out of eight. **The increased concentrations at other locations were not alarming as they were well within the NAAQS.**
3	GKEL should conduct AQ dispersionmodelling for all the seasons and depending upon the outcome of the same, GKEL should also conduct AAQ monitoring at sensitive/ high impact receptors falling in the impact zone of power plant outside the site.	Study is being conducted by SGS expected date of completion August 2016.	Dispersion modelling study *(Reference: IN/ES-SAS/2015-044)* undertaken by M/s SGS India Private Limited, Kolkata has been completed. The final report for the study was available for review. The analysis of results of dispersion modelling for all four seasons revealed that a maximum of 2.53 µg/m3 in PM10

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			concentration increases due to the emissions from stacks in the 10 km radius of the plant. This increment is just about 2.5% of the stipulated NAAQS value for PM10 which is 100 µg/m3. For SO2 and NOx the overall maximum increment is 22.4 and 11.1 µg/m3 in winter season within the 10 km radius of the plant. These increments in SO2 and NOx are acceptable as none of the sites showed exceedances in the concentrations of these parameters as measured during the course of this study.
4	The industrial wastewater should not be released into the garland drains and should not be discharged outside the plant boundary. The waste water generated from the Ash handling plant and the Cooling water blow down should be directed to the Effluent Treatment Plant, treated and reused in the HCSD system and used as cooling water, makeup water respectively. The drains should be cleaned regularly and the oil mixed surface runoff should be sent to oily wastewater system.	Based on ERM's monitoring visit, it was observed that the Ash handling plant was being connected to the reclamation pond, from where the water was being recycled in the plant itself. However, there is a leakage in the underground cooling tower pipe line, from where the water is collected in a pit and again pumped back to the CT – 3A basin. The fuel house was provided with oily treatment wastewater system which was further sent to the Guard pond in the STP and was used in the green belt development. During this visit, it was also observed that the drains are being cleaned and maintained regularly.	The measures for compliance mentioned in the previous column were physically verified at the time of the on-site assessment. No deviation was observed on the day of the on-site assessment.
5	The locations of water sampling points for monitoring of water quality needs to be reworked to comply with EC conditions and included in the monitoring plan.	Two monitoring locations (inlet and out let Khanda Nalla) has been considered by the SS Environics for collection of water sample for surface water. GKEL started the water sampling from other three locations (02 locations from river Brahmani and 01 location from village pond) once in a quarter i.e. for June 2016.	The sampling report of the respective locations were available at the time of the assessment. No deviation was noted
6	GKEL should maintain records of the recycled water quantities and have an accounting system for it; GKEL should have a benchmarking system for comparison to establish the relative level of water conservation efficiency.	Water Balance Diagram has been prepared by the respective Water department in GKEL. The same was reviewed by ERM at site and corrections were made in the revised WBD submitted by GKEL. For water conservation measures, rain water harvesting is being carried out, STP water is being used for green belt	The revised Water Balance Diagram was made available at the time of the on-site assessment. Based on discussion with the site management and on-site review it was noted that the Ash Handling Plant water is being recycled and used in the HCSD.

