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INDEX OF REVISIONS

REV	DESCRIPTION AND/OR REVISED SHEETS
0	ORIGINAL
A	REVISED TO COMPLY WITH REQUIREMENTS OF ITEM 8.3 OF SAFETY ENGINEERING GUIDELINE DR-ENGP-M-I-1.3
B	REVISED ITEMS 7 AND 8.10 ABOUT RISKS CLASSIFICATION

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	JUN/23/2020	DEC/14/2021	MAR/22/2022						
PROJECT	EPS	ESUP	EPS						
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THIS FORM IS PART OF PETROBRAS N-381-REV.L.



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1. INTRODUCTION

The Hazard and Operability Study (HAZOP) is an inductive and structured technique used to identify hazards in process deviations and their operability characteristics by systematically associating a set of guide words to process variables.

In the execution of HAZOP, the requirements of the National Agency of Petroleum, Natural Gas and Biofuels - ANP, NR-37 of Secretary of Labor of Ministry of Economy, Petrobras standard N-2782 - Techniques Applicable to the Analysis of Industrial Risks and Safety Engineering Guidelines - I-DR- ENGP-M-I-1.3 shall be followed.


This Technical Specification (TS) complements the hazard identification requirements of standard N-2782 and Safety Engineering Guidelines – I-DR-ENGP-M-I-1.3, in force on the date of signature of the contract. It also aims at guiding the development of the implementation of HAZOP and the execution of its respective report.


The risks assessment related to the hazards identified in the HAZOP shall be used in making decisions regarding the adoption of prevention and control safeguards regarding the deviations identified in the analysis. For each identified deviation, the need to include other measures or devices to return the system to the control levels foreseen in the project, or to stop the evolution of the deviation before the undesired consequences resulting therefrom, shall be evaluated. Existing safeguards and modes of detection for mitigation of consequences shall also be identified or recommended new ones where necessary.

2. PURPOSE

This specification has the following objectives:

- 2.1. Define the scope and criteria for conducting HAZOP for project phases of Basic Design, Detailing Design and Pre-Operation of the Floating Production Unit (FPU) and fixed units, hereinafter referred to as the Unit. This TS may optionally be used as a guide in the Operation phase of the Unit.

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<p>2.2. Guide the dynamics for the planning, development and monitoring of the study by the parties involved and their final approval.</p> <p>2.3. Define the standardization, content and minimum requirements for presentation of the HAZOP report.</p> <p>3. HAZOP SCOPE</p> <p>3.1. HAZOP shall cover hazardous events whose causes has the origin from deviations in the process variables of the analyzed Unit, considering as much both component or system failures, as possible operational or maintenance errors (human failures).</p> <p>3.2. HAZOP shall cover all unit's process systems, utilities and hull systems.</p> <p>3.3. For projects where there are several systems with multiple interfaces, HAZOP shall be done obligatorily with an integrated view of these systems, considering topside (including interface between modules), hull systems and subsea systems, giving special attention to the interfaces between them.</p> <p>3.4. General Aspects</p> <p>3.4.1. The final HAZOP report shall be issued in Portuguese (Brazil). If the contractual language of the project is English, the report shall also be issued in English.</p> <p>3.4.2. The analyzes shall be based on the data contained in the design documentation of the Unit used as reference and in the condition released by Petrobras, according to this TS.</p> <p>In case of pending or incomplete information is identified in the project documents, prior to the HAZOP or during its development, the HAZOP Consulting shall request them from the Designer in accordance with the Communication Management Plan. These requests shall be informed to Petrobras.</p> <p>3.4.3. The Consulting is responsible for searching and obtain all information necessary to carry out the HAZOP, in responsible organization,</p>			

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whether public or not, including engineering documentation, updated technical data, technical standards and applicable legislation. In case of the project is executed internally at Petrobras, the department responsible for the project will have the same responsibility as the Designer.


3.4.4. The final report of HAZOP shall contain the complete list of reference documents, indicating the revision used in the study, being responsibility of the HAZOP's Consulting the verification of completeness of the list of documents.


3.4.5. It is the responsibility of the Designer to carry out the management of change of reference documents for the realization of the HAZOP and its impacts (changes) in the study, according to ET-3000.00-5400-947-P4X-002 – Safety Studies Recommendations Management. All changes shall be informed and approved by Petrobras.

