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# 090 – Norwegian Oil and Gas recommended guidelines on a common model for safe job analysis (SJA)

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*Original version*

## PREFACE

These guidelines are recommended by the Norwegian Oil and Gas' HSE Forum and by the Operations Committee. They have also been approved by the director general of Norwegian Oil and Gas.

The responsible for this guideline in Norwegian Oil and Gas is the special advisor for operations.

These guidelines have been developed through a collaboration between Working Together for Safety (SfS), the Norwegian Shipowners Association (NR), the Federation of Norwegian Industries (NI), the unions and Norwegian Oil and Gas.

The guidelines are owned and administered by Norwegian Oil and Gas.

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## 1 INTRODUCTION

### 1.1 Purpose

The purpose of this model is to establish a common practice for the use of safe job analysis (SJA) on the Norwegian continental shelf (NCS). The guidelines describe when and how an SJA should be carried out.

### 1.2 Scope

These guidelines apply to the implementation of an SJA on fixed and floating facilities on the NCS.

### 1.3 Definitions and abbreviations

NCS	Norwegian continental shelf
SJA	Safe job analysis
WP	Work permit
Risk	Risk means the consequences of the activity with associated uncertainty
Uncertainty	Uncertainties about the type of incidents and consequences.
Knowledge	Data, information, justified beliefs
Strength of knowledge	The strength of knowledge expresses how good the background information is when assessing a risk and estimating the potential consequences and associated probability. The strength of knowledge supports the assessments made about probability and consequences. It is assessed as weak, medium or strong by looking at:  <ol style="list-style-type: none"><li>1) judgements/reasonableness of assumptions</li><li>2) quantity and relevance of data/information</li><li>3) degree of agreement on and understanding of the work operation (phenomena).</li></ol>
Robustness	Opposite of vulnerability. A low level of vulnerability means a high level of robustness and vice versa.

## 2 SAFE JOB ANALYSIS

An SJA is a systematic, step-by-step review of risk ahead of a work activity or operation. It is carried out in order to identify and eliminate identified risks and to control these.

### 2.1 Organisation and roles related to carrying out an SJA

It is assumed that the roles described below are implemented in the company's organisation.

#### 2.1.1 Roles in an SJA

##### **Person responsible for the SJA**

When an SJA is to be carried out, a person must be appointed to be responsible for it. This could be the responsible leader for the work to be done, the area/operations supervisor or somebody else who has been assigned this responsibility for the relevant job.

The responsible person must

- ensure that the team which will carry out the SJA has the appropriate expertise
- ensure that the necessary preparations are made
- ensure that an SJA meeting is called
- chair the SJA meeting
- document participation and analysis results
- sum up experience after the work has been done.

This person is responsible for ensuring that implementation of the identified measures is followed up, and for ensuring that the analysis accords with the common model for SJAs.

##### **Person responsible for execution of the work**

The person who is responsible for execution of the relevant work activity/operation.

##### **Executing personnel**

Everyone involved in executing the relevant work activity/operation.

##### **People responsible for measures**

The individuals who have been given responsibility for implementing measures identified and documented in the SJA.

##### **Area/operations supervisor**

The supervisor/manager responsible for the area or plant where the work is to be done, and who will be involved in approving the work. If responsibility for the area and operation is shared between two posts, both must participate in exercising this role.

##### **Area technician**

A technician or operator with operational responsibility for the area or plant where the work is to be done. If operational responsibility is shared between two posts, both must participate in exercising this role.

