EDUZONE: International Peer Reviewed/Refereed Multidisciplinary Journal (EIPRMJ), ISSN: 2319-5045
Volume 2, Issue 2, July-December, 2013, Available online at: www.eduzonejournal.com

Study of Various Hazards in Power Generating Units Management in Power System

Amit Bhardwaj

M.Tech. (Electrical Engineering), LPU, Punjab, India

ABSTRACT

A thermal power is the largest source of electrical power in India and accounting of total power generation. The primary fuel is used for the generation of thermal power is lignite coal. In power generation process huge quantity of lignite coal is required to be handle long distances every day throughout the year. In a conveyor system is used in the receipt of lignite coal, storage bunkers and boiler bunkers. During this operation and maintenance of conveyors, the plant, machinery and operating personal are exposed to a variety of hazards and risks. It can result in damage to equipment, injury to personal and degradation to the environment. There are several unsafe conditions and practices in various process and equipment of the thermal power plant leading to a number of accidents and which can cause loss and injury to human lives, damages the property, interrupt production. A risk assessment is an important step in protecting the plant from such conditions. The hazard resolution process is to assess the identified hazards in terms of the severity and consequences of the hazard and the probability of occurrence each type of hazard. Risk classification by severity and probability can be performed by using a risk assessment matrix. So, suggested and to identify the analysis of risk assessment of hazards and to identified a hazard identification and risk assessment in thermal plant in a potential forcible hazard associated with operation and maintenance activities in a thermal plant of hazard identification and risk assessment.

Keywords: Thermal power, Risk and Hazard, Consequence analysis, Mitigation Hazard Resolution, Risk Assessment.

INTRODUCTION

In the electric power generation is being done by many sources in India. The significant wellsprings of electric energy in India are petroleum products and water. It manages regulator configuration involving quantitative criticism hypothesis for nuclear energy station process. commitment by various kinds of plants is Steam plant, Hydro plant, atomic plant, Diesel and Wind plant and Gas plant. Regulator configuration involving quantitative input hypothesis for nuclear energy station process. Steam will be delivered from evaporator drum and it will be taken care of to super warmer then a bunch of turbines as motor energy will be changed over in to mechanical energy. Regulator configuration involving quantitative input hypothesis for nuclear energy station process. It bargains about that the presentation examination of photovoltaic supported coal terminated power plant. These plants are named under and contingent on their energy change. Power area is one of the center modern areas which assume an essential part in general financial development of the country. The hole between the energy interest and supply is extremely huge.

To examined the gamble appraisal activity of fuel dealing with framework and activity of kettle have been distinguished and examination. To investigated the evaluation permits one to dole out a gamble appraisal worth to a danger in view of its seriousness and its likelihood. It assists us with zeroing in on the dangers that truly can possibly hurt. The peril goal process is to survey the recognized risks with regards to the seriousness and result of the danger and the likelihood of event of each kind of peril. To survey the gamble level related with the recognized perils and to assess the ampleness of chance control measures taken up for the avoidance, control and relief of results. To broke down a give suggestion for offices in regards to additional enhancements in the security principles of the plant. To performing peril

ID and hazard evaluation in the basic exercises and helps the administration to fostering the fitting preventive and control procedures. Thus, it helps as to control measures and to safeguard the hardware, working individual and climate.

Heat energy delivered ignition of coal in heater draft. It bargains about the thermodynamic investigation of super expander and gas turbine crossover framework for gas pressure decrease station of a power plant. It bargains about thought to be that fading qualities of soluble coal burning results for a situation study from a coal terminated power plant. Weariness lifetime assessment of a radiator in coal terminated power plants under an adaptable functional structure directing extraction steam of high strain warmers. Thus to fulfill the need supply hole, aside from expanding the limit there is a huge need to work on the exhibition of the current power creating units. In an exhaustion lifetime assessment of a radiator in coal terminated power plants under an adaptable functional structure controlling extraction steam of high strain warmers. It bargains about that control of electric power generation of nuclear energy station. Shipping of lignite consistently as well as enough is the greatest errand.

In the current lignite dealing with framework, the different functional issues are knowledgeable about many events like over-burdening. To control of electric power generation of nuclear energy station. It bargains about that practicality study and improvement of a manageable sun oriented nuclear energy station through use of mine waste terrains. Condition based observing of kettle boundaries in a nuclear energy plant. To interest for electrical power is expanding at a fast speed in our country. Arranging of creation assets use and ecological consequences for the case of a nuclear energy stations. It bargains about arranging of creation assets use and natural consequences for the case of a nuclear energy stations.

