CONGRATULATIONS
The British Safety Council congratulates you on winning an International Safety Award and invites you to the 54th International Safety Awards Presentation Banquet.

To celebrate your success, join us on Friday, 18 May 2012 at the Grosvenor House in London, where you will be presented with your award.

A spectacular celebration featuring a dramatic light show ILLUMINE, world-class performer WOLFGANG from Cirque du Solei and 5 time Royal Command star PAUL ZERDIN, with hilarious new comedy from his sell-out show at the Edinburgh Festival.

TO MAKE A BOOKING OR FOR MORE INFORMATION visit our website www.britsafe.org/ISAbanquet

IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT OUR CUSTOMER SERVICES TEAM
T: +44 (0) 20 8741 1231
E: customer.service@britsafe.org
www.britsafe.org
Rabi Narayan Mishra
Vedanta Aluminium Limited
Lanjigarh
Biswaanathpur
Kalahandi
Odisha 766027
India

23 March 2012

Dear Rabi

We are delighted to inform you that Vedanta Aluminium Limited - Lanjigarh has been awarded a British Safety Council International Safety Award with distinction. Your application scored 60 out of 60 (pass 36; merit 48; distinction 60). Please find enclosed details of the marking and result enquiry process for your reference.

This achievement clearly demonstrates a strong commitment by Vedanta Aluminium Limited to maintain the health, safety and well-being of your employees through good health and safety management.

To recognise your success, we would like to invite you to the International Safety Awards Presentation Banquet at the Grosvenor House in London on Friday 18 May 2012 to accept your award. The banquet provides an excellent opportunity to not only celebrate your success, but also network and share ideas with other health and safety professionals. Please refer to the enclosed leaflet or visit our website www.britsafe.org/isabanquet for more information or to make a booking.

We would like to ensure the information printed on your certificate is correct. The name to be printed on your certificate is Vedanta Aluminium Limited - Lanjigarh. It would be appreciated if you could please notify our customer service team on 020 8741 1231 or customer.service@britsafe.org before Friday 6 April 2012 if any changes are required.

I would like to congratulate you on your achievement and look forward to celebrating your success at the International Safety Awards Presentation Banquet.

Yours sincerely,

Alex Botha
Chief Executive

Your ISA Reference: O-0553757
INSTRUCTIONS TO APPLICANTS

Type your responses in the white boxes only; they will expand to accept your text.
Do not amend text in the grey boxes.
If you have any difficulties completing the form, contact our customer service team on +44 (0)20 8741 1231.
Each application form covers one site or business unit. If you wish to enter several sites or business units, please complete a separate form for each one.
When you have completed the form, e-mail it to submissions@britsafe.org
Your submission will be acknowledged within two working days.
Please note that payment must accompany your application and that submission of your application indicates your acceptance of the terms detailed in the ‘Guidance for Applicants’ document.
The deadline for applications is **29 February 2012**. Late applications will not be accepted.

REFERENCE NUMBER: O-0553757

CONTACT INFORMATION

<table>
<thead>
<tr>
<th>NAME OF ORGANISATION AND SITE / BUSINESS UNIT</th>
<th>[M/s VEDANTA ALUMINIUM LIMITED,LANJIGARH]</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is the name which will appear on your certificate; it may <strong>not</strong> be changed after you submit your application.</td>
<td></td>
</tr>
</tbody>
</table>

| FULL POSTAL ADDRESS OF SITE / BUSINESS UNIT | [M/s VEDANTA ALUMINIUM LIMITED, PO: LANJIGARH VIA-BISWANATHPUR DIST-KALAHANDI ODISHA-766027 INDIA] |

| IS YOUR ORGANISATION | [Yes ] |

O-0553757
<table>
<thead>
<tr>
<th><strong>A MEMBER OF THE BRITISH SAFETY COUNCIL?</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>NAME AND ADDRESS OF PERSON TO WHOM THE RESULT SHOULD BE SENT</strong></th>
<th>[RABI NARAYAN MISHRA, HEAD- EHS, PO: LANJIGARH VIA-BISWANATHPUR DIST-KALAHANDI ODISHA-766027 INDIA]</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>TELEPHONE NUMBER AND E-MAIL ADDRESS OF MAIN POINT OF CONTACT</strong></th>
<th>[919937251436 &amp; <a href="mailto:rabi.mishra@vedanta.co.in">rabi.mishra@vedanta.co.in</a>]</th>
</tr>
</thead>
</table>

**DECLARATION**

Declaration by senior person responsible for this application:

I confirm that, since 1 January 2011, this site or business unit has NOT:

a) suffered any fatalities;
b) been subject to any prohibition notices;
c) been the subject of any convictions in relation to health and safety.

In addition, there are NO ongoing criminal investigations or prosecutions pending in relation to health and safety at this site / in this business unit.

Please note that checks will be made and that a false declaration will lead to disqualification.

<table>
<thead>
<tr>
<th><strong>NAME OF SENIOR PERSON</strong></th>
<th><strong>JOB TITLE</strong></th>
<th><strong>PHONE NUMBER</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>[Dr. Mukesh Kumar]</td>
<td>[President &amp; COO]</td>
<td>[919937251216]</td>
</tr>
</tbody>
</table>
**APPLICATION**

**IMPROVEMENT NOTICES**

An improvement notice at the site does not preclude you from entering for an award. However, if an improvement notice has been served at this site since 1 January 2011, you must satisfy the adjudicators that adequate remedial measures have been implemented.

<table>
<thead>
<tr>
<th>Please provide details of any improvement notices and the remedial measures implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>[NO]</td>
</tr>
</tbody>
</table>

**MAJOR INJURIES**

A major injury at the site does not preclude you from entering for an award. However, if there has been a major injury at this site since 1 January 2011, you must satisfy the adjudicators that actions have been taken to minimise the risk of a similar injury happening again.

<table>
<thead>
<tr>
<th>Please provide details of any major injuries and the remedial actions taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>[No]</td>
</tr>
</tbody>
</table>
M/s Vedanta Aluminium Limited (VAL) a part of the US$ 6 billion Vedanta Resources Plc, a London listed 100 FTSE company. VAL is a non ferrous metallurgical industry having an Alumina refinery at Lanjigarh, Odisha, India and Smelters at Korba, Chhattisgarh, India and Jharsuguda, Odisha, India. The Alumina Refinery is of 1 MMTPA capacity. The main product of the unit is Calcined Alumina which is an input to the smelters. The operation involves receipt of bauxite mainly through rail and partially through road from the nearest railway station at a distance of 10 KM, the extraction of alumina from bauxite using Bayer Process and Calcination at high temperature. The steam and power requirement is met through a coal based 75 MW capacity Co-generation Power Plant.

Alumina is extracted from bauxite ore by employing several unit processes/operations. These include -

![Process Flow Diagram](image-url)
Crushing
The bauxite is received from mines through long-distance conveyors and sized using roller seizers. The size of the bauxite is reduced from 80 mm to 25 mm. The crushed bauxite is passed to the grinding section through overhead conveyors.

Grinding
The crushed bauxite and the spent liquor are fed to the ball milling circuit for wet grinding. During grinding spent liquor is added to ball mill with bauxite.

Pre-desilication
This preheated slurry is fed into a series of pre-desilication tanks to initiate the process of removing reactive silica from the bauxite in the form of desilicated product (DSP).

Digestion
When the slurry is mixed with sodium hydroxide at over temperature between 145 ºC to 150 ºC, aluminium hydroxide (bauxite) forms a solution of sodium aluminate as per the following reaction.

\[ \text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O} + 2\text{NaOH} \rightarrow \text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 + 4\text{H}_2\text{O} \]

Evaporation
The evaporation unit is used to remove any excess water that has entered the Bayer circuit.

Settling and washing
Settling involves the separation of impurities from the liquor containing alumina.

Security filtration
The liquor from the settler overflow tanks (which is at 102ºC to 102ºC) is pumped to Diastar pressure filters for the removal of residual impurities.

Precipitation
The two-stage precipitation model has been adopted to precipitate the alumina hydrate from the caustic solution. The two stages are agglomeration and growth.

\[ \text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 + 4\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}. \]

Classification
Alumina hydrate from the last growth tank is sent to the classification section and separated out into three size fractions: fine, coarse and product size.

Hydrate seed thickener
Fine seed slurry (secondary cyclone overflow) is thickened by means of the hydrate seed thickener for effective filtration.
Calcination

The preheated alumina hydrate is Calcined at a temperature of 1070 °C to 1100 °C using furnace oil & air gas. The calcination reaction is as follows:

\[
\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O} \quad \rightarrow \quad \text{Al}_2\text{O}_3 + 3\text{H}_2\text{O}
\]

The Calcined product alumina is pre-cooled at a temperature of 77°C and sent to the alumina handling plant.

The major health & safety risk identified are elaborated below. Medical tests are conducted according to the hazards exposed to during the course of employment.

Major health & safety risk -

- Caustic,
- Dust
- High temperature
- Noise
- Steam
- Electricity
- Vibration
- Chemicals
- Work at height
- Moving parts and machinery
- Conveyers
- Ergonomics

Control of the above hazards is done through Engineering control and Administrative control, PPE and Health surveillance monitoring program.

Each Worker in the Organization irrespective of his/her nature of employment (Contract Labourers, Permanent Employee) etc. Is subject to a rigorously imposed occupation health scrutiny at predetermined intervals of time. The medical check is normally conducted upon the subject at a frequency of 12 Months other than canteen workers. In case of canteen workers medical examination is conducted at interval of 6 months. At the time of entry Medical examination is conducted and critical aspects of industrial health, preventative and curative interventions that can be taken up at the personal level by workers to prevent the same and steps of first aid, cardio pulmonary resuscitation is communicated to all. The plant in running in 4 shift pattern ie A shift from 6 am to 2 pm, B shift from 2 pm to 10 pm, C shift from 10 pm to 6 am & General shift from 9 am to 6 pm.
Answer ALL the questions.