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		development. Ash Handling Plant water is being recycled and used in the HCSD. Regarding bench marking COC maintained above 5 and specific water conservation maintained is 2.7 – 2.8 m3/MWH which is better in comparison to other plants of same capacity.	With regard to the bench marking of COC, it was maintained above 5 and specific water conservation maintained is 2.7 – 2.8 m3/MWH. The site has also undertaken water sustainability assessment. Report of the same was available for review.
7	All the storm water drains should be cleaned and maintained. Concrete parapet wall of adequate height should be provided all along the concreted drains on its both the sides with rain cuts at regular intervals to prevent entry of dust/ash from the road and work zone into the drainage system.	Storm water drains were observed to be cleaned. Concrete parapet wall of adequate height on both side of the drain with rain cuts at regular intervals to prevent entry of dust/ash from the road and work zone into the drainage system is under progress. Remaining 1.6 kms is expected to be complete by July 2016.	The site was observed to have provided concrete parapet wall (of adequate height) to the storm water drain at the time of the on-site assessment. This was physically verified.
8	Personal protection devices should be provided to the workers in the TG Floor area. Regular Maintenance of the equipment should be undertaken.	PPEs have been provided to the workers however, few workers were observed not wearing them. Regular monitoring activities by OHS have also been strengthened by GKEL. However, it is recommended that the O&M should ensure use of the same at the respective functional areas.	The site has developed and implemented PPE matrix based on the outcome of the HIRA. The site has displayed the list of required PPE at the work areas. The site undertakes training and safety talks on the usage of PPE. Based on discussion with ten (10) workers at various location it was noted that the site encourages them to use PPE at all times. The workers were observed using appropriate PPE (such as helmet, dust mask, safety shoe, ear plug *etc.* as applicable at various work locations) on the day of the on-site assessment.
9	Undertake a cumulative impact assessment for the project along with all its components to identify the E&S issues and furthermore, prepare a suitable management Plan for handling such issues.	Based on the discussions with GKEL, it was understood that IFC and IDFC suggested only undertaking Air Quality cumulative impact assessment for this observation and SGS has been engaged by GKEL to conduct this study, which is yet to be completed. Three seasons monitoring has already been completed and expected date of completion is August 2016.	Dispersion modelling study *(Reference: IN/ES-SAS/2015-044)* undertaken by M/s SGS Indian Private Limited has been completed. The final report for the study was available for review. The analysis of results of dispersion modelling for all four seasons revealed that a maximum of 2.53 µg/m3 in PM10 concentrations increases due to the emissions from stacks in the 10 km radius of the plant. This increment is just about 2.5% of the stipulated NAAQS value for PM10 which is 100 µg/m3. For SO2 and NOx the overall maximum increment is 22.4 and 11.1 µg/m3 in winter season within the 10 km

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			radius of the plant. These increments in SO2 and NOx are acceptable as none of the sites showed exceedances in the concentrations of these parameters as measured during the course of this study.
10	GKEL should develop an integrated internal and external communication procedure to be implemented at the sub-contractor level for the ongoing construction and implementation activities and documentation of such records should be maintained at site.	Internal Audit report templates are being prepared. Grievance Redress Mechanism and Stakeholder Engagement Plan have been developed.	The site has developed internal and external communication procedure. These were verified at the time of site assessment. Records pertaining to the usage of such plans were available at the time pf the assessment.
11	GKEL should ensure mandatory use of noise protection PPE while working in high noise zone; Personal protection devices should be provided to the workers in the TG Floor area. Site staff should encourage workers for using PPEs at site.	PPEs have been provided to the workers however, few workers were observed not wearing them. Regular monitoring activities by OHS have also been strengthened by GKEL. GKEL should implement a fine collection or award system to enable the workers to actually understand the importance of wearing the PPEs.	The site has developed and implemented PPE matrix based on the outcome of the HIRA. The site has displayed the list of required PPE at the work areas. The site undertakes training and safety talks on the usage of PPE. Based on discussion with ten (10) (2) workers at various it was noted that the site encourages them to use PPE at all times. The workers were observed using appropriate PPE (such as helmet, dust mask, safety shoe, ear plug *etc.* as applicable at various work locations) on the day of the on-site assessment.
12	GKEL should ensure that impacts associated with the decommissioning phase are assessed and addressed at least 1 to 2 years prior to eventual decommissioning. A Project Decommissioning plan should be prepared.	As suggested GKEL will prepare this plan 2 years prior to realization of decommissioning of plant.	As suggested GKEL will prepare this plan 2 years prior to realization of decommissioning of plant.

