

Comite Technique Europeen Du Fluor

Working Group Storage, Transport and Safety

Training Recommendations for HF handling

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PREFACE

Hydrogen Fluoride (HF) is essential in the chemical industry and there is a need for HF to be produced, transported, stored and used.

The HF industry has a very good safety record ; nevertheless, the European HF producers, acting within CTEF have drawn up this document to promote continuous improvement in the standards of safety associated with HF handling.

This Recommendation is based on the various measures taken by member companies of the CTEF.

It in no way is intended as a substitute for the various national or international regulations, which should be respected in an integral manner.

It results from the understanding and many years experience of the HF producers in their respective countries at the date of issue of this particular document.

Established in good faith, this recommendation should not be used as a standard or a comprehensive specification, but rather as a guide which should, in each particular case, be adapted and utilised in consultation with an HF manufacturer, supplier or user, or other experts in the field.

It has been assumed in the preparation of this publication that the user will ensure that the contents are relevant to the application selected and are correctly applied by appropriately qualified and experienced people for whose guidance it has been prepared.

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The contents of this recommendation are based on the most authoritative information available at the time of writing and on good engineering practice, but it is essential to take account of appropriate subsequent technical developments or legislative changes. It is the intent of the CTEF that this guideline be periodically reviewed and updated to reflect developments in industry practices and evolution of technology. Users of this guideline are urged to use the most recent edition of it, and to consult with an HF manufacturer before implementing it in detail.

This edition of the document has been drawn up by a Working Group "Storage, Transport and Safety" to whom all suggestions concerning possible revision should be addressed through the offices of CTEF. It may not be reproduced in whole or in part without the authorisation of CTEF or of members companies.

1. INTRODUCTION

This guideline has been developed by the Storage, Transport and Safety Group of the Comité Technique Européen Du Fluor (CTEF). **It is intended to identify the training requirements for all staff associated with a facility handling hydrogen fluoride (HF).** It does not replace or assume any local, national or federal regulations which may identify training requirements.

The guideline has been developed by the European manufacturers association and is based upon many years of practical experience.

It is not intended to be a guideline to which all manufacturers and consumers of HF must adhere nor does it attempt to describe any additional training other than that associated with HF. This guideline should not be used in isolation to determine training rather it should be used in conjunction with the supplier(s) of HF and form the basis of a discussion aimed at determining an appropriate level of training for given roles, duties or activities.

CTEF or its members cannot accept any legal liability or responsibility for the use or misuse of the information contained in this document.

2. DEFINITIONS

- 2.1 PPE - Personal Protective Equipment
- 2.2 HF - Hydrogen Fluoride
- 2.3 CTEF - Comité Technique Européen du Fluor
- 2.4 HAZOP - Hazards & Operability Study

3. OTHER RELEVANT STS DOCUMENTATION

The following STS documents are also relevant when considering training requirements :

- 3.1 STS 79/30 - *Chemical Safety Data Sheet for Anhydrous Hydrogen Fluoride*
- 3.2 STS 81/37 - *Chemical Safety Data Sheet for Aqueous Hydrogen Fluoride*
- 3.3 STS 98/111 - *Personal Protective Equipment for Use with HF*
- 3.4 STS 97/107 - *European security organisation to take account of any accident in which liquid HF is involved*
- 3.5 STS 83/41 - *Measures to be taken following spillage or leakage of hydrogen fluoride, hydrofluoric acid, hexafluorosilicic acid or tetrafluoroboric acid on railways or public roads*
- 3.6 STS 79/27 - *Recommendation on emergency plan for HF producing plants.*

3.7 STS 94/96 – *Medical management of HF injuries*

3.8 STS 99/114 – *HF Handling in laboratories*

4. GENERAL OVERVIEW

- (i) All HF handling facilities should have written policies and procedures covering the appropriate training requirements for each task or role. All employees and contractors involved with HF handling facilities should understand the risks associated with handling HF and should be provided with the training required to complete their task or role. Specific training should include hazard awareness, risk assessment, the correct way to fit, wear and decontaminate personal protective equipment as well as first aid and emergency procedures as a minimum. These training requirements should be strictly enforced and implemented.

Note : In order to ensure that the appropriate standards are achieved and maintained a policy detailing the re-training of personnel should be implemented.

