

“Capacity Building and Strengthening Institutional Arrangement”

Workshop: Quantitative risk assessment of oil and gas plants

**Safety Management Systems Assessment
for Oil and Gas Major Hazard Industrial
Plants**

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Critical Sms Elements Identification

- From safety analysis (the main contributors of the accidents, as resulting from Authorities technical evaluation (“istruttoria”) or preliminary discussion with the operator about his own risk analysis)
- From operational experience analysis (plant operating experience or/and experience from similar plants)

Sms Inspection Aim

Check if the operator has implemented, in systematic and documented way, the main issues of the SMS established:

- POLICY AND GENERAL MANAGEMENT
- TECHNICAL ORGANIZATION AND HUMAN RESOURCES
- PLANNING OF SAFETY ACTIVITIES
- MEASURE OF PERFORMANCE
- AUDIT AND REVIEW



functions

The Operator Implements The Sms Trough:

- Policy and documents
- Definition of roles and responsibilities
- Resources
- Procedures and instructions
- Information and training of workers



**Operator
tools**

Operative Tools For The Inspections

- decree for the organization of SMS inspections (draft):
 - Annex 2 – operational experience analysis: form to filled by operator and to discussed with inspectors
 - Annex 3 – check-list on SMS elements: form to filled by both operator and inspectors
- Note: annexes are included in the procedures of the Min. Environment for the SMS inspections conducted according to DECREE 5 NOVEMBER 1997

Annex 2: Accidental Causes Form

- Joint analysis, inspectors-operator, of the operational experience
- Review of accidents forms filled by the operator including the main events (accidents, near-misses, operating deviations or management troubles, etc.) due to SMS failures occurred during the last 10 years

Accidental Causes Form: Sms Elements Analysis

Ref .no.	Date	Title	
Brief description of the event:			
SMS elements 1	Relationship between causes and SMS element	Preventive and protective measures undertaken	Other planned measures

1-according to the number assigned to elements in the SMS check-klist

Accidental Causes Form

Ref .no.	Date	Title		
<p>Brief description : strappo manichetta flessibile per errore di manovra cisterna con urto autobotte in fase di travaso; nel deposito non c'erano cartellonistica e segnaletica chiare.</p>				
Management elements ¹	Relationship between causes and SMS element	Preventive and protective measures undertaken	Other planned measures	
<p>2.ii Attività di informazione</p>	Carenza informazione autista terzista	Informazione corretta ai terzisti su regole circolazione e percorsi all'interno del deposito		
<p>4.iii Procedure operative e istruzioni</p>	Mancanza regole di circolazione e cartellonistica chiara	Ripristino cartellonistica e segnali visibili		
<p>3.iii Pianificazione adeguamenti impiantistici</p>	Carenze nella pianificazione degli adeguamenti in relazione all'evoluzione normativa	Sostituzione manichette con bracci metallici	Delimitazione fisica aree di travaso dalle aree di manovra	

1-according to the number assigned to that element in the SMS check-list (annex 3)

ANNEX 3: check-list for the inspections

- Tool for systematic and detailed SMS analysis through:
 - Documents evaluation
 - Interviews with the management
 - Inspection on site with:
 - Interviews with workers
 - Tests and observations
- 2 Check-lists:
 - general check-list
 - check-list for simple and standard establishments

Check-list for simpler and standard establishments

- Establishments where there are only:
 - loading/unloading
 - storage
 - bottling or packaging of dangerous substances

- No processes or chemical-physical transformations

Examples: LPG storage depots, petroleum products storage, pesticide warehouses, etc.

➔ Some check points are simplified:

- company organization
- personnel resources
- documents to verify
- changes and maintenance, etc.

Structure of the Check-list (1)

- 8 SMS elements (related to Annex 3 of Seveso II)
 1. Document on major hazards prevention policy, SMS structure and his its integration with the general management
 2. Organization and personnel
 3. Evaluation and identification of major hazards.
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- 25 specific points (total)
i.e. for element 2:
 - i. Definition of responsibilities, resources and planning of activities
 - ii. Information activities
 - iii. Training activities

Structure of the Check-list (2)

- For each point there are checks to be considered
(70 for the general check-list, 60 for the simplified check-list)
i.e For the point 2.ii:
 - Verify that the information activities are provided for all the involved personnel: establishment workers; third parties workers.
 - Verify that the information to the personnel is consistent with law requirements
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- Note: checks have to be considered indicative, not exhaustive:
 - Others checks are possible
 - Some checks may be “non-applicable”

- Findings and non-compliances are communicated to the operator

Verification point Outcomes

1. Documento sulla politica di prevenzione

i Definizione della Politica di prevenzione

- Verificare che sia stato redatto il documento di Politica di prevenzione e che sia stato diffuso in azienda come documento di stabilimento, o integrazione delle politiche emesse a livello più alto dell'organizzazione aziendale;

ii Verifica della struttura del SGS adottato ed integrazione con la gestione aziendale

- Verificare il SGS adottato, preveda come componenti della sua struttura complessiva:
 - la definizione della Politica,
 - l'organizzazione tecnica e delle risorse umane,
 - la pianificazione delle attività,
 - la misura delle prestazioni,
 - la verifica ed il riesame delle prestazioni.
 e che sia integrato con la gestione dell'azienda, attraverso i richiami e le integrazioni dei ruoli, delle responsabilità, delle procedure, della documentazione già previsti in azienda per gli aspetti che riguardano:
 - produzione
 - gestione della sicurezza e dell'igiene del lavoro;
 - eventuale gestione della qualità e dell'ambiente.

