C T E F **STS 95/98**

COMITE TECHNIQUE EUROPEEN DU FLUOR

STORAGE, TRANSPORT AND SAFETY GROUP

RECOMMENDATION ON THE C.T.E.F.

HEALTH AND SAFETY POLICY

Second edition

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HEALTH AND SAFETY POLICY

1 GENERAL

To successfully avoid accidents, a multifaceted approach is needed to manage facilities technologies and personnel.

The essential elements of this multifaceted approach can be given as follows :

- Management leadership and company commitment.
- Process safety information.
- Process hazard analysis and assessment.
- Safe design and specifications of equipment.
- Operating procedures.
- Maintenance procedures. Safe work practices.
- Training.
- Contractor safety.
- Mechanical integrity.
- Management of change.
- Incident investigation and analysis.
- Emergency Management.
- Compliance audits.

The CTEF Storage, Transport and Safety Working Group has already issued several recommendations on parts of a proper health and safety policy and mainly in the area of :

. Process Safety Information.

. Process hazard analysis and assessment.

. Safe design and specifications of all equipment and ancillaries in contact with HF.

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. Accident investigation and analysis.

. Emergency management.

. Compliance audits.

The present paper is the result of an exchange of experience of the European HF producers in the areas of :

. Training

. Safety of operation.

. Safe work practices.

. Emergency management.

1.1 TRAINING COURSES INITIAL AND REFRESHER OF OPERATORS

During the introduction period of new personnel, training is provided by the Safety & Environmental Department and by the own department. In addition, refreshing courses are provided for experienced personnel. As an example, twice a year refresher courses are given to production personnel.

Training programs include particularly :

- HF : product characteristics, hazards, health risk, safe handling, etc...

- General operating rules and safety instructions.

- Main plant procedures and safety procedures.

Training programs for first aid and for assistance in case of accident are in force. Moreover per department a safety instruction scheme is in place.

Emergency exercises are carried out periodically, simulation of possible hazardous emergencies are prepared and the operators and maintenance teams are briefed on their roles. The exercise audits the followings areas :

. Emergency procedures understanding.
. Use of personal protective equipment.
. Isolation and decontamination of plant.
. On site emergency service responds.
. Interplant communication process.
. Evacuation and head count procedure.

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Periodically the emergency exercise should involve the site safety personnel (fire brigade).

Training courses and refresher are provided to the maintenance teams on the following items :

. Hazards linked to the products.
. Safe handling of equipment.
. Personal protective equipment.
. Procedures for maintenance.
. Works permits.

1.2 PROCEDURES

A specific safety handbook should be in place basically covering all aspects of safety Management.

Main items

. General and department safety instructions in which responsibilities and competences are laid down.

. Procedure for alterations/changes of process and/or equipment (management of change).

. Safety permit system.

. Safety instructions for third party personnel working on the site.

. Accident reporting procedures.

. Reference to guidelines of the factory inspectorate, which are kept per department.

. Safety information about chemical compounds present on the site (MSDS).

. Internal audit procedures.

. Training programs.

Maintenance procedures

Procedures for routine maintenance works should be established.

For exceptional works, a specific procedure should be written inside the safety permit system.

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As a general rule :

. A plant operator must be present at any opening of circuit.

. No maintenance work can begin without a permit signed by the shift foreman or his delegate.

Contractors - See Section 1.7.

1.3 ACCIDENT AND INCIDENT INVESTIGATIONS

Accidents and incidents generally fall under three main headings :

. Local incident, investigated by plant management and operating teams. Actions to prevent a recurrence are handled locally and learning from the incident does not need to be shared with the other production areas on site : "Local Incident".

. Local incident, investigated by plant management and operating teams that brings to light actions to prevent a recurrence that other production areas would learn from: "Learning Events".

. Accidents

Lost time accidents

The investigation is again handled by plant management and operating teams but a detailed report is compiled and issued to site management for comment and approach. After which it will also be issued as "Learning Event" to other production areas and reported to the Company Safety officers.

All incidents are investigated and the learning communicated locally and to other production areas depending on the nature and severity.

All "Learning Events" are reported to CTEF.

Fault tree analysis

A fault tree analysis of the accident is done for all lost time accident and significant near misses (upon plant management decision).

1.4 AUDITING

1.4.1 Auditing of safety instructions, operating instructions, and general operation, is carried out by all members of staff. Auditing schedules are agreed with individuals at the beginning of each year and are reviewed periodically at local safety meetings.

