AZERBAIJAN BUSINESS UNIT

(AzBU)

Procedure for:

Task Risk Assessment

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HSE - SAFETY

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1 INTRODUCTION

1.1 Purpose

It is a requirement of the Permit to Work procedure employed within BP AzBU that a Task Risk Assessment is carried out before any permits are issued.

The purpose of this procedure is to describe the Task Risk Assessment process employed by BP AzBU in support of the Permit to Work System.

It is a requirement of 'Getting HSE Right' and the 'Golden Rules of Safety' that the Hazards associated with BP activities are identified and that the Risks are assessed and managed.

1.2 Deviations

The procedures are written in sufficient detail that they should be able to be applied consistently at all sites. There may still be the requirement for some local rules covering site-specific logistical/administrative arrangements and local variations in responsibilities to reflect differences in organisational arrangements. These local rules should not deviate from the core processes within this document. Any form of deviation from this procedure, including but not limited to local rules, shall be requested and authorised in accordance with the SSOW Deviations from Regulations and Procedures procedure (Doc. No. UNIF-HSE-PRO-101)

1.3 Scope

The scope covers defined activities of BP and Contractors at all BP AzBU sites and installations.

BP AzBU Managed Sites/Installations
A Permit To Work system with supporting Task Risk Assessment process is employed at all BP AzBU managed sites where hydrocarbons are processed or handled, and at any other site directly managed by BP AzBU.

When 3rd party/contractor visits a site/installation with a pre-prepared Risk Assessment, it must be reviewed. The RA must have similar features and ensures identification of hazards and controls as effectively as the Task Risk Assessment procedures employed by BP AzBU. In such circumstances, the Risk Assessment process is followed as normal, with only a new Risk Assessment front-sheet requiring completion.

Third Party Managed Sites/Installations
On sites managed by a third party, e.g., a contracted drilling rig, the contractor's permit to work and Risk Assessment systems may be used provided that they have similar features and ensures identification of hazards and controls as effectively as the Task Risk Assessment procedures employed by BP AzBU.

1.4 Document review

This document will be reviewed on an annual basis when users from the sites will have an opportunity to propose changes to the existing processes and procedures. The document Technical Authority will be responsible for coordinating this review.

1.5 SSOW Specific Cross references

This SSOW procedure shall, where appropriate, be used in conjunction with this suite of AzBU SSOW Procedures referenced below.

Document Number	Title of Procedure
UNIF - HSE- PRO - 101	Deviations from Regulations and Procedures
UNIF - HSE- PRO - 102	Incident Investigation and Reporting
UNIF - HSE- PRO - 103	Permit To Work
UNIF - HSE- PRO - 104	Authorisation
UNIF - HSE- PRO - 105	Task Risk Assessment
UNIF - HSE- PRO - 106	Energy Isolations-Electrical
UNIF - HSE- PRO - 107	Energy Isolations-Process
UNIF - HSE- PRO - 108	Confined Space Entry
UNIF - HSE- PRO - 241	Leak Testing

1.6 BP Golden Rules

Risk Assessment is not an explicit Golden Rule on its own, however it is applicable to them all. The Golden Rules identify the main areas where Risk Assessment is paramount. This procedure should be used for all the Golden Rules, being:

Permit To Work	**Working at Heights**
Energy Isolation	**Lifting Operations**
Ground Disturbance	**Vehicle Safety**
Confined Space Entry	**Management of Change**

1.7 Language Facilitation

Due to the various languages spoken at site, there is a necessity to assist all with “an ease of understanding”. Therefore, the development and use of information tools are available.

2 ROLES AND RESPONSIBILITIES

2.1 Site Manager/OIM/Site Controller

The Site Manager (SM) / Offshore Installation Manager (OIM) / Site Controller (SC) are responsible for:

- Ensuring that the TRA Process is applied at sites within their area of responsibility.
- Periodic internal reviews and / or audit of the operations of TRA.

Appointing individuals to act as TRA Team Leaders to facilitate the TRA process.

Site Managers/OIM/Site Controllers are responsible for reviewing all Level 2 Risk Assessments.

Note: It is incumbent on Site Manager/OIM/Site Controller to request a higher level of Risk Assessment should they consider that risks have not been fully addressed.

2.2 Area Authority

Area Authorities are responsible for:

- Determining the level of Risk Assessment required to support any Permit to Work application
- Organising and participating in the Risk Assessment process.

2.3 Performing Authority

Performing Authorities are responsible for taking part in the Risk Assessment process and disseminating the output from the Risk Assessment process to the personnel who will be doing the work.

2.4 TRA Team Leader

The main responsibilities of the TRA Team Leader are to:

- Lead the team in performing a Level 2 Risk Assessment
- Ensure the team understands the assessment process
- Take responsibility for maintaining the quality of the TRA
- Ensure that the assessment team includes personnel with all the necessary experience, knowledge and competence for the task involved
- Ensure that the TRA includes a worksite visit
- Ensure that all members of the TRA team have a full opportunity to contribute

and that the details of the assessment are agreed by all team members

- Ensure that the details of the assessment are accurately recorded

2.5 Individual TRA Member

The responsibilities of individual team members are to:

- Actively participate in the TRA process
- Help identify hazards and control measures to reduce the likelihood of an incident/accident occurring
- Ensure they agree with the overall TRA before approval, ensuring that risks have been reduced to as low as reasonably practicable

2.6 People carrying out the Work

The responsibilities of the people carrying out the work is to:

- Understand the hazards, risks and controls associated with the task
- Participate and contribute in the Toolbox Talk
- Actively monitor the worksite and surroundings for changes
- Stop the job at any time if they are concerned about safety

3 AUDITING AND MONITORING

Each Business Asset shall:

- Undertake internal audits of the operation of the Risk Assessment process as part of the Safe Systems Of Work at each site.
- Maintain an Audit Register.
- Have in place a system for tracking recommendations

Use of a Standard Audit Checklist is recommended, to allow comparison with external audit results.

The recommended frequency of Audit is as follows:

- Installation/Site personnel 1 permit per day
- Site Safety Adviser 1 permit per week
- Site Manager/ Controller 1 permit per month

Permit and Risk Assessment audits should be a cross section of activities ongoing. Where possible, audits should be conducted on all forms of risk assessment:

- Normal (Level 1 and Level 2)
- Isolation Risk Assessment (IRA)
- Operational Risk Assessment (ORA)
- Stand Alone Risk Assessment (SARA)

Installation / Site personnel should carry out audits of individual tasks covering both the PTW and the Isolation Confirmation Certificate (ICC) on a regular basis.