**SJA group**

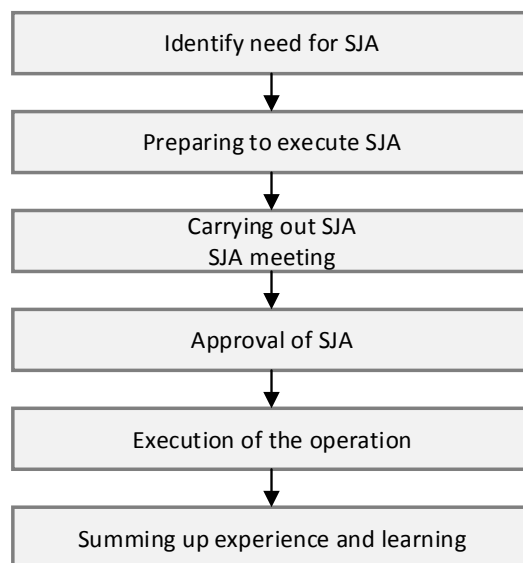
The personnel who participate in carrying out the SJA. This group will normally comprise everyone involved in preparing and executing the work.

It can include:

- person responsible for the SJA (must always attend the SJA meeting)
- person responsible for execution of the work
- area/operations supervisor or a person they designate
- area technician(s)
- executing personnel
- relevant safety delegates
- personnel with specialist expertise relevant to the analysis
- the HSE function.

### 3 METHOD AND REQUIREMENTS WHEN PLANNING AND CARRYING OUT AN SJA

Planning and executing an SJA is carried out in accordance with the main steps presented in the flow diagram below.



*Figure 1: Main steps in an SJA.*

#### 3.1 Identifying the need for an SJA

The need for an SJA is assessed through several phases, from planning the job until its execution. Everyone involved in planning, approving and executing the work and work permits (WPs) must assess the need for an SJA.

Hazards must be identified, and control over these must be documented. If hazards are not under control, a risk analysis must be carried out.

Factors emphasised when identifying the need for an SJA:

- Is the work described in procedures or routines, or are exemptions from these required?
- Have hazards in the individual sub-tasks been identified?
- Have undesirable incidents occurred earlier with this type of work?
- Does the work operation involve several disciplines/units?
- Is new equipment or methods not covered by procedures or routines being used?
- Do the personnel involved have experience with the work operation?

If the risk is adequately clarified and controlled through applicable procedures or an approved WP, an SJA will not be required.

### 3.2 Preparations for an SJA

The person responsible for the SJA must ensure that the necessary preparations are made ahead of the SJA meeting. These include:

- Acquiring data, drawings, previous experience and possible risk assessments which might be available for the relevant work
- Producing forms and making a preliminary breakdown of the work into its sub-tasks and sequence
- Assessing preconditions for the work
- Defining which people should participate in the SJA
- Calling the SJA meeting.

The scope of these preparations will depend on the nature of the work. A new SJA must be carried out for each new job (even if one has been done earlier for the same type of work). Earlier SJAs are used for experience transfer and learning lessons.

The table below show how the person responsible can fill out the SJA form. See appendix E.

Table 1: Guidance for filling out the SJA form – top section

<b>Standard SJA form – top section</b>	<b>Identification/description of the job and preconditions</b>
<i>SJA title</i>	Brief descriptive title for the job
<i>SJA no</i>	Serial number for the SJA if the company uses this system
<i>Dept/discipline</i>	Name of department/discipline which is to do the work
<i>Person responsible for the SJA</i>	Name of the responsible person
<i>Description of the work</i>	Brief description of the work
<i>Facility</i>	Name of the facility where the work will take place
<i>Area/module/deck</i>	Name of area/module/deck where the work will be done
<i>No of equipment/pipeline</i>	Number of the equipment/pipeline to be worked on
<i>Preconditions</i>	Specify possible preconditions for the work
<i>WP/WO no</i>	Reference to the number of the work permit/order
<i>Number of appendices</i>	Specify number of appendices to the WP form

### 3.3 Carrying out an SJA

#### **SJA meeting**

The SJA is carried out by the SJA group. Good communication and dialogue in the meeting will ensure that all aspects are covered. All participants must have an opportunity to contribute. Each person's expertise is used to identify the steps in the work and their hazards, and to develop good solutions. Verify that the content of the analysis is understood by everyone involved.

The SJA form in appendix E is used for the SJA meeting.