3.4.6. The final HAZOP report shall be submitted to formal approval by Petrobras.

4. DEFINITIONS

- Safety Barriers - All physical and non-physical means designed to prevent, control or mitigate accidental events. Barriers include project safeguards, and safety and operational procedures.
- Causes - These are the events that initiate the deviation, the reasons why deviations can occur. They may include equipment failure, human errors, unanticipated changes in operational conditions and others.
- Deviations - Deviations from design intentions or normal operating conditions. The relation of the applicable deviations is obtained from the combination of the process parameters (variables) with the guidewords.
- Effects - Consequences resulting from the deviation event, which may affect people, environment, asset and image of the Company.

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<ul style="list-style-type: none"> • HAZOP Consulting - Company responsible for the execution of HAZOP, which may be a contracted company, either by DESIGNER or Petrobras, or an internal Petrobras department / workforce. • Detection modes - Devices, systems or other means already existing in Unit or provided in the design, used to identify the occurrence of the deviation. Examples: Level control loops, pressure control loops, alarms, fire and gas detectors, etc. • Node - Process segment defined from process and instrumentation diagram in which process deviations are analyzed. • Assisted Operation - Support activity to the operation and maintenance teams to ensure that the operation start up is the safe continuation of the pre-operation and operation, or activity performed with the presence of operators. • Guidewords - Words or expressions applied to process parameters to qualify the deviations. • Danger - a condition or property inherent in a substance, an activity, a system or a process, with potential to cause harm to the physical integrity of people, environment, asset or image of the Company. • Designer - company responsible for the elaboration of the engineering project, which may be conceptual design, basic design, executive project design or pre-operation technical assistance, being Petrobras itself or contracted company. • Recommendations - Proposed measures to reduce the likelihood of an accidental scenario or to mitigate its consequences whenever existing safeguards are considered insufficient. • Risk - Combination of the expected frequency of occurrence of an accidental scenario with the severity of its consequence. • Safeguards - Any device, system or action, already planned in the project or existing in the Unit, that are properly sized, and operational conditions that allow effective prevention or mitigation of the scenario analyzed 			

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5. REFERENCE DOCUMENTATION:

As inputs for the elaboration of HAZOP, the following documents shall be considered, in its most up-to-date version and with status of RELEASED by Petrobras at SIGEM or another electronic document management system defined in a contract. The review of each document to be used shall be clearly indicated in the study report.

- a) Process Flow Diagrams (PFDs);
- b) Process and Instrumentation Diagrams (P&IDs)
- c) Cause and Effect Matrix;
- d) General arrangement of the Unit and the specific arrangements of the environments of hull systems, utility room / engine room, pump room, bow compartments, the accommodations, process plant and utilities;

Note: In the layout drawings, the location of the equipment with its respective identification (TAGs) shall be indicated, including also: the location of the pipe racks, the arrival location of the risers, diving areas, cranes and laydown areas, helideck, helicopters refueling stations, chemical storage, offloading stations among others. The arrangements shall have the wind rose with the indication of prevailing winds, north of design and true north.
- e) Risk Analysis Reports already performed for the Unit, including risk analyzes carried out for hull systems and subsea systems;
- f) Systems Descriptive Memorandum;
- g) Process/utilities equipment data sheets;
- h) Areas classification plan.

Depending on the project phase for which HAZOP is being prepared, some of the documents mentioned above may not be available; in this case, Petrobras shall be consulted about its relevance to the preparation of the study.

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The documentation shall be available to the HAZOP leader and to the participants at least 10 days before the study start date.

It is not allowed to perform the HAZOP with the process flow diagram only (PFD's), being obligatory the use of P&IDs.

6. REQUIREMENTS FOR THE PARTICIPATING TEAM DEFINITION

The following are the main requirements for professionals involved in HAZOP:

- The HAZOP shall be elaborated by a multidisciplinary team involving professionals from the Designer and Petrobras. The team of the Designer shall be formed by professionals who are experienced in the area they represent, with representatives of the following disciplines: process, mechanics, instrumentation / automation and control, safety, hull and subsea systems, according to the characteristics of the system being analyzed. Petrobras team may be composed of professionals from all disciplines mentioned or in part, however, there shall be full participation of process professionals (surface systems), marine systems (hull systems), operation and maintenance.
- The HAZOP leader shall have proven training in the HAZOP leadership tool and activity. He shall also have participated in at least five (5) HAZOP meetings, two (2) of which as a leader in units with a similar process.
- For elaboration of the HAZOP, the defined team shall have in its composition, function and attributions performed by each one, as follows:



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Table 1 - Basic composition of the HAZOP participating team

Function	Activities
Coordinator	<p>Professional of the Designer responsible for the event and who shall:</p> <ul style="list-style-type: none"> • organize the team; • gather up-to-date information, such as: P&IDs, project technical specifications, etc. • distribute material to the team; • schedule meetings and provide the resources for its realization;
Leader Of HAZOP	<p>Professional of the HAZOP Consulting who knows the methodology, responsible for:</p> <ul style="list-style-type: none"> • explain the methodology to be used to the other participants; • advise the meetings and define the pace of their progress; • ask participants for pending from the previous meetings; • prior evaluation of the documentation to be used in the analysis, defining the sections to be evaluated; • prepare the final analysis report.
Participants	<p>Professionals of the Designers/Suppliers and Petrobras, representatives of the design project and operation disciplines, who have knowledge about the design project of the Unit or system to be analyzed or experience acquired in similar systems/Units.</p> <p>At least one representative from each discipline shall have at least 3 years' experience in the area they represent. Each discipline shall have a professional with this experience, not necessarily the same professional, for full-time follow-up during HAZOP.</p>
Specialists	<p>Professionals from the Designer, Suppliers or even Petrobras who have advanced knowledge about specific equipment, technologies or systems that can participate on demand, according to the need.</p>

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7. PLANNING

Prior to the HAZOP, a planning stage shall occur, when shall be defined the objectives and scope of the analysis , the schedule of the meetings, the identification of the necessary documentation, the location of the meetings and the participating team in accordance with item 6.

In addition, invitations shall be sent and all the documentation to be used and this technical specification shall be previously available to the participants.

The language for conducting and recording Hazop meetings shall be defined.

During planning, all interfaces between systems shall be identified, which shall be included in the scope of the analysis, in order to guarantee their integrated analysis.

Hazop shall be performed after Preliminary Hazard Analysis (PHA) with the purpose to, in scenarios with the possibility of loss of containment (LOPC), classify the severity for all dimensions (people, environment, asset and image) based on the severities determined in PHA, according to item 8.10.

8. METHODOLOGY


The HAZOP methodology shall follow Annex C of N-2782 and consider the following information.

8.1. Regarding the assumptions adopted

a) All deviations, observations and recommendations raised during the HAZOP of the basic design project shall be re-evaluated in the HAZOP of the detailing design project, considering the treatment given to the recommendations of the previous phases of the project.

b) The documentation of systems considered as a "package" shall be added to the study documentation, or a specific HAZOP shall be performed for such a system and its interfaces, which later be attached to the main HAZOP report of the unit.

c) The unit shall always be divided into nodes, and the interfaces between the Unit's systems and the discipline of subsea systems shall be considered.

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d) HAZOP shall not consider causes that depend on the occurrence of two or more simultaneous faults. However, these causes may be considered if there are previous reports and with consequences of critical or catastrophic severity, as defined in the Risk Matrix of the Safety Engineering Guidelines

e) Visual and hearing detection, and local instrumentation can be considered as effective detection methods in cases of assisted operation.

f) Actions such as appropriate use of PPE, following existing operating procedures, specific training, and maintenance plans shall not be considered as HAZOP safeguards except when specifically designed to prevent / mitigate the hazardous scenario.

g) All deviation analyzes applicable to equipment / well A shall also apply to equipment / wells B, C and so on, provided that all are identical.

h) The analysis shall indicate possible interfaces between the systems analyzed in the HAZOP with other systems, outside the scope of the study. Where these are not verified, a note shall be included in the report informing and justifying why the interfaces were not verified.

i) All modes of operation of the process plant shall be considered.

j) Human errors may be considered as possible causes of process deviations, when related to assisted operations, or those ones that require manual actuation or associated to a possible incorrect or improper valve actuation.


k) Instruments that start alarms may be considered as detection methods, but not as safeguards.