Offshore Installation Managers / Site Controllers / Site Managers shall carry out regular internal reviews of the findings of Permit to Work and Risk Assessment Audits, to ensure that any critical failings in the system, or its manner of implementation, have been identified and appropriate actions have been, or are being, taken.

The BU HSE Department as part of their annual audit schedule will conduct PTW audits. Such audits shall examine a cross section of at least 20 Permits, and a number of relevant ICC's. These audits should examine detailed reviews of Risk Assessments, and check compliance with this procedure and any deviations in place.

The results of the audit shall be discussed with Management and issued for information and actions allocated to individuals as appropriate.

4 COMPETENCY, TRAINING AND AWARENESS

4.1 General

All personnel involved in the use of the Risk Assessment process shall be trained and proven to be competent.

The competency of all relevant personnel shall be established during the planning process for a particular risk assessment. The Area Authority and/or Line Supervisor shall ensure that the personnel involved in the activity have the correct competencies through records or requesting individuals to produce relevant certification.

4.2 Levels of Training

The levels of training are:

First time users: -

Risk Assessment Team Member and Risk Assessment Team Leader level using classroom based training, with possibly a computer-based Training (CBT) for refreshers. This also requires a practical assessment to demonstrate that the trainee understands the Risk Assessment procedure.

Having undergone the appropriate training, RA-Team Members and RA-Team Leaders can only take on the role when they have been assessed and authorised by the OIM / Site Manager or Site Controller.

For those considered experienced: (Regular users)- Refresher training shall be undertaken, and assessed, at a frequency of not more than 2 years, or if absent from the site/installation for more than 12 months.

For those transitioning from another Risk Assessment system to this one: - transition training shall be undertaken with all attendees being assessed for their competency.

For all BP AzBU employees: - prior to any involvement with the PTW and Risk Assessment system all employees shall receive awareness training to ensure that they understand the importance of PTW and how it affects them in the working environment.

Note: The Toolbox Talk is an essential part of the Risk Assessment Process. All users of SSOW should contribute at this point. Additional information can be found in section 6.9 of this document.

4.3 Records

Records of attendance and competency will be filed for future reference / verification by Senior Management.

5 RISK ASSESSMENT LEVELS

5.1 General

The process of Task Risk Assessment (TRA) is a method for systematically examining an individual work assignment (task), to identify the hazards, evaluate the risks and specify appropriate controls.

There are two levels of risk assessment defined within the process:

Level 1

- Level 1 is a broad overview of the task by a Competent Person (CP) or persons (typically the Team Leader, Performing Authority (PA) and Area Authority (AA), to identify any significant hazards involved and appropriate control measures which require to be in place to allow the job to proceed.

Level 2

- Level 2 is a formal quantitative assessment, which is required only when the CP(s) judge that there are greater hazards or complexities associated with the task, which requires a more rigorous level of assessment. A team of minimum 3 personnel carries out this assessment.

All Risk Assessments require input from those who will be doing the work. In addition, some Level 2 Risk Assessments may require the input of expertise from outside the normal site/installation team.

Previously carried out L2 Risk Assessments (L2RA) can be used for repeat tasks.

Note: Whenever a previous L2RA is re-used then it is critical that the details of the TRA are reviewed to ensure that the scope of the task is still relevant, conditions have not changed and that the hazards and control measures are still appropriate. A new L2RA Front-Sheet must be completed, to capture details of the new review team.

5.2 Level 1 Risk Assessment Guidance Notes

A Level 1 Risk Assessment is based on section 1 and 2 of the Permit. The Permit Form provides the prompt list and structured approach for this level of Risk Assessment. Different Permits have different prompt lists in section 2.

A Level 1 Risk Assessment involves a review of the task by the PA in consultation with another competent person (CP) (normally the PA, Team leader or AA) to identify the hazards associated with the task and appropriate control measures required to manage these hazards. The PA's in using their technical competence and task information from section 1 selects the hazards from a list.

The PA then uses the controls listed in section 2 of the Permit to show how the work will be controlled.

These hazards and controls are selected from a list from the permit, although the PA should not be constrained by this and must use his judgement and expertise to identify any further hazards or controls – there is space on the permit to add additional hazards and controls.

The CP must decide whether the risks can be controlled adequately by the proposed means, taking into account the controls required by any relevant local procedure and the competence of the person in charge. If the CP is not completely assured that the risks will be adequately controlled by these measures and feels a more rigorous assessment is required, they must inform the person in charge of the work and request a Level 2 Risk Assessment. This requirement should ideally be identified at the earliest opportunity. The Site Manager / Site Controller / Offshore Installation Manager can direct that a Level 2 Risk Assessment shall be undertaken at any time. Earliest communication of the task requirement and discussion about it will identify the level of Risk Assessment process to be conducted.

The Area Authority will review with the PA Section 1 and 2 of the permit along with any documentation. They will visit the worksite to confirm all hazards have been identified and controlled.

The flow-path that should be followed is provided in Appendix E.

> **Note:** Discussing the job with the workforce involved is an important part of this process.

5.3 Level 2 Risk Assessment Guidance Notes

A Level 2 Risk Assessment must be carried out at any stage in the process where the PA, AA, a member of management or any other personnel believes that significant risks exist which will not be adequately controlled without a more rigorous assessment and the application of additional controls. This requirement should ideally be identified when the planning for the task is first initiated.

The reasons for a Level 2 Risk Assessment might include, for example:

- The task is new and unfamiliar
- It is physically impossible to comply fully with the standards in a relevant local procedure or other recognised source of guidance
- Previously used controls may not be reasonably practicable in this case
- The task is complex and/or has potential impact on other activities

The decision on when a Level 2 Risk Assessment is required for a task is somewhat subjective and will depend on the people involved but the following rules should be applied to ensure a consistent level of assessment is being carried out across the organisation.

There are four types of Level 2 Risk Assessment:

- Normal
- Operational Risk Assessment (ORA)
- Stand Alone Risk Assessment (SARA)
- Isolation Risk Assessment (IRA)

A Level 2 Risk Assessment is mandatory for any job described in Table 1 and is advised in Table 2.

