

SAFE OPERATIONS MANUAL

HEALTH SAFETY AND ENVIRONMENT

Issued 2014

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Document Revision Data

Rev No	Revision Data	Revised by (name)	Date	Comment

1.1 Document Issue and Distribution

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1.2 How to revise this document

Suggestions for revision to this document can be sent to the AOC HSE Manager directly. Revisions shall be recorded in the table at section 1. Document revision Data. Full revision data is required and must be recorded along with the revision location (section and paragraph number) and date. This document shall be reviewed annually to ensure it remains current.

1.3 Distribution of this document

This document provides the standards by which Africa oil Corporation shall conduct safe operations. This document is issued primarily to support field operations, is complimented by HSE Procedures and other standards are incorporated for office use. The Operations Team Management is responsible for further distribution to applicable contractors. Applicable contractors are those with direct contracts with Africa Oil Corporation in support of company activities.

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Manual Contents

1. Document Revision Data	2
1.1 Document Issue and Distribution	2
1.2 How to revise this document.....	2
1.3 Distribution of this document.....	2
Intentionally left blank.....	3
Manual Contents	4
Glossary of Terms	12
References & Useful Websites	14
A – “Right First Time” for Operational Excellence	15
B - Key Safety Principles	15
C - Right First Time	15
2. Operational Excellence	16
For Safe, Reliable, Efficient, Healthy, and Environmentally Sound Operations	16
3. Introduction	17
3.1 Intent	17
3.2 AOC Safe Work Practices	17
4. Responsibility Overview	18
4.1. Stop Work Authority.....	18
4.2. Supervisor Responsibilities.....	18
4.3. Africa oil Corporation Employee Responsibilities	19
4.4. Contractor Responsibilities	20
4.4.1. Behaviour-Based Safety Process.....	21
4.5. Visitor Responsibilities.....	21
4.6. Short-Service Employee Policy.....	21
5. Emergency Management	22
5.1. Emergency Action Plans.....	22
5.2. Emergency Radio Communications.....	22
5.3. Responding to an Emergency.....	22
5.3.1. General	22
5.3.2. Fire Emergencies	23
5.3.3. Evacuating Buildings on Fire	23
5.3.4. Medical Emergencies.....	23
5.3.5. Injury and Illness Reporting Procedures.....	23
5.3.6. Spill or Release Emergencies	23

5.4. Emergency Response Drills.....	24
5.5. Security Operations.....	24
5.5.1. What You Need to Know.....	24
5.5.2. Things You Must Not Do.....	25
5.5.3. Journey Planning.....	25
6. Personal Protective Equipment.....	26
6.1. Personal Protective Equipment.....	26
6.2. Work Clothing.....	26
6.3. Fire-Retardant Clothing.....	26
6.4. Safety Footwear.....	27
6.5. Safety Hard Hats.....	28
6.6. Hearing Protection.....	29
6.7. Eye Protection.....	29
6.7.1. Selection of Proper Type of Eye Protection.....	29
6.7.2. Use of Contact Lenses.....	31
6.7.3. Ultraviolet Protection for Welders and Assistants.....	31
6.8. Hand Protection.....	31
6.9. Respiratory Protection.....	32
6.10. Eyewash and Safety Showers – Heliports, Docks, Offshore Platforms, and Other Facilities.....	33
6.10.1 Emergency Showers and Eye-wash Stations.....	33
6.11. First-Aid Equipment.....	33
7. Fire Protection.....	35
7.1. Description of Fire.....	35
Table 1: Fire classification.....	35
7.2. Control of Fuel Sources.....	35
7.2.1. Flammable/Combustible Liquid Storage and Dispensing.....	35
7.2.2. Flammable/Combustible Liquid Transportation.....	36
7.2.3. Use of Solvents to Clean Equipment.....	36
7.2.4. Use of Natural Gas and Gas Sampling.....	37
7.2.5. Eliminating Unnecessary Combustible Materials.....	37
7.3. Control of Ignition Sources.....	37
7.3.1. Intrinsically Safe Electronic Devices.....	37
7.3.2. Explosion-Proof Devices and Equipment.....	38
7.3.3. Smoking.....	38

8. Fire Suppression and Detection Equipment	39
8.1. Fire fighting Equipment – Inspection and Maintenance.....	39
8.1.1. Location of Fire fighting Equipment.....	39
8.1.2. Weekly Inspections	39
8.1.3. Monthly Inspections	39
8.1.4 Annual Inspections/Maintenance.....	39
8.2. Portable Fire Extinguishers.....	40
8.3. Fire Water Systems	40
8.4. Fixed Gas, Smoke, and Fire Detection Systems.....	40
8.4.1. Quarterly Inspections	40
9. Occupational Health & Industrial Hygiene	41
9.1. Chemical Hazards	41
9.1.1. CHIP	41
9.2 Hydrogen Sulphide.....	42
9.3 H ₂ S Monitors Fixed Monitors.....	43
9.4 Portable/Personal Monitors.....	43
9.5 Training	43
9.6 H ₂ S Safety.....	43
9.7. Asbestos.....	44
9.8. Lead	45
9.9. Benzene	45
Table 2: Occupational exposure standards for benzene	46
9.10. Naturally Occurring Radioactive Material.....	46
9.11. Radiography.....	47
9.12. Noise	47
9.13. Particulate Hazards	47
9.14. Welding Fumes.....	48
9.15. Disease Control.....	48
9.15.1. Blood-Borne Pathogens	48
9.16. Natural and Environmental Hazards	49
9.16.1. Cold Stress	49
9.16.2. Heat Stress	50
Table 3: Heat stress symptoms and First Aid.....	51
9.16.3. Ultraviolet.....	51
9.16.4. Skin Cancer	52

9.17. Wildlife.....	52
9.17.1. Snake Bites.....	53
9.17.2. Bee Stings.....	53
10. Safe Operations	54
10.1. Slip, Trip, and Fall Prevention.....	54
10.1.1. Walking Surfaces	54
10.1.2. Housekeeping.....	54
10.1.3. Working at height.....	55
10.1.4. Open Holes in Floors and Grating.....	55
10.2. Ergonomics and Human factors at Work.....	55
10.2.1. Workstation Ergonomics	56
10.2.2. Carrying Heavy Objects	56
10.2.3. Proper Lifting Techniques	57
10.3. Tools and Equipment.....	57
10.3.1. General.....	57
10.3.2. Equipment Guards	57
10.3.3. Lighting Flares or Vent Pipes	58
10.3.4. Minimum Equipment Spacing Requirements.....	58
Table 4: Minimum equipment spacing requirements.....	58
10.3.5. Pressurized Production Equipment	59
10.3.6. Opening Equipment Safe Work.....	60
10.3.7. Scraper/Sphere Launchers and Receivers (Pig Traps).....	61
10.3.8. Gauge Glasses	61
10.3.9. Valves, Piping, and Tubing.....	62
10.3.10. Corrosion	62
10.3.11. Compressed Gas Cylinders.....	63
10.3.12. Grinding Equipment.....	64
10.3.13. Chain Saws.....	64
10.3.14. Hand Tool Maintenance and Use	65
10.3.15. Use of Cheater Bars/Pipes.....	65
10.3.16. Hot and Cold Surfaces	65
10.4. Forklifts.....	65
10.5. Operational Excellence Meetings (OE).....	66
10.6. General Office Safety	66
11. Managing Safe Work/Safe Work Practices.....	67

11.1. Safe Work Practices	67
11.2. Purpose and Objective	67
11.3. MSW/SWP Requirements.....	67
11.4. Hazard Analysis.....	68
11.4.1. Requirements.....	68
11.4.2. Planning Phase Hazard Analysis	68
11.4.3. Job Safety Analysis.....	68
11.4.4. Think Incident-Free	68
11.5. Permit to Work.....	68
11.6. Isolation of Hazardous Energy (Lock Out/Tag Out).....	69
11.6.1. Requirements.....	69
11.6.2. Key Points.....	70
11.7. Simultaneous Operations.....	71
11.8. Hot Work	71
11.9. Confined Space Entry.....	73
11.9.1. Requirements.....	73
11.10. Bypassing Critical Protections.....	74
11.11. Excavation and Trenching Safe Work.....	75
11.12. Lifting and Rigging.....	76
11.12.1. Lifting and Rigging – Personnel Safety Precautions	77
11.13. Working at Heights (1.8m or higher)	77
11.13.1. Fall Protection – Key Points	78
11.13.2. Scaffolding	79
11.13.3. Ladders.....	80
11.13.4. Qualified Gas Tester	81
Table 5.....	81
12. Electricity.....	82
12.1. General Electrical Safety	82
12.2. Electrical Power Tools	83
12.3. Extension Cords	83
12.4. Static Electricity	84
12.5. Overhead Power Lines	84
13. Drilling and Well Servicing Operations	86
13.1. Drilling, Completion, Work-over, and Well Service Operations.....	86
13.2. Safe Practices and Procedures for Working Near Power Lines.....	86

Table 6:.....	87
13.2.1. Job Site Safety Requirements for Working Near Power Lines.....	87
13.2.2. Hazard Areas for Rig Operations Near Electric Power Lines.....	88
Figure 1	88
13.3. Rig Equipment Grounding.....	88
13.4. Derrick Ladders	89
13.5. Lifting of Personnel With Air Hoist or Hydraulic Winch.....	89
13.6. Fall Protection During Rig Moves.....	90
13.7. Emergency Drills	90
13.8. Training Requirements for Well Service Rigs.....	91
13.9. Well Control Drills.....	92
13.10. Blowout Prevention Equipment Tests	92
13.11. Well Service/Workover Rigs	92
13.11.1. Process for Conducting Rig Inspections.....	92
13.11.2. Recommendations to Govern Tubing Block Speeds.....	93
13.11.3. Workover/Well Service Safety and Environment Guidelines.....	94
13.11.4. Additional Operator/Crew Chief Roles and Responsibilities.....	94
13.12. Rotary Drilling Rigs.....	94
13.12.1. Process for Conducting Rotary Rig Inspections.....	94
13.13. Forklifts.....	95
13.14. Tubular Handling	95
13.15. Pipe Racks	96
13.16. Winch and Gin Pole Trucks	96
13.17. Blow Down, Choke Manifold, and Return Lines.....	97
13.18. Rig Floor Tools	97
13.18.1. Slips.....	97
13.18.2. Tongs.....	98
13.18.3. Other Tools	98
13.18.4. Casing Handling.....	98
13.19. Cementing.....	99
13.20. Perforating and Wire Line Operations	100
13.21. Coiled Tubing Unit.....	100
13.22. Snubbing Unit/High Pressure Coil Tubing.....	101
14. Alcohol and Drugs.....	102
15. Explosives and Firearms.....	104

16. Traffic Safety	105
16.1. Motor Vehicle Operation.....	105
17. Aircraft Safety	106
17.1. General.....	106
17.2. Helicopter Safety.....	106
17.3. Transportation of Hazardous Materials.....	107
17.4. Helideck Safety.....	107
17.5. Emergency Water Landings.....	107
17.6. Fixed-Wing Aircraft Safety.....	108
18. Water Safety	109
18.1. Personal Flotation Devices.....	109
18.1.1. Selecting personal buoyancy equipment.....	109
18.1.2. Lifejacket standards for work over water.....	109
18.2. Lifejackets for abandonment from an offshore installation.....	110
18.2.1. Introduction.....	110
18.2.2. Background.....	110
18.2.3. Required features of abandonment lifejackets.....	112
18.2.4 Action required.....	113
18.3. Boat Transportation.....	113
18.3. Direct Transfer To/From a Passenger Boat.....	114
18.4. Transfers From Boat to Boat.....	114
18.5. Personnel Baskets.....	114
18.6. Material Transfers.....	114
18.7. Life Floats and Life Rings.....	114
19. Waste Management	116
19.1. General Waste-Handling Guidelines.....	116
19.2. Contractor Waste Management Requirements.....	116
19.3. Waste Categories.....	116
19.3.1. Hazardous Waste.....	116
19.3.2. Exploration and Production Waste.....	117
19.3.3. Other Waste.....	117
19.3.4. Other Regulated Waste.....	117
19.4. Pollution Prevention.....	117
Appendix 1 – SSE Exception Worksheet	119
Appendix 2 – Required Eye Protection	122

[Appendix 3 - Safe Hot Work Area Validation Checklist.....](#) 123

[Appendix 4 – Hazard Areas for Rig Operations near Electrical power-lines](#) 124

[Appendix 5: Workover & Production Rigs Checklist](#) 125

 Workover and Production Checklist..... 125

[Appendix 6: Non-Rig Checklist.....](#) 128

 General Safety

 128

[Appendix 7 - Acceptable Approach to Helicopters.....](#) 131

[Appendix 8: Personal Flotation Device \(PFD\) Requirements](#) 132

[9. Emergency Contact Information.....](#) 133

 9.1 For worker to complete after discussion with Supervisor

 133

Glossary of Terms

Term/Acronym	Definition
µg	micrograms
°C	degrees Celsius
°F	degrees Fahrenheit
AC	alternating current
ACM	asbestos containing material
AESC	Association of Energy Services Companies
AIDS	acquired Immunodeficiency syndrome
AL	action level
ANSI	American National Standards Institute
API-RP	American Petroleum Institute Recommended Practice
APF	Assigned Protection Factor
ASTM	ASTM International
BAC	blood alcohol content
BBS	behaviour-based safety
BOP	blowout preventer
BOPE	blowout prevention equipment
CFR	Code of federal regulations
cm	centimetre
CO ₂	carbon dioxide
COSHH	control of substances hazardous to health
CPR	cardio-pulmonary resuscitation
CSA	Canadian Standards Association
dba	decibels
DC	direct current
DOT	Department of Transport
EAP	emergency action plan
EPA	Environmental Protection Agency
ESD	emergency shutdown device
EU	European Union
FeS	iron sulphide
FMT	Field Management Team
FRC	fire retardant clothing
Ft	foot (feet)
GFCI	ground-fault circuit interrupters
H ₂ S	hydrogen sulphide
HA	hazard analysis
HSE	health safety environment
HIV	human Immunodeficiency
IATA	International Air Transporters Association
IDLH	Immediately dangerous to life or health
IHE	Isolation of energy hazard
in.	Inch (inches)
JSA	Job safety analysis
kV	kilovolts
Lb	pound(s) unit of mass weight measurement
LEL	lower exposure limit
LO/TO	lock out / tag out
m	meter(s) unit of measurement

AFRICA OIL CORPORATION
HSE SAFE OPERATIONS MANUAL

m ³	Cubic meters unit of measurement
AOC	Africa Oil Corporation
mm	millimetres unit of measurement
MMS	Mineral Management Services
MSDS	material safety data sheet(s)
MSW	managing safe work
NDT	non-destructive testing
NFPA	National Fire protection Association
NIOSH	National Institute of Occupational Health
NORM	Naturally occurring radioactive material
OE	Operational Excellence
OSHA	Occupational Safety & Health Administration
PCB	polychlorinated biphenyl
PED	personal electronic devices
PEL	permissible exposure limit
PFD	personal floatation devices
PIC	person in charge
PPE	personal protective equipment
ppm	parts per million
psi	pounds per square inch
psig	pounds per square inch guage
RCRA	Resource Conservation and Recovery Act
RPP	Respiratory Protection Program
SCBA	self contained breathing apparatus
SCR	silicon-controlled rectifier
SimOps	simultaneous operations
SO ₂	sulphur dioxide
SOP	standard operating procedure
SSE	short service employee
SSV	surface safety valve
STEL	short-term exposure limit
SWA	stop work authority
SWP	safe work practice
TIF	Think Accident Free
TIW	Texas Iron Works – Safety Valve
TSCA	Toxic Substances Control Act
TWA	time weighted average
UL	Underwriters laboratory
UV	Ultraviolet

References & Useful Websites

<http://www.hse.gov.uk/index.htm>

<http://www.hse.gov.uk/COSHH/industry/offshore.htm>

<http://www.hse.gov.uk/coshh/index.htm>

<http://www.hse.gov.uk/guidance/index.htm>

<http://www.hse.gov.uk/cdg/index.htm>

<http://www.hse.gov.uk/fireandexplosion/dsear.htm>

<http://www.hse.gov.uk/toolbox/introduction.htm>

<https://www.gov.uk/government/organisations/department-for-transport>

<http://www.environment-agency.gov.uk/>

<http://www.hpa.org.uk/>

<http://www.hpa.org.uk/ProductsServices/ChemicalsPoisons/RemediationAndEnvironmentalDecontamination/>

<https://osha.europa.eu/en/topics>

<https://www.osha.gov/>

<http://www2.epa.gov/laws-regulations>

A – “Right First Time” for Operational Excellence

Africa Oil uses an overarching code of conduct called ***Right First Time*** for Operational Excellence and guiding daily decisions.

Right First Time for Operational Excellence is intended to protect people, the environment, and assets, and is an extension of our company values. To meet Africa Oil Corporations expectations, follow the Key Safety Principles and ***Right First Time*** to achieve Operational Excellence:

B - Key Safety Principles

1. Do it safely or not at all
2. There is always time to do it right

C - Right First Time

In order to achieve getting it right first time there are a number of key points to consider before starting any task and to put them to use during the work.

Always:

- Operate within design or environmental limits.
- Operate in a safe and controlled condition.
- Ensure safety devices are in place and functioning.
- Follow safe work practices and procedures.
- Meet or exceed customer’s requirements.
- Maintain integrity of dedicated systems.
- Comply with all rules and regulations.
- Address abnormal conditions.
- Follow written procedures for potentially high-risk or unusual situations.
- Involve the right people in decisions that affect procedures and equipment.

