

Chapter 3 Recommendations for Improvement and Implementation Measures

I. Recommendations for Improvement

○ Field of Structure, Employment and Civil Rights

Recommendation 1. Direct hiring of and full-time position for workers in operation of fuel/environment facility and routine maintenance for labor safety

[Reference] Entire report

[Needs for Recommendation]

- When investigating risks locally and partially, we cannot identify structural and fundamental causes that made the late Kim Yong-gyun bend and put his body into the access shaft.
- The structure of a principal contractor and subcontractor not only divides the flow of processes and forces outsourcing of works but also derives numerous procedures to manage risks and clarify allocation of responsibilities and creates voids of risk management.
- Coal-fired thermal power plants are built an integrated production system consisting of coal unloading - transportation of coals - turbine - ash disposal - desulfurization. Unreasonable division of flow processes at coal-fired thermal power plants is prone to complicate communications between processes, which causes risks to safety. Hence, integration of flawless communication between processes and its management are integral to workers' safety as well as efficiency of given works. Direct hiring practice is the starting point to take care of such risks.
- Today, because operations of main facilities and remaining processes, which

cannot be separated, are impractically divided, such separation resulted in complicating communications, and it causes criticism of structural illegal temporary workers dispatched.

- Current practices of subcontracts eventually force workers to endure low wages and substandard working conditions while bringing excessive profits to subcontractors.
- ‘Follow-up measures for fatal accident of the late Kim Yong-gyun’ announced by the government and political parties on February 5th stipulate to establish new public institutions in the field of fuel environmental facility operation to implement direct hiring. Such establishment of public institutions and direct hiring may seem to bring positive effects on stable employment and better treatment of workers; however, from the safety perspective, the dual operating structure needs to be further improved.
- Being overseen by a regular support department of power generation systems, routine maintenance works are better to be integrated and operated through unification the same as the operating works of fuel environment facilities; however, re-collectivization would be a step-by-step alternative by revisiting the past experiences where professionalism was pursued while KEPCO KPS was in charge of maintenance works.

[Detailed Recommendations]

- ① Operating works of fuel environment facility need to be integrated and operated by each power company, and required workers, including direct and indirect workers, need to be directly hired by power companies.
- ② Re-collectivization of routine maintenance works would be executed through KEPCO KPS; subsequently, KEPCO KPS shall directly hire direct/indirect workers affiliated to private maintenance companies.
- ③ Integration and operation of operating works of fuel environment facilities to each power company and re-collectivization of routine maintenance works to KEPCO KPS would also include the secondary subcontract works (permanent regular works). Hence, direct hiring shall include secondary subcontracted workers.

- ④ When primary/secondary subcontracted workers are directly hired by power companies and KEPCO KPS, those workers shall be assimilated into existing organization of offices in order to prevent unreasonable hierarchy amongst and discrimination against those workers.

Recommendation 2. Prohibition of Embezzlement of Labor Costs and Improvement of Bidding System

[Reference] 2-2-1 Hiring in the Report

[Needs for Recommendation]

- Proper level of wages for workers can hardly be guaranteed through current subcontract practices due to structural problems.
- First, because the priority of prices is determined by applying the bidding rate to the entire amount of anticipated price, the actual design price for subcontract amount, such bidding rate consequently applies to the labor costs (market value of labor costs) during its design. Second, even if subcontracts are concluded, no supervision or management is available with respect to direct labor costs under those agreements. It has been estimated that only 47~61% of direct labor costs under construction agreements for routine maintenance are actually distributed to workers. Substantial portion of labor costs, not paid to workers, is being embezzled as corporate profits.
- Therefore, direct labor costs from subcontract amounts shall not be subject to bidding rates but subject to market value of labor wages, and supervision and management over allocation of labor costs shall be enhanced.

[Detailed Recommendations]

- ① When a project is being operated through subcontracts, bidding rates shall not apply to direct labor costs during execution of bidding agreements in order to ensure proper level of wages for subcontracted workers.

- ② Management measures need to be developed in order to ensure the entire amount of direct labor costs under subcontracts to reach workers without any embezzlement in between.

Recommendation 3. Reinforcement of Manpower Required for Labor Safety

[Reference] 2-1-2 Hiring, 2-2-1 Conditions of Occupational Accident and Health, 2-2-4 Health Management in the Report

[Needs for Recommendation]

- Although a principle of a group with a pair of workers to engage in hazardous works was in place even before the fatal accident of the late Kim Yong-gyun, it was never observed. Specific guideline concerning the principle concerned was never available.
- Since the accident, responses to safety issues were strengthened, and 170 workers were additionally dispatched into the field of fuel operation in an urgent fashion in order to execute operations by a group with a pair of workers; however, the manpower required to secure safety was not based on precise calculation.
- Conveyor belts need to be used during the processes of coal transportation, removal of fallen coal, ash disposal and desulfurization, and minimum safety personnel are required to be secured at the sections with revolving shells.
- In cases of operators and their assistants for conveyors at coal transportation process, persons handling fallen coals, persons handling fallen gypsum/limestone, operators of common utility and wastewater treatment and operators of conveyors for ash disposal process, the manpower must be distributed to ensure all works to be done by at least a group of 2 workers.
- Extended hours of labor and excessive night shift works are well-known causes for accidents, and the findings from workers' survey also confirmed

that over 52 hours of excessive labor and 7 days or more of night shift works increased risks for accidents.

