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Pakistan

May 7, 2007

Dear Mr. Hayat:

The Overseas Private Investment Corporation (OPIC) is considering providing consent to Citibank for their loan to Engro Vopak Terminal Limited to construct an ethylene storage facility in Karachi, Pakistan. OPIC is an agency of the United States Government with a mandate to encourage and support U.S. private sector investments in developing countries and emerging economies. All OPIC-supported projects must be economically and environmentally sound.

OPIC is required by U.S. law to notify appropriate government authorities of investments under consideration for OPIC assistance that have the potential to pose significant consequences for the environment. The project that is the subject of this notification involves the construction of an ethylene storage facility at Port Qasim, Karachi.

OPIC is also required by U.S. law to provide your government with information about standards and guidelines that have been developed by international organizations or by federal environmental regulatory authorities of the United States and that are applicable to such investments. OPIC applies guidelines and standards established by the World Bank Group. OPIC has enclosed these guidelines.

According to documentation submitted by the project company, the potential adverse environmental hazards associated with the operation of this ethylene storage facility are impacts associated with accidents such as fire and explosion. The ethylene storage facility will use internationally accepted safety and environmental management practices to mitigate potential impacts to acceptable levels. Based on information provided by the project company, this project does not appear to pose significant hazards to the environment, public health or safety resulting from its operation.

We understand, of course, that the project will be subject to the laws of Islamic Republic of Pakistan with regard to protection of the environment as well as occupational health and safety.

If you have any questions about OPIC's environmental assessment of this project, you may contact OPIC's Director of Environmental Affairs at the above address.

Sincerely,



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Enclosures: International Finance Corporation: Environmental and Social Guidelines  
for Gas Terminal Systems and Occupational Health and Safety



**International Finance Corporation**

**Environmental, Health and  
Safety Guidelines for**

**Gas Terminal Systems**

**Liquid Effluents**

Process wastewater, domestic sewage and contaminated stormwater should be treated to meet the following specified limits before being discharged to surface waters:

<i>Parameter/Pollutant</i>	<i>Maximum Value</i>
pH	6 to 9
BOD <sub>5</sub>	50 mg/L
Oil and grease	10 mg/L
Total suspended solids	50 mg/L
Cyanide	
Free	0.1 mg/L
Total	1.0 mg/L
Heavy metals, total	10 mg/L

Liquid effluent discharges to a public or private central wastewater treatment system may be subject to pre-treatment requirements. Sponsors should provide information from the local authority or private central wastewater treatment company, to confirm that the treatment system has the capacity to adequately treat the project's liquid effluents.

**Stack Emissions**

Concentrations of contaminants emitted from stacks, including boilers, furnaces, incinerators and electrical generating equipment should not exceed the following limits:

<i>Parameter/Pollutant</i>	<i>Maximum Value</i>
Particulate Matter (PM <sub>10</sub> )	
≥50 MWe	50 mg/Nm <sup>3</sup>
<50 MWe	100 mg/Nm <sup>3</sup>
Nitrogen Oxides, as NO <sub>2</sub>	
Coal fired	750 mg/Nm <sup>3</sup>
Oil fired	460 mg/Nm <sup>3</sup>
Gas fired	320 mg/Nm <sup>3</sup>
Sulfur Dioxide	2,000 mg/Nm <sup>3</sup>

**Ambient Noise**

Noise abatement measures should achieve either the following levels or a maximum increase in background levels of 3 dB(A). Measurements are to be taken at noise receptors located outside the project property boundary.

**Ambient Noise**

Receptor	Maximum Allowable L <sub>eq</sub> (hourly), in dB(A)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

**Solid and Liquid Wastes**

- a) Project sponsors should recycle or reclaim materials where possible.
- b) If recycling or reclaim is not practical, wastes must be disposed of in an environmentally

acceptable manner and in compliance with local laws and regulations.

c) All hazardous materials, process residues, solvents, oils, and sludges from raw water, process wastewater and domestic sewage treatment systems must be disposed of in a manner to prevent the contamination of soil, groundwater and surface waters.

### **Other General Environmental Requirements**

a) Transformers or equipment containing polychlorinated biphenyls (PCBs) or PCB-contaminated oil should not be installed, and existing equipment involving PCBs or PCB-contaminated oil should be phased out and disposed of in a manner consistent with the requirements of the host country.

b) Processes, equipment and central cooling systems involving the use or potential release to the environment of chlorofluorocarbons (CFCs), including halon, should not be installed, and their use in existing processes and systems should be phased-out and disposed of in a manner consistent with the requirements of the host country.

c) Storage and liquid impoundment areas for fuels, raw and in-process materials, solvents, wastes and finished products should be designed with secondary containment (e.g. dikes, berms) to prevent spills and the contamination of soil, groundwater and surface waters.

### **Workplace Air Quality**

a) Periodic monitoring of workplace air quality should be conducted for air contaminants relevant to employee tasks and the plant's operations.

b) Ventilation, air contaminant control equipment, protective respiratory equipment and air quality monitoring equipment should be well maintained.

c) Protective respiratory equipment must be used by employees when the exposure levels for welding fumes, solvents and other materials present in the workplace exceed local or

internationally accepted standards, generally expressed as threshold limit values (TLVs).

### **Workplace Noise**

a) Feasible administrative and engineering controls, including sound-insulated equipment and control rooms should be employed to reduce the average noise level in normal work areas.

b) Plant equipment should be well maintained to minimize noise levels.

c) Personnel must use hearing protection when exposed to noise levels above 85 dBA.

### **Work in Confined Spaces**

a) Prior to entry and occupancy, all confined spaces (e.g., tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapors, and for the lack of oxygen.

b) Adequate ventilation must be provided before entry and during occupancy of these spaces.

c) Personnel must use air-supplied respirators when working in confined spaces which may become contaminated or deficient in oxygen during the period of occupancy.

d) Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas.

### **Hazardous Material Handling and Storage**

a) All hazardous (reactive, flammable, radioactive, corrosive and toxic) materials must be stored in clearly labeled containers or vessels.

b) Storage and handling of hazardous materials must be in accordance with local regulations, and appropriate to their hazard characteristics.

c) Fire prevention systems and secondary containment should be provided for storage facilities, where necessary or required by regulation, to prevent fires or the release of hazardous materials to the environment.

## Health - General

- a) Sanitary facilities should be well equipped and employees should be encouraged to wash frequently.
- b) Ventilation systems should be provided to control work area temperatures and humidity.
- c) Personnel required to work in areas of high temperature and/or high humidity should be allowed to take frequent breaks away from these areas.
- d) Pre-employment and periodic medical examinations should be conducted for all personnel.