2. Operational Excellence

For Safe, Reliable, Efficient, Healthy, and Environmentally Sound Operations



3. Introduction

3.1 Intent

It is the intent of the management of Africa Oil Corporation (AOC) to operate according to the principles of **Right First Time**, to fully implement Africa Oil Corporations Operational Excellence Management System, to conform to applicable recognized world-class international standards and practices, and to comply with all company policies and applicable government laws and regulations.

Employees at all levels of the organization are responsible for following these policies, standards, and operating practices to assure that the design, installation, operation, and maintenance of AOC facilities and equipment accomplish the following:

- Protect Africa Oil Corporation and contractor employees, visitors, and the public from accidents and injuries.
- Protect equipment, facilities, and resources, and prevent losses caused by accidents such as fires and equipment failures.
- Protect the environment by minimizing the environmental impact of all operations to the fullest extent possible.

All Africa Oil Corporation and contractor employees working at AOC locations and working on AOC projects should use this Safe Practices manual as a daily guide. It defines many of our health, environmental, and safety policies, and provides references and guides to other policy documents and operating practices such as standard operating procedures (SOPs). It should also be used as a reference to help with orientation of new employees and visitors, and should be reviewed at monthly Operational Excellence meetings.

3.2 AOC Safe Work Practices

These require via contract language and contract management that contractors follow Africa Oil Corporation safe work practices.

Require contractors to follow their own companies' safe work practices

Where permits are required, Africa Oil Corporation and contractors shall prepare the permits on the Africa Oil Corporation Permit form.

When permits are required at locations under Africa Oil Corporation operational control, permits shall be approved by the Africa Oil Corporation representative with no delegation of this responsibility.

The Africa Oil Corporation representative will remain on site for the duration of the permitted hot work when it pertains to a facility that has "Hydrocarbon Service" or where "Permit required" confined space entries are being performed.

The Africa Oil Corporation representative is any individual responsible for the operation of Africa Oil Corporation equipment or responsible for the oversight of construction, maintenance, repair, or safety processes on Africa Oil Corporation property and includes designated contractor employees hired to provide supervision typically provided by Africa Oil Corporation employees. This does not include contractor supervisors of the crew or individuals performing the work.

4. Responsibility Overview

4.1. Stop Work Authority

All Africa Oil Corporation employees and contractors have the responsibility and authority to stop work if unsafe behaviours or conditions are observed, or if the environment is at risk. No repercussions will result from this action. If you have questions regarding whether or not to exercise your stop work authority, or if you are discouraged from doing so, consult with your supervisor or local health, environmental, and safety (HSE) specialist. You can also call the Africa Oil Corporation HSE manager directly at any time.

4.2. Supervisor Responsibilities

It is the Africa Oil Corporation and contractor supervisors' responsibility to:

- Understand and comply with all AOC policies related to health, environment, and safety and communicate and enforce these policies with all personnel.
- Investigate and report all accidents and incidents, including injuries, illnesses, spills, fires, motor vehicle accidents, and near misses. Take appropriate actions to address root causes, share lessons learned, and prevent recurrence.
- Make sure that emergency action plans (EAP) are current and posted at all locations. Make sure that all employees and visitors understand their roles and responsibilities in the event of an emergency.
- Make sure that all new Africa Oil Corporation and contractor employees receive initial health, environmental, and safety AOC general and site-specific orientations before starting work.
- Make sure that all Africa Oil Corporation employees have received the appropriate classroom and on-the-job training so that they have the skills and knowledge to perform their duties safely. Also, make sure that contractor employees have received adequate training to perform their duties safely.
- Periodically inspect and audit facilities for potential hazards, stopping work if necessary to eliminate or mitigate hazards to an acceptable level of risk.
- Keep inventories of all chemicals used at work locations. Make sure that current material safety data sheets (MSDS) for these chemicals are readily available to all employees. Chemicals, such as floor and bathroom cleansers that are used in the workplace for the purpose intended by the manufacturer and that result in duration and frequency of exposure no greater than those normally experienced by consumers are not required to be inventoried.
- Reinforce safe behaviours and correct unsafe behaviours, using the principles of behaviour-based safety.

Listen and respond to employees' concerns regarding workplace conditions, and either act directly to resolve unsafe conditions or raise the concerns to an appropriate level of management to assure resolution.

4.3. Africa oil Corporation Employee Responsibilities

It is the responsibility of Africa Oil Corporation employees to follow policies and procedures, and written and oral instructions from your supervisor to perform work safely. There is always time to do it right. If a task cannot be performed right, do not do it! When in doubt, ask your supervisor. Africa Oil Corporation employee responsibilities are list below:

- In an emergency situation, safeguard your own life first and then the lives of those around you, before initiating a response. Understand your roles and responsibilities in an emergency, and know how to summon help. Do not attempt to respond in a manner that is beyond your capabilities or training. Wait for a qualified emergency responder to arrive.
- Drilling Rig / Facility Shutdown – In cases of imminent danger, Africa Oil Corporation employees are authorized and expected to stop work, shut down facilities, sound alarms, and activate fire-fighting/life-safety systems as required to prevent injuries or catastrophic loss. Immediately notify the facility supervisor and your own supervisor when such action is taken.
- Perform your duties in compliance with company policies and government laws and regulations. Report all violations of policies and regulation to your supervisor.
- Correct and/or immediately report to your supervisor any unsafe condition or act observed
- Report concerns about contractor health, environmental, and safety performance to the contractor's supervisor or to the company contract owner's representative. In cases of imminent danger, speak directly to the affected contractor.
- Report all accidents, injuries, spills, and near hits to a supervisor, regardless of severity, so that root causes can be determined and preventive measures implemented.
- If you are a current/new Africa Oil Corporation employee, completion of the AOC HSES (Security) Orientation is mandatory, regardless of your job function. Repetition of the AOC HSES Orientation is not necessary when visiting additional AOC locations, but site-specific Field Management team (FMT) orientations are required.
- Africa Oil Corporation employees will successfully complete all training listed in the AOC Required Training Plan for your discipline in a timely manner.
- Give instructions and assistance to new Africa Oil Corporation and contractor personnel and visitors to help assure that they are familiar with applicable policies, practices, and emergency procedures. Inform personnel of the known hazard potential including fire, explosion, and toxic release hazards relating to the contractor's work. Communicate to contractors the applicable portions of the emergency action plan.

Notify your supervisor before working when you are taking any medication (prescription or non-prescription) that may affect your fitness for duty or call Africa Oil Corporation Medical Representative when confidentiality is required. This information may also be essential should you require any treatment in an emergency.

4.4. Contractor Responsibilities

All contractor employees must familiarize themselves with Africa Oil Corporation's policies and procedures, which are intended to supplement, not replace, your employer's own health, environment and safety program. Where the contractor companies' practices are more stringent than Africa Oil Corporation's practices, the additional requirements must be satisfied in addition to Africa Oil Corporation's requirements. Contractors must always adhere to the following:

- Perform your work in compliance with the health, environment, and safety program provided by your employer, as well as those Africa Oil Corporation guidelines and state and government laws that apply to your situation.
- Notify your supervisor when you are taking any medication (prescription or non-prescription) that may affect your fitness for duty. This information may also be essential in case you require any treatment in an emergency.
- Perform day-to-day work in a safe and proper manner. Use quality JSAs and the Think Incident Free (TIF) process to identify hazards and mitigate the risk.
- Maintain a file of worker training records. Each training record should include the identity of the trainee, training date, instructor name, outline of material, and verification of worker understanding.
- Provide workers with proper personal protective equipment (PPE) that is in good working condition. Contractors must also train their workers in the proper use and maintenance of PPE.
- Where practical and on high-risk activities, Africa Oil Corporation will have a designated safety representative present at job sites. This person is responsible for all safety-related activities and depending on job scope or risk, may be a qualified contractor that has been designated by the person in charge of the job.
- Conduct appropriate industrial hygiene monitoring and, upon request, provide copies of results to an Africa Oil Corporation HES representative.
- Verbally report all incidents (injuries, First Aid, motor vehicle crashes, environmental releases, fires near misses, etc.) immediately to the Africa Oil Corporation representative.
- Contractors will be asked to conduct an investigation and provide a completed hard copy of the report for contractor injuries/accidents.
- Review and verify that any subcontractor's health, environment, and safety systems meet or exceed the contractor's own safety and training requirements.
- Identify and immediately report potentially dangerous conditions in the workplace to your supervisor or local Africa Oil Corporation representative. Correct any hazardous conditions that workers create while performing their work.
- Make sure that workers at Africa Oil Corporation locations are fit for duty and physically capable of performing all aspects of their jobs.
- Make sure that workers understand and comply with Africa Oil Corporation's drug and alcohol policies, which are part of the contract with Africa Oil Corporation. Further details of Africa Oil Corporation's drug and alcohol policy can be found in Section 14 of this manual.

4.4.1. Behaviour-Based Safety Process

Contractors are required to have their own behaviour-based safety (BBS) process in place. The process must include an observation form that is to be completed and submitted to contractors by their workers for tracking purposes. Workers must participate and receive training in the contractor's BBS process. AOC minimum expectations for contractor compliance for a BBS observation process are as follows:

Demonstrates an actionable process is in place.

Provides defined process and training for workers to observe each other and give feedback. Provides tracking and trending of at-risk behaviours, shared with all workers and leading to action plan development to reduce the at-risk behaviours.

4.5. Visitor Responsibilities

It is the visitor's responsibility to:

- Always report in to the facility supervisor when visiting an AOC facility. Remain with your assigned guide or mentor while visiting field facilities, well sites, construction sites, etc.
- Complete any logs or registration forms so that you can be accounted for in an emergency.
- Always sign out when you depart.
- Follow the instructions of your host at all times. Listen carefully to safety briefings and orientations and know what to do in an emergency. If you have any questions, ask your host.

4.6. Short-Service Employee Policy

The purpose of the Short-Service Employee policy (also described as New-on-Job or NOJ) is to assure that workers with less than six months experience are identified, adequately supervised, trained, and managed so as to prevent injury to themselves or others, property damage, or environmental harm.

Any worker with less than six months service in the same job/position with his/her present employer will be considered a short-service employee (SSE). Experienced workers who are new to a location should be considered by the Africa Oil Corporation location supervisor for inclusion in the SSE program based on the specifics of their assignment. Factors to consider include significant differences in:

- Job responsibilities/duties from previous assignments/employers
- Work processes/practices from previous assignments/employers
- Equipment/tools from previous assignments/employers
- Skill level
- Familiarity with co-workers

5. Emergency Management

5.1. Emergency Action Plans

Each location shall develop a site-specific emergency action plan (EAP), which will include a Fire plan. Highlights of these plans (notification procedures, telephone numbers, evacuation routes, etc.) shall be posted in strategic work locations.

Personnel shall familiarize themselves with the emergency procedures regarding fires, explosions, evacuations, man overboard, and other emergencies, and shall be prepared to take proper action.

Contractors shall have an EAP that describes the appropriate response for all parties during an emergency event. At a minimum, this plan will identify key contacts and procedures for handling medical emergencies. The plan will be posted at the work site and remain there for the duration of the job.

Contractor EAPs will align with the local Africa Oil Corporation EAP, which shall be provided to the Contractor by the Africa Oil Corporation HES representative or other knowledgeable Africa Oil Corporation person.

5.2. Emergency Radio Communications

At least one person in a working crew at a high-hazard location shall have radio or cell phone access to summon help in an emergency. However, radios and cell phones must be kept outside of restricted work areas.

5.3. Responding to an Emergency

5.3.1. General

When responding to an emergency:

- Remain calm.
- Assess the situation.
- Make sure that you are personally safe. Do not become a victim.
- Assure the safety of others in the area and initiate rescue as needed.
- Notify facility operators, supervisors, and emergency response services according to the scope of the emergency.
- Respond to the emergency according to your job duties and training. Do not attempt to take actions that you are unfamiliar with or for which you are not trained. Keep yourself safe.
- If you have specified emergency response duties such as fire brigade or evacuation warden, report to your duty location. Otherwise, muster at designated muster locations, wait for instructions from the person in charge, and prevent unauthorized personnel from re-entering the facility.

5.3.2. Fire Emergencies

Most employees are trained to fight fires in their early (incipient) stages only. If the fire can be extinguished by portable extinguishers, you should do so. If the fire becomes more involved, evacuate the area immediately and activate emergency alarms and emergency shutdown device (ESD) systems where available. Notify supervisors and/or emergency responders who are trained to fight fires beyond the incipient stage.

5.3.3. Evacuating Buildings on Fire

In the event of a building fire, immediately sound the alarm, evacuate the building, and muster in designated locations. Employees should report to their designated evacuation warden. Help account for all personnel and determine if anyone is still inside. Never re-enter a burning building unless you are a trained emergency responder.

5.3.4. Medical Emergencies

When an injury occurs on Africa Oil Corporation property, the first priority is the care and treatment of the injured person(s). In the event of a medical emergency:

- Call or send someone for help.
- Do not allow an injured person to leave the scene unattended.
- Do not move an injured person unless his or her life is in immediate danger.
- Provide First Aid or cardio-pulmonary resuscitation (CPR) if you are trained to do so.
- Avoid contact with bodily fluids
- Wait for emergency responders.

5.3.5. Injury and Illness Reporting Procedures

All injuries and illnesses occurring on Africa Oil Corporation property should be reported as soon as practically possible to the local Africa Oil Corporation person in charge. The use of an active case-management process is required for injuries or illnesses occurring on Africa Oil Corporation property. Any contractor that does not have such a process in place should contact the onsite Medic for all injuries or illnesses on Africa Oil Corporation property. All incidents involving Africa Oil Corporation personnel shall use ISOS Medical Management in East Africa.

5.3.6. Spill or Release Emergencies

Africa Oil Corporation or contractor employees who observe an unanticipated spill or release of oil or hazardous substances must take the following steps:

- Immediately notify the facility operator. If you cannot contact the facility operator, notify any other supervisor or your local emergency response or HES representative according to local emergency action plans.
- Make efforts to assure the safety of all personnel on site. Anyone observing the spill should act carefully, cautiously, and reasonably.

- The facility operator or other personnel with appropriate knowledge and experience will take actions to isolate and control the source of the spill. These actions may include but are not limited to:
 - Shutting in the well(s) or vessel(s).
 - Closing the surface and/or subsurface (automatic or manual) safety device(s).
 - Actuating emergency shutdown device(s) (ESDs).
 - Actuating blowout prevent (BOP) assembly and well control system(s) (WCSs)

5.4. Emergency Response Drills

Emergency response drills are required to verify understanding of roles and responsibilities in the event of an actual emergency. They are also a tool used to identify gaps in emergency action plans and equipment. Emergency response drills shall be documented and kept on file at the FMT office.

Locations, such as field offices and accommodations, should conduct drills at least twice per year. One of these two drills can be performed in an office setting such as in a monthly Operational Excellence (OE) meeting. The other drill should be conducted in a field setting.

Contractors are required to actively participate in emergency response drills, which may include but are not limited to well control, hydrogen sulphide (H₂S) release, spills, fires, fall rescue, confined space rescue, and medical emergencies.

Drilling rig and well service rig crews require drills that are more frequent and are described further in Sections 13.7 and 13.9 of this manual.

5.5. Security Operations

5.5.1. What You Need to Know

You are responsible for your personal security. Insist on receiving security briefings. Maintain awareness and do not place yourself into situations or environments where you could become a victim. Report any unusual activities to the proper authorities and always:

Become familiar with security codes and the required precautions. Compliance is imperative and shortcuts should not be taken.

When in remote locations, use a “buddy system” if possible. You or your buddy should have a radio or cell phone to maintain communications. Wear your ID prominently within AOC premises. Personnel who cannot provide identification when asked should be promptly reported to Security.

5.5.2. Things You Must Not Do

Do not:

- Divulge security information to others.
- Bring unauthorized persons into Africa Oil Corporation facilities.

Do not breach site security rules. These include but are not limited to the following

- Do not violate alcohol and smoking policies.
- Do not take banned substances or contraband into any AOC facility
- Do not use illegal or controlled substances.
- Do not carry unauthorized firearms/explosives in or around the facility.
- Do not get involved in any form of violent behaviour in the workplace.
Workplace violence is unacceptable.

5.5.3. Journey Planning

Always determine in advance whether a trip is necessary. If not, consider alternatives to meeting with others such as teleconferences and email. When planning a journey, AOC employees shall use the Journey Management Procedure to mitigate driving hazards. On arrival at location, check in using the approved site-specific procedure. Do not transport banned items on AOC provided aircraft or in AOC vehicles.

6. Personal Protective Equipment

6.1. Personal Protective Equipment

AOC shall provide appropriate personal protective equipment (PPE) for Africa Oil Corporation employees as required, to perform their duties. Contractors shall provide appropriate PPE for their employees as required, to perform their duties.

References: <http://www.hse.gov.uk/toolbox/ppe.htm> & Personal Protective Equipment at Work Regulations 1992 (as amended) for more detail.

6.2. Work Clothing

The following are the safety requirements for work clothing:

- At a minimum, long pants and a shirt, or coveralls, are required. Clothing material should be cotton or equivalent, rather than a synthetic such as nylon.
- Loose or ragged clothing, sleeveless shirts, and tank tops are not allowed.
- Clothing or shoes that are saturated with petroleum products or chemicals are not allowed to be worn in the workplace. Saturated clothing can cause skin irritation and increase the risk of burns in the event of a fire.
- Wear suitable protective clothing (specified on MSDS) when handling chemicals, hot fluids, or hazardous substances.
- Jewellery shall be removed when employees are working in areas where the jewellery could catch on moving or sharp objects or contact electrical circuits.