In underlying designing difficulties in structures for cooling water framework in nuclear energy station. It bargains about underlying designing difficulties in structures for cooling water framework in nuclear energy station. The solid and effective treatment of lignite at different stages involves prime worry to a power station. In a spillage disappointment examination in a power plant kettle. Any disappointments in mining exercises or any fluctuating power interest at power station unquestionably influence the capabilities at both end. So the framework ought to be in the middle between which should be more than customary noticeable elements of coal mining whether according to specialized and financial perspective. The different functional issues are knowledgeable about many events like over-burdening under the usage of mining transport limit, increment the inactive running season of transports. It bargains about the activity and support of coal dealing with framework in nuclear energy station. By increment the oil utilization because of defer in dugout filling additionally decline in power generation because of basic shelter fuel conditions. Arranging of creation assets use and ecological impacts on the case of a nuclear energy stations. It likewise looks at the preparation of creation assets use and natural consequences for the case of a nuclear energy stations. Factual displaying of a coordinated heater for coal terminated nuclear energy station. From this factual displaying of a coordinated heater for coal terminated nuclear energy station. This paper will assist us with being familiar with recognizable proof of dangers and risks to keep from evaluation of working regions in a nuclear energy station.

HAZARD IDENTIFICATION

Risk recognizable proof ought to expect to decide proactively all sources, circumstances and acts, emerging from an association movement, with a potential for hurt regarding human injury or infirmity. They incorporate Source as moving apparatus, Situations as working at levels and goes about as manual lifting. Danger ID ought to consider the various sorts of perils in the work environment incorporates Physical, Chemical, Biological and Psychological.

Danger ID ought to consider all people approaching the working environment. Eg: Customers and Employees. The dangers and dangers emerging from their movement, their way of behaving and human

factors like capacities, ways of behaving and impediments, must be considered while assessing the perils and hazard of cycles, gear and workplace. In taking into account human factors, the associations risk recognizable proof cycle ought to think about the accompanying and their collaborations. The idea of the gig, the climate, human way of behaving, mental abilities and Physiological capacities.

RISKS IN FUEL HANDLING

Framework A risk in fuel taking care of framework are fall of item, fall of individual, in the middle between nip point, trapped in power transmission moving parts, fire and blast, dangerous workspace, hazardous floor opening, dust blast, electricity produced via friction, hot work in combustible and unstable environment, bound space upkeep, restricted space review, manual material dealing with, vehicle development and mechanical material dealing with,

HAZARDS IN BOILER

A danger in evaporator area of activity and support are to openness to high tension, high temperature, heated water and steam, openness to hot surface of pipeline and machine parts, openness to fire blast, fall of individual and item during upkeep, openness because of lignite residue and fly debris dust, openness to power, manual and machine dealing with risk, snare of body parts in working hardware.