1.2.2 Occupational Health and Safety

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1	Inspect all the fire exits at the facility and train people on emergency evacuation to the different types of emergency encountered at the plant. All the fire exits shall be free from any obstruction and easily accessible to all	The site has developed a list of all emergency exits. The site conducts weekly inspection of the fire exits. Records pertaining to such inspection were available for review. The following deviation was observed pertaining to emergency exits: • The emergency route *(following the Emergency exit at the 1st floor of*	• The site conducts weekly inspection of the fire exits. Records pertaining to such inspection were available for review; • The site has provided one stair at the emergency route *(following the Emergency exit at the 1st floor of the*

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	workers in respective area.	*the administrative building)* was observed to be partially obstructed; • The site has not demarcated the emergency exit route following the emergency exits provided across the site; • Emergency exit signage have not been displayed at the Crusher house; The site conducts Emergency Mock Drill at the frequency of once in every three (3) months. Records pertaining to such mock drills were available for review at the time of the on-site assessment. The emergency scenarios considered include*:* • Leakage of Chlorine from the Tonner and chlorine exposure to one workman causing head riling; • Fire near Crusher House; • Leakage of Chlorine from the running Tonner; Post Audit, the site has provided one stair at the emergency route *(following the Emergency exit at the 1st floor of the administrative building)* to facilitate easy movement of the occupants during the time of any emergency evacuation. Graphics of the newly constructed stair was provided by the site on electronic mail on 2 May 2016.	*administrative building)* to facilitate easy movement of the occupants during the time of any emergency evacuation. This was verified physically at the time of the on-site assessment; • Display boards indicating the location of the Emergency Assembly area were observed at many places inside the premises. Based on discussion with the site management, it was noted that the site had displayed a total of 45 such display board to indicate the direction of the Emergency Assembly area; • The site has modified the CCR 1 & CCR 2 area in order to provide emergency exit. This was physically verified at the time of the on-site assessment. A display board indicating "Emergency Exit" had been provided on the exit door. The site had displayed board indicating the emergency exit route following the emergency exit at CCR 1 & CCR 2.
2	Conduct risk assessment for coal stack area and procure the relevant equipment for monitoring of the coal stacks such as thermo- graphic monitoring, temperature recording and Gas tests.	The site has conducted Health & Safety (H&S) risk assessment (i.e. HIRA) for Coal stack area considering the various activities undertaken. The activities captured in the H&S risk assessment include: • Coal stacking through stacker Reclaimer; • Coal reclaiming through stacker Reclaimer; • Operation of Coal Dozers; • Cleaning of peripheral drains; • Covering of coal pile by tarpaulin; and • Loading & unloading of material by Truck. The site has not identified the hazards (and associated risks) relating to Coal crushing, coal conveying to the transfer point (and to the bunkers) in the H&S risk assessment.	The site had revised the Hazard Identification & Risk Assessment (HIRA) sheet dated 3 June 2016. The copy of the revised HIRA *(Doc. No: GKEL/C&A/D/HIRA-18)* was made available at the time of the on-site assessment. A review of the revised document revealed that the site had incorporate the following activities and associated hazards and risks in the revised HIRA: • Coal stacking through stacker Re-claimer; • Coal reclaiming through stacker Re-claimer; • Operation of Coal Dozers; • Cleaning of peripheral drains; • Loading & unloading of material by Truck. The site has provided hand railing to the metallic platform *(to the Hot Air Duct located at the Mill 1A at the Coal Mill*