6.3. Fire-Retardant Clothing

All Africa Oil Corporation and contractor employees permanently assigned to work on Drilling Rigs are required to wear approved fire-retardant clothing (FRC) at all times while in these areas. FRC will be long-sleeved and kept in good condition free of any modifications (e.g., sleeves or pants length that are cut off). FRC may be required in additional facilities at the discretion of local management. In addition, FRC is required for certain electrical applications and tasks.

Casual visitors to offshore production platforms and inside gas plant processing areas are required to wear FRC. Access to certain areas shall be controlled by the facility supervisor and shall be denied if there are high-hazard activities or process upsets underway.

FRC must be the outermost layer of clothing except when working conditions require an additional outer garment. Additional outer layers may be necessary when working with corrosive chemicals. Welders may wear their leathers over their FRC. When required, flotation devices may be worn over FRC.

- FRC must be made from approved materials such as Nomex® or equivalent material that conforms to ISO 11611:2007 Protective clothing – Clothing to protect against heat and flame, which specifies minimum basic safety requirements and test

methods for protective clothing including hoods, aprons, sleeves and gaiters that are designed to protect the wearer's body including head (hoods) and feet (gaiters) and that are to be worn during welding and allied processes with comparable risks.

- For the protection of the wearer's head and feet, ISO 11611:2007 is only applicable to hoods and gaiters. ISO 11611:2007 does not cover requirements for hand protection.
- This type of protective clothing is intended to protect the wearer against spatter (small splashes of molten metal), short contact time with flame, radiant heat from the arc, and minimizes the possibility of electrical shock by short-term, accidental contact with live electrical conductors at voltages up to approximately 100 V d.c. in normal conditions of welding. Sweat, soiling or other contaminants can affect the level of protection provided against short-term accidental contact with live electric conductors at these voltages.
- ISO 11611:2007 specifies two classes with specific performance requirements, i.e. Class 1 being the lower level and Class 2 the higher level.
 - Class 1 is protection against less hazardous welding techniques and situations, causing lower levels of spatter and radiant heat.
 - Class 2 is protection against more hazardous welding techniques and situations, causing higher levels of spatter and radiant heat.
- For adequate overall protection against the risks to which welders are likely to be exposed, personal protective equipment (PPE) covered by other standards should additionally be worn to protect the head, face, hands and feet.

References: ISO 11612:2008, *Protective clothing – Clothing to protect against heat and flame*, ISO 11611:2007, *Protective clothing for use in welding and allied processes* and ISO 14116:2008, *Protective clothing – Protection against heat and flame – Limited flame spread materials, material assemblies and clothing*.

6.4. Safety Footwear

Africa Oil Corporation and contractor personnel working in areas that present foot hazards (e.g., field locations, construction sites, drilling rigs) shall wear safety footwear that meets BS EN ISO 20345:2004 - Safety footwear for professional use.

More detail at: <http://www.hse.gov.uk/foi/internalops/oms/2009/03/om200903app6.pdf>

Safety footwear shall be slip resistant and have soles that are resistant to oil, gas, heat, and chemical contact. Escorted visitors who are not engaged in work can be exempt from the requirement for safety footwear at the discretion of the facility supervisor.

- A worker's footwear must be of a design, construction, and material appropriate to the protection required.
- Supervisors and management must determine the appropriate protection required for the feet and ankles based on the work assigned to each worker, and ensure each worker wears appropriate footwear.
- To determine appropriate protection the following factors must be considered: slipping, uneven terrain, abrasion, ankle protection and foot support, crushing

potential, temperature extremes, corrosive substances, puncture hazards, electrical shock and any other recognizable hazard."

- The assessment is based on whatever work procedures and arrangements exist in the workplace at any time. The management may change the work procedures and arrangements to reduce or remove the risk. For example, by limiting the number of workers doing tasks that cause a risk of foot injury. Or by changing the way the tasks are done. Protective footwear need only be worn while a worker is exposed to the risk that requires it.
- When determining the requirements for appropriate protective footwear, management should not consider training and supervision as a substitute for protective footwear.

The risk assessment to determine appropriate footwear will result in persons or activities being placed into 1 of 3 categories:

1. The hazards present require "safety footwear". Because safety footwear is only certified with respect to certain features to protect from specific types of hazard, regard must be had to whether there should be additional requirements to cover all hazards of a worker's job.
2. There are some hazards present that require footwear to provide protection, but not necessarily protection to the level of "certified safety footwear". For example, a lifeguard at a beach likely will not need to wear footwear with safety toe protection, but needs to wear footwear that will protect against cuts from objects on a beach where there is a risk from such objects.
3. There are no hazards of foot injury for which specific requirements are necessary. For example, this will be the case for most office workers.

6.5. Safety Hard Hats

Safety hats shall be non-metallic, and shall meet British Standard BS EN 397:2012 – Industrial Safety Helmets

More detail at: <http://www.hse.gov.uk/foi/internalops/oms/2009/03/om200903app1.pdf>

Regardless of the existence of overhead hazards or work activity, the use of safety hard hats is mandatory for all Africa Oil Corporation and contractor employees and visitors in all work areas, with the following exceptions:

- Inside accommodations and recreational facilities, offices, control rooms, laboratories, and field offices.
- While riding inside passenger vehicles.
- In parking lots.
- In or around helicopters.
- In boats (provided no lifts are being made).

Welders are not required to wear hard hats while welding, but are required to wear hard hats at other appropriate times. This exception to the hard hat policy must be documented on the Hot Work permit.

Hard hats that are damaged or show signs of significant wear or weathering should be replaced immediately. The hard hat's internal suspension system should be maintained and replaced as necessary. Hard hats must not be altered (drilled, riveted, or painted) in any way. Any hard hat that is struck by a forcible blow should be replaced immediately.

Hard hats should be worn squarely on the head and not cocked to one side or worn in the reverse position.

6.6. Hearing Protection

"Ear Protection required" signs (or equivalent) shall be posted at the entrance of all high-noise areas. High-noise areas are locations where continuous or intermittent noise is 85 decibels (dBA) or more.

- Make sure the protectors give enough protection - aim at least to get below 85 dB at the ear;
- Target the use of protectors to the noisy tasks and jobs in a working day;
- Select protectors which are suitable for the working environment - consider how comfortable and hygienic they are;
- Think about how they will be worn with other protective equipment (e.g. hard hats, dust masks and eye protection);
- Provide a range of protectors so that employees can choose ones which suit them.
- Hearing protection devices (earplugs and/or earmuffs) must be worn by all:
- Employees and visitors in posted areas and in other areas with obvious high-noise levels (operating cranes, flares, etc.)
- Passengers on helicopters.
- Personnel on the decks of work boats and crew boats while underway.
- The company shall provide hearing protection to employees and visitors in all high-noise areas (e.g., compressor sites, heliports, docks, offshore platforms).

6.7. Eye Protection

6.7.1. Selection of Proper Type of Eye Protection

Eye protection is mandatory when entering or working in locations where potential eye hazards exist. These locations include all Civils construction sites, field locations, and certain situations in the office (building furniture, hanging objects, etc.).

Supervisors should determine which locations and activities require eye protection, and then post signs, establish procedures, and train employees to make sure that proper protection is worn (see Appendix 2). Eye protection equipment must have either side shields or a wrap-around safety design and must meet European Standards and markings for eye and face protection EN 166:2001 - Personal eye protection.

More detail at:

<http://www.hse.gov.uk/foi/internalops/oms/2009/03/om200903app3.pdf>

Side shields are not to be worn in conjunction with normal eyeglasses and are intended only for use with safety glasses that do not provide wrap-around support. Safety goggles must be worn in areas where there are:

- Eye hazards caused by particulates from activities such as striking an object against another, wire brushing, buffing, chipping, grinding, cutting wire, welding, working with rusty or dirty equipment, or bleeding down a pressure line or vessel.
- Potential eye hazards caused by spraying or splashing of liquids or chemicals.

Safety goggles designed for impact protection can be used without safety eyeglasses.

Face shields must be used in conjunction with safety goggles whenever performing activities such as grinding or chipping where an impact hazard and a particulate hazard exist.

Standard flexible fitting safety goggles can be worn if worn over safety eyeglasses.

Africa Oil Corporation shall provide prescription safety glasses for AOC employees who need corrective lenses and are required to wear safety glasses as part of the job. Local management shall determine the process for providing prescription safety glasses.

Contractor personnel who normally wear prescription glasses shall wear either prescription safety glasses or safety glasses over the prescription glasses during their complete tour of field or shop duty.

The following EU standards should be referred to and adhered to for specific tasks where eye protection is required:

- EN 166:2001 - Personal eye protection – specifications
- EN 1731:2006 - Mesh type eye and face protectors
- EN 169:2002 - Filters for welding and related techniques
- EN 175:1997 - Eye and face protection during welding and allied processes *Note – this describes the frame or holder which must be used in conjunction with an appropriate welding filter - EN 169 or EN 379.)
- EN 379:2003 – Personal eye-protection — Automatic welding Filters (amended 2009)
- EN 207:1998 - Filters and eye protection against laser radiation
- EN 207:2009 - Filters and eye protection against laser radiation Corrected 2012
- EN 208:1998 - Personal eye protectors for adjustment work on lasers
- EN 208:2009 - Personal eye protectors for adjustment work on lasers
- BS 8497-1:2008 – Eyewear for protection against intense light sources used on humans and animals for cosmetic and medical applications: Part 1 – specification for products
- EN 14458:2004 – Face-shields and visors for firefighters, ambulance and emergency services. Corrected 2004

6.7.2. Use of Contact Lenses

All Africa Oil Corporation and contractor personnel who wear contact lenses shall use the following guidelines for eye protection:

- Notify your supervisor if you normally wear contact lenses.
- Wear safety goggles or safety glasses with side shields over contact lenses in areas where eye protection is required.
- Wear soft lenses or gas-permeable lenses.
- Keep a spare pair of contact lenses or prescription glasses readily available in case you lose your primary pair.

6.7.3. Ultraviolet Protection for Welders and Assistants

Arc welders shall wear UV-blocking eye protection. Never look directly at a welding arc. Always shield your eyes from the rays, even rays being reflected from other surfaces such as sheet metal or water. Employees helping or working near arc welders shall wear UV-blocking goggles.

6.8. Hand Protection

For hand protection safety, observe the following:

- Wear suitable hand protection (as specified on the MSDS) when handling chemicals, hazardous substances, and hot liquids.
- When handling inorganic materials such as acids, caustic soda, soda ash, and calcium chloride, use butyl, nitrile, or neoprene chemical protective gloves.
- When handling organic materials such as crude oil, diesel, jet fuel, kerosene, mineral spirits, Stoddard solvents, and other cleaning agents, use nitrile chemical protective gloves.
- Use cotton or leather gloves when handling tools and equipment and Kevlar® cut-resistant gloves when the hands may be exposed to hazards such as cuts, punctures, and abrasions. Gloves should not be worn around machinery with unguarded rotating parts.
- Welding-specific, flameproof gauntlet gloves must be used during all arc welding, gas welding, or gas cutting operations except when engaged in light work such as test-fitting pieces.

Contact your supervisor or your local HSE representative if you are uncertain about which gloves to use for protection from chemicals.

The following EU standards should be referred to and adhered to for specific tasks where hand and arm protection is required:

- EN 420:2003- General requirements for gloves. Corrected 2007, Amended 2009.
- EN 381-7:1999 - Requirements for chainsaw protective gloves
- EN 388:2003 - Protective gloves against mechanical risks
- EN 1082-1:1997- Protective clothing - Gloves and arm guards protecting against cuts and stabs by hand knives: Chain mail gloves and arm guards
- EN 1082-2:2000 - Gloves and arm guards made of material other than chain mail

- EN 14328:2005 - Gloves and armguards protecting against cuts by powered knives.
EN 407:2004 - Protective gloves against thermal risks (heat and/or fire)
- EN 421:1994 - Protective gloves against ionizing radiation and radioactive contamination
- EN 421:2010 - Protective gloves against ionizing radiation and radioactive contamination
EN 511:2006 - Protective gloves against cold
- EN 659:2003 - Protective gloves for firefighters Amended 2008, Corrected 2009
- EN 12477:2001 – Protective gloves for welders
- EN 60903:2003 - Gloves and mitts with mechanical protection for electrical purposes
- EN 60903:2003 - Gloves and mitts of insulating material for live working. Corrected 2004 and 2006
- EN 60984:1993 - Sleeves of insulating material for live working Amended 1998 and 2002
- BS IEC 61942:1997 - Live working – gloves and mitts with mechanical protection
- EN 374-1:2003 - Protective gloves against chemicals and micro-organisms
- EN 455-1:2000 – Medical gloves for single use – Part 1: Requirements and testing for freedom from holes

6.9. Respiratory Protection

Jobs that may require the use of respiratory protection include painting, urethane foam application, confined space entry, sand blasting, welding processes, entry into H₂S environments, handling chemicals (powders and liquids), and application of pesticides. To minimize potential risks, supervisors, employees, and contractors shall complete a JSA and read all MSDS for products to be used to determine the type of respirator they will need.

Locations with employees that perform work requiring respiratory protection must have a written Respiratory Protection program (RPP). Contractors that will be performing work of this nature on AOC property must also have a written RPP.

Supervisors shall make sure that employees understand respiratory protection requirements in their work areas and shall enforce the use of respirators where required. Jobs that typically require the use of respiratory protection include painting, confined space entry, sand blasting, and handling chemicals and pesticides. Supervisors shall also ensure that employees receive respiratory protection training and fit testing before performing jobs that require respiratory protection.

Africa Oil Corporation and contractor employees must receive medical clearance before using any cartridge-type or supplied-air respiratory protection. This medical clearance shall confirm that employees do not have pre-existing medical conditions and are not taking medication that prevents them from using the equipment safely. This clearance shall also document that an annual fit test has been successfully passed.

General guidelines are as follows:

- Beards and facial hair that can interfere with the seal or use of a respirator are not allowed.
- Facial characteristics – False teeth, scars, or skin abnormalities can prevent a proper face seal.
- Corrective lenses – If wearing contact lenses inside the respirator, blink often so that air entering the mask does not dry out your eyes.
- Eyeglasses – Because of the earpieces, a good facial seal cannot be attained if eyeglasses are worn inside the respirator. Those who cannot see without eyeglasses should have, at company expense, a special mask fitted with internal corrective lenses.
- In IDLH (immediately dangerous to life and health) atmospheres, a trained, respirator-equipped standby person with the ability to communicate with respirator users and retrieval equipment or a means of rescue in place must be present.
- Emergency Respirator Repair – Leave the contaminated area before removing respirator to refill or repair respirator. Return to the contaminated area only when respirator is functional.

The following R - COSHH essentials: Respiratory protective equipment (RPE) requirements should be adopted for specific work practices and are mandatory protection for workers.

[R1 - UK Standard Assigned Protection Factor 4 \(APF 4\)](#) 

[R2 - UK Standard Assigned Protection Factor 10 \(APF 10\)](#) 

[R3 - UK Standard Assigned Protection Factor 20 \(APF 20\)](#) 

[R4 - UK Standard Assigned Protection Factor 40 \(APF 40\)](#) 

[R5 - Breathing apparatus with UK Standard Assigned Protection Factor 40](#) 

[R6 - UK Standard Assigned Protection Factor 2000 \(APF 2000\)](#) 

<http://www.hse.gov.uk/respiratory-protective-equipment/index.htm>

6.10. Eyewash and Safety Showers – Heliports, Docks, Offshore Platforms, and Other Facilities

All manned facilities and construction sites should have some form of eyewash capability, commensurate with the risk. If hard-pipe units are deemed necessary, they shall be installed in compliance with O&G best practices by a qualified and competent contractor.

6.10.1 Emergency Showers and Eye-wash Stations

Emergency showers and eye-wash stations are recommended because of the hazards associated with chemicals used in various facilities. Typical water flow rates for showers and eye-wash stations are 75 l/min and 1.5 l/min respectively. Other requirements are:

- Eyewash-flushing supplies shall be made available at facilities where corrosive chemical eye hazards exist.
- Eyewash-flushing supplies shall be in all company and contractor vehicles.

6.11. First-Aid Equipment

First-aid equipment requirements are as follows:

- Fully equipped first-aid kits and equipment shall be maintained at each facility and construction site for use in medical emergencies.
- All AOC field vehicles shall be equipped with a first-aid kit.
- Blood-borne pathogen kits shall be in all company and contractor vehicles.
- Each manned offshore platform, drilling rig, and work barge shall maintain at least one Stokes litter (or other suitable safety litter) capable of being safely hoisted with an injured person. The litter shall be equipped with tie-down straps and shall be designed to fit in helicopters designated for use in medical evacuations.

There is a British Standard BS 8599 for first aid kits, it is not a regulatory requirement under the Health and Safety (First-Aid) Regulations 1981 to purchase kits that comply with this standard. Instead the contents of a first aid box is dependent on an employer's first aid needs assessment.

This means for employers following a needs assessment the options are:

- Within your workplace you have access to a first aid kit whose contents complies with BS 8599 and matches or exceeds the findings from your needs assessment;

Or within your workplace you have access to a first aid kit whose contents matches the findings from your needs assessment but does not comply with the requirements of BS 8599.

