






STANDARD

DIVING

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OPS0184 **Standard**

Diving




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1 Introduction

1.1 Purpose This Standard establishes procedures and requirements for performing diving activities at Upstream Americas Deep Water (UAD) locations and supplements the federal and local regulatory requirements that govern diving operations.

This document provides guidance to ensure implementation and assurance of Shell Group diving practices for Shell Companies located in the Americas region. It shall be used as a supplement to international, national, and regional regulatory and governmental requirements, Shell Group diving practices, Shell HSSE & SP Control Framework documents, and the reference documents listed in this Guideline.

1.2 Applicability This document applies to ALL:

- UAD employees
- Contractors working for UAD
- Locations owned, operated, or leased by UAD

The only exceptions are:

- by agreed variance approved by UA Diving Technical Authority (TA) or
- by agreed bridging document approved by UA Diving TA.

1.3 Specific Exclusions None

1.4 Target Audience Primary users of this document are individuals involved with diving, including the following:

- Contract Holders
- Project Engineers
- Operations Managers
- Facility Managers
- Persons in Charge (PIC)

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1 Introduction, Continued

1.5 Key Milestones

Approval Date	May 21, 2012
Implementation Date	June 15, 2012 (Some individual requirements have later implementation dates.)

1.6 References/ Companion Documents

The following list of publications, in order of precedence, is integral to this Guideline. The most current edition, unless otherwise noted, of these publications shall be used as well as the documents referenced within these publications.

- Local Governmental Regulations
- Shell HSSE & SP Control Framework for Diving Operations
- International Association of Oil & Gas Producers (OGP) Diving Recommended Practice: Report No. 411
- Documents included by reference.

Refer to [OPS0184-TO.02](#) for a list, but not limited to, reference/companion documents.

1.7 Deleted Documents

None.

1.8 Auditing Requirements

As per Shell requirements.

2 Executive Summary

2.1 Background

This Standard provides guidance to ensure implementation and assurance of Shell Group Diving Practices for Shell Companies located in the Americas region. It shall be used as a supplement to international, national, and regional regulatory and governmental requirements, Shell Group Diving Practices, Shell HSSE & SP Control Framework documents, and the reference documents listed in this Guideline. Nothing in this Standard is intended to replace, modify, or supersede these other requirements. Where conflicts or contradictions arise the more stringent shall apply, unless specific variances apply.

This Standard will address issues that the Americas region faces in relation to available resources and regional regulatory requirement.

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2 Executive Summary, Continued

2.2 Accountability All Shell personnel whose responsibilities concern diving, including Contract Holders, Project Engineers, Operations Managers, Facility Managers or any Shell Personnel designated as PIC of a work scope involving diving operations, are accountable for compliance as defined by the Shell HSSE & SP Control Framework Personal Safety Manual.

Refer to Shell HSSE & SP Control Framework for Diving Operations manual for specific definitions of accountability and instructions to implement Group Standards that pertain to diving operations.

2.3 Management of Change UAD's Business Control Documents (BCD) Process will be used to manage change. The BCD process includes procedures for:

- stakeholder engagement and review,
- management approval,
- communication/roll-out,
- implementation, and
- training.

Nonconformance and deviations from non-regulatory documents shall require a variance approved by the appropriate TA and shall be addressed on an individual basis. The contractor is responsible for obtaining variances for regulatory and governmental requirements and must provide Shell documentation of the approved variances. The variances obtained by the contractor must be reviewed and approved by Shell to ensure Shell's minimum requirements are still being maintained.

All Shell HSSE procedures shall be followed during all phases of the project such as pre-job preparations, project execution, and post job close out.

2.4 Implementation Detailed implementation plans have been prepared by the Safe Work Plan Authorization (SWPA) project execution team and are maintained by the SWPA Coordinator

TOOL

Glossary

Definitions The following table provides definitions of terms used in this document suite.

Term/ Abbreviation	Definition
ABS	American Bureau of Shipping
ADCI	Association of Diving Contractors International
ALARP	As Low As Reasonably Practicable
ASOG	Activity Specific Operational Guidelines
BCD	Business Control Documents
DWR	Diving Worksite Representative
CP	Cathodic Protection
CSMP	Contractor Safety Management Plan
CSMS	Contractor Safety Management System
DDC	Deck Decompression Chamber
DESIGN	Diving Equipment Systems Inspection Guidance Note
DMT	Diving Medical Technician
DMAC	Diving Medical Advisory Committee
DNV	Det Norske Veritas
DOT	Department of Transportation
DP	Dynamic Positioning
DPR	Daily Progress Report
DSV	Diving Support Vessel
DWR	Diving Worksite Representative
EMT	Emergency Medical Technician
FMEA	Failure Mode Effects Analysis
FMECA	Failure Mode Effects Criticality Analysis
FOUNTAIN	HSSE Incident Management and Tracking System
FSW	Feet of Sea Water
GOM	Gulf of Mexico
HAZID	Project Specific Hazard Identification
HES	Hyperbaric Evacuation System (includes hyperbaric evacuation unit, handling system, and life support system)
HEU	Hyperbaric Evacuation Unit (a unit whereby divers under pressure can be safely evacuated and decompressed)
HSSE	Health, Safety, Security and Environment
IMCA	International Marine Contractor's Association
ICS	Incident Command System
JSEA	Job Safety Environmental Analysis

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Glossary, Continued

Definitions The following table provides definitions of terms used in this document suite.

Term/ Abbreviation	Definition
MOC	Management of Change
OGP	International Association of Oil and Gas Producers
OIM	Offshore Installation Manager
OQ	Operator Qualification Program; per DOT
OSHA	Occupational Safety & Health Administration
OVID	Offshore Vessel Inspection Database
PIC	Person in Charge
PTW	Permit to Work
ROV	Remotely Operated Vehicle
SDC	Submersible Decompression Chamber, i.e. closed diving bell
SIMOPS	Simultaneous Operations
SIT	Systems Integration Test
SME	Subject Matter Expert
SPLC	Shell Pipeline Company LP
SSCE	Short Service Contractor Employee
SWL	Safe Working Load
SWP	Safe Work Plan
SWPA	Safe Work Plan Authorization
TA	Technical Authority
TG	Technical Guideline
TLP	Tension Leg Platform
TS	Technical Specification
UA	Upstream Americas
UAD	Upstream Americas Deep Water
USCG	United States Coast Guard
USN	United States Navy

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References and Companion Documents

Companion Documents Documents in this suite are listed in the table below.

Document Number	Title
OPS0184	Diving Standard
OPS0184-TO.01	Glossary
OPS0184-TO.02	References and Companion Documents
OPS0184-TO.03	Roles and Responsibilities
OPS0184-PR01	General Diving Requirements
OPS0184-PR02	Diving Personnel Requirements
OPS0184-PR03	Diving Equipment Requirements
OPS0184-SP01	Diving Specifications
OPS0184-SP02	Documentation Specifications

Reference Documents Shell control documents, government regulations, and industry standards and codes referenced in this document suite are listed in the table below.

Document Number	Document Title
Shell Documents	
DEP 37.90.10.32-EPP	Dynamically Positioned (DP) Vessel Requirements
OPS0011	Marine Transportation Operations
OPS0055	Lifting and Hoisting Standard
OPS0077A	Temporary Equipment (when conducting operations from a fixed or floating production facility)
N/A	UA Diving Operations Page which includes a link to the HSSE & SP Control Framework for Diving Operations
External Documents	
ABS	American Bureau of Shipping (ABS) Rules for Building and Classing Underwater Vehicles, Systems, and Hyperbaric Facilities
ADCI 000	Association of Diving Contractors International (ADCI) Consensus Standards for Commercial Diving and Underwater Operations
AODC 032	Association of Offshore Diving Contractors (AODC) Remotely Operated Vehicle Intervention During Diving Operations
AODC 045	AODC Code of Practice for The Safe Use of Electricity Underwater
CFR 29	Safety and Health Regulations for Construction – Department of Labor (OSHA)
CFR 30	Mineral Resources – Department of Interior (BSEE)
CFR 46	Shipping – Marine Occupational Safety and Health Standards (USCG)
CFR 49	Transportation – Department of Transportation (Pipeline and Hazardous Material Safety Administration)

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References and Companion Documents, Continued

Reference Documents (cont.) Shell control documents, government regulations, and industry standards and codes referenced in this document suite are listed in the table below.

External Documents (cont.)	
IMCA D 014	International Code of Practice for Offshore Diving
IMCA D 016	Underwater Air Lift Bags
IMCA D 018	Code of Practice for the Initial and Periodic Examination, Testing and Certification of Diving Plant and Equipment
IMCA D 023	DESIGN for Surface Orientated (Air) Diving Systems
IMCA D 024	DESIGN for Saturation (Bell) Diving Systems
IMCA D 037	DESIGN for Surface Supplied Mixed Gas Diving
IMCA D 039	FMEA Guide for Diving Systems
IMCA D 040	DESIGN for Mobile/Portable Surface Supplied Systems
IMCA R 004	Code of Practice for The Safe & Efficient Operation of Remotely Operated Vehicles
IMCA Safety Flash 07/07	Failure of Air Lift Bag Attachment Point
OGP Report No. 411	Diving Recommended Practice

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Roles and Responsibilities

Roles and Responsibilities Table

The following table describes the roles and responsibilities of personnel involved in diving operations at UAD Locations.

Role	Responsibility
Americas Diving Operations Technical Authority	Responsible for assuring dive operations are executed per Shell Group requirements and defines diving practices for the Group This person establishes local procedures and policies to aid in compliance and approves any variances from the established Group requirements <ul style="list-style-type: none"> • Approves specialist diving contractors • Approves DWR
Contract Holder	<ul style="list-style-type: none"> • Accountable for ensuring diving operations are executed per Shell Group and HSSE requirements • Obtain specialist support from the Diving Operations Subject Matter Expert. • Challenge the need for manned diving and use only approved specialist diving contractors
Contractor Offshore Manager	Some jobs may require that both an offshore manager and a diving superintendent be present on the job site. The duties may be shared with a responsible person clearly identified for each responsibility. <ul style="list-style-type: none"> • Openly report all non-compliances involving Shell Group Diving Requirements. Notification shall be in writing and given to the Shell UA Diving TA/SME before work commences or if equipment or conditions change during work activities. • Participate in the development and approval of project specific work procedures. • Responsible for overall project execution • Ensure that the diving approved plans and procedures are followed by all employees and subcontracted personnel. • Ensure that all risk-reducing measures have been closed-out prior to diving operations commencing. • Immediately report all accidents, incidents, and near misses to the Shell DWR. • Manage personnel and ensure competencies and qualifications of all personnel are met. • Liaise and interface between Shell DWR, Vessel Master, dive personnel and subcontracted personnel.

Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
<p>Person In Charge</p>	<p>This person is the single contact point between the asset requiring diving services and the Shell Roles and Responsibilities DWR. The PIC is accountable for ensuring that the project is conducted according to all Shell Group Requirements. This position may be filled by the:</p> <ul style="list-style-type: none"> • Offshore Installation Manager • Production supervisor, • Drilling foreman, or • Another person designated by the Asset Operations Manager or OIM. <p>In the event the dive location is 500 meter or more from a platform or off of Shell leases and properties the Project Engineer will take this role.</p> <p>The Shell UAD PIC shall perform the following:</p> <ul style="list-style-type: none"> • Approve any deviations from Shell Standards. • Oversee and ensure diving operations and third party non-diving contractors' operations being conducted on Shell UAD controlled worksites are contracted and carried out in accordance with this Standard. • Provide a safe workplace for diving operations by communicating all relevant information. • Designate a Job Sponsor and alternate PIC. • Communicate the scope of work required by the asset to the Shell UA Diving TA and SME • Manage SIMOPS and identify operational changes that may require shutting down or re-scheduling conflicting activities. • When a SWP is required, ensure that it is developed and approved, for work that entails diving activities. The SWP shall include Roles and Responsibilities, Emergency Response, SIMOPS, and asset-specific requirements. Dive procedures and diving related amendments shall be supplied by the Shell UAD DWR for inclusion in the SWP.