Before answering the questions, you are strongly advised to familiarise yourself with the marking scheme and guidance document which accompany this form.

The answer to each question must NOT exceed 500 words.

The adjudicator will only read the first 500 words of each answer.

We only require ONE appendix (a risk assessment for Question 2). Adjudicators will NOT look at any other appendices.

Use Arial font size 10 and 1.5 line spacing.

**RISK**

1. **What are the THREE most significant health hazards and THREE most significant safety hazards at this site / in this business unit? Justify your selection.**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health hazard 1</td>
<td>Silicosis</td>
</tr>
<tr>
<td>Health hazard 2</td>
<td>Coal Miners Pneumoconiosis</td>
</tr>
<tr>
<td>Health hazard 3</td>
<td>Noise Induced Hearing Loss</td>
</tr>
<tr>
<td>Safety hazard 1</td>
<td>Chemical Hazards like Caustic fumes, hot caustic liquor &amp; Dust</td>
</tr>
<tr>
<td>Safety hazard 2</td>
<td>Mechanical Hazards</td>
</tr>
<tr>
<td>Safety hazard 3</td>
<td>Physical Hazards like Noise &amp; heat</td>
</tr>
</tbody>
</table>
2. With reference to ONE of the hazards identified in Question 1, describe how the level of risk was determined (the process used) and (as an attachment) provide a copy of the relevant risk assessment.

One of the major hazards in Alumina Refinery due to hot caustic liquor splash over to eyes, face, body parts etc,

Risk Assessment:-

<table>
<thead>
<tr>
<th>What are the hazards</th>
<th>Who might be harmed and how?</th>
<th>What are you already doing?</th>
<th>What further action is necessary?</th>
<th>Action by who?</th>
<th>Action by when?</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Hazards like Caustic liquor splash</td>
<td>Caustic Burn injury due to leakages from pipeline, spillage &amp; Gasket failure</td>
<td>Safety induction training imparted to all the new workers. Training on SOP/SMP is also given. 100% PPEs ( mono goggles, chemical suit, gum boot, compliance are ensured. Adequate no. of Safety showers are installed at site. Signage (First-Aid for caustic, MSDS, Do’s &amp; Don’t for caustic, requirement of PPEs) has been displayed.</td>
<td>If, any observation detected then, engineering and administrative control are in place to mitigate the exposure.</td>
<td>Area Engineer</td>
<td>NA</td>
<td>Done</td>
</tr>
</tbody>
</table>

Annexure is attached

CONTROL

3. What did you do during 2011 to evaluate the effectiveness of the control measures in relation to health and safety at this site / in this business unit?
Overall, it is the responsibility of the unit head and the concerned department/section head, to ensure the effectiveness of health and safety at VAL, Lanjigarh. The unit head in turn form committees and designate specific responsibilities to committees/individual members in their respective division for effective implementation and for monitoring performance.

The health and Safety department and/or the Management Review Committee is responsible for reviewing control measures taken at site, guidelines and for providing necessary guidance and support to all the concerned for effective implementation.

With the above the evaluation has been done through:

- Conduct Pre employment Medical Examination/ Periodic Medical Examination/ Exit Medical Examination
- Conduct Special Examination for the group exposed to Respirable Dust, Caustic, Height Job, Working near High Temperature, Noise, Ergonomics Hazards and record it in monthly MIS for discussion and suitable corrective action if required
- Stress Management Program
- Hearing Conservation Program

**Pep Talk & Safety steward System:**

Pep talk & safety steward systems for associate partners have been well formed. Every day morning 9 AM pep talk has been given in presence of site engineer and supervisor and its repeated in every shift before start up work. It is reviewed by the senior management very often to motivate the line engineers and workers. Pep talk involves talking to all workmen about safety at their workplace in order to refresh their memory on safety, prior to starting their jobs for the day. In the safety steward system, associate partners are required to depute one person, exclusively for supervising all the safety aspects in that working area. All the associate partners having more than 50 employees have to depute one safety supervisor as Safety Steward.

**Refresher Training:**

Safety department has prepared a training calendar based on site observations like repeated safety violations and the training needs for each and every employee. We have a WSO database for all workers where person’s name, sex, age, designation, address, date of joining to the organization, health check up status, gate pass no., date of safety induction given, refresher training imparted, any specialized training attended and Every employee has been covered for refresher HSE training atleast once in a year. It is ensured by the Safety department that each and every person is imparted the refresher HSE training as per the training calendar.
Abnormality reporting:
Periodically (once in a week) a team of senior management was involved in the auditing at various areas. During the audit the abnormality observed and the material is put on a red tape and defined for immediate correction.

Inspections & External audit:
- Daily site inspection is being carried out by safety officers at site.
- Fortnight inspection has been carried out by a team of senior management throughout refinery power plant.
- External audit was conducted by National Safety Council from 8th-12th August; 2011.
- Inter Group Safety audit has been conducted from 19th Jan-21st Jan 2011.
- Regular audit by statutory bodies like Director of factories and Boilers, Odisha

4. How do you inform employees and associate partners about the findings of your risk assessments at this site / in this business unit?

All the risk assessment & corresponding corrective and preventive actions are discussed in the safety committee & subcommittee meetings and implemented at site. It is informed to all employees by circulating these through intranets and also by displaying at area notice board for the knowledge of shop floor workers for creating awareness. All the corrective and preventive actions are routed through hazard identification and risk assessment procedure, before the implementation of the same. After the proper HIRA procedure is carried out, the necessary work instructions or procedures are modified or renewed.

These are also included in the training of the new entrants so that it will help in increasing their safety awareness.

Safety Committee & Subcommittee-
We have constituted a health and safety committee, which assists and co-ordinates with the management, in achieving the aims and objectives outlined in the ‘Health and Safety Policy’ of the company. The committee consists of equal members from among the workmen & management, which is under the chairmanship of the plant head. This committee meets once in a month. Before every meeting, the safety committee carries out inspection of predetermined worksites at the plant. The functions and duties of the Safety Committee are as mentioned in the Odisha State Factory rules 1950. Apart from the Central Safety Committee we have 5 different safety sub committees (Red area, White area, Power Plant, Utilities Calciner, Work shop) headed by one of the area managers once in every months and out comes from the safety subcommittee are discussed in the Central Safety Committee.
**Tool box talk:**

In VAL, Lanjigarh every day, before start of the work, line supervisors deliver Tool Box talk covering the risk involved in the daily activities with workmen for about 10 minutes and remind them on the safety aspects at their workplace.

**Reporting/Investigating/Analysis Of Accidents, Dangerous Occurrences And Near Misses.**

When any accident occurred in plant premise, the concern area shifts in-charge informed his higher officers as well as fire and safety section regarding this. Immediately accident/dangerous occurrence investigation committee consisting of senior officers from affected area, fire and safety section, factory safety officer and medical person set up. This committee starts immediately investigation without delay. It also preserves all facts and finding and reports of for future reference.

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**COMPLIANCE**

5. What did you do to evaluate the effectiveness of the fire safety arrangements at this site / in this business unit during 2011?

A detailed fire hazard analysis has been carried out at Vedanta Aluminium Limited, Lanjigarh during initial plant design to reflect the proposed construction arrangements, materials and facilities.

The fire risk quantified for the process based on the indices like Fire & Explosion Index. The indices are comprehensive and give a realistic value to the risk of individual process unit due to potential fires and explosion. Facilities handling and storing flammable liquids are exposed to a potential fire risk. The fires due to flammable liquid may be a Pool Fire, Boiling Liquid Expanding Vapour Explosion (BLEVE) depending on the containment, type of release and source of ignition.

**Fire system for updating and testing-**

Fire drills are conducted regularly as per the plan given by the safety manager (twice in am month). After conducting the fire drills, the observer records the proceedings covering three necessary resource elements of emergency preparedness ie. manpower, materials and machinery & sends the report to the safety manager. Depending on the observations of the mock drill, suitable actions are taken & recorded on the Fire drill report.

**While designing VAL has ensured the following-**

**Building design-** All the buildings and working areas of the facility provided with adequate numbers of fire escape stairs / exits.
**Electric Circuits & Equipment:** In closed ventilated areas, where smoke/heat venting is not possible, for power cables and control cables, halogen-free, fire-retardant, low smoke (FRLS) materials used for sheathing.

**Transformers:** We ensure all transformers meet the requirements of "The Indian Electricity Rules, 1956.

Apart from the above following system are incorporated as

- Fire detection and alarm system
- Fire Extinguisher System
- Fire Hydrant System all around the plant
- HVWS System - High Velocity Water System in electrical substation
- MVWS System - Medium Velocity Water system in electrical substation

**Fire Detection** - Fire detectors along with additional systems such as actuation of shut down of power-operated equipments and of course annunciation and activation of fire suppression system.

**Fire prevention & control** -

Fire prevention activities categorized as Engineering, Training & Enforcement functions. Engineering refers to the careful planning of the fire safe buildings & processes. It also includes the proper interpretation of relevant fire codes & control of process hazards through design & installation of fire detection & protection systems. Proper training in regular intervals imparted on all employees to increase fire consciousness among employees and to eliminate fire hazards in workplace. The training also includes basic as well as advanced fire fighting procedures. Enforcement is the third important element of the fire prevention program. It deals with the activities of inspecting plants to ensure compliance with the relevant fire protection standards.

**Fire Protection** -

- **Fire hydrant system** - Standpipes with hose connections equipped with fire hose & nozzles should be installed in conspicuous locations in the plant area as per fire hazard analysis requirements to suppress fire

- **Water sprinkler system** - Low-pressure water sprinkler system installed in areas where substantial amount of combustible material are present.

- **Portable Fire Extinguisher** - Fire Extinguisher are installed as per Engineer India Limited.
6. Organisations should have access to competent assistance in relation to health and safety. How does your organisation satisfy this requirement in relation to this site / business unit?

