OPITO APPROVED STANDARD

Basic H_2S Training

OPITO Standard Code: 9014

OPITO STANDARDS

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The contents of this document were developed by an industry workgroup facilitated and supported by OPITO. The workgroup consisted of representation from a cross section of oil and gas Industry employers, discipline experts working within the industry and members of the OPITO Approved Training network.

This standard has been verified and accepted through the governance and integrity management model for OPITO standards.

Guidance on this standard is available by contacting OPITO at: Standards enquiries

This standard has been designed to accommodate global variations in national legislation and regulations. In the absence of relevant national legislation and regulations, OPITO approved centres should use legislative and regulatory criteria specified within this Standard

AMENDMENTS					
AMENDMENT & DATE		**PAGES**	**CHANGES MADE BY**	**CHECKED BY**	**APPROVED BY**
1	Changed to new OPITO logo; updated header, title page & numbering scheme 06-12-07	All	T. Wilson	P. Crowther	P. Crowther
2	Clarified number of EBS (hood & masks) required 05-05-08	12	T. Wilson	P. Crowther	P. Crowther
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6	Added section C.4 Location of Training	13	T. Wilson	J. Cameron	M. Duncan
7	Entire standard moved to new OPITO template 27 Aug 2010	All	M. Carr	P. Lammiman	J. Cameron
Rev. 1	**Revision 1:** Standard Reviewed. 29 Feb 2012	All	Standards & Development Function	M. Carr	P. Lammiman
1	Amended the note in C.4 Item b) Refer to Rationale Doc. for detail. 27 March 2012	Section C.4 Page 15	Standards & Development Function	M. Carr	P. Lammiman
2	Amended Appendix 1 to include more relevant OPITO information. Revision 1 Amendment 2 23-August 2012	Appendix 1, page 21	M. Foo	M. Carr	P. Lammiman
3	Replaced Course Code with Standard Code in Title Page and amended reference to 'course identification code' with 'OPITO registration code' under section D.3 Certification - to align with other OPITO standards Revision 1 Amendment 3 10-January 2013	Title Page, page 17	M. Foo	M. Carr	P. Lammiman

Any amendments made to this standard by OPITO will be recorded above.

Contents

Introduction and Course Description

H_2S (hydrogen sulphide) is a gas that can be created by natural biological processes or by human activity and poses a serious threat to people or assets because of its extremely toxic and corrosive properties. It is important, therefore, for oil and gas personnel to be competent in emergency response practices necessary for them to stay and work in an environment with potential for exposure to H_2S gas.

An industry workgroup made up of key employers from the Middle East and the Asia Pacific, where H_2S environments are particularly prevalent, convened in Abu Dhabi in February 2007 for the express purpose of defining a basic H_2S training course.

The OPITO *Basic H_2S Training* standard covers the emergency response competency requirements (Section E OPITO Approved Competence Units) and provides details of training required (Sections A to C) for personnel working in potential H_2S environments. This training covers the characteristics of hydrogen sulphide gas and the potential physiological effects of exposure as well as the use of H_2S detection equipment and escape breathing apparatus.

SECTION A Basic H_2S Training

The information in this section is for trainers. It provides the requirements for **basic training** which includes a programme to enable delegates to acquire the necessary knowledge and skills which underpin the tasks to be performed.

A.1 Target Group

The Target group is personnel that are, or could be, working in an environment that could become contaminated by H_2S gas.

A.2 Delegate Pre-requisites

There are no prerequisites required for *Basic H_2S Training*.

A.3 Physical and Stressful Demands of the Course

Training and/or assessment activities contained within this Standard may include physically demanding and potentially stressful elements. All personnel who participate in such activities must be physically and mentally capable of participating fully.

Therefore OPITO-approved training centres are required, as a minimum, to ensure that prior to participating in practical exercises the delegate either:

a) Possess a valid, current offshore medical certificate **or**
b) Possess an operator approved medical certificate, **or**
c) Undergoes medical screening by completing an appropriate medical screening form provided by the OPITO-approved centre (a list of medical conditions which could be included in a medical screening form is available from OPITO).

The OPITO-approved Centre shall keep a record of the delegate's/candidate's declaration of fitness in accordance with their document control policy(s) or procedures.

This information, along with summary details of the type of physical activities the delegate/candidate will be asked to perform, will be given to delegates/candidates by the OPITO-approved Centre and, if applicable, to their sponsoring company as part of the joining instructions. The responsibility for declaring any current or pre-existing medical conditions that could have adverse effects to the individual's state of health while undertaking the training and/or assessment activities lies with the delegate/candidate and/or company sponsoring the delegate.

Where doubt exists regarding the fitness of any delegate/candidate, the OPITO-approved Centre should direct the individual to consult a medical officer familiar with the nature and extent of the training.