## Safety - General

- a) Shield guards or guard railings should be installed at all belts, pulleys, gears and other moving parts.
- b) Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toeboards and non-slip surfaces.
- c) Electrical equipment should be grounded, well insulated and conform with applicable codes.
- d) Employees should be provided with non-slip footwear, gloves, safety glasses, helmets, face protection, leggings and other necessary protective equipment.
- e) Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated.
- f) A safety program should be established for construction and maintenance work.
- g) A fire prevention and fire safety program should be implemented and include regular drills.

- h) A plant hazard assessment analysis must be conducted and continually updated based on changes in processes, equipment or procedures.

## Training

- a) Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee's task and work area.
- b) Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials.
- c) Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities.
- d) Training also should include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, and proper response actions for each foreseeable emergency situation.

## Record Keeping And Reporting

- a) The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies.
- b) This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety program.
- c) An annual summary of the above information should be provided to IFC.



## Environmental and Social Guidelines for

# Occupational Health & Safety

This guideline contains the performance levels and measures that are normally acceptable to IFC and are generally considered to be achievable at reasonable costs by existing technology. While adherence to this guideline is strongly recommended, the application of these guidelines may be adjusted to each project or site, taking into account variables such as host country context, sponsor capacity and project factors. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if accepted by IFC, become project- or site-specific standards or requirements. The environmental assessment document must provide a full and detailed justification or explanation for the levels or measures recommended for the particular project or site.

## 1 INTRODUCTION

### AREA OF APPLICABILITY

This guideline applies to places of work associated with IFC projects. The place of work may be a building, an installation or an outdoor area. The guidelines also apply to temporary places of work. IFC project sponsors should ensure that suppliers, service providers, contractors, and subcontractors are required to follow comparable practices.

The guideline covers general aspects of occupational health and safety only. It does not adequately cover high risk activities or sectors requiring advanced labor protection measures. It must for projects involving especially hazardous situations be supplemented with appropriate international standards and guidelines or national standards of equal standing. Supplementary guidelines would thus be needed for e.g. construction sites, sectors such as mining, oil & gas, petrochemicals, etc., and for work involving extensive handling of dangerous substances such as hazardous or toxic compounds, biological agents, radioactive materials, etc.

### DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

<i>Employer</i>	Organization employing individuals, service providers or contractors.
<i>Worker/employee</i>	Person engaged by the organization, employed by a service provider or contractor carrying out an activity for the organization.
<i>OHS</i>	Occupational health and safety.
<i>OHSMS</i>	Occupational health and safety management system.
<i>Confined space</i>	Area not designed for continuous work having unfavorable natural ventilation and restricted access.

<i>Hazardous material</i>	Any compound or material posing an immediate or longer term hazard to human health due to its physical, chemical or biological effect.
<i>Biological agents</i>	Microorganisms, cell cultures, viruses, or human endoparasites able to provoke infections, allergy or toxic responses.
<i>Microorganism</i>	Microbiological entity, cellular or non cellular, capable of replication or transferring genetic material.
<i>Exposure</i>	Occupation-caused condition with potential immediate or long-term negative effect on the health and/or physical performance of the exposed person(s).
<i>Exposure Limit (EL)</i>	General term for expressions such as "Threshold Limit Values" (TLV), "Permissible Level", "Limit Value", "Occupational Exposure Limit" and similar terms used in regulations defining exposure limits for workers.
<i>LA<sub>eq,8h</sub></i>	Equivalent 8-hour continuous A-weighted sound pressure level (dB(A)).
<i>LA<sub>max,fast</sub></i>	Maximum A-weighted sound pressure level for "Fast" response time (0.125 sec).
<i>mSv</i>	MilliSievert - Dose equivalent unit for the amount of ionizing radiation energy absorbed per unit mass (body weight) (mJ/kg)
<i>PPE</i>	Personal protective equipment.
<i>UV</i>	Ultra violet.
<i>IR</i>	Infra red.
<i>WBGT</i>	Wet bulb globe temperature (°C).

### DESCRIPTION OF SECTOR

Assigned employees and visitors to workplaces may be exposed to a variety of personal health and safety risks. The type and level of exposure is generally related to factors controlled by the employer. Such factors include without being limited to workplace design, installations, equipment, tools, work procedures, raw materials, byproducts, and the degree and sophistication of employee training. Administrative and managerial facilities generally involve fewer risks and hazards than industrial settings.

Occupational health and safety risks that must be considered by the employer arise from normal functions and operations and during unusual circumstances such as accidents and incidents. The employer is responsible for implementing appropriate national and internationally recognized OHS standards, codes and guidelines. Maximum effectiveness of OHS systems requires the inclusion and meaningful participation of employees in implementation and maintenance of procedures and processes. To achieve meaningful and effective participation, the employer may have to implement a program to change employee culture and attitudes regarding health and safety.

## 2 GUIDELINES

### GENERAL

The employer is responsible for planning, implementing and monitoring programs and systems required to ensure OHS on its premises. Such provisions shall be pro-active and preventive by identification of hazards as well as by evaluation, monitoring, and control of work related risks. The employer shall provide and maintain workplaces, plant, equipment, tools, and machinery and organize work so as to eliminate or control hazardous ambient factors at work. The employer shall provide appropriate occupational health and safety training for all employees. The organization shall, at no cost to the employee, provide adequate personal protective equipment. The employer shall record and report occupational injuries and illnesses. Contract specifications must include demands for service providers, contractors and sub-contractors to have or establish systems enabling them to meet the OHS requirements of the employer.

### OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

An Occupational Health and Safety management system (OHSMS) shall be established, operated and maintained for work associated with IFC projects. The OHSMS should be designed such that certification may be obtained. The comprehensiveness of the system depends on the nature and scale of the project and the magnitude of risks involved. The system may be based on OHSAS 18001, ILO-OHS 2001 or an equivalent

internationally recognized standard. The content of an OHSMS is summarized in and further described in Annex 1<sup>1</sup>. The adequacy of the adopted system shall be audited annually. Risk management within the OHSMS should be based on an internationally recognized standard such as AS/NZS 4360:1999<sup>2</sup>.

The OHSMS shall be designed following a competent OHS audit to review the project, its organization and environment. The audit should identify needs for risk reduction and control measures related to transmission of blood borne pathogens (e.g. HIV, Hepatitis B virus etc.) at the place of work<sup>3</sup>.