**In-house Expertise – Full time qualified safety professionals’ team at site**

The EHS team is headed by Head -HSE holding B. Tech Degree in Chemical Engineering. The other full time Safety Professionals Include 2 Safety Officers Holding government approved Safety Diploma. The Occupational Health Team consists of Two Full Time Occupational Health Physicians at Occupational Health Centre catering to the needs of employees; The Occupational Health Physicians are supported by the following specialists and emergency medical officers in fulfilling all the requirement of Health and Wellness management program of the unit. Full time consultant available in branches-

- Medicine, Paediatrics, Orthopaedics, Dental, Physiotherapy
- Two Full time emergency medical officer available.
- 36 Paramedics help in Biochemistry, Hematology, Immunology tests, X-Rays, ECG, TMT, Ultrasound, Spirometry, Audiometry, Dental, Skin, Eye, ENT Examination and Rehabilitation.

**External input from specialist services from external agencies in field of Safety and Health**

We have engaged various expert organisations in the field of Occupation Health and Safety for our OHSAS 18001 and other management systems viz. ISO 9001, ISO 14001 & ISO 50001 as an auditor. DNV is a renowned government body in the field of safety for HAZOP Studies and NSC for Safety Audits.

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**MONITORING**

7. Describe the ways in which health and safety at this site / in this business unit was proactively monitored during 2011.

[ Vedanta Aluminium Limited following system proactively monitored during 2011 as-]
Health Surveillance Program –

- Assess Physical and Mental Requirement for the specific job and record it and do a trend analysis regarding all parameters.
- Conduct Pre Place Medical Examination/ Periodic Medical Examination/ Exit Medical Examination
- Conduct Special Examination for the group exposed to Respirable Dust, Caustic, Height Job, Working near High Temperature, Noise, Ergonomics Hazards and record it in monthly MIS for discussion and suitable corrective action if required
- Stress Management Program
- Hearing Conservation Program
- Sickness Absentism Prevention Program
- Rehabilitation, Relocation and Competency Mapping Program

Safety Steward System

This system comprises of involving line people with direct safety responsibilities within their area of control/operations.

Near Miss Reporting and Reward System

We have promoted the innovative NMI reporting. We have found increase in near miss reporting leading to correction of many such situations, which if left could have resulted into serious injuries.

Plant level safety committees and Central Safety Committee

Associate Partner Safety Management

Selection and control of associate partners, PPE Quality Management, Safety work permit system, Motivation & reward, Health checkup for associate partners, All PPEs routed through Safety Deptt. Lifting Tools and Tackles Management (Submission of Original Certificates to Safety Department), Exclusive Helmet Colour Coding for all.

Abnormality Reporting:-

Periodically (once in a week) a team of senior management is involved in the auditing at various areas. During the audit the abnormality observed and the material is put on a red tape and defined for immediate correction.

Pep Talk

Pep talk & safety steward systems for associate partners have been well formed. Everyday morning 9 AM pep talk has been given in presence of site engineer and supervisor and its repeated in every shift before start up work. It is reviewed by the senior management very often to motivate the line engineers and workers. Pep talk involves talking to all workmen about safety at their workplace in order to refresh their memory on safety, prior to starting their jobs for the day. In the safety steward system, associate partners are required to depute one person, exclusively for supervising all the safety aspects in that working area. All the associate partners having more than 50 employees have to depute one safety
supervisor as Safety Steward.

**Color coding**

Vedanta Lanjigarh site comply with the Lifting Gear, Appliances and Portable Power tools & equipment policy in accordance with Factory Act 1948 under Sec. 28 & 29, Odisha Factory Rules 1950, Rule 55. Coding is used to highlight the expiry date of equipment.

**Vedanta Colour Coding Chart:**

<table>
<thead>
<tr>
<th>Month</th>
<th>Quarterly (Lifting Gear &amp; Appliances)</th>
<th>Monthly (Portable H Power Tools &amp; Equipment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>March</td>
<td>Blue</td>
<td>Orange</td>
</tr>
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<tr>
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<td>Blue</td>
<td>Green</td>
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<tr>
<td>July</td>
<td>Blue</td>
<td>Blue</td>
</tr>
<tr>
<td>August</td>
<td>Yellow</td>
<td>Orange</td>
</tr>
<tr>
<td>September</td>
<td>Yellow</td>
<td>White</td>
</tr>
<tr>
<td>October</td>
<td>Orange</td>
<td>Brown</td>
</tr>
<tr>
<td>November</td>
<td>Yellow</td>
<td>Brown</td>
</tr>
<tr>
<td>December</td>
<td>Orange</td>
<td>White</td>
</tr>
</tbody>
</table>

**Implementation of WSO software**

The purpose of this software package is to identify the business requirements for Health, Safety and Environment for Vedanta Aluminum Ltd.

**Benefits:** WSO Software package allows for users to record hazards, incidents, environmental aspects, and Health aspects through a simple and easy to use form, which will allow employees to capture information for increased visibility for notifications and follow up actions to rectify potential HSE issues before an issue, arise. Any kind of injury and near miss at site immediate communicate to every member through this software.

**One day safety officer concept**

An innovative scheme launched called as the one day safety officer for VAL & Associate Partners. Accordingly, a staff member from every Associated Partner is deputed as a safety officer, for one day.

**5S housekeeping system**

The company has recently initiated the 5S housekeeping system. The ground work is complete.
8. Describe the ways in which health and safety at this site / in this business unit was reactively monitored during 2011.

Monitoring of Occupational Health

We have arrangements for regular Pre Medical Examination/ Periodic Medical Examination/ Exit Medical Examination for all our employees and associate partners. The records are maintained and analysed for any variance, indications etc. We also measure for certain occupation health indicators like Noise Induced Hearing Losses (NIHL) for specific groups of workforce depending upon the exposure areas. Work Zone Monitoring is also done at areas of exposure for determining exposure quantum. Treatments are also facilitated for non occupational diseases to the employees and their families. As such, no occupational disease has so far been detected in our unit.

Monitoring of Safety Performance

Performance Indicators for Safety are captured on daily and monthly basis. The monthly reviews are done at SBU level, Unit level as well as at Corporate level. Safety concerning both within as well as outside the plant: -

- The man hours worked
- Incident reported with manhours lost if any
- Action taken to improve safety by HSE department.

Nearmiss / Incident Monitoring:

Any near-miss / incident happened at site has been recorded ( +91-9937251358) and detailed investigation are done by safety experts and a corrective preventive action plan has been made to eliminate re-occurrence.

Every day a production report is sent to the Managing Director of the company which is then forwarded to Executive Management mentioning details of accidents, if any, on that day.

All the near miss cases, incidents and accidents with their corrective actions status are discussed daily during the operations meeting and during the monthly operational review meeting, which is chaired by the COO of the company.

Sending of the monthly compliance reports to the corporate office, on the status of legal compliance, corrective actions on accidents, incidents, makes the monitoring & evaluation system a robust one.

Other than this, there are HSEC reports sent to the central MIS system of VEDANTHA. These reports are made known to all the group companies. The advantage of this is that the corrective actions can be taken in the incidents before they actually occur at your plant.

Joint Inspection of Areas

Monthly Joint inspections by process, maintenance and safety for critical areas like for
Regular operating hoists, conveyors etc.

**Reporting & Investigation System**

We have a robust reporting and investigating mechanism in place for all occupational health and safety problems. We have procedure for “Identification of Unsafe Conditions / Act, Near Miss/ Incident / Accident Investigation and Analysis”.

**Sickness absence**

Sickness absence is managed by leave signoff by line managers. Also all the sickness leaves exceeding three days have to be authorized by company medical officers. We have online system of leave monitoring and management for executives to get an MIS on the same and take preventive & corrective actions.

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**PEOPLE**

9. What did you do during 2011 to ensure the health and well-being of the workforce at this site / in this business unit?

**Health & well-being Promotion Activities of the year 2011**

- Dissemination of information to all employees and community regarding Company Policy, Procedures, Product Line, Processes, By Products and its Health Effects, Disaster Management Plan of the site and the role of Public to minimise Health Effects in case of Disasters.
- Environment Health Risk Assessment and Training all in preventing Diseases due to Environmental Pollutants
- Updated Quality, Environment, Occupational Health, Safety & Community Policy is being approved by President cum COO and displayed at all the conspicuous locations.
- Pre employment, periodical and post employment health check up is mandatory.
- Health Program implementation takes care of issues related to acquisition, diversification, mergers, exploration, construction, operation, debottlenecking, expansion, ancillary services, closure, future liabilities
- Community health improved in association with National Vector Borne Disease Control Program Guidelines, National Rural Health Mission Program Guidelines, Framework and Persons associated with it. Gaon Kalyan Samiti, Rogi Kalyan Samiti, Local Youth Organizations, Water Sanitation Department, Block Program Development Officials, Child Development Program Officers, Anganwadi Workers, Child care Workers, Dist Health Authorities, CHC, PHC, Area Hospital, Subcenter Personnel, Insurance Providers etc.
Government Organizations working in the locality, Pest Control Society of India, Horticulture Department, Forest and Wild life Conservation Department, District Planning Officer, etc.

