Qualifying the Risk

The matrix used for determining the risk rating for this Stage 1 Risk Assessment has come from the Step Change in Safety Task Risk Assessment Guide (2007).

Likelihood of Occurrence	Hazard Severity: Negligible Negligible injury, no absence from work	Slight Minor injury requiring first aid treatment	Moderate Injury leading to a lost time incident	High Involving a single death or serious injury	Very High Multiple deaths
Very Unlikely A freak combination of factors would be required for an incident to result	L	L	L	L	L
Unlikely A rare combination of factors would be required for an incident to result	L	L	L	M	M
Possible Could happen when additional factors are present but otherwise unlikely to occur	L	L	M	M	H
Likely Not certain to happen but an additional factor may result in an accident	L	M	M	H	H
Very Likely Almost inevitable that an incident would result	M	M	H	H	H

Risk Rating Criteria

To determine the Risk Rating (RR), multiply the Hazard Severity (S) by the Likelihood of Occurrence (L).

Low Risk	Identified as L in the matrix. May be acceptable; however, review task to see if risk can be reduced further.
Medium Risk	Task should only proceed with appropriate management authorisation after consultation with specialist personnel and assessment team. Where possible, the risk should be redefined to take account of the hazards involved or the risk should be reduced further prior to task commencement.
High Risk	Identified as H in the matrix. Task must not proceed. It should be redefined or further control measures put in place to reduce risk. The controls should be re-assessed for adequacy prior to task commencement.

Probability Guidelines

It is appreciated the likelihood of occurrence is fairly subjective and open to personal interpretation. In an attempt to achieve a level of consistency, the following definitions are applied;

Very Unlikely	A freak combination of factors would be required for an incident to result.
Unlikely	A rare combination of factors would be required for an incident to result.
Possible	Could happen when additional factors are present but otherwise unlikely to occur
Likely	Not certain to happen but an additional factor may result in an accident.
Very Likely	Almost inevitable that an incident would result

Severity Guidelines

Negligible	Negligible injury or health implications, no absence from work. Negligible loss of function/production with no damage to equipment or the environment.
Slight	Minor injury requiring first-aid treatment or headache, nausea, dizziness, mild rashes. Damage to equipment requiring minor remedial repair, loss of production or impact to the environment.
Moderate	Event leading to a lost time incident or persistent dermatitis, acne or asthma. Localised damage to equipment requiring extensive repair, significant loss of function/production or moderate pollution incurring some restitution costs.
High	Involving a single death or severe injury, poisoning, sensitisation or dangerous infection. Damage to equipment resulting in production shutdown and significant production loss. Severe pollution with short-term localised implications incurring significant restitution costs.
Very High	Multiple deaths, lung diseases, permanent debility or fatality. Major pollution with long-term implication and very high restitution costs.

Control Measures

Controls should be chosen taking into account the following, which are in order of effectiveness:

1. Elimination
2. Substitution by something less hazardous and risky
3. Enclosure (enclose the hazard in a way that eliminates or controls the risk)
4. Guarding/Segregation of people
5. Safe system of work that reduces the risk to an acceptable level
6. Written procedures that are known and understood by those affected
7. Review the blend of technical and procedural control
8. Adequate supervision
9. Identification of training needs
10. Information/Instruction (signs, hand-outs)
11. Personal Protective Equipment (last resort) – cannot be controlled by any other means

MSF AIDE MEMOIRE TO STAGE ONE RISK ASSESSMENT FOR PLANNING MOU MOVES

The process that is usally followed when planning a MOU relocation is as follows;

1 Identify surface location and surrounding infrastructure
2 Identify Rig
3 Develop basic principles and a step by step method statement of how the MOU relocation will be carried out.
4 Hold a high level Risk Assessment and Hazard Identification meeting (Stage 1)
6 Publish and close-out actions arising from above
7 Develop formal MOU-Relocation procedures based on output of Stage 1 Risk Assessment
8 Publish and circulate MOU-Relocation procedures for review to all stake-holders
9 Hold pre-MOU-Relocation-meeting as a final Risk Assessment and document check
10 Amend and agree final procedures and issue for operations
11 Hold Stage 2 Risk Assessment offshore to review the procedures and Stage 1 Risk Assessment and apply local MOU and/or situation specific peculiarities
12 Hold documented Job Safe Analyses (JSA) and Toolbox Talks (Stage 3 Risk Assessment) onboard individiual vessels and installations offshore

Each Operator/Duty Holder during the process of planning MOU-Relocations is required to assess key risks associated with the activity and apply appropraite mitigations to reduce risk to "as low as reasonably practicable".