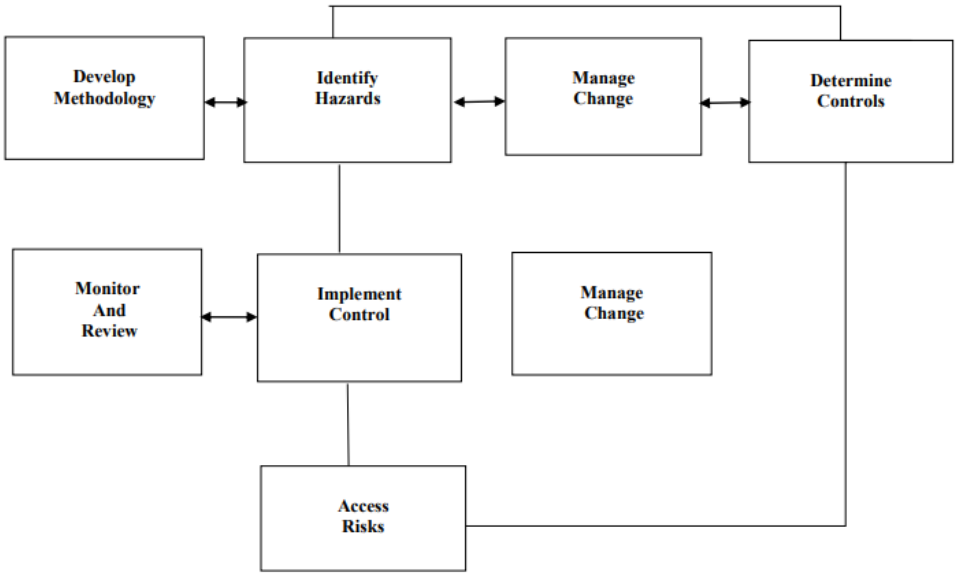

Figure 1: Overview of the Hazard Identification

HIERARCHY OF CONTROLS FOR POWER PLANT HAZARDS

Elimination

Physically eliminating the peril - this is the best danger control. Consider moving a power control station from a raised stage to ground level to eliminate the gamble of falling.

Replacement

This is the second best danger control and implies supplanting something that delivers a peril (like end) with something that doesn't create a risk.

Designing Controls

These don't wipe out power plant dangers, yet rather detach individuals from perils by utilizing an actual hindrance that shields laborers from a risk. Models incorporate machine gatekeepers, railings, or locked-out machines.

Mindfulness

Give data to empower laborers to pursue safe choices that lead to additional effective cycles. Give clear and clear signage, explicit machine preparing, and other instruction.

Regulatory Controls

Regulatory controls meaningfully alter the manner in which individuals work. You can execute explicit arrangements to restrict representative openness to control plant risks.

Individual Protective Equipment

PPE is the most un-successful method for controlling power plant dangers due to the potential for harm or abuse to make it incapable. Circular segment evaluated dress and fall bridles ought to be utilized in power plants relying upon a laborer's job.

Dangers

There are various risks related with the generation of hydroelectric power. A portion of these perils are shared by every one of the representatives who work in the business, while others are confined to those engaged with either electrical or mechanical upkeep exercises. A large portion of the dangers which can emerge are summed up in table , which likewise sum up safety measures.

Table 1. Controlling exposures to selected chemical and biological hazards in power system

Exposure	Where it can be found	Affected workers	Approaches to control
Abrasive dusts (blasting)	Dust can contain blast material and paint dust. Paint applied prior to 1971 may contain PCBs.	Mechanical maintenance workers	-Dust control system -Personal protective equipment -Respiratory protection -Personal hygiene measures -Medical surveillance (depends on circumstances)
Asbestos	Asbestos may be present in generator brakes, pipe and electrical insulation, spray-on coatings, asbestos cement and other products; exposure depends on friability and proximity to source.	Electrical maintenance workers, mechanical maintenance workers	-Adopt current best practices for work involving asbestos-containing products. -Personal protective equipment -Respiratory protection -Personal hygiene measures -Medical surveillance (depends on circumstances)
Battery explosion products	Short circuit across terminals in banks of batteries could cause	Electrical maintenance workers	-Shielding of battery terminals and noninsulated conductors

	explosion and fire and exposure to liquid and aerosols of the electrolyte.		-Practices and procedures to ensure safe conditions of work around this equipment
Coating decomposition products	Emissions can include: carbon monoxide, inorganic pigments containing lead and other chromates and decomposition products from paint resins. PCBs may have been used as plasticizers prior to 1971. PCBs can form furans and dioxins, when heated.	Mechanical maintenance workers	-Local exhaust ventilation -Respiratory protection -Personal hygiene measures -Medical surveillance (depends on composition of the coating)
Chlorine	Chlorine exposure can occur during connection/disconnection of chlorine cylinders in water and wastewater treatment systems.	Operators	-Follow chlorine industry guidelines when working with chlorine cylinders -Escape respirator
Degreasing solvents	Degreasing of electrical equipment requires solvents with specific properties of inflammability, solvation and rapid evaporation without leaving a residue; solvents meeting these characteristics are volatile and can pose inhalation hazards.	Electrical maintenance workers	-Local exhaust ventilation -Personal protective equipment -Respiratory protection
Diesel exhaust emissions	Emissions primarily include nitrogen dioxide, nitric oxide, carbon monoxide, carbon dioxide, sulphur dioxide and particulates containing polycyclic aromatic hydrocarbons (PAHs) from vehicles or engines operated in the powerhouse.	All workers	-Prohibit operation of automobiles and trucks in buildings. -Local exhaust system to collect exhaust at source -Catalytic converters on exhaust systems
Insect remains	Some insects breed in the fast waters around the station; following mating, the adults die and the carcasses decay and dry; some individuals develop allergic respiratory sensitization to substances in the dust.	All workers Maintenance workers	-Insects that spend part of their lives in fast-running waters lose habitat as a result of construction of a hydrogenerating station. These organisms may use the water channels of the station as surrogate habitat. Dust from dried remains can cause allergic