Note: Practical exercises should be designed and delivered solely to meet this standard, and must not place on the delegates any physical or mental demands other than those required to meet the Standard.

A.4 Aims and Objectives

The aims and objectives of the training are to ensure that the delegate gains the required knowledge and understanding of the particular hazards and properties of H_2S, and appropriate emergency response actions to take should a H_2S related incident arise.

A.5 Learning Outcomes

During the training programme, delegates will be required to demonstrate their skills and understanding of the following key areas.

To successfully complete this training delegates must able to **explain:**

(1) Hydrogen sulphide – how it is formed and where it is found
(2) Other names used to describe H_2S
(3) Properties and characteristics of H_2S
(4) Parts per million (ppm) as a measurement parameter
(5) Occupational exposure limits to H_2S
(6) Factors affecting individual susceptibility to H_2S
(7) Types of detector equipment
(8) Types of respiratory equipment
(9) Pre-use checks of personal detection devices and EBA

To successfully complete this training delegates must able to **demonstrate:**

(10) Operating personal H_2S detection equipment (including checks)
(11) Responding to an alarm
(12) Donning & operating (including checks) an escape breathing apparatus (EBA) with a mask within 30 seconds
(13) Donning & operating (including checks) an EBA with a hood within 30 seconds
(14) Connecting to a pressurised cascade breathing system with an activated EBA which has been donned correctly
(15) Disconnecting from a pressurised cascade breathing system with an activated EBA which has been donned correctly.

A.6 Delegate Performance Assessment

Delegates attending this training and assessment programme will be given a series of explanations and demonstrations which will identify what they are expected to know and do. This will be followed by practical exercises which will allow delegates to demonstrate their knowledge and understanding and emergency response skills.

Delegates will be assessed against the learning outcomes using direct observation, and oral and written questions as appropriate.
Delegates will be given a **30 minute written exam** on completion of the training.

Refer to Appendix 2 for sample Assessor's Checklist.

Training providers must have a documented procedure in place for dealing with persons not meeting the stated learning outcomes.

A.7 Duration of the Training Programme

The optimum contact time (including a refreshment break) is seen as **4 hours**.

Where this training is part of a programme of longer duration the total contact time per day must not exceed 8 hours and the total training day must not exceed 10 hours. The total training day includes contact time, refreshment and meal breaks and travel between training sites where applicable.

A.8 The Training Programme

The training programme provided below is designed to help delegates achieve the stated learning outcomes specified in section A.5. The order in which elements of the training programme are delivered may vary. However, contents in Appendix 1 must be covered prior to course commencement.

To make efficient use of time and ensure effective learning there should, wherever practicable, be an integration of the three phases of explanation, demonstration and practise. Full use should be made of audio / visual aids and course handout material. Training staff should give practical demonstrations for all training activities which delegates are required to practice and demonstrate.

Prior to the start of the module, the following must be included as part of the introduction by training staff:

(a) **Aim** – The main purpose of the module
(b) **Learning Outcomes** – What the delegates are expected to learn
(c) **Timetable** – Training module duration and timing
(d) **Assessment** – how delegates will be assessed and what they will be assessed against
(e) **Staff** - who will be delivering the training and roles of training support staff.

The time taken for this introduction is expected to be approximately 10 minutes.
The training course consists of the following modules and elements:

Module 1 Basic H_2S Training
Element 1.1 H_2S hazards, Emergency Response Actions and Apparatus

MODULE 1 Basic H_2S Training

ELEMENT 1.1 H_2S Hazards, Emergency Response Actions and Apparatus

Training staff to **explain:**

1.1.1 H_2S gas, its common names and where it is ordinarily found
1.1.2 The physical properties and characteristics of H_2S
1.1.3 Common definitions such as parts per million (ppm) and occupational/workplace exposure limits (OEL/WEL)
1.1.4 Measurement and the OEL/WEL of H_2S
1.1.5 The physiological effects of exposure to H_2S
1.1.6 How H_2S is detected and the use of onsite & personal detection equipment
1.1.7 Actions to be taken in the event of an alarm
1.1.8 The types of respiratory equipment available including escape breathing apparatus (EBA) & self-contained breathing apparatus (SCBA) and the importance of correct fit of the face mask
1.1.9 The role of response teams in an H_2S emergency and their use of SCBA.

Training staff to **demonstrate:**

1.1.10 H_2S personal detection equipment – pre-use checks & operation
1.1.11 Responding to an alarm
1.1.12 EBA fitted with a mask – pre-use checks & operation
1.1.13 EBA fitted with a hood – pre-use checks & operation
1.1.14 Method of connection to a pressurised cascade air supply with an activated EBA which has been donned correctly
1.1.15 Method of disconnection from a pressurised cascade air supply with an activated EBA which has been donned correctly.