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		The H&S Risk Assessment (as mentioned before) have notaccurately identified the consequences/risks associated with each of the identified hazard (corresponding to the activities). Instances of such deviations include: **Hazard** **Consequence** Dust Exposure First aid injury Poor illumination First Aid injury However, post ERM's visit, GKEL revised the IMS Manual and surveillance and recertification audit was being done in June 2016. The site has engaged an external agency *(M/s Acme Private Limited, Bhubaneswar)* to carry out Thermography survey of the coal yard. The Thermography Survey is conducted at the frequency of: • Once a month during summer (March – June); and • Once in every three (3) months for rest of the year. Reports pertaining to the Thermography survey were readily available at the time of the on-site assessment. As per the latest Thermography survey (dated 11 March 2016) undertaken at the Coal yard, no thermal temperature (i.e. over 60^0C) was identified and no corrective action was suggested.	*Area)*. Also, the site has made arrangement to anchor the safety belt while working on the aforesaid metallic platform. Graphics of the newly provided hand rail and the anchor point was shared by the site dated 2 May 2016. This arrangement was physically verified at the time of the assessment. No deviation was observed. The site had prepared inspection checklist for ladders, vertical fall arrestor. Reportedly, these checklists are in use at the site. The inspection checklists and the filled-in records *(of the checklists)* were made available at the time of the on-site assessment.
3	Prepare an inventory of the work at height equipment and inspect the equipment against the requirements under pre-use inspection checklist. Discard all the equipment not meeting the requirements & provide with red tag stating *'Do not use '*. Identify contractor workers working at height and provide work at height trainings to supervisor and contractor worker group.	The site has developed an inventory for all equipment used during work at height. These include ladders, Hydraulic Platform, Step Ladder with wheel *etc.* The site has developed pre-use inspection checklist for Hydraulic platform. However, similar type of pre-use inspection checklist has not been developed for all other equipment (such as various type of ladders, vertical fall arrestor *etc.*) used during work at height. However, Post ERM's visit, GKEL developed this inspection checklist. Per the site management, the equipment that are used for work at height, are inspected at the time of issuing permit to work.	The hand railing provided to the metallic platform (to the Hot Air duct located at the Mill 1A at the Coal Mill Area) was physically verified at the time of the on-site assessment. The site has developed pre-use inspection checklist for ladders, vertical fall arrestors, hydraulic platform *etc.* Sample filled in copies of such checklists were available for review at the time of the on-site assessment.

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	Display the work at height related safety posters and conduct awareness program for work at height for the employees and contractor workers – Completed Provide proper access, standard working platform, guardrails to all scaffolds – Work in progress. Provide cage ladder to the fire water tank area	The site has conducted training and awareness sessions for safely working at height. The site also has displayed signage and instructions for safely performing work at height. The site has provided cage ladder to the fire water tank area. The assessment team observed one metallic platform temporarily fixed at a height of approximately 2 meters from the ground to access the Hot Air Duct located at the Mill 1A at the Coal Mill Area. The metallic platform lacked any form of barricading. No arrangement for anchoring safety belt was observed above the platform. Post Audit, the site has provided hand railing to the metallic platform (to the Hot Air Duct located at the Mill 1A at the Coal Mill Area). Also, the site has made arrangement to anchor the safety belt while working on the aforesaid metallic platform. Graphics of the newly provided hand rail and the anchor point was shared by the site dated 2 May 2016.	
4	Review checklist of the equipment inspections carried out during the preventive maintenance and ensure that checklist contains machine guarding related aspects which help the maintenance personnel to ensure that the machine guarding related aspects are taken care while undertaking preventive maintenance. Through existing onsite inspections being conducted by safety department or by the safety committee, consider undertaking a comprehensive review of the equipment and ensure that the appropriate machine guarding is available and provisioned and maintain corresponding documentation.	The site has included machine guarding related aspects in the Preventive Maintenance Schedule (wherever applicable). The site conducts Machine Guarding assessment for all department (by cross –functional team) once in every 6 months. Reports of such assessments were made available for review. Approximately, 2 meters both side of the belt conveyor from tails and head end already guarded. adequate administrative control (including ensuring proper supervision, trainings, display of signage on hazards associated with rotating parts of conveyer etc.) must be put in place; Conduct tool box talks at the Crusher house to remind/refresh the workers about the entrapment hazard from the moving conveyer	Based on discussion with the site management it was noted that the site conducts tool box talk informing the workers pertaining to the hazards associated with the rotating parts of plant and machinery. Also the areas are (i.e. crusher house, transport towers and conveyer galleries) supervised as reported. The site has put in place administrative control *[i.e. displayed (in vernacular language) the potential hazards (of rotating parts of plant and machinery) and safe working method]* at the crusher house, transport towers and conveyer galleries. Reportedly, the respective departments were involved in displaying such boards.
5	Ensure that unsafe conditions posing slip and	The site conducts periodic inspections to identify unsafe	The site had provided toe guard to stairs located at the TG