	Following draining, insect larvae living in the water channels may attempt to lower their bodies into remaining water by production of thread-like ropes; some individuals may develop allergic respiratory sensitivity to dust resulting from drying out of these materials.		sensitization. -Control measures include: Lighting that does not attract flying insects Screens on windows, doors and openings in the building envelope. Vacuum cleaning to remove carcasses
Oils and lubricants	Oils and hydraulic fluids coat windings of the rotor and stator; decomposition of hydrocarbons in contact with hot surfaces can produce polycyclic aromatic hydrocarbons (PAHs). Exposure can occur by inhalation and skin contact. Skin contact can cause dermatitis.	Electrical maintenance workers, mechanical maintenance workers	-Personal protective equipment (depends on circumstances)
Ozone	Ozone generated by arcing in the rotor and other electrical equipment could pose an exposure problem, depending on proximity to the source.	All workers	-Maintain electrical equipment to prevent arcing
Paint fumes	Paint aerosols contain sprayed paint and diluent; solvent in droplets and vapour can form flammable mixture; resin system can include isocyanates, epoxies, amines, peroxides and other reactive intermediates. Solvent vapours can be present in paint storage and mixing areas, and paint booth; flammable mixtures can develop inside confined spaces during spraying.	Bystanders, painters	-Paint spray booth -Personal protective equipment -Respiratory protection -Personal hygiene measures -Medical surveillance (depends on circumstances)
Polychlorinated biphenyls (PCBs)	PCBs were used in electrical insulating fluids until the early 1970s; original fluids or residuals may still be present in cables, capacitors, transformers	Electrical maintenance workers	-Personal protective equipment -Respiratory protection -Medical surveillance (depends on circumstances)

	or other equipment; exposure can occur by inhalation or skin contact. Fire or extreme heating during service can convert PCBs into furans and dioxins.		
Sulphur hexafluoride and breakdown products	Electrical arc breakdown of sulphur hexafluoride produces gaseous and solid substances of considerably greater toxicity. Release of large quantities of sulphur hexafluoride into subgrade spaces can create oxygen deficiency by displacing the atmosphere.	Electrical maintenance workers	-Local exhaust ventilation -Personal protective equipment -Respiratory protection -Medical surveillance (depends on circumstances)
Welding and brazing fumes	Cadmium, lead, silver in solder Work primarily involves carbon and stainless steels; aluminium welding may occur. Build-up welding is required to repair erosion due to cavitation. Emissions include: shield gases and fluxes, metal fumes, ozone, nitrogen dioxide, visible and ultraviolet energy.	Electrical maintenance workers Mechanical maintenance workers	-Local exhaust ventilation -Personal protective equipment -Respiratory protection -Personal hygiene measures -Medical surveillance (depends on composition of base metal and metal in wire or rod)

CONCLUSION

In this study, it is clearly indicated the presence of a hazard Identification and risk assessment in a thermal power plant is the major sources of electric energy in India are fossil fuels and water. The hole between the energy interest and supply is extremely huge. Consequently to fulfill the need supply hole, aside from expanding the limit there is a massive need to work on the presentation of the current power producing units. The earthy colored coal likewise called Lignite is the primary fuel in the terminating framework to create steam in the Boilers.

Moving of lignite is the greatest assignment. By utilizing squandered nuclear energy of gas turbine Outlet gas and super expander has assisted with recuperating energy and forestalling energy misfortune. Any disappointments in mining exercises and any fluctuating power interest at power station influence the capabilities at the two closures. So the framework ought to be planned in more than customary unmistakable elements of coal mining and furthermore it decreases the dangers and risks in nuclear energy station. At last in these paper obviously showed and examination the significant dangers and perils.