1. Occupational health and safety policy
2. Organizational framework of the OHSMS
  - staffing of OHSMS
  - competence requirements
  - operating procedures
  - training programs
  - system documentation
  - communication
3. OHS objectives (quantified)
4. Hazard prevention
  - Risk assessment
  - prevention and control measures (active and passive)
  - management of changes
  - emergency preparedness and response
  - procurement (tools, equipment, plants, services, contractors)
5. Performance monitoring and measurements
  - hazard prevention measures
  - ambient working environment
  - work related injuries, ill health, diseases and incidents
6. Evaluation
  - feed back
  - corrective measures
  - action plan

**Figure 2** Occupational Health and Safety Management System Features<sup>5</sup>

<sup>1</sup> The OHSMS shall incorporate universal precautions and measures against transmission of blood borne pathogens (e.g. HIV, Hepatitis B, etc.). For high risk workplaces where workers come into regular contact with human blood and body fluids, comprehensive precautions and dedicated training should be undertaken.

<sup>2</sup> Risk Management, Standards Australia/New Zealand, 1999

<sup>3</sup> The ILO code of practice on "HIV/AIDS and the world of work," Geneva 2001, and the IFC Good Practice Note "HIV/AIDS in the Workplace," December 2002 provide background information and references for execution of reviews and policy implementation.

<sup>4</sup> Prepared after ILO-OHS 2001 Guidelines on Occupational and Health Management Systems.

<sup>5</sup> Prepared after ILO-OHS 2001 Guidelines on Occupational and Health Management Systems.

## PHYSICAL FACTORS IN THE WORKPLACE

### *BUILDINGS AND STRUCTURES*

Building facilities housing installations, activities or sectors not necessitating special labor protection and safety measures shall comply with the following physical requirements<sup>6</sup>. Where the nature of the activities or the materials used necessitates particular precautions, they must be designed according to local and internationally recognized standards as available for specific industries (e.g. mining, petroleum and chemical) and for hazardous materials such as asbestos.

Permanent and recurrent places of work shall be designed and equipped to protect OHS. Surfaces, structures and installations shall be easy to clean and maintain, and not allow for accumulation of hazardous compounds. Buildings must be structurally safe, provide appropriate protection against the climate and have acceptable light and noise conditions. Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls. Floors should be level, even, and non-skid. Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

The space provided for each worker and in total must be adequate for safe execution of all activities including transport and interim storage of materials and products. Passages to emergency exits must be unobstructed at all times. The number and capacity of emergency exits must be sufficient for safe and orderly evacuation of the greatest number of people present at any time.

### *CONFINED SPACES*

Engineering measures must be implemented to eliminate to the degree feasible existence and adverse character of confined spaces. Unavoidable confined spaces shall, to the extent possible, be provided with permanent safety measures for venting, monitoring and rescue operations. The area adjoining an access to a confined space shall provide ample room for emergency and rescue operations.

### *ACCESS*

Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe and appropriate access. Equipment and installations requiring recurrent servicing and

cleaning should have permanent means of access. Hand, knee and foot railings must be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps, etc. Openings must be sealed by gates or removable chains. Covers shall if feasible be installed to protect against falling items. Measures to prevent unauthorized access to dangerous areas must be in place.

### *INSTALLATIONS, EQUIPMENT, TOOLS AND SUBSTANCES*

Installations, equipment, tools and substances shall be suitable for their use and selected to minimize dangers to safety or health when used correctly. Appropriate shields, guards or railings must be installed and maintained to eliminate human contact with moving parts, or hot and cold items. Equipment must be provided with adequate noise and vibration dampers. Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees. Ergonomic risks and hazards shall be minimized by selecting equipment, tools and furniture appropriate for the assigned worker.

### *SIGNAGE*

Hazardous and risky areas, installations, materials, safety measures, emergency exits, etc. shall be appropriately marked. Signage shall be in accordance with international standards, be well known to, and easily understood by workers, visitors and the general public as appropriate<sup>7</sup>.

### *LIGHTING*

Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health. Emergency lighting of adequate intensity must be installed and automatically activated upon failure of the artificial light source to ensure safe shut-down, evacuation, etc.

### *VENTILATION AND TEMPERATURES*

Sufficient fresh air must be supplied for indoor and confined work spaces. Factors to be considered in ventilation design include physical activity, substances in use and process related emissions. Mechanical ventilation systems shall be maintained in good working order. Point-source exhaust systems required for maintaining a safe ambient environment must have local indicators of correct functioning. Recirculation of contaminated air is generally not acceptable. Air inlet filters must be kept clean and

<sup>6</sup> Deviations from the general requirements are acceptable if the place of work and ambient environment are safe and the occurrence/duration of an activity limited.

<sup>7</sup> ISO 9186 and ANSI Z535.3 advise on signage design.

free of dust and microorganisms. HVAC and industrial evaporative cooling systems shall be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. *Legionella pneumophila*) or breeding of vectors e.g. mosquitoes and flies of public health concern. Air distribution systems must be designed so as not to expose workers to draughts.

The temperature in work, rest room and other welfare facilities should, during service hours, be maintained at a level appropriate for the purpose of the facility.

#### *FIRE DETECTION AND FIRE FIGHTING*

The workplace must be equipped with fire detectors, alarm systems and fire-fighting equipment. The equipment shall be maintained in good working order. It must be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present. Non-automatic firefighting equipment must be easily accessible and simple to use. Fire and emergency alarm systems shall be both audible and visible. The IFC Life and Fire Safety Guideline shall apply to buildings accessible to the public.

#### *CLEANING*

Washbasins with running hot and cold water shall be installed in sufficient numbers where demanded by the character of the work and when contaminants or pollution must be confined to the place of work. The washbasins must have soap and/or other appropriate cleaning agents.

Places of work, traffic routes and passageways shall be kept free from waste and spillage, regularly cleaned, and maintained.

#### *FIRST-AID*

The employer must ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work. Eye-wash stations and/or emergency showers shall be provided close to all workstations where the recommended first-aid response is immediate flushing with water. Where the scale of work or the type of activity being carried out so requires, dedicated and appropriately equipped first-aid room(s) must be provided. First aid stations and rooms shall be equipped with gloves, gowns and masks for protection against direct contact with blood and other body fluids. Remote sites shall have in place written emergency procedures for dealing with cases of trauma or serious illness up to the point at

which care of the patient can be transferred to an appropriate medical facility.

#### *WELFARE FACILITIES*

The scope and comprehensiveness of welfare facilities depend on the number of workers present at any one time and the activities executed. Welfare facilities must include locker rooms, an adequate number of toilets with washbasins, and a room dedicated for eating. Separate eating facilities shall be provided for employees wearing clean and soiled work clothes respectively. Gender-segregated changing rooms with lockers and benches should be provided when special work-clothes are required. Hot and cold water shower facilities and wash basins should be available in connection with locker rooms.