7. Fire Protection

7.1. Description of Fire

Fire is a chemical process involving the vaporization and oxidation of a combustible material, accompanied by the release of energy in the form of heat and light. There are four classes of fires, shown in Table 1.

Table 1: Fire classification

Fire Classification	Description
Class A fires	Involve ordinary combustibles such as wood, cloth, or paper
Class B fires	Involve flammable or combustible liquids, grease, and gases (common in the oil industry)
Class C fires	Involve energized electrical equipment
Class D fires	Involve combustible metals such as magnesium, titanium, sodium, and potassium

7.2. Control of Fuel Sources

7.2.1. Flammable/Combustible Liquid Storage and Dispensing

A fuel's flash point is the lowest temperature at which the vapour pressure of the liquid is just sufficient to produce a flammable mixture. Combustible liquids have flash points at or above 100°F (38°C). Flammable liquids have flash points below 100°F (38°C).

Flammable/combustible liquid storage and usage restrictions are as follows:

- All flammable and combustible liquids shall be stored in approved containers.
- Gasoline, with a low flash point of -45°F (-42°C), presents a greater potential fire hazard than most other fuels. Gasoline storage in office buildings is prohibited. Gasoline shall be contained in safety cans that are clearly labelled and stored in flammable liquid lockers. Use gasoline only as fuel. Do not use it as paint thinner or solvent.
- Avoid using gasoline engines where feasible. Gasoline engines are allowed only with the approval of management and may be used only for small power tools/engines, such as outboard motors, lawn mowers, chain saws, and electrical generators. When possible, engines should be equipped with kill switches. Samples of flammable liquids such as crude oil, methanol, ethanol, propane, and butane must be kept in vapour-tight containers.

- When a hose is used to dispense flammable and combustible liquids from a tank or fuelling hydrant system, the hose must have a self-closing valve.
- Dock fuelling hoses shall be suitable for hydrocarbon use, shall be equipped with self-closing valves, and shall be stored on a reel (with a drip pan under the reel), or shall be stored in a box. Hoses that are cut or damaged shall be discarded. Refer to NFPA 30 for more detailed information.

7.2.2. Flammable/Combustible Liquid Transportation

For flammable/combustible liquid transportation safety, observe the following:

- Trucks transporting flammable/combustible liquids shall be bottom loading or shall be filled by means of a downspout that extends from the loading arm to near the bottom of the truck tank to prevent “splash loading.” The downspout shall be bonded to the loading arm and shall not have static charge accumulators (e.g., gauging rods) inside the tank.
- Vacuum trucks shall use bonded loading hoses or a separate dedicated, low-resistance bonding strap between the truck and tank.
- Trucks transporting flammable/combustible liquids shall be signed clearly with the tank contents. These signs shall be provided by the transport company.
- Liquid sample containers shall be stored in a leak-proof box when they are transported. Sample containers shall be segregated and cushioned inside the shipping box so they will not be broken in transit.
- Sample containers shall be labelled and manifested with the contents, quantity, and source facility. Flammable/combustible liquids, including hydrocarbon samples, shall never be transported onboard any aircraft or boat without specifically notifying the pilot or captain and obtaining approval.

7.2.3. Use of Solvents to Clean Equipment

Observe the following when using solvents:

- Do not clean equipment with gasoline, Varsol (white spirit). ®, or other flammable liquids. Trained aircraft mechanics are exempted from this prohibition. Painters are exempted only when cleaning their paint-spraying equipment.
- Use commercial fire-safe solvents for cleaning mechanical equipment. A safe solvent is a Class IIIA liquid that has a flash point above 140°F (60°C) and below 200°F (94°C). If fire-safe solvents are not available or are unsuitable, contact the HSE waste specialist to identify an acceptable alternative. If in doubt about fire-safe solvents, contact your supervisor or local HSE representative.
- Refer to the material safety data sheets for safety precaution information and for guidelines about the proper personal protective equipment to use when handling solvents.
- Oily rags and gloves are a potential source of spontaneous ignition and are also a pollution hazard. Dispose of oily rags separately from regular trash and in designated containers. Make sure that oily wastes are sent to waste disposal facilities that are approved for use by Africa Oil Corporation and that all appropriate documentation is completed before sending the waste.

7.2.4. Use of Natural Gas and Gas Sampling

Natural gas shall be used only as fuel for internal combustion machines and gas-fired heaters, or to power pumps, pneumatic controls, or starters. Other uses of natural gas require prior approval from management. Pump and starter exhaust shall be vented to a safe area. Natural gas shall not be vented or exhausted to confined areas, enclosures, or other areas where gas can become trapped.

Rubber hoses shall not be used as supply or exhaust lines for natural gas-powered equipment. Natural gas and air supply systems shall be isolated from each other. Never interconnect natural gas and air supply systems because a flammable mixture can result. Gas samples must be stored in special stainless steel containers, commonly referred to as “bombs,” designed for that purpose.

The bombs must have stainless steel block valves with plugged ends. All sample bombs must be manifested with the contents and source facility. Where natural gas is used for domestic purposes inside buildings (e.g., stove, heaters), an odorization unit shall be installed in the gas line before it enters the building, so that a leak in the gas line inside the building can be detected.

7.2.5. Eliminating Unnecessary Combustible Materials

Avoid accumulations of waste material, including spilled oil, wood, rags, paper, construction debris, rags or filters contaminated with iron sulphide (FeS) and rubber goods. Combustible wastes can be a fuel source in a fire and upon application of fire water streams, can float and cover drains.

This can spread liquid fuels and increase the severity of the fire. Non-combustible materials also present hazards. Scrap steel, bottles, pipe, and masonry all constitute tripping hazards that make fire response more difficult for operations personnel and emergency responders. All personnel shall maintain good housekeeping in their facilities. Grass and brush should be cut frequently to prevent growth in production facilities, including inside tank farm dikes.

7.3. Control of Ignition Sources

7.3.1. Intrinsically Safe Electronic Devices

Intrinsically safe personal electronic devices (PEDs) may be used in restricted areas without a Hot Work permit. Intrinsically safe units are those that are certified and listed by agencies such as Underwriter’s Laboratory (UL) and Factory Mutual Research (FM). The listing agency’s trademark and an “intrinsically safe” certification must be stamped on the electrical device. If workers are in doubt about a piece of equipment, they should ask their supervisor or HSE representative for guidance.

The following PEDs are non-intrinsically safe and may not be used in restricted production and process areas without a Hot Work permit:

- Flashlights
- Cameras
- Radios
- Electronic survey equipment

- Mobile phones & cell phones, personal organizers, and pagers
- All non-intrinsically safe PEDs must be turned off or left in the vehicle before entry into hydrocarbon processing areas (production platforms, tank farms, crude processing units, dehydration units, and gas plants), or must be authorized under a Hot Work permit.

7.3.2. Explosion-Proof Devices and Equipment

Explosion-proof devices and equipment may be installed and used in restricted areas without a Hot Work permit. The “minimum rating” is dependent on the area classification. The devices and equipment must be labelled with the appropriate rating. Explosion-proof devices must be maintained in the same condition as when they were installed. More detail can be found at Electrical standards and approved codes of practice section of the UK HSE Executive website, see link below. It is the responsibility of the specifier to select and apply these as applicable. Supervisors and engineers have a responsibility and duty of care to ensure that the standard used is the current one.

The standards are organised into a number of topic areas and are ordered with the lowest number at the top of each table:

<http://www.hse.gov.uk/electricity/standards.htm>

1. [Electrical and Power](#)
2. [Electrical Appliances](#)
3. [Electromagnetic Compatibility](#)
4. [Flammable Atmospheres](#)
5. [Machinery](#)

7.3.3. Smoking

A lit cigarette, cigar, or pipe is an ignition source and can pose a significant fire risk in both restricted and unrestricted areas. Smoking is prohibited inside all AOC facilities except in areas that have been specifically designated and approved by management as smoking areas. These areas shall be posted with “Smoking Permitted” signs.

Smoking is prohibited within the guy wires of well service rigs or within 30m of any equipment. Smoking is never allowed in any production facility, office building, accommodation building, mess hall, vehicle, aircraft (rotary and fixed wing), or during personnel transfers by boat.

“Strike anywhere” matches and lighters with exposed striking wheels are forbidden from being brought into production facilities and onto drilling rigs. Personnel working at other field locations shall leave matches and lighters in vehicles or other secure areas to avoid accidental burn or explosion hazards.

8. Fire Suppression and Detection Equipment

8.1. Fire fighting Equipment – Inspection and Maintenance

This section addresses inspection and maintenance of basic fire-fighting equipment (fire extinguishers, hose reels, monitors, and foam units).

8.1.1. Location of Fire fighting Equipment

A facility diagram that shows the location of each piece of fire-fighting equipment should be posted and available at each facility. Each piece of equipment should be assigned a number, and this number should be shown at the station, on the equipment, and on the facility diagram. A master log of all fire fighting equipment should be maintained.

8.1.2. Weekly Inspections

Weekly equipment checks should be conducted to make certain that:

- Appropriate and labelled equipment is on hand at assigned stations.
- Equipment is unobstructed and accessible.
- No obvious mechanical damage or tampering has occurred.
- Seals are unbroken. Equipment is ready for use. Weekly inspections do not require documentation, but may be included on facility inspection checklists.

8.1.3. Monthly Inspections

Detailed monthly equipment inspections should be conducted according to manufacturer's recommendations. Monthly inspections should be documented. Monthly inspections incorporate the elements of the weekly check, plus more detailed examination of:

- Physical inspections of hoses, nozzles, valves, and similar equipment.
- Pressure gauges and readings.
- Functionality of wheels on wheeled units.
- Pressure ratings of hoses, clamps, and couplings for their intended services.

8.1.4 Annual Inspections/Maintenance

- Comprehensive annual inspections/maintenance shall be performed according to manufacturer's recommendations.
- If fire-fighting equipment is missing, needs repair, or is unserviceable, immediately notify the facility supervisor or your local emergency response group.

8.2. Portable Fire Extinguishers

Portable fire extinguishers are the first line of defence against fire. Since their duration of discharge is short, they are designed for fires of limited size in the incipient (i.e., early or beginning) stage. All Africa Oil Corporation employees assigned to field locations shall know how to operate portable fire extinguishers. Training and practice are necessary to operate a fire extinguisher safely and effectively. Fight incipient fires only within your level of experience and training. Portable fire extinguishers will be located near the equipment or facility to be protected not more than (15 m) from the fire risk and preferably in the escape path from the area. Fire extinguishers must be mounted above grade to prevent corrosion.

Africa Oil Corporation-owned field vehicles that operate regularly at field locations shall be equipped with a properly mounted, 9kg or larger capacity fire extinguisher unit. These units shall be inspected according to schedule and bear all proper tags and plates.

8.3. Fire Water Systems

Fire water systems are intended to be used for fire-fighting purposes only (maintenance, drills, and actual responses). Any use of fire water systems for utility purposes (wash down, flushing, hydro-testing, etc.) must be approved by the operations supervisor.

Trained personnel who are authorized by the Field Management team shall regularly maintain fire water systems (storage systems, pumps, valves, pipe, hoses, nozzles, etc.). Unauthorized personnel should not open or close any fire water system valves.

8.4. Fixed Gas, Smoke, and Fire Detection Systems

Fixed gas, smoke, and fire detection systems are installed to protect personnel and facilities. Never disable a detector. If a detector causes an alarm, always treat it as the real thing, evacuate and muster, and make notifications according to local emergency action plans.

8.4.1. Quarterly Inspections

Quarterly inspections and calibrations should be conducted to make certain that:

Power supplies are functioning properly.

- No obvious corrosion, loose wires, mechanical damage, and/or tampering are visible.
- Sensors are not obstructed or clogged because of water, oil, dust, or paint.
- System is calibrated according to manufacturer's recommendations.
- Smoke, thermal, and manual alarm stations are functioning properly.
- All audio and visual alarms are functioning properly.

More detail at: <http://www.hse.gov.uk/comah/sragtech/techmeasfire.htm>

9. Occupational Health & Industrial Hygiene

9.1. Chemical Hazards

Material safety data sheets (MSDS) must be readily available to all employees and contractors for all chemicals used, brought onto, or stored at each facility. These documents provide details on the material, including trade names, chemical properties, physical properties, emergency care, first-aid procedures, special protection information, fire protection information, reactivity data, environmental protection information, and any special precautions.

To minimize risk, MSDS provide general guidelines on protective clothing that may need to be worn, or other protective equipment that may be appropriate when using the material.

Supervisors must consider the overall hazards and uses of each material and determine specific safeguards and procedures to follow for each type of use.

Africa Oil Corporation employees and contractors should receive an orientation regarding the materials they may be exposed to in the workplace. The orientation should explain how to obtain and use the hazard information contained in the MSDS, safe material handling procedures, and emergency response in the event of exposures, leaks, or fires.

9.1.1. CHIP

CHIP is the abbreviated name for the Chemicals (Hazard Information and Packaging for Supply) Regulations.

CHIP implements two European Directives:

- the Dangerous Substances Directive (No. 67/548/EEC), and
- the Dangerous Preparations Directive (No. 99/45/EC)

The 2009 CHIP Regulations represent the fourth consolidating version of the regulations, which date back to the mid-1970s in earlier versions. Northern Ireland has its own CHIP Regulations which exactly mirror those in GB. Both sets of Regulations can be viewed here:

[The Chemicals \(Hazard Information and Packaging for Supply\) Regulations 2009](#)

[The Chemicals \(Hazard Information and Packaging for Supply\) Regulations \(Northern Ireland\) 2009](#)

CHIP helps protect people and the environment from the ill effects of chemicals by requiring suppliers to:

- identify the hazards (dangers) of the chemicals they supply;
- give information about the chemicals' hazards to their customers; and
- package the chemicals safely.

CHIP is well known by chemical suppliers, and many chemical users and consumers will also be familiar with the orange and black hazard symbols which have appeared on chemical products for many years.

CHIP hazard symbols



Many of you will also be familiar with the accompanying warning and safety phrases that appear on CHIP hazard labels.

Example risk and safety phrases:

- Toxic by inhalation and if swallowed
- Very toxic to aquatic organisms
- Keep locked up and out of reach of children
- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

9.2 Hydrogen Sulphide

Hydrogen sulphide, commonly called H_2S , is a poisonous gas. The gas rapidly deadens the sense of smell. Therefore, smell cannot be used as an adequate means of detecting its presence.

It is a colourless, flammable gas with an odour similar to rotten eggs at low concentrations. The gas is heavier than air and tends to accumulate in low areas such as pits, trenches, and containment walls. It is produced in potentially toxic concentrations along with crude oil, water, and natural gas in certain producing fields. Exposure to high concentrations of hydrogen sulphide can cause immediate death. H_2S is water soluble and can emanate from spilled crude oil and produced water. Exposures may occur while gauging tanks, repairing leaks, running pigs, working in confined spaces, or cleaning and repairing tanks and vessels.

H_2S also has a very wide flammable range and produces toxic sulphur dioxide (SO_2) when burned. H_2S is very corrosive, and exposed piping and equipment will deteriorate faster than expected. This can increase the chance of leaks, electrical short circuits, or structural failures.

To minimize these risks, personnel working in an H₂S environment will have a personal monitor that is set to alarm at 10 ppm and calibrated to meet manufacturer specifications. More information can be found at: <http://www.hse.gov.uk/pubns/guidance/oce6.pdf>

9.3 H₂S Monitors Fixed Monitors

Some facilities are equipped with H₂S sensors that are designed to detect high H₂S concentrations and provide a warning to personnel. If the alarm sounds on fixed monitors in public areas or if there is a release that potentially may reach a public area, the H₂S Contingency Emergency Action Plan will be initiated and the public evacuated from the release area.

9.4 Portable/Personal Monitors

Regardless of facility or location, H₂S personal protective monitors must be worn in areas that have known concentrations of H₂S (greater than zero). Personal protective monitors are designed to alarm when the monitor senses a concentration of H₂S at or above 10 ppm. When a personal monitor alarm sounds, move upwind to the nearest safe muster area; or in the case of a tank, get down from the tank immediately.

Move crosswind if the upwind path is blocked by fences, piping, or equipment. Sound the alarm and remain stationary until the site can be surveyed using self-contained breathing apparatus and re-entry permission is given by the Africa Oil Corporation representative or supervisor.

9.5 Training

All Africa Oil Corporation employees and contractors working in areas containing H₂S shall have current H₂S training. Personnel working in an H₂S environment shall carry a current H₂S training certification card on their person at all times. Special H₂S awareness and self-contained (or supplied air) positive pressure breathing apparatus (SCBA) training is required for personnel working in H₂S-contaminated areas. Respirators are not a substitute for SCBA. If you are not trained to use SCBA, do not enter an H₂S-contaminated area.

As stated above, if your H₂S monitor alarm goes off, leave the area immediately and do not re-enter. Only personnel that are in a respiratory protection program can re-enter the H₂S-contaminated site with a SCBA or supplied air system with standby personnel on site.

9.6 H₂S Safety

Always use caution and follow all rules and guidelines when entering an H₂S-designated area. Have a radio or other means to call for help in an emergency. If you discover an unconscious worker inside an H₂S-designated area, assume H₂S exposure may have occurred.

Do not enter the area to perform a rescue unless you are properly equipped with SCBA and have a backup (safety watch). Do not become another victim.

Specific rules and guidelines are as follows:

- As stated above, H₂S monitors must be worn in areas that have known concentrations of H₂S (greater than zero).

