



Reviewing records

It is important in the HRA process to review records, location specifications, details of past incidents and accidents and remedial actions taken. Some examples include:

- Incident/accident reports;
- Occupational illness and injury reports;
- Equipment maintenance and fault reports;
- Health surveillance records;
- Sickness absence reports;
- Previous occupational hygiene surveys;
- Minutes of health and safety meetings.

6. Health risk evaluation

A health risk is generally defined as the likelihood that exposure to a hazard will result in occupational illness, disability or death.

Health risk evaluation considers the information generated by the hazard identification process (see Section 4—'The process').

Individual susceptibility

Health risk assessments are usually generic. It is impossible to assess how each individual will react to every health risk. Factors that influence this variability include: heredity, age, sex, personal

habits (e.g. smoking, alcohol and substance abuse/dependence), medical and occupational history as well as health status. Pregnancy and breast-feeding require special consideration.

Exposures

Exposure is the amount (dose) of the hazard to which the person has been exposed. This is a combination of the magnitude, frequency and duration of exposure.

In order to assess the degree of exposure to an identified health hazard, it may be necessary to quantify the level of personal and/or environmental exposure and benchmark against accepted standards. Examples range from sound level meters for measuring noise to personal dosimeters for measuring radioactive exposure.

When necessary, reference documents should be consulted and past experience borne in mind.

Cumulative exposures

Multiple exposures to health hazards can occur either simultaneously or consecutively, adding to an individual's total dose and potentially increasing the risk. *If, for example, a combination of chemicals with similar toxicity is encountered, the effect may be the sum of the effects of all the chemicals, or even more. Similarly, if several short tasks are carried out, exposures from each task may be cumulative (e.g. manual handling).*

People are exposed to health hazards in every aspect of their lives, including home, hobbies and leisure, as well as work. Where the same hazard is involved, this adds to any exposure. *For example, people whose hobbies expose them to chemicals, noise or hand-arm vibration are not starting with zero exposure when they begin work. In the case of psychological hazards domestic and relationship pressures may affect an individual's ability to handle workplace stress.*

Education and training

Education and training on the causes of, and measures to prevent, noise-induced hearing loss should result in improved employee understandings of health risks and greater personal compliance. This can be achieved through visual displays, online training, toolbox talks, health events and discussion at health and safety meetings.

PPE

Personal protective equipment should always be considered as a last resort and should only be provided when it is not reasonably practicable to control exposure by other means. In the case of noise, the provision of hearing protection such as ear plugs, semi-inserts and ear defenders should only be issued after the controls discussed above have been instituted.

9. Remedial action plan

Where the need for action to reduce health risks is identified by HRA, a Remedial Action Plan should be drawn up. This should state which additional control or recovery measures are required. This plan should include priorities, responsible person and target dates for actions and there should be a tracking system to ensure that the action plan has been carried out efficiently, effectively and on time.

...

10. Recording HRA

A written record of the HRA should be kept. The record of the HRA should:

- be readily retrievable when needed for external/internal audits, local or national authorities or periodic reviews;
- meet statutory and company legal requirements;
- be kept for a period as required for national law/practice;
- contain sufficient information to ensure an audit trail on how conclusions/decisions were reached;
- include exposure monitoring where applicable;
- be linked to health records where applicable;
- be linked to the companies HSE Management System; and
- be communicated to relevant staff.

11. Review of HRA

The HRA should be reviewed periodically and, in particular, in response to changes in activities, equipment or personnel, and take account of the results of health surveillance or disease outbreaks. Any major modifications to the operation will warrant a review of the HRA.



Controlling Health Risks at Work:

A roadmap to Health Risk Assessment in the oil and gas industry



Existing controls

In assessing the level of exposure, account should be taken of the effectiveness of existing controls e.g. engineering, provision of PPE and work-rest periods.

Threshold levels

The threshold level of exposure is the level at which no adverse effects are observed. For some health hazards there are defined threshold levels (e.g. Occupational Exposure Limit (OEL)). For most health hazards threshold levels have not been established.

7. Setting priorities

The risk associated with a particular activity is often judged by estimating the probability and consequence in relative terms, 'low,' 'medium' or

'high,' and combining the two using previously agreed rules. This approach to the expression of risk is perfectly adequate for many types of evaluation, allowing for a structured approach to be adopted in situations where more precise numerical methods would be inappropriate.