The person responsible for the SJA ensures that the following are reviewed:

- The job to be done
- The preconditions for doing the job
- Available plans and other preparatory materials.

#### **Inspection of the worksite**

An inspection of the worksite will be required in many cases. The SJA meeting will consider this and undertake any possible inspection.

#### **Define sub-tasks**

Break the whole job down into its sub-tasks.

1. Briefly describe each sub-task.
2. Specify their sequence.
3. Describe what is to be done.
4. Use action words, such as "take", "remove" or "open".

#### **Identify hazards**

Possible incidents and conditions which could pose hazards for personnel, the environment or financial assets must be identified for each sub-task. The following must be assessed.

1. Which incidents and conditions could create hazards while the work is being done? (eg, crushing injuries, dropped objects or exposure to hazardous substances)
2. Which incidents and conditions could create hazards later? (eg, finishing the work with a valve in the wrong position or forgetting tools at the work site)
3. Could an error in doing the work lead to a major accident, either immediately or later? (eg, wrong type of gasket, wrong torque table or a valve inadequately secured against changing position)

#### **Risk assessment**

Assess the potential consequences of the identified hazards. If these may be unacceptable, assess the probability of the incident occurring.

When executing the work activity/operation, attention must be paid to identified hazard signals. An example of the enhanced risk matrix that can be used is shown in Appendix B

#### **Identified measures**

Measures which can prevent an incident occurring must be identified and given priority.



When a particular potential exists for very serious consequences, priority is given to measures for strengthening knowledge and reducing uncertainty. If the knowledge base is judged to be weak, other specialists should be brought in to carry out the analysis.

Emphasis must also be given to measures which will strengthen robustness in the event that something unexpected occurs.

### **Using a checklist**

A checklist is used as an aid to providing quality assurance that possible hazards, consequences and measures have been assessed. A standard checklist is provided in appendix C. This can be supplemented if and when required.

### **Allocate responsibility for measures**

Responsibility for the identified measures must be identified and entered on the SJA form. Those responsible for measures must follow up and ensure that the measures are implemented.

### **Assess residual risk and conclude the analysis**

Finally, the SJA will make an overall assessment to determine whether the work can be done. This assessment determines whether the residual risk of the work/operation is acceptable.

### **Documentation and signature**

The SJA is documented on the SJA form, appendix E. This form is signed by the person responsible for the SJA on behalf of the SJA group.

The SJA checklist, appendix C and a signed list of participants is attached to the SJA form. A standard list of participants is presented in appendix D.

The table below shows how the person responsible can complete the SJA form.

Table 2: Guidance on completing the SJA form – middle section

<b>Standard SJA form – middle section</b>	<b>Breakdown into sub-tasks, identification of hazards, consequences, measures and those responsible for measures</b>
<i>No</i>	Serial number for the sub-task
<i>Sub-tasks</i>	Brief description of each sub-task, step by step The job is broken down into logical steps Each step specifies what is to be done (not how) Hazards or safety measures are not described in this phase, but later Sub-tasks are described in their normal sequence Each step begins with an action word, such as “take”, “remove” or “open” Only a few words are normally used to describe each step Avoid creating overly detailed or extensive steps
<i>Hazards (source, cause, incident)</i>	List hazards for each sub-task (source, cause, incident). The following must be covered. <ol style="list-style-type: none"> <li>1. What incidents or conditions could lead to hazards while the job is being executed?</li> <li>2. What incidents or conditions could lead to hazards later?</li> </ol> Could an error when executing the job lead to a major accident, either immediately or later?
<i>Possible consequences</i>	Possible consequences are listed for each hazard/cause. In this phase, a risk matrix like the one presented in appendix B could well be used as an aid to support the risk assessment.
<i>Measures</i>	Measures are listed for each consequence where considered necessary. These measures are based on a risk assessment, preferably an enhanced risk matrix which also covers strength of knowledge, as presented in appendix B.
<i>People responsible for measures</i>	Enter the name of the person responsible for implementing each measure.