- In addition to safety concerns, manpower required to regulate working hours and guarantee rights for paid leave needs to be allocated.

[Detailed Recommendations]

- ① Works by a group of 2 workers need to be practically implemented regarding hazardous works.
- ② Not only compliance with regulations on 52 working hours per week but also 40 working hours per week have to be fully implemented, and 7 days or more of night shift works must be prohibited.
- ③ By improving the work shift system, the right to use annual paid leave has to be guaranteed.
- ④ Inputs from field workers need to be reflected in order to develop the human resource plans securing safety.
- ⑤ Shift systems need to be improved in order to reduce long working hours and night shift works.

Recommendation 4. Improvement of Collective Labor-Management Relationships Related to Safety and Health

[Reference] 2-1-2 Hiring, 2-2-5 Right to Participate in Safety and Health

[Needs for Recommendation]

- It is important to procure safety and health regulations through collective bargaining agreements; however, the worksites where workers from subsidiaries and subcontractors of power companies do their jobs are operated and managed by power companies.
- Even if the provisions in collective bargaining agreements of subcontractors between labor and management prohibit workers who reasonably suspend operation or evacuate in the event of safety accident from being given any disadvantages, it is quite questionable how such provisions would be fully

effective under the given structures.

- At power plants where risks for accidents are always present against workers of subsidiaries and subcontractors and works are being performed within the premise of power companies, joint discussion between a principal contractor and subcontractor is required.

[Detailed Recommendations]

- ① Joint negotiation between a principal contractor and subcontractor shall be made mandatory in order to improve hazardous facilities at worksites and practically guarantee the right to suspend operation during emergency.
- ② Occupational safety and health commission shall be jointly operated by a principal contractor and subcontractor.

Recommendation 5. Realistic Enhancement of Workers' Right to Safety

[Reference] 2-1-3 Civil Rights, 2-2-3 Safety Management, 2-2-5 Right to Participate in Safety and Health

[Needs for Recommendation]

- The current Occupational Safety and Health Act or Safety Manual of the power generation headquarters is all described focusing on mandatory provisions on safety management of users.
- Legally stipulated mandatory provisions for users are designed for workers to exercise their right to safety; however, the users' obligations are being converted to the workers' obligation to comply with safety regulations within the structure of a principal contractor and subcontractor at the worksites of power plants.
- Labor safety rights are the right designed for workers to enforce users' obligations or resolve and improve harmful risk factors for the sake of workers' safety. If such rights are not guaranteed, safety functions as a tool to control, and a feedback system for practical safety will not properly work.

- Thus, rights to safety shall be specifically prescribed more than anything else, those rights shall be practically exercised, and the processes and procedures to improve risks at worksites shall be strengthened based on the above.
- Labor safety rights include the right to know about risks, right to present means to address risks and right to participate and act in order to raise objections against and improve safety measures. Moreover, efforts for improvement of hazardous facility and equipment and improvement of labor strength and working protocol shall be made from the aspects of safety rights.

[Detailed Recommendations]

- ① It is to delete the provision on individual negligence of workers for causes of accidents.
- ② It is to guarantee equal right for workers (representatives) to participate and investigate during the course of accident investigation.
- ③ Right to demand improvement of facility and equipment;
- ④ Right to collect data on and improve harmful risk factors;
- ⑤ Right to demand improvement of safety measures;
- ⑥ Right to demand improvement of labor strength and working protocol;
- ⑦ Systemization and mandatory treatment for victims of occupational accidents and their colleagues for trauma;

Recommendation 6. Improvement of Punitive Punishment Indicators for Occupational Accidents

[Reference] 2-1-3 Civil Rights

[Needs for Recommendation]

- Long-standing conventional concealment of occupational accidents within power plants has been repeated in a more serious manner under the structure of a principal contractor and subcontractor.

- Point deduction on occupational accident indicators during management assessments by the government has been repeated as occupational accident indicators to deduct points within 5 power companies, which leads to penalty surcharges for safety or enhancement of safety regulations within subcontract agreements or employment agreements under the structure of a principal contractor and subcontractor.
- A series of these systems promotes a culture to evade occupational accidents implicitly forcing concealments of occupational accidents. Practical measures to change the above are desperately needed.
- Punitive measures to deduct points on various occupational accident indicators need to be improved; and to the contrary, strict disciplinary provisions need to be established against attempts to conceal occupational accidents.
- Current situations where many occupational accidents are not notified to worksites in an aggressive manner or attempts to conceal occupational accidents still prolong prove the fact that such measures stated above must be implemented as soon as possible.

[Detailed Recommendations]

- ① It is to insert an indicator of direct evaluation by workers to safety indicators under items of management assessment by the government (improvement indicators for requests from field workers related to safety, such as completion rate of field workers' requests for improvement of facility (number of requests, ratio within budgets for facility improvement));
- ② It is to improve indicators excessively deducting points in the event of occupational accidents during management assessments by the government and to apply indicators adding points to investigation and improvement of occupational accidents and erroneous accidents.
- ③ It is to delete occupational accident-related indicators deducting points from internal assessment indicators of 5 power companies.
- ④ It is to delete provisions on penalty surcharges in relation to occupational accidents during execution of subcontracts.
- ⑤ It is to add provisions for deduction of points and expulsion if concealment

of occupational accidents is discovered from management assessments by government and subcontract agreements with subcontractors.