- (ii) HF is a very toxic and corrosive chemical which, when exposure occurs, can lead to severe health risks and can, if the correct treatment is not quickly and efficiently applied, prove to be fatal. However, it should be noted that, despite the hazards associated with handling HF, the European industry has a good safety record and has shown that HF can be safely handled, that the associated risks can be accurately identified and suitable personal protective equipment provides sufficient protection when worn in the correct manner. The largest proportion of injuries are due to a failure in the Risk Assessment process or to a lack or incorrect use of the appropriate personal protective equipment. It is recommended that users of this guideline also use the information contained in the Chemical Safety Data Sheet for HF (See STS 79/30 for Anhydrous and STS 81/37 for Aqueous) and work in conjunction with a recognised and experienced supplier of HF to ensure adequate design standards.

This guideline attempts to describe typical training requirements of an HF handling facility and the appropriate level of retraining. All training discussed in this document refers to additional training above and beyond that which would normally be expected for each employee, i.e. Secondary First aid concentrates on HF specific actions and assumes that the recipient understands and is qualified in some way in the basics of first aid e.g. a doctor or a nurse. The guideline also assumes that training in standard procedures for a chemical plant, e.g. Permit to Work, has been identified and given as appropriate.

Where appropriate, existing CTEF documentation has been referenced.

5. TRAINING RECOMMENDATIONS

Training recommendations for all personnel involved with the manufacture, storage, transport and use of Hydrogen Fluoride have been summarised in Table 1.

The training program has been structured as modules of training each of which is intended to build upon the training already given and should be used to re-emphasise key points. Each facility manufacturing or using HF should produce suitable packages to meet these requirements. Some of the required training is generic, e.g. HF Awareness or Initial First Aid, but much of the training is specific to the plant and, as such, may vary from site to site within a single company, e.g. Operating Procedures, Maintenance procedures.

Consideration must also be given to re-training. The requirements and frequencies for retraining will vary with the activities and experience of personnel but the importance of positive reinforcement of good practice by retraining should not be under-estimated.

For each module of training provided the understanding of the individual should be validated. In some packages practical training as well as classroom training is appropriate and this should also be tested. In this way the trainer can ensure that the messages have been received and understood and any misconceptions can be identified and clarified.

All training or re-training given, together with the identity of the trainer should be formally recorded and these records should be readily available for checking and auditing.

5.1 Site Induction Module

Purpose

The Site Induction Module is intended to raise the awareness of the potential risks associated with the site for all individuals working on the site. This training will be site specific.

Content

The Site Induction Module should include the basic requirements of an individual who wishes to enter the site boundary and should, as a minimum, cover the following topics :-

General Introduction to site

Site policies, rules and regulations

On-site Vehicle policy

Parking requirements

Signing in and out policy

Fire & Emergency Procedures (including, where possible examples of alarms, etc.)

Wind direction indicators

Evacuation routes and assembly points

Personal protective equipment requirements

Instructions on entering plant areas

Identification of any specific equipment requirements (e.g. intrinsically safe, etc.)

Hygiene Issues

Permit to Work Arrangements (additional training may be required)

The importance of reporting incidents

Audience

The Site Induction Module should be given to all employees, contractors and internal or external visitors who will be working on or visiting the site. Additionally, consideration should be given to making any close neighbours aware of these systems and procedures, in particular the testing, use and meaning of any emergency alarm systems and the appropriate actions required.

One exception may be temporary visitors who are accompanied on site at all times by an experienced site person. Under this circumstance the host will be responsible for the visitors behaviour and will ensure that the site procedures and systems are followed.

Individuals having completed the site training module should then be given a pass or badge which clearly shows that the training has been successfully completed.

5.2 Plant Induction Module

Purpose

The Plant Induction Module is intended to build upon the Site Awareness module by detailing the requirements of the plant. Each plant handling HF will have specific requirements and alarms the correct response to which should be fully understood by all personnel working in or visiting the plant. This training will be plant specific though there may be areas common to more than one plant within a site boundary.

Content

The Plant Induction Module should build upon the basic information contained in the Site Awareness module and should identify the requirements for an individual who wishes to enter inside the plant boundary and should, as a minimum, cover the following topics :

General Introduction to plant (geography, areas of special concern, etc.)

Plant rules and regulations

Signing on and off policy

How to raise an alarm

Fire & Emergency Procedures (including, where possible examples of alarms, etc.)