Once this has been done, a checklist is used as an aid to providing quality assurance that possible hazards and consequences for the individual step in the work have been assessed.

When the analysis has been completed, the SJA group must consider whether the residual risk is acceptable and conclude the analysis. The bottom section of the SJA form is used for this.

The table below shows how the person responsible can complete the SJA form.

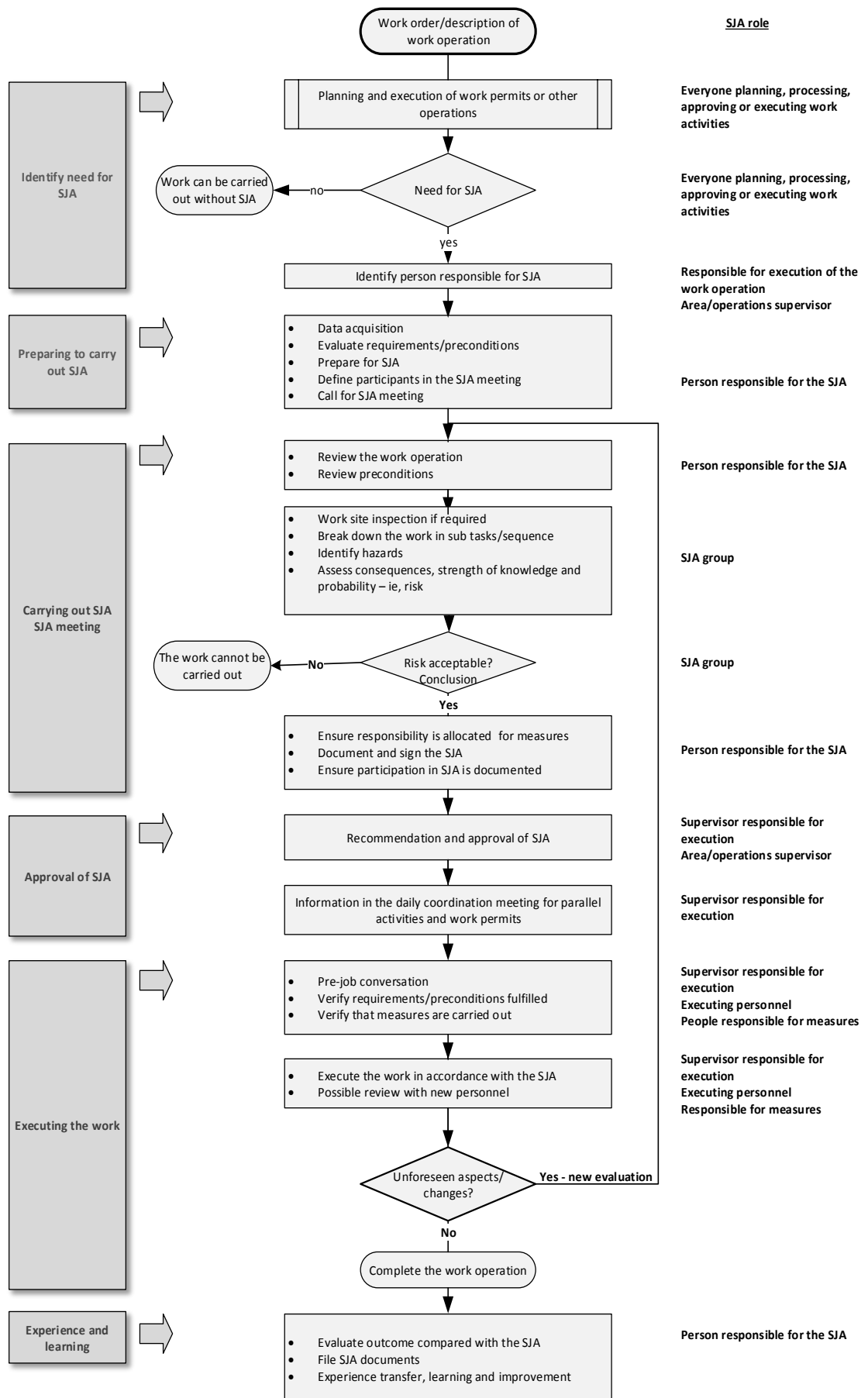
Table 3: Guidance on completing the SJA form – bottom section