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Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
Dive Contractor Project Manager	<ul style="list-style-type: none"> • Ensure compliance with governmental regulations, Shell Group Requirements and their company's policies, standards, procedures, etc. • Ensure all contractor personnel understand and comply with Shell requirements. • Be the focal point for all communication between dive contractor and Shell. • Source for incident/accident reporting to Shell and initiate a root cause analysis and final report of incidents. • Participate in teleconferences and job updates as determined by Shell. • Write job and task specific procedures for all work • Notify Shell SME in writing if unable to comply with requirement(s). • Ensure contractor personnel participate in preparation of work procedures, project risk assessments, and planning for all reasonably foreseeable emergencies. • Provide fit for purpose dive plant equipment in use during project and clearly define work scope for each diving site. • Conduct a job-specific assessment of the necessary dive personnel and ensure their personnel are competent to use the equipment and carry out the tasks required for which they have been contracted. • Appoint the diving superintendent and supervisor(s) in writing to supervise the work site diving operation. • Give input and oversee compilation of the job close out reports and as-built documentation. • At the time of job proposal, shall have conducted a GAP analysis and provide a written list of non-conformances in regards to Shell requirements. Analysis shall be updated to reflect all equipment changes through the life of the contract.
Dive Superintendent	<ul style="list-style-type: none"> • Hold an industry-recognized certification card for the level of diving to be undertaken. • Required on projects calling for more than one supervisor. • Be competent to manage the overall diving operation. • Maintain control of dive plant and maintenance thereof. • Responsible for actions taken by dive supervisor(s) and oversight of adherence to procedures and MOC acceptance. • Responsible for diving operation and deck related activities • Responsible for reviewing and providing all required reports daily

Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
Dive Supervisor	<ul style="list-style-type: none"> • Hold an industry recognized Dive Supervisor’s certification card for the level of diving to be undertaken. • During saturation diving activities a second supervisor will be on shift and in the immediate vicinity of dive control. • Be signed on to the dive panel and solely in charge of the diving operation at all times. • Supervise the dive operation at the work site. • Be a Non-Diving Supervisor.
Diving Contractor	<p>Diving contractors shall perform the following:</p> <ul style="list-style-type: none"> • Comply with: <ul style="list-style-type: none"> • Governmental regulations and standards, • OPG Recommended Practices Report 411 • industry recognized consensus standards, • this Standard, and • their company’s policies, standards, procedures, and Safe Practices Manual. • If the Diving Contractor is unable to comply with any of the above, they shall notify the: <ul style="list-style-type: none"> • Shell UA Diving TA/SME and if on location then the Shell DWR • Participate in the risk assessments to avoid or plan for all reasonably foreseeable emergencies. • Provide competent personnel and suitable equipment to perform diving operations. • Appoint the non-diving supervisor in writing to supervise the onsite operations. • Provide documentation of all technical information, work scope, and daily costs. • On all diving matters, maintain a close and open liaison with: <ul style="list-style-type: none"> • the Shell TA, SME, and DWR. • Immediately report all accidents and incidents involving personnel or equipment to the Shell DWR. • Report any equipment failures that impact the Contractor’s ability to complete the project in a safe and timely manner.

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Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
Diving Operations Subject Matter Expert	<ul style="list-style-type: none"> • Provide technical support to the TA. • Has a skill level of competency for the Shell Dive Operations requirements. • Approve the diving operation plan against Shell Group diving practices. • Review the diving operation after closeout. • Communicate leanings to the Diving Operations TA. • Ensure proper emergency response plans are in place.
Shell Diving Worksite Representative or Construction Inspector	<ul style="list-style-type: none"> • Shall monitor the Contractor(s) activities to ensure compliance with Shell Diving Group Requirements and Shell HSSE Standards. • Ensure work is performed in accordance with approved procedures, specifications, and work plans. • Maintain regular communication with key personnel at worksite and other affected locations. • Reporting of job progress and operational issues to relevant personnel onshore and offshore. • Maintain adequate records and logs of events. • Facilitate issuance and acceptance of Permit to Work. • Verify that the emergency response plans are approved and in place per OGP. • Confirm through the Permit to Work that the diving contractor is aware of concurrent operations which may affect the diving operation. • Review with the Contractor the Shell Permit to Work • Monitor, inspect, and approve/reject the construction work both in progress and as completed by the Contractor. • Jointly plan the work on a day-to-day basis with the Offshore Manager or Dive Superintendent with assistance by Shell Operations as necessary. • Ensure the Contractor completes a JSEA prior to beginning each task and that an acceptable JSEA format is utilized. Review the Contractor's JSEA worksheets with the Contractor's on-site Supervisor and the actual personnel performing the task in preparation for the task to be performed. • Ensure that daily safety meetings with contractor personnel are being conducted, are relevant, and include feedback from previously submitted BBSM observation cards. • Champion the safety effort by participating in the safety meetings, conducting BBSM observations, and being visible on deck. • Verify all equipment complies with Shell requirements. • Monitor the work area to ensure personnel safety and contractor is working in a safety conscious manner. • Serve as the liaison with Shell personnel to keep them informed on the work activities/plans, safety aspects, and schedule.

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Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
Shell Client Representative, Worksite Representative or Construction Inspector (cont.)	<ul style="list-style-type: none"> • Keep all copies of checklists and permits throughout the duration of the construction and turnover to Shell project engineer at completion. • Ensure all contractor personnel, visitors, and others new to the job site are provided with an orientation upon arrival and prior to start of work. • Ensure that all emergencies, accidents, incidents, and uncontrolled events are reported as soon as possible and investigated as appropriate. Provide assistance with the investigation as needed to ensure that the First Notification Report is received by designated personnel within 24 hours. • Verify that dive personnel have proper certification to conduct work being performed.
Shell Diving Technical Authority	<ul style="list-style-type: none"> • Assist the project manager in assigning a risk level to each project. • Ensure a Shell Diving SME is assigned to each project executing diving activities • Define diving practices for the Group. • Act as custodian of this guideline. • Approve specialist Diving Contractors. • Review and have final approval of Diving Contractor per project. • Participate in the MOC review and approval of deviations from Shell UA Diving Group Requirements. Provide final approval on the MOC document for any deviation from Shell Diving Group Requirements. • Coordinate Shell UAD representation in commercial diving industry organizations. • Ensure that all dive related incidents are reported and managed per the HSSE Incident Management System. • Communicate regularly with the Shell Diving Centre of Excellence in regards to global diving issues, global diving HSSE reports, and diving lessons learned.

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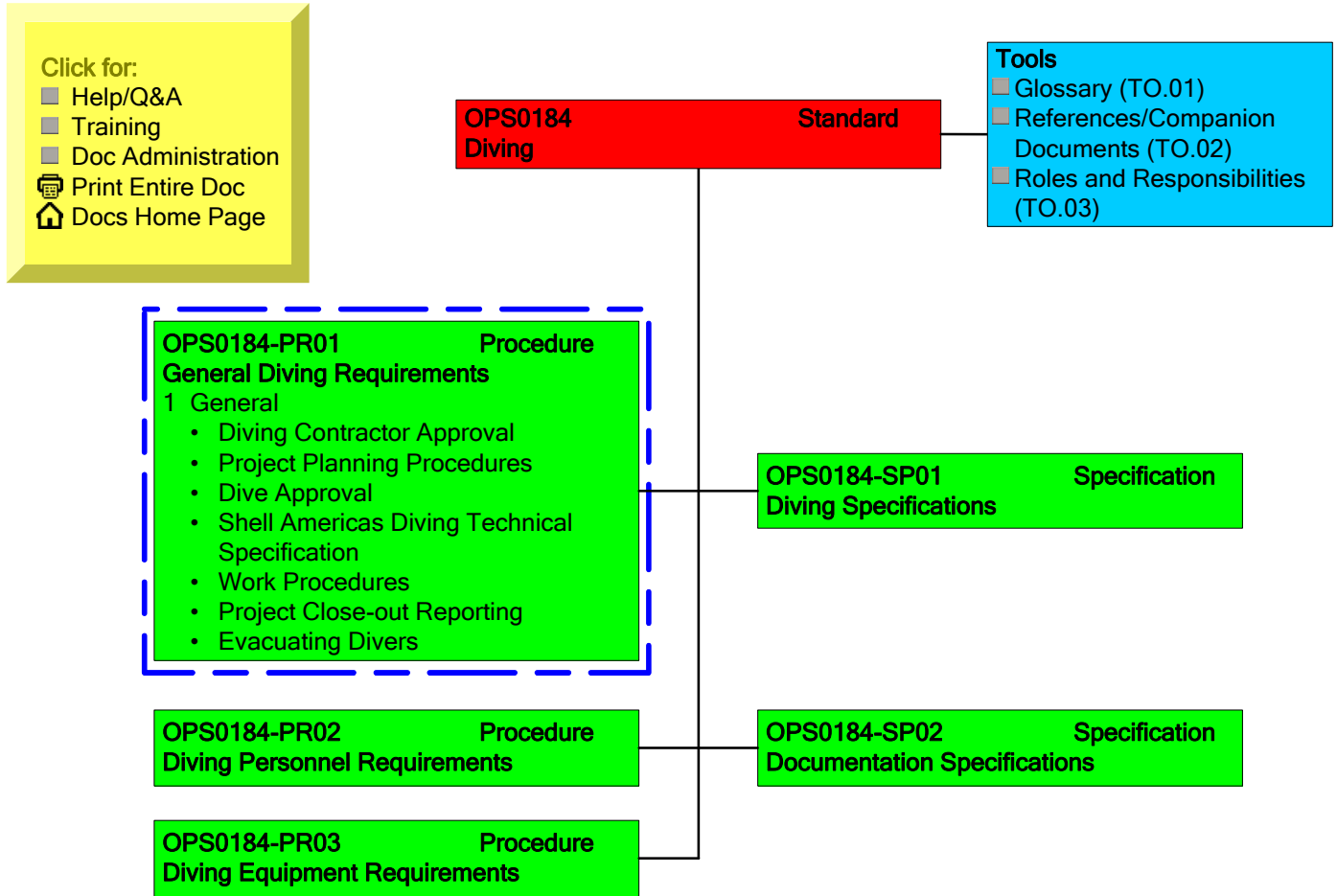
Roles and Responsibilities, Continued

Roles and Responsibilities Table (cont.)