- Safety induction is compulsory for all the new workers and visitors.
- Safety induction movie is made in English and local Odia language.
- Specialized training to selected employees imparted by Head Refinery.
- Up gradation of Occupational health and safety manual is being prepared in Odia language.
- Involvement of senior management & associate partners for area inspection.
- Internal Safety audit are being conducted fortnight basis by senior management.
- PPE’s inspection has been done at main gate daily basis.
- Safety shower audit has been conducted once in every month.
- Vehicle inspection has been conducted once in every quarter.
- Portable hand tools inspection has been conducted once in every month.
- Welding machines inspection has been conducted and unfit machines has been discarded from site.
- Near miss reporting and rewarding policy is being followed.
- Stability study was done and certificate was issued by competent person on October 2011.
- All the lifting tools, tackles and pressure vessels are tested by competent person August 2011.
- Work permit inspection everyday at the time of site inspection.
- Rotating machine guarding inspection has been done.
- Fitness of ladder & staircase inspection is in progress and will be completed on 15th Feb 2012.
- “Swachata Abhiyan” is being carried out every month involving all level of employees.
- Colour coding system for all the lifting tools and tackles and portable hand tools has been implemented at site.
- “Crash Helmet Campaign” carried out at Township & Rehab colony.
- Fixing of wheel Guard for all hydas and transportation through hydra has been banned.
- Road Marking for pedestrians has been implemented.
- External Safety audit has been carried out by National Safety Council of India August 2011.
- Director of Factories and Boilers of Odisha factory inspection.
- Annual Safety inspection by Assistant Director Factories & Boilers Odisha on Dec-2011.
- Quarterly legal safety audit carried out by Veda Management system and Ernst & Young.
- ERM, Australia safety audit was done Nov 2011.

10. How do you, or how would you, ensure the health, safety and welfare of any vulnerable persons at this site / in this business unit (e.g. new and expectant mothers, young workers, disabled workers)?
We have been conducting pre employment health check up in the process of gate pass system. Also safety induction training has been a part of the process.

Crèches: - At Vedanta a well furnished Crèches with all provisions are maintained for new mothers.

Young Workers: - In Vedanta only adult person (more than 18 years) are eligible for work inside the factory premises. Vedanta never encourage young person (age less than 18 years) for working in/ out side of the factory premises.

Disabled workers: - Till date no disabilities has been recorded at Vedanta Aluminium Limited, Lanjigarh factory.

PRIORITIES

11. What are your priorities in relation to health, safety and welfare at this site / in this business unit for the next 12 months and why have these been selected as priority areas?

Innovative projects in relation to Health, safety & welfare carried out in the last 12 months:

Health priorities-

We at Vedanta, Lanjigarh give equal importance to Workers Health and community health.

We believe employee is a person from the community hence community health and employee health is one and the same

• Our approach is to cater to the health needs of all workers beyond the workplace
• Health Promotion is responsibility of everyone.
• All other stakeholders are given equal importance in Health and Wellness management program.
• Health protection is not subject to collective negotiation.
• Knowledge up gradation to induce a positive attitude in each member of the society including employees to develop a safe work environment and a healthy community.
• We take care to preserve traditional knowledge and culture of the society.
• We promote plantation of local medicinal plants and spread the knowledge in the community regarding its use and correct dose.
• We thrive to achieve the Millennium Development goal specially in field of mother and child care and prevention of Malaria, Tuberculosis, HIV.AIDS.

Safety priorities-

➢ Inspection of machine guarding.
➢ Reduced musculoskeletal disorder.
➢ Reduced work related incident involving fall from height.
➢ Improve road traffic inside the plant by engineering.
➢ Conductance of weekly Behavioural Based Safety observations drive in shop floor by
Top Management executives and SBU Heads.

- Prevent unwanted inevitable eye injuries.
As hazardous chemical caustic is used in refinery, all employees working inside the operational areas are trained and enforced to wear Monogoggle (chemical Goggle) eye protection. Generally safety glasses/Plain glasses are only required while outside these areas. No serious eye injuries have occurred since commissioning of the refinery.

**Reason for priority** - Caustic is very hazardous chemical which can harm the human eye in very short time.

- Training in Work Permit System & Job Safety Analysis (JSA) has been given to Engineers & Associate partner Supervisors/In charges.

All work requires a work permit & risk assessment to be carried out prior to commencing work.

**Reason for priority** - Minimize the industrial major incident through JSA to achieve Zero harm which is our company goal.

- Training in local language to Local workforce on PPE use and safety culture

Maximum workforces are taken in our organization from the surrounding villages. Basically they are cultivators. Industrial exposure is a new thing for them. With a view to bring them to a modern work system of our organization, we have to adopt a number of persuasive and rewarding methods for increasing industrial safety awareness. Our aim is to bring them to a standard of safe work culture of Vedanta level. We have spared no pains in this direction in a very slow and positive approach. We tried to infuse in them a better life with better habits so that their children even learn to improve their own standard both in quality and merit. Their language was the main barrier between them and us. Initially it was very difficult to approach them, as they were not interested to mix with us. But now they have taken up the habit of work inside process plant confidently with all types PPE prescribed for work inside the factory. A level has been attained where no one is found without proper PPE. We have done this by the add of visual training together with general entertainment programmes.

**Reason for priority** - Reduction of injury rate significantly.

**Welfare priorities** -

All the welfare facilities like Canteen, Crèche, Drinking water, Urinals, Toilets, First aid, Rest room etc have been provided inside the factory premise.

Our Next priorities are to ensure healthy and engaged workforce, for that we would like to.

- Create awareness across all level of workforce on personal hygiene at place of work & place of living.
Create awareness of the use and benefit of online Biometric Gate pass punching system while entering & leaving the factory.

Encourage participation of workers in Sports, Cultural & Other events organized by the company.

Up gradation of canteen facilities are available at all the buildings for employees (direct & indirect)

A better facility will be provided outside the factory to associate partners workers like accommodation, recreational facilities, and education facilities.

Develop a welfare policy.

All Associate partners employees will be covered under ESI scheme.

12. Describe how you intend to involve your workforce in addressing these priority areas.

Workforce Communication

Occupational health and safety information is communicated to all employees & associate partners. When a new employee joins the company, all the HSE related information along with a copy of the HSE policy is given to him and shown a safety video during the safety induction program. Also, the policy is explained to every employee and is given the policy placard. All the associate partner workers and supervisors on joining are explained the HSE policy & training is imparted on the general safety guidelines of the plant. This is ensured before commencing the work inside the plant premises for the first time. A new worker is put on the job after explaining the HSE policy and trained in general safety. Suppliers are communicated through purchase orders about the policy & other health & safety related requirements.

Apart from this, policy boards and health & safety information are displayed at conspicuous places of the plant in English as well as local language. The policy is also made available on the company’s INTRANET “Lotus Notes” and it is displayed at conspicuous places inside and outside the plant.

Other Occupational Health & Safety Information Communication

During Induction trainings and on job briefings to employees and associate partners. Visual
Management by putting guidelines onsite, display boards, warning signage, fire and mock drills. Regular interaction with local people and bodies through our CSR (Corporate Social Responsibility) activities. During Periodical Medical Examination for Employees and Contract Workmen in line with statutory norms, additional information is given.

Communication of occupational health issues internally is done through various channels such as-

- Internally at the time of induction training and on the job monthly training
- Posting in health database of lotus-internal mail
- Distribution of pamphlets
- Posters in strategic locations such as training hall, control room, rest rooms, departmental notice boards etc
- Seminars
- Awareness to safety officers, HR Executives.
- Communication of occupational health issues externally is done through various channels-
  - Doctor and Staff along with a Mobile Van visits all the villages around the Refinery and Township and communicate Health hazards associated with plant activity directly and indirectly and educate them regarding the prevention and treatment of all possible health effects of such hazards.
  - Distribution of pamphlets, posters, wall painting in villages
  - HIV/AIDS, Transport safety and handling of chemicals, first aid to injured and ill, Cardio Pulmonary resuscitation.
  - Spread of Awareness among community members through school children
  - Awareness drive in schools
    Spread of awareness through opinion makers, local leaders, Accredited Social Health Activists, Anganwadi Workers, Health Workers, School Teachers, And Local Youth

**Safety Awareness and Promotion**

Safety publicity and awareness promotion is key to our safety initiative like Suggestion Schemes, Contests, Questionnaires, Poster, Essay, Slogan, Fire Extinguishing, Fire Drill Competitions, Exhibitions, News Letters with Safety Articles.

**Performance Reviews and Internal Reporting**

We have system of monthly review of the occupational health and safety performance. These performance indicators are matched with our business plan targets for the year. Each year based on the performance, we set new targets for attaining further improvements in health and safety domain. The process is continuous and dynamic one and also is a competitive phenomenon among the group companies.
External Reporting

Reporting to external stakeholder is done by including health, safety and environmental performance in Annual Reports of the company (Hard copy is attached as Reference of excerpts from Annual Report). We also do Sustainable Reporting at corporate level as part of the guidelines of IFC and ICMM. The document can be retrieved from corporate company site [http://www.vedantaresources.com](http://www.vedantaresources.com) Part of Sustainability report related to Health & Safety is Reporting to the local government body (Dy. Chief Inspector of Factories and Boilers) is done for all reportable accidents (more that 48 hr disability arising out of accidents) in Form 18 of the Odisha Factories Rules 1950.
Risk Analysis:

For the evaluation of risk involved in each deviation/scenarios, severity of the consequence and likelihood of occurrence were considered based on the following tables. The severity of the consequences was ranked in terms of health, safety or environmental issues or as plant downtime.