<b>Standard SJA form – bottom section</b>	<b>Conclusion of the analysis and approval</b>
<i>Is the total risk acceptable (Yes/No)?</i>	Enter Yes or No here.
<i>Hazards during the actual work</i>	Enter which hazards require attention during the actual work, and potential measures. Appendix E.
<i>Conclusion/comments</i>	Enter a brief conclusion from the analysis carried out. A basis here is the checklist in appendix C.
<i>Recommendation/approval Date/signature</i>	Fields for signatures.
<i>Person responsible for the SJA</i>	Signature of person responsible for the SJA on behalf of the SJA group.

Documentation of participants in the SJA makes use of the standard participant list provided in appendix D.

A detailed work flow is presented on the following page.

Figure 2: Detailed workflow



### 3.4 Recommendation and approval of the SJA

The SJA form is reviewed and recommended by the person responsible for execution of the work, and then approved by the area/operations supervisor.

Information on planned jobs which require an SJA must be given in the daily meeting to coordinate WPs and parallel activities on the facility.

The table below show how the responsible person can fill out the SJA form.

*Table 4: Guidance on how the person responsible for an SJA can fill out the SJA form.*

<b>Standard SJA form – bottom section</b>	<b>Conclusion of the analysis and approval</b>
<i>Recommendation/approval/date/signature</i>	Fields for signatures
<i>Responsible for execution of work</i>	Recommendation by the person responsible for execution of the work
<i>Area/operations supervisor</i>	Approval by area/operations supervisor
<i>Other post</i>	Field available for possible approval by person in a different post.

### 3.5 Execution of the work

#### **Pre-job conversation**

Personnel involved in the work operation are assembled before starting for a review of the job, if this has not been done in the SJA meeting.

#### **Verification**

Before and during the job, the person responsible for the work must ensure that the preconditions for carrying it out are met, and that planned measures have been implemented.

#### **Unexpected incidents/changes**

If changes occur to the preconditions described in the SJA during the job, work must cease and a new assessment be made.

#### **Change of personnel**

Should the person responsible for execution of the work leave the facility, a new responsible person must be appointed. The personnel involved must be informed.

Should personnel executing the work be replaced before or during the job, the person responsible for executing the work must ensure that the SJA documentation is reviewed with their replacement(s). This review must be documented by signing the participant list.

Before work starts, implementation of the measures decided upon must be verified.

### 3.6 Summing up experience and learning lessons

#### **Evaluation**

After the work has been completed, the person responsible for the SJA must sum up experience gained and register this on the SJA form. Relevant issues include: did the assumptions change, did unforeseen hazards arise, were there external conditions or interfaces which affected the work in an unexpected way?

#### **Archiving**

The SJA documentation must be archived in accordance with each company's routines.

#### **Experience transfer, learning and improvement**

Experience from work which requires an SJA should be used when preparing and improving procedures and with future work of a similar nature.

This will make it easy to refer back to and draw on the experience gained on later occasions or in connection with improving routines and procedures.

### 3.7 Expertise requirements for SJAs

Personnel involved in work operations which require an SJA must have expertise appropriate to the role they will play in carrying out the SJA.

That includes taking interactive e-learning courses on SJAs.

## APPENDIX A: REVISION HISTORY

### Revision 4:

Amendments to language and structure in the guidelines have been made to improve their user- and reader-friendliness. Tables and figures which describe the work process for planning and carrying out an SJA have been incorporated in the actual guidelines.

The wording has been clarified to take account of the correct expertise composition for the team which is to carry out an SJA. This is described in more detail in section 2.2.1 on roles in an SJA.