Role	Responsibility
Shell Project Manager or Project Engineer	<ul style="list-style-type: none"> • Development of work scope. • Ensure contractor’s personnel have been instructed in the 12 Life-Saving Rules. • Ensure all vessels, dive equipment, and contractors are approved as fit-for-purpose. • Accountable for ensuring diving operations and HSSE requirements comply with Shell Group requirements. • Review and approve work procedures submitted by contractor. • Responsible for notifying all Shell assets and third party organizations that may be affected by the work scope. • Create and distribute contact lists for involved parties. • Approve MOCs • Risk asses all activities at locations, i.e. painting, sandblasting, crane activities, sea suction, marine traffic, discharge lines, etc. • Develop mitigations and obtain approval for SIMOPs from Shell UA Diving TA/SME prior to mobilization.
Vessel Master	<p>DSVs are inseparable from the Dive Plant, especially in the case of DP vessels. The Vessel Master must be included in the project planning, execution and day-to-day operation of the dive system. The Vessel Master shall have the responsibility for:</p> <ul style="list-style-type: none"> • The safety of the vessel and all personnel aboard the vessel. • Ensure all Shell approved ASOG is strictly adhered to during DP operations. • Openly engage Shell auditors during all vessel and DP audit verification processes. • Insure that the vessel and all vessel systems are within the defined limits of the vessel classification and that all inspections and certifications are up to date. • Keeping the Offshore Manager or Dive Superintendent and Shell DWR are apprised of vessel functions and vessel interfaces with diving control. • Ensure the LO/TO of all propulsion systems, unless DP. • Reference: OGP Diving Recommended Practice, Report 411, Section 6.5 for amplification of details.

PROCEDURE

GENERAL DIVING REQUIREMENTS



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1 General

1.1 Introduction

Shell Companies shall execute all diving operations, including third party, undertaken at Shell Upstream Americas Deep Water (UAD) operated facilities. Execution at UAD facilities shall be coordinated through the UA Diving TA. Execution at Shell Pipeline Company, LP (SPLC) facilities shall be coordinated through the SPLC Diving TA.

Randall Abadie	Jason Dollar
UA	SPLC
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An approved Shell Diving Worksite Representative (DWR) shall be present on locations for all diving operations unless otherwise approved by Shell Diving TA.

1.2 Diving Contractor Approval

The appropriate Shell Diving TA shall approve all diving contractors.

1.3 Safe Work Planning and Authorization

A Work Permit shall be in place before work commences each day. [HSE0008 Safe Work Planning and Authorization](#) shall be used for the permitting of all diving activities.

The Diving Supervisor shall submit a dive plan to the Shell DWR before work commences each day. The Shell DWR shall approve this plan. If the dive plan changes during an operation, the job shall immediately stop, and a new dive plan shall be developed to reflect the changes. The job shall not commence until the Shell DWR approves the new dive plan.

The dive plan shall include communication requirements for surface support crew (i.e. crane and winch operators, tenders, and all others involved in dive operations).

The dive plan shall identify any discharges, intakes, or other site specific hazards in the diver's vicinity.

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1 General, Continued

1.4 Dive Approval

This approval process shall consist of, but not be limited to the following: review and approval of the diving contractor, method of diving, work procedures, and HAZID recognition. For inshore diving, the scope must be reviewed by the authorized Subject Matter Expert (SME) in order to determine whether the risks of the intended operation require a Shell DWR to monitor the diving operation. A Shell DWR shall always be on site during offshore diving operations.

The following Diving SMEs, as appointed by the Shell Principal Technical Authority residing in the Diving Center of Excellence, must be consulted for all diving operations:

Allen Dyson	Jim Parks	Fon Stonum
Upstream Americas	Shell Pipeline Company, LP	Shell Pipeline Company, LP
(504) 728-7597	(832) 335-0949	(713) 241-2796
allen.dyson@shell.com	jim.parks@shell.com	f.stonum@shell.com

1.5 Shell Americas Diving Technical Specification

Specific guidance is provided as Technical Specifications to aid in implementation of this Standard and for tasks identified as having an elevated risk. These Specifications communicate specific needs, conditions, or institutional knowledge in addition to the referenced documents.

1.6 Work Procedures

Detailed task-by-task work procedures shall be created identifying each component of the work scope. Each task shall include procedures for all activities that must be completed. If tasks are to be completed in accordance with standard procedures, the procedures must be provided and referenced each time they are to be followed. The latest version of all procedures shall be maintained and available at the jobsite.

All changes in the work scope or work procedures shall include a contractor-generated Management of Change (MOC) and this MOC shall be signed off by all concerned parties including Diving SME and TA. Completed MOC documents shall be presented and approved by Shell before changes are implemented. A HAZID of the change must be completed and included as part of the MOC.

The Contractor's organizational chart, listing management, vessel officers, and dive supervisory staff will be included in proposals. A 24-hr contact information list shall be included.

Work procedures shall be incorporated with the Shell Safe Work Plan (SWP). A HAZID and risk assessment of the work will be performed and the results documented prior to the vessel approaching the work site. A review of the HAZID shall be required of all dive personnel and their replacements. This shall be the responsibility of the Dive Superintendent.

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1 General, Continued

1.7 Work Procedures (cont.)

The required HAZID attendees shall be:

- Shell project team delegates
 - Shell Diving SME or delegate
 - Shell DWR
 - Contractor project manager
 - Contractor offshore manager and dive superintendent
 - Contractor safety officer
 - Vessel Master (if possible). As a minimum the HAZID shall be reviewed and approved by Vessel Master.
-

1.8 Project Close-Out Reporting

The following documents and/or items shall be sent to the Shell Diving SME after the project is completed. This should be a hard copy in a Green Job File with an accompanying CD in the front of the folder.

- Contractor's Time Tickets
 - Contractor's Job/Dive Log
 - Inspector's Job Log
 - Job Scope/Procedures
 - Contingency Plans
 - IMCA DESIGN audit form (final version)
 - Rigging Certifications should be kept until project completion and then remain with equipment.
 - Safety Meeting Documents (Attendance and Subject Matter Sheet)
 - PTW (If not kept on TLP or Web Site)
 - JSEA (If not kept on TLP or Job Site)
 - Technical Information Sheets (flange tensioning, drawings, etc.)
 - Summary of Project with Lessons Learned and Future Recommendations
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1.9 Evacuating Divers

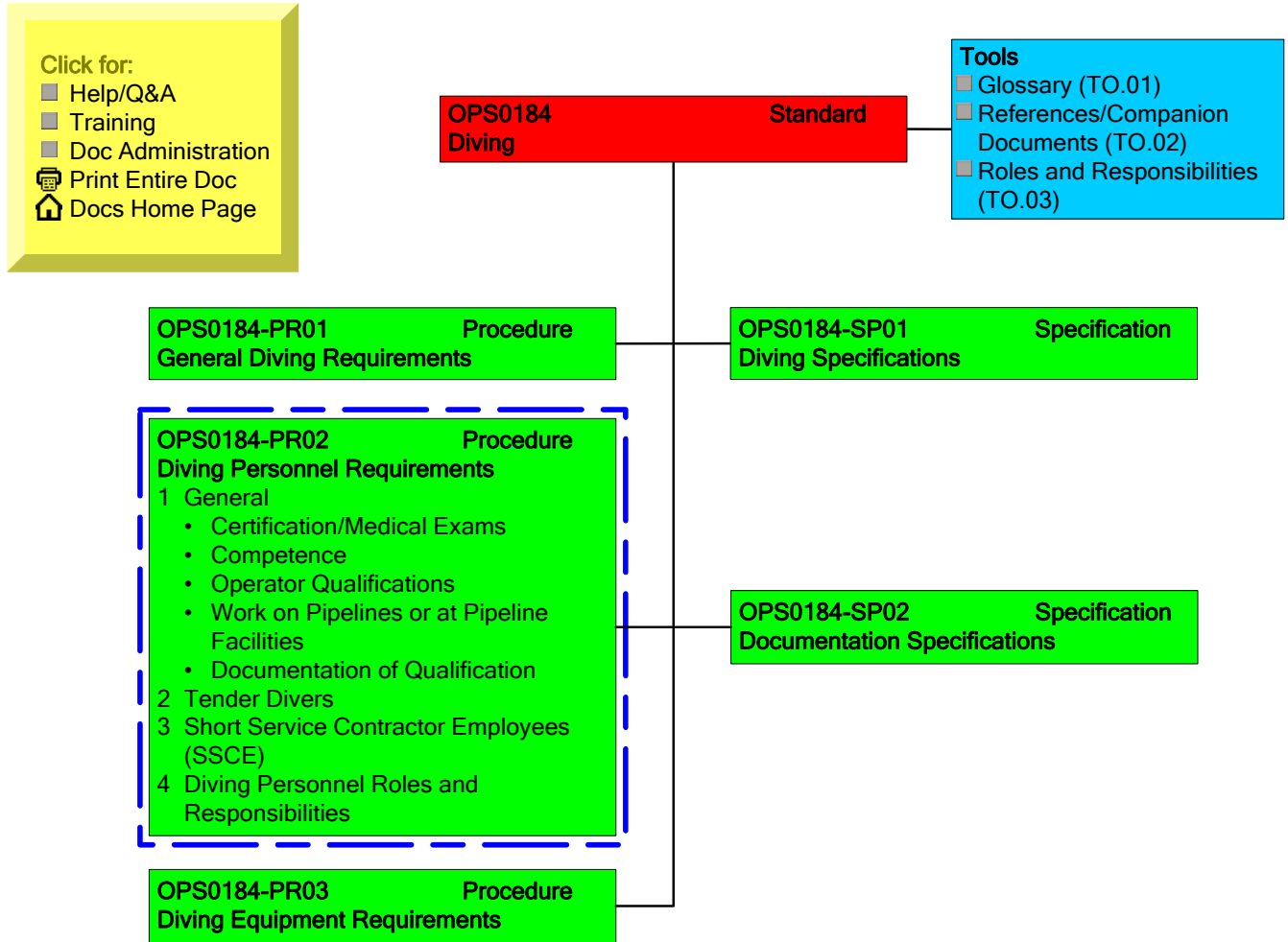
A project-specific diver evacuation plan shall be developed during pre-job planning and approved by Shell Diving SME.

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DIVING PERSONNEL REQUIREMENTS



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1 General

1.1 Certification / Medical Exams

All diving personnel shall be required to hold an industry-recognized certification card and maintain up-to-date logbooks of experience. Medical exams must be in date and verification of passing the exam, as per ADCI or IMCA, (others possible), shall be supplied to Shell with diver resumes, certification verification, and Operator Qualifications (OQ) (as required). Logs shall be available prior to dive operations starting.

A pre-dive medical exam shall be conducted on all divers before entering into a saturation dive environment. The person conducting the exam must be a certified DMT or EMT and preferably will be conducted by the vessel medic. The exam must prove fitness to dive. Divers exhibiting symptoms of a cold or sinus blockage shall be considered unfit to dive until the symptoms clear.

1.2 Competence

Each person involved with diving will have varying degrees of competence related to the equipment, work, and environment of diving operations.

It is required that diving contractor management personnel select personnel based on known competencies that are specific to the work scope, clearly defined, and clearly documented.

1.3 Operator Qualifications

OQ shall be required for each person, diver, and supervisor directly engaged in work on a DOT pipeline. It is preferred and in most cases required that each diver have the OQ as well as the dive supervisor(s). OQ records shall be submitted and approved by Shell.