REFERENCES

[1]. A M. S. Murshitha Shajahan, D. Najumnissa Jamal, V. Aparna, "Controller design using quantitative feedback theory for thermal power plant process", A case study from a coal fired power plant, volume 5 10: 38-45.
[2]. Hooman Golchoobian, Mohammad Hasan Taheri, Seyfolah Saedodin, "Thermodynamic analysis of turboexpander and gas turbine hybrid system for gas pressure reduction station of a power plant", Journal of thermal engineering and process, volume 1, 20: 23-36.
[3]. M. K. A. Ajamed Khan, V. Aparna, D. Najumnissa Jamal, "Control of electric power generation of thermal power plant ", A case study of ISIJ International journal, volume 8, 45: 728- 735.
[4]. Wilson R. Nyemba, Prominent Munanga, Charles Mbohwa, "Feasibility study and development of a sustainable solar thermal power plant through utilization of mines wastelands", A case study from coal fired power plant, volume 5,; 23: 353-360.
[5]. Tawanda Mushiri, Tichaona Kennedy Mhazo and Charles Mbohwa, "Condition based monitoring of boiler parameters in a thermal power station", International journal of engineering development and research, volume 1,; 65: 369-375.
[6]. Agata Mesjasz Lech, "Planning of production resources use and environmental effects on the example of a thermal power plants", A case study in an productional resource safety, volume 3,; 3: 539-545.
[7]. Dipal P Trivedi, Raja I Baga, Jignesh V Chokshi, "Structural engineering challenges in structures for cooling water system in thermal power plant", A case study of an observational study and structural engineering, volume 5,; 44: 141 - 150.
[8]. Bhardwaj, A., Kamboj, V. K., Shukla, V. K., Singh, B., & Khurana, P. (2012, June). Unit commitment in electrical power system-a literature review. In Power Engineering and Optimization Conference (PEDCO) Melaka, Malaysia, 2012 IEEE International (pp. 275-280). IEEE.
[9]. Bhardwaj, A., Tung, N. S., & Kamboj, V. (2012). Unit commitment in power system: A review. International Journal of Electrical and Power Engineering, 6(1), 51-57.
[10]. Er Amit Bhardwaj, Amardeep Singh Virdi, RK Sharma, Installation of Automatically Controlled Compensation Banks, International Journal of Enhanced Research in Science Technology & Engineering, 2013.
[11]. EA Bhardwaj, RK Sharma, EA Bhadoria, A Case Study of Various Constraints Affecting Unit Commitment in Power System Planning, International Journal of Enhanced Research in Science Technology & Engineering, 2013.
[12]. NS Tung, V Kamboj, B Singh, A Bhardwaj, Switch Mode Power Supply An Introductory approach, Switch Mode Power Supply An Introductory approach, May 2012.
[13]. Navpreet Singh Tung, Gurpreet Kaur, Gaganpreet Kaur, Amit Bhardwaj, Optimization Techniques in Unit Commitment A Review, International Journal of Engineering Science and Technology (IJEST), Volume 4, Issue, 04, Pages 1623-1627.
[14]. Amit Bharadwaj, Vikram Kumar Kamboj, Dynamic programming approach in power system unit commitment, International Journal of Advanced Research and Technology, Issue 2, 2012.
[15]. Bhardwaj, A., Tung, N. S., Shukla, V. K., & Kamboj, V. K. (2012). The important impacts of unit commitment constraints in power system planning. International Journal of Emerging Trends in Engineering and Development, 5(2), 301-306.
[16]. NS Tung, V Kamboj, A Bhardwaj, "Unit commitment dynamics-an introduction", International Journal of Computer Science & Information Technology Research Excellence, Volume 2, Issue 1, Pages 70-74, 2012.
[17]. Preet Khandelwal, Surya Prakash Ahirwar, Amit Bhardwaj, Image Processing Based Quality Analyzer and Controller, International Journal of Enhanced Research in Science Technology & Engineering, Volume 2, Issue 7, 2013.
[18]. VK Kamboj, A Bhardwaj, HS Bhullar, K Arora, K Kaur, Mathematical model of reliability assessment for generation system, Power Engineering and Optimization Conference (PEDCO) Melaka, Malaysia, 2012 IEEE.
[19]. Navpreet Singh Tung, Amit Bhardwaj, Tarun Mittal, Vijay Shukla, Dynamics of IGBT based PWM Converter A Case Study, International Journal of Engineering Science and Technology (IJEST), ISSN: 0975-5462, 2012.
[20]. Navpreet Singh Tung, Amit Bhardwaj, Ashutosh Bhadoria, Kiranpreet Kaur, Simmi Bhadauria, Dynamic programming model based on cost minimization algorithms for thermal generating units, International Journal of Enhanced Research in Science Technology & Engineering, Volume 1, Issue 3, ISSN: 2319-7463, 2012.