An amendment has been made in section 2.1.1. to emphasize that the SJA responsible person must ensure that the team which will carry out the SJA has the appropriate expertise.

The guidelines have been based on the new clarification of the risk concept in the regulations.

Appendix B provides an example of an enhanced risk matrix with the new clarification of risk. In addition, a link has been included to a film which demonstrates the use of a risk matrix of this kind.

Clarifications have been made to appendix C – Standard checklist for safe job analysis (SJA). Changes to the wording have been made to the following items: A1, A2, A3/B1, B2/C1, C3, C5, C6, C7/E1, E2/F 3/G1, G2/H6.

## APPENDIX B: AN ENHANCED RISK MATRIX – EXAMPLE

Company-specific matrix are used.

Below is an example of an enhanced risk matrix that can be applied.

[Safe Job Analysis film](#)

### **Assessing hazards – probability and consequence**

In a number of cases, it could be appropriate for the SJA group to use an enhanced risk matrix for assessing hazards – in other words, assessing the probability that an undesirable incident will occur, its consequences and the strength of the knowledge which these assessments build on.

The assessment method provides a rough qualitative approximation, and high-risk hazards could well be the subject of a more detailed assessment later.

### **Using the risk matrix**

An enhanced risk matrix is used to assess/specify risk by specifying the probability of an undesirable incident along one axis, the severity of its consequences along the other, and the strength of the underlying knowledge by different colours, for example.

The risk is specified by different colours, for example. This is done for each sub-task – see the SJA form. Measures will need to be taken if the risk, expressed in terms of probability, consequences and strength of knowledge, is judged to be relatively high.

Each company will normally have its own matrices for use in risk analyses. However, a simplified version like the one presented below, with three levels of probability, severity of consequences and strength of knowledge, could be advantageous when carrying out an SJA.

Table 4: Enhanced risk matrix

		Probability		
Consequence/ severity	Strength of knowledge	Low	Medium	High
<b>Low</b>	<b>Weak</b>	M	M	H
	<b>Medium</b>	L	M	H
	<b>Strong</b>	L	L	M
<b>Medium</b>	<b>Weak</b>	M	H	H
	<b>Medium</b>	M	H	H
	<b>Strong</b>	L	M	H
<b>High</b>	<b>Weak</b>	H	H	H
	<b>Medium</b>	H	H	H
	<b>Strong</b>	M	H	H

H: high risk, M: medium risk, L: low risk.

### Severity of consequences

High	Death, serious personal injury or illness, extensive pollution, extensive damage to equipment or material assets, significant deferred production, substantial gas/oil leak, safety integrity weakened for all or large parts of the facility.
Medium	Lost-time injury or minor personal injury, limited pollution, limited damage to equipment or material assets, limited deferred production, minor gas/oil leak, safety integrity weakened for part of the facility (such as a module).
Low	No personal injury, little/insignificant pollution, little/no damage to equipment or material assets, insignificant deferred production, insignificant gas/oil leak, local/negligible weakening in the facility's safety integrity.

### Probability

High	Probable, occurrence assessed as possible several times in a year.
Medium	Possible, occurrence assessed as possible occasionally, not every year, has occurred on the facility.
Low	Unrealistic, but conceivable, has occurred in the industry.



### **Strength of knowledge**

The knowledge which underpins the assessments of probability and consequences is assessed as weak, medium or strong by looking at:

- the reasonableness of the assumptions made
- available or relevant data/information
- degree of agreement in the group
- understanding of the work operation.

### **Overall risk assessment**

An overall risk assessment can be obtained by comparing consequences, probability and strength of knowledge. With strong background knowledge, a risk description will be as shown in the standard risk matrix based on probability and consequences. With weak and medium background knowledge, the risk increases by one level.

## APPENDIX C: STANDARD CHECKLIST FOR SJA

See the next page.