<table>
<thead>
<tr>
<th>Severity</th>
<th>People</th>
<th>Assets</th>
<th>Environment</th>
<th>Reputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Catastrophic</td>
<td>Major Damage</td>
<td>Mass Effect</td>
<td>International</td>
</tr>
<tr>
<td></td>
<td>Multiple Fatalities or permanent total disabilities</td>
<td>Extensive Damage</td>
<td>Massive Effect</td>
<td>Impact</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
<td>Major Damage</td>
<td>Major Effect</td>
<td>National Impact</td>
</tr>
<tr>
<td></td>
<td>Single fatality or permanent total disability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Critical</td>
<td>Local Damage</td>
<td>Localized effect</td>
<td>Considerable Impact</td>
</tr>
<tr>
<td></td>
<td>Major injury or health effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Marginal</td>
<td>Minor Damage</td>
<td>Minor Effect</td>
<td>Minor Impact</td>
</tr>
<tr>
<td></td>
<td>Minor injury or health effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Negligible</td>
<td>Slight Damage</td>
<td>Slight Effect</td>
<td>Slight Impact</td>
</tr>
<tr>
<td></td>
<td>Slight Injury or health Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Besides this, we have various inspection procedures through which risk assessment is done, including the safety committee inspections and in special cases follow up inspections by our seniors. Also, whenever any new activity, plant or facility is to be started, a team comprising of the members from safety department, electrical department, production and project department review the proposed activity, plant or facility from the safety point of view. The hazard identification & aspects/impacts for such activity, plant or facilities are carried out by the user dept. SOP/SMP’s contain safety and hazard warnings with appropriate corrective actions. Where SOP’s are not in place, individual JSA’s are developed by the work team and supervised by the Safety Department and seniors. After the review, external help is sought, if required. This activity is coordinated by Associate Manager Safety.
### Table: Likelihood Definition

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rare</td>
</tr>
<tr>
<td>B</td>
<td>Unlikely</td>
</tr>
<tr>
<td>C</td>
<td>Possible</td>
</tr>
<tr>
<td>D</td>
<td>Likely</td>
</tr>
<tr>
<td>E</td>
<td>Certain</td>
</tr>
</tbody>
</table>

- A: Has occurred in world-wide industry but not in Group Company
- B: Has occurred in other Group Company
- C: Has occurred in specific Group Company
- D: Happened several times per year in specific Group
- E: Happens several times per year in same location or operation

The risk matrix used for the HazOp Study is provided in Figure. The numbers in the matrix are intended to reflect the relative risk when moving from one block to another. The risk level is expressed numerically, the greater the number, the greater the risk.
The HazOp team developed scenarios based on the causes and consequences identified during the HazOp team sessions. For each scenario, the team assigned the severity rating on what they felt was the worse credible case with no safeguards in place. The severity levels range from Low (1) to Critical (5).

The HazOp team then examines the likelihood (probability) of this entire event happening giving credit for safeguards already designed to be in place. Likelihood levels rank from Rare (A) to Almost Certain (E).

The consequence/likelihood ratings establish the placement of the scenario in the Risk Matrix. All scenarios that were rated in the ‘Red’ portions of the matrix are considered to be unacceptably high risk by the HazOp team and require improvement prior to start-up. Those in the ‘Yellow’ have significant risks and risk reduction measures should be implemented if it is practical to do so. Risks found in the ‘Green’ portions of the matrix are low risk issues and no action is needed although they may offer significant operability benefits. All of the Hazop team risk rating are based on the team’s experience and assumed all safeguards are in place.

Physical and Health Occupational Hazards in alumina Refinery like our can be broadly classified into the following categories:
<table>
<thead>
<tr>
<th>Process stages</th>
<th>Activities</th>
<th>Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauxite handling and grinding</td>
<td>Unloading of bauxite by long distance conveyor (LDC)</td>
<td>Falling objects, entrapment, dust, slip and fall</td>
</tr>
<tr>
<td></td>
<td>Stacking and reclaiming</td>
<td>Falling objects</td>
</tr>
<tr>
<td></td>
<td>Tertiary crushing in sizers</td>
<td>Noise, dust, slip and fall</td>
</tr>
<tr>
<td></td>
<td>Operation of apron feeder</td>
<td>Dust, falling objects</td>
</tr>
<tr>
<td></td>
<td>Feeding to the ball mill by mill feed conveyor</td>
<td>Dust, spill</td>
</tr>
<tr>
<td></td>
<td>Spent liquor addition for wet grinding</td>
<td>Caustic fumes, heat, slip and fall</td>
</tr>
<tr>
<td></td>
<td>Operation of ball mill</td>
<td>Noise, spill</td>
</tr>
<tr>
<td></td>
<td>Operation of banana screen</td>
<td>Caustic fumes</td>
</tr>
<tr>
<td></td>
<td>Operation of dedusting system</td>
<td>Noise</td>
</tr>
<tr>
<td></td>
<td>Digestion liquor preparation</td>
<td>Caustic fumes, splashing</td>
</tr>
<tr>
<td>Pre-desilication</td>
<td>Removal of silica</td>
<td>Heat, splashing</td>
</tr>
<tr>
<td></td>
<td>Formation of desilicated product (Bayer sodalite)</td>
<td>Caustic fumes, heat, splashing</td>
</tr>
<tr>
<td></td>
<td>Vapour from digestion to indirect slurry heater</td>
<td>Heat, caustic fumes, splashing</td>
</tr>
<tr>
<td>Slaked lime preparation</td>
<td>Operation of lime slacker</td>
<td>Slip and fall</td>
</tr>
<tr>
<td>Digestion and heat recuperation system</td>
<td>Operation of digester booster pump</td>
<td>Noise, heat</td>
</tr>
<tr>
<td></td>
<td>Operation of digester</td>
<td>Slip and fall</td>
</tr>
<tr>
<td></td>
<td>Operation of slurry heaters and flash heaters</td>
<td>Heat</td>
</tr>
<tr>
<td>Flash cooling</td>
<td>Operation of low pressure flash vessels</td>
<td>Splashing</td>
</tr>
<tr>
<td>Settling and washing</td>
<td>Operation of settlers</td>
<td>Splashing</td>
</tr>
<tr>
<td>Process stages</td>
<td>Activities</td>
<td>Hazards</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td>Preparation and addition of flocculants</td>
<td>Splashing</td>
</tr>
<tr>
<td></td>
<td>Mud level measurement of settlers and washers</td>
<td>Burns, spill</td>
</tr>
<tr>
<td></td>
<td>Recovery of caustic</td>
<td>Caustic fumes, burns, heat</td>
</tr>
<tr>
<td></td>
<td>Attending to power failure in settler washer area</td>
<td>Slip and fall</td>
</tr>
<tr>
<td></td>
<td>Disposing the red mud</td>
<td>Spill</td>
</tr>
<tr>
<td>Security filtration</td>
<td>Operation of pressure filter</td>
<td>Splashing, heat</td>
</tr>
<tr>
<td></td>
<td>Removal of solid impurities</td>
<td>Burns, spill</td>
</tr>
<tr>
<td>Heat interchange division</td>
<td>Operation of plate heat exchanger</td>
<td>Heat, corrosion</td>
</tr>
<tr>
<td></td>
<td>Cleaning of heat exchanger using caustic soda</td>
<td>Heat; contact with acid</td>
</tr>
<tr>
<td></td>
<td>To cool the pregnant liquor</td>
<td>Leakage</td>
</tr>
<tr>
<td>Precipitation</td>
<td>To precipitate the alumina hydrate from the pregnant liquor</td>
<td>Splashing</td>
</tr>
<tr>
<td></td>
<td>Level measurement of tanks</td>
<td>Burns, heat, overflow</td>
</tr>
<tr>
<td></td>
<td>Technological tank cleaning/pipe cleaning</td>
<td>Falling objects, slip and fall, spill</td>
</tr>
<tr>
<td></td>
<td>Descaling of tanks</td>
<td>Falling objects, slip and fall</td>
</tr>
<tr>
<td></td>
<td>Maintenance of agitator</td>
<td>Falling objects, entrapment, slip and fall</td>
</tr>
<tr>
<td>Classification</td>
<td>Separating the hydrate into coarse seed, fine seed and product</td>
<td>Splashing, burns</td>
</tr>
<tr>
<td></td>
<td>Sending the fines to fine seed area</td>
<td>Splashing</td>
</tr>
<tr>
<td></td>
<td>Operation of hydro-cyclones</td>
<td>Spillage</td>
</tr>
<tr>
<td>Process stages</td>
<td>Activities</td>
<td>Hazards</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Cloth changing of hydrated mud filters</td>
<td>Slip and fall</td>
<td></td>
</tr>
<tr>
<td>Drains cleaning</td>
<td>Slip and fall</td>
<td></td>
</tr>
<tr>
<td>Hydrate washing</td>
<td>Operation of disc filter</td>
<td>Falling objects, spill, fumes</td>
</tr>
<tr>
<td></td>
<td>Operation of pan filter</td>
<td>Falling objects, spill, fumes, slip and fall</td>
</tr>
<tr>
<td></td>
<td>To supply hot condensate and steam</td>
<td>Heat, leakage</td>
</tr>
<tr>
<td></td>
<td>Removal of scale from hydrate thickener</td>
<td>Slip and fall</td>
</tr>
<tr>
<td>Calcination</td>
<td>Operation of calciner</td>
<td>Heat, dust, noise</td>
</tr>
<tr>
<td></td>
<td>Operation of blower and ID fan</td>
<td>Entrapment, noise</td>
</tr>
<tr>
<td></td>
<td>Operation of venturi dryer</td>
<td>Heat, dust</td>
</tr>
<tr>
<td></td>
<td>Operation of vacuum pump</td>
<td>Noise</td>
</tr>
<tr>
<td></td>
<td>Fuel oil unloading</td>
<td>Spill, explosion, slip and fall</td>
</tr>
<tr>
<td>Evaporation</td>
<td>Operation of shell and tube heat exchange</td>
<td>Heat, corrosion</td>
</tr>
<tr>
<td></td>
<td>To supply the conc. spent liquor to digestion</td>
<td>Splashing, burns, heat, caustic fum</td>
</tr>
<tr>
<td>Slaked lime preparation</td>
<td>To supply lime for wet grinding and for digestion</td>
<td>Heat</td>
</tr>
<tr>
<td>Storage</td>
<td>Sulphuric acid unloading</td>
<td>Slip and fall</td>
</tr>
<tr>
<td></td>
<td>Furnace oil</td>
<td>Leakage</td>
</tr>
</tbody>
</table>

**Hierarchy of Risk Management**
HAZARD IDENTIFICATION

Identify likely hazards at all locations

RISK ANALYSIS

Analyse hazard severity and likelihood of occurrence

Evaluate results, determine acceptability

RISK CONTROL

Eliminate or reduce risks

RISK ASSESSMENT

Risk assessment

MODIFICATION AND CHANGE CONTROL

Assess all changes and modifications

MONITORING

Ensure controls are effectively maintained

COMMUNICATION

Keep personnel informed of all risks and controls

AUDIT AND REVIEW

Ensure compliance and improve system
Please note that full payment must accompany your application.