Recommendation 7. Abolishment of Privatization and Outsourcing for the Sake of Labor Safety and Public Convenience

[Reference] 2-1-1 Structure

[Needs for Recommendation]

- Opening of routine maintenance and operation of fuel/environment facility to the private sector, which has been in place for the past 5 years at least (1st period to open power-generation maintenance industry to private sector) and for the past 15 years at most (entrance into operation of fuel/environment facility by Korea Electric Power Industrial Development Co., Ltd. in 1992, privatization in 2003), to private sector has been accelerating to expand a massive number of unskilled young workers with low wage.
- While workers of private companies are forced to face hazardous situations by working at worksites after taking 1~3 weeks of training, they have been exposed to long working hours due to continuously shrinking OH hours, manpower allocation not allowing proper use of annual leaves and lack of alternative workforce (percentage of allowance).
- Private companies, which just have to accommodate all requests from power companies, have ignored demands for facility improvement while failing to provide protective gears for workers, and workers are still lack of sufficient skills because of high turnover rates for being unable to endure high risks, low wages and placement at remote regions.
- At the same time, although power companies have paid private companies constantly increasing subcontract amounts every year, those subcontract amounts have been accumulated for profits of those private companies rather than distributed to workers.
- Contrary to the government's original intention to 'procure competitive

competence’ and ‘develop companies with efficiency’ through private competitive systems, the policy concerned ended up failing to improve efficiency and stability of the market.

[Detailed Recommendations]

- ① It is to recommend abolishing **privatization/outsourcing** of the field of routine maintenance and fuel/environment facility operation.

Recommendation 8. Enhancement of Workers’ Safety and Reorganization of Power Industry to Improve Public Convenience

[Reference] 2-1-1 Structure, 2-2-2 Facility Technology

[Needs for Recommendation]

- Division of power companies for the purpose of privatization created factitious competitions as well as numerous problems, including reduced purchasing power for fuel due to divided purchases, countless difficulties in flexible operation of maintenance materials and severance of expertise, know-how and information of power companies, which may lead to infusion of public fund or increasing electric charges due to rising costs.
- Competitive system of 5 power companies led to attempts to reduce costs within the realms threatening workers’ safety for the sake of business performances, and safety risks of workers from principal contractors and subcontractors as well as facility malfunction were increased because the period of planned preventive maintenance works continued being shortened under the situations where the structure of main office expanded and manpower at worksites shrank.
- Workers’ safety was seriously threatened as fuel/environment facility operating works, which used to be handled by a group of 2 workers in the past, were converted to jobs by a single worker; and especially, situations became worsened because private companies in charge of fuel/environment operating facility dispatched newly recruited workers into worksites without

proper training due to insufficient manpower.

- Moreover, the current structure is not suitable to fulfill the role of public leader addressing the responsive works to climate changes and future direction of changing energy industry (reduction of coal and nuclear power plants, conversion to renewable energy, super grid, etc.).

[Detailed Recommendations]

- ① It is to aggressively examine vertical integration of power industry (similar to the previous KEPCO system), and it is to recommend integrating the field of power generation first.
- ② It is to recommend forming the ‘committee for advancement of future power industry’ (tentatively named) participated by labor unions and civil groups under the supervision of the Ministry of Trade, Industry and Energy and to begin discussion on integration.

○ Field of Safety and Health Technology

Recommendation 9. Construction of Safety Management System Allocating Clear Responsibility to Business Owner

[Reference] 2-2-3 Safety Management

[Needs for Recommendation]

Allocation of responsibility for safety becomes more unclear the higher job titles are at power companies, and autonomous participation by workers is absolutely essential to secure safety.

- While voluntary participation by workers is absolutely required to discover sources of risks at worksites especially at huge sites like power plants, tools or systems to identify risk sources are yet to be systemized as of today.

- Unless responsibilities for safety and health are clearly specified, allocation of responsibility will become more unclear as the job titles go higher within the organization; hence, it is important to allocate responsibilities upon them.
- For realistic effects of safety and health management system, a process consulting with workers is truly important, and it is also necessary to build a database regarding past accidents/incidents of power companies.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① Appointment of director in charge of safety and health at power companies	Government/power company	Within 1 year
② Stipulation of management supervisor's responsibilities for the head of department at power plant	Power company	Within 6 months
③ Construction of DB on accidents/incidents and comprehensive risk management system at 5 power companies	Power company	Within 6 months
④ Additional implementation of indicators evaluating safety and health activities for individuals under a line organization concerning the head of division and department	Power company	Within 6 months
⑤ Development of qualitative leading indicators to prevent occupational accidents in addition to qualitative performance indicators	Power company	Within 1 year
⑥ Establishment of priority regarding improvement measures for risk sources at worksites	Power company	Effective immediately

Recommendation 10. Commission of Occupational Health and Establishment of Medical System at Power Plants

[Reference. 2-2-4 Health Management]

[Needs for Recommendation]

Based on analysis of health conditions at coal-fired thermal power plants, the following problems were identified; hence, we hereby recommend commissioning industrial physicians taking charge of health management for

members at workplaces.