In order for an alarm to be considered as a safeguard, the requirements on item 8.8 shall be met.

l) Control loops shall not be considered as safeguards.

m) The following items shall not be considered as causes of deviations:

- Failures in demand of safety devices (ex: PSV, SDV, BDV);

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<p>- Improper operation of manual valves with locking devices (locked, carseald);</p> <p>- Rupture of lines for the environment, except in cases where its occurrence is relevant and the team considers evaluating its possibility of occurrence and the impacts to the process;</p> <p>- Failure of check valves shall not be considered as a cause of reverse flow;</p> <p>- Simultaneous faults (except when the consequences are critical and there are previous records of that scenario occurring).</p> <p>n) Spurious actuations of relief systems that can lead a process fluid to sudden expansion, from the liquid to the vapor state; can be considered as causes of deviation. Spurious closing of SDVs can be considered as cause of deviation.</p> <p>o) All instruments, valves and equipment mentioned in the HAZOP shall have their tags explained in the worksheet.</p> <p>p) In carrying out HAZOP, the technique shall be used only for the investigation of the hazards related to PROCESSES and OPERATION, not intended to be used to implement operational improvements or project comments.</p> <p>8.2. Regarding the identification of the system nodes</p> <p>It consists of the determination by means of demarcation of the process representative points, where the deviations will be analyzed. The nodes are sections of the equipment or system, with defined boundaries.</p> <p>8.3. Regarding the identification of process parameters</p> <p>It consists of determining the process variables that affect the system in case of deviations: flow, level, temperature and pressure.</p> <p>8.4. Regarding the Identification of deviations</p> <p>Table 2 below shows examples of parameters and guidewords for the formation of deviations. Such deviations shall be recorded in the HAZOP worksheet.</p>			

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If any deviation is not applicable or has consequences considered to be irrelevant, the expressions "not applicable" or "not relevant" shall be recorded, in order to ensure that all deviations have been analyzed.

Table 2 - Examples of parameters and guidewords for the formation of deviations

Parameter	Guideword	Deviation
Flow	None	No Flow
	Lower	Lower flow
	Higher	Higher flow
	Also	Contamination
	Reverse	Reverse flow
Level	Lower	Lower level
	Higher	Higher level
Temperature	Lower	Lower temperature
	Higher	Higher temperature
Pressure	Lower	Lower pressure
	Higher	Higher pressure


Application of the guideword to the process parameter forming a deviation. The guidewords are applied to the process parameters that remain within the standards established by the design project intent or operating conditions.

8.5. Regarding the Identification of possible causes

For each deviation identified in the previous step, the possible causes shall be raised. These causes can comprise inherent failures of equipment, (ruptures, instrumentation failures, etc.), as also as human operating errors. Table 3 shows examples of causes linked to the deviations identified.

Table 3 - Examples of causes related to identified deviations

Deviation	Possible Causes
No Flow	Improper alignment; Improper blocking; Equipment failure (pump).
High level	Output blocked; Failure in control loop Failure in level measurement

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Low pressure	Condensation Failure in control loop Improper opening of drain valve
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Note: When fault in the control loop is considered as cause, it may be related to the failure of the actuator, the sensor element or the control logic.

8.6. Regarding the identification of possible effects

For each deviation identified, the possible effects shall be related. Examples:

- a) Loss of containment in systems and equipment;
- b) Damage to the functionality or integrity of equipment and systems;
- c) Loss of specification of process streams;
- d) Production losses, etc;
- e) Environmental Contamination (water resources / air contamination);
- f) Operational disturbance.


The HAZOP team must include as a premise of the study that the assessment of the consequences from the loss of containment (e.g., fire, explosion, etc.) and the mitigating safeguards applicable to these scenarios will be scope of the PHA (Preliminary Hazard Analysis) assessment.

Consequences such as mechanical explosions of equipment and/or piping (e.g., flame return, formation of an explosive atmosphere inside equipment, rupture of the exchanger shell, etc.), which are not within the scope of the PHA evaluation and are intrinsic to the evaluation of the HAZOP may be considered, if applicable.

8.7. Regarding detection modes

These are devices, systems or other means already existing in the installation or planned in the project, used to identify the occurrence of the deviation. Examples: alarms, gas detectors, etc.

8.8. Regarding the identification of safeguards

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When the safeguard aims to reduce the frequency of occurrence of the accidental scenario, it will be considered as Preventive Safeguard (PS) and when it reduces the severity of the consequence, it will be considered Mitigating Safeguard (MS).

Each safeguard shall be identified, that is, describe the means available to eliminate the cause of the deviation, reduce its OCCURENCE frequency or minimize its consequences.