5.3.1 Normal Level 2 Risk Assessment

Tasks identified in this section require a Normal Level 2 TRA to be performed. In the event a particular task is not listed but the Task has a significant risk (s) then a Line Supervisor should be consulted. Some sites may have specific activities unique to that site which they deem as mandatory Level 2 tasks. A Level 2 Risk Assessment must **always** be undertaken for any job, which requires:

Table 1 - Mandatory Level 2 Risk Assessment

- Confined Space Entry
- Work on flare systems
- Plugging/sealing
- Hot / Odd Bolting
- Working with asbestos
- Working at Heights without scaffold or structure
- When minimum standards of Energy Isolation cannot be achieved
- Unconventional access (e.g., abseiling, crane basket)
- Proof Tests (initial hydro test where no design pressure exists)
- Pneumatic test (as alternative to hydro test, up to 110% of design pressure)
- Non-routine venting/draining/cleaning of equipment containing hazardous chemicals
- Tasks which are unfamiliar, or which involve unfamiliar methods or technologies
- Heavy Lifts
- Diving Operations
- Simultaneous Operations (SIMOPs)
- Use of Explosives
- Lifts over live process pipelines or process plant
- Tasks involving Ground Disturbance (Excavations)
- Where there is a significant potential for injury to people outside the site boundary
- Hot work within 15m radius of hydrocarbons
- When the any approved procedures cannot be followed.
- Task that may have specific hazards associated with Energy Isolation.
- Tasks which are judged to be unusually complex (e.g., due to the number of steps or interfaces)

Table 2 - Advisory Level 2 Risk Assessment

- Any activities involving potential exposure to H_2s
- Where multiple protective devices are removed or inhibited from a system
- New activities being carried out for the first time and/or involving personnel or vendors new to the site
- Where an element of emergency equipment is being removed from service (e.g. fire pump removal/maintenance)

Some sites will have standing instructions or procedures in place covering standard precautions for some of these activities. They can act in support of the assessment and may adequately cover most of the required control measures.

A Level 2 Risk Assessment is carried out against check lists (see *Appendix B Risk Assessment Check Lists*).

The flow-path that should be followed is provided in Appendix E.

5.3.2 Operational Risk Assessment

Operational Risk Assessments (ORAs) are associated with a piece of equipment or plant as opposed to being associated with a specific task. They involve carrying out a Level 2 Risk Assessment and identifying some control measures that need to be put in place.

Examples of an ORA are:

- Operating a compressor with some instrumentation out of service (e.g. vibration probe), where some additional controls or monitoring is required to allow continued operation of the compressor
- Reduction of deluge cover in an area of the Installation where some additional controls/restriction on work would be applied to that particular area of the plant
- Problem with a lifeboat where some alternative evacuation arrangements are in place

If a piece of equipment requires an ORA, the procedure would be:

- Create a team as per L2RA procedure (Mandatory Level 2 Risk Assessment)
- Complete a TRA on Front Sheet and Work Sheets
- Authorise ORA – register held by OIM / Site Controller / Site Manager
- Assign controls, and put in-place

Note that an ORA is not a permit, therefore no isolation is available. If any isolation is required, a permit should be raised.

An Operational Risk Assessment is valid for 28 days and has to be reviewed every 7 days by the Site Manager/OIM/Site Controller.

5.3.3 Stand-Alone Risk Assessment

SARAs are not task-related but once again require that a Level 2 Risk Assessment be conducted. A Stand-Alone Risk Assessment involves carrying out a risk assessment, which may not be associated with either a task or specific piece of equipment. It could for example involve performing a risk assessment associated with a change in organisation or responsibilities. It allows direct use of the standard Level 2 Risk Assessment process.

If a SARA is required, the procedure would be:

- Create a team as per L2RA procedure (Mandatory Level 2 Risk Assessment)
- Complete a TRA on Front-Sheet and Work-Sheets
- Authorise SARA – register held by OIM / Site Controller / Site Manager
- Assign controls, and put in-place

Note that a SARA is not a permit. Therefore no isolation is available.

A Stand Alone Risk Assessment has no restriction on validity duration, but should be reviewed by the Site Manager/OIM/Site Controller every 28 days.

5.3.4 Isolation Risk Assessment

When an Energy Isolation-Process does not meet the standard as stipulated in procedure UNIF-HSE-PRO-107 a L2RA is required. The risk assessment should only be on the isolation element of the task, and not the work task element.

Examples of when an Isolation Risk Assessment (IRA) is required are:

- Sufficient number of valves are not available to achieve the level of isolation required
- There is an integrity issue (e.g. leaking) of part of an isolation
- An alternative means of isolation must be resourced, i.e. stopple bag, ice-plug

If an isolation requires a risk assessment, the procedure would be:

- Create a team as per L2RA procedure (Mandatory Level 2 Risk Assessment)
- Complete TRA Front Sheet
- The TRA Worksheet should identify controls to allow a safe and suitable isolation
- Authorise IRA – register held by OIM / Site Controller / Site Manager
- Assign controls, and put in-place

An Isolation Risk Assessment is valid indefinitely, however it has to be revalidated after 7 days by the OIM/Site Controller/Site Manager.

5.4 Level 2 Risk Assessment Team

The objective of the Level 2 Risk Assessment is to assemble a team of persons with intimate knowledge and expertise of the task and in a structured way, examine all the hazards associated with that task, and then devise a set of controls which will ensure an acceptable level of risk is achieved. Where necessary, expertise from elsewhere (e.g. specialist vendors/contractors) may also be brought into the assessment process.

Where larger jobs or shutdowns are planned, work should be undertaken early on to identify potential tasks requiring Level 2 Risk Assessments in order to allow adequate time for the assessment to be undertaken.

The Level 2 Assessment Team should be made up of a minimum of three persons and consist of persons having intimate knowledge and experience of the task or equipment to be used. There should also be a fully competent TRA Leader capable of acting as facilitator and leader of the assessment process.

The TRA Team Leader should make arrangements for the team to work as a group. It is important to ensure, for example, that there is adequate space for examination of drawings and that sufficient time is allocated to allow a rational decision to be reached.

It should not normally require more than a team of five persons to carry out an assessment.

The objective of a Level 2 Risk Assessment is to use local knowledge and specialist knowledge in a structured way in order to achieve ALARP for any residual risk.

The Risk Assessment team should include:

- the Area Authorities for the areas in which the task will be carried out
- the Performing Authority
- the person who will undertake the task, if not the Performing Authority
- a specialist from inside and external to the operation as required
- an HSE specialist who is responsible for ensuring that the Risk Assessment is carried out in accordance with this procedure and for recording the results.

Note: a L2RA Team requires at least three members

6 THE STAGES OF RISK ASSESSMENT

6.1 Define the Task to be Assessed

The task description detail must provide information on Who, What, Why, How and When the task will be performed. As the task becomes more complex the level of detail and supportive documentation required will increase. The level of information provided must take into account all people taking part in the task.