- At facilities where the known concentration of H₂S inside the tank is greater than 100 ppm (measured at the vapour space of the tank gauge hatch), supplied air or an SCBA and a personal protective monitor is required to ascend the tank and a standby person with a SCBA (buddy system) must be on site to perform work.
- Tanks can be climbed and gauged without using supplied air or an SCBA if the known concentration of H₂S inside the tank (measured at the vapour space of the tank gauge hatch) is less than 100 ppm. However, as with any H₂S-designated area, a personal protective H₂S monitor is required.
- If a worker's personal monitor alarm goes off while working on a tank, the worker must descend the tank safely and immediately go to a safe area.
- As stated above, for a worker to go back on top of a tank or back into an area where a personal alarm was triggered, he/she must call for assistance (buddy system) and must use supplied air before ascending the tank or re-entering the affected area.
- Negative pressure half-face or full-face respirators are not allowed to be used as a substitute for positive pressure breathing apparatus. Users of SCBA or supplied air must be in a respiratory protection program.

Standby persons shall have SCBA donned. They do not need to don the mask unless their entry into the H₂S area is required.

The standby person shall also have:

- An H₂S or multi-gas monitor.
- All respiratory protection program requirements completed.
- Access to an approved device (phone or radio) to summon help. Note that this device may need to be intrinsically safe, or hot work permitted, to be used within production facilities or drill sites.
- Training in CPR, proper rescue procedures, health effects, and pertinent physical and chemical properties of H₂S.

When possible, work upwind of an emission source. Windssocks or streamers shall be used to identify wind direction at AOC facilities. Vanes are not an acceptable method of indicating wind direction at AOC locations.

H₂S surveys shall be conducted every two years and signs should be posted in areas where H₂S is present.

Note: *The exception is for facilities/tank(s) that currently have both respiratory protection and standby requirements (very high H₂S levels). These do not need to be resurveyed unless it is anticipated that the H₂S concentration has diminished significantly.*

9.7. Asbestos

Asbestos may be found in pipe and vessel insulation, transit panels, floor tiles, and roofing felts and may still be present in some older facilities and structures. It is often difficult to differentiate between asbestos and non-asbestos without performing laboratory tests. Contact an Africa Oil Corporation representative if you identify possible asbestos.

Asbestos can be dangerous if not handled properly. Do not breathe asbestos dust. Asbestos insulation that is not damaged or friable (meaning minimum pressure can crumble, pulverize,

or reduce it to powder when it is dry), generally does not produce asbestos fibres at a dangerous level, especially on non-enclosed structures.

To minimize these risks, it is important not to drill, cut, remove, tear, step on, brush against, hammer on, or in any way disturbs suspected asbestos. If it is necessary to disturb any suspected asbestos, or if any deterioration in the condition of the suspected asbestos is apparent, contact an Africa Oil Corporation representative. Only trained personnel with proper equipment shall disturb or remove asbestos.

Materials that may contain asbestos should be surveyed to verify the absence or presence of asbestos-containing material (ACM) and labelled properly. A summary of the survey results shall be maintained at the local field office with this information as part of your hazard communication information.

Africa Oil Corporation locations with known or suspected ACM will inform all contractors and employees of its presence during site-specific orientations. Africa Oil Corporation will also inform contractors if actual or suspected ACM is present when soliciting or bidding a project.

More detail at: <http://www.legislation.gov.uk/ukxi/2012/632/contents/made>
<http://www.hse.gov.uk/asbestos/regulations.htm> Control of Asbestos Regulations 2012

9.8. Lead

Overexposure to lead can result in serious short-term (acute) or longer-term (chronic) health effects. Inorganic lead may be absorbed into the body by ingestion or inhalation. Lead is most commonly found in paints and coatings. Tasks such as abrasive blasting or burning of painted surfaces probably pose the greatest potential for lead exposure.

Any materials suspected of containing lead should be tested before any burning or abrasive removal of painted surfaces is performed. To minimize these risks:

Interim protection must be used until an exposure assessment has been done to determine whether exposures exceed the Action Level (AL) of 30 µg/m³ for an eight-hour time-weighted average, which triggers specific monitoring, training, and medical surveillance requirements.

Africa Oil Corporation will inform contractors if lead-based paints or coatings may be present before soliciting or bidding a project. Contractors whose personnel will be exposed to lead must have a written program in place to monitor their blood-level exposure.

More detail at: <http://www.hse.gov.uk/lead/index.htm> Working safely with lead

<http://www.hse.gov.uk/pubns/indg305.pdf> Lead and you

<http://www.hse.gov.uk/toolbox/harmful/lead.htm> Lead

9.9. Benzene

Benzene is a liquid found in most crude oil and condensate. Low concentrations of benzene have a sweet odour and employees or contractors should move upwind of the source. Benzene can also be found in produced gas in a gaseous form. It is known to cause cancer in humans and efforts shall be made to limit exposure. Possible potential routes of benzene exposure include ingestion, inhalation, and absorption through skin contact.

To minimize benzene exposure risks:

- Africa Oil Corporation locations that are known to have hazardous levels of benzene shall have signs posted. These signs shall meet the benzene sign requirements found in the AOC Safety program.
- Keep the work area and clothing as clean as possible.
- Gloves or clothing saturated with liquid containing benzene should be removed and cleaned or discarded to prevent prolonged skin exposure.
- When benzene levels exceed the action level or permissible exposure levels at a facility where contractor personnel will be working, the contractor should be notified.
- The contractor shall furnish its employees with the proper PPE.

Table 2: Occupational exposure standards for benzene

Exposure Measures	Definition	AOC Exposure Standard
Time Weighted Average (TWA) Exposure Limit	Eight-hour TWA concentration that may not be exceeded.	1 ppm
Short-Term Exposure Limit (STEL)	A 15-minute TWA concentration that may not be exceeded, even if the eight-hour TWA is within the standards.	5 ppm

More information can be found at the following link:

<http://www.hse.gov.uk/pubns/indg329.pdf> Benzene and you

9.10. Naturally Occurring Radioactive Material

Naturally occurring radioactive material (NORM) can be found in piping, tubing, sludge pits, brine and sand filters, saltwater disposal or injection wells, producing wells, spill impacted soils, and equipment. NORM can also be present in valve/junction boxes associated with water systems.

NORM surveys should be conducted periodically:

- Significant changes in the operation of a field may require more frequent surveys. If significant levels of NORM are detected, a NORM SOP should be developed and implemented to make sure that the risks are properly controlled.
- Site-specific and job-specific procedures should be developed for any work on NORM-contaminated equipment to make sure that work personnel are adequately protected and that release of any NORM is prevented.

More information can be found at the following link:

<http://www.hse.gov.uk/pubns/guidance/ore1.pdf>

9.11. Radiography

Radiography is a form of non-destructive testing (NDT) commonly used to assess the quality of welds and to detect material defects. All radiography operations shall be authorized and controlled by qualified radiography technicians.

To minimize risks, before starting radiography procedures, the facility supervisor and the radiography technician should develop a plan. The plan should include a means to communicate during the job (e.g., radio channel and call signs) and a way to make sure that all unauthorized personnel are clear of the radiography area (e.g., sweep the area, install barricades and signs, and appoint a safety watch).

The facility supervisor should inform affected employees that radiography operations will be occurring and explain precautions to be followed. All unauthorized personnel shall stay outside of taped and posted radiography areas.

More information can be found at the following link:

<http://www.hse.gov.uk/pubns/irp1.pdf> HSE information sheet Industrial radiography - managing radiation risks

9.12. Noise

Surveys shall be conducted when warranted by significant process, work procedure, or engineering control changes that may affect the workers' noise exposure. Those areas where the noise level has been measured to exceed 85 dBA have been posted with signs that indicate "Hearing Protection Required."

To reduce these risks, hearing protection shall be provided, at no charge, to all employees including those in the Hearing Conservation program:

- Employees shall be given a choice of several alternative types of appropriate hearing protection.
- Hearing protection must attenuate exposure to a TWA less than 85 dBA.
- Any employee with an eight-hour TWA equal to or greater than 85 dBA shall be notified and enrolled in the Hearing Conservation program.

More information can be found at the following links:

<http://www.hse.gov.uk/noise/regulations.htm> Noise at work regulations

<http://www.hse.gov.uk/toolbox/noise.htm> Noise

9.13. Particulate Hazards

Potential particulate hazards consist of chemicals used in mud recipes, silica from sand-blasting, and any other air-borne nuisance dust that can be inhaled. For some particulates, specific potential hazards may be present from the chemical components of the product. To minimize risk, read the product's MSDS and wear any PPE or respiratory protection to reduce exposures.

Sandblasting can result in hazards from crystalline silica in the breathing zone. To minimize risk, during paint/coating removal using silica sand, wear the supplied air respiratory protection.

Any type of particulate can be sampled to determine exposure levels, even when PPE is worn to reduce potential exposures. Contact the Industrial Health (IH) Safety specialist for more information.

9.14. Welding Fumes

Welding, cutting, and brazing processes can produce a variety of potential chemical and physical hazards. Depending on the process, toxic metallic fume particulate, toxic gases, and ultraviolet (UV) light may be present in the work environment. Supervisors, employees, and contractors should read the MSDS for welding products used in the process. Stainless steel welding can release hexavalent chromium, which may require special caution and protections.

Sampling should be conducted to determine exposure levels and comparison to permissible exposure limits (PEL). Contact the IH Safety specialist for information on sample collection.

More information can be found at the following links:

<http://www.hse.gov.uk/welding/fume-facts.htm> Fume Facts

<http://www.hse.gov.uk/welding> Welding Health and Safety

9.15. Disease Control

9.15.1. Blood-Borne Pathogens

Blood-borne pathogens, such as Hepatitis B and HIV, are infectious agents that can be transmitted through contact with blood or other bodily fluids:

- Hepatitis A is the most common form of hepatitis and has an adverse effect on the liver.

A person becoming infected with Hepatitis A will usually become sick for two to three weeks, and then recover without permanent liver damage. This disease is highly infectious and is primarily transmitted through food and water, although transmission through body fluids is possible. It can also be spread by an infected person who does not use proper personal hygiene and exposes others by handling food, water, or eating utensils.

Hepatitis B is similar to Hepatitis A in the initial symptoms, but can cause permanent liver damage and death. Transmission of the disease is mainly through body fluids.

- HIV (human immunodeficiency virus) is the virus that causes AIDS (acquired immune deficiency syndrome). HIV attacks the human immune system and over time gradually destroys the body's defences against diseases, leaving it vulnerable to many infections and cancers that would not normally develop in healthy people. There is no known cure for HIV.

- It can be contracted through unprotected sex, sharing of needles, unsafe blood transfusions, improper sterilization of hospital equipment, and exposure from mother to child during pregnancy. In the early stages of infection, HIV often causes no symptoms and can be diagnosed only by a blood test. Blood-borne pathogen kits shall be present in all company and contractor vehicles.

To reduce these risks, during first-aid training, instructors will explain the risks involved when providing First Aid to other persons, and how you can protect yourself from exposures to blood and body fluids. Proper hygiene is the best method to prevent the spread of Hepatitis A. Preventing exposures to blood and body fluids is the best method of protection for Hepatitis B and HIV/AIDS.

Immunization against Hepatitis A and B is available from your local medical department. If you are exposed, report the exposure to your supervisor and your local medical department.

More information can be found at the following links:

<http://www.hse.gov.uk/pubns/indg342.pdf>

<http://www.hse.gov.uk/biosafety/diseases/bbv.pdf>

9.16. Natural and Environmental Hazards

9.16.1. Cold Stress

Working in severe cold environments may create a physical hazard when the body is unable to warm itself. Serious cold-related illnesses and injuries such as hypothermia and frostbite may lead to permanent tissue damage and even death. To minimize risks of working in cold, wet, or windy conditions such as open cabs, projects near large bodies of water, and buildings open to the wind:

- Make sure workers, especially those that work in exposed locations or elevated platforms, understand wind-chill factor.
- Make sure that workers are medically fit to work in excessive cold, especially those subject to the risk factors highlighted above.
- Make sure that workers understand the importance of high-caloric foods when working in cold environments. Warm sweet drinks and soups should be arranged at the work site to maintain caloric intake and fluid volume. Coffee intake should be discouraged because it increases water loss and blood flow to extremities.
- If possible, personnel working in isolated cold environments should have backup.
- Provide hot drinks and regular breaks under extremely cold working conditions.
- Select protective clothing to suit the cold, the job, and the level of physical activity:
- Wear several layers of clothing rather than one thick layer. Air captured between layers acts as an insulator. Workers in areas that require fire-

retardant clothing (FRC) should make sure that the outer layer is fire retardant.

- There is not an absolute temperature at which hypothermia can set in; therefore, offer advice to employees and contractor to change into dry clothing when their clothing becomes wet or soaked when working in cold conditions.
- Encourage the use cold-weather equipment to prevent heat loss from the head and to protect ears. This equipment should allow concurrent use of required PPE such as a hard hat. FRC, balaclavas, (ski masks) or other face covers may also be necessary under certain conditions.
- To prevent contact frostbite, workers should wear insulated gloves when surfaces within reach (especially metallic surfaces) are at freezing temperatures or below. Workers should be warned to avoid skin contact with these surfaces.
- Tight-fitting footwear restricts blood flow. Footwear should be large enough to allow wearing either one thick or two thin pairs of socks. Wearing too many socks can tighten fit and harm rather than help. Workers who get hot while working should open their jackets but keep hats and gloves on. Manual dexterity is essential to safety and production. When fine work is to be performed in cold environments, hands should be kept warm with equipment such as warm air jets, radiant heaters (fuel burning or electric), or contact warming plates. Personnel using this equipment must adhere to Hot Work guidelines.
- Metal handles of tools and control bars should be covered by thermal insulating material for temperatures below 30.2°F (-1°C). Tools and machine controls to be used in cold conditions should be designed for operation by gloved hands.

9.16.2. Heat Stress

Working in a hot climate can pose threats to an employee's health from heat exhaustion or heat stroke. When working outdoors, or in poorly ventilated workshops, take the following precautions to reduce heat stress:

- Drink more fluids (preferably water) than you feel you actually need. Your body uses more fluid than what you normally drink on a hot day.
- On hot days, perform heavy work during the early morning or late afternoon hours when it is cooler.
- Take frequent breaks in the shade to cool off.
- Protect your body against direct sunlight. Wear a hat, a lightweight, light-coloured cotton shirt with long sleeves, and long pants. Avoid sunburn and wear sunscreen.
- Attempt to work in areas that are well ventilated. All workplaces should have good general ventilation, as well as spot cooling in work areas of high heat production. Good airflow increases evaporation of sweat, which cools the skin.

- If symptoms of heat exhaustion or heat stroke occur, seek medical attention immediately. In hot conditions, reduce work for anyone at increased risk of susceptibility to heat stress. Employers should use common sense when determining fitness for work in hot environments. Lack of acclimatization, age, obesity, poor conditioning, pregnancy, inadequate rest, previous heat injuries, certain medical conditions, and medications are some factors that increase susceptibility to heat stress.
- Table 3 below shows the effects of heat stress and the corresponding medical treatment.

Table 3: Heat stress symptoms and First Aid

Term	Symptoms	First Aid
Heat stroke	Sweating diminished or absent, hot/dry skin, high body temperature($\geq 106^{\circ}\text{F}$)	Medical Emergency – Summon medical aid quickly, douse body with cool liquid
Heat exhaustion	Profuse sweating, weakness, pale/clammy skin, rapid pulse, dizziness, nausea, headache, vomiting, unconsciousness	Rest in shade/cool area, drink plenty of water (preferred) or electrolyte fluids
Heat cramps	Intermittent spasms of abdomen/muscles	Rest and drink plenty of water
Heat rash	Rash, reduced ability to sweat	Clean and dry affected area, lotion to relieve discomfort
Fatigue	Increased tiredness or weakness, decrease in alertness	Rest

More information can be found at the following link:

<http://www.hse.gov.uk/temperature/thermal/step1.htm>

9.16.3. Ultraviolet

Ultraviolet (UV) is the name for a band of energy on the electromagnetic spectrum that lies between visible light and X-rays. Common sources of UV light include the sun (especially when reflected by water, snow, or ice), mercury lamps, welding arcs, plasma torches, and some lasers. Sunlight is implicated in increased rates of skin cancer. The severity of UV injuries depends on the duration and intensity of the exposure, the type of UV, and the presence of certain chemicals (photosensitizes). The antibiotic tetracycline can cause skin burns to happen faster and be more severe. Some petroleum products can also cause UV skin burns to happen faster. UV absorbed by the eyes and eyelids can result in welder's flash, which usually occurs 6 to 12 hours after exposure and may last 6 to 24 hours. Typically, there is no lasting injury.

To reduce UV risk:

Skin can be protected effectively from sunlight by wearing clothing that covers exposed skin, limiting exposure as much as possible, and by using sunscreen. Welders shall protect their eyes by using appropriate shades for lenses according to the specifications for their process, and protect other exposed skin with clothing.

More information can be found at the following link:

<http://www.hse.gov.uk/pubns/radindex.htm>

<http://www.hse.gov.uk/radiation/nonionising/information.htm>

9.16.4. Skin Cancer

Prolonged sun exposure increases the risk of skin cancer and development of cataracts. To minimize skin cancer risk:

- Avoid sun exposure whenever possible.
- Wear head dressing (hat with broad brim) when outside.
- Use sun block on exposed parts of the body
- Wear sunglasses with 100% UV protection.
- Wear light-coloured clothing with long-sleeved shirts and long pants. If you notice a change in a mole, such as size increase, itching, discoloration, or ease of bleeding, consult a physician immediately.