Wind direction indicators

Evacuation routes and assembly points

Personal protective equipment requirements (i.e. the levels of personal protective equipment on plant and the acceptable activities)

Identification of any specific equipment requirements (e.g. intrinsically safe, etc.)

Hygiene Arrangements

Permit to Work Issue Points (if applicable)

The importance of reporting incidents, however minor

The location of safety equipment (e.g. First aid kit; safety showers, etc.)

Audience

The Plant Induction Module should be given to all employees, contractors and internal or external visitors who will be working on the plant. For larger sites this will mean that employees or contractors working on more than one plant will require more than one plant induction module.

Individuals having completed the site training module should then be given a pass or badge which clearly shows that the plant-specific training has been successfully completed.

5.3 HF Induction Module

Purpose

The HF Induction Module is intended to raise the awareness of the specific hazards associated with handling HF. This training could be a generic package used at more than one HF handling plant.

Content

The HF Induction Module should build upon the basic information contained in the Plant Induction module and give detailed information about the hazards associated with HF and its use together with any mitigation systems (e.g. Calcium Gluconate gel). The training should cover the following topics :

A description of the hazards associated with HF

A description of the initial first aid measures

A description of the delayed onset of symptoms associated with HF

A description of the site personal protective equipment and its suitability, limitations, etc.

The location of Safety, Health & Environmental information (e.g. Safety data sheet)

The location of first aid equipment on site

The correct response to involvement in an HF incident

Decontamination procedures

How to raise further help if required

How / where to get further advice

The importance of ceasing work and reporting back to the control room if in doubt

The importance of cleaning up when work is complete

The most effective way to decontaminate tools, equipment and personal protective equipment

The role of the individual in a plant emergency

Assembly points

The importance of labeling samples or contaminated equipment

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

The HF Induction Module should be given to all employees, contractors (including contract hauliers, drivers, etc.) and internal or external visitors who could potentially be exposed to HF either directly or indirectly.

Following successful completion of this training some companies have elected to give employees a tube of calcium gluconate to keep at home.

5.4 PPE Module

Purpose

The PPE Module is intended to describe the requirement for personal protective equipment. When, where and how it should be used. The module should identify the correct personal protective equipment and how this was derived.

For additional information see CTEF Recommendation STS 98/111 *Personal Protective Equipment*.

Content

A description of the hazards associated with HF

A review of past incidents and learning

A description of the personal protective equipment required

A description of the decontamination systems

A description of the initial first aid procedures

A practical demonstration showing how to put the personal protective equipment on

A practical demonstration of the decontamination procedures

A practical demonstration of the use of calcium gluconate gel

A discussion on potential pitfalls identified

Validation of the understanding of each part of the procedure

A check that each attendee has a tube of gel available at home (if applicable)

The importance of reporting any exposure, either whilst at work or home

The importance of reporting the use of gel and requesting a replacement

Note : PPE supplied by external contractors or visitors should not be used within the plant boundaries unless it has been shown to be suitable for use with HF.

Audience

This training is intended for any individual who has the potential to be exposed to HF either directly or indirectly. This includes individuals who are not expected to work on contaminated systems but who could potentially be contaminated by the actions of others, e.g. drivers.

5.5 Initial First Aid Module

Purpose

The Initial First Aid Module is intended to describe the actions which should be taken in the event of a potential exposure to HF. The training should emphasise the need for prompt and correct action to be taken in order to minimise the impact of the exposure.

For additional information see the *CTEF Recommendation on Medical Management of HF Injuries (STS 94/96)*.

Content

A description of the hazards associated with HF

A review of past incidents and learning

The importance of fast and effective first aid

The importance of self-protection to prevent additional casualties

The importance of getting help & how this is achieved – particularly if more than one casualty is present

A description of the personal protective equipment required when treating a casualty

A description of the need to remove all contaminated clothing

A description of how to decontaminate a casualty

A description of the correct first aid procedures for each potential exposure, i.e. Skin contact, Ingestion, Eye contact and Inhalation

A practical demonstration of the use of calcium gluconate gel

Validation of the understanding of each part of the procedure

A check that each attendee has a tube of gel available at home (if applicable)

The importance of reporting any exposure, either whilst at work or home

The importance of reporting the use of gel and requesting a replacement

The importance of passing on casualties who are injured to medical professionals as soon as possible

The importance of giving full and accurate information to medical professionals upon their arrival e.g. Safety data sheet if available, history, treatment given, etc.