When the HAZOP analysis identifies the need for a safeguard and it is not present in the project documentation under analysis, even if provided for in a project standard or guideline, this shall be included as a recommendation. Typical examples of safeguards (protection barriers):


- a) PSHH with closing action of the vessel inlet valve;
- b) Relief and safety valves (PSVs);


Interlock actions shall be recorded in the safeguard column.

The operational procedure contemplating the operator response associated with a process variable alarm may be considered as a safeguard in an accidental scenario, provided that it meets all requirements:

- The alarm shall be generated in a location where the operator is present continuously (control point permanently assisted) and can recognize it;
- Field alarm and response devices shall have initiators independent of the interlocking loop;
- The response time to the alarm shall be enough for the operator to take the actions planned to interrupt the scenario;
- The action taken is effective to minimize risk without exposing the responding operator.

In this way, the alarm, the element to be actuated and the operating procedure are integral parts of the "operator response to alarm" safeguard. Operational procedures and alarm, without regard to the above, cannot be considered as safeguards.

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<p>8.9. As regards the identification of additional recommendations, observations and additional comments</p> <p>Recommendations are proposed measures to prevent the occurrence of the accidental event or mitigate its consequences whenever the existing safeguards are considered insufficient.</p> <p>Recommendations shall be clear, concise, well-defined and preceded by action verb. Terms such as plan, design, elaborate, identify, specify, install, etc. shall be complemented by conclusive actions.</p> <p>The designer shall manage the implementation of the recommendations generated in HAZOP, including the impact on the revision of reference documents used in HAZOP. For each recommendation, the company or organization responsible for its implementation shall be identified according to ET-3000.00-5400-947-P4X-002 - Management of Safety Studies Recommendations.</p> <p>Observations are complementary information that can be recorded in order to clarify the scenario analyzed, without, however, requiring any action.</p> <p>Further comments are general or specific information that may contribute to clarification of aspects considered in the study, but which do not fit into recommendations or observations.</p> <p>The recommendations generated in the HAZOP will be identified as Rxxx, the observations will be identified as Oxxx, and the Additional Comments will be identified as Cxxx, where xxx corresponds to the sequential numbering.</p> <p>8.10. Regarding the risks classification</p> <p>In pre-operation and operation reviews, HAZOP shall have the risks classified according to the risk matrix of the Safety Engineering Guideline.</p> <p>The scenarios that generate recommendations shall be classified without the recommendations and also with the implementation of the recommendations (residual risk).</p> <p>In loss of primary containment scenarios, the possible effects shall be considered for the classification of severity, such as: fire, intoxication, explosion etc.</p>			

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For the determination of initial risk in Hazop, the categorization of the severity of the residual risk generated in the PHA (severity considering the PHA recommendations) shall be used as initial estimate, but it shall be evaluated if there are no specific consequences in the Hazop scenario that result in a greater severity than determined in the PHA. In Hazop, the recommendations generated shall be considered for the classification of residual risk.

9. REQUIREMENTS FOR HAZOP MEETINGS

Meetings shall follow the following guidelines:

9.1 Planning Meeting


This meeting is designed to summarize the project in question, define the objectives and scope of the contracted study, as well as evaluate and make the necessary adjustments in the work schedule proposed by the HAZOP Consulting, where the minimum agenda shall be:

- Sizing of Petrobras teams, designer and HAZOP Consulting (preparation of list of participants to issue invitations);
- Clarifications on objectives and scope of the study;
- Prior analysis of all necessary documentation for the execution of the HAZOP and elaboration of pending list, if any, for supply by the Designer;
- Presentation of the proposal for the schedule of meetings by the HAZOP Consulting and evaluation of this schedule to meet the project schedule;
- Definition of locations, resources needed and duration of meetings;

Participants: Representatives of Petrobras, designer and HAZOP Consulting (mandatory participation of the leader of HAZOP).

9.2 Initial HAZOP Meeting and other study development meetings

At the initial HAZOP meeting, the Leader shall address the following topics:

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- Safety briefing on the place of performance;
- Presentation of participants;
- Presentation of the objective and scope of the analysis;
- Presentation of the schedule of meetings;
- Brief presentation of the methodology and premises;
- Short description of the Unit;
- Presentation of a summary of the historical analysis of incidents occurring in the Installation or other similar installations.
- Description of the systems to be analyzed and indication of HAZOP nodes;

The other HAZOP meetings shall address the following topics:


- Presentation of new participants, if any;
- Description of the systems to be analyzed and indication of HAZOP nodes;

Participants: Professionals from Petrobras, HAZOP Consulting and Execution Engineer (including the HAZOP Leader), as defined in item 6 of this TS.