1. ORGANISATION INFORMATION

| Organisation name: M/s VEDANTA ALUMINIUM LIMITED, LANJIGARH |
| Type of Business/Industry: Manufacture of Hydrate and Calcined Alumina /SIC code-24420 |
| Invoice address: PO: LANJIGARH VIA-BISWANATHPUR DIST-KALAHANDI ODISHA-766027 INDIA |
| Organisation size (number of employees): 2500 |
| Contact name: Rabi Narayan Mishra |
| Job title: Head -EHS |
| Email address: rabi.mishra@vedanta.co.in |
| Telephone: +91 0667724731/16 |
| Fax number: +91 06677247311/344 |

Is the site or business unit a member of the British Safety Council? (Please circle) Yes
If Yes, please enter your membership number: 282136-BS

2. PRICING INFORMATION

The International Safety Awards are site-specific. There must be a separate application for each site / business unit.

<table>
<thead>
<tr>
<th>AMOUNT PAYABLE</th>
<th>RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sites: 01</td>
<td>Rate (per site): £ 395</td>
</tr>
<tr>
<td>TOTAL PAYABLE: £ 395 Excl VAT</td>
<td>£395 per site / business unit</td>
</tr>
<tr>
<td>£395 Excl VAT</td>
<td>£495 per site / business unit</td>
</tr>
</tbody>
</table>

3. PAYMENT DETAILS (Please select payment option)

- Pay by Credit/Debit Card (We do not accept Diners Club or Solo cards)
  - Card Type: 
  - Credit Card Number: 
  - Security Code: (3/4 digits on reverse of card) 
  - Issue Number: (switch only) 
  - Start Date: 
  - Expiry Date: 
  - Name on Card: 
  - Amount to be debited: £ 

- Payment by BACS
  - Total Sent: £ 
  - Bank details: Barclays Bank plc 75 King Street Hammersmith, London W6 9HY United Kingdom 
  - Company details: British Safety Council Account name: BSC No3 Account Account number 50809926 Sort code 20 35 90 

If you wish to pay by invoice, please enter a purchase order number here: SIN010063

4. AUTHORISATION OF PAYMENT

Authorised by (Print name in capitals)
Rabi Narayan Mishra

Signature (I have read and accept the Terms and Conditions of payment and application).
Rabi Narayan Mishra
British Safety Council International Safety Awards

How your application was marked

All applications were marked by one of four independent adjudicators appointed and trained by the British Safety Council. All four adjudicators are chartered members of the Institution of Occupational Safety and Health (IOSH) and senior health and safety professionals in their respective organisations. All four have been employed by the British Safety Council for a number of years as senior examiners for our awarding body.

Rigorous standardisation procedures, including a meeting of all four adjudicators, ensured that each adjudicator applied the marking scheme in exactly the same way so that all applications were marked to the same standard.

The adjudicators applied the marking scheme to each application and arrived at a score out of 60. Applications scoring 36-47 were awarded a pass; applications scoring 48-59 were awarded a merit; and applications scoring 60 out of 60 were awarded a distinction.

There was no quota of grades to be awarded. If all applications had scored 52, then all applicants would have achieved an International Safety Award with merit.

Any application scoring just short of a particular grade was subject to a borderline review to ensure that the marking was correct. If necessary, marks were adjusted.

While the questions vary year on year, the standard remains the same. Therefore, if an organisation achieved a pass grade last year and a merit grade this year, this can be considered a significant improvement.

Chief adjudicator’s report

A chief adjudicator’s report outlining the general strengths and weaknesses of this year’s applications (but not mentioning organisations by name) is now available on our website.

A full list of winners and their grades is also available on our website.

Result enquiries

The British Safety Council endorses the right of organisations to enquire about their result. Procedures are in place to ensure that result enquiries are dealt with thoroughly and fairly. There are four services available: breakdown of marks (£20); re-mark (£50); feedback (£100); re-mark and feedback (£150). The result enquiry policy and application form is on our website at www.britsafe.org/isa

Please note that result enquiries must be made in line with the result enquiry policy and using the application form on the website. We are not able to enter into any informal correspondence about results.
Dear Sir,

pls find attached herewith our application for the BSC International Safety Award.

thanx n best regards

Rabinarayan Mishra
Head(HSE)
Vedanta Aluminium Ltd
Lanjigarh-766027
Dist-Kalahandi,
Orissa.
Cell nos:+91-9937251436
  +91-9437023815

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[] Restricted
[] Confidential

----- Forwarded by Rabi Narayan Mishra/PROD/LAN/ALUMINA/Vedanta on 06/22/2012 06:01 PM -----

From: British Safety Council customer service <customer.service@britsafe.org>
To: Rabi Narayan Mishra <rabi.mishra@vedanta.co.in>
Date: 03/23/2012 09:33 PM
Subject: British Safety Council International Safety Awards 2012

Dear Colleague,

Please find attached your result notification for the International Safety Awards.

A full list of winners is available at www.britsafe.org/isa.

Kind regards,

Customer service team
BRITISH SAFETY COUNCIL
TEL: +44 (0)20 8741 1231
Dear Rabi Mishra,

As I'm sure you'll agree one of the attractions of applying for an International Safety Award is that there is a degree of rigour, objectivity and independence that's applied in making awards. We try and guard these standards and the credibility of the scheme.

With this in mind, I am writing to inform you that, based on recent information that has come to light the British Safety Council has decided to suspend the awarding of the 2012 International Safety Award conferred on Vedanta Aluminium's Lanjigarh refinery pending further investigations as to whether your business has satisfied the eligibility conditions laid down in the...
scheme arrangements. As you are aware the British Safety Council reserves the right to withdraw this award where there has been a fatality and/or major injury either in the qualifying period, that is 2011, or subsequently. The fatal injury suffered by Mr S Ganeshan reported in the press in April 2012 and the extensive reporting of the leaks from the red mud ponds at the Lanjigarh refinery in May 2011 necessitate the British Safety Council to request Vedanta Aluminium to provide full particulars of both incidents including the underlying causes and the actions you have taken to prevent further re-occurrences. We also request that you provide us with details of any investigations carried out in connection with either event by the relevant regulatory authorities - either national or state. This information will enable us to make a more informed decision as to whether the suspension of the award will be lifted.

You need to be aware that, if required, the British Safety Council might issue a press release setting out the circumstances surrounding our decision to suspend this award.

I know this will come as a disappointment to you but as I noted earlier, in order to maintain the credibility of this award scheme we are obliged to carry out further investigation in this event. Please feel free to contact me should you or any of your colleagues require further information.

Kind regards

John

-------------------------------------------------
John Phillips
Director of qualifications and standards
BRITISH SAFETY COUNCIL
Tel: +44 (0)121 6974785
Mob: +44 (0)7917 243283
WWW.BRITSafe.ORG
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Introducing the new [IOSH Working Safely e-learning course](https://www.brtsafe.org/learning/iosh-working-safely) – health, safety & environmental basics for anyone. Only £85 + VAT.

British Safety Council
Registered Office:
70 Chancellors Road
London
W6 9RS

A company limited by guarantee registered in England and Wales
Company number: 04618713
Registered charity number: 1097271
OSCR: SC037998

This email and any files transmitted with it are confidential and intended for the addressee only. If you are not the intended recipient, please notify the sender immediately by e-mail and delete it from your system. You should not disseminate, distribute or copy this e-mail.
Dear Mr Philips,

Subsequent to your mail dated 14th May 2012, I had a detailed telephonic discussion with Mr Smith today. Accordingly, I am enclosing a detailed reply covering both the points raised in your letter and shall be pleased to provide more information, if any, in support of our claim.

With regards

Dr Mukesh Kumar
President
Vedanta Aluminium Limited
P.O Lanjigarh, Distt: Kalahandi
Orissa-766027
M: +919937251216/9437072938
D: +91 6677-247307
F: +91 6677-247311/345

For information and record.

With regards

Dr Mukesh Kumar
President
Vedanta Aluminium Limited
P.O Lanjigarh, Distt: Kalahandi
Orissa-766027
M: +919937251216/9437072938
D: +91 6677-247307
VAL/MK/12/102

John Phillips
Director of Qualifications and Standards
British Safety Council
London

Ref: Your letter of 14th May, 2012 -Suspension of 2012 International Safety Award of Vedanta Aluminium Limited, Lanjigarh, Odisha, India.

Dear Mr. Phillips,

I am in receipt of your above referred letter informing me of your intention to suspend the International Safety Award 2012 given to Vedanta Aluminium Limited, Lanjigarh and subsequent telephonic discussions I had with Mr. Justin Smith today.

I am obviously very disappointed to know the reasons and hence felt necessary to clarify the points you raised as follows:

1. **Alleged leakage of Red Mud Pond:**

   You may be aware that the Ministry of Environment and Forest and the State Pollution Control Boards are the regulating agencies for monitoring and control of environmental hazards and pollution by Industrial houses or any other agencies. Last year an allegation was lodged with the MOEF about a leakage from our Red Mud Pond from some organization. MOEF, immediately on receipt of such complaint appointed committees and simultaneously sought the inspection report from the respective State Pollution Control Boards. The committee took the water sample not only from the nearby area but also from a long stretch of the river beyond the Plant. On detailed investigation by their expert teams and physical site investigations as well as analysis of the samples collected, the MOEF concluded that no such incident of leakage had taken place from the Red Mud Pond of the Alumina Refinery. This was further substantiated by a press release issued by MOEF on 3rd June, 2011, copy attached (also available on MOEF website-www.moe.nic.in) confirming the same. I hope this clarifies the matter and BSC will take an impartial view of the entire episode before concluding or taking a final decision regarding suspension of International Safety Award, 2012.