Water supplied to areas with food preparation or for the purpose of personal hygiene (washing or bathing) must meet drinking water quality standards.

If the circumstances (e.g. dirt, dangerous substances, humidity, blood, microorganisms, etc.) so require, separate lockers must be installed for isolating street-from work-clothes for the exposed employees. Work-clothes that may be contaminated with dangerous or contagious substances or in any way involve a health hazard to the worker, his family or the general public shall not leave the premises of work, but be collected on site and adequately cleaned and disinfected at the employer's expense. Staff exposed to risk of contamination shall change clothes and undergo decontamination before entering common facilities such as eating places.

#### *PERSONAL PROTECTIVE EQUIPMENT*

The employer shall identify and provide appropriate personal protective equipment (PPE) that will offer adequate protection to the worker, co-workers and occasional visitors without incurring unnecessary inconvenience. The employer shall actively enforce use of PPE if alternative technologies, work plans or procedures cannot eliminate or sufficiently reduce a hazard or exposure. The employer shall ensure that PPE is cleaned when dirty, properly maintained and replaced when damaged or worn out. Proper use of PPE shall be part of the recurrent training programs for employees. Table 1 presents selected examples of occupational hazards and types of PPE available for different purposes.

Objective	Occupational Hazards	PPE
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation.	Glasses, shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords.	Helmets with or without electrical protection.
Hearing protection	Noise, ultra-sound.	Hearing protectors.
Foot protection	Falling or rolling objects, pointed objects. Liquids.	Safety shoes and boots for protection against liquids and chemicals.
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures.	Gloves made of rubber or synthetic materials, leather, steel, insulating materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors, oxygen deficiency.	Facemasks with appropriate filters for dust removal and air purification (chemicals and gases) or air supply.
Body/leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration.	Insulating clothing, body suits, aprons etc. of appropriate materials.

**Table 1** Occupational Hazards — Exposure Examples and Types of PPE Available

**DRINKING WATER**

The employer shall ensure an ample supply of drinking water<sup>8</sup> at all places of work. Water supplies shall be conveniently located especially for areas of elevated temperatures, high physical activity, and cold or dry environments. Drinking water supplies shall be clearly marked especially where non-drinking water is also available.

**AMBIENT FACTORS IN THE WORKPLACE**

**NOISE**

Noise limits for different working environments are provided in Table 2. No employee may be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. The use of hearing protection must be actively enforced when LA<sub>eq,8h</sub> reaches 85 dB(A), the peak sound levels 140 dB(C) or the LA<sub>max,fast</sub> 110dB(A).

<sup>8</sup> Drinking water shall as minimum comply with physical chemical and bacteriological requirements of the World Health Organization (WHO) Guidelines for Drinking Water Quality, Geneva 1998.

Location /activity	Equivalent level LA <sub>eq,8h</sub>	Maximum LA <sub>max,fast</sub>
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual offices (no disturbing noise)	40-45 dB(A)	-
Classrooms, lecture halls	35-40 dB(A)	-
Hospitals	30-35 dB(A)	40 dB(A)

**Table 2** Noise Limits LA<sub>eq,8h</sub> and Maximum LA<sub>max,fast</sub><sup>9</sup>

**VIBRATION**

Exposure to hand-arm vibration from equipment such as hand and power tools or whole-body vibrations from surfaces on which the worker stands or sits shall be controlled through selection of equipment and limitation of time of exposure. The limits for vibration and action values, i.e. the level of exposure at which remediation should be initiated, are provided in Table 3. Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers<sup>10</sup>.

	Hand-arm vibration	Whole-body vibration
Daily exposure limit value standardized to an 8-hours reference period <sup>11</sup>	5 m/s <sup>2</sup>	1.15 m/s <sup>2</sup> or
Daily exposure action value standardized to an 8-hours reference period <sup>12</sup>	2.5 m/s <sup>2</sup>	0.6 m/s <sup>2</sup> or

**Table 3** Vibration Exposure and Action Values Limits (acceleration, m/s<sup>2</sup>)<sup>13</sup>

**ILLUMINATION, LIGHT RADIATION AND REFLECTIONS**

Work area light intensity must be adequate for the general purpose of the location and type of activity and must be supplemented with dedicated work station illumination as needed. All light sources should be energy efficient with minimum heat emission. The employer shall take measures to

<sup>9</sup> WHO guideline values for community noise in specific environments, Geneva 1999.

<sup>10</sup> The UK Health and Safety Executive at <http://www.hse.gov.uk/hthdir/noframes/vibrat.htm> provides information on reduction of vibration risks and a "Vibration exposure calculator".

<sup>11</sup> ISO standard 5349-1 (2001) chapters 4, and 5, and Annex A.

<sup>12</sup> ISO standard 2631-1 (1997) chapters 5, 6 and 7 and Annex A and B.

<sup>13</sup> European Community EC 2001/C 301/01).

eliminate reflections and flickering of lights. The minimum limits for illumination intensity for a range of locations/activities appear in Table 4.

Location /activity	Light intensity
Emergency light	10 lux
Outdoor non working areas	20 lux
Simple orientation and temporary visits (machine storage, garage, warehouse)	50 lux
Workspace with occasional visual tasks only (corridors, stairways, lobby, elevator, auditorium, etc.)	100 lux
Medium precision work (simple assembly, rough machine works, welding, packing, etc.)	200 lux
Precision work (reading, moderately difficult assembly, sorting, checking, medium bench and machine works, etc.), offices.	500 lux
High precision work (difficult assembly, sewing, color inspection, fine sorting etc.)	1,000 – 3,000 lux

**Table 4** Minimum Illumination Intensity on Objects of Work <sup>14</sup>

The employer shall take precautions to minimize and control optical radiation including direct sunlight. Exposure to high intensity UV and IR radiation and high intensity visible light shall also be controlled. Laser hazards shall be controlled in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser shall be applied to minimize risks.