1.4 Work on Pipelines or at Pipeline Facilities

Divers and supervisors performing operation or maintenance work on pipelines or pipeline facilities (as defined in 49 CFR, parts 192 and 195) shall comply with or meet the requirements of the following:

- [Accountable Pipeline Safety and Partnership Act of 1996 \(the "Act"\)](#), 49 CFR Parts 192 or 195,
 - the [U.S. DOT's Operator Qualification Requirements](#), and
 - Shell's qualification requirements (collectively referred to as the "Requirements").
-

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1 General, Continued

- 1.5 Documentation of Qualification** Failure on the Contractor's part to supply an appropriate number of qualified personnel or the required OQ documentation to Shell will result in Shell's option to terminate the project contract in whole or in part at no cost or liability to Shell.
-

2 Tender Divers

- 2.1 Background** Diving a tender on jobs is:
- Part of the apprentice program used as a training aid to future divers in the GOM and therefore a critical part of their training.
 - Not allowed for dives that are considered part of the critical path for the project.
 - Must be within the capabilities of the tender's experience level.
-

- 2.2 Prohibited/ Permitted Dives** Tenders will not be allowed to perform critical activities such as:
- Surface mixed gas dives.
 - Bell/Saturation dives.
 - Dives requiring underwater burning, use of lift bags, or deep ditch jetting.
 - Dives requiring the use of a crane to set a critical tool or piece of equipment.
 - Being the stand-by diver for any of the above tasks.

The on-site Dive Supervisor must request the use of a tender on a job site dive and this request must be approved by Shell's DWR. The request and approval shall be required for each and every dive.

The Shell DWR shall review the tender's dive log prior to the approval.

The Dive Supervisor is required to run the dive.

- 2.2 General Requirements** When diving a tender is allowed the tender shall:
- have a current dive physical. The supervisor or DMT/EMT shall conduct a pre-dive medical assessment.
 - have a working knowledge of the emergency procedures for divers while in the water.
 - have a complete knowledge of the work scope of the dive and be familiar with the overall job.
 - have required "OQ" training for job being performed, if required.
 - understand that they can stop the work, without repercussion, if they become disoriented, uncomfortable with the task, or deem it unsafe.
 - be comfortable with the conditions of the dive (job requirements, sea state, water conditions, dive equipment, etc.).
-

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2 Tender Divers, Continued

2.2 General Requirements (cont.)

- be limited to water depths of 60 fsw and no-decompression dives when they have less than 6 months of service time or less than 25 logged commercial dives.
- be limited to a depth of 140 fsw when they have 7-18 months of service time or more than 25 logged commercial dives.
- be restricted to a depth of 160 fsw no matter their experience level, even when they have more than 50 logged commercial dives.

Any tender diving outside the above requirements will require an MOC approved by the contractor and Shell UA Diving SME.

3 Short Service Contractor Employees (SSCE)

3.1 Mentors

SSCE are required to have an assigned and documented mentor that is not a supervisor, and that mentor must be in position to be able to immediately communicate with the SSCE. The SSCE and mentor shall be identified on the JSEA for all tasks in which the SSCE is involved. See Shell Contractor Safety Management System SSCE Policy.

3.2 Dive Teams

In addition to the above, a dive team in saturation can only consist of two short service employees in a team of six divers, or one in a team of four divers. Under no circumstance can two SSCE personnel be teamed together in the bell at the same time. The allowable limit of SSCE may be reduced depending on the job-scope and must be approved by Shell UA Diving SME and TA.

3.3 Contractor Personnel with ≤ 6 Months Experience

Contractor personnel with six months or less experience with the company or in a particular craft shall be made known to Shell as SSCE in accordance with Shell's SSCE Policy.

3.4 Diver's Experience

Divers with less than two years in water experience and/or less than 20 bell runs will fall under the same guidelines as SSCE in regard to what comprises an acceptable dive team.

4 Diving Personnel Roles and Responsibilities

4.1 Reference

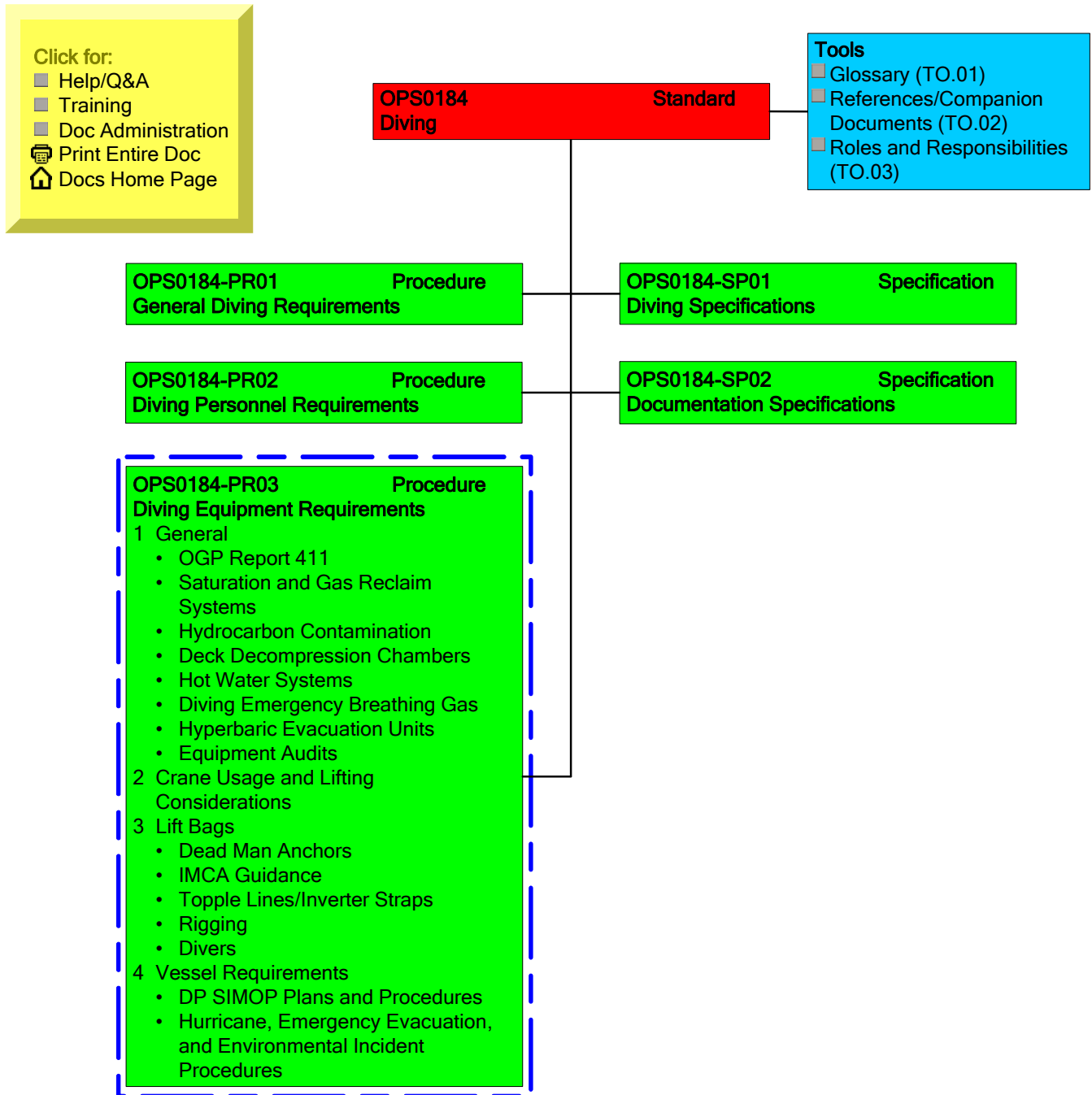
Refer to [OPS0184-TO.03](#).

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PROCEDURE

DIVING EQUIPMENT REQUIREMENTS



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1 General

1.1 Scope Equipment requirements found in this Procedure do not include all of the equipment found on a dive spread. This Procedure highlights certain areas needing further clarification.

1.2 OGP Report 411 The mode of diving to be employed will dictate the requirements for operation, equipment, and audits. [OGP Report 411](#) Appendices 1-14 provide summaries of the operational and equipment requirements for each type of diving. All dive modes to be conducted during the work scope, including emergency operations, must meet these requirements.

1.3 Diving Contractor Equipment Requirements The diving contractor is responsible for the set-up, inspection, verification, maintenance, repair, and certification of all diving equipment including divers' personal equipment. Before being accepted as "fit for purpose", all diving plant and equipment must have an IMCA Diving Equipment Systems Inspection Guidance Note (DESIGN) standard audit.

The diving contractor shall have a system in place for self-auditing their dive systems, as well as a Shell approved third party auditor's verification prior to award of any work scope. Compliance level issues shall be determined by the Shell Diving TA and SME.

1.4 Equipment List A list of equipment proposed for diving shall be submitted as part of all proposals. Any dive system components that are replaced, removed, or added during the course of work shall have all required documentation, including a risk assessment, before beginning the modification.

Minimum quantities of gases needed for diving operations, including therapeutic treatment and emergencies, shall also be included in the list and in accordance with [IMCA D 014](#) Section 7.3.17.

1.5 FMEA and FMECA Saturation systems must be supported with a current Failure Mode Effect Analysis (FMEA) document, and a Failure Mode, Effects and Criticality Analysis (FMECA). [IMCA D 039 FMEA Guide for Diving Systems](#) shall be used when preparing the FMEA. A copy of these documents shall be provided to Shell upon request. The class documentation should be free of any conditions of class.

1.6 Gas Reclaim Systems Gas reclaim systems, while not required, are recommended. The benefits will be considered during the proposal evaluation.

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1 General, Continued

1.7 Hydrocarbon Contamination The risk of hydrocarbon contamination shall be considered for all operations. Divers may inadvertently bring the contamination into the bell atmosphere on the hoses and diver's personal gear. A hydrocarbon monitor shall be installed in the bell to alert divers and dive control to the presence of hydrocarbon in the bell. The hydrocarbon monitor shall meet the requirements of [OGP Report 411](#), Appendix 8.

1.8 Deck Decompression Chambers One double-lock decompression chamber will be required on all diving jobs. If the vessel cannot accommodate a chamber and the dive depth is less than 33 fsw, a chamber shall be located no more than two hours travel distance from the dive site. Adverse conditions should be considered when calculating the two-hour distance.

1.9 Hot Water Systems Hot water systems will be required on all dive spreads when mixed gas is the breathing medium. Hot water systems should also be considered on all diving jobs performed in winter months.

On projects in greater than 650 fsw, a higher capacity hot water system, capable of providing a sufficient pressure/volume of hot water to the diver at depth and at the end of his umbilical, shall be required.

Supplemental hot water systems shall be required as water depth increases. Hot-water-heated diver's gas should also be considered in depths greater than 500 fsw.

Actual temperature at depth shall also be considered to determine the hot water system requirement.

1.10 Diving Emergency Breathing Gas Bailout bottle (cylinder) of emergency breathing gas shall be used on all dives regardless of depth.

All breathing medium in bailout bottles shall be checked prior to a diver's use on a job to ensure that the medium is correct for the depth of water the operation is being conducted in. As a practice, all bottles should be emptied and refilled on-site with the correct breathing medium, i.e. no mixed gas on a shallow air job

The capacity of the cylinder(s) at the depth of diving shall allow breathing air for 1 minute for every 10 meters horizontal excursion plus, and (if using surface umbilical) 1 minute for every 10 meters of depth.

Closed-circuit or re-breather systems, such as the Secondary Life Support (SLS) backpack, are mandatory for water depths greater than 500 fsw, unless the risk assessment determines other systems adequately reduce the risk to ALARP.