More information can be found at the following link:

<http://www.hse.gov.uk/pubns/indg337.pdf>

9.17. Wildlife

In many cases, our facilities are located in areas that possess unique wildlife communities. Some animals and their habitats are protected by national or state regulations. It is important that personnel are aware of any regulatory requirements and refrain from interfering with wildlife in any way. Interactions with wildlife can result in serious injury, illness, or death.

General safety considerations regarding wildlife include the following:

- Encounters with large mammals like bears, cougars, elk, deer, hippopotamus, lion, buffalo, wild dogs, leopard, lion, and boar are potentially dangerous.
- Small mammals, such as foxes and coyotes with rabies and rodents with Hantavirus and plague, are also potentially dangerous.

To minimize our impact on wildlife and their habitats, and greatly decrease the likelihood of dangerous encounters, the most important action we can take is to control our food waste and other garbage. Food waste and packaging should remain in vehicles with the windows closed until it can be deposited in a dumpster with animal-proof lids, in indoor trash, or other proper receptacles. This will minimize the odours that can attract wildlife and decrease the likelihood of an encounter. Never intentionally feed, approach, or harass wildlife.

9.17.1. Snake Bites

Poisonous snakes are found throughout the AOC areas of operation. Communication of the hazards associated with snakes should be included in pre-job safety reviews and JSAs. The legs and hands are the most common body parts bitten by snakes. To protect against snake bites:

- Wear safety boots or safety rain boots to protect the ankle area.
- Use caution when passing through or clearing brush.
- Carry a stick and tap the ground ahead of you while travelling through the brush. This will either cause the snake to exit the area or strike at the stick.
- Try to avoid crawling under buildings, where snakes are often found.

If bitten, **seek medical attention immediately**, and be guided by the following:

- The employee should remain calm and avoid exertion or anxiety. If possible, keep the bitten area elevated. Apply direct pressure over the bitten area.
- Apply a firm bandage (pressure immobilization bandage) starting from just above the fingers or toes, and wind as far up the limb as the arm pit or groin. Immobilize the limb with a splint.
- **Do not** remove the bandage and splint once it has been applied.
- **Do not** incise and suction the bite without proper medical training and equipment. Note also that this method is only effective within several minutes of having been bitten by a snake.
- **Do not** use an arterial tourniquet.
- **Do not** try to capture the snake. Contact ISOS medical services.

9.17.2. Bee Stings

Stings from bees can be life threatening, especially to individuals allergic to bee venom. Personnel working in areas prone to bee encounters (surveyors, brush clearing crews, etc.) should observe the following:

- Communication of the hazards associated with bees should be included in pre-job safety reviews and JSAs.
- Workers with allergies to bee stings should take appropriate precautions and notify their supervisor of any related prescription medications in their possession.
- Always wear long-sleeved shirts, long pants, and boots. Keep shirts tucked into the pants.
- If you experience a sting(s):
- Move away from the nest location as quickly as possible.
- **Do not** swat the bees; this will only aggravate them more. In a safe place, when possible, remove the stingers.

Personnel assisting a bee sting victim should:

- Sit the victim down and keep the victim calm.
- Establish if the victim is feeling particularly unwell or is suffering from any breathing difficulties. If necessary, follow recognized first-aid procedures (e.g., administer first-aid treatment for shock) and initiate medical evacuation procedures immediately.

10. Safe Operations

10.1. Slip, Trip, and Fall Prevention

10.1.1. Walking Surfaces

To prevent slips, trips, and falls on walking surfaces, observe the following:

- Walkways and grating should be kept in good condition. Damaged or deteriorated grating should be reported to the facility supervisor.
- Extra precautions shall be taken when walking on wet or icy surfaces. Wear ice boots when walking on sheet ice.
- Personnel shall not walk or climb on piping, valves, fittings, or any other equipment not designed as walking surfaces. Work stands shall be designed and used for working on specific equipment.
- Use hand rails if they are available. Shift loads if necessary to free up at least one hand. Use stiles when crossing tank berms/fire walls and pipes that cannot be stepped over easily.

More information can be found at the following links:

<http://www.hse.gov.uk/slips/>

<http://www.hse.gov.uk/pubns/indg225.pdf>

<http://www.hse.gov.uk/construction/safetytopics/falls.htm>

<http://www.hse.gov.uk/food/falls.htm>

10.1.2. Housekeeping

Good housekeeping is usually a reflection of the overall operation of any facility. When employees pay attention to housekeeping, it is a good indication that they also pay attention to other important details of Operational Excellence. Observe the following:

- Personnel shall keep all working areas, walking surfaces, handrails, equipment, tools, life-saving and fire-fighting equipment clean and free of obstructions.
- Do not leave tools on the floor, decking or around the work site where they can present hazards.
- Clean up oil spills and slippery areas immediately. Do not use plastic buckets to collect hydrocarbons. Only metal containers with metal handles are approved for this use.

More information can be found at the following links:

<http://www.hse.gov.uk/slips/preventing.htm> & <http://www.hse.gov.uk/toolbox/slips.htm>

10.1.3. Working at height

The Work at Height Regulations 2005 No. 735 applies to all maintenance and construction tasks that are performed above ground level and pose additional risks such as:

- Potential of falling personnel, tools, and equipment.
- Body positioning outside of the elevated workspace.
- Atmospheric hazards (e.g., wind, rain, lightning).
- Physical stress of the additional personal protective equipment.

Work should be planned to minimize or eliminate the risks of dropped objects from overhead. Identified hazards should be documented in the JSA and addressed in pre-job discussions.

Personnel working overhead shall notify everyone below of their location. Tools and materials shall be handed up or down and never thrown. When it is necessary to hoist tools with a rope, exercise care to make sure that the tools are securely attached to the rope and there is no danger of dropping them. A strong sack is recommended for raising or lowering tools. Plastic buckets are not allowed for use on lease or process areas.

Avoid storing tools at elevated heights when tools are not being used.

Employees working in unprotected areas 1.8 m or higher above grade or deck level (e.g., a tank, production vessel, or unguarded working platform) shall wear a full-body harness fall-protection device.

More information can be found at the following links:

<http://www.legislation.gov.uk/uksi/2005/735/made>

<http://www.hse.gov.uk/work-at-height/the-law.htm>

<http://www.hse.gov.uk/work-at-height/wait/index.htm>

<http://www.hse.gov.uk/pubns/indg401.pdf>

10.1.4. Open Holes in Floors and Grating

Barricades, tape, and signs must be installed around open holes in floors and grating to restrict access by unauthorized personnel and to prevent them from stepping into or falling into the holes. Barricades should be installed a minimum of 1.5 m from the opening where possible. Where feasible, open holes should be covered when work is not in progress. An open hole is defined as a gap or void 5 cm or more in its least dimension. See above links for more detail.

10.2. Ergonomics and Human factors at Work

Ergonomics is the study of human performance and wellness in relation to performing work. Planning your work, personalizing your environment to fit you, and following the guidelines in this section will promote health and wellness. Performing repetitive tasks without giving the body a chance to recover, especially in awkward body positions or using forceful exertion,

can lead to injury. Any pain or discomfort associated with performing repetitive tasks at work should be immediately reported to your supervisor.

10.2.1. Workstation Ergonomics

To prevent injury, observe the following workstation ergonomics practices:

- If your job requires several hours at a keyboard, move and change positions throughout the day to reduce muscle fatigue. Stretch frequently and focus your eyes on distant objects. Take a 30-second break every 30 minutes of work.
- Position your computer monitor directly in front of you. Adjust the monitor height so that the top line of text is at or below eye level. Correct monitor distance is as far as is comfortable for reading. Place the monitor at right angles to windows or light sources, pull down window blinds, and adjust the position of the monitor to minimize glare.
- Adjust your chair as often as is necessary to achieve correct posture. The chair back should support the curve of your lower back. Your feet should be able to reach the floor or footrest, and the edge of your chair should not press into the back of your knees.
- Sit back in your chair with the body properly aligned. Your back should be upright or slightly reclined.
- Whenever possible, position the keyboard and mouse on a flat surface at the same height.
- When you type or use the mouse, your arms should fall relaxed at your sides, with elbows close to the body and shoulders relaxed.
- When using the mouse, use it as close as possible to your body. Grip it lightly, and drive the mouse from your shoulder, not just your wrist.

More information can be found at the following links:

<http://www.hse.gov.uk/humanfactors/index.htm>

<http://www.hse.gov.uk/pubns/indg90.pdf>

10.2.2. Carrying Heavy Objects

The Manual Handling Operations Regulations 1992 (as amended) apply to work which involves lifting, lowering, pushing, pulling or carrying.

- Before attempting to carry or move a heavy object, observe the following:
- Consider whether a mechanical device can be used to move the object.
- If the object is too bulky and obscures vision, get assistance from another person.
- Make sure that the object is within your lifting capability. Make sure that the walking surface is solid and free of obstructions.

More information at:

<http://www.hse.gov.uk/pubns/indg143.pdf>

10.2.3. Proper Lifting Techniques

To prevent injury, observe the following proper lifting techniques:

- Bend your legs at the knees and keep your back nearly vertical. Your body should be as close to the object as possible. Your feet should be apart, but not wider than shoulder width.
- Firmly grasp the object and straighten your legs, keeping your back straight and upright. Pull the object close to your body, and lean back slightly to keep the centre of gravity over your feet.
- Avoid twisting your body when lifting or carrying heavy objects. When handling material with others, agree on who will direct or give signals. Materials should not be released until everyone is ready.

10.3. Tools and Equipment

10.3.1. General

Only trained operators shall start and stop operating equipment. Personnel starting engines, loading compressors, or igniting fired vessels shall follow these procedures:

- Start-up and loading procedures shall be posted at each engine or compressor location.
- Ignition procedures shall be posted at all fired vessels.
- Before start-up, the person starting the engine shall make sure that only authorized personnel are in the area and that they are clear of machinery.
- Machinery shall not be started after maintenance until the facility operator has examined the equipment and has assured that it is ready for start-up.
- Make sure that all drain pans are in good condition and are kept clean and dry with drain plugs wrenched tight.
- Repairs shall not be made on machinery until the power, gas, or air supply has been turned off and provisions have been made to prevent revolving or reciprocating parts from turning over accidentally. Equipment-specific lock out/tag out (LO/TO) guidelines should be followed when available.

10.3.2. Equipment Guards

Observe the following regarding equipment guards:

- Replace equipment guards that were removed from machinery during repairs before the machinery is restarted.
- After manually turning over an engine with a barring tool, be sure to remove the tool from the flywheel and store it in a safe location. Never leave the bar in the flywheel after manually turning the engine.
- Do not wipe revolving shafts and other moving parts with rags.
- Do not clean beltways or areas protected by guards while equipment is operating.
- Do not wear loose clothing or jewellery around rotating equipment since it may become caught in the machinery.
- Tie or cover loose, long hair when working around rotating equipment to prevent it from being caught in the machinery. Fire-retardant clothing (FRC)

does not tear easily. Extra care should be taken to avoid getting it caught in machinery.

More information at: <http://www.hse.gov.uk/pubns/indg229.pdf> & <http://www.hse.gov.uk/pubns/indg291.pdf>

10.3.3. Lighting Flares or Vent Pipes

When possible, self-igniting flares should be considered for use to reduce the risk of fire hazard.

Use a flare pistol to light all flares or vent pipes that are not self-igniting. Approach the flare from the upwind side. Make sure that the trajectory of the projectile is not towards hydrocarbon-handling equipment, platforms, other combustible materials, or personnel. Caution should be taken around dry vegetation to prevent grass fires.

10.3.4. Minimum Equipment Spacing Requirements

This section sets out minimum equipment spacing requirements between selected mobile equipment or permanently installed equipment and other pieces of fixed equipment for normally unattended operation. This section is not intended to provide guidance at drilling and work-over locations. For attended operations, variances should be made from these spacing requirements (with appropriate safety measures implemented) only with prior Africa Oil Corporation approval. The maximum variance that may be granted, in any case, shall not exceed:

Greater than 30.5 m: 50% reduction is the maximum variance allowed with prior Africa Oil Corporation approval. Less than 30.5m: 25% reduction is the maximum variance allowed with prior Africa Oil Corporation approval. Table 4 shows minimum spacing requirement from wellhead to other oilfield equipment and applications.

Table 4: Minimum equipment spacing requirements

From Wellhead (Hydrocarbon)	Distance	
Test tanks, oil storage, pits	150	45.72
Generators	150	45.72
Direct-fired heater with flame arrestor	150	45.72
Circulating pumps	150	45.72
Engine exhaust muffler (not automobile)	150	45.72
Fuel storage	150	45.72
Hydraulic power units (electric motor driven)	150	45.72
From Pits (Not Burning)		
Fuel and ignition sources	50	15.24
Circulating pumps and hydraulic	100	30.5

power units		
Circulating pumps and hydraulic power units (with spark arrestors)	25	7.6
From Hot Oil Trucks		
Storage tanks	100	30.5
Wellhead	100	30.5
From Vacuum Truck		
All tanks to truck engine	50	15.24
From Gas Vents		
Well and ignition sources	150	45.72

10.3.5. Pressurized Production Equipment

Only individuals who are properly trained may perform work on pressurized equipment. Before trying to loosen or tighten threaded or flanged connections or starting repairs on any line, vessel, engine cylinder, wellhead equipment, or other producing equipment, isolate all sources of pressure and bleed down in strict adherence to the Isolation of Hazardous Energy (Lock Out/Tag Out) procedures.

Exercise caution to make certain that the pressure has been bled off and will remain bled off for the duration of the repair. This can be accomplished by doing the following:

- Empty any equipment being prepared for opening of any noxious, toxic, or flammable liquid or vapours in a controlled manner.
- Drain depressurized lines containing liquids into a bonded form of containment to prevent static ignition.
- Adequately isolate and check the opened equipment, which must be found free of potential hazardous materials and/or conditions. If previously unidentified hazards exist or previous safeguards are determined to be inadequate, equipment must be closed until safeguards are taken.
- Isolate (blind or air gap) the process equipment whenever possible at the first flange nearest the equipment to be opened. Valves will be locked and tagged, and blinds must be listed on an equipment isolation checklist. The equipment isolation checklist shall be maintained with the Permit to Work for the work site.
- Lock out or otherwise secure prime mover energy sources associated with the equipment to be opened.
- Blind or air gap any pressurized connection to a vessel or system before the equipment is opened.
- Double block and bleed valves may also be used to isolate equipment from process lines. Bleed lines should be carefully checked to make certain they are not plugged.
- Any pressurized connecting points to equipment being opened will be blind flanged before being left unattended. Air gapping alone is not adequate.

- Depressurize and drain process equipment being opened to a safe area such as a flare system or recovered oil system. Depressurizing and draining into a closed system is the best practice.
- Do not allow hot work in the immediate area during draining or depressurizing of process equipment if there is a possibility of flammable vapour release. Refer to the Hot Work Procedure.
- Adequately purge, steam, or wash opened equipment to assure removal of toxic or flammable commodities to safe levels. Purged equipment shall be vented to a safe area where potential ignition sources are not present. Appropriate flammability and toxic chemical monitoring will be conducted on the equipment before it is declared safe for work. The potential for pyrophoric material such as iron sulphide in sour plants shall be considered and mitigation measures implemented.
- Isolate and/or drain gauge glass columns before equipment is declared safe for work. Take appropriate precautions with process equipment contaminated with naturally occurring radioactive material (NORM).

10.3.6. Opening Equipment Safe Work

- Any equipment being prepared for opening shall be emptied of any noxious, toxic, or flammable liquid or vapours in a controlled manner. A controlled manner is a means of maintaining dissipation rate and/or destination of liquid and vapours without creating a hazard.
- The opened equipment must be adequately isolated, checked, and found free of potentially hazardous materials and/or conditions. If hazards exist, equipment must be closed until adequate safe guards are taken.
- Whenever possible, process equipment shall be isolated (blinded or air gapped) at the first flange nearest the equipment to be opened. All valves will be locked and tagged and all blinds listed on the Isolation of Hazardous Energy (IHE) Lock Out/Tag Out (LO/TO) checklist. The blind list shall be maintained with the Permit to Work permit and or JSA at the work site.
- All prime mover energy sources associated with the equipment to be opened shall be appropriately locked out/tagged out and secured. Documentation is required via the Isolation of Hazardous Energy IHE (LO/TO) checklist.
- Any pressurized connection to a vessel or system to be opened shall be blinded or air gapped before the equipment is opened.
- Any pressurized connecting points to equipment being opened will be blind flanged before being left unattended. Air gapping is not an adequate practice in this instance.
- Process equipment to be opened shall be depressurized and drained to a safe area such as a flare system or recovered oil system. Hot work will not be allowed in the immediate area during draining or depressurizing of process equipment if there is a possibility of flammable vapours being released. Opened equipment shall be adequately purged, steamed or washed to assure removal of toxic or flammable materials to safe levels. Equipment purged with air shall be vented to a safe area where potential ignition sources are not present. Appropriate flammability and toxic chemical monitoring will be conducted on the equipment before it is pronounced safe for work. Gauge

glass columns shall be appropriately isolated and/or drained before equipment is declared safe for work. When opening process equipment that has been in hydrogen sulphide service, precautions shall be taken to keep the interior surfaces of the equipment wet when possible to reduce the chances of iron sulphide fires. Appropriate precautions shall be taken with process equipment contaminated with naturally occurring radioactive material (NORM). The AOC program for naturally occurring radioactive material applies.