**TEMPERATURE**

The employer shall maintain indoor temperatures that are reasonable and appropriate for the type of work. Risks of heat or cold related stress must be adequately addressed and feasible control measures implemented for work in adverse environments. The wet bulb globe temperature (WBGT) or a nationally recognized method of equal standing should be used for screening environmental contribution to heat stress<sup>15</sup>. Commonly applied limits used for WBGT

<sup>14</sup> Table 4 states minimum levels for illumination only. Final design of lighting levels and systems must adequately consider type and characteristic of the activity, required speed and accuracy of the performance, age of staff, reflectance of task surface, and color of the light, see e.g. Lighting Handbook 8<sup>th</sup> Edition, The Illumination Engineering Society of North America, New York, 1993

<sup>15</sup> The wet bulb globe temperature WBGT (ISO 7243 is calculated using one of the following equations: i) without direct sunlight exposure  $WBGT_{in} = 0.7 \cdot T_{WB} + 0.3 \cdot T_{GT}$  and ii) with direct sunlight exposure  $WBGT_{out} = 0.7 \cdot T_{WB} + 0.2 \cdot T_{GT} + 0.1 \cdot T_{DB}$ . Where  $T_{WB}$  = natural wet bulb temperature,  $T_{GT}$  = globe temperature and  $T_{DB}$  = dry bulb temperature

screening<sup>16</sup> appear in Table 5. Additional investigations are required to properly assess the magnitude of the problem and identify feasible heat stress control measures.

Level of physical activity - type of work	Maximum WBGT
Minimum to light	29.5°C
Moderate - walking, standing, use of hand tools	27.5°C
High - heavy burdens, intensive use of tools	26°C
Very high – high speed intensive and heavy work	25°C

**Table 5** Heat Stress Screening Temperatures WBGT°C <sup>18</sup>.

For continuous work in temperatures below -7°C, the wind-chill temperature should be calculated to assess the need for cold-stress precautions in addition to protective clothing<sup>19</sup>. For wind-chill temperatures below -20°C, a 10-minute warm-up period should be provided in a heated shelter in the middle of any 4-hour work period. A second warm-up period of equal duration shall be added if the temperature decreases to -32°C. Additional warm-up periods shall be added for every following three degree temperature drop. Below wind chill temperatures of -43°C non emergency work should cease.

**HAZARDOUS MATERIALS**

Organizations that produce, handle, store, transport and dispose of hazardous materials (chemicals, gases, vapors, fumes, dust, fibers, etc.) shall in addition to the present guidelines fulfill the requirements of the IFC Hazardous Materials Management Guidelines.

The employer shall avoid the use of any hazardous substance by replacing it with a substance that under its normal conditions of use is not dangerous or less dangerous to the workers, if the nature of the activity so permits. Precautions must be taken to keep the risk

<sup>16</sup> Canadian OHS regulation (<http://regulation.healthandsafetycenter.com/s/GuidelinePart7.asp>), Management and Prevention of Heat Stress - Guideline, Department of Minerals and Energy Western Australia, December 1997, and ACGIH 2001, contains detailed guidelines for assessing and controlling heat and cold stress.

<sup>17</sup> Canadian OHS regulation (<http://regulation.healthandsafetycenter.com/s/GuidelinePart7.asp>), Management and Prevention of Heat Stress - Guideline, Department of Minerals and Energy Western Australia, December 1997, and ACGIH 2001, contains guidelines for assessing and controlling heat and cold stress.

<sup>18</sup> American Conference of Governmental Industrial Hygienists, ACGIH, 2001.

<sup>19</sup>  $W = 13.12 + 0.6215 \cdot T_{DB} - 11.37 \cdot V^{0.16} + 0.3965 \cdot T_{DB} \cdot V^{0.16}$ , where W is the wind-chill index (°C) (equivalent chill temperature),  $T_{DB}$  = dry bulb - air temperature (°C) and V = wind speed in km/h at 10 meters height.

of exposure as low as possible. Work processes, engineering and administrative control measures must be designed, maintained and operated so as to avoid or minimize the release of hazardous substances into the working environment. The number of employees exposed or likely to become exposed must be kept at a minimum and the level of exposure maintained below internationally established or recognized exposure limits.

When ambient air contains several hazardous compounds with additive effects, the combined exposure is assessed by summarizing the relative level of exposure to each compound. The resulting level of exposure is considered acceptable if the outcome is less than or equal to one ( $\leq 1.0$ )<sup>20</sup>.

The employer must ensure that all chemicals and hazardous materials present are labeled and marked according to national and internationally recognized requirements and standards. International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS) or equivalent data/information in an easily understood language must be readily available to exposed workers and first-aid personnel. The employer must ensure adequate and competent supervision of the work, work practices, and the appropriate use of PPE.

#### BIOLOGICAL AGENTS

The employer shall avoid the use of any harmful biological agent by replacing it with an agent that, under its normal conditions of use, is not dangerous or less dangerous to the workers, if the nature of the activity so permits. Precautions must be taken to keep the risk of exposure as low as possible. Work processes, engineering and administrative controls must be designed, maintained and operated to avoid or minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed must be kept at a minimum. Levels of exposure must be maintained below internationally established/recognized exposure limits.

The employer shall review and assess known and suspected presence of biological agents at the place

$$^{20} \sum_{1}^n \frac{c_x}{EL_x} = \frac{c_1}{EL_1} + \frac{c_2}{EL_2} \dots \frac{c_n}{EL_n} \leq 1.0; \text{ where } n$$

is the total number of hazardous compounds present,  $c_x$  the ambient concentration level of compound No.  $x$ , and  $EL_x$  its exposure limit.

of work<sup>21</sup> and implement appropriate safety measures, monitoring and training programs. Biological agents should be classified into four groups<sup>22</sup>:

1. Biological agents unlikely to cause human disease.
2. Biological agents that can cause human disease but are unlikely to spread to the community.
3. Biological agents that can cause severe human disease and present a serious hazard to workers and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available.
4. Biological agents that can cause severe human disease are a serious hazard to workers and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available.

Measures to eliminate and control hazards from known and suspected biological agents at the place of work shall be designed, implemented and maintained in close co-operation with the local health authorities and according to recognized international standards. The employer shall at all times encourage and enforce the highest level of hygiene and personal protection especially for activities employing biological agents of group 3 and 4 above.

#### IONIZING RADIATION

Places of work involving occupational<sup>24</sup> and/or natural<sup>25</sup> exposure to ionizing radiation shall be established and operated in accordance with the, "International Basic Safety Standard for protection against Ionizing Radiation and for the Safety of Radiation Sources,"<sup>26</sup> and its three interrelated Safety Guides. The acceptable effective dose limits appear in Table 6.

<sup>21</sup> Known presence means identified micro-organisms utilized in industry, research facilities and the like. Suspected presence are unidentified micro-organisms occasionally appearing in health care and veterinary facilities and laboratories or pathogens present in the work force.  
<sup>22</sup> European Community Directive 2000/54/EC of 18 September 2000 on protection of workers from risks related to exposure to biological agents at work.