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1 General, Continued

1.11 Hyperbaric Evacuation System

All marine vessels performing saturation diving services shall have one of the following types of Hyperbaric Evacuation Units (HEU) as defined by ABS Section 12 Diving Systems Chapter 11.1:

- Type I - Self-Propelled Hyperbaric Lifeboat
- Type II - Towable Hyperbaric Rescue Chamber
- Type III - Hyperbaric Rescue Chamber that is suitable for offloading or recovery by an attendant vessel/offshore facility

The HEU must be classed by an international classification society and have no outstanding citations. Power for launching systems used for hyperbaric evacuation must be independent of ship's supply and must be either gravity or stored mechanical energy.

Depending on the work location and hazards, a Type I or II HEU may be required and will be determined by the Shell TA/SME.

A job-specific evacuation procedure shall be provided that details the recovery, transportation to a reception facility, and de-saturation plan. This plan will identify responsible parties for each stage of this event. This plan must be approved by Shell Diving TA/SME. Periodic drills shall be performed to ensure readiness.

The HEU is not to be used as an additional compression chamber.

1.12 Equipment Audit

A Shell approved third party auditor shall perform the IMCA DESIGN audit on all dive systems. This audit shall be valid for a period of 12 months unless there are repairs, modifications, or replacements to the system.

Shell may undertake spot, theme, or full audits at any time and the results of these shall be considered.

Copies of the IMCA DESIGN audit forms shall be kept by the Diving Project Team Inspector in the project file.

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2 Crane Usage and Lifting Considerations

2.1 General

- Vessel cranes on classed vessels shall be operated and maintained per vessel class.
 - Crane inspections shall be a part of the vessel audit. No cranes shall be used in dive operations that are out of specification, under-rated, or out of inspection date.
 - Crane usage and lifting in water depths greater than 500 fsw should be calculated to include weight of crane lifting wire to prevent inadvertent overloading of the crane.
 - [OPS0055 Lifting and Hoisting](#) Standard shall apply to all projects unless a variance is granted for specific activities by Shell Diving TA/SME.
 - Lifts requiring supplemental buoyancy due to exceeding the capacity of the crane (such as moving pipe spools) shall require documented engineering and acceptance by the project engineer and vessel owner. These lifts should be avoided.
 - Crane Operator shall have industry-recognized certification and be fit for work
 - Dedicated signalmen are required for on deck crane activity
 - Communication must occur directly between the diver/dive supervisor and crane operator.
 - All deck personnel used in crane operations shall have completed a Shell-approved rigger certification course.
-

3 Lift Bags

3.1 General

Lift bags shall be newly purchased and project specific, and shall have certification paperwork not older than one year. The lift bag capacity and unit of measure shall be clearly marked on the bag.

In deeper water, air compressors should be sized (pressure, volume) for rapid inflation of a lift bag. A diver shall always be present during a bag's inflation.

Any time a pipeline is to be lifted, a Shell-approved, engineered work plan must be used.

Using lift bags to increase crane capacity should be avoided. This is only allowed with a variance approved by Shell UA Civil Engineering.

3.2 Dead Man Anchors

Whenever lift bags are employed a dead man anchor or independent anchor point shall be used.

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3 Lift Bags, Continued

3.3 Leaving in Place Under no circumstance shall lift bags be left in place if the DSV is to depart the location, or during any period of inactivity at the location of the bags. As a minimum, lift bags shall be deflated, laid on bottom, and left in place. In areas where trawl fishing is possible, the bags should be removed from the worksite and returned to the surface.

3.4 IMCA Guidance The guidance provided by [IMCA Safety Flash 07/07](#) and [IMCA D-016, Rev 3: Underwater Air Lift Bags](#) shall be followed for all use of lift bags.

3.5 Underwater Buoyancy Compensation Lift bags used for underwater buoyancy compensation shall be tightly controlled and strict adherence to written procedure is mandatory. Procedure shall contain hold points during operation to double check critical components and job steps.

3.6 Topple Lines/Inverter Straps Lift bags shall always be used with a topple line or inverter strap (a load-rated line attached from the top of the bag to a suitable anchor to allow the bag to dump should the buoyancy become greater than the load, and the load begins to float off).

3.7 Rigging Rigging should be safety rated above the bag's maximum capacity. Lift bags should be sized not to exceed the load to be lifted. If positive buoyancy is required, additional small capacity bags may be used to gain the degree of positive buoyancy required.

3.8 Divers Divers working with lift bags should have an ongoing knowledge of the position of their umbilical while inflating or working around a lift bag.

4 Vessel Requirements

4.1 General

Vessels shall be determined as “fit for purpose” prior to a contract award.

All vessels working at Shell facilities shall be audited and approved by the Shell Marine Department. An up to date Offshore Vessel Inspection Database (OVID) and DP Trial Certificate shall be in place and submitted to Shell Marine Department.

All DP vessels shall have an Activity Specific Operational Guideline (ASOG) created by the Shell DP SME. All Vessel operations shall comply with this ASOG.

To support the approval process of the ASOG, the most recent FMEA and DP Sea Trail documents shall be submitted. The complete requirements are detailed in [DEP 37.90.10.32-EPP – Dynamically Positioned \(DP\) Vessel Requirements](#).

4.2 DP SIMOP Plans and Procedures

If working near a structure or more than one vessel is planned for the work scope a Simultaneous Operations (SIMOPS) procedure shall be written by the contractor for Shell’s review and approval. This SIMOPS plan would describe the planning for the vessels to work in close proximity to each other or a structure. Clear plans shall be developed for communications and identify which vessel/structure is the primary and is the focal point during each operation. Any diving vessel working within 500 meters of another vessel or structure is considered close proximity.

4.3 Hurricane, Emergency Evacuation

Procedures for all personnel shall be developed for hurricane and emergency evacuation from the field. Contractor requirements for the evacuation shall be delivered with the work proposal. Site-specific procedures shall be developed as part of the work scope procedures.

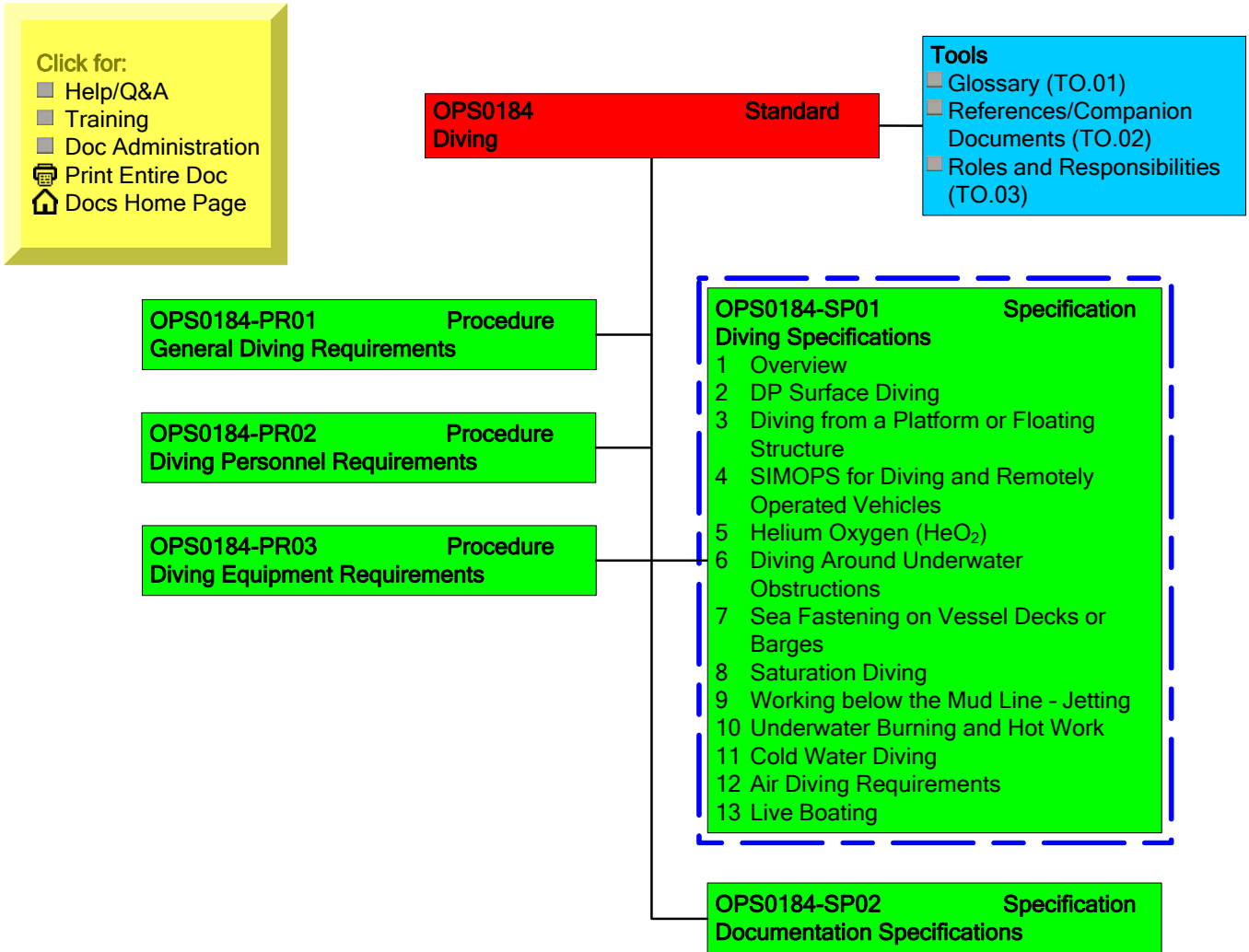
4.4 Environmental Incident Procedures

Environmental procedures shall be in place for vessel operation and should outline any spill kits or related equipment the vessel has on board.

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SPECIFICATION

DIVING SPECIFICATIONS



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1 Overview

1.1 Introduction

OGP Diving Recommended Practice Report No. 411 shall be followed including any stricter requirements as set forth by Shell Americas. The International Marine Contractor's Association (IMCA) current Guidance and Information Notes, including those from AODC and DMAC, are integral to OGP Report No. 411. The job requirements shall be followed from the planning stages through execution, and post-construction job closeout.

1.2 Compliance

It is crucial that current international and local governmental regulations are complied with for all activities. Precedence of each type of requirement is listed in the table below with examples of typical documents for each. The examples are a representation of some of the documents. This is not an all-inclusive listing.

Type I – National and Regional Regulatory Requirements	
Document Number	Title
CFR 29	Safety and Health Regulations for Construction – Department of Labor (OSHA)
CFR 30	Mineral Resources – Department of Interior (BSEE)
CFR 46	Shipping – Marine Occupational Safety and Health Standards (USCG)
CFR 49	Transportation – Department of Transportation (Pipeline and Hazardous Material Safety Administration)
International Regulatory Requirements	
	International Maritime Organization IMO (Including SOLAS, MARPOL, etc.)
	Port and Flag States
	International Classification Societies (who are members of IACS)
Type II – Regional Shell Operating Documents	
DEP 37.90.10.32- EPP	Dynamically Positioned (DP) Vessel Requirements
OPS0184	Diving Standard
OPS0055	Lifting and Hoisting Standard
OPS0011	Marine Transportation Operations
OPS0077A	Temporary Equipment (when conducting operations from a fixed or floating production facility)
Type III – Industry Guidance	
Report 411	International Association of Oil and Gas Producers

1.3 Non-Compliance

Any non-compliance to these documents shall be identified and presented with the diving service provider's proposal. Any non-compliances shall be considered prior to bid award.