The Task Risk Assessment team must first ensure that they fully understand the task and its implications. The overall task may need breaking into steps to facilitate carrying out the Task Risk Assessment. When defining the task, think about such aspects as provided below:

Item	Issues to Consider
1. System boundaries	What is the system being worked on? The extent of equipment, hardware, or software affected by the activity. Will the work be carried out on isolated or un-isolated systems? Where are the isolations, or interfaces with other systems?
2. Area or space boundaries	What area is affected by the activity? What area could be affected in an accident?
3. Work activities included	What do you have to do? What might be the effect of doing it? Think about isolations, inhibits, etc.
4. People affected	People; in the team, working nearby, who might be passing by, working on related activities and working on connected systems.
5. Time and duration of work	Will the task take one hour or multiple shifts? Will the work be done during the day or night or both?
6. Tools and equipment to be used	Does the activity require hand tools, power tools, ladders, lifting equipment, etc.? Task-specific PPE
7. Interfaces with adjacent work-fronts	How will your work affect other work going on at the same time? How will other work affect you?

6.1.1 L1RA Specific

For a L1 Risk Assessment, the Task Description is recorded in box 1.

6.1.2 L2RA Specific

The L2RA Front Sheet should be completed as far as possible. The sections that should be completed are:

INSTALLATION	DEPARTMENT/SYSTEM/LOCATION – complete for relevant option
PERMIT No – if known at this point. If not, complete when PTW is initiated.	TASK DESCRIPTION – be as explicit as possible, for clarity and future use
DATE – the date the risk assessment took place	REFERENCES AND OTHER RELEVANT INFORMATION – enter all relevant information
TRA Ref No – if registered, enter number here. This will be used when Risk Assessments are being stored for future use. Site specific rules will dictate how this is administered.	RISK ASSESMENT TEAM – enter names and positions. No signatures required
TYPE – NORMAL, IRA, SARA or ORA	

Any sub task steps should be identified on the L2RA Work-Sheet columns 1 & 2.

Note that the TRA front sheet is not signed as approved initially; this section will only be signed after worksheets are complete and the SM/SC/OIM accepts the Task Risk Assessment.

6.2 Identify the Hazards

A visit to the work site is MANDATORY in order to assess the layout of the area, site conditions and adjacent plant and activities. Once the members are all familiar with the scope of the task to be carried out, the team should list all the significant hazards in column 3 of the TRA worksheet. For a L2RA these are identified on the permit

Checklists are supplied as a guide for reference purposes only. They should not be considered as being comprehensive. A group brainstorm, with the team leader making sure that each member is given adequate opportunity to express their views is vital to maintain a systematic approach to using these checklists.

Hazard Checklist - General		
Falling from height	Mental Stress	Noise
Manual Handling	Cold/Heat	Vibration
Lifting operations	Ionising Radiation	Pressure
Falling object	Inert gas	Biological agents
Noise	Chemical hazard	Welding/cutting
Lighting	Flammable gas	Power tools
Fume/dust	Flammable liquid	Static Electricity
Weather	Hand tools	Work on safety systems
Collision	Ignition	Transport by sea/air
Hand tools	Fire	Storage
Machinery	Explosion	Water jetting
Asphyxiation	Structural damage	Grit blasting
Electricity	Personal injury	Potential for ignition
Loss of containment from nearby system	Barriers/access restrictions	Loss of containment from system being worked on

Hazard Checklist - Isolations	
Type of valves and reliability	H_2S
Size of pipe work	Wax
Integrity testing	Sand
Reverse flow	LSA Scale
Pressure build-up	Hydrates
Migration from other systems	Foaming
Inventory behind isolations	Blockage
Duration of isolation	Trapped pressure
Adequacy of pipe supports	Nature of fluid
Fail position of ESD valves/blow down valves	Temperature stability of system and adjacent systems
Contingency in the event of failure of isolations	Pressure stability of system and adjacent systems
Environmental impact of spills or emissions	

Hazard Checklist - Breaking Containment **Note:** This checklist should be used in conjunction with **Hazard Checklist - Isolations**.	
Electrical risk of using portable tools	Chemical reactions with cleaning materials
Hazardous substances trapped around bends, behind baffles, linings etc.	Flammable or toxic vapours arising from sludge in vessel
Trapped pressure	Chemical reactions with cleaning materials
Environmental impact of spills or emissions	Residual pressure
LSA Scale	Residual heat
Pyrophoric scale	Liquids remaining from flushing
Asbestos gaskets	Inert atmospheres
	Chemical hazards

Hazard Checklist - Vessel Entry	
Residual gases/vapours	Noise, general
Sludge which may give rise to vapours/gases when disturbed	Communication difficulties within the vessel or with the standby man
LSA / NORM scale	Adequacy of lighting within the vessel
Adequacy of ventilation	Temperature effects
Need for air movers during entry.	Oxygen enrichment
Location of rescue kits	Oxygen deficiency
Standby man communication with the CCR	Frequency of gas testing
Ingress of gases/vapours from other nearby activities or systems	Use of mechanical tools/power tools/electrical equipment
Competency of standby man	Disposal of vessel cleanings
Slip hazards within the vessel or at the point of entry	Noise when using power tools
Ionising radiation; nucleonic instrumentation	Visibility within the vessel
Danger of falling into vessel boots or sumps	

6.3 Identify the Hazard Effects

Note: recording of the Hazard effects is only recorded on a L2RA. However the hazards effects should be considered on any type of Risk Assessment.

The Team must then identify the Hazard Effects, which will be entered into column 4 of the L2RA Work-Sheet. Hazard effects are the worst credible possible outcome of the hazard. As guidance, the team can refer to table the Risk Matrix in the appendices. The Team should be as explicit as possible in the Hazard Effect details. It is important to consider property damage and environmental impact and not just personal injury

Examples are shown below:

SUB-TASK ACTIVITY / DESCRIPTION	HAZARD	EFFECT
Move temporary oil decanting hoses in utilities area to new storage cupboard.	Slipping/tripping hazard Dropped object	sprain, graze broken foot bone
Decant methanol from temporary skid on deck to new storage tanks, use of temporary hoses	Flammable (invisible flame) and Toxic by inhalation & swallowing.	Burns Fatality
Welding of new earthing point in live operational area	Fire / explosion in hydrocarbon area	Multiple fatality Long term plant shut down

The table below should be used to determine the hazard effect, rated A – E.