2. **Fatal Injury of Mr. S. Ganeshan**

   I deeply regret the loss of Mr. S. Ganeshan in a fire at a guest house located outside our plant premises in Lanjigarh on the night of 29th April, 2012. Mr. Ganeshan was an employee of our supplier Hindustan Dorr Oliver Ltd., who have owned, operated and maintained the guest house for the last 8 years. We are carrying out a full investigation with experts from Industrial Fire & Safety, Gujarat, who are providing fire safety related special advices/services to the refinery. The preliminary findings suggest that the fire could have started due to some casual approach
adopted during smoking in the party, they had in the night but electrical short circuiting also cannot be ruled out. Although the incident was not linked with any of the Plant operations or Plant Safety systems but as a responsible corporate, we have appointed special agencies to investigate the matter besides taking help of the local Police so that the route cause can be identified and such incidents are prevented in the periphery.

Vedanta Aluminium Limited, Lanjigarh accords highest priority to the safety, Human Right abuses, environmental protection and sustainable development. Because of our continuous efforts to become world class Alumina Refinery and improvement/innovative approaches adopted in this direction, the unit has been acclaimed and recognized at various forums including winning of various National and State Level Awards.

We do support and applaud ethical standards British Safety Council has maintained in selection of such awards at the same we do hope and will expect Organizations of repute like yours to exercise utmost care to ensure that no steps are taken based on half truths or misinformation which could cause avoidable harm to our equity and goodwill. We will therefore expect you to give due weightage to above facts and take the right decision. We at our end are confident that we are fully deserving of the Award we were selected for and the decision of British Safety Council in selecting us will stand vindicated. We will also urge you to make no announcement in haste which may harm us for no justifiable reason. In case you have any more doubt or question on this subject, please feel free to contact me and we will be happy to answer the same.

With Regards

Dr. Mukesh Kumar.
President and COO
Vedanta Aluminium Limited
Phone: +919937251216
The Ministry of Environment and Forests accorded environmental clearance in September, 2004 to M/s Vedanta Aluminium Limited for 1.0 MTPA Alumina Refinery and 75 MW Captive Power Plant at Lanjigarh in District Kalahandi in Orissa subject to stipulation of environmental safeguards.

Concerns were raised by Amnesty International and allegations in a section of the press regarding leakage from the red mud pond of alumina refinery due to heavy rain fall and pollution of nearby water bodies due to high pH.

To address the concerns and to oversee the compliance to the various stipulations and environmental safeguards by M/s Vedanta Aluminium Limited, officers of the Regional Office of the Ministry at Bhubaneswar and Orissa State Pollution Control Board, inspected the unit separately. As per these reports, there was no breach of the red mud pond and pH of the water body in the down stream of red mud pond was within the prescribed limits. Copies of these reports are at Annexure 1 & 2.
John, further to our meeting in London, please find attached the internal and external accident investigation reports.

We are working to modify our management systems to implement all the recommendations.

Best regards Tony

INVESTIGATION REPORT
ON THE FIRE INCIDENT DATED 29\textsuperscript{TH} APRIL, 2012
AT TOWNSHIP HDO BUILDING, NEAR ‘D’ BLOCK,
VEDANTA ALUMINIUM LIMITED, LANJIGARH

CONDUCTED BY
SRI RAMA CHANDRA SAHOO, O.P.S
ADVANCE DIPLOMA IN FIRE ENGINEERING.
NATIONAL FIRE SERVICE COLLEGE, NAGPUR.O.C & F.P (LONDON)
RETD DEPUTY FIRE OFFICER,
ODISHA FIRE SERVICE,
BHUBANESWAR
MOBILE: 09338200988
SET UP FOR INVESTIGATION :-

There was an outbreak of a disastrous fire incident in to the HDO BUILDING GUEST HOUSE near ‘D’ BLOCK on last 29.04.2012. It caused loss of huge valuable properties along with pathetic loss of a precious human life.

Being entrusted by the security management wing of Vedanta Aluminium Limited, Lanjigarh I have caused a discreet investigation on the above fire incident and my observations are as follows.

RECORD OF STATEMENT OF EYE WITNESSES:-

During the course of my above investigation I have closely interacted with the important office bearers which includes the occupants of the guest house on the eventful night.

And the plant fire service officers & men who have actively fought the fire and were eye-witnesses of the incident. I have also recorded their statements to bring into light the real facts & figures.

The list of above eye witnesses is as follows.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sri Sanjib Kumar Choudhury</td>
<td>Safety Officer-HDO</td>
</tr>
<tr>
<td>2</td>
<td>Sri Gopanath Mishra</td>
<td>Senior Manager-Civil (HDO)</td>
</tr>
<tr>
<td>3</td>
<td>Sri Bijay Kumar Mohapatra</td>
<td>Asst. Manager-Security (VAL)</td>
</tr>
<tr>
<td>4</td>
<td>Sri Alok Gaya</td>
<td>Township Administration</td>
</tr>
<tr>
<td>5</td>
<td>Sri Dipalok Biswal</td>
<td>Accounts officer</td>
</tr>
<tr>
<td>6</td>
<td>Sri Biswa Ranjan Moharana</td>
<td>Chief Fire Officer-VAL</td>
</tr>
<tr>
<td>7</td>
<td>Sri Aneesh S.S</td>
<td>Leading Firemen</td>
</tr>
<tr>
<td>8</td>
<td>Sri Biswaranjan Mohanty</td>
<td>Driver cum Operator-HDO</td>
</tr>
</tbody>
</table>

FIRE AFFECTED STRUCTURE:-

I have paid a personal visit with Sri Rabinarayan Mishra, General Manager, HSE, Sri Biswaranjan Moharana, Chief Fire officer, occupants of the guest house, Sri Nipun Kumar Nanda, Safety officer.

It was found that the entire inside structure of HDO Guest House were gutted into ashes leaving aside the bare iron pillars/iron angles of roof structure & corrugated tin sheet roofing. The house structure was rectangular in size having 24 rooms in total. (Length wise 9*2=18 rooms & Breadth wise 3*2=6 rooms). The rooms are:– Guest room -18 Numbers, Common room -1, Dining room-1, Store-2 Numbers, Entertainment room-1, Kitchen room-1
**GAP ANALYSIS:-**

There were no solid walls as the guest house was made for temporary use only. The wall was set by synthetic fiber sheets strapped inside iron plate angles. The ceiling of the rooms was also made of synthetic fiber sheet. The door & windows were made up of with the above materials. Most of the living rooms were provided with window A/C. Besides above; one worker’s shed adjacent to the kitchen which was also partially damaged by Fire was made up off similar material.

- All these synthetic materials are though commonly used in temporary structures but are highly inflammable. When on fire these materials produce toxic fumes & poisonous thick smoke. In case of inhalation of this fume & smoke which will cause severe suffocation. The constituents of this synthetic fiber is also conducive for rapid propagation of fire.
The fire was first seen by Sri Gopanath Mishra occupant of Room No-16 at about 03:00Hrs on 29/04/2012. The other occupants were alerted naturally they were fire panic stricken & tried their best for self rescue from the fire trap. The occupants have not been able to send message to Fire Station immediately. At belated stage this fire station was intimated by Sri P.K.Panigrahi at 03.45Hrs on 29/04/12. More than one hour had passed after the starting of fire to start fire fighting operation. This long gap of time has caused the fire to spread with blaze, fume & smoke covering the entire highly combustible structures of the guest house causing colossal loss of the life of Sri P. Ganeshan & sizeable loss of valuable properties. Things would have been different had the fire station been intimated soon after notice of fire.

There were two identified means of entry & exit from the guest house. But one nearer to the kitchen was locked from outside by the cook and the other one was the main entrance which too was locked from inside with one key in the store room and the other key with Mr Biswal, the occupant of room no-9.

- Fire extinguishers were not available in the guest house.
- No Fire alarm system was available for the guest house.
- No security personnel were there for the night.
- Emergency contact numbers were not displayed.
- No emergency exit plan was available.

NORMS:-

- Such guest houses to be made up of solid structures instead of synthetic flammable material.
- Provision of fire extinguishers as per the fire load must be there.
- Fire alarm system must be installed
- Emergency preparedness plan and awareness to be given at the time of room allotment.
- Emergency contact no. to be displayed,
- A round the clock security personnel to be deployed.

The fire could have been extinguished easily, had the HDO staff directly contacted with the fire dept or town administration dept. immediately after noticing the fire.
OCCUPANTS OF THE GUEST HOUSE DURING FIRE INCIDENT:-

The following officials were fast asleep in their respective rooms as follows

1) Room No.5 - Sri Ashok Kumar Panda
2) Room No.6 - Sri P. Ganeshan
3) Room No.7 - Sri Durai Murugan
4) Room No.9 - Sri Dipalok Biswal
5) Room No.16 - Sri Gopanath Mishra

CAUSE OF FIRE:-

The cause of fire accident is the most precious information for all concerned. This helps the management to install preventive measures to check reoccurrence of such type of incident in future. It is always a guideline for right action. Fire accident does not happen but is caused. There cannot be an effect without a cause.

In the context of the above horrendous outbreak of fire the most prominent cause can be attributed to the use of ELECTRICAL HEATERS for cooking in the kitchen. The burning remnants have clearly left the signature of spreading of fire from kitchen room. Carelessness & unsafe way of handling the electrical heater with bad housekeeping condition was the root cause of outbreak of fire.

SUGGESTION:-

A proverb says “MAN IS TO ERR” but it should not be forgotten that we learn from our errors. The vital need is that the lesson we learnt from mistake must be practically implemented in all our future actions as safety & preventive measures.