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1 Overview, Continued

1.4 Organization

The Sections that follow are intended to provide:

- Additional requirements for commonly executed tasks.
 - Additional requirements for higher risk tasks.
 - Non-diving requirements such as Vessel Marine Audits, Dynamic Positioning System Assurance, Crane/lifting, etc.
-

2 DP Surface Diving

2.1 Diving Plan A detailed vessel-specific DP diving plan must be provided. The dive plan shall contain a detailed HAZID. The plan shall be submitted before the vessel can be considered for DP surface diving. Once the vessel is approved for DP surface diving, a Job/Site specific diving plan shall be developed.

The allowable umbilical length at the project's working depth(s) will determine if a Robert's Hoop/Golden Gate type system is required. If this system is required, it shall be engineered by the contractor and approved by Shell.

All IMCA and OGP guidance for DP surface diving shall be followed.

When operating within the 500-meter exclusion zone of a Shell offshore facility, a Permit-To-Work must be approved by the facility. All hot work occurring on the vessel shall be approved by the Shell facility's PIC/OIM.

DP diving procedures are too voluminous to be covered in this Standard.

However, the following requirements apply to DP surface diving:

- The vessel specific DP diving plan will be reviewed and approved by the Shell UA Diving SME.
- A Shell job-specific HAZID shall be performed

No floating or soft down line is to be used on DP vessels. A cable, with breakaway soft rope, is required.

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3 Diving from a Platform or Floating Structure

3.1 General Diving off of a structure requires the detailed Safe Work Plan, Work Procedures, and HAZID Assessment to address the additional hazards of being near production equipment.

3.2 Pre-MOBE Requirements The contractor, with Shell Diving TA/SME involvement and approval, shall develop detailed work procedures.

Work procedures shall include a bridging document to identify the responsibilities of dive crew and topside crews during job mobilization, execution, and demobilization.

Tie down drawings for all equipment shall be provided by the contractor and be approved by a Shell civil engineer.

Contractor to provide the requested equipment utility requirements for each component of the dive system. Utility requirements may be air, water, hydraulic, or electrical. These utility requirements shall be submitted to the TLP Instrumentation & Electrical (I&E) inspectors and the TLP leadership for review and approval. Contractor shall submit one line drawings of equipment placement, weights, footprints, utility requirements, source of utility, such as AMPs voltage, water pressure and GPMs, air PSI and CFM, etc.

All electrical equipment located or used outside of the dive van shall be approved for Class I, Division II Hazardous Locations. Equipment, including hand held radios and other portable devices, shall be listed and labeled by a recognized testing laboratory.

Electrical power for dive critical equipment shall have two independent sources. Main supply shall be from facility main power. Secondary supply shall be from the structure's emergency supply or a separate portable generator will be required.

Contingency plans for the following developed and Shell-approved:

- ICS (Incident Command System) alarm with diver in water
- ICS alarm with diver in chamber
- Retrieval of injured diver from water and to offsite safe haven

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3 Diving from a Platform or Floating Structure, Continued

3.2 Pre-MOBE Requirements (cont.)

All equipment certifications shall be reviewed and the equipment shall be inspected. Equipment certifications shall be provided in a book with a Table of Contents. This equipment must meet Regulatory, IMCA D 018, and the following Shell requirements:

- [OPS0055 Lifting and Hoisting](#)
- [OPS0077A Temporary Equipment](#)

All rigging and lifting equipment shall be identified. Certifications shall be provided in a book with TOC to Shell for their approval. Certifications shall be undated as equipment is replaced.

A pre-mobilization equipment audit shall be performed by a third party inspection company to identify any non-conformances. The list of non-conformances as well as the appropriate DESIGN audit must be presented to Shell prior to the shipping of equipment. The timing of this audit shall allow sufficient time for Shell to review the third party audit and for the contractor to correct any non-conformances and to clarify any of the information.

A Shell-approved dive control van shall be integrated with contractor's air/mixed gas rack before mobilization. The complete dive system shall have a Systems Integration Test (SIT) and pressure-test before mobilization to confirm system requirements prior to arrival on site.

3.3 LARS Pre-MOBE Requirements

A procedure detailing the following operations of the Launch and Recovery System (LARS) shall be submitted to Shell for approval:

- Securing the LARS to the structure deck that includes engineered calculations of loads
 - Set up
 - Load Testing of tie downs with calculation and information on how the loads were determined.
 - Function testing
 - Lifting and lowering of the stage several times with main lift winch
 - Lifting and lowering of the stage with the clump weight system winch
 - Depth of main basket clump weight
 - Depth of stand-by basket clump weight
 - Depth of stand-by stage while diving to recover an injured diver
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3 Diving from a Platform or Floating Structure, Continued

3.4 MOBE Requirements

These items shall be completed prior to the first working dive and a detailed log of all actions shall be recorded and kept in the job log.

- Approval from the facility operations staff before any equipment can be started or powered. Care should be taken to prevent any exhaust or heat signatures from triggering any platform emergency sensing devices.
 - All equipment to be setup and secured to TLP decks as per approved plan.
 - Load testing of all lifting equipment.
 - Function testing of LARS and recovery time from water to deck recorded. Function test should include as a minimum the retrieving of basket with main lift winch and basket being retrieved by clump weight winch.
 - Injured diver recovery drills to be conducted. As a minimum one drill per shift shall be conducted. This drill should imitate the retrieval of an injured diver from depth to the chamber. Standby diver shall be able to reach the injured divers work location within a 2 minute time span. A review of the drill shall be conducted after completion of the drill with the dive crew. If lessons learned from first drill change the contingency plan, a second drill shall be performed. Contractor's management and Shell diving SME or TA shall approve any changes to contingency plans.
 - A list of all rigging in use or to be used shall be inserted into an inspection sheet. This sheet shall be used at the beginning of each shift change to inspect all rigging components. This check sheet shall be kept with the shift change safety meeting record sheets and maintained with the dive log.
-

4 SIMOPS for Diving and Remotely Operated Vehicles (ROV)

4.1 General

This section covers the requirements for divers and an ROV working at the same location. The respective work can involve the same job task or it can be totally independent job tasks. In either case, before ROV and Diving SIMOPS begin, a safety meeting shall be held to develop a detailed JSEA and must include ROV and dive personnel.

The following are only some of the basic rules that shall be adhered to when divers and ROVs are working at the same location:

- ROV personnel shall attend all diving shift change safety meetings to stay informed of diving activities and revise their JSEA when needed.
 - Dive Supervisor has the final approval on all underwater simultaneous operations.
 - Direct communications shall be established between the dive and the ROV control vans.
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SIMOPS for Diving and Remotely Operated Vehicles, Continued

4.1 General (cont.)

- A video link shall be established between the dive control and the ROV control vans to show video feed between the two. ROV shall launch and recover only with Dive Supervisor's permission.
- During a surface dive the ROV shall never be allowed at a shallower depth than the diver's depth.
- ROVs shall be aware of the diver's status at all times.
- ROVs shall not approach the diver without visual confirmation of the diver's location.
- ROVs shall not be used to physically transport divers.
- Dive supervisor shall be aware of the ROV status at all times.
- While working in conjunction with diving operations, ROV movements and operations shall always be directed by Dive Supervisor.
- ROVs shall never approach within 100' of diver's location without dive supervisor's direction.
- ROVs shall never come into close proximity to a diver without guidance from the working diver.
- ROVs shall have thruster cages to prevent dive hose entanglement.

ROVs shall be equipped with electrical trip devices as per IMCA Guidance.

4.2 Additional ROV Guidance

Additional guidance can be found in, but not limited to:

- [IMCA D-014](#), International Code of Practice for Offshore Diving
 - [IMCA R-004](#), The Safe and Efficient Operation of Remotely Operated Vehicles
 - [AODC 045](#), The Safe Use of Electricity Underwater
 - [AODC 032](#), Remotely Operated Vehicle Intervention During Diving Operations
-

4.3 Value Added Tasks

ROV Value Added Tasks:

- Establish travel lines from dive bell to work sites, without free swimming a diver.
 - Inspection of a work site for hazards before deployment of diver.
 - Reduce the length of power supply umbilical to many of the diver's tools.
 - Deliver tools and supplies to diver at the work site.
 - Monitor diver's status and provide topside personnel with an overall picture of the diver performing a task.
 - Monitor loads being lowered or recovered with crane line.
-

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5 Helium Oxygen (HeO₂) Diving Requirements

5.1 General Practice currently under review.

Surface-supplied HeO₂ diving shall be limited to 250 FSW, unless the following are adhered to:

- The diving is done only with the Shell UA Diving TA approval.
 - The diving is limited to short duration and light work.
 - Must comply with [IMCA D-014](#) Section 7.3.5 Surface Supplied Mixed Gas Diving unless otherwise approved by Shell Diving TA.
 - [IMCA DESIGN D037](#) standard audit shall be conducted by the contractor and a copy shall be provided to Shell for their review and verification prior to mobilization.
-

6 Diving Around Underwater Obstructions

6.1 General A project specific HAZID and Risk Assessment shall be performed prior to diving around underwater obstructions. This should address, but not be limited to:

- loss of positioning,
 - loss of vessel power,
 - drifting into another vessel's anchor spread,
 - length of umbilical to be used, and
 - emergency plans and drills to be performed.
-

7 Sea Fastening on Vessel Decks or Barges

7.1 General The Contractor shall provide engineered specifications and drawings to detail all items that require sea fastening for Shell Civil Engineering review and approval. This pertains to any project specific items.

Sea fastening, including tie-down welding, shall be done in accordance with a Shell approved engineering plan. The barge or vessel shall be inspected by a Marine Surveyor and approved as "fit for purpose" and capable of carrying the proposed load in the sea conditions expected during transit to the work site. All loading and securing methods shall be certified by a Marine Surveyor.

In the case of sea fastening of small equipment on a Dive Support Vessel (DSV), the fastening system to be used shall be fit for purpose, in good condition, and approved by the Vessel Master with Shell concurrence.

Any welding on the vessel shall be with approval of the Vessel Master.

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8 Saturation Diving

- 8.1 General** Saturation diving shall comply with OGP's Diving Recommended Practice Appendix 8. Approved variance by Shell SME/TA is required for any deviations or non-conformances.
-
- 8.2 Bell Runs** Bell runs (seal to seal) shall not exceed 10 hours. No diver shall be locked out of the bell more than five hours. Divers shall have a minimum of 12 continuous hours of rest in each 24 hour period.
-
- 8.3 Divers Time in Saturation** Divers time in saturation shall not exceed 28 days without a variance being approved by Shell Diving TA and will be based on job duration, type of work to be performed, physical condition of the divers and divers' willingness to remain past the 28 days.
-
- 8.4 IMCA DESIGN D 024** [IMCA DESIGN D 024](#) standard audit form shall be completed by dive contractor, verified by a third party, and a copy shall be provided to Shell for their review and approval. Shell reserves the right to verify conformance.
-

9 Working Below the Mud Line – Jetting

- 9.1 General** A secondary or stand-by jetting system is required when working below the mud line. This shall consist of two jet hoses and two jet nozzles. A complete secondary system with second jet pump shall be onsite for work greater than 6' below the mud line.
-
- 9.2 Air Lifts** Certain soil conditions may require the use of air lifts. When air lifts are required a secondary system for the air lift will also be required.
-
- 9.3 Jetting between 6' and 10' below the mud line.** When jetting 6' or more below the mud line, engineering shall review proposed incline grade of the ditch wall. A 3:1 minimum ditch wall slope shall be maintained in any ditch. It is extremely important to obtain the proper ditch slope to prevent sloughing of material into the ditch and onto the diver. Inclines can be as much as 10:1 when jetting in soft mud.
-

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9 Working Below the Mud Line – Jetting, Continued

9.4 Jetting more than 10' below the mud line. Special considerations shall be reviewed when jetting greater than 10' below mud line. These considerations shall be, but not limited to; soil conditions, coffer dams, self-jetting caisson, air lifts, dredging with diver-less systems such as Rotech equipment/Toyo pumps, etc. The Diving TA shall approve any jetting 10' and below mud line.