Stage 1 of this document is intended to be a worked example of a risk assessment to act as a prompt for individual Operators/Duty Holders to hold their own internal risk assessments/hazard identification.
It is recommneded that stage 1 of this document is used in the planning stage prior to development of formal procedures for the activity.

Stage 2 of this document is intended to be a prompt list to carrying out risk assessments offshore prior to the MOU move commencing and ideally should involve the operator/duty holder, MOU owner, towmasters and vessel masters as a minimum. The basis of the stage 2 risk assessment is to review the approved MOU move procedures and stage 1 risk assessment and apply local variations where applicable.

Example Risk Assessment – Stage 1

Originated: Apr-08
First Annual Revision Sep-09
Second Annual Revision: Feb-11

Summary of Activities Covered by this Worked Risk Assessment
This example of High Level Risk Assessment applies to the planning and execution of rig move operations.

Existing Control Measures

North West European Area Guidelines - Version 2
Current Common Marine Inspection Document with all actions addressed
MSF Template of Data
MSF Anchor Handling Manual
MSF MOU Move Procedure - Content Guidance
MSF AHTS Checklist
MOU Move Specific Procedures
National Statutory Requirements
MOU Owner Safety Management System
Marine Operations Manuals – all parties
Lessons Learned from previous operations
Anchor Manufacturers Handling Instruction
International Shipboard Management Code

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
Step 1 – Confirmed Location and Rig Identification.												

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
Step 2 - Planning **Identifying Specific Requirements**												
	Assessing the location	Weather	Inability to achieve location	VH	VL	H	Define limits of weather		VH	U	M	
		Water depth	Inadequate procedures				Site survey					
		Seabed conditions					Mooring analysis & deployment / recovery load analysis					
		Currents	Inadequate vessel and equipment specification				Traffic Survey					
		Tides					Field drawings					
							Hind Casting & Weather Forecasting					
		Subsea infrastructure	Damage to seabed assets and/or towing and mooring assemblies				Heights determined for seabed clearances for anchor handling and towing					
							Location approval					
		Mooring assemblies					Catenary Calculations					
		Other assets					Location historical data (where applicable)					
		Traffic density					Previous experience of location					
		Dynamic loadings					Tidal & Current Data					
	People	Lack of competence/ Lack of time/ resource constraints	Incorrect data	VH	VL	H	Approved vendors		VH	U	M	
		Experience e.g. Naval Architects	Inability to achieve required location				Contractor audits					
		Approval authorities	Inadequate procedures				Industry accreditation					
		Warranty Assurance Survey	Inadequate vessel and equipment specification				Proven history					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
Step 3 - Planning Develop Procedures												
	Input data	Lack-of or wrong input data	Schedule delay	VH	VL	H	Site survey data		VH	U	M	
			Inadequate selection of vessels, personnel, equip				Mooring analysis and recovery / deployment load analysis					
			Incorrect mooring plan				Location HAZOP / HAZID					
			Incorrect location				Accurate field survey data					
							Survey procedures					
							Verification of data					
							Lessons learned including use of previous procedures					
	Competence of author	Lack of knowledge	Schedule delay	VH	VL	H	Review and approval process which should define reviewers		VH	U	M	
			Inadequate specification / selection of vessels, personnel, equipment				Approved Vendors					
			Incorrect mooring plan				Contractor audits					
			Damage to property and equipment				Proven history					
			Harm to personnel				Realistic schedule to be identified					
			Unrealistic scheduling									
		Lack of understanding of required content	Schedule delay	VH	VL	H	Existing control measures No additional controls identified		VH	VU	L	
			Inadequate specification / selection of vessels, personnel, equip									
			Incorrect mooring plan									
			Damage to property and equipment									
			Harm to personnel									
			Critical items / issues not identified									