A cura del gestore		A cura del verificatore		
Riferimento documento SGS	Note	Criticità	Riscontro	Nota

Some definitions for the use of check-list:

- Check: description of the specific verifications made by inspectors for a point (docs exam, observation, interview)
- Finding: relevant facts found during the check, supported by objective evidences
- Non-compliances: safety technical or organizational deviation of one or more elements compared to specified requirements

Elements

1. Document on major hazards prevention policy, SMS structure and its integration with the general management of establishments
2. Organization and personnel
3. Evaluation and identification of major hazards
4. Operational control
5. Management of change
6. Emergency planning
7. Monitoring performance
8. Audit and review

Evaluation and identification of major hazards

i – Identification of dangerous substances and processes, definition of safety requirements and criteria

- Verify the presence of a system of information, updating and acquisition, with regard to characteristics of dangerous substances and processes, criteria and requirements for plant safety
- Verify that safety requirements are defined in relation to the general and specific safety objectives adopted by the establishment safety policy, and that they are verified and revised also as consequence of change of regulations or in the state-of-the-art

Evaluation and identification of major hazards

i – Identification of dangerous substances and processes, definition of safety requirements and criteria

Docs examination (examples)

- *Hazardous substances safety sheets*
- *Update plant docs (drawings, description, P&ID, etc.)*
- *General Safety criteria*
- *Specific safety criteria (i.e. for critical equipment)*
- *.....*

Evaluation and identification of major hazards

ii– Identification of possible accidental events and safety analysis (1)

- Verify that criteria for the identification and evaluation of hazardous events are defined, including :
 - Periodic updating and implementation also as result of operational experience
 - Selection of the appropriate level in technical analysis to be used (check-list,HAZOP,FTA,etc...) following the regulatory requirements and in relation to the actual plant criticality and complexity
 - Revision of the risk analysis, also with regard to the regulatory requirements, the evolution state-of-the-art and the changes
 - Assignment of the priorities in carrying out safety analysis
- Verify the consistency between the safety analysis and the operative procedures for normal, abnormal and emergency conditions

Evaluation and identification of major hazards

ii– Identification of possible accidental events and safety analysis
(2)

- Verify the arrangement of the necessary information regarding the land use planning (Decree 9 may 2001- related to art.12 of Seveso II)
- Verify that the safety analysis considers in appropriate way the human factors and the conditions in which relevant safety activities have to be carried out by the personnel (for example: response time in emergency, etc...)
- Verify that the personnel is involved in the identification of troubles and solutions

Evaluation and identification of major hazards

ii– Identification of possible accidental events and safety analysis

Docs exam (examples)

- *Hazards identification procedures*
- *Safety report or specific docs including hazards analysis results*
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Evaluation and identification of major hazards

ii– Identification of possible accidental events and safety analysis

Interviews/observations (example)

- *Verify effective involvement of management in safety analysis and their comprehension of methodologies used and results*
- *Use of operational experience of the establishment in safety analysis*
- *Interview of workers to verify their role in identification of the safety problems and in solving them*
- *.....*

Evaluation and identification of major hazards

iii– Planning and updating of technical and/or managerial solutions for the reduction of risks (1)

- Verify that planned activities for risk reduction include technical, organisational and managerial aspects
- Verify that the planned activities for risk reduction is applied take into account:
 - The level of the specific risk
 - The objectives and criteria adopted in the safety policy
 - Operative experience gained
 - The trend of the indicators of performance adopted

Evaluation and identification of major hazards

iii– Planning and updating of technical and/or managerial solutions for the reduction of risks (2)

- Verify the acquisition of information, its updating, diffusion and preservation following the evolution of rules, standards and the state-of-the-art, concerning the design, construction, operation and maintenance of plants

Evaluation and identification of major hazards

iii– Planning and updating of technical and/or managerial solutions for the reduction of risks

Docs exam (examples)

- *Programme for risk reduction*
- *procedures o instructions to get and update info on safety issues*
- *Company docs and notes to proof updating of knowledge of safety issues*
- *.....*

Interviews/observations (example)

- *Interviews of managers to evaluate level of updating on safety issues and their consideration for risk reduction programme*
- *.....*