Note : This training should only be given by medical professionals or those with extensive knowledge of HF first aid procedures

Audience

This training is intended for any individual who has the potential to be exposed to HF either directly or indirectly in his workplace, e.g. plant operators, laboratory, etc. This includes individuals who are not expected to work on contaminated systems but who could potentially be contaminated by the actions of others, e.g. drivers, maintenance personnel.

Suppliers of HF will ensure that customers handling HF have the necessary first aid equipment in place and the necessary training is understood and given as appropriate.

Support personnel, e.g. Emergency response teams, also require this module.

5.6 Secondary First Aid Module

Purpose

The Secondary First Aid Module is intended for medical professionals and describes the actions which should be taken in the event of an exposure to HF. The training should emphasise the need for the correct medical care to be given to serious and minor exposures in order to minimise the long term effects. Secondary medical treatment may be provided by an on-site facility or by a local hospital or doctor.

For additional information see the *CTEF Recommendation on Medical Management of HF Injuries (STS 94/96)*.

Content

A description of the hazards associated with HF

A review of past incidents and learning

The importance of fast and effective treatment

A description of the effects of HF on the human body

A description of the correct symptomatic treatment required.

The importance of self-protection to prevent additional casualties

A description of the personal protective equipment required when treating a casualty

A description of the need to remove all contaminated clothing

A description of how to decontaminate a casualty

A description of the first aid procedures which will have been followed by the initial response

A practical demonstration of the use of calcium gluconate gel

A check that gel is available at the facility

The importance of reporting all incidents and the treatments given so that learning can prevent a recurrence

Note : This training is intended for medical professionals and should be given by suitably qualified personnel only.

Audience

This training is intended for those with a higher level of medical training e.g. medical professionals. Suppliers of HF will ensure that customers handling HF have access to a suitable secondary first aid resource.

5.7 Operating Procedures Module

Purpose

The Operating Procedures Module is intended to describe the structure of the detailed plant operating instructions. Complex plants are normally broken into a number of discrete areas, e.g. spar drying, each of which have a number of operating procedures associated. Once an operator has been trained and validated in all of the procedures within an area the individual is competent to operate in that area. Additional training is required for each process area.

Detailed procedures describing the tasks and activities required to operate the plant area safely shall be available. The area operating teams shall be fully trained in these procedures.

For new operators joining the plant a structured training plan should be developed.

Operating procedure training involves both classroom and practical training with validation for each part. Individuals have to prove understanding in the classroom before being allowed to watch the procedure for real and only then are they allowed to follow the procedure under supervision. Once the individual has shown an appropriate level of competence the supervisor will sign off the practical validation and only then will the individual be considered fully competent.

Many companies appoint a ‘mentor’ for an operator moving into an area for the first time. The mentor’s role is to help, guide and support the new starter through the training program by sharing knowledge and experiences. In this way new operators gain a high level of training and knowledge and the plant management team gain a confidence in the new operator.

Individuals will be expected to have undergone the Site, Plant, HF Induction, PPE and Initial First Aid modules before completing operating procedures on plant.

Content

A description of the hazards associated with HF

A description of the process and the individuals role

A description of the personal protective equipment required when following each procedure

A description of the emergency procedures and the individuals role in these

A description of the initial first aid procedures

A detailed description of each procedure, the safety, health and environmental issues associated, the personal protective equipment required and the most effective way to do the task safely.

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the plant operating team and should be given to all operators and supervisors on the plant. Supervisors should be given the full training module covering all of the plant, operators may be given all or parts of the module as appropriate.

5.8 Tanker Procedures Module

Purpose

The Tanker Procedures Module is intended to describe, in detail, the steps needed to connect and disconnect a tanker in order to load or unload. It will also cover the design features associated with the various tankers within the fleet and their valving systems, reliefs, etc.

Detailed procedures describing the tasks and activities required to operate the plant area safely shall be available. The tanker loading or unloading teams shall be fully trained in all of these procedures.

For new operators moving into this area a structured training plan should be developed.

Tanker procedure training involves both classroom and practical training with validation for each part. Individuals have to prove understanding in the classroom before being allowed to connect or disconnect a tanker under supervision. Once the individual has shown an appropriate level of competence the supervisor will sign off the practical validation and only then will the individual be considered fully competent.