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
	Preparation, Review, Approval and distribution of Procedures and Onshore pre-move meeting	Pressure of time	Inadequate time to prepare, develop and review procedures	VH	L	H	Sufficient time and resources allowed for preparation and developing procedures Procedures issued in sufficient time to allow adequate review		VH	U	M	
		Competency of review team.	Inadequate review	VH	L	H	Procedures to be reviewed by competent personnel and as a minimum to include: (i) Operator (ii) MOU Owner (iii) Survey Reps (iv) Procedure Author (v) Marine competent MOU mover		VH	U	M	
		Distribution	Correct procedures are not distributed to the relevant parties. Relevant parties not prepared Potential delays	VH	L	H	Define distribution list Final revision of procedures to be signed off by accountable personnel		VH	U	M	

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
Step 4 - Planning In-Field Operations												
	Timing	Inadequate preparation period	Shortcuts	VH	VL	H	Planning Adequate notification period for moves to be defined.		VH	U	M	
		SIMOPS	Time pressure				Resources					
			Delay in operation				Integrated communication between relevant parties					
			Equipment, vessel and personnel lead times / availability									
			Damage to Equipment									
	People	Lack of competent and experienced people	Harm to personnel	VH	VL	H	Existing control measures		H	U	M	
		Inadequate manning	Damage to equipment				Approved vendors with competency assurance systems in place					
		Changes to personnel	Delay to schedule				Demonstrable work experience available (CV, work history)					
		Poor or lack of meaningful communication	Lack of continuity				Shift change not to be undertaken during critical operations					
		Unsafe practices	Dilution of experience				Realistic schedule that includes allowance for familiarisation, delays and rest periods					
		Lack of understanding of equipment, operation and procedures					Personnel competent for proposed operation					
		Inexperience of proposed operations					Clear roles and responsibilities					
		Fatigue					Adequate shift change handover to take place					
		Loss of focus					Staggered shift change where possible					
							New crews to be adequately briefed in the operation					
							Crew changes during MOU move operations to be adequately assessed using Management of Change process					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
	Chartering Vessels	AHTS not fit for purpose	Damage to, or loss of vessels, property / assets	VH	VL	H	Existing Control Measures		H	U	M	
							Duty Holders to satisfy themselves that a vessel assurance process is in place and is verified.					
			Inadequate selection of vessels and crew				Person chartering vessel has to be familiar with the operation and the vessels intended activity					
			Injury to personnel				Vessel requirements clearly defined					
			Schedule delay				Vessel meets defined specification in procedures					
	Mobilisation demobilisation of Equipment	Equipment and/or mobilisation location not fit for purpose	Delay to schedule	H	P	M	Existing control measures		M	U	L	
		Incorrect vessel preparation	Damage to equipment / property / assets				Correct Load out plan with defined load list supplied to vessels					
		Competence of people	Harm to people				Approved vendors responsible for supplying equipment as per operators / rig owners standards					
							Confirmation of equipment at mobilisation meets procedural requirements					
							Certified equipment					
							Level 2 Risk Assessment to be undertaken specific to the equipment being mobilised					
							Substitute equipment to be confirmed with operator / MOU owner prior to mob					
							Adequate time given to vessel configuration					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
	Vessel Procedural Review and Detailed Operational Briefing and final assurance and mobilisation	Insufficient time to mobilise personnel, undertake MOU induction and familiarisation	Delay in operation	VH	VL	H	Existing control measures		VH	U	M	
		Insufficient time to review procedures	Damage to, or loss of vessels, property / assets				Adequate time given to vessel to review and discuss the procedures, understand the operation and the vessels role					
		Lack of understanding of procedures	Harm to people				Competent and experienced personnel familiar with the operation to conduct the vessel briefings and final assurance					
		Inadequate briefing	Lack of understanding of operation									
		Insufficient rest time	Fatigue									
	Mobilisation, Procedural Review and Detailed Operational Briefing of assigned MOU move personnel e.g. Tow Master, Marine Rep, Survey rep, etc.	Insufficient time to mobilise personnel, undertake MOU induction and familiarisation	Delay in operation	VH	VL	H	Existing control measures		VH	U	M	
		Insufficient time to review procedures	Damage to, or loss of vessels, property / assets				Competent and experienced personnel familiar with the operation					
		Lack of understanding of procedures	Harm to people				Adequate time given to review and discuss the procedures, understand the operation and their role					
		Inadequate briefing	Lack of uunderstanding of operation				Sufficient time in process to ensure MOU induction and familiarisation is undertaken					
		Insufficient rest time	Fatigue				Sufficient rest time to be given prior to commencement of operations					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
	Pre-Operational Commencement Meeting (offshore)	Vessels do not understand the MOu requirements	Delay in operation	VH	P	H	Existing control measures		M	U	L	
		MOU does not understand the vessels capabilities and limitations	Damage to, or loss of vessels, property / assets				Discussion between the MOU and the vessels to ensure accurate sharing of information and vessel equipment availability					
		Failure to manage any changes	Harm to people				MOU to fully understand the vessels capabilities and limitations					
		MOU and vessel crew are not familiar with their roles in the operation.					Confirmation and agreement from vessels that they understand their roles in the operation					
		Clear lines of communication and accountability are not defined.					Operational status of vessels and MOU to be confirmed					
		Lack of co-ordination of operation					Define communication lines and accountability					
		Failure to identify specific risks associated with the operation					Continual review of all factors to be undertaken and communicated until such times as a start time has been identified and agreed between all parties.					
							Confirmation that Level 2 Risk Assessments have been undertaken and any issues shared with all parties involved in the operation					
							Management of change assessment					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
	Establishing and assessing environmental Conditions	Information on environmental conditions and forecast not available or incorrect	Damage to, or loss of vessels, property / assets	VH	VL	H	Operational status of vessels and MOU to be confirmed within operating limits and continual reviews to be undertaken		M	U	L	
		Insufficient environmental working window	Harm to people				Suitable weather window identified and agreed for each phase of the operation to commence or be suspended					
		Inadequate monitoring and appraisal of environmental conditions	Damage to the environment				Suitable monitoring equipment to be available onsite and utilised					
			Operating out with the safe working limits of the vessels and/or and MOU				Accurate and up-to-date Environmental information and forecasting to be provided and verified					
							Open lines of communication between MOU and vessels and vice-versa to advise of any change in status					