- Despite higher prevalence rate of overwork-related diseases for power plant workers than general wage workers due to extensive night shift works and long working hours, treatment rates for power plant workers are lower, and no physicians are available to manage them.
- Because of low awareness and poor management of harmful factors, such as carcinogenic agents and dusts, at coal-fired thermal power plants, there are concerns for outbreak of occupational diseases in the future; hence, doctors are required to engage in preventive activities, including planning of special medical examination and follow-up managements.
- It is to evaluate propriety of current workers with diseases whether to return to duties as well as to ensure those workers concerned to return to their duties in an appropriate manner.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① It is to appoint an industrial physician and grant practical authority at all power plants (ex officio member of OSHC, guidance and advice on safety and health activities of power generation headquarters).	Power company	Launch within 6 months
② It is to establish in-house clinic at power plants with at least 1,000 full-time workers (to place a specialist in occupational environment medicine and to have the specialist to assume the role of industrial physician for power companies and subcontractors).	Power company	Launch within 6 months
③ It is to commission an outside industrial physician at power plants with less than 1,000 full-time workers (frequent consultation with at least one visit per week; a doctor under the central safety and health support center is to assume the role).	Power company	Launch within 6 months
④ It is to establish a response system at all power plants in the event of emergency patients (mandatory hiring of emergency medical technician; agreement with designated hospital for emergency medical care).	Power company	Launch within 6 months

Recommendation 11. Enhancement of Safety and Health Organizational System and Improvement of Operation Practice

[Reference. 2-2-1 Conditions of Occupational Accident and Health, 2-2-4
Health Management in the Report]

[Needs for Recommendation]

Analysis showed that the safety and health management organizations of power companies and subcontractors are good enough to forecast, evaluate and manage risks within workplaces.

- Clear limitations are evident in independence, authority and professionalism of organizations. Since health management workforce is limited to nurses, industrial hygiene manpower capable of managing working environment, such as dust and chemicals, is required.
- Lack of field-oriented executive management capabilities because of document-oriented safety and health management as a matter of formality;
- Lack of efficiency and communication system due to independent organizational systems between power companies and subcontractors (unilateral work orders, etc.);
- Lack of professional workforce and facility for management despite soaring prevalence rates on high blood pressure, diabetes, depression, asthma and chronic lung diseases;
- Because the status of health manager is limited to a commissioned position, problems of limited authority and disadvantageous status clearly exist.
- Appropriation account for legal occupational safety and health management costs is inappropriate.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① Composition of joint safety and health operating system amongst 5 power companies (including subcontractors) (discussion, structure, training, various regulations and manuals, etc.);	Labor union Power company Subcontract or	Within 1 year
② Construction of integrated system for safety and health management organization between power plants and subcontractors (organization, manpower, training, facility, etc.);	Labor union Subcontract or	Within 1 year
③ Amendment to safety and health management regulation (strengthened field management works, including roving inspection of worksites, guarantee of operational continuity);	Labor union Power company Subcontract or	Within 6 months
④ Improvement for job title of health manager (commissioned position → general position) and hiring system (non-full-time employment → full-time employment);	Power company	Immediate improvement
⑤ Manpower reinforcement for health manager (1 manager per 300 full-time workers including subcontractors + at least 1 person in the field of industrial hygiene);	Power company	Within 6 months
⑥ Revision of appropriation account on safety and health management costs (deletion of labor costs);	Ministry of Employment and Labor	Within 1 year

Recommendation 12. Establishment of Central Safety and Health Center for Coal-fired Thermal Power Plant to Support Effective Safety and Health Management

[Reference, 2-2-1 Conditions of Occupational Accident and Health, 2-2-3 Safety Management, 2-2-5 Right to Participate in Safety and Health]

[Needs for Recommendation]

Based on analysis of occupational accidents and health conditions at coal-fired thermal power plants, the following issues were identified. To address the issues concerned, it requires a high level of professionalism and information sharing among power companies, and it is to recommend improving the level

of safety and health through joint establishment of a safety and health support center by power companies.

- Occupational accident rates at coal-fired thermal power plants are rapidly increasing during the time of reorganization of power generation industry, and the medical access rate on damages and poisoning continues increasing, which leads to necessity of causal analysis and development of responsive strategies.
- Workers at power plants show higher prevalence rate of chronic diseases, prone to develop into occupational diseases but lower treatment rate than general wage workers, and health gap between power companies and subcontractors is also substantial.
- Coal-fired thermal power plants have low awareness of working environment management, such as carcinogenic agents, and are not armed with sufficient expertise to manage the above.
- Power companies need to overcome chronic problems of being unable to share lessons learned from the cases of similar occupational accidents due to competitive systems amongst them.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① It is to establish a central safety and health support center for coal-fired thermal power plants at Hanil Hospital, an subsidiary of KEPCO (Structure: Specialists of occupational environment medicine, safety technician, industrial hygienist, health statistician, nurse and administrative staff);	KEPCO/power companies	Within 6 months
② Development and distribution of occupational accident prevention measures accommodating characteristics of power plants;	Center	Every year
③ Construction and operation of surveillance system over occupational accidents and risk factors for occupational accidents for power companies and subcontractors;	Same as above	Continuously
④ Development and distribution of guidelines on safety management and health management for power companies and subcontractors;	Same as above	Continuously
⑤ Follow-up study on occurrence of occupational diseases through construction of cohorts of workers at power companies and subcontractors;	Same as above	Continuously
⑥ Operation of training programs for safety and health personnel of power companies and subcontractors;	Same as above	Continuously