10.3.7. Scraper/Sphere Launchers and Receivers (Pig Traps)

Each launcher and receiver should be identified as to service (e.g., 100mm bulk oil to Delta Platform). An operating procedure, hazard analysis including a piping diagram, should be prepared for each launcher and receiver, and a laminated copy should be available at each launcher and receiver location. Be aware that NORM may be present so take proper precautions before receiving scrapers.

Each launcher and receiver on an in-service pipeline shall be permanently equipped with a pressure gauge, except when:

- The launcher/receiver is equipped with a device that assures that it cannot be opened without depressurizing the barrel.
- The launcher or receiver is located in areas prone to theft. Simultaneous operations (such as lifting or wire line operations) are underway that could result in damage to the gauge. In such cases, it is acceptable for the operator to install a pressure gauge only during actual launcher/receiver opening operations. Do not open any pig trap until it has been absolutely confirmed that there is no pressure on the barrel. To prevent injury from unexpected trapped pressure, stand to the side opposite the launcher or receiver hinge. The use of mirror devices to observe the inside of receivers is recommended. After a pig is launched or received, and the pig trap is isolated from the pipeline, the launcher or receiver should be bled down.

10.3.8. Gauge Glasses

Wear goggles and gloves when installing gauge glasses. When bleeding down or pressurizing gauge glasses, personnel shall be positioned out of the way of potential pressure releases. Also, observe the following recommendations:

- Gauge glasses shall be bled down and pressurized slowly.
- When gauge glasses are in service, their gauge cock valves shall be fully opened.
- All gauge glasses shall have guards regardless of location and of sufficient design to prevent accidental breakage such as that that might occur in a hailstorm.
- Scratched or damaged gauge glasses shall be replaced.
- When replacing gauge glasses, the packing gland shall be tightened only enough to prevent leakage and not bind or break the glass. Halar® may be used for gauge glasses in low-pressure applications, and in such cases

guards are not required. Plastic materials other than Halar® are not acceptable as gauge glasses.

10.3.9. Valves, Piping, and Tubing

The following guidelines address some of the safety-related issues encountered most frequently in the installation and use of valves, piping, and tubing in hydrocarbon service. They are not intended to be a complete set of design specifications. Consult your supervisor for questions or clarification regarding valves, piping, and tubing.

Valves in hydrocarbon service that open to the atmosphere shall have bull plugs installed or be blind flanged. Needle valves with metal-to-metal seats can be used without a plug.

Hammering of valves is not permitted. If lubrication will not free a valve for operation, it shall be tagged for repair or replacement at the next scheduled shutdown.

Lower master gate valves on wellheads shall not be used in day-to-day operations. Leaking or difficult to-operate master gate valves should be reported to the facility supervisor to enable prompt repairs.

Open-ended valves 12.5mm ($\frac{1}{2}$ inch) and larger (excluding needle valves and valves in CO₂ service) are required to have a plug installed. Plugs two inches and larger are required to be tapped with a bleed valve installed to relieve trapped pressure.

Note: Cam-Loc connections (i.e., well truck treating connections) are exempt from this plugging requirement. Also, trapping CO₂ can be dangerous and should be avoided.

Only high quality, flare-less compression-type tubing connections shall be used for high-pressure hydrocarbon service. Connections shall be inspected for proper ferrule seating before final tightening.

Leaking fitting connections shall never be tightened while under pressure.

Tubing and fittings on installations shall be stainless steel, (except for PolyFlow® tubing and connectors used in emergency shutdown (ESD) loop, fusible plug, or other low-pressure systems), and shall be adequate for design temperature and pressure requirements of the system. Copper and brass tubing and fittings shall not be used in hydrocarbon service. Brass-bodied valves shall not be used in hydrocarbon service.

10.3.10. Corrosion

All signs of internal and external corrosion of lines and equipment should be reported immediately to facility supervisors. Observe the following:

- Look for internal corrosion when opening pig traps, lines, vessels, etc
- Look for signs of external corrosion where lines contact the ground, deck, or water. External corrosion can also be prevalent near metal clamps and near damaged coatings.
- Immediately report all leaks and failures to your supervisor.

- Report abnormally high replacement frequencies of valves, fittings, or other equipment to your supervisor. Corrosion or erosion may be the cause. Turn off rectifiers used in corrosion control before any maintenance is performed on pipelines and flow-lines. Rectifiers are a source of ignition.
- Get authorization from your local maintenance group before performing any work on lines with rectifiers. The location of rectifiers must be identified and this information conveyed to all employees during the site-specific orientation.

10.3.11. Compressed Gas Cylinders

Compressed gas cylinders shall be:

- Marked to properly identify the cylinder contents.
- Secured in an upright position to prevent them from being knocked over or damaged.
- Stored separately from combustible and flammable materials.
- Lifted and transported in purpose-designed racks
- Securely fastened to hand trucks when being moved.
- Cylinders shall not be used if they have been defaced or if markings, labels, tags, or stencil marks used for identification have been removed, nor as rollers, as supports, or for any purpose other than to contain gas, for which they were designed.
- Cylinders shall not be placed where they might become part of an electrical circuit and shall not be exposed to temperatures above 125°F (52°C), open flames, or areas where heavy equipment is being moved.
- Cylinders shall not be stored in offices, administration buildings, or basements. To prevent sliding or dragging, hand trucks shall be used to move cylinders.
- Compressed gas cylinders used for welding or cutting shall be equipped with flashback arrestors on both ends of the hose on the welding/cutting assembly. Oxygen cylinders are typically pressured to 2,400 pounds per square inch gauge (psig) at 21°C when full. They shall be stored in shaded areas to avoid increased pressure from heat expansion.
- Oxygen supports combustion. When oxygen comes in contact with oil or grease, a spontaneous explosion and fire can occur. To prevent this, never lubricate or allow oil or grease to get on oxygen connections.
- Keep oxygen and hydrocarbons separated.
- Never use oxygen in place of compressed air or as a source of pressure or in self-contained breathing apparatus.
- Caps shall be in place when cylinders are not in use and when they are being moved.
- Cylinders shall not be lifted by their caps.
- Cylinder valves shall be kept closed at all times except when the cylinder is in active use. Open cylinder valves slowly, with the valve pointing away from personnel.
- Compressed gas shall not be used for cleaning. This may cause serious injury to personnel or create a fire hazard.

- Regulators, gauges, and hoses provided for use with a particular gas or group of gases shall not be used on cylinders containing gases having different properties.
- Properly sized wrenches shall be used with cylinder valve accessories.
- Hoses connected to pressurized cylinders shall be placed in a manner that will minimize tripping hazards and prevent contact with other equipment, people, and objects that could rupture the hose.
- Acetylene should never be used with the cylinder secured more than 45 degrees from a vertical position.
- Acetylene is extremely unstable above 15 psig. To reduce the possibility of an explosion, never use acetylene at a hose pressure exceeding 15 psig. CO₂ cylinders are normally high-pressure, lightweight units that are carried by hand and used for shooting fluid levels. The safe practices listed above should be exercised when using these CO₂ cylinders.

10.3.12. Grinding Equipment

Approved safety goggles designed to meet the BS EN 166:2001 standard and a full-face shield shall be worn when using or working near a grinding wheel. Work should be positioned in a manner that forces projectiles away from personnel. Only those personnel necessary to the grinding job should be in the area while work is being conducted. Because grinding wheels and grinding discs are a potential ignition source, use them only in unrestricted areas or obtain a Hot Work permit before operating them. Signs indicating eye protection required shall be posted at all fixed grinder stations.

Do not use the side of a grinding wheel unless the wheel is designed for that purpose. Store new grinding discs in a safe location off the floor. Damaged grinding discs may crack and break when placed in use. Inspect in-service grinding discs regularly. Because the grinding disc surface is rough, damage and cracking is difficult to see. Treat new grinding discs with care.

Wheel and disc-type grinders shall have guards installed. The work rest for a wheel grinder shall be no more than 3mm from the wheel and the tongue guard no more than 6mm from the wheel. Frequent inspections are necessary to assure that proper distances are maintained. Do not adjust guards when wheels are in motion. Only qualified, competent persons shall install grinding wheels. A ring test shall be performed before installation.

Since some wheels are designed only for low-speed use, before installation check the rated speed of the grinding wheel versus the spindle speed of the machine. Only low-speed grinding wheels shall be used to grind aluminium. High-speed grinding wheels create excessive temperatures that may cause the wheel to disintegrate.

10.3.13. Chain Saws

Only trained, competent persons are permitted to operate chain saws. Operators of chain saws must always:

- Follow the chain saw manufacturer's recommended safe operating procedures when operating and refuelling chain saws.

- Wear appropriate personal protective equipment (PPE), including hard hats, safety footwear, goggles and/or face shields, chaps, and earplugs or earmuffs. Wear close-fitting clothing. Make sure that chain saws are in safe operating condition. Do not use defective chain saws.

More information and standards at these links:<http://www.hse.gov.uk/treework/safety-topics/chainsaw-operator.htm> & <http://www.hse.gov.uk/pubns/indg317.pdf> Chainsaws at work (excellent guide)

10.3.14. Hand Tool Maintenance and Use

Observe the following hand tool maintenance and use practices:

- Use hand tools only for their intended purpose.
- Inspect hand tools before use to make sure that they are the proper size and in good condition.
- Do not use defective tools. Properly dispose of defective tools to avoid misuse.
- Do not carry sharp tools in your pockets.
- After completing a job, clean your hand tools and return them to toolboxes or storage areas. Make sure that wrenches have a good bite before you apply force. Brace your body in a balanced position so that if the tool slips, you will not fall. Make sure your hands and fingers have sufficient clearance in the event the tool slips.

10.3.15. Use of Cheater Bars/Pipes

Use cheater pipes only when absolutely necessary. The pipes must be less than twice the length of the wrench handle and must closely fit the entire length of the wrench handle.

Do not:

- Stand, jump, or jerk on cheater pipes to break connections
- Use cheater pipes on crescent-type adjustable wrenches.

10.3.16. Hot and Cold Surfaces

Hot surfaces of temperatures 140°F (60°C) or higher located within 2.2m) vertically from the floor or working level or 40 cm horizontally from the floor work level, stairs, ramps, or fixed ladders shall be insulated or guarded against accidental contact. If insulation or guarding is not possible, signage should be attached at or near the surface to warn of the danger. Similarly, extremely cold equipment should be guarded, if necessary, although a layer of ice generally forms on cold surfaces and acts as an insulator.

10.4. Forklifts

No one other than the operator is allowed to ride on a forklift. The only exception is an instructor working with an operator during training. All forklift operators must be certified as having completed the necessary training to become forklift operators and have current certification to operate a forklift.

Personnel may not be raised or lowered with a forklift unless an approved personnel basket or cage is used. Do not use a forklift to transport loads if the load or forks obstruct the operator's vision. Forklifts are subject to the same rules of operation as motor vehicles.

Forklifts at all Africa Oil Corporation facilities shall be equipped with audible backup warning.

<http://www.hse.gov.uk/workplacetransport/lift-trucks>

<http://www.hse.gov.uk/pubns/priced/l117.pdf>

10.5. Operational Excellence Meetings (OE)

Safety meetings shall be conducted to enhance each employee's awareness of safe work practices and pollution prevention procedures, and to improve overall safety and environmental communication, compliance, and practices.

Formal safety meetings should be conducted for field personnel at least monthly for each shift. At a minimum, quarterly safety meetings should be conducted for office personnel. Additional meetings should be scheduled as operational needs dictate.

When a hazardous or non-routine operation is planned, the designated person-in-charge shall be responsible for preparing and conducting tailgate or toolbox safety meetings. These meetings should focus on JSAs, safe work practices, scope of work activities, and identification of potential safety hazards. Toolbox safety meetings should also review unsafe behaviours or near misses, review root causes of incidents, and recommended actions to prevent recurrence.

10.6. General Office Safety

Observe the following recommended practices for general office safety:

- Office equipment and supplies should be positioned so as not to impede egress or cause tripping hazards. Nor should it block access to fire equipment or electric panels.
- To prevent cabinets from tipping over, only one filing cabinet drawer should be open at any time. Drawers should be closed immediately after use to prevent someone from running into them.
- Telephone cords and flexible cables should be safely positioned so that they do not become a tripping hazard. Frayed or damaged electrical cables should be taken out of service, reported, and replaced immediately.
- Broken or defective furniture and equipment should be taken out of service and reported immediately. Ergonomic furniture shall be purchased to replace broken or defective furniture.
- Paper cutter blade guards shall be in place and blades secured when not in use.
- Horseplay is not allowed. Walk; do not run.
- All office employees should be familiar with procedures for reporting emergencies, and evacuation procedures should be posted for their building.

11. Managing Safe Work/Safe Work Practices

11.1. Safe Work Practices

Safe work practice (SWP) processes addressed here are:

- Hazard Analysis.
- JSA.
- Permit to Work.
- Isolation of Hazardous Energy (Lock Out/Tag Out).
- SimOps.
- Hot Work.
- Confined Space Entry.
- Bypassing Critical Protections.
- Excavation.
- Lifting and Rigging.
- Working at Heights.

11.2. Purpose and Objective

The purpose of the Managing Safe Work (MSW) process is to identify, assess and mitigate, control or eliminate the risks associated with work. The MSW process provides for the identification and evaluation of job task hazards, specification of control measures, management of those measures, control of the work, and behaviours to support safe work.

11.3. MSW/SWP Requirements

To comply with this process, Africa Oil Corporation and contractors shall meet the following requirements:

1. Work planning shall include a hazard analysis.
2. Contractors shall use an MSW process consistent with the design and intent of the process. Contractors using their MSW process shall be reviewed through the Contractor HES Management (CHESM) process.
3. All work requires a job safety analysis (JSA) before performing the work. This shall be discussed with workers before starting the job.
4. The Stop Work Authority (SWA) policy shall be used, communicated, and reinforced by local management.
5. Both Africa Oil Corporation employees and contractors shall understand the safe work practices that apply to their work and level of responsibility before performing the work, or be under the direct (and constant) supervision of a supervisor.

11.4. Hazard Analysis

11.4.1. Requirements

A Hazard Analysis (HA) and Job Safety Analysis (JSA) shall be conducted for work performed at Africa Oil Corporation facilities, and the TIF (think incident free) card should be reviewed before beginning any activity.

11.4.2. Planning Phase Hazard Analysis

The Hazard Analysis performed as part of job planning provides a structured approach for identifying potential hazards and developing control measures. This should assure that the proper people, equipment, preparation, and HES processes are identified and acted upon before commencing work. This also provides the opportunity to adjust the work plan to reduce risk.

11.4.3. Job Safety Analysis

The Job Safety Analysis (JSA) is a tool for analyzing a task, specifically in the area of health, environment, and safety. This analysis occurs at the work site immediately before beginning work and involves those individuals that may be affected by the task. The JSA should identify the hazards present at the time the work starts, as well as identify specific mitigation actions necessary to prevent incidents.

11.4.4. Think Incident-Free

Think Incident-Free (TIF) assessments should be used by everyone before beginning any activity. These self-assessments focus on the fact that, in order to achieve incident-free operations, each worker shall take responsibility for his or her own health and safety in all activities, as well as protect the environment. Many tasks have risks associated with them that could potentially result in injuries, environmental impact, and losses. Before these risks can be eliminated or controlled, they shall be identified. TIF enables employees to observe day-to-day operational and procedural systems to identify potential hazards that could threaten the health or safety of our personnel or contract workforce, company facilities, or the environment.

The steps in an effective TIF assessment are:

1. Determine the potential hazards.
2. Determine what can be done to eliminate the hazard.
3. Take action to prevent any negative consequences.

More information at: <http://www.hse.gov.uk/coshh/basics/assessment.htm> &

<http://www.hse.gov.uk/pubns/priced/hsg97.pdf>

11.5. Permit to Work

Personnel assigned responsibilities in the Permit to Work roles shall be trained and competent. The facility shall maintain documentation of authorized permit approvers and area controllers.

When any of the following occur, AOC requires a Permit to Work (Note: Other permits for other tasks not listed may also be required):

- Specialized work permits are initiated (e.g., Hot Work, Confined Space, Isolation of Hazardous Energy, Excavation, SimOps)
- Work or maintenance is performed in a process area that involves breaking into a line, equipment, or vessel that contains actual or potential hazards
- There is a transfer of work and responsibilities from one group to another.
- Communication across more than one area, group, or technical type is required to accomplish the task.
- If the Area Controller determines a permit is required.
- The work has significant potential for injury or incident.
- Erecting or dismantling scaffolding (maybe required for other work at height conditions).
- For any lift that is classified as a “heavy lift”.
- Any time work is necessary within 3m of overhead power lines.

A Hazard Analysis shall be performed when planning the work and a Job Safety Analysis (JSA) shall be performed on site with the work crew before the initiation of work.

Individuals shall not self-issue a permit; that is, the same person cannot act as area controller or permit approver, and work team leader/permit user at the same time.

Identification and preparation of specialized work permits shall be included as required.

Any associated specialized permits shall indicate the Permit to Work permit number.

Permit to Work documentation shall be available at the work site and shall be retained after work is completed. The local HES specialist is required to retain the documents for a minimum of one year. For facilities that are regulated by UK HSE Executive Process Safety Management (PSM) rule, retain the documents for a minimum of three years.

<http://www.hse.gov.uk/pubns/priced/hsg250.pdf>

&

<http://www.hse.gov.uk/safemaintenance/permits.htm>

11.6. Isolation of Hazardous Energy (Lock Out/Tag Out)

The purpose of Isolation of Hazardous Energy (Lock Out/Tag Out) process is to make sure that the isolation of hazardous energy and the opening of equipment are performed in a safe and controlled manner.