A health 'Risk Assessment Matrix' (RAM) is a useful tool in ranking health risks. A ranking is obtained by assigning to each identified health hazard within the activity a severity and likelihood, based on their potential to cause ill health and on the history of previous exposure.

Entering different risks on the matrix enables priorities for health-care management to be set and mitigation measures planned. A comparison between the required controls and current controls will enable the identification of any gaps.

The figure below gives an example of such a technique.

Severity	CONSEQUENCES				INCREASING LIKELIHOOD				
	People	Assets	Environment	Reputation	A	B	C	D	E
					never heard of in the industry	heard of in the industry	has happened in the organization, or more than once per year in the industry	has happened at the location, or more than once per year in the organization	has happened more than once per year at the location
0	no injury or health effect	no damage	no effect	no impact					
1	slight injury or health effect	slight damage	slight effect	slight impact					
2	minor injury or health effect	minor damage	minor effect	minor impact					
3	major injury or health effect	moderate damage	moderate effect	moderate impact					
4	PTD or up to 3 fatalities	major damage	major effect	major impact					
5	more than 3 fatalities	massive damage	massive effect	massive impact					

8. Reducing risks: remedial actions

Controlling adverse exposure

The general principles of controlling adverse exposure to health hazards are well-known and include:

- elimination;
- substitution;
- modification;
- containment;
- isolation;
- procedures;
- education and training; and
- personal protective equipment (PPE).

This hierarchy of control can be applied to all health hazard categories and is illustrated by applying it to the following example—noise.

Controlling noise—an example:

Elimination

Noise is only generated if there is a vibration source. Eliminating noise requires engineering measures to remove the origins of vibration.

Substitution

Quieter alternatives with better vibratory characteristics may be available.

Modification

Once noise is generated it can travel from the source via 'noise pathways'. Measures should be taken to make structural adjustment to the workplace, such as partition walls and the introduction of absorptive materials/devices, for example acoustic ceiling tiles, reflective wall coverings and flexible acoustic screening.



However, where noisy work is undertaken in an ad hoc fashion, portable sound screens can be used to modify 'local' noise generation and personal exposure.

Containment

Noise emitted by equipment and/or processes can be contained by partial or total acoustic enclosures.

Isolation

Increasing the distance between the noise source and people can be achieved by automation, the use of remote controls and acoustic refuges.

Procedures

Work procedures, task rotation and permits to work are examples of systems used to control adverse exposure. In the case of noise, this may mean restricting the hours of work or numbers of people involved in a noisy activity.

Contents

PART 1 (this document)

1. Introduction
2. Scope
3. Purpose
4. The process
5. Health hazard identification
6. Health risk evaluation
7. Setting priorities
8. Reducing risks: remedial actions
9. Remedial action plan
10. Recording Health Risk Assessment (HRA)
11. Review of HRA

This document was prepared for the OGP-IPIECA Health Committee, based on an original template provided by Shell International Health Services. The assistance of Geert de Jong and Karen Nißen (Shell) and the OGP-IPIECA Health Committee reviewers is appreciated.

© IPIECA/OGP 2006. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior consent of IPIECA/OGP.

Disclaimer: Information provided herein is offered in good faith as accurate, but without guarantees or warranties of completeness or accuracy. Readers are hereby put on notice that they must rely on their own diligence when determining how or whether to respond to the information herein. Further, this guide is not intended to replace necessary and appropriate medical or other professional advice or attention.

This publication is printed on paper manufactured from fibre obtained from sustainably grown softwood forests and bleached without any damage to the environment.