#	Activity	Hazards	Consequences	Initial Risk			Control Measures	Action By	Residual Risk			Actions
				S	L	RR			S	L	RR	
Step 5 - Vessel Demobilisation												
	Release of vessels	Premature release of vessels	Reduced redundancy and/or capability of remaining vessels	VH	P	H	Planning - adequate notification period for moves to be defined. Resources Integrated communication between relevant parties		VH	U	M	

Risk Assessment – Stage 2 Prompt

Originated: Apr-08
First Annual Revision Sep-09
Second Annual Revision: Feb-11

Activity	Typical Hazards	Potential Consequences	Typical Control Measures	Comment
The following points are included to act as an 'aide memoire' to assist in the Stage 2 Risk Assessment - To be discussed Offshore				
Anchor Handling	Dropped Objects	Damage to, or loss of vessels, property / assets		
Transfer / Receiving PCP	Failure to follow procedures	Harm to people	Break out limits and strategy to be defined	
Chasing Out / Stripping back	Vessels in close proximity to rig / platform and each other	Damage to the environment	Good communication between rig / vessels	
J Hooking / Grappling	Collision	Delay to schedule	Extension line to be highlighted beyond anchor position	
Crane / lifting operations	Vessel capsize	Man Overboard	Identify vessel excursion limits from intended mooring track	
Winch Operation	Other marine traffic	Flooding	Back deck clear policy when wires and equipment are under tension	
Breaking Out	Breakdown in communications		Planned Maintenance System	
Recovery / Decking the Anchor	Equipment failure		Certified and/or inspection and testing regime of equipment in place	
Recovery and deployment of mooring system	Working on deck and / or over side		Mooring analysis calculations	
Fitting of specialised moorings	Over stressing equipment		Decking / Overboarding to be carried out in “safe area” (clear of such as subsea assets)	
Bolster / Un-bolstering Anchor	High breakout loads		Awareness of anchor orientation when decking / overboarding	