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	trip hazard are identified and eliminated through adequate and systemic corrective actions such that recurrence of such conditions is avoided. This can be undertaken through existing onsite safety inspections being undertaken by safety department and safety Committee. Install signage at the noticeable location to communicate the Slip and Trip hazards. Review the hazard identification and risk assessment undertaken for the unloading of coal operations near Track Hopper. Identify the hazard and associated risk associated with the size of the grid opening where personnel use their legs to poke the coal. Consider provision of toe guards to the staircases provided in the wagon tippler and crusher house areas.	conditions at the site. This includes inspections of slip and trip hazards. The site was observed to have displayed signage to communicate hazards. The site has provided toe guard at the stair at the Wagon tippler area. Trip hazard identified in the following locations: • Stair (between 1st and 2nd floor) with tiles broken at the TG Building; • Stair (between 1st and ground floor) with tiles broken at the DM Plant; and • Toe guard has not been provided on the Stair railing at the TG Building. However, post ERM's visit, this was completed and provided at the respective area. During ERM's visit, HIRA was not been revised / updated to incorporate the hazards of unloading of coal operations near Track Hopper and risks associated with size of the grid opening where personnel use their legs to poke the coal. However, post ERM's visit, GKEL revised the IMS Manual and surveillance and recertification audit was being done in June 2016.	building. The damaged tiles at the stairs (at the TG building and DM plant area) have been replaced. This was physically verified at the time of the on-site assessment.
6	GKEL should carry out risk assessment to identify areas of potential exposure to employees. For such areas, carry out survey of the exposure levels. Based on the results develop action plans and implement the control measures	The site currently undertakes: • Pre-employment health check-ups (*with include Pulmonary Function Test, hearing tests etc.)* for all employees; • Annual medical check-ups. Records pertaining to these tests were available at the time of the on-site assessment. During ERM's visit in March 2016, the site had however not carried out any specific risk assessment to identify areas of potential exposure to the employees. Post ERM's visit, GKEL developed and completed this. During ERM's visit in March 2016, the site had undertaken HIRA for various departments. The existing HIRA registers for various departments (such as CHP, Coal yard etc.) has not	Refer row below.

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		appropriately captured the risks associated with various types of exposures (such as coal dust, noise, vibration etc.). However, post ERM's visit, GKEL revised the IMS Manual and surveillance and recertification audit was being done in June 2016 and this manual captures HIRA for all exposures. During ERM's visit in March 2016, the site had not developed any action plan to track the health status of the employees (over a period of time) and implement measures to mitigate the health impacts from various types of exposures.	
7	GKEL should revisit hazard identification and risk assessment already undertaken in view of the observations made during this audit.	During ERM's visit in March 2016, per site management, the Hazard identification and risk assessment (HIRA) register has been revised to accommodate the identified risks/observations during the ERM Audit in April 2014. During ERM's visit in March2016, the site had not developed any action plan to track the health status of the employees (over a period of time) and implement measures to mitigate the health impacts from various types of exposures. However, it could not be explicitly ascertained whether the HIRA (apart from Control &Instrumentation department) has under-gone any revision post the ERM audit (April 2014). The HIRA register lacked the revision date to ascertain when the HIRA was reviewed and updated.	The updated HIRA was available for review (June 2016). The HIRA has taken into consideration the risks associated with exposures. The site conducts pre-employment medical tests for all employees. The Factory medical officer examines all such medical test reports before the person is allowed employment at the site. The site also undertakes periodic medical examination (once in every year). The reports are also verified and examined by the medical officer in order to identify any potential deviation in the health status of the employee.

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