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1.4.2 Auditing of safety instructions and operating instructions is called "Operational Auditing". This audit basically sets out to test the understanding of managers, supervisors, operators and maintenance staff in the use of safety and operating instructions.

1.4.3 Auditing of general operation, ie maintenance teams carrying out repairs to plant, or operating teams carrying out general duties, is called "Unsafe Acts Auditing". This auditing basically sets out to test the awareness of the people when they are working :

Are they working safely ?
Are they wearing the correct protective clothing ?
Are they aware at the potential hazards ?
Do they have the correct documentation ?
Do they understand fully the work in hand ?

1.5 COMMUNICATION PROCESS

Periodically line managers should meet with their teams to discuss safety, health and environmental matters. The objective is to positively influence the team and gain commitment to continuous improvement in this area.

The meeting should review the results obtained, the weak points and needs for improvement. A general plant safety improvement program should be established on a yearly basis.

1.6 SAFETY EQUIPMENT PERIODIC TESTING

Each plant should establish a list of equipment which are important for safety and therefore must be subject to periodic checks.

→ Equipment such as storage and pressure vessels and their ancillaries.

→ HF piping network, valves, relief valves and instruments.

→ Individual safety equipment.

→ Emergency communication network.

→ Safety equipment such as showers, water curtains, emergency HF absorption systems, emergency power system, shut down systems, HF detectors.

Such tests will be recorded.

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1.7 CONTRACTORS

Contractors working inside the HF plant facilities should be subject to :

- Selection based :

. on the capability and expertise

. on their ability to cope with the internal safety rules of the site

. on their organization in terms of training and safety, including their results in lost time accident indicators

. on the internal training organization for their specific works and specific risks.

- Specific training for the hazards resulting from their works inside the plant (cooperation with the plant or site HSE organization).

To facilitate the above, a nominative list of contractor workers should be established with distribution of personnel badges to the trained and recognized workers.

As a general rule, important maintenance works involving the use of cranes and engines should be made after emptying the local vessels and pipes to prevent any risk of leakage resulting from equipment falling down or shocks. If not possible suitable protection should be provided.

1.8 ACTION PLAN IN THE EVENT OF A MAJOR INCIDENT IN THE HYDROFLUORIC ACID PLANT

See also STS 79/27 recommendation on emergency plan for HF handling plants.

General principles

4 general principles are applied for the action plan :

. Alarm instructions
. Hazard prevention plan
. Plant operating instructions
. Safety analysis in accordance with major incident regulations.

1.8.1 Preventive measures

- Display of alarm instructions throughout building (stairwells, notice-boards, emergency exits, platforms).

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- Designation of emergency team and guide for the Fire Brigade.

- Continuous training of all personnel in alarm instructions, safety instructions and hazard prevention plan so as to prevent panic in the event of a major incident.

- Regular drills (at least once a year) involving Fire Brigade and plant personnel (e.g. HF leak, leak in rail tanker, HF pool in basement, etc...).

- Investigation of possible major incidents and appropriate action.
- Training of all personnel working in the plant (including those from subcontractors) using videos, safety instructions and verbal instruction.
- Updating of the documentation and specially the communication system.

1.8.2 Procedure in the event of a major incident

Alarm

- Sound internal alarm in the plant.
- Notify Fire Brigade which will in turn notify neighboring plants, Plant Security and Environmental Protection via the Central Site Warning System.
- Notify all relevant personnel (plant manager, plant supervisor, engineers, craftsmen) : to be notified by phone by shift foreman or Fire Brigade according to

a communication list.

Action to be taken in plant

- Proceed in accordance with alarm instructions.
- All persons (except emergency team) to leave building carrying gas masks.
- Proceed to designated assembly area.
- Await further instructions or all-clear.

Emergency team

- The emergency team for the plant includes the shift foreman and the control room supervisor of the plant.

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Equipment for the emergency team

- Heavy-duty breathing apparatus.
- Protective suits.
- Hand-held radios.

Tasks of the emergency team

- Shut down the plant.
- Ensure that the building has been cleared.
- Liaise with the on-site leader of the Fire Brigade (agree individual actions to be taken).

1.9 HEALTH

Level of exposure of the personnel shall be monitored by wearing from time to time personal monitoring devices.

Occupational exposure limits are at present

STEL 3 ppm or 2,5 mg/m^3

MAK 3 ppm or 2,5 mg/m^3