NO	Checklist for SJA no: SJA title:				Comments (must be completed if No is ticked)
		Yes	No	N/A	
<b>A</b>	<b>Documentation and experience data</b>				
1	Is the work team familiar with the work operation?				
2	Is an applicable procedure/set of instructions/job package available for the work operation?				
3	Have experience and/or undesirable incidents from similar work operations been taken into account?				
<b>B</b>	<b>Expertise</b>				
1	Are necessary personnel and expertise available for the work operation?				
2	Are necessary personnel present at the SJA meeting?				
<b>C</b>	<b>Communication and coordination</b>				
1	Has communication with possible other units/work teams been established?				
2	Are suitable means of communication in place?				
3	Are parallel activities coordinated within the system, area and facility?				
4	Has it been clarified who will be leading the work?				
5	Has sufficient time been allocated for the work operation?				
6	Has the response to possible alarms or emergencies been assessed?				
7	Are emergency response functions informed of possible conditions which could affect them?				
<b>D</b>	<b>Key physical safety systems</b>				
1	Are barriers for reducing the probability of undesirable leaks intact and will they remain so (safety valves, piping, tanks, control systems, etc)?				
2	Are barriers for reducing the probability of an HC leak intact and will they remain so (detection, overpressure, disconnection of ignition sources, etc)?				
3	Are barriers for isolating leak sources/leading hydrocarbons to a safe area intact and will they remain so (process/ESD systems, blowdown systems, Xmas trees, drains, etc)?				
4	Are barriers for extinguishing or limiting the scope/spread of a fire/explosion intact and will they remain so (detection/alarm, fire pumps, extinguishing system/ equipment, etc)?				
5	Are barriers to help ensure safe evacuation of personnel intact and will they remain so (emergency power/lights, alarms/PA, escape routes, lifeboats, etc)?				
6	Are barriers to help ensure the stability of floating facilities intact and will they remain so (watertight bulkheads/doors, open tanks, ballast pumps, etc)?				
<b>E</b>	<b>Equipment covered by the job</b>				
1	Is necessary isolation from energy dealt with (rotation, pressure, voltage, etc)?				
2	Are possible hazards from high temperatures dealt with?				
3	Is machinery protection/shielding sufficient?				
<b>F</b>	<b>Equipment for doing the job</b>				
1	Is lifting equipment, special tools and equipment/materials for the job known, available, checked and found to be in order?				
2	Does everyone have correct and adequate protective equipment?				
3	Have possible hazards from uncontrolled motion/rotation of equipment/tools been assessed and dealt with?				
<b>G</b>	<b>The area</b>				
1	Has an inspection been carried out to verify access to and knowledge of the work area and its working conditions?				
2	Has account been taken of work at height, several levels and dropped objects?				
3	Has account been taken of flammable gas/liquid/materials in the area?				
4	Has account been taken of possible exposure to noise, vibration, toxic gas/liquids, smoke, dust, vapour, chemicals, solvents or radioactivity?				
<b>H</b>	<b>The workplace</b>				
1	Is the workplace clean and tidy?				
2	Are marking/signs/cordons required?				
3	Have transport conditions to/from the workplace been taken into account?				
4	Are additional guards required?				
5	Have weather, wind, waves, visibility and light been taken into account?				
6	Have access and escape been assessed?				
7	Have work position/threat of occupational illness been taken into account?				
<b>I</b>	<b>Local supplementary questions</b>				
1					



## APPENDIX E: STANDARD SJA FORM

SJA title:		SJA no:		Dept/discipline:		Person resp for the SJA:	
Description of the work:				Facility:		No of equipment/ pipeline:	
				Area/module/deck:			
Preconditions:				WP/WO no:		No of appendices:	
No	Sub-task	Hazard/cause	Possible consequences	Measures		People responsible for measures	
Is the total risk acceptable?: (Yes/No)		Recommendation/approval		Date/signature		Check that the checklist for the SJA has been reviewed	
Conclusion/comments:		Person resp for SJA		(Recomm)		Summation of experience after the job:	
		Resp for execution of work		(Recomm)			
		Area/operations supervisor		(Approve)			
		Other post		(Approve)			