Delegates to **practise and demonstrate 1.1.10** to **1.1.15.**

Training staff to provide time for review and any clarification required. Delegates will be given a 30 minute written exam to assess Learning Outcomes 1-9 on completion of training.

SECTION B Refresher Training – Not applicable

SECTION C Resources

In order that a training programme may be delivered successfully it is essential that appropriately qualified and experienced people are there to deliver and support the programme and that the appropriate facilities and equipment are in place.

C.1 Staff

Training staff must be:

(a) Qualified or experienced in emergency response roles in the event of H2S release
(b) Trained in instructional techniques and/or have proven training or instructing experience
(c) Included in an ongoing staff training and development programme to enable them to maintain and update skills and knowledge.

Assessors will be discipline experts trained and qualified in assessment techniques.

All staff will have the appropriate competencies to conduct/assist with the element of training being undertaken.

C.2 Trainer/Delegate Ratio

The ratio shown for theory sessions indicates the maximum number of delegates that should attend the course in any one session. Ratios indicate the maximum number of delegates to be supervised by an instructor at any one time during each activity.

Theory	1 : 16
Demonstrations	1 : 16
Personal Detection Equipment	1 : 8
Escape Breathing Apparatus & Cascade	1 : 8

C.3 Facilities and Location of Training

To ensure proper presentation the training provider should adhere to the following criteria and provide a designated room that will not be used simultaneously for any other activity and which includes:

Administration arrangements appropriate for enrolment and certification of delegates.

Theory training area(s) with sufficient room to allow delegates to participate fully in group theory or syndicate paper exercises. Each delegate should be afforded ample space to be comfortable when carrying our theoretical exercises.

Practical training area(s) with adequate floor space for each delegate to participate fully in practical demonstrations and exercises such as responding to alarms, observing detection equipment or operating escape breathing apparatus.

All facilities must be maintained and where appropriate, inspected and tested in accordance with current standards/legislation and manufacturers recommendations.
Risk assessments must be conducted and documented for all training facilities and equipment.

Location of Training

It is recognised that the restricted range of resources and facilities required makes this course suitable for on-location training. However, prior to any courses being delivered remotely, training providers must comply with the following requirements:

(a) Prior to initial approval, the training provider will specify a single 'approved site' and advise OPITO of its intention to deliver training remotely

(b) The training provider will advise OPITO of the location of any remote training in advance of each delivery

(c) The training provider shall ensure the suitability of facilities and arrangements prior to delivery

(d) Documented evidence will be retained by the training provider to show that delivery of training at the remote site meets the criteria detailed in this OPITO standard including, but not limited to, facilities, equipment and qualification of instructional staff

(e) Documented management procedures shall be retained which record any measures required to assure the quality and safety of on location training

(f) All records and associated documentation must be retained at a single, specified location, mutually agreed with OPITO, and made available at time of audit OPITO reserves the right to physically audit any or all of the remote sites operated by the training provider

C.4 Equipment

It is important to make sure that equipment required to conduct the training is both available and fit for purpose.

The following equipment is required to meet the stated content of the training course:

(a) Sufficient Personal H_2S Detectors

(b) One mask EBA **and** one hood EBA for **each** delegate

NOTE: Training Providers must provide mask EBAs and hood EBAs for **all** delegates undertaking the Basic H2S Training programme.

(c) Pressurised Cascade (also known as manifold) System with minimum of four whip lines to enable 4 delegates to connect and disconnect when the system is pressurised.

All equipment must be maintained, and where appropriate, inspected and tested in accordance with current standards/legislation, guidance and manufacturers recommendations.

SECTION D Administration and Certification

An OPITO Certificate will be issued to all delegates assessed as meeting the stated outcomes. The issue of a certificate indicates that the delegate has achieved a level of training to enable him/her to work in an area that could become contaminated with H_2S.

D.1 Joining Instructions

All joining instructions must contain information which indicates that certain aspects of the course are of a physical nature and contain potentially stressful elements.

Prior to each course commencing, delegates must sign a declaration indicating they have read and understood a written statement regarding the physical and potentially stressful nature of the programme and the need for delegates to be in good health.

D.2 Periodicity

The interval between the initial training and further assessment will be determined by the employing company. The **validity** of the OPITO certificate **is two years.**

Note: Some individual companies require re-validation at intervals more frequent than that required by OPITO; in these instances it will be acceptable for training providers to omit or modify the expiry date to avoid confusion. However the validity period will remain as set by OPITO with regard to the central register and the industry as a whole.