Recommendation 13. Guarantee of Right for Workers to Participate in Safety and Health Activity

[Reference. 2-2-3 Safety Management 2-2-5 Right to Participate in Safety and Health in the Report]

[Needs for Recommendation]

- Participation by workers (representatives) is to contribute to enhancement of safety and health activities and prevention of occupational accidents at business sites.
- Power generation sites share quite similar working environments, and workers do their jobs while moving around power generation facilities within the premise of the company. Because even workers of subcontractors engage in their duties by moving one power company to another, a joint safety and health management system is required.
- The highest decision-making organization concerning workers' safety health is the occupational safety and health commission (OSHC), and the Ministry

of Strategy and Finance prescribes to form a safety management committee at the safety management guideline for public institutions; however, since representatives (presidents) do not attend, a role of the person with ultimate authority needs to be implemented.

- Since accidents at power plants are mostly suffered by workers of subcontractors and OH corporations and workers in special employment types, responsibilities of power companies, which have full authority within business sites, need to be strengthened.
- The most important system from the workers' right to participate is the system of honorary supervisor; however, that particular position is mostly vacant at subcontractors, and even supervisors appointed are not gaining any activity hours or training supports.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
<p>① Enhancement of collective labor-management relationships regarding safety and health (operation of OSHC by each company, operation of OHSC of a principal contractor and subcontractor, safety and health consultative group and safety labor consultative group between a principal contractor and subcontractor);</p> <ul style="list-style-type: none"> - Obligation for president and representative director to participate; - Guarantee of rights for multiple labor unions (unorganized workers) to participate in order to collect inputs from workers; - Offering of paid working hours, necessary data and learning opportunity to strengthen activities of workers (representatives); - Addition of guaranteeing activities of workers (representatives) in the operational regulations of labor supervisor; 	Labor union Power company Subcontractor MOEL	Within 1 year
<p>② Appointment of honorary occupational safety supervisor and guarantee of applicable activities</p> <ul style="list-style-type: none"> - Appointment of honorary supervisor at all power plants (subcontractors) and guarantee of his/her activities (time and expenses for meetings, safety management, accident investigation, field survey, training of workers); - Improvement of local honorary occupational safety supervisor system for small subcontractors and temporary workers (without limitations to the scope of outside supervisor's activity (complete application of Subparagraph 1-10 of Article 61-2 of the Occupational Safety and Health Act)); - Amendment to operational regulations on honorary occupational safety supervisor; 	Labor union Power company Subcontractor MOEL	Year-round implementation

Recommendation 14. Improvement on Operation and Management of Facility related to Coal Processing

[Reference. 2-2-2 Facility Technology in the Report]

[Needs for Recommendation]

Based on analysis of errors in design, operation and maintenance of coal-processing facilities, the following issues were identified.

- During design of conveyor belts, determinations were made upon cross-sectional areas, velocity and angle of the belts based on design coal; however, coals in actual use are being operated differently;
- As the proportion of using low-calorie coal increased for the purpose of saving raw material costs, safety elements became vulnerable due to increasing mechanical load and fallen coals affecting facilities;
- Because safety wire mesh at inspection isles or spraying and vacuum equipment to handle fallen coal is not installed at some facilities, safety is being seriously threatened.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① It is to improve conveyor belts to closed transportation facility (improvement of air-borne belt conveyor (ABC) and car at triffer room to a scraper type);	Power company	Year-round implementation
② Improvement on how to handle fallen coals at belt conveyor (Use of suction wheels and installation of sprinkler facility);	Power company	Within 1 year
③ Installation of safety fence near pulley and belt conveyor;	Power company	Immediate improvement
④ Regular inspection on pull cord of belt conveyor and installation of safety bar;	Power company Subcontractor	Immediate improvement
⑤ Improvement on how to install all emergency control and safety device (improvement on location, how to operate and safety signs);	Power company Subcontractor	Immediate improvement
⑥ Improvement on inspection method for coal-processing facility and guideline on processing of fallen coal (installation of access shaft, modification and supplementation of manuals, etc.);	Power company Subcontractor	Immediate improvement
⑦ Development of principle on the use of design coals (establishment of operating standards and reflection of government's management assessment indicators);	Power company	Within 1 year
⑧ Improvement of illumination at all operation routes;	Power company Subcontractor	Immediate improvement

Recommendation 15. Improvement of Management Measures for High-toxic Harmful Chemicals, i.e. Carcinogenic Agents

[Reference] 2-2-4 Health Management in the Report

[Needs for Recommendation]

Despite the present of various first-degree carcinogenic agents in the environment of power plants, proper management has been failed, and the following issues concerning workers' health were identified.