PERSONAL INJURY	**PROPERTY DAMAGE**	**ENVIRONMENTAL DAMAGE**	EFFECT (E) RATING
Fatality	Major Loss >$5M	Total Loss of Containment	A
Likely Permanent Disability	Significant Damage Loss $500k to $5M	Significant Loss of Containment. 100bbl, Limited ability to control	B
Hospital Stay	Moderate Damage Loss $100k to $500k	Significant Loss of Containment > 100bbl only Workplace affected	C
DAFWC / Restricted Work Case / Medical Treatment	Minor Loss $10k to $100k	Minor Loss of Containment < 100bbl only Workplace affected	D
Simple First Aid Injury	Loss <$10k	Slight Loss of Containment < 1bbl	E

6.4 Existing Control Measures

Note: Existing Control measures are valid for both L1RA and L2RA

When doing a risk assessment, it is normal to assume that no controls are in place. For many tasks, some controls may be known before the risk assessment, and it is not realistic to think of the work being done without these controls (e.g. an energy isolation). So, if experience or normal industry or trade standards dictate, it may be valid to assume that certain controls are in place, provided that:

- they are stated in column 5 of the L2RA Work-Sheet
- they are demonstrated as part of the task definition (e.g. planned isolations must have appropriate isolation certificate and marked-up P&IDs); and
- the controls are confirmed to be in place prior to the work being carried out

Controls that may be included in the definition of the task include:

- procedures, operating guides, etc. (supported by a valid risk assessment);
- energy isolations confirmation certificate (including P&IDs)
- entry certificate
- scaffolding request; and
- other risk assessments such as, manual handling, LSA/NORM scale.

Work permits are used for recording the controls for individual work tasks, for controlling the interfaces between work activities and to gain the correct approvals to start a job. However, a work permit itself is not a control for an individual work task and should therefore not be included in the task definition.

6.5 Evaluate the Risk

Note: recording of the Risk value is only recorded on a L2RA. However the risk factors should be discussed for a L1RA.

The risks created by each hazard on the list should be evaluated according to:

- The worst credible severity of the hazard effects, should anything go wrong
- The probability of the hazard being realised and resulting in the specified hazard effect

It is important to consider property damage and environmental impact and not just personal injury

For each hazard the initial hazard effect and probability are defined based on the hazard and probability matrix shown:

PERSONAL INJURY	PROPERTY DAMAGE	ENVIRONMENTAL DAMAGE	EFFECT (E) RATING
Fatality	Major Loss >$5M	Total Loss of Containment	A
Likely Permanent Disability	Significant Damage Loss $500k to $5M	Significant Loss of Containment. >100bbl, Limited ability to control	B
Hospital Stay	Moderate Damage Loss $100k to $500k	Significant Loss of Containment > 100bbl only Workplace affected	C
DAFWC / Restricted Work Case / Medical Treatment	Minor Loss $10k to $100k	Minor Loss of Containment < 100bbl only Workplace affected	D
Simple First Aid Injury	Loss <$10k	Slight Loss of Containment < 1bbl	E

PROBABILITY GUIDELINES (P)	RATING
Will occur more than once per quarter OR nearly every time	**HIGH** (H)
Will occur at least once per year, but less than quarterly OR sometimes	**MEDIUM** (M)
Will occur less than once per year OR hardly ever	**LOW** (L)

The hazard effect (E) and probability (P) are then used to determine the risk (R), using the risk matrix provided. The E, P & R values are written in column 6 of the TRA worksheet.

The initial assessment of risk is to be determined on the basis that no specific control measures exist. This is in order that the full risk potential may be recognised. The effectiveness of the assessment will depend entirely on the team's ability to identify and evaluate all significant hazards associated with the task.

The team should also consider the possibility of the interaction of different hazards, including those related to:

- Location - Attention should focus on the proximity to other plant or equipment, e.g., air intakes, shut down systems, control points, vents, drains, sample points and ignition sources.
- Critical Activities - Critical activities include isolation, flushing, inerting, confined space entry; work at height, hot work, lifting, use of power tools, temporary power and air supplies, pressure testing, radiography.
- Simultaneous Activities. - Simultaneous activities should be investigated both within the task itself and with other unrelated activities taking place nearby.

Risk Matrix (R)

HAZARD EFFECT						
PROBABILITY		A	B	C	D	E
	H	15	14	13	9	4
	M	12	11	10	5	3
	L	8	7	6	2	1

6.6 Determine the Additional Controls Required

Note: recording of the Additional Controls is only completed on a L2RA column 7. Recording of Controls for a L1RA is in section 2 of the permit.

Once the initial Assessment of Risk is complete, the team must work systematically through the list of Hazards and specify all the Additional Control Measures needed to mitigate each associated Risk. These are recorded in column 7 of the TRA worksheet.

Note: Controls, which prevent the hazard being realised, should be used in preference to controls that reduce the effect of a hazard.

The hierarchy of controls is applied in the following order;

1. Eliminate
2. Reduce (substitution, Engineering, Segregation)
3. Manage or Administration (reduce exposure, Procedures)
4. PPE – This must be the last control applied; remember that with PPE you are inside the hazard zone.

Wherever possible, measures higher in the hierarchy should be used, providing they are reasonably practicable, and emphasis should be placed upon control at source. A combination of measures will usually be necessary in order to reduce the level of Risk As Low As Reasonably Practicable (ALARP). It should also be considered that when specifying controls, any associated risk that they bring with them needs to be assessed and controlled.

Typical Control Measures can be placed in the following categories:

Control Measure	Typical Examples
1. Physical	Removal of fuses; Insert spade or blank flange in pipe work; Lock off valve; Erect mechanical barrier; Use locked enclosure; Keep people at a distance (e.g., signs, warning tape); Eliminate or substitute toxic substances; Substitute noisy machinery; Use mechanical handling equipment.
2. Procedural	Test for pressure build-up or leaks; Examination of flushing fluid; Test for hazardous chemicals in liquid, solid or gaseous form; Procedure for control of simultaneous or adjacent work; Prohibition of hot work; Equipment lock-out; Develop contingency plan,
3. Human	Use of independent specialist personnel; Regular or constant monitoring of the Task; Use of method statements / detailed procedures; Clear instructions and warnings to workforce; Clear definitions of roles and responsibilities during the Task; Adequate supervision; Ensure competency of personnel for the activity
4. Time	Limit duration of the Task or time of day when the activity occurs; Use time-saving measures such as hot-bolting, good work-site preparation and planning for the movement of materials, tools.
5a. Contingency (Control)	Emergency shutdown, deluge and blow-down systems, reduction of inventory.
5b. Contingency (Mitigation)	Temporary refuge, emergency response system, fire/blast wall, water curtain, provision of PPE, rescue equipment, etc.

6.7 Allocating Responsibilities for Control Actions

Note: recording of the Responsibilities is completed on a L2RA column 8. Responsibilities for control actions are not recorded on a L1RA, but can be identified in a method statement or procedure.

Once the control measures have been identified, each should be allocated to either an individual or a role. The Risk Assessment may be completed some time before the actual work task-taking place; therefore the delegated individual/role may change. Where possible, identify both a role and a specific individual. These are recorded in column 8 of the L2RA Work Sheet.