9.5 Jetting with a Sled or by Moving a Jetting Machine When jetting with a sled or moving a jetting machine, divers shall not check a "Hot Sled". Jet pumps and airlifts shall be set at idle and forward motion ceased while diver is in vicinity. Written procedures shall be provided on how this will be accomplished and the procedure for verification by Dive Supervisor.

9.6 Jet Hose Connection Joints Jet hose connection joints shall be safety wired or roped together across fittings to hold the ends together in the event of a fitting failure, thus preventing the hose from "whipping" and injuring a diver.

9.7 Jetting Down a Pipeline When jetting down a pipeline, the proper lowering profile shall be maintained by the diver and periodically verified by depth readings recorded by the diving supervisor. Any lowering of pipelines shall be done only in accordance with detailed engineering drawings showing the slope length, number of passes, and allowable depth change per pass.

10 Underwater Burning and Hot Work

10.1 General Cold cutting techniques shall be the primary and preferred method of cutting underwater. All cold cutting methods must be considered before underwater burning or hot work. Cold cutting alternatives shall be considered and used to eliminate the diver from Oxy-Arc cutting.

Hot work is considered any task performed that creates an ignition source. Grinding with an abrasive disc or pad is considered hot work, similar to underwater burning as a hot spark can be created at the point of abrasion.

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10 Underwater Burning and Hot Work, Continued

10.2 Hot Work Definition and Requirements

All oxy-arc cutting shall be per OGP RP, unless approved by Shell UA Diving TA/SME.

All underwater oxy-arc cutting and or welding operations shall require prior approval of the Shell Diving TA. Before commencing any oxy-arc cutting and/or welding operations all risks must be assessed, stringent control measures shall be in place, documented, reviewed and approved by the Shell UA Diving TA/SME.

A circumferential cut shall not be the initial cut on any member that has held pressure or hydrocarbons. A drilled hole or a reciprocating saw cut shall be performed to ensure that no pressure or hydrocarbons are present.

NOTE: Dive crews should assume nothing about the pipe conditions and verify everything. If there is any doubt about the internal condition of the member STOP WORK AUTHORITY shall be implemented.

10.3 Dive Plan

- A detailed dive plan shall be submitted before any underwater burning is performed.
 - This plan shall be submitted to the Shell DWR on site for approval by the Shell Diving TA/SME.
 - Any changes in the plan shall be submitted in the form of a new dive plan and shall be reviewed and approved by the Shell DWR.
 - This plan shall identify the exact item(s) and location(s) that burning will be performed.
 - This plan shall detail all venting, flooding and other precautionary measures to be in place to mitigate all known hazards during burning operations.
 - The diver shall be formally trained in underwater burning techniques and approved by the Shell UA Diving SME.
 - Dive contractor shall have a burning procedure in their Operation Manual. All personnel involved with the burning activity must be familiar with the procedure.
 - Specifications on equipment defined in the burning plan shall be submitted and approved by the Shell UA Diving TA/SME.
-

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10 Underwater Burning and Hot Work, Continued

- 10.3 Dive Plan** (cont.)
- Only direct current (DC) diesel engine driven power supplies for burning shall be allowed (no AC machines used unless approved Shell UA Diving TA/SME).
 - Diving dress for burning shall be defined in dive plan.
 - No platform leg or piling inside burn offs will be considered without outside jetting and formal HAZID performed.
 - No burning on anode material is allowed.
 - Underwater burning equipment shall be in good repair and shall be inspected prior to usage.
-

11 Cold Water Diving

11.1 General To be developed

12 Air Diving Requirements

- 12.1 General**
- All equipment shall be inspected using the [IMCA D 023](#) and/or [D 040](#) DESIGN audit form. All non-conformances identified in the audit shall be reported to the Shell UA Diving TA/SME.
 - The Shell UA Diving TA/SME may approve non-conformances based upon an evaluation of the impact of the non-conformances and if alternate methods can be provided to achieve the same result.
 - Bottom times shall comply with OGP Diving Recommended Practice Appendix 10 Table 2 unless approval from the Shell Diving TA is obtained.
-

- 12.2 Decompression Chambers**
- A decompression chamber is required for all diving activities unless approval from the Shell Diving TA/SME is obtained.
 - One double-lock decompression chamber is required on all diving jobs. If the vessel cannot accommodate a chamber and the dive depth is less than 33 fsw a chamber shall be located no more than two hours travel distance from the dive site. However, the TA/SME must approve this exception and adverse conditions shall be considered when calculating the two-hour travel distance.
-

12.3 Diving Below 165 FSW Air diving deeper than 165 fsw is generally not permitted. In special situations, air diving deeper than 165 fsw may be allowed after receiving approval from the Shell UA Diving TA. If approved, the diving activities shall be limited to light-duty, short duration dives.

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12 Air Diving Requirements, Continued

12.4 SCUBA Diving

Self Contained Underwater Breathing Apparatus (SCUBA) diving is **not** allowed.

12.5 Dive Control Vans

A dive control van shall be required on all projects. Dive control vans shall meet the following requirements:

- Provide shelter from noise, weather, and outside forces that would adversely affect the Supervisor's ability to communicate safely with the divers and topside crew.
- Be equipped with underwater video and audio equipment, platform or vessel alarm systems, and ROV video and audio equipment when divers and ROVs are used in combination.
- All dive recordings are to be maintained for 72 hours. These recordings are the property of Shell UAD and will be surrendered upon request. Dive recordings may be discarded only after obtaining written permission from the Shell DWR.
- Under no circumstances will recordings involving any type of incident be destroyed.
- Provide a designated area from which the Shell DWR can monitor dive operations.
- During operations the dive van shall only be occupied by necessary personnel i.e. dive supervisor, Shell DWR, stand-by diver, technical advisor, etc.

12.6 Ingress and Egress from the Water

The diver shall be provided safe ingress and egress from the water during all air diving operations. The following requirements apply to ingress and egress from the water during air diving operations:

- Launch and recovery of the Diver and Stand-by Diver must be risk assessed:
- Diving baskets are recommended for all diving and must be equipped to IMCA standards.
- Ladders shall not be the primary means of exit from the water if the deck is more than 6' above the water surface or where there are obstructions at the diving site.
- When used, ladders shall extend at least 6' below the water and have sufficient hand holds above water to allow the diver to step easily onto the deck. In addition a dedicated arrangement, e.g. a crane, A-frame or davit, certified for man riding, with sufficient reach shall be present to recover an incapacitated diver from the water, for example, their safety harness onto the deck.
- The diver shall climb down a ladder feet first or be lowered into the water using IMCA compliant system
- All entry into the water shall be feet first.
- A clear path to the decompression chamber shall be provided and maintained.

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12 Air Diving Requirements, Continued

12.7 Diving with Air Gap Requirements

- An air gap is defined as the period of time during which divers use a lifting device to enter or exit the water. Air gaps more than 6' shall require the use of dive basket or wet bell and must be equipped to IMCA standards.
 - When diving on a TLP or with an extended air gap a three man dive basket shall be used. The basket, when fully equipped, must have sufficient space to allow for the diver, standby diver, and tender to safely traverse the air gap. The Shell SME shall make the final decision on when a three man dive basket is required.
 - The launch and recovery system (LARS) used in conjunction with the dive basket or wet bell shall be IMCA compliant.
 - The LARS, dive baskets, and wet bells must be inspected using the appropriate IMCA DESIGN audit form.
-

13 Live Boating

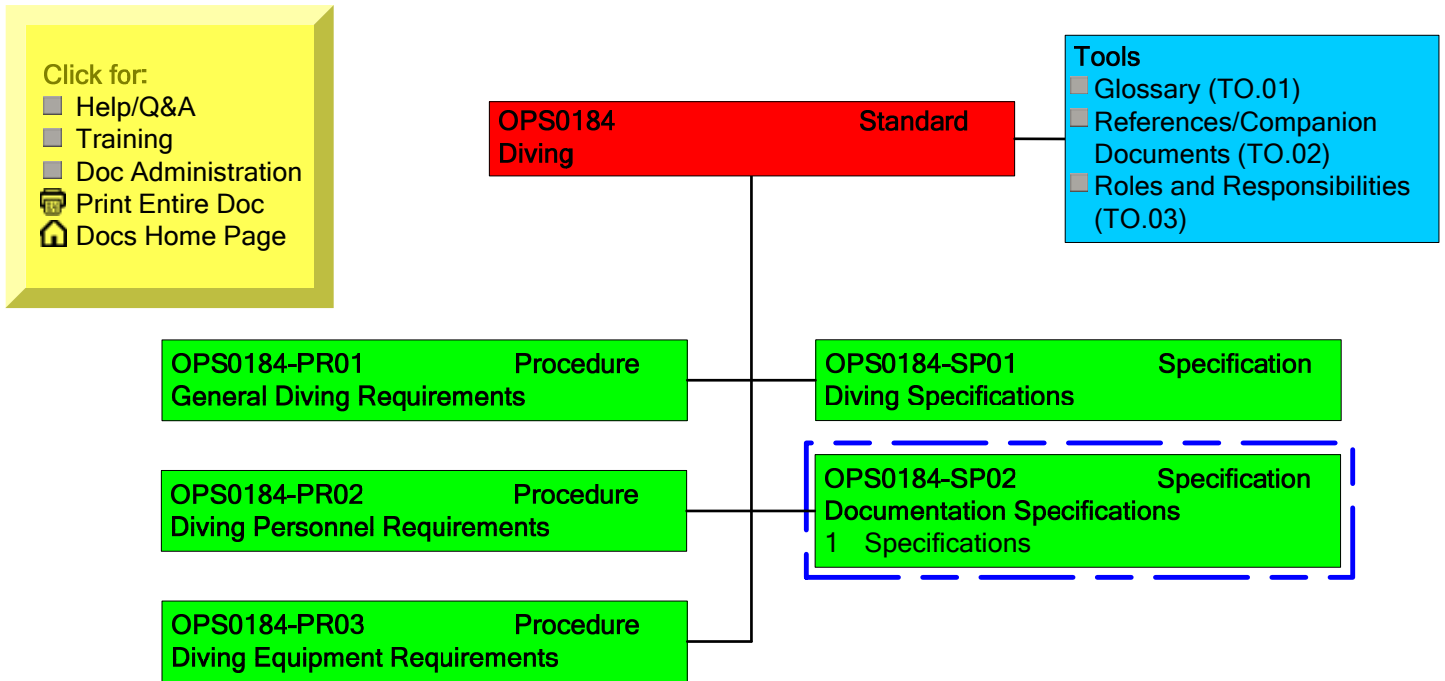
13.1 General Live boating is the practice of supporting a diver from a non-DP vessel that is under power and making seaway. **This method of diving is not allowed.**

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SPECIFICATION

DOCUMENTATION SPECIFICATIONS



Document Suite Map

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1 Specifications

1.1 General

All documentation produced on the work location shall be a Microsoft Office format, such as Word or Excel. Documents that need to remain unchanged can be provided in Adobe Acrobat format or password protected. Formats outside the Microsoft Office Suite must be clarified before the job commences for acceptance, including AutoCAD.