<sup>24</sup> Organizations processing, or applying radioactive substances for purposes such as medical or industrial processes, education, training, research, etc.

<sup>25</sup> Underground mines (other than those for radioactive ore), spas, radon prone areas, etc.

<sup>26</sup> IAEA Safety Series No. 115.

Exposure	Workers (min. 19 years of age)	Apprentices and students (16-18 years of age)
Five consecutive year average – effective dose	20 mSv/year	
Single year exposure – effective dose	50 mSv/year	6 mSv/year
Equivalent dose to the lens of the eye	150 mSv/year	50 mSv/year
Equivalent dose to the extremities (hands, feet) or the skin	500 mSv/year	150 mSv/year

**Table 6** Effective Dose Limits For Occupational Ionizing Radiation Exposure [mSv/year]

## TRAINING AND DOCUMENTATION

### TRAINING

The employer shall ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment, and tools; b) known hazards in the operations and how they are controlled; c) potential risks to health; d) precautions to prevent exposure; e) hygiene requirements; f) wearing and use of protective equipment and clothing; and g) appropriate response to operation extremes, incidents and accidents.

A basic occupational training program and specialty courses shall be provided as needed to ensure that workers are oriented to the specific hazards of individual work assignments. Training shall generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards. Training shall also be provided to account for new or changed risks whenever procedures are altered or new materials/equipment introduced. Training should be repeated periodically and supported by feasible incentives. Workers with rescue and first-aid duties shall receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers. The latter training would include the risks of becoming infected with blood-borne pathogens through contact with bodily fluids and tissue.

The employer shall through appropriate contract specifications and monitoring ensure that service providers, as well as contracted and subcontracted labor is appropriately trained before start of their assignments

## 3. MONITORING & REPORTING GUIDELINES

Safety features, ambient working environments and OHS-indicators are subject to regular monitoring and review. The collected information shall be processed and findings reported to national authorities as required. The compiled information and any corrective measures taken shall be applied in a continuous process to improve the OHS management system. An annual report adequately presenting performance and achievements in regard to OHS shall be submitted to IFC. The report shall also outline and justify changes made to the OHSMS. Employee monitoring data (originals) must be saved for a period of 5 years or longer if required by national regulations.

The OHSMS shall include specifications for performance monitoring, evaluation, and improvement of the system as well as for recording and reporting occupational diseases and accidents.

### PERFORMANCE MONITORING

*OHSMS organization.* The performance and achievements of the OHSMS organization shall be re-assessed annually.

*Safety inspection, testing and calibration.* The employer shall arrange for regular inspection and testing of all safety features and hazard control measures at the premises. The inspection shall focus on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used. The inspection must ensure that issued personal protective equipment continues to provide adequate protection and is being worn as required. All instruments installed or used for monitoring and recording of working environment parameters must be regularly tested and calibrated. Records shall be kept of all inspections, tests, and calibrations.

*Surveillance of the working environment.* The employer shall document compliance using an appropriate combination of portable and stationary

sampling and monitoring instruments. Monitoring and analyses shall be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies, and parameters shall be established individually for each project following a review of the seriousness of the inherent hazards.

Generally, monitoring should be performed during commissioning of facilities or equipment and at the end of the defect and liability period, and otherwise repeated according to the monitoring plan established as part of the OHSMS.

*Surveillance of workers health.* When extraordinary protective measures are required (against biological agents group 3 and 4 and/or hazardous compounds), the employer shall provide appropriate and relevant health surveillance to workers prior to first exposure and at regular intervals thereafter. The surveillance shall, if deemed necessary be continued after termination of the employment.

*Training.* Training activities for employees, and visitors shall be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises including fire drills shall be adequately documented. Service providers and contractors must be contractually required to submit to the employer adequate training documentation before start of their assignment.

## ACCIDENTS AND DISEASES MONITORING

The employer shall establish procedures and systems for reporting and recording: i) occupational accidents and diseases; and ii) dangerous occurrences and incidents. The systems must require and enable workers to report to their immediate supervisor immediately any situation they believe presents a serious danger to life or health. The systems and the employer shall further enable and encourage workers to report all: i) occupational injuries and near misses; ii) suspected cases of occupational disease; and iii) dangerous occurrences and incidents.

*Occupational accidents and diseases.* The employer must with the assistance of a competent person investigate all reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses. The investigation should as far as possible:

1. Establish what happened;
2. Determine the cause of what happened; and
3. Identify measures necessary to prevent a recurrence.

Occupational accidents and diseases should at a minimum be classified according to Figure 3. Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total number of man-days and hours worked during the reporting period must be stated.

a. Fatalities (number)	b. Non-fatal injuries (number) <sup>27</sup>	c. Total time lost non-fatal injuries (days)
a.1 Immediate	b.1 Less than one day	
a.2 Within a month	b.2 Up to 3 days	c.1 Category b.2
a.3 Within a year	b.3 More than 3 days	c.2 Category b.3

**Figure 3** Occupational Accident and Disease Reporting

## REPORTING GUIDELINES

The annual report to IFC on OHS shall include a comprehensive summary of the following.

*Host country regulatory compliance.* The employer shall record, list and preserve any reports submitted to host country authorities, e.g. on OHS, fire and safety inspections, compliance monitoring, emergency exercises, etc., as well as comments received and actions taken. Host country authority monitoring and inspections with subsequent actions taken shall also be summarized and reported.

*OHSMS reporting.* The annual report shall include summaries of OHS performance monitoring, and records of occurred occupational accidents, incidents and diseases. Special emphasis shall be placed on evaluation of findings and actions taken or planned due to the number and type of accidents observed. The report shall also include an assessment of the degree of fulfillment of the previous year's OHS objectives and action plans for improvement.

The report shall include proposed revisions to the OHS Management System; revised quantitative objectives; action plans for technical improvements; and planned training activities.

<sup>27</sup> The day on which an incident occurs is not included in b.2 and b.3.

#### 4. BEST PRACTICE

For projects or components of projects with particular health and safety risks, this guideline shall be supplemented with recognized national and/or international standards. The following OHS websites may be used to obtain additional information.

ILO Safe Work, International Labour organization

- <http://www.ilo.org/public/english/protection/safework/index.htm> - Index with access to a range of facts, information, and links on occupational health and safety.
- <http://www.ilo.org/public/english/protection/safework/cis/products/icsc/index.htm> - International Chemical Safety Cards.
- <http://www.ilo.org/public/english/protection/safework/cis/products/hdo/htm/index.htm> - International Hazard Data Sheets on Occupation.
- [http://www.ilo.org/public/english/protection/trav/aids/download/pdf/hiv\\_a4\\_e.pdf](http://www.ilo.org/public/english/protection/trav/aids/download/pdf/hiv_a4_e.pdf) - Code of Practice on HIV/AIDS and the world of work.