- Working environment management, such as measurement of high-toxic substances (crystal quartz, benzene, etc.) devastating to human bodies, has not been properly conducted.
- Risks of maintenance works with high exposure to harmful chemicals and indoor coal yards have been underestimated, and management methods have not been appropriate.
- Health management system, i.e. risk assessment during the purchase of chemicals, has not been properly functioned.
- Site and worker-oriented working environment management, i.e. roving on-site inspection, has not been performed.
- Organic integrated management of working environment between power plants and subcontractors has not been fulfilled, and inefficiency is still visibly present.
- Health follow-up investigation (health management notebook system, etc.) on those who highly exposed to crystal quartz, such as workers handling coal ash, is not being in operation.

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① Implementation of evaluation on exposure to heavy metal, i.e. crystal quartz, arsenics and leads, regarding the works where coal and ash dust are major concerns;	Power company Subcontractor	Immediate improvement
② Development of management measures on working environment specialized for maintenance works (installation of mobile ventilation device, frequent evaluation of working environment, career management of workers, etc.);	Power company Subcontractor	Within 6 months
③ Development of management measures on working environment specialized for indoor coal yards (procurement of individual monitoring standards for CO gas, measurement of benzene, enhanced criteria on restricted access, etc.);	Power company Subcontractor	Within 6 months
④ Introduction of risk evaluation process to chemicals purchasing system and participation by health manager;	Power company Subcontractor	Immediate improvement
⑤ Sharing of information on content of harmful materials specified in coal evaluation reports (health managers and relevant workers);	Power company Subcontractor	Immediate improvement
⑥ Construction of integrated working environment management system between power plants and subcontractors (measurement, improvement, management of protective gear, etc.);	Power company Subcontractor	Within 1 year
⑦ Inclusion of those who highly exposed to crystal quartz and subject to issuance of health management notebooks;	MOEL	Within 1 year

Recommendation 16. Improvement on Methods of Accident Investigation and Risk Assessment

[Reference] 2-1-3 Civil Rights, 2-2-3 Safety Management, 2-2-5 Right to Participate in Safety and Health in the Report

[Needs for Recommendation]

Investigation of accident causes for the purpose of advanced prevention and risk assessments for the purpose of forecasting, evaluating and managing risk factors have been systematically implemented; however, the following issues were identified.

- Management of statistics, investigation of accidents which is the most basic investigation into cause of accident, has not been properly in operation (system and method of accident investigation, management of statistics between a principal contractor and subcontractor, etc.);
- Investigation on fundamental cause of accident, the most important element in accident investigation, has not been performed.
- A system for interested parties (victims, victims' colleagues, workers' representatives, etc.) to participate in the process of accident investigation is not made available.
- Conspicuous limitations were found from risk assessment methods and operating system (omission of subject to evaluation, sharing of findings, workers' right to participate, etc.);

[Detailed Recommendations]

Detailed Implementation Measures	Principal Entity to Execute	Remark
① Improvement on statistical investigation of occupational accidents and management methods (interlink of accident history between a principal contractor and subcontractor, construction of accident DB system);	Power company Subcontractor	Within 6 months
② Improvement on the objectives and methods of accident investigation, including principles of fundamental causal investigation (including stipulation of the purpose to prevent reoccurrence rather than punishment, etc.);	Power company Subcontractor	Immediate improvement
③ Guarantee of labor representatives' right to participate during accident investigation;	Power company Subcontractor	Immediate improvement
④ Enhancement of disciplinary provisions against anyone concealing accidents;	Power company Subcontractor	Immediate improvement
⑤ Improvement of risk assessment methods (prevention of omission of subjects to evaluation, construction of sharing system between a principal contractor and subcontractor, guarantee of workers' right to participate, utilization of inspection tables, etc.);	Power company Subcontractor	Within 6 months
⑥ Development of systems to verify implementation of findings from risk assessments;	Power company Subcontractor	Within 6 months

Recommendation 17. Construction of System to Promote Safety Culture

[Reference] 2-2-6 Safety Culture in the Report

[Needs for Recommendation]

- It is necessary to promote safety culture through construction of lower culture, a foundation for safety culture.
- Keywords of safety and health guideline by representative director and chief director of power companies can be summarized with the highest priority on safety/life, environment and quality management, achievement of zero accident and compliance of basics and principles; however, very few power companies have actually presented specific goals for safety and health.
- Moreover, changes need to be made from independent culture to interdependent culture in order to promote safety culture.

[Detailed Recommendations]

1. **Construction of information sharing culture:** In order to elevate the sense of guarding against risks while accidents rarely happen, it is important to collect and spread accurate information; hence, it is necessary to reevaluate information sharing system.
- ① **Promotion of reporting culture:** For availability of safety information system, participation by workers in direct contact with risks is critical. And to achieve the above, reporting culture is required. Since it is necessary to foster safety working environment by reporting workers' errors, mistakes and hazardous works, effective measures to utilize the safety call system are required.
- ② **Making culture of flexibility:** Organizational flexibility means that the organization possesses capability to effectively adjust to demands for changes. A trustworthy organization shows quite a different look during emergency from a superficial shape based on daily and bureaucratic standard operation procedures (SOP). Authorities are moved to functional

technology basis, and mutually cooperative authority replaces bureaucratic matters. Official job title and stature disappears from works, and vertical hierarchy is replaced by technical expertise. Composition of organization and code of conduct for workers need to be reexamined in order for these types of flexibility to be applied to power generation industries.

