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Principles of on- and off-site Emergency Planning and Interdependencies between the two

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- Integrated System of Plant Safety
- Principles of on-site emergency planning
- Principles of off-site emergency planning and its linkage to the emergency response in the installation
- Concluding Remarks

Integrated System of Plant Safety

1. Prevention Principle

- The plant shall be constructed and operated in a way as to avoid accidents.
- The plant shall be constructed and operated in a way as to limit the effects of accidents.
- The plant shall be supervised by authorities and qualified technical experts.
- The plant is subject to a licensing procedure.

In the area of process technology the prevention principle shall be implemented particularly through:

- safety regulations,
- standards,
- training and instruction,
- supervision,
- licensing.

2. Consideration of Systems

Complex systems may be sufficiently examined only by means of systematic, logical methods. This is taken into account by applying:

- system analytical investigation methods,
- detailed safety analysis considering the conditions of the individual case.

3. Relativity Principle

Safety requirements are graded according to the "type and scope of hazards to be expected". To this end, rules are set up for:

- hazardous substances relevant to major accidents (substance criteria, list of substances),
- accident relevant processing (list of plants).

Content of a Typical Emergency Plan (Part I)

1 Identification section

- Name and address of plant, telephone, fax
- Distributor of the plan

2 Scope of emergency planning

3 Description of installation

- General
- Ways to the installation
- Times of operating, business hours
- Special plans, like
    - fire fighting plan after German standard DIN14095
    - energy supply plan
    - piping plan
    - wastewater catchment including water from firefighting
    - location of alarmsystem components
    - escape and rescue plans
    - emergency shut off plans
- Main hazards in the installation, like
    - hazardous substances
    - hazardous technical equipment
    - area of danger
    - area of possible danger derived from standard scenario
- Surroundings, neighbourhood
    - general
    - special vulnerable objects
    - sources of danger

Content of a Typical Emergency Plan (Part II)

4 Emergency forces and equipment

- On-site emergency forces
    - alarmcentre
    - fire fighting personal
    - medical service
    - security service
    - special expert service
- Responsible person of the installation
- Special emergency support by
    - occupational accident officer
    - environmental officer
    - clean air officer
    - major accident officer
    - water protecting officer
- Off-site emergency forces (this section is filled in by the competent authority)
- Equipment and infrastructure
    - emergency co-ordinator
    - structure of communication channels
    - mobile equipment
    - list of emergency equipment within the installation
    - measuring equipment
    - internal alarm equipment

5 Alarm-plan

- classification of different alarm steps
- alarm flow sheet

Content of a Typical Emergency Plan (Part III)

6 Warning of the public
- warning of workers
- warning of the neighbourhood

7 Organisation of emergency response
- emergency response by on-site forces
- emergency response together with external forces

8 Special events, e.g.:
- worst weather conditions
- information channel break down
- bomb alarm
- terrorist threat
- special plant procedures

9 Information of authorities and media
- information of authorities by special formula
- agreement with press, radio and TV for standardised messages

10 Equipment and experts available off-site

11 List of annexes and material of the emergency plan

Checklist for the agreement on emergency plans between operator and competent authority (examples)- Part I

1 General section

- Distributor
- Procedure for up-dating
- Description of surroundings
    - special vulnerable objects
    - public buildings
    - sources of danger
- Area of danger as results from scenario
    - dispersion calculation
    - dispersion models
    - selection of scenario
    - selection of sectors/radii for response
- Special plans, like
    - local surroundings of the installation
    - water supply
    - waste water catchment
    - energy supply
- Instant response of on-site forces
    - alarming of external support
    - internal alarm procedure
    - information channels
    - information of neighbouring installations
- On-site organisation of emergency response
- Evacuation procedure
- Shut-off procedure

Checklist for the agreement on emergency plans between operator and competent authority (examples)- Part II

2 External emergency forces

- Mission and role of on-site forces
- Emergency response strategy
- Preparation of external response
- Reservation of places for external response forces
- Informationtransfer
- Technical field headquarters
- Local field headquarters
- Shut-off procedures
- Warning of the public
- Mission and role of external forces
- Medical support
- Information of the public, media

3 Fire protection by constructive measures

- Fire safe constructions
- Safety distance
- Isolation
- Fire distinguishing water catchment
- Automatic fire detection
- Stationary fire fighting equipment
- Explosion-protection
- Emergency power supply

4 Fire protection by organisational measures

- Responsible person
- Availability of on-site fire fighting personal
- Combined training of on- and off-site forces
- Adopting a common fire protecting order for workers

5 Fire safe storage of hazardous

4 Step Alarm Scale (Classification)

Step 1

signifies an internal irregularity, for example a minor release of toxic gas, a small fire or a failure in the control system which causes an abnormal situation.

Step 2

signifies an internal danger with the possibility of a threat to the internal staff but not for the public or the environment. Examples are a runaway reaction, overheating of a pressure vessel or a small release of toxic substances.

Step 3

is announced if the danger spreads off-site. An impact of the public or the environment is likely. Examples are the release of a toxic cloud which leaves the limits of the installation or a major fire which spreads toxic fume in the neighbourhood.

Step 4

is the catastrophic level. The accident is no longer controlled by the on-site forces, here is a severe danger for the public or the environment.

4 Step Alarm Scale (Reaction)

Step 1

The firefighting forces, the police and the local authorities (Group I) are alarmed. No alert is given to the public and no measures are to be taken off-site.

Step 2

Besides the firebrigades and the police on duty the heads of their regional offices are informed also services of Group II In the case, if there are disturbing signals from the site, e.g. a fumecolumne, smell, noise of explosions, but no real danger occurs the public would be informed.

Step 3

Additional alarmgroups (group III-V) are informed. The Emergency Operation Centre (EOC) and the Technical Field Headquarters (TFH) are activated to a stand-by position. Some public emergency forces take action in response to the accidents. The common public is informed, the public which is directly endangered is instructed by radio, etc.

Step 4

The accident is classified as a disaster. All groups, including group VI,VII if necessary, are alarmed. The information of the public takes place with standardised radiomessages.

In Emergencies Acting Groups

PROFESSIONAL GROUPS

Group I

- authorities
- public services
- private fire brigades

Group II

- rescue forces
- medical services
- water/electricity supply

SPECIAL GROUPS

Group IV

- operator of hazardous installations

Group V

- persons or facilities which need special protection

VOLUNTEER GROUPS

Group III

- transport enterprises
- civil engineering enterprises etc.

Group VI

- scientists
- engineers
- experts

Group VII

- information services

Alarm flow sheet