Activity	Typical Hazards	Potential Consequences	Typical Control Measures	Comment
Setting Anchor	Vessel(s) unable to hold station and/or heading		Adequate positive stability to be maintained in worst case scenario	
	Loss of control of anchor and/or equipment on deck		Minimum separations and distances to be agreed and adhered to between all parties involved in the operation	
	Survey equipment not working, ready or set-up properly		Change of rig thruster status to be advised	
	Entanglement of wired with vessel(s)		Operational status of vessels and rig to be confirmed within operating limits and continual reviews to be undertaken	
	Excessive movement of crane assemblies		Suitable crane assembly (pennant length, hook, headache ball)	
	Lack of understanding of emergency preparedness during operation		All Emergency release procedures to be defined and clearly understood	
	Operating outwith safe working limits		Equipment to be operated within manufacturers specification	
	Tandem operations		Survey Quality Assurance Procedures	
	Unable to maintain required tension		Redundancy in survey equipment	
			Water tight integrity policy strictly adhered to during the operation	

Activity	Typical Hazards	Potential Consequences	Typical Control Measures	Comment
Towing	Other marine traffic	Damage to, or loss of vessels, property / assets	Existing control measures	NWEA Guidelines to be reviewed with regard to SWL vs BL
Passing / Recovery of Tow Bridle	Proximity of towing vessel to rig	Harm to people	Good communication	ISM reference to be resolved
Under Tow	Tow length vs water depth	Damage to the environment	Limitation of equipment known and understood	
	Inadequate passage plan	Delay to schedule	Certified and inspected equipment and connections	
	Change in environmental conditions	Collision	Planned Maintenance System	
	Critical motions exceeded (rig and vessels)	Flooding and/or capsize	Tow Master visual inspection and review of rig towing system	
	Towing arrangements and equipment not fit for Purpose	Loss of control of tow	Limiting loads to take into account age and condition of equipment	
	Loss of tow	Man Overboard	Emergency Tow arrangements clarified before commencement of tow	
	Equipment failure		Water tight integrity checks to be undertaken	
	Equipment failure		Rig specific passage plan prepared	
	Loss of water tight integrity		Spare tow wire available and accessible on tow vessel	
	Inadequate communication		Navigation warnings	
			If heli-ops undertaken during tow then speed and heading to be agreed	

Activity	Typical Hazards	Potential Consequences	Typical Control Measures	Comment
Manoeuvring / Positioning	Proximity to other assets (surface and subsea)	Damage to, or loss of vessels, property / assets	Existing control measures	
	Inability to maintain intended track	Harm to people	Good communication	
	Equipment Failure	Damage to the environment	Limitation of equipment known and understood	
	Poor communication	Delay to schedule	Certified and inspected equipment and connections	
	Excessive thrust from rig	Collision	Planned Maintenance System	
		Flooding and/or capsize	Limiting loads to take into account age and condition of equipment	
		Loss of control of tow	Contingency procedures to be agreed and understood	
		Unable to achieve final position	Emergency Procedures clarified before commencement of approach	
			Interfaces with other assets / 3rd parties	

Marine Safety Forum - Stage 1 Risk Assessment Example - Mobile Offshore Unit (MOU) Move Operations

THE FOLLOWING 'ACTIONS' WERE IDENTIFIED AS NECESSARY TO REDUCE THE RISKS INVOLVED TO A LEVEL THAT IS 'AS LOW AS IS REASONABLY PRACTICABLE':					
No.	**ACTION**	**WHEN**	**BY WHOM**	**ACTION TAKEN**	**CLOSED**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					