PART 2: Oil & gas industry HRA template (see accompanying CD-ROM)

IPIECA

International Petroleum Industry Environmental Conservation Association
5th Floor, 209–215 Blackfriars Road, London SE1 8NL, United Kingdom
Telephone: +44 (0)20 7633 2388 Facsimile: +44 (0)20 7633 2389
E-mail: info@ipecica.org Internet: www.ipecica.org

OGP

International Association of Oil & Gas Producers
London office
5th Floor, 209–215 Blackfriars Road, London SE1 8NL, United Kingdom
Telephone: +44 (0)20 7633 0272 Facsimile: +44 (0)20 7633 2350
E-mail: reception@ogp.org.uk Internet: www.ogp.org.uk

Brussels office
Boulevard du Souverain 165, 4th Floor, B-1160 Brussels, Belgium
Telephone: +32 (0)2 566 9150 Facsimile: +32 (0)2 566 9159
E-mail: reception@ogp.org.uk Internet: www.ogp.org.uk



A roadmap to Health Risk Assessment in the oil and gas industry

1. Introduction

The aim of a Health Risk Assessment (HRA) is to identify health hazards, evaluate their risks to health and determine appropriate control and recovery measures.

Given the multi-faceted nature of health and the responsibility of employers to provide a secure and healthy workplace, it is essential that a systematic approach be used to evaluate the potential for individual harm and protect against any adverse exposure.

This document provides a brief overview of the HRA process. Detailed guidance can be found in the generic HRA standard template given in Part 2 (on the attached CD-ROM) or by consulting an occupational health professional.

2. Scope

The health risk assessment process is broadly applicable to all activities within the oil and gas industry.

HRA addresses the life cycle of any operation, and takes account of all employees, contractors and third parties at work.

A health risk assessment should be performed at the earliest stage of a project or operation, reviewed periodically and revisited when there is a significant change or as required by local legislation.



3. Purpose

The purpose of this document is to expand on the information presented within the OGP publication *Managing Health for Field Operations in Oil and Gas Activities*.

It provides a framework for the identification, evaluation and control of potential health hazards and risks with the overall intent of protecting employees' health.

Responsibilities and accountabilities of both the individual subject matter experts and the line/operational staff, and the exact relationship between the two, will vary depending on culture and organizational structure. However, this document is aimed primarily at helping line management to understand the process and competencies required. It is nevertheless important to ensure that these responsibilities and accountabilities are defined. In general, the subject matter experts guide the HRA process and ensure its integrity, while line/operational staff use their knowledge of the operational processes and their judgment to apply the Risk Assessment techniques. They are ultimately responsible for ensuring that the HRA is undertaken, and that the results of the HRA are acted upon.

A roadmap to Health Risk Assessment

PART 2: Oil & gas industry HRA template (on CD-ROM)



The attached CD-ROM contains Part 2 of *A Roadmap to Health Risk Assessment* in Microsoft® Word™ format. The document defines what HRA is, what it should include, and how to incorporate the HRA within an HSE Management System.

The appendices provide further guidance and good practice examples to assist in implementing these elements.



Workplace

When inspecting the design documents or the actual workplace, consider that any of the above hazard categories may be found.

It is important to consider whether the physical layout of the area may make the activity more hazardous (e.g. incorrect height, poor ventilation or lighting, confined space).

Activities

All levels of workplace activity, including routine/non-routine tasks and emergency activities, should be reviewed. Health hazards may amplify each other. Discussion with the person actually doing the job and a review of operating procedures is essential.

Equipment and materials

Workplace equipment may pose a risk to health especially if it has been poorly designed, is used incorrectly or malfunctions. When listing the equipment and materials used in an activity, it will be necessary to consider:

Equipment:

- Condition of the equipment;
- Specific hazards linked to the equipment (noise, vibration, radiation, heat, cold and exhaust emissions);
- Training and method of use.

Materials:

- Physical and chemical characteristics;
- Property changes or dispersion of the material during the activity may increase the hazard;
- Quality of information (e.g. language and availability) pertaining to the materials being used (material safety data sheet and/or industry/trade union information).

Environment and Location

Special consideration must be given to jobs which, under certain circumstances, are considered as safe and low risk but when performed in extreme conditions (e.g. extreme heat, cold or noise, altitude, confined space) render the task more hazardous.

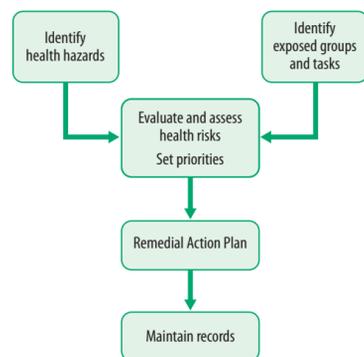
Special attention should also be given to personal protective equipment (PPE) and/or work/rest regimens when considering these highly hazardous situations. In certain cases, however, PPE may represent an additional risk (e.g. in extreme heat).