- ③ **Promotion of culture of fairness:** In order to promote employees' true participation in safety and health, it needs to develop the process of determining responsibility for accident, disciplinary action system and disciplinary procedures, and it is to ensure safety and health to be properly understood through transparent operation of those processes.
 - ④ **Promotion of learning culture:** Elements forming the culture of learning are observation (awareness, participation, interests and tracking), thoughts (analysis, interpretation and diagnosis), creation (imagination, design and plan) and action (execution, implementation and experiment). Reorganization is required for examination of risk factors, owning of accident reporting system, possession of punishment-type regulatory system, support for autonomy of frontline managers and development and implementation of improvement measures for safety and health.
 - ⑤ It needs to operate leadership promotion programs for executives, managers, safety and health officers and executives of subcontractors.
2. Development of vitalization measures for communication of safety and health;

○ Field of Improvement on Management Supervision and Legal System

Recommendation 18. Enhanced Management and Supervision by Government and Procurement of Practical Effectiveness

[Reference] 2-3-1 Enhanced Management and Supervision by Government in the Report

[Needs for Recommendation]

From the manpower for management and supervision of occupational safety and health by the government, organizational system and operating procedures, the following issues were identified.

- Hiring and placement of human resources without consideration of expertise;
- Limitations of engineering and technical approaches due to lack of expertise;
- Absence of management system to improve expertise (career management, motivation, educational training, etc.);
- Organizational operation without consideration of unique characteristics of occupational safety and health (revolving assignment system, etc.);
- Limitation and inefficient operation of organizational system;

[Detailed Recommendations]

- ① Enhancement of professional training to improve job competence;
- ② Development of organizational operation measures to improve expertise (career management, i.e. improvement of revolving duty system);
- ③ Enhanced organization of occupational accident prevention compensation policy division (reorganization, etc.);
- ④ Establishment of mid-to-long-term plans to guarantee independence of occupational safety and health administrative organization;

Recommendation 19. Amendments to Statutes on Occupational Safety and Health

[Reference] 2-3-2 Enhanced Legal Liability for Business Enterprise in the Report

[Needs for Recommendation]

- It is believed that the amended Occupational Safety and Health Act, dubbed as the “Kim Yong-gyun Act” and recently passed, and subordinate statutes announced for legislation would not be able to stop risk outsourcing and would be unable to make changes to the reality where risks at worksites are pushed over to workers, especially temporary workers.

[Detailed Recommendations]

- ① **Reexamination of works subject to prohibition and approval of subcontracts:** In addition to this very accident, the works of which major cause for occupational accident was originated from the structure of a principal contractor and subcontractor were not included in the works subject to prohibition of subcontracts and approval of subcontracts. Especially when harmful substances are used or manufactured, it shall fall under the works prohibited for subcontracts; however, no grounds to block subcontracts were established because the cases of being exposed at confined spaces within the workplaces like power plants do not fall under the prohibitions concerned. Reexamination needs to be made to the relevant provisions in order to practically stop outsourcing of risks. Handling of carcinogenic agents needs to be the subject to prohibition of subcontracts; and for the works exposed to high-content crystal quartz at confined spaces, those works shall be included in the works subject to prohibition and approval of subcontracts by reflecting the minimal findings of fact-finding investigation.
- ② **Clarification of business owners’ obligation and scope of works subject to suspension of operation in the event when an order to suspend operation is lifted:** It needs to expressly specify measures for

business owners to take when petitioning for order of suspending operation to be lifted, and effectiveness of orders to suspend operation needs to be secured by including all works likely to cause the same or similar risks in the works subject to suspension of operation.

- ③ **Reexamination of disciplinary provisions and penalty surcharge provisions:** It is difficult to expect preventive effects through disciplinary actions because no low limit is prescribed in the disciplinary provisions of the Occupational Safety and Health Act against business owners when workers experience fatality due to violation of obligation under the same Act. And because the maximum amount is specified for penalty surcharges regardless of the size of business enterprises, it is also difficult to secure practical effectiveness of penalty surcharge systems. Reexamination needs to be made to all provisions concerning disciplinary actions and penalty surcharges.

Recommendation 20. Enactment of Disciplinary Statutes against Business Enterprise Responsible for Major Accident

[Reference] 2-3-2 Enhanced Legal Liability for Business Enterprise in the Report

[Needs for Recommendation]

- Even if major accidents occur, disciplinary actions only go to individual doers or person responsible, and the only means to hold business enterprises legally liable is the joint penal provisions against employer and employee. Even when legal liability for a doer is not fully stated, a disciplinary statute against business enterprises responsible for major accidents needs to be enacted as a legal tool to practically deliver negative impacts on operation and profits of the company by imposing penalty surcharges based on operating incomes of the company concerned and publicly announcing criminal acts and restrictions on permits and licenses in addition to ensuring the company to assume criminal liabilities for outcomes arising from its operation ignoring labor safety.