Column 11 is for recording the closeout of the actions. Therefore this column should not be completed until the work is about to commence.

6.8 Re-evaluate the Risks for Acceptability

Note: this is completed on a L2RA column 9. Risk re-evaluations are not recorded on a L1RA (permit).

The team must then re-evaluate the risk for all those hazards for which controls have been determined. The new risk level should be determined and the team should consider whether the risk is now as low as reasonably practicable (ALARP). Column 10 should be identified with a 'Y' to confirm the Risk Analysis Team has agreed ALARP.

If the risk is not ALARP, the review team must decide what further safeguards need to be put in place. The agreed residual E, P and R are recorded in column 9 of the TRA Worksheet.

The team must finally decide on the acceptability of the overall remaining risk for the task. Individual hazards with a medium risk may be acceptable provided the overall risk of the task is considered low. If the team decides that even with the controls in place, there are too many hazards, which still have a medium risk, this must be recorded and the task in its present form must be abandoned.

The higher the perceived risk for any particular hazard, the greater should be the number and/or quality of independent controls, which the team specify as necessary. Consideration should also be given to the possibility of cumulative effects from the interaction of several different hazards.

If the team considers that there are insufficient independent controls available, or that the controls are likely to be ineffective against any particular risk, that risk must be judged to be unacceptable, and the team leader must record this decision. The task must then be abandoned or referred to higher management.

The team may also conclude that because of the complexity or degree of the risks involved, a more detailed engineering assessment is needed. In this case, the task must be suspended until the assessment is available.

As a final check, the team should ask itself the following questions about the proposed task:

- Have all necessary control measures been fully and effectively identified?
- Is there a need for engineering change to eliminate or reduce risk?
- Is there a need to shutdown the plant or process?
- Is the residual risk rating acceptable?

Only at this point can the team judge whether ALARP has been achieved.

Where the residual risk is in the 7 to 11 range should only proceed with utmost caution.

Where the residual risk >=12, the task may NOT proceed. Either additional controls must be put in-place, or the task re-engineered.

The table provided provides guidance for residual risk results.

HE	P	R	CONTROL ACTIONS
A	H	15	
B	H	14	TASK MAY NOT PROCEED DUE TO SERIOUS LOSS POTENTIAL.
A	M	13	TASK MAY PROCEED ONLY WITH ADDITIONAL CONTROLS IN PLACE TO AVOID SERIOUS LOSS, AND REDUCE RISK TO <12, THE RESIDUAL RISK MUST BE ALARP.
C	H	12	
D	H	11	
B	M	10	TASK MAY PROCEED ONLY WITH THE UTMOST CAUTION.
A	L	9	REVIEW PROCEDURES AND CONTROLS TO REDUCE RISK FURTHER TO ACHIEVE ALARP
C	M	8	
B	L	7	MONITOR CONTINUOUSLY DURING TASK TO ENSURE RISK DOES NOT INCREASE.
D	M	6	REVIEW PROCEDURES AND CONTROLS TO ENSURE RISK IS REDUCED TO ALARP.
E	H	5	
C	L	4	
E	M	3	MONITOR CONTINUOUSLY DURING TASK TO ENSURE RISK DOES NOT INCREASE.
D	L	2	
E	L	1	

6.9 Implementation of Control Measures

Note: recording of the control implementation is completed on a L2RA column 11. Implementation of controls is not recorded on a L1RA.

Column 11 is for recording the close-out of the actions. Therefore this column should not be completed until the work is about to commence.

There are two types of control measures that will be identified from either the Level 1 or Level 2 TRA process:

- Prerequisite controls are those which must be in place prior to the job starting
- Supplementary controls are those which have to be applied during the job

The prerequisite control measures must be implemented prior to the job going live. This includes any training and/or special briefing of the PA and work party according to an agreed plan of action.

The supplementary controls, which will be applied during the job, must be understood fully by the PA and the work party before work commences.

The AA must satisfy himself that Competent Persons have been allocated the work; the required controls are in place, any additional paperwork is complete, and that all the individual risks are reduced to ALARP.

6.10 Toolbox Talks

Note: Toolbox talks will be carried out for all tasks, whether they are L1RA or L2RA.

This is the process of transferring the methodology and controls to the people who will carry out the work. It is vital that all persons involved in working on a particular activity are fully aware of the details of the TRA and all the hazards and controls associated with the job. Some of them may have been directly involved in the TRA but others may not have been. This is particularly true of larger jobs (e.g. construction) where the PA who is probably the Construction Supervisor will have been directly involved in the TRA but the rest of the work party probably have not.

A Toolbox Talk is a vital part of the process to ensure that the TRA and its associated documents are reviewed prior to the start of the job and are fully understood by all persons involved in the task.

Particular emphasis should be placed on those residual risks with a higher rating. It is also an opportunity for those involved in the work to raise any further concerns about the job and to identify any hazards not picked up in the TRA process.

Note: If anyone at this stage identifies some additional hazards that have not been properly assessed or thinks the control measures are inadequate, then the job should not proceed until the TRA has been re-evaluated and appropriate controls identified to ensure the job is ALARP.

Keys to success of this step are:

- Communication of the task, the hazards and what must be done to control them to every person involved in the task.
- Language is critical, especially in complex technical tasks.
- The toolbox talk is held prior to work starting
- Everyone understands everything discussed
- Everyone has the opportunity to voice concerns

Some example topics to cover as part of the Toolbox Talk are:

Issue	Notes
The current weather conditions	• Weather • Sea State
The work party	• Competence and experience • Familiarity with the installation and the system being worked on • Anyone fatigued or distracted
The worksite	• Access • Awkward working position • Temperature/humidity • Lighting
The current state of the plant and equipment	• Physical condition of plant and equipment • Current operating status of plant and equipment
The current adjacent work sites	• Can this job affect other work sites • Can other work sites affect this job
The pre-defined precautions and controls	• Are they as per written instructions, risk assessments, PTW, etc

7 MANAGEMENT OF RISK

7.1 Approval

On completion of the Risk Assessment, the Risk Assessment Front & Work Sheets must be attached to the permit application for the job. It must be reviewed and signed by the OIM / Site Controller / Site Manager before he approves the associated Permit(s) to Work.

Should the OIM / Site Controller / Site Manager feel that the task presents risks beyond his level of accountability, he must refer to his Manager for guidance, and if necessary request a more sophisticated analysis of the risks and mitigation than can be provided by the method described in this procedure.