10. HAZOP REVIEW

The HAZOP shall be reviewed in the following cases:

- a) at each phase change of the project (mandatory all systems);
- b) when changes in the project occur that generate new risk scenarios and/or change the risks previously considered.
- c) when Petrobras detects systemic or critical deviations from reports in relation to this specification;
- d) in the pre-operation and operation phases in the situations established in the Company's operational safety management standards.

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11. REPORT CONTENT

The HAZOP report shall be submitted with the N-1710 compliance coding and N-381 formatting, and it shall be issued within five (5) business days after the conclusion of the meetings.

The HAZOP Report shall include at least the following items:

1. Purpose and scope of the analysis;

Description of the searched objectives with the application of the technique, the scope covered by the analysis, and the structure of the report.

2. List of participants

The list of participants shall contain the general data of each participant (full name, company, company position (management), position, contact email, discipline representing and time of experience in it).

A daily presence list shall also be generated and shall be signed by each of the participants in the meetings held.

3. Executive summary

4. Introduction


The introduction shall contain the description of the Unit, its capacity (POB), description of the analyzed systems, considering modes of operation, and any relevant aspects related to the study.

5. Justification and description of the HAZOP technique

6. List of reference documents

All the documents that were used for the study with their respective revisions shall be listed.

7. Historical Analysis

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Consider the historic analysis of incidents occurred in the Unit or other similar Units;

Shall be presented evidence that the occurrence of accidental scenarios in similar units, especially at Petrobras, with the respective Reports of Treatment of Anomalies (RTA), when applicable, whose cause is associated with deviations of process variables, were considered. International database events can be used, considering the applicability of the data to the project (unit type and complexity, sea conditions, modes of operation of the unit / equipment, etc.).

The historical analysis shall be presented to all participants on the first meeting day, before the start of HAZOP.

References that can be used to elaborate the historical analysis:

a) Hydrocarbon Release Data Base (HCRD - HSE)

b) WOAD -World Offshore Accident Database -
<https://www.dnvgl.com/services/world-offshore-accident-database-woad-1747>

c) Report Blowout and Well Release Characteristics and Frequencies, 2014 - SINTEF Technology and Society - Safety Research 2014-12-30;

d) Accident Statistics for Floating Offshore Units on the UK Continental Shelf 1980-2005. HSE Research Report RR 567 2007;


e) Process Release Frequency, OGP 2010;

f) Accident Statistics for Fixed Offshore Units on the UK Continental Shelf 1980-2005, HSE Research Report RR 566 2007 -
<http://www.hse.gov.uk/research/rrhtm/rr566.htm>

g) Reports of Treatment of Anomalies - Petrobras' RTA.

8. Assumptions Adopted in HAZOP

9. List of recommendations

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It shall be presented in a table to enable management of the implementation of the recommendations. It shall be listed in this table, the person responsible for implementing each recommendation as well as the scenario number and corresponding node.

10. List of observations

The corresponding scenario number and node shall be displayed in a table.

11. List of Additional Considerations

These shall be presented in a table along with the identification of those responsible.

12. Conclusions

This item shall contain, at least, the following information set out below:

- Total systems and scenarios evaluated;
- Total of recommendations and observations generated;
- Identification of interfaces between topside systems and their modules, naval systems and submarine systems, indicating the HAZOP scenarios in which such interfaces were analyzed. The studies of Hull and Submarine disciplines that also contain analysis of these interfaces shall be related.


13. References

14. Annexes

A. Filled HAZOP Worksheets

All completed worksheets shall be presented in the analysis run. The scenarios shall be numbered in order to facilitate their identification, and scenarios related to different systems of the Unit cannot have the same numbering.

B. Documents reviewed

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An annex shall be included in the report with all analyzed P&IDs, with segments (nodes) analyzed, identified and highlighted, among other relevant documents.

C. Signed presence list.

The daily presence lists (morning and afternoon) shall be attached, which shall be signed by the participants in each of the meetings. The lists shall inform which systems were analyzed at each meeting.

D. List of Barriers.

A list of barriers shall be drawn up and annexed to the final report, which lists their respective safety barriers for each of the accidental scenarios and classifies them as preventive or mitigating barriers.