Recommendation 21. Establishment of Punitive Compensation System for Damages

[Reference] 2-3-2 Enhanced Legal Liability for Business Enterprise in the Report

[Needs for Recommendation]

- When a worker loses his/her life or suffers irrecoverable injuries, it is difficult for the worker to prove business owner's violation of duty of care and hold the owner concerned liable, and the compensation amount does not usually reach the level practically affecting the operation of the company concerned; hence, no motivation is apparent for business owners to comply with the Occupational Safety and Health Act. Upon such

occasions as described above, a punitive compensation system for damages needs to be introduced to impose realistic punishment where the system is severe enough to forcibly inhibit business owners from committing violation of laws. Examination needs to be made either to develop relevant provisions within the Occupational Safety and Health Act or to prescribe specific measures in the event of establishing a ‘Punishment act on corporate for major accident’; however, a punitive compensation system for damages needs to be prepared in the meantime.

Recommendation 22. Enhancement of Socially Responsible Management by Business Enterprise

[Reference] 2-3-3 Enhanced Social Responsibility for Business Enterprise in the Report

[Needs for Recommendation]

Examining the below, it appears quite apparent that the government-led practice of socially responsible management by business enterprises in Korea falls far behind that of businesses in advanced countries.

- In advanced countries, all issues related to socially responsible management by business enterprises are dealt as major national agendas, and governments are aggressively leading the way to address those issues.
- Policies taken by the government are designed to encourage businesses voluntarily participating in socially responsible management, and the government is employing various political means to promote businesses to become accustomed to socially responsible management models.
- It is social partnership through participation by civil society, but construction of network is being concurrently implemented.

[Detailed Recommendations]

- ① It is to set the issues of socially responsible management by business enterprises, including occupational safety and health issues, as pan-governmental core political agendas, and it is also to engage in campaigns, training and information offering activities as well as to build social network in order to improve social awareness.
- ② It is to present guidelines or models suitable to socially responsible management, including occupational safety and health issues, and it is also to explore joint participations by business, labor and civil society.
- ③ It is to effectively implement official certification/evaluation systems through independent certification/evaluation institutions.
- ④ It is to establish laws and systems forcing a certain scope of business enterprises to prepare a report on socially responsible management and

assume duties of public announcement and to have them attain social verification.

- ⑤ It is to examine a variety of incentive policies designed to grant benefits, such as preferential offering of opportunities for public procurements and tax exemptions, to companies with outstanding performance in socially responsible management and bring proper types of financial aids to small-and-medium-size enterprises.

II. Inspection Measures for Implementation

1. Background of implementation inspection

A. Public statement by the government-ruling party with regard to the fact-finding commission

According to the statement from the government-ruling party on February 5, 2019, the Special Labor Safety Investigation Board of Coal-fired Thermal Power Plant (Fact-finding Board) shall be formed and operated in the earliest time possible to investigate structural causes of the accident and to develop and implement the measures for structural-fundamental improvement and prevention of reoccurrence.

B. Operating regulation of the Fact-finding Board related to implementation measures

The ‘Regulation on establishment and operation of the Special Labor Safety Investigation Board of Coal-fired Thermal Power Plant for Fact Finding and Prevention of Reoccurrence for Fatal Accident of the Late Kim Yong-gyun’ (Article 737 of Prime Minister’s Directive) prescribes as shown below concerning activities of the board.

Article 12 (Processing of Activities by the Board, etc.) ① The board shall publish and announce an investigation report upon completion of its activities.

② Upon completion of activities, the board shall make recommendations on assignments for improvement and preventive measures against reoccurrence to the Prime Minister, and the Prime Minister may order necessary measures to relevant government departments in order to reflect the board’s recommendations on policies.

③ The Prime Minister shall take extra care of the board’s recommendations in order to ensure them to be properly reflected on policies of relevant government departments, and may hold meetings for inspections when deemed necessary.

2. Implementation Measures

In order to develop and implement measures for structural-fundamental improvement in accordance with the announcement by the government-ruling party and operation regulations, the Prime Minister shall take special care of the recommendations from the special fact-finding board in order for the recommendations to be fully reflected on government policies, and the Prime Minister is entitled to hold meetings for inspection if necessary.

The special fact-finding board hereby presents recommendations as listed below in order to ensure effective inspection on implementation of the recommendations above.

<Recommendations for Inspection of Implementation>

- 1) The ‘Inspection Commission on Implementation of Recommendations for Coal-fired Thermal Power Plant’ shall be formed with the Deputy Manager at Office 2 for Government Policy Coordination as a chairperson, and the commission shall convene regular inspection meetings on quarterly basis to check whether implementations have been completed. Temporary meetings may be convened upon requests made by a majority of commission members.
- 2) The commission concerned shall be comprised of directors from related government departments in association with the activities of the special fact-finding board (Prime Minister, MOEL, Ministry of Strategy and Finance, Ministry of Trade, Industry and Energy) and 5 members recommended by the special fact-finding board.
- 3) The commission concerned shall report the Prime Minister of the results and progresses of each regular meeting.
- 4) Upon convocation of inspection meetings, the commission concerned may allow interested parties, including users of principal contractors and subcontractors, workers and workers’ representatives, to observe the meeting.
- 5) The commission concerned shall engage in inspection activities for the period of 2 years and may extend the period for one year when deemed necessary.