7.2 Recording the Risk Assessment

Where a task is likely to be repeated, a record of the Risk Assessment should, at the permit issuer's discretion, be retained for future reference. In any event Risk Assessments, which include hazards to the health of those, undertaking the task must be attached to the permit(s) for the job and retained for 12 months.

Where a Risk Assessment form is being re-used, it must be fully reviewed and a new front sheet created.

APPENDIX A: DEFINITIONS & ABBREVIATIONS

Confined Space Entry:	where there is inadequate ventilation to dispel injurious or flammable fumes, vapour or gas or to provide sufficient oxygen. Also includes areas where access / egress is restricted.
Controls:	steps taken to reduce either the probability or consequences, or both of a particular risk.
Hazard:	the potential for human injury or loss of life, damage to the environment or to material assets or a combination of these.
Hazardous Consequence:	the result when a hazard is realised.
Inhibition:	The isolation of the executive action of a protective system. Where practicable, this should not prevent the operation of the visual / audible warning system.
Isolation:	• Process Isolation involves the closing and locking of valves. This may include depressurising, flushing and purging, e.g. single valve isolations. • Positive Isolation involves the disconnection of plant, equipment and systems from sources of motive power, liquids and gases. • Electrical Isolation - The secure, disconnection and separation of a circuit, or item of equipment, from every source of electrical energy. This may involve electrical, instrument and communication isolations. • Long Term Isolation - An isolation that remains in place after permit cancellation, and recorded as “Long Term”.
Isolation Certificate Register:	a register maintained in the control room identifying the status of all Isolation Certificates by the Control Room Operator-referenced to individual permits.
Permit:	an authorising document approved by management, specifying the required precautions and conditions under which potentially hazardous or interacting activities can take place
Permit Display Board:	a board used to display the status of active and suspended permits.
Permit Register:	a register maintained in the control room identifying the status of all permits.

Probability:	the chance of occurrence of an event. Probability can be expressed as a likelihood, frequency, class, rank etc.
Risk:	a combination of the likelihood of a hazardous event and the severity of the possible consequences of that hazardous event.
Risk Assessment:	the overall process of risk analysis and risk evaluation.
Risk Evaluation:	the process to support management decisions as to acceptability or risk reduction requirements by comparing the estimated risk against relevant criteria.

APPENDIX B: LEVEL 2 RISK ASSESSMENT – CHECKLISTS

Note: These checklists are for guidance only. They should not be regarded as comprehensive in nature and do not replace sound judgment in the recognition of all hazards associated with any task undergoing assessment.

Several checklists are provided below AS A STARTING POINT FOR LEVEL 2 RISK ASSESSMENTS. The team should choose the list, which it feels, is the best starting point for the assessment to be carried out.

The Incident Causation Check List or the General Check List can be used for guidance on all tasks, in combination with a more specific checklist if appropriate.

Hazard Checklist - General

Falling from height	Noise
Manual Handling	Vibration
Lifting operations	Pressure
Falling object	Biological agents
Noise	Welding/cutting
Lighting	Power tools
Fume/dust	Hand tools
Minimise potential for ignition	Work on safety systems
Collision	Transport by sea/air
Hand tools	Storage
Machinery	Water jetting
Asphyxiation	Grit blasting
Cold/Heat	Loss of containment from nearby system
Mental Stress	Loss of containment from system being worked on
Ionising Radiation	Ignition
Chemical hazard	Fire
Inert gas	Explosion
Flammable gas	Structural damage
Flammable liquid	Personal injury
Electricity	Barriers/access restrictions
Static Electricity	Weather

Hazard Checklist - Isolations

Nature of fluid

Pressure stability of system and adjacent systems

Temperature stability of system and adjacent systems

H2S

Wax

Sand

LSA Scale

Hydrates

Foaming

Blockage

Trapped pressure

Type of valves and reliability

Size of pipe work

Integrity testing

Reverse flow

Pressure build-up

Migration from other systems

Inventory behind isolations

Duration of isolation

Adequacy of pipe supports

Fail position of ESD valves/blow down valves

Contingency in the event of failure of isolations

Environmental impact of spills or emissions

Hazard Checklist - Breaking Containment

Note: This checklist should be used in conjunction with **Hazard Checklist - Isolations**.

Electrical risk of using portable tools

Flammable or toxic vapours arising from sludge in vessel

Hazardous substances trapped around bends, behind baffles, linings etc.

Chemical reactions with cleaning materials

Environmental impact of spills or emissions

LSA Scale

Pyrophoric scale

Asbestos gaskets

Trapped pressure

Residual pressure

Residual heat

Liquids remaining from flushing

Inert atmospheres

Chemical hazards

Hazard Checklist - Vessel Entry

Residual gases/vapours

Sludge which may give rise to vapours/gases when disturbed

LSA scale

Adequacy of ventilation

Need for air movers during entry.

Communication difficulties within the vessel or with the standby man

Standby man communication with the CCR

Ingress of gases/vapours from other nearby activities or systems

Use of mechanical tools/power tools/electrical equipment

Slip hazards within the vessel or at the point of entry

Ionising radiation; nucleonic instrumentation

Danger of falling into vessel boots or sumps

Noise, general

Noise when using power tools

Visibility within the vessel

Adequacy of lighting within the vessel

Temperature effects

Oxygen enrichment

Oxygen deficiency

Frequency of gas testing

Location of rescue kits

Competency of standby man

Disposal of vessel cleanings

APPENDIX C: L2RA FORMS

Sheet 1 of __

INSTALLATION :		**PERMIT No :**		**DATE :**		**TRA REF No :**	
DEPARTMENT / SYSTEM / LOCATION:				**RISK ASSESSMENT TEAM (FIRST NAMED-TRA TEAM LEADER)**			
RISK ASSESSMENT TYPE:		NORMAL ❍ IRA ❍ SARA ❍ ORA ❍		**NAME**		**POSITION**	
TASK DESCRIPTION:							

REFERENCES AND OTHER RELEVANT INFORMATION : (e.g. Emergency Provision Required, Competency requirements, Tools & Equipment, additional PPE, P&IDs, Drawings, PTW, Procedures, Certificates, other Risk Assessments)	**CONFIRMED ALARP TRA APPROVED BY (OIM/SC/SM):**	
	NAME (PRINT) :	
	SIGNATURE :	
	POSITION :	
	DATE :	

Work-Sheet ___ of ___

TASK DESCRIPTION SUMMARY :		TRA REF No :	

1. SUB-TASK No	2. SUB-TASK ACTIVITY / DESCRIPTION	3. HAZARD DESCRIPTION	4. HAZARD EFFECT	5. EXISTING CONTROL MEASURES	6. INITIAL RISK			7. LIST ALL CONTROL MEASURES REQUIRED	8. PERSON OR ROLE RESPONSIBLE	9. RESIDUAL RISK			10. ALARP ?	11. ACTIONS CLOSED?
					E	P	R			E	P	R		