D.3 Certification

Training Centres are responsible for issuing a certificate direct to the delegate completing the programme and to the sponsoring company (when required). Each certificate must indicate that the delegate has been assessed against and met the learning outcomes and must contain the following:

(a) Training Centre name
(b) Full OPITO course title stating that it is OPITO-approved
(c) OPITO registration code
(d) Delegate's name
(e) Course dates
(f) Expiry date (Two years minus one day following the date that the delegate successfully completes the course)
(g) Unique Certificate Number (UCN) – Refer to OPITO UCN Guidance doc. for details
(h) Training Centre Signatory.

D.4 Course Administration

Each delegate attending any OPITO approved programme must be registered with the Central Register (CR) operated by OPITO. Registration must be made by the training establishment to OPITO within one week following the course.

OPITO confirms that information on the registration form will be contained in a computerised register which will be available to employers, prospective employers and training providers in the oil and gas industry to verify training records. At all times use of this data will be strictly in accordance with principles laid down in relevant data protection legislation.

SECTION E Competence Units

Competence Statement

To develop a training course, an evaluation of workplace competence is required. In other words, what does an employee have to know and do if he/she encountered hydrogen sulphide onsite?

Using a competence-based approach the following were identified and developed:

a) What personnel are expected to do
b) The knowledge and skills they would require to enable them to do what was expected of them
c) How they could demonstrate what was expected of them
d) How their performance would be assessed

From well defined competence statements, training requirements can be determined.
The Unit for the *Basic H_2S Training* standard is included over page.

Recognise H_2S hazards and react appropriately to an H_2S emergency.

E.1 Competence Unit

UNIT 1 Responding to an H_2S emergency

This unit is about personal H_2S detection devices, the use of an escape breathing apparatus (with a hood or a mask) and connection to a cascade system.

Standards of Performance

In achieving this Unit you will:

(1) Operate a personal H_2S detection device, including pre-use checks
(2) Respond effectively to alarms
(3) Operate an **escape breathing apparatus** including pre-use checks within 30 seconds
(4) Connect to a cascade system
(5) Disconnect from a cascade system

Scope:

Escape breathing apparatus could include the types fitted with either a mask or a hood

Underpinning Knowledge & Understanding

Within the limits of your responsibility you must be able to demonstrate that you know:

(a) How H_2S is created/formed
(b) Areas where H_2S is commonly found
(c) The properties and characteristics of H_2S gas
(d) The physiological effects of H_2S gas and the critical factors which determine the degree of harm to humans
(e) The occupational/workplace exposure limits (OEL/WEL) of H_2S
(f) The purpose and types of H_2S detection equipment
(g) Alarm systems and actions to be taken in response to alarms
(h) The purpose and type of emergency breathing apparatus
(i) The role of ER teams in an H_2S emergency

Glossary

EBA	Escape Breathing Apparatus
ER	Emergency Response
H_2S	Hydrogen Sulphide
OEL	Occupational Exposure Limits
ppm	Parts per million
SCBA	Self-contained Breathing Apparatus
WEL	Workplace Exposure Limits

Appendix 1

The topics listed below are to be delivered as part of the introduction to this course and included in the Lesson Plans/Instructor guides/Exercise Plans. Additional introduction topics may include training centre layout and alarms, emergency actions, first aid and domestic arrangements

Mandatory OPITO Information:

a) Medical Fitness
b) Certification Periods
c) CR/Vantage (provided by OPITO)
d) OPITO Customer Service Statement (provided by OPITO)
e) The roles of employers and training providers (provided by OPITO)
f) What is OPITO's role in industry? (provided by OPITO)
g) Current Global Network of training providers (provided by OPITO)
h) Emergency Response Framework (provided by OPITO – applicable for ER Training Providers)
i) OPITO DVD (*BOSIET/TBOSIET only*) provided by OPITO

Appendix 2

Assessors Checklist

BASIC H_2S TRAINING – FOR PERSONNEL WORKING IN AN ENVIRONMENT WITH THE POTENTIAL FOR EXPOSURE TO H_2S GAS

Ref:	Learning Outcomes	Completed	Source of Evidence
1-9	Knowledge Assessment		
10	Operate personal H_2S detection equipment (including checks)		
11	Respond to an alarm		
12	Don & operate (including checks) an EBA **with a mask** within 30 seconds		
13	Donning & operating (including checks) an EBA **with a hood** within 30 seconds		
14	Connect to a pressurised cascade breathing system		
15	Disconnect from a pressurised cascade breathing system		
Remarks:			
Source of Evidence: O – Observation S- Simulation Q – Questioning W - Witness			

Candidate's Records

Basic H2S Training

Candidate Name: Company:
Training and Development Needs:

Declaration: The person named was assessed by me against the standards of performance specified in this document and in accordance with the assessment guidance.

I consider that the above person *has/*has not achieved a level of competence to enable him/her to work in a facility with the potential for exposure to H_2S gas.

*I consider that the above person requires further training and development in addition to that which is installation specific.

Assessor's Name	Signature	Date

* delete whichever does not apply