NIOSH, National Institute of Occupational Safety and Health, US Department of Health and Human Services.

- <http://www.cdc.gov/niohs/siteindx.html> - Site Index A\_Z
- <http://www.cdc.gov/niohs/toplist.html> - Safety and Health Topics.
- <http://www.cdc.gov/niohs/hpg/npq.html> - Pocket Guide to Chemical Hazards.
- <http://www.cdc.gov/niohs/81-123.html> - Occupational Health Guidelines for Chemical Hazards, January 1981.
- <http://www.cdc.gov/niohs/ipcsneng/neng0068.html> - International Chemical Safety Cards.

WHO, World Health Organization

- [http://www.who.int/peh/occupational\\_health/ocindex.html](http://www.who.int/peh/occupational_health/ocindex.html) - Protecting the Human Environment, Occupational Health.

#### 5. REFERENCES

- /1/ Guidelines on Occupational Safety and Health management systems, ILO-OHS 2001, International Labour Office, Geneva, 2001.
- /2/ Occupational health and safety management systems, OHSAS 18001, British Standards, 1999.
- /3/ Ambient factors in the workplace, International Labour Office, Geneva, 2001.
- /4/ Occupational Radiation protection, IAEA Safety Standard Series No. RS-G-1.1. International Atomic Energy Agency, Vienna, 1999.
- /5/ International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, IAEA Safety Series No.115; International Atomic Agency, Vienna 1996.
- /6/ Safety in the use of chemicals at work, ILO code of practice. International Labour Office, Geneva 1993.
- /7/ Occupational Safety and Health Standards, CFR29, Part 1910, OSHA, U.S Department of Labor, 2001
- /8/ OSHA Handbook for Small Businesses, OSHA 2209, 1996.
- /9/ European Communities Council Directives 89/654/EEC of 30 November 1989, 2000/39/EC of 8 June 2000, 2000/54/EC of 18 September 2000, 2002/44/EC of 25 June 2002.
- /10/ Lighting Handbook 8<sup>th</sup> Edition, The Illumination Engineering Society of North America, New York, 1993.
- /11/ HIV/AIDS and the world of work, ILO code of practice, Geneva, June 2001.
- /12/ HIV/AIDS in the Workplace. IFC Good Practice Note number 2, 2002.
- /13/ Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure; The American Conference of Governmental Industrial Hygienists (ACGIH), 2001.

## 6. ANNEXES

### ANNEX 1

#### THE OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM<sup>28</sup>

Occupational health and safety, including compliance with national OHS requirements, is the responsibility and duty of the employer. Implementation of a fully transparent OHSMS in an organization is a powerful tool towards fulfilling these obligations. The OHSMS signals the commitment of the organization to ensure safe working conditions. However, active participation from workers is required for optimum results. Meaningful participation by employees may be obtainable through efficient awareness raising and training to change the prevailing labor safety culture. An OHSMS must have features for continuous feedback and self-improvement.

#### POLICY

The OHS Policy Statement of the organization must be in writing and prepared in consultation with workers and their representatives. Senior management must endorse it. The policy shall be appropriate for the size and nature of the organization. The organization should, through a policy statement, be committed to: i) protect the health of all employees, ii) comply with relevant national and international OHS requirements, iii) ensure consultation with and active participation of the workers, and iv) continuously seek to improve the performance of the OHS system. The OHSMS should be integrated in or compatible with other management systems of the organization (e.g. ISO 9001-2000) and appropriately certified.

The employer should when feasible ensure establishment and efficient functioning of a "Safety and Health Committee." The workers and their representatives should be given time and resources to participate actively in the processes of the OHSMS.

<sup>28</sup> After Guidelines on occupational safety and health management systems, ILO-OHS 2001, Geneva 2001

## ORGANIZATION

#### RESPONSIBILITY AND ACCOUNTABILITY

A person at senior management level should have responsibility and authority for development, implementation, management review and evaluation of the OHSMS.

Structures and processes shall be created within the organization ensuring: OHS as a line management responsibility, effective supervision, co-operation and communication on implementation of the OHSMS, effective arrangements for identification and elimination or control of work related hazards and risks, the full participation of workers and their representatives, and appropriate allocation of resources.

#### COMPETENCE AND TRAINING

The organization must possess, develop or have permanent access to sufficient OHS competence to implement and maintain the OHSMS. Permanent competence is required to continuously identify, eliminate and/or control work related hazards and risks within the organization.

Appropriate OHS training programs must be established and implemented for all employees and levels of the organization. Training must be conducted by competent persons, take place prior to the start of a new activity, and be refreshed as needed. Training must be provided free of charge to the employees.

#### OHSMS DOCUMENTATION

An appropriately sized and scoped OHS manual shall be prepared and maintained. The manual shall at a minimum fulfill relevant national and international requirements for the activities of the organization. The manual should include: OHS Policy, OHS organization and allocation of responsibilities, schedules, procedures, instructions and other internal documents used for OHS management and control. There should be a section identifying key risks and hazards arising from the organization's activities together with arrangements for their prevention and control. The manual shall establish procedures, schedules and methodologies for review of safety and control features, as well as plans and schedules for monitoring ambient working environment quality and individual exposure levels as appropriate.

OHS records with details appropriate to the needs of the organization shall be established, managed, and maintained locally. The records shall contain appropriate information regarding national OHS laws

and regulation, the OHSMS itself, as well as monitoring data regarding elements such as workers health and exposure, ambient working environment, work-related injuries, ill health, diseases, incidents, training programs and lists of trainees. IFC requires original data and records to be saved for a minimum of 5 years.

**COMMUNICATION**

The OHSMS shall include effective arrangements for receiving and responding to internal and external communication. The system shall ensure communication and exchange of information among relevant levels and functions within the organization. The system shall ensure that concerns, ideas and inputs of workers are considered and addressed.

**PLANNING AND IMPLEMENTATION**

**OHS AUDIT**

A competent person shall carry out an initial OHS audit for new and existing organizations. The audit shall:

1. Identify applicable current national and international laws, regulations, treaties, agreements and OHS standards relevant for the organization and its activities;
2. Identify, anticipate and assess hazards and risks to safety and health arising from the existing or proposed work environment and organization;
3. Determine whether planned or existing controls are adequate to eliminate hazards or control identified risks; and
4. Analyze data provided from workers' health surveillance for the present activities or equivalent ones elsewhere.