APPENDIX D: HAZARD EFFECT & PROBABILITY TABLES, RISK MATRIX

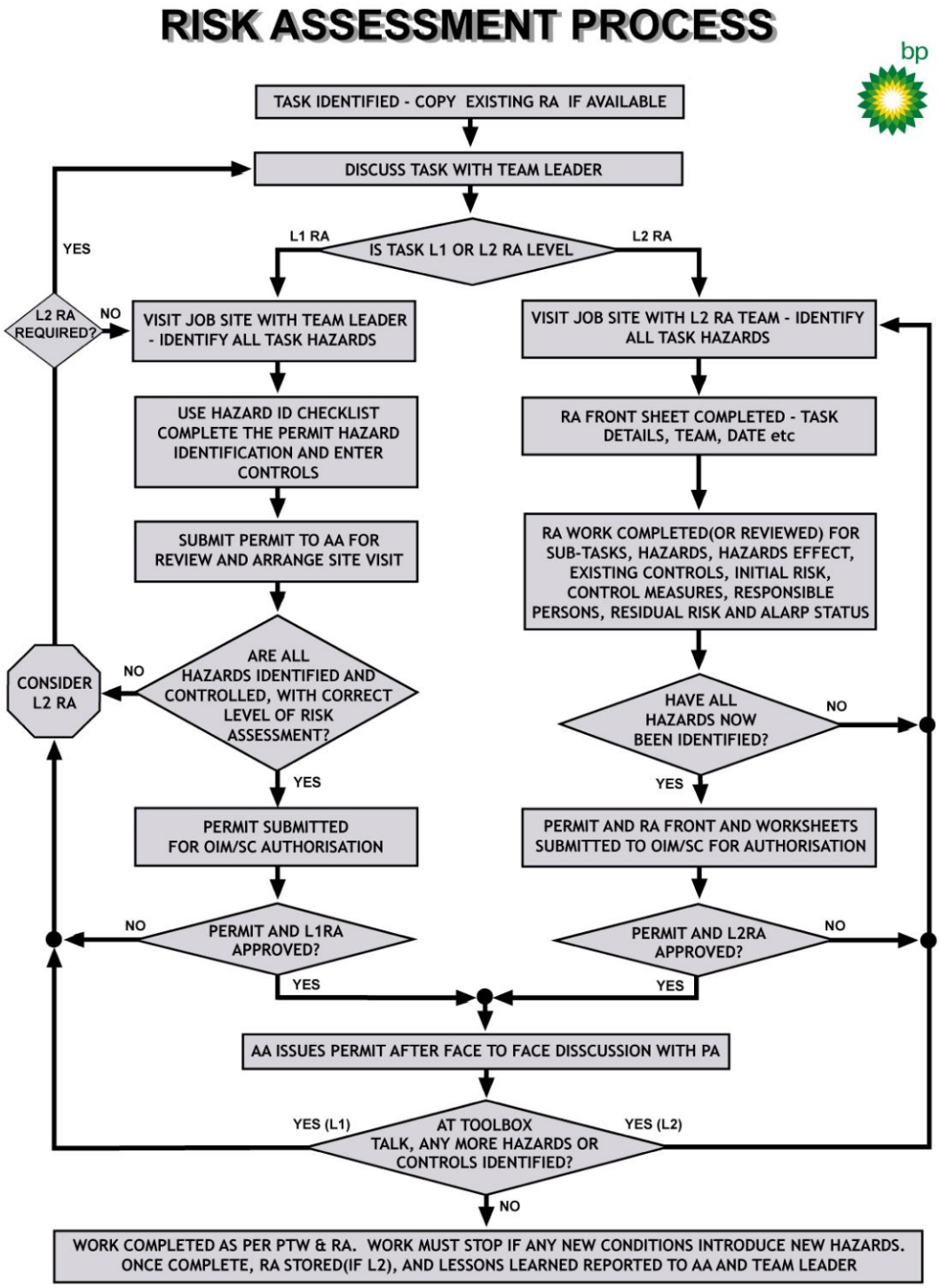
PERSONAL INJURY	PROPERTY DAMAGE	ENVIRONMENTAL DAMAGE	HAZARD EFFECT (E) RATING
Fatality	Major Loss >$5M	Total Loss of Containment	A
Likely Permanent Disability	Significant Damage Loss $500k to $5M	Significant Loss of Containment > 100bbl, Limited ability to control	B
Hospital Stay	Moderate Damage Loss $100k to $500k	Significant Loss of Containment > 100bbl only Workplace affected	C
DAFWC / Restricted Work Case / Medical Treatment / First Aid	Minor Loss $10k to $100k	Minor Loss of Containment < 100bbl only Workplace affected	D
Simple First Aid Injury	Loss <$10k	Slight Loss of Containment < 1bbl	E

PROBABILITY GUIDELINES (P)	RATING
Will occur more than once per quarter OR nearly every time	**HIGH** (H)
Will occur at least once per year, but less than quarterly OR sometimes	**MEDIUM** (M)
Will occur less than once per year OR hardly ever	**LOW** (L)

HAZARD EFFECT

PROBABILITY	A	B	C	D	E
H	15	14	13	9	4
M	12	11	10	5	3
L	8	7	6	2	1

APPENDIX E: RISK ASSESSMENT FLOWPATH



APPENDIX F: RISK HIERARCHY EXAMPLES

Examples	
1. Elimination / Prohibition	• Use of mechanical device instead of manual handling • Maximum stacking height • Unauthorised personnel • Prohibit smoking, jewellery, mobile phones
2. Substitution	• Solvent-based paint with water-based paint • Dusty powders with pastilles or pellets • Electric hand tools with compressed air • Reduction in size or weight of item
3. Engineering Controls	• Local exhaust ventilation for e.g.: - Welding - Soldering - Grinding • Mechanical or electrical isolations • Lighting • Enclosure, e.g.: - Sealable containers - Noise enclosures for turbines or pumps
4. Segregation	• Barrier or guard • Separate storage areas • Physical isolations (spade, lock-off) • Access controls
5. Reduction in Personnel or Time Exposure	• Job or shift rotation • Breaks • Hazardous work carried out at low activity periods such as nights or weekends • Dispense dilute chemical • Increase airflow through work area • Automated feed process instead of manual
6. Personal Protective Equipment	• Gloves • Goggles • Face mask • Boots • Respiratory protective equipment • Chemical suits or gauntlets • Safety harness or inertia reel