Many companies appoint a 'mentor' for an operator moving into an area for the first time. The mentor's role is to help, guide and support the new starter through the training program by sharing knowledge and experiences. In this way new operators gain a high level of training and knowledge and the plant management team gain a confidence in the new operator.

Content

A description of the hazards associated with HF

A description of the tank design features (valves, reliefs, etc.) both inside and out

A description of the personal protective equipment required at each stage of the procedure

A description of the emergency procedures

A description of the initial first aid procedures

A detailed description of the procedure for loading a tanker

A detailed description of the procedure for unloading a tanker

A detailed description of the procedure for preparing a tank for maintenance

A detailed description of the procedure to change a valve or a relief valve on a tank

A detailed description of the procedure for re-commissioning a tank following maintenance

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the supervisors and operators responsible for the loading or unloading of HF tankers.

5.9 Decontamination Procedures Module

Purpose

The Decontamination Procedures Module is intended to describe, in detail, the principles to be followed when decontaminating or preparing equipment for maintenance and when maintaining equipment. The module should cover the specific issues associated with ‘dirty’ break-ins where it is identified that full decontamination cannot be guaranteed.

Special attention should be given during the training to ensure that where equipment is being moved either on site or off site the wider issues of the transportation are included.

Some companies use a predetermined checklist to ensure that all possible outcomes are considered, i.e. a HAZOP study, prior to beginning work on the plant. Following the decontamination the procedure is then reviewed and any learning incorporated.

For equipment which is regularly maintained, e.g. vessels, some companies record the method of decontamination, the HAZOP and the report for reference each time the equipment is decontaminated.

Content

A description of the hazards associated with HF

A description of the equipment to be decontaminated (with diagrams if possible)

A description of any equipment needed to effect the decontamination (hoses, water lines, etc.)

A description of the personal protective equipment required at each stage of the procedure

A description of the potential issues which may arise, their likelihood and how these would be dealt with should they arise

A description of the initial first aid procedures

A description of the isolation standards necessary (locks, spades, etc.)

An overview of the Permit to Work system

A paper example preparing a system for decontamination

A practical example where the individual prepares a system for maintenance under supervision

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the supervisors, operators and maintenance personnel responsible for preparing or working on HF plant equipment.

5.10 Maintenance Procedures Module

Purpose

The Maintenance Procedures Module is intended to describe, in detail, the principles to be followed when maintaining equipment. The module should cover the specific issues associated with 'clean' and 'dirty' equipment.

For equipment which is regularly maintained, e.g. pumps, some companies use standard procedures and generate a report on the effectiveness of the decontamination procedure, the condition of the equipment and the work carried out each time the equipment is worked on.

Content

A description of the hazards associated with HF

A description of the equipment to be maintained (with diagrams if possible)

A description of the personal protective equipment required at each stage of the procedure

A description of the potential issues which may arise, their likelihood and how these would be dealt with should they arise

A description of the initial first aid procedures

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the supervisors and maintenance personnel responsible for working on HF plant equipment.

5.11 Sampling Procedures Module

Purpose

The Sampling Procedures Module is intended to describe, in detail, the steps to be followed when sampling systems containing HF.

Sampling HF containing streams is a hazardous activity which should be undertaken as little as necessary. Customers wishing to ensure the quality control of HF should be encouraged to do this in partnership with their supplier by auditing rather than by re-sampling and additional analysis.

Content

A description of the hazards associated with HF

A description of the equipment to be used (with diagrams if possible)

A description of the personal protective equipment required at each stage of the procedure

A description of the potential issues which may arise, their likelihood and how these would be dealt with should they arise

A description of the initial first aid procedures

A description of the site method for transporting samples to the laboratory, if this is not located on the plant.

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the supervisors, operators and laboratory personnel responsible for taking samples on an HF plant.

5.12 Emergency Procedures Module

Purpose

The Emergency Procedures Module is intended to describe, in general, the actions required in an on-site or off-site emergency. The level of training provided will depend upon the role and responsibilities of the individual. The Emergency procedures module will include classroom and practical training.

Emergencies involving HF are infrequent occurrences but when they do occur require a highly trained team to respond. A supplier of HF must also consider the off site implications of transporting HF and therefore, there may be two response teams, internal and external, who require training.