The audit shall be appropriately documented (text, tables, and photos) and shall subsequently be used for decision-making on implementation/revision of the OHSMS. The audit will further establish a quantified baseline for the objectives and achievements of the OHSMS.

**OHS OBJECTIVES**

Consistent with the OHS Policy Statement and results of OHS audits, measurable objectives shall be established for the entire organization and for individual departments. The objectives shall be realistic, achievable and focused on continued improvements. The objectives should be communicated to all relevant functions of the

organization. The objectives shall be periodically evaluated and revised.

**SYSTEM PLANNING, DEVELOPMENT AND IMPLEMENTATION**

The system shall, at minimum, be planned and developed to comply with national laws and regulations, IFC guidelines, and to fully support the elements endorsed by the organizations senior management. The planning, implementation and operation shall be closely related to the objectives established by the audit. The OHSMS shall ensure availability of sufficient resources for achieving the established goals.

**HAZARD PREVENTATION AND CONTROL MESAURES**

Hazards and risks to workers' safety and health shall be identified and assessed on a recurrent basis. Identified occupational hazards may be analyzed and prioritized using the below qualitative risk analysis matrix <sup>30</sup>.

Likelihood	Consequences				
	Insigni- ficant 1	Minor 2	Moderate 3	Major 4	Cata- strophic 5
A. Almost certain	H	H	E	E	E
B. Likely	M	H	H	E	E
C. Moderate	L	M	H	E	E
D. Unlikely	L	L	M	H	E
E. Rare	L	L	M	H	H
<b>Legend</b>					
E: extreme risk; immediate action required					
H: high risk; senior management attention needed					
M: moderate risk; management responsibility must be specified					
L: low risk; manage by routine procedures					

Preventive and protective measures should be introduced immediately when a hazard is recognized and fully implemented in the shortest feasible time. Further in the following order of priority:

1. Eliminate the hazard/risk;
2. Control the hazard/risk at source through use of engineering controls and organizational measures;
3. Minimize the hazard/risk through design of safe work systems and administrative control measures; and
4. Where a residual hazard/risk cannot be adequately controlled, the employer shall provide for free appropriate personal protective equipment and implement measures to ensure its use and maintenance.

<sup>30</sup> Reference Australian, New Zealand Risk Management Standard AS/NZS 4360:1999.

The established preventive and protective measures and operational procedures shall be revised regularly and modified if necessary. Measures shall comply with national laws and regulation, reflect good practice, and consider the current status of knowledge of the sector.

#### MANAGEMENT OF CHANGE

The impact of proposed changes both internal (organization, staff, procedures, processes etc.) and external (new regulation, OHS knowledge, technology, organizational mergers, etc.) must be evaluated and preventive steps taken prior to their introduction. Application of new methods, materials, processes, equipment and tools should always be preceded by a hazard identification and risk assessment involving the affected workers. Issuance of a “*decision to change*” can ensure that all affected employees are properly informed and trained when needed.

#### EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE

Emergency prevention, preparedness and response arrangements shall be suitable for the needs of the organization. The plans shall be prepared in cooperation with external emergency services and agencies as applicable. The arrangements must ensure adequate internal exchange of information and communication, and provide for information and communication with outside authorities and the neighborhood as needed. The system must adequately address first-aid and medical assistance, firefighting and emergency evacuation of staff. Training and exercises shall be conducted.

#### PROCUREMENT

Procurement includes a potential for changes. Procedures must be established to ensure that safety and health requirements of the organization are implemented in procurement, renting and leasing specifications. The OHS requirements of the organization shall be identified and compliance with these demands ensured prior to procurement of goods and services.

#### CONTRACTING

Procedures shall be established to ensure that the OHS requirements of the organization apply to contractors, sub-contractors, service providers and their workers. OHS criteria should be included when evaluating and closing contracts. Contractors should be committed to provide OHS training appropriate for the contracted works to the involved workers and managers. Work-related injuries, ill health, diseases and incidents among the contractors' and subcontractors' workers occurring while performing

work for the organization shall be recorded according to the demands of the OHSMS and reported to the organization. The organization shall regularly monitor the OHS performance of contractors and sub-contractors and ensure that appropriate training has been provided and that on-site procedures are followed.

#### EVALUATION

##### PERFORMANCE MONITORING AND MEASUREMENT

Procedures to regularly monitor, measure and report OHS performance and procedures shall be developed, implemented and periodically reviewed. The OHSMS manual shall specify the monitoring responsibility of different levels of the employer's management. Qualitative and quantitative performance indicators shall be used according to the size and nature of the organization. The monitoring shall provide sufficient feed-back on OHS performance.

*Active monitoring* should include elements required by a proactive OHS management system such as:

1. monitoring of the achievements of specific plans, established performance criteria, and fulfillment of objectives;
2. systematic inspection of work systems, premises, plant, and equipment (job hazard analyses);
3. surveillance and monitoring of the working environment, including the organization of the work and activities involved;
4. surveillance of workers' health where appropriate; and
5. compliance with laws, regulations and other requirements.

*Reactive monitoring* should include identification, reporting and investigation of:

1. work related injuries, ill health (including record keeping and monitoring of sickness/absence), diseases, and incidents;
2. other losses such as damage to property;
3. deficient safety and health performance including OHSMS failures; and
4. workers rehabilitation and health restoration programs.

##### INVESTIGATION OF WORK-RELATED INJURIES, ILL HEALTH, DISEASES, AND INCIDENTS

All work related injuries, ill health, diseases, and incidents must be investigated by a competent person to identify any failures in the OHSMS. The outcome

of investigations shall be communicated to the Safety and Health Committee where established and to persons responsible for corrective actions. Reports produced by external investigative agencies shall be acted upon in the same manner as internal investigations.

#### *AUDIT*

Arrangements shall be made for periodic audits of the OHSMS to confirm the adequacy of the system. An audit policy should cover independency of auditors, scope and frequency of audits, methodology and reporting.

#### *MANAGEMENT REVIEW*

The employer's management shall regularly review the OHSMS and assess whether it meets planned performance objectives and whether it is adequate for meeting the needs of the organization and its stakeholders. Management must evaluate the need for changes to the overall system or parts thereof, identify actions required to remedy deficiencies, and evaluate the effectiveness of follow-up actions from previous management reviews.

#### **ACTIONS FOR IMPROVEMENT**

The OHSMS shall include a capacity for continuous evaluation and analysis of system performance and follow-up actions to address partial or overall improvements. Planning and implementation of needed improvements should follow the decision process outlined above.