Reviewing standards for health hazards

The most current information from Material Safety Data Sheets (MSDSs), industry trade groups, governmental health and safety bodies, and current occupational exposure limits should be reviewed and incorporated into the health risk assessment.

4. The process

The HRA process is summarized in the following diagram. The individual steps in this process are explained further in the document.



In general the health hazard identification process requires involvement of a person who has had training in health hazard identification, together with individuals familiar with the activity being assessed.

The following section explains how health hazards can be assessed in terms of their composition (i.e. the nature of the agent that is causing them); by the effect that the exposure causes; or by reference to the environment/workplace location in which the hazard occurs.

There are five key factors that influence the effects of potential health hazards:

- Time period of exposure;
- Level of exposure (dose);
- Mode of exposure (e.g. contact, inhalation or ingestion);
- Individual susceptibility;
- Characteristics of the causal agent.

For convenience, health hazards can be associated with the following:

5. Health hazard identification

A health hazard is something with the potential to adversely affect the health of individuals or groups.

The difference between safety hazards and health hazards is that safety hazards have the potential to cause sudden injury, whereas health hazards have the potential to cause occupational illness (which may be acute, delayed or chronic) with varying degrees of disability or even death.

Health hazard identification is a process that considers all facets of work activity in order to establish the presence of health hazards.



Physical

- Noise;
- Motion (e.g. sea-sickness);
- Vibration (hand-arm, whole body);
- Pressure (vessels, diving);
- Ionizing and non-ionizing radiation;
- Thermal work environment;
- Display screen equipment;
- Ergonomics: associated with mismatches between the task and capability (including man-machine interfaces, manual handling, repetitive movements);
- Sharp objects;
- Transport during work;
- Ambient light levels.

Chemical

- Systemic poisons (e.g. heavy metals, H₂S);
- Irritants;
- Sensitizers (that cause skin and respiratory reactions);
- Acids and alkalis/caustic agents;
- Carcinogens.

Geographical location

- Temperature and climate (e.g. extreme heat or cold) and wide temperature variations;
- Altitude (e.g. low pressure of oxygen);
- Humidity and air quality;
- Daylight (extremes of dark or light);
- Transport;
- Communication infrastructure;
- Location in relation to available health services and facilities (distance and access);
- Standard of healthcare facilities;
- Competence of healthcare staff;
- Security (e.g. stress, anxiety, kidnapping, violence);
- The potential for natural catastrophes.



Biological

- Wildlife (animals including pets and guard dogs, reptiles, insects, plants);
- Sexually transmitted disease (commercial sex workers, camp followers);
- Endemic/epidemic diseases (due to viruses, bacteria, fungi, parasites);
- Occupational diseases (due to viruses, bacteria, fungi, parasites);
- Contaminated food and drink;
- Poor hygiene (catering, accommodation, toilet facilities, waste disposal).

Psychosocial

- Isolation (degree of access to social support);
- Overcrowding and lack of privacy;
- Communication problems (business and family contacts);
- Discrimination;
- Bullying and harassment;
- Culture, local laws, religion and language (comprehension and comfort level);
- Job design (control, content, workload);
- Job organization (shift patterns, sleep deprivation, rotations, jet lag);
- Leisure and recreation opportunities;
- Substance abuse/dependence and smoking.

The examples cited are not exhaustive and the hazard identification process will determine the health hazard profile for the specific activity. Health hazards can generate either acute, delayed and/or chronic health effects:

Acute effects (e.g. asthma):

- Occur suddenly;
- Appear within seconds to hours following exposure;
- Usually have an easily identifiable cause;
- May follow repeated or prolonged exposure to a health hazard;
- May lead to removal from the hazard and/or seeking early medical attention.

Delayed effects (e.g. lung cancer):

- Occur hours to years after the exposure;
- May not be easily associated with a specific hazard;
- May not present obvious symptoms;
- May only be diagnosed through health surveillance or sophisticated testing.

Chronic effects (e.g. asbestosis):

- Occur gradually over a long period of time (often years);
- May not be easily diagnosed or associated with a specific hazard;
- Do not result in immediate remedial action as the individual may not be aware of the exposure and its potential results at the time.