By the nature of emergencies it is impossible to predetermine every possible scenario. Therefore the emergency response module should concentrate on the principles to be followed and the equipment which is provided. This is why, generally, only very experienced personnel are selected for a response team.

Some members of the response team may have specific duties which require additional training (e.g. Press communications).

For additional information refer to the CTEF documents STS 97/107 *European security organisation to take account of any accident in which liquid HF is involved*; STS 83/41 *Measures to be taken following spillage or leakage of hydrogen fluoride, hydrofluoric acid, hexafluorosilicic acid or tetrafluoroboric acid on railways or public roads* and STS 79/27 *Recommendation on emergency plan for HF producing plants*.

Content

A description of the hazards associated with HF both on site and off site

A description of the most likely scenarios and how these would be dealt

A description of the equipment required (water hoses, polyacrylamide, etc.), where it is kept and how it is maintained

A description and practical exercise in the personal protective equipment required

A description of the initial first aid procedures

A description of the CTEF Mutual Aid scheme

A description of information available and how to access this data

A description of the back up systems (communications, etc.)

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Audience

This training is intended for the response teams who would be expected to manage an emergency situation involving HF. This may be two separate teams for internal and external emergencies.

5.13 Laboratory Handling Module

For additional information refer to the CTEF document STS 99/114 *HF Handling in Laboratories*

Purpose

The Laboratory Handling Module is intended to describe, in general, the requirements for using HF in a laboratory environment. This may be a Quality control laboratory or a Research and Development environment.

Due to the nature of the work carried out in laboratories relatively small amounts of HF may be present at any one time. However, the sometimes specialist activities, e.g. dilution, transfers, etc., do have a high risk factor associated with them and should not be overlooked. Also, the personnel involved may not be experienced in the use of personal protective equipment, etc.

Content

A description of the hazards associated with HF

A description and practical exercise in the personal protective equipment required

A description of the initial first aid procedures

A detailed description of each analytical technique to be followed and the risks associated.

The location of emergency equipment.

Detailed descriptions of any generic procedures done repeatedly, e.g. dilution of Anhydrous HF.

Detailed descriptions of any waste disposal requirements.

The importance of reporting all incidents or near misses so that learning can prevent a recurrence

Detailed description of the paperwork required prior to initiating a new experiment involving HF

Audience

This training is intended for laboratory personnel involved with handling HF and their supervisors. It should also be provided for analysts working alongside colleagues handling HF.

Table 1 : Training Guidelines Matrix

| | Visitors | Plant Engineer | Plant Supervisor | Plant Operator | Tanker Operator | Plant/ Contract Maintenance | Laboratory Staff | Occupational Health (Internal or External) | Emergency Response Team | Hauliers | Other Companies in close proximity | Customers |
|----------------------------|----------|----------------|------------------|----------------|-----------------|-----------------------------|------------------|--|-------------------------|----------|------------------------------------|-----------|
| Site Induction | + | * | * | * | * | * | * | * | * | * | + | N/A |
| Plant Induction | + | * | * | * | * | * | * | * | * | * | N/A | N/A |
| HF Induction | + | * | * | * | * | * | * | * | * | * | N/A | N/A |
| PPE | N/A | * | * | * | * | * | * | * | * | * | N/A | * |
| Initial First Aid | N/A | * | * | * | * | * | * | * | * | * | N/A | * |
| Secondary First Aid | N/A | N/A | N/A | N/A | N/A | N/A | N/A | * | + | N/A | N/A | + |
| Operating Procedures | N/A | * | * | * | * | + | N/A | N/A | * | N/A | N/A | N/A |
| Tanker Procedures | N/A | * | * | * | * | + | N/A | N/A | * | * | N/A | N/A |
| Decontamination Procedures | N/A | * | * | * | * | * | N/A | N/A | * | N/A | N/A | N/A |
| Maintenance Procedures | N/A | * | * | * | * | * | N/A | N/A | * | N/A | N/A | N/A |
| Sampling Procedures | N/A | + | * | * | * | N/A | * | N/A | N/A | N/A | N/A | + |
| Emergency Procedures | N/A | + | * | * | * | * | + | + | * | * | * | * |
| Laboratory Handling | N/A | + | + | + | + | N/A | * | N/A | N/A | N/A | N/A | + |

* Recommended Training

+ Optional Training

N/A - Training not Applicable