All documents shall be presented electronically. Non-electronic originals shall be scanned and submitted in an Adobe Acrobat format.

All video recording shall be recorded on DVD discs, or hard drives for large volumes of video. All files stored or recorded on DVD shall be saved as .vob files. All videos stored on hard drives shall be saved as non-proprietary .mpeg or similar files.

All dive recordings are to be maintained for 72 hours. These recordings are the property of Shell UAD and will be surrendered upon request. Dive recordings may be discarded only after obtaining written permission from the Shell DWR.

Under no circumstances will recordings involving any type of incident be destroyed or erased.

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1 Specifications, Continued

1.2 Documentation Format Table The following format should be followed for all video captured for Shell UAD. Minor deviations will be allowed if they enhance the overall quality of the video, but they must first be approved by the Shell DWR.

1.	a.	Include an Introduction Overlay All recordings shall have a text overlay																				
		<table border="1"> <thead> <tr> <th colspan="2">Introduction Text Overlay for ROV</th> </tr> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Name of the Job</td> <td>Display the name of the current job (This item can remain constant for multiple DVDs).</td> </tr> <tr> <td>DVD Number</td> <td>Display the number order of the DVD in the series of DVDs for the current job.</td> </tr> <tr> <td>DVD Name</td> <td>Concisely describe the content of the DVD</td> </tr> <tr> <td>Location</td> <td>Include area, block and structure name. For subsea work include area, block, tie-in structure, and subsea field name.</td> </tr> <tr> <td>Date</td> <td>Display the current date.</td> </tr> <tr> <td>Time</td> <td>Display the current time.</td> </tr> <tr> <td>Contractor</td> <td>Include the name of the company performing the dive.</td> </tr> <tr> <td>Vessel</td> <td>Include the name of the vessel being utilized for the dive.</td> </tr> </tbody> </table>	Introduction Text Overlay for ROV		Item	Description	Name of the Job	Display the name of the current job (This item can remain constant for multiple DVDs).	DVD Number	Display the number order of the DVD in the series of DVDs for the current job.	DVD Name	Concisely describe the content of the DVD	Location	Include area, block and structure name. For subsea work include area, block, tie-in structure, and subsea field name.	Date	Display the current date.	Time	Display the current time.	Contractor	Include the name of the company performing the dive.	Vessel	Include the name of the vessel being utilized for the dive.
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b.	Record an Audio Introduction																					
	<ul style="list-style-type: none"> At the beginning of each recording state aloud the items displayed in the introduction overlay State any other pertinent information 																					

Continued on next page

1 Specifications, Continued

1.2 Documentation Format Table & } dD

1.	<p>c. Display a Constant Overlay</p> <p>Once the introduction is complete, display along the top and bottom of the screen the following items for ROV/Diving:</p> <table border="1" data-bbox="295 445 1518 743"> <thead> <tr> <th colspan="2">Constant Text Overlay for ROV</th> </tr> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>DVD Name</td> <td>Concisely describe the content of the DVD</td> </tr> <tr> <td>Location</td> <td>Include area, block and structure name or area, block, tie-in platform, and field name</td> </tr> <tr> <td>Date</td> <td>Display the current date</td> </tr> <tr> <td>Time</td> <td>Display the current time</td> </tr> <tr> <td>Water Depth</td> <td>Display the water depth</td> </tr> <tr> <td>Heading</td> <td>Display the vehicle heading</td> </tr> </tbody> </table> <table border="1" data-bbox="295 758 1518 961"> <thead> <tr> <th colspan="2">Constant Text Overlay for Diving</th> </tr> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Name of Job</td> <td>Display the name of the current job (This item can remain constant for multiple DVDs)</td> </tr> <tr> <td>Date</td> <td>Display the current date</td> </tr> <tr> <td>Time</td> <td>Display the current time</td> </tr> </tbody> </table> <p>d. Keep Detailed Video Logs</p> <ul style="list-style-type: none"> • Video logs shall include the following: <ul style="list-style-type: none"> • Header – Display the company name, job name, vessel, location, and DVD # • Log – Each row of the log shall include the date, dive number, time, time on counter, track, description of task, and depth <table border="1" data-bbox="342 1144 1518 1209"> <tr> <td>a.</td> <td>The task description shall concisely describe the activities being recorded, the location of the activities, and what task is being conducted.</td> </tr> </table> • Keeping logs <ul style="list-style-type: none"> • Make a log entry at least every 10 minutes • Make an entry any time the task changes, the work scope is modified, or the task is completed • Make an entry any time one of the following is encountered: <table border="1" data-bbox="347 1396 1518 1497"> <tr> <td>a.</td> <td>Damage</td> <td>d.</td> <td>Repair</td> </tr> <tr> <td>b.</td> <td>Debris</td> <td>e.</td> <td>Missing Marine Growth</td> </tr> <tr> <td>c.</td> <td>Leak</td> <td>f.</td> <td>Other types of abnormalities or anomalies</td> </tr> </table> • If any of the above items are encountered, the task, abnormality or anomaly should be labeled as such and include a brief description • Transmitting Video Logs <ul style="list-style-type: none"> • Print a hard copy of the log and attach it to the appropriate DVD • Label an electronic version of the log with the appropriate DVD name, save it to a disk, and submit it to Shell along with the video • Include the complete log and to label/attach the log with the correct DVD • Label the DVD and protective case the same way as the Introduction Text Overlay. 	Constant Text Overlay for ROV		Item	Description	DVD Name	Concisely describe the content of the DVD	Location	Include area, block and structure name or area, block, tie-in platform, and field name	Date	Display the current date	Time	Display the current time	Water Depth	Display the water depth	Heading	Display the vehicle heading	Constant Text Overlay for Diving		Item	Description	Name of Job	Display the name of the current job (This item can remain constant for multiple DVDs)	Date	Display the current date	Time	Display the current time	a.	The task description shall concisely describe the activities being recorded, the location of the activities, and what task is being conducted.	a.	Damage	d.	Repair	b.	Debris	e.	Missing Marine Growth	c.	Leak	f.	Other types of abnormalities or anomalies
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1 Specifications, Continued

1.2 Documentation Format Table (cont.)

1	e.	<p>Include Plenty of Audio</p> <ul style="list-style-type: none"> • Incorporating Audio <ul style="list-style-type: none"> • The video should be supplemented with a voice overlay • Make an audio entry at least every 5 minutes. More audio is encouraged. • Commentary should be made any time a written video logged entry is made. • Guidelines <ul style="list-style-type: none"> • It is acceptable to leave the microphone “open” • The task description should describe in detail the activities being recorded and convey the location of the activities and what task is being conducted. • Audio entries should contain a more detailed task description than video logs 													
	f.	<p>Record Quality Video</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="2">Preferred Video Format</th> </tr> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Media</td> <td>DVD or External Hard drive</td> </tr> <tr> <td>File Format</td> <td>VOB</td> </tr> <tr> <td>Codec</td> <td>MPEG-2 (NTSC)</td> </tr> <tr> <td>Frame Rate</td> <td>29.97 frames per second (minimum)</td> </tr> <tr> <td>Resolution</td> <td>720x480 (minimum)</td> </tr> </tbody> </table> <p>Important Notes:</p> <ul style="list-style-type: none"> • Please make sure the video segments for each video are contained in separate, individual folders. A “single folder” should always contain the video segments belonging to a “single video” only. • When recording on a hard drive, the first preference is that the video segments are split into pieces that match exactly with the log timelines. For example, if the length of a video is 2 hours and 11 minutes and contains 24 log segments, it is preferred that we receive 24 chopped video segments within a single folder with total time adding up to exactly 2 hours and 11 minutes. <u>Also the individual clip name should match the timestamp or counter on the log sheet.</u> • If this is not possible, the second preference is to provide a continuous footage of the single log video in one big file. • If the second preference could not be met due to huge file sizes, the third preference is to split the single log video into manageable “hourly” segments where the start/end times match that of the start/end times of log entries. If the start/end times of the hourly segments match that of the log timeline entries, there is no need for stitching them together during post production process within FMS. 	Preferred Video Format		Item	Description	Media	DVD or External Hard drive	File Format	VOB	Codec	MPEG-2 (NTSC)	Frame Rate	29.97 frames per second (minimum)	Resolution
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Continued on next page

1 Specifications, Continued

1.2 Documentation

Format Table (cont.)

2	Scanning sonar images shall be required for all on-bottom work. A recorded image of the jobsite shall be created of the initial jobsite and as-left jobsite.
3	<p>Copies of Dive Logs and Daily Progress Reports (DPR) shall be provided daily. All files shall be electronic. Handwritten logs shall be scanned, legible, and presented to the Shell DWR.</p> <p>The current supply of onboard consumables and the amount used since the previous submission shall be part of the DPR. Consumables include the available dive gas supplies. These items should be submitted on a weekly consumables ticket for approval from the Shell DWR.</p>
4	<p>Copies of Marine Logs from the vessel shall be provided daily. All files shall be electronic. Handwritten logs shall be scanned, legible, and presented to the Shell DWR. Any equipment on the vessel that could affect the diving operation shall be noted in the log if inoperable or a concern for the Vessel Master or Chief Engineer. This includes stand-by equipment or secondary systems that can impact the station keeping ability of the vessel.</p> <p>The current supply of onboard consumables and the amount used since the previous submission shall be part of the Marine Log. Consumables may include fuel, lube.</p>
5	Copies of daily Safety Meeting minutes shall be provided daily . All files shall be electronic. Handwritten logs shall be scanned, clearly readable, and presented to the Shell DWR.
6	JSEAs shall be performed prior to work commencement by those involved. Pre-written JSEAs shall be reviewed and amended to include any new, previously unknown, task-specific, or overlooked information that may impact the safety of the work to be performed. Copies shall be provided to the Shell DWR. All files shall be electronic. Handwritten logs shall be scanned, legible, and presented to the Shell DWR.
7	Surveys of areas of concern shall be presented via a clear drawing, chart, table, graph, or written document and submitted to the Shell DWR for review. An example of this documentation shall be produced prior to commencement of the work scope and approved by the Shell Project Engineer for review and approval as fit for purpose. These documents may be created by hand or computer generated. However, they shall be completed in draft form at the time the survey is ongoing.
8	Mechanical inspections conducted on a round or circumferential surface such as flange gap recordings, pipe straightness or ovality inspections, mechanical end connector installation data, shall be documented on a drawing showing the most suitable view. For example, the end view of a flange with inspection criteria noted by o'clock positions around the circumference or on a corresponding table with the 12 o'clock position being the top of pipe. The inspection formats to be used shall be submitted for approval by the Shell DWR or Project Engineer prior to the inspection(s) being conducted.
9	All material to be provided by the contractor that is to become a permanent part of a pipeline, pipeline system, platform, TLP, or structurally significant item must be approved by the Shell Project Engineer or Shell DWR prior to procurement and installation of the material. Submittals for approval of the material shall be done using Material Test Reports. These reports shall include all critical information such as the manufacturer, specifications, grade of material, etc. All approvals shall be in writing.