This tragic fire incident enforces the following precautionary measures for quick implementations.

1. Good housekeeping must be maintained in all the premises round the clock.
2. All the electrical equipments & apparatus must be regularly checked, maintained & tested for their workability by the experts. Certificate should be issued by the competent authority.
3. The workers should be adequately trained in safe handling of hazardous equipments.
4. Portable fire extinguishers suitable to fire hazards must be kept hanging in the prominent & conspicuous places within easy reach.
5. All the inmates must be trained in handling of extinguishers.
6. Fire buckets filled with SAND & WATER must be installed in the vicinity of structure.
7. The cables used for electrical heater should not be under size. It should be sound & strong to retain the load.
8. The sockets & plugs used in Heaters should match the voltage & wattage of the coil.
9. All the employees must remember the telephone number of the fire station for emergency call.
10. It is wise to save the fire station telephone number in the mobile phone used.
11. A warning notice should be displayed in each room with suggestions “WHAT TO DO WHEN FIND FIRE”.
12. F-Find the fire
   I-Inform all neighbours & fire station
   R-Restrict the spread of fire
   E-Extinguish the fire using available media.
13. The structural members of the building or shed should be preferably of non combustible materials.
14. There should be fire partition wall in between to check spread of fire.
15. The ceiling/door window should be made of fire resistance materials.

**CONCLUSION:**

This dreadful fire incident has left a lot of impressions for lamentation over years. The loss of precious life of Sri P. Ganeshan is irreparable to his family & VAL. The damage of property is lost forever. The above loss is not the only loss of Vedanta Aluminium Limited, Lanjigarh in particular but loss of the Nation in general. Because what is lost in fire is lost forever. Which once burns never returns?

It is therefore impressed upon to materialize the above simple suggestions in the wider interest of Vedanta Aluminium Limited, Lanjigarh & a better tomorrow.

Enclosed:

Eye witness statement-9 sheets
Incident Investigation

Date of incident: (include time) 29.04.2012 Time-3.41AM

Name/Age/Emp No. (Of injured person or person reporting the "near miss") (Vedanta Dept or Contractor name)

Mr. P. Ganesan
Civil Engineer
DOB-23.03.1972
S/o. S. Periswamy
Village-Pananilai, PO-Thattarmatam, Tehsil-Arasoor, Dist- Tuticorin, State-Tamilnadu

Employer

Hindustan Dorr Oliver Limited

Injury classification:
(Leave for S. Dept to classify)

Fatal

Injury
(Describe nature of injury.)

Incident Location
(Physical location of incident)

HDO Guest house

Task
(What was being done? Description)

Sleeping at guesthouse

Risk ranking (e.g.; Moderate)
(Use risk matrix Consequence + Likelihood)

Incident
(Describe what happened)

Mr. P. Ganesan lost his life due to a massive fire at HDO guest house

Investigation
(Description of events and external factors that are the findings of the investigation)

Consider: Position, People, Places, Paper
Electrical circuit distribution

Room No-6

Body Found Here

Steel Almirah found in open condition
Room No-6

- Door found locked inside with key attached to lock
- Empty LPG cylinders found in the store room
- Brick Chullha

Kitchen Room

- Electrical coil Heater kept here

- 3:40 A.M. - Fire call given by HDO personnel (Mr. Durai Murugan) to Mr. Biswajit Samantaray (Package owner from VAL, Red Mud Filtration).
- 3:41 A.M. - Mr. Samantaray informed to Mr. Alok Gaya (Township admin in-charge) and at the same time rushed to the spot. (Mr. Samantaray did not have the Fire Department mobile number).
3:42 A.M- Mr.Alok Gaya informed to Mr.Raiguru of Security Dept (at that time Mr.Raiguru was out of station) as he could not recall the fire department number immediately and rushed to HDO site on his bike.

3.43AM – Mr.Raiguru informed to the patrolling security and Mr. Panigrahi officer in-charge of security dept.

3.44AM- Mr. Panigrahi informed to fire dept.

3:53 A.M- Fire tender reached at site and started extinguishing fire.

Fire extinguished completely by 05:00 A.M.

**Investigation revealed that:-**

- The houses were built by M/s. FLSmidth in 2004, and are made up of pre-fabricated PVC sheets manufactured by Sintex.
- Later on in 2009, it was taken over by HDO.
- There were 23 rooms including kitchen, dining hall, entertainment room & 2 store rooms.
- Behind the Guest House, one more room was there alongside the common toilets for the house-keeping staff.
- Room no-5 allotted to Mr. Ashok Kumar Panda, civil engineer.
- Room no-6 allotted to Late P. Ganeshan, civil manager.
- Room no-7 allotted to Mr. Durai Murugan, civil engineer.
- Room no-9 allotted to Mr. Dipalok Biswal, accountant cum administrative officer.
- Room no-16 allotted to Mr. Gopanath Mishra- Civil Manager who had come to this site the same day in the morning.
- Approximately between 03:00 to 03:30 AM Mr. Gopanath Mishra saw fire on the ceiling of his room .Then he came out of the room and saw heavy fire and smoke on the kitchen, dining hall, and store, as well as room no 11, 12, 13, 14, 15, and 16, also heavy smoke on the other side of the living rooms, i.e. room nos 1 to 9.
- He started calling others from room no 1 to 9. At that time Mr. Ashok Panda first came out from room no-5.Both of them ran to the entrance gate and shouted for gate key as gate was locked. The original key of the main entrance gate was kept in store near to the room no.9. The spare key was with Mr Biswal.
- At the same time Mr.Dipalok Biswal got up as he felt uneasy in his room. He saw that the common wall of store & his room had caught fire. Then he came out of his room to open lawn and he heard Mr. Durai Murugan was shouting for help as his door was jammed & room was filled with dense smoke. Mr Biswal immediately kicked the door & dragged him out of the room. Mean time Mr .Biswal heard other two staff (Mr Panda & Mr. Mishra) calling him for bringing the key. Mr Biswal again went back to his room & brought the spare key from his room and rushed towards the entrance gate along with Mr. Murugan. All of them (Mr Biswal, Mr. Panda, Mr. Murugan & Mr Mishra) came out of the guest house & came to a safe place nearer to the main gate. Mr Murugan communicated to Mr Samantaray (VAL-Package Owner) around 03.40 hrs by Mobile phone for sending the fire tender. Mr. Mishra communicated to Mr. Sanjeev Kumar Choudhary (HDO-Safety officer) around 03.40 hrs by Mobile phone for sending the fire tender.
- In the mean time they realized that Mr.P.Ganeshan was not with them .All of them saw that Mr Siba Majhi(House Keeping staff) was trying to break the window glass of Room No-6 from the out-side as Mr Ganeshan was shouting for help( open , open...) & showing the torch light of his mobile. Mr Majhi broke the window glass but unable to break the window iron grill. After some time Mr Majhi was calling Mr Ganeshan but did not get any response. He thought Mr Ganeshan might have gone to the lawn.
- Fire tender reached at site at 03:53AM and started extinguishing fire, particularly on the room no-6 as they got information that one person might be present inside room no-6. After fire completely extinguished around 04:30AM, they found the body of Mr. Ganeshan lying near to the window below the A/C & the body was in charred condition. Mr Ganeshan was found with a file folder with documents in his hand. The steel almirah door was found in open condition .The door of his room (No-6) was locked from inside and the key was attached with the lock.

**Root cause Analysis**
1. After testing the material, with which Guest house was made, it was found that ignition temperature of the material is more than 150 deg C. It required continuous source of heat to catch fire. Therefore Possibility of electrical short circuit was negated. In addition to above

A. The circuit breaker of the main panel was tested for tripping and found working.
   (Load distribution diag. attached)
   B. As per the statement of Mr. Siba Majhi (House keeping staff) there was no power supply in his room for which he woke-up. This shows that the ELCB had tripped due to Fire.

2. At the time of investigation it was found that there was no cooking LPG since 10 days prior to the incident. 6 empty cylinders were found in the store room. One Brick Chullha which was being used for cooking purpose was found approximately 2 mtr away from the exit of kitchen room. It was in open space. As on that night at around 01:00 A.M heavy rain was there, so possibility of fire due to the brick Chullha is also negated.

3. In addition to the brick Chullha, two electrical coil heaters were also being used for cooking (As per the statement of Mr. Siba Majhi and also remnants of the same were found on the kitchen slab during investigation after the fire). Heater was placed over the cemented slab closer to the thin metal sheet & fiber wall of the kitchen. It is suspected that after cooking the heater was left in switched-on condition which might have caused continuous heating of the fiber wall of kitchen, and hence the possible source of fire.

**Root cause (Usually only one)**

Hence it is found the possible root cause of fire was electric coil Heater which was not switched off after usage.

**Contributory factors (May be many).**

- MOC (Guest house made of PVC sheets)
- Lack of emergency exit plan
- No security Guard deployed at HDO guest house
- Human error
- Unusual behavior on part of Mr Ganeshan in trying to collect file instead of trying to escape
- Consuming alcohol which could have contributed in slow reaction/response

**Recommendations (From the investigation - these must be able to be implemented)**

Include any actions already completed

- No temporary shed/room should be made of flammable material.
- There should be separate entry & exit path for any building
- Signage for emergency exit to provided
- Emergency contact number leaflet to be circulated to all.
- Fire hydrant point to be provided inside township.

**Investigation team: (Names & designations)**

- Mr. B.S. Mund - GM - Power Plant
- Mr. S.K. Chand - AGM - Electrical
- Mr. S.R. Nayak - AM - Safety
- Mr. Pramod Ranjan - AM - Safety
- Mr. Alok Gaya - Admin in-charge
- Mr. B. Maharana - Fire officer

**Date: (Of investigation) 30.04.2012/01.05.2012**