11.6.1. Requirements

The requirements for the isolation of hazardous energy (lock out/tag out) are as follows:

Personnel performing isolation of hazardous energy shall be trained and competent in the roles for which they are responsible.

Hazards associated with isolation of hazardous energy shall be identified and mitigated before beginning work.

Positive physical isolation is required for vessel entry and hot work.

Isolation points shall be locked, tagged, and documented on the isolation point checklist.

Equipment involved in isolation of hazardous energy shall meet industry specification standards or applicable regulatory requirements. Each personal lock/tag used for energy control will only identify and be used by a single individual.

11.6.2. Key Points

The key points for the isolation of hazardous energy (IHE) are as follows:

Africa Oil Corporation Operations shall follow the First-On/Last-Off policy for all energy isolation situations.

Each individual performing maintenance or service activity shall install his/her own lock(s) on the isolation device(s) or on a lock box containing the keys to the isolation device's locks.

O&G standardized tags shall be attached with the device locks. All tags shall be dated and signed.

Attachments for tags shall be positive locking with a breaking strength of 25kg.

Lock usage will abide by the following coloured format that determines application:

- Red locks – Personal locks
- Black locks – Lock-box locks
- Blue locks – Operational locks

Locks will be single keyed. The key shall remain in the possession of the person who installed the lock

If a lock box is used for that task or project, the corresponding lock box lock keys will be placed inside the lock box during the maintenance or service activity.

A lock box may be used where one lock is applied to each isolation point requiring a lock, and the key to the locks are placed inside a lock box, to which each worker applies their own lock.

Operational lock (blue lock) process: *Applying an operational lock is not the same as isolation of hazardous energy (LO/TO). Personnel involved in maintenance or servicing the equipment shall still perform the isolation of hazardous energy (LO/TO) process. An operational lock may be used anytime the Africa Oil Corporation representative determines that it is necessary to protect machinery and equipment or the environment.*

More detail provided at these links:

<http://www.hse.gov.uk/chemicals/workshop/safe-isolation-10/importance.pdf>

<http://www.hse.gov.uk/pubns/priced/hsg253.pdf> The Safe Isolation of Plant and Equipment – HS(G) 253

11.7. Simultaneous Operations

Simultaneous operations (SimOps) are defined as performing two or more operations concurrently. Simultaneous operations include but are not limited to:

- Production operations.
- Rig operations (drilling, work-over, and completions).
- Production wire line operations.
- Construction operations.
- Blasting and painting operations.
- Heavy lifts (75% crane capacity) by stationary cranes.

Simultaneous operations shall be documented and controlled via the Permit to Work process and specifically the onsite JSA process.

The key element during simultaneous operations is communication:

- It is imperative that clear and continuous communication be maintained between Africa Oil Corporation and contractor personnel.
- Communications are assured via SimOps discussions during daily shift change meetings and documented by the Daily Simultaneous Operations permit.
- An Africa Oil Corporation representative shall be designated as the person in charge (PIC) before SimOps begin.

11.8. Hot Work

The purpose of the AOC Hot Work program and permit is to protect workers from potential fire hazards and explosions. These procedures apply to all Africa Oil Corporation properties in all areas of responsibility. Key points are as follows:

Consider all practical cold work alternatives before performing hot work.

- Potential hazards associated with isolation of hazardous energy shall be identified and mitigated before beginning work.
- Personnel involved in hot work activities shall be trained and competent in the roles for which they are responsible.
- A qualified gas tester shall conduct gas testing before beginning hot work where there is a potential for flammable gases to be present. The qualified gas tester shall determine the frequency of gas testing based on the potential risk.
- Fire Watch shall be present where open flame hot work is carried out, except in designated safe welding areas. Open flame sources include, but are not limited to, activities such as welding, cutting, brazing, burning, and grit blasting.
- The hot work shall begin within 30 minutes after the qualified gas tester has tested the area and cleared it for hot work to start.
- When the work has been completed according to the job scope, the work team leader shall close out and return the Hot Work permit and permit-related documents to the permit approver after:

- The job site has been left in a safe, clean, and orderly condition
- Adequate time (30 minutes) has elapsed for the Fire Watch to verify the condition of the job site.
- The work that was performed meets the required scope and specifications.
- If work is interrupted by Stop Work Authority (SWA), weather conditions, alarms, or unforeseen dangerous conditions, the Hot Work permit shall be revalidated before work can be restarted.
- Hot work that is carried out in a designated safe hot work area will require a Safe Hot Work Area
- Validation checklist (see Appendix 3) to be completed prior to performing the hot work.
- These requirements are not intended for use with hot tapping. Hot tapping is considered a high-risk activity that requires subject matter expert (SME) input, written procedures, and a high level of management approval before initiating hot tap work.
- Welding is not permitted within 3 m of a wellhead. Welding is also not permitted within 3m of a well bay unless all producing wells at the surface safety valve (SSV) in that well bay have been shut in. Test for lower exposure limits (LEL) near the tubing hanger pins if applicable.
- Welding is not permitted within 3m of a production area unless the affected production area has been shut in.
- When personnel are carrying only non-intrinsically safe devices (e.g., battery operated equipment or occupational hygiene monitoring equipment), these personnel shall also carry a continuously monitoring gas detector. If the gas detector alarm sounds, personnel shall immediately stop work, vacate the area, and inform facility personnel of the alarm. Fire Watch is not required in these situations.
- A Hot Work permit is required for bringing vehicles inside the firewalls of facilities or within 3m of a wellhead.

COSHH essentials for welding, hot work and allied processes:

[WL0 - Advice for managers](#)  [40kb]

[WL1 - Workshop ventilation](#)  [47kb]

[WL2 - Forced ventilation](#)  [83kb]

[WL3 - Fixed extraction: Welding booth or downdraught bench](#)  [78kb]

[WL4 - Moveable extraction: Fume hood on a flexible arm](#)  [61kb]

[WL5 - Respiratory protective equipment \(RPE\)](#)  [49kb]

[WL6 - RPE used with forced ventilation](#)  [50kb]

[WL7 - RPE used with engineering controls](#)  [50kb]

[WL8 - Oxy-gas welding and brazing](#)  [61kb]

[WL9 - Manual metal arc \(MMA\) or stick welding](#)  [83kb]

[WL10 - Metal inert gas \(MIG\) and metal active gas \(MAG\) welding](#)  [83kb]

[WL11 - Tungsten inert gas \(TIG\) welding](#)  [47kb]

[WL12 - Flux-cored arc \(FCA\) and metal-cored arc \(MCA\) welding](#)  [83kb]

[WL13 - Resistance \(spot\) welding: Fixed equipment](#)  [46kb]

[WL14 - Gas and oxy-gas cutting](#)  [61kb]

[WL15 - Arc-plasma cutting: Fixed equipment](#)  [49kb]

[WL16 - Arc-air gouging \(aircarbon arc gouging\)](#)  [55kb]

[WL17 - Soldering: Hand-held with lead-based, rosin-cored solders](#)  [63kb]

[WL18 - Surface preparation: Pressure blasting \(small items\)](#)  [55kb]

[WL19 - Surface preparation: Pressure blasting \(medium-sized items\)](#)  [57kb]

[WL20 - Surface preparation: Pressure blasting \(large items\)](#)  [48kb]

[WL21 - Weld cleaning with pickling paste](#)  [48kb]

[WL22 - Expert advice](#)  [30kb]

11.9. Confined Space Entry

A confined space has the following characteristics:

- Is large enough and configured so that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, excavations, and pits are spaces that may have limited means of entry or exit).
- Is not designed for continuous employee occupancy.
- An excavation deeper than 1.2 m for which access/egress is compromised — that is, workers cannot easily walk into and out of the space because of steeply sloped sides, ladders, etc.

Critical: *Never attempt to enter a confined space, even in an emergency, until help has arrived. Do not try to lift a person out of a hole without help.*

11.9.1. Requirements

Confined space entry requirements are as follows:

- All confined space entries shall be properly permitted following the Africa Oil Corporation Permit to Work and Confined Space Entry standards.
- Consider all viable alternatives to performing an entry, such as the use of mechanical tools to perform tank cleaning from outside the confined space before performing confined space entry.
- A qualified gas tester shall perform gas testing for entry into a confined space.

- A rescue plan shall be in place before any confined space entry.
- Rescue personnel shall be trained and competent and have the ability to perform their responsibilities. Rescue personnel shall be equipped with the appropriate rescue equipment.
- An Entry Watch shall be onsite at all times when personnel are in the confined space. The Entry Watch shall maintain an entry log that includes the name of the entrants and the time(s) they entered and exited the confined space. The Entry Watch may not leave his or her position unless a qualified replacement Entry Watch is in place.
- The confined space shall be secured and any flammable gas sources shall be removed whenever the confined space is left unattended for any period of time.
- A confined space becomes a permit-required entry when it has one or more of the following characteristics:
 - Contains or has a potential to contain a hazardous atmosphere
 - Contains a material that has the potential for engulfing an entrant
 - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
 - Contains any other recognized serious safety or health hazard
- The Confined Space permit shall be used to evaluate and document all confined space entry activities on Africa oil Corporation properties, both non-permit required and permit required.
- The Africa Oil Corporation representative or permit approver is responsible for confirming that appropriate permit conditions are met before commencing work, and will be on site while permit-required entry work is being performed.
- The entry supervisor is responsible to verify that all conditions are met for safe entry.
- The entry supervisor and Africa Oil Corporation representative shall sign and post the Confined Space permit prior to entry.
- Identify, by name or position, those who are authorized to fill the roles of entry supervisors, attendants, and standby personnel.
- Provide for attendants (standby personnel) whose sole responsibility is to monitor the conditions and entrants for the duration of the entry.
- Provide procedures for rescue by authorized personnel.
- Provide procedures for working in spaces with mixed crews to prevent employees of one employer from negatively affecting the safety of employees of another employer. Permit approvers shall terminate the permit upon completion of the work task.

More information at: <http://www.hse.gov.uk/confinedspace/> & <http://www.hse.gov.uk/pubns/indg258.pdf> Confined space regulations 1997
<http://www.hse.gov.uk/confinedspace/legislation.htm>

11.10. Bypassing Critical Protections

Observe the following regarding bypassing critical protections:

- Permanent bypasses, the application of bypasses that change the basis of design as it relates to safety and/or critical protections that are already properly isolated, shall be managed under the Management of Change process and/or the Isolation of Hazardous Energy standard.
- Personnel involved in the authorization, approval, and implementation of bypassing critical protections shall be trained and competent in the roles for which they are responsible.
- Hazards involved with bypassing critical protections for maintenance or testing, planned or unplanned, shall be assessed, and alternative protections shall be identified.
- Only a minimum number of critical protective devices shall be bypassed at a time. There shall be at least one other layer of protection whenever a critical protection is on bypass.
- Critical protection devices that have been bypassed shall be identified by a bypass flag or tag at the bypass or isolation point.
- An individual shall be able to manually provide the same level of protection as the bypassed critical protection(s) in a timely manner in order to prevent an undesirable event. (Leaving the area for breaks, parts, supplies, or tools would compromise effective monitoring.)
- Bypassing, isolating, or removing critical protections during upset/abnormal operating conditions in order to maintain production is strictly forbidden.
- Facility management shall conduct periodic audits and verifications to ensure compliance to this standard.

More information at: <http://www.hse.gov.uk/offshore/loss-of-containment-manual-2012.pdf>

11.11. Excavation and Trenching Safe Work

Observe the following excavation and trenching safe work practices:

- The Excavation permit shall be completed for all excavations and trenches greater than 30.5 cm:
- Exception 1: Excavation permit is not required for any excavation 30.5cm or less using hand tools only.
- Exception 2: Excavation permit is not required for road grading and dressing locations that does not disturb subsoil. This does not include cutting bar ditches or earth removal.
- Excavations deeper than 1.5m require sloping/benching or shoring/bracing before personnel may enter.
- The appropriate communication and notification with landowners will be conducted at least 48 hours before digging is begun (or within the time frame required by law).
- The competent person (Africa Oil Corporation representative) is required to be on site and to oversee the excavation involving persons entering a confined space excavation.
- The competent person shall inspect the excavation before each shift begins and after any changes in the excavation environment.

- If an excavation or trench is greater than 6m deep, a registered professional engineer is required to design the shoring and shielding systems for the excavation or trench in question.
- The Africa Oil Corporation representative is required to evaluate all excavations using the Confined Space standard before personnel may enter the excavation. The evaluation will be completed at least once per shift, or if conditions (such as sloping or shoring systems, weather conditions or potential atmospheric conditions) change.
- Walkways or bridges with guardrails shall be provided anywhere workers cross over a trench.
- Spoil piles should be kept 1 m or more from the trench.
- Emergency action plan shall be developed before any entry into the excavation or trench.
- Ladders, ramps, or other suitable egress shall be provided so that workers are always within 7.6 m of an egress when working in an excavation or trench.
- Do not work above or below a co-worker on sloped or benched excavations.
- Make certain that all necessary PPE, SCBAs, lifelines, and harnesses are used and or available in the event of an emergency if required.

More information can be found at:

<http://www.hse.gov.uk/construction/safetytopics/excavations.htm>

<http://www.hse.gov.uk/construction/lwit/assets/downloads/excavations.pdf>

<http://www.hse.gov.uk/electricity/information/excavations.htm>

11.12. Lifting and Rigging

During lifting and rigging operations, observe the following safe work practices and procedures:

- Hazards associated with lifting and rigging shall be identified and mitigated before beginning work.
- Trained and knowledgeable personnel shall complete (i.e., develop lift plan as required) the steps needed to properly and safely prepare the job site and equipment for the start of work.
- Make sure lifting and rigging equipment is certified for current use and is in good working order based on pre-use inspections.
- Confirm weight of the object and establish the load's centre of gravity before beginning the lift.
- Establish clear pick-up and lay-down areas that are within the crane's load lifting radius.
- Make sure the load path from the beginning of the lift to the lay-down area is clear of obstructions.
- Rig loads appropriately and make sure loads are free of possible restraints (e.g., ice, sea fastenings, hold-down bolts).
- Place load in designated lay-down area and remove rigging equipment after load is securely in place and free of support from the crane.

11.12.1. Lifting and Rigging – Personnel Safety Precautions

Personnel shall observe the following safety precautions when performing lifting and rigging operations:

- Do not exceed the boom and basket load limit specified by the manufacturer.
- Workers shall not be permitted to use or operate any lifting equipment unless they are instructed, trained, and qualified by a competent person in the use and operation of the equipment. Documentation of contractor qualified crane operator qualifications shall be provided upon request as per the contract.
- Keep lifting equipment and work areas free of oil, grease, and trash.
- Do not move the crane or lifting equipment when the boom is elevated in a working position.
- Do not move the crane or lifting equipment when workers are in a basket or on an elevated platform (unless equipment is specifically designed for that use).
- Workers shall wear a full-body harness and an approved lanyard while working from a basket, while ensuring 100% tie-off at all times.
- Lanyards shall be attached to the lifting device, not at the basket.
- Workers shall not sit, stand, or climb on the guardrail of the basket.
- Personnel shall be instructed in safe lifting and hoisting procedures before handling materials or cargo.
- Use the correct cargo handling tools, and regularly check and maintain these tools.
- Watch over the load being lifted until it is set in place and disconnected from the lifting device.
- Do not stand or pass under a suspended load.
- Stand clear of any rope, line, or cable that is under strain.
- Do not place any part of your body between unsecured objects (pinch points).
- Do not put your hands or fingers in the possible path of any heavy machinery or load.
- Use tag lines to guide heavy suspended loads.
- Do not wear loose clothing when near rotating machinery.
- Do not handle rope or cables when wearing finger jewellery.
- Wear gloves when handling and using a tag line. Do not ride on a load being hoisted.

More information can be found at: <http://www.hse.gov.uk/work-equipment-machinery/loler.htm> & <http://www.hse.gov.uk/pubns/indg422.pdf>,
http://www.hse.gov.uk/research/crr_pdf/2002/crr02429.pdf

11.13. Working at Heights (1.8m or higher)

When working at heights 1.8 m or higher, observe the following safe work practices and procedures:

- Exhaust all work-at-grade alternatives before beginning and dismantling work at height.

- Hazards associated with working at height shall be identified and mitigated before beginning work.
- Fall hazards shall be identified and personnel shall be protected by fall prevention or fall protection systems.
- Personnel performing work at height shall be competent in the roles for which they are responsible. Persons working at height shall be trained in the proper use, maintenance, and inspection of the equipment they will be required to use.
- Scaffolding shall be designed, erected, inspected, labelled, and dismantled by competent, trained persons.
- Work-at-height equipment shall be inspected periodically to make sure that it is safe to use.
- Persons wearing fall-arrest systems shall not work alone and shall use 100% tie off.
- Rescue personnel shall be trained, competent, and have the ability to perform their responsibilities. Rescue personnel shall also have the correct rescue equipment at the work location.
- Work should be planned to minimize or eliminate the risks of dropped objects from overhead work. Personnel working overhead shall notify everyone below. Tools and materials shall be handed up or down and never thrown. When it is necessary to hoist tools with a rope, care shall be exercised to make sure that the tools are securely attached to the rope and there is no danger of dropping them. A tool bag or a sack designed for this purpose is recommended for raising or lowering tools.
- Avoid storing tools at elevated heights when tools are not being used.
- Employees working in unprotected areas 1.8 meters or greater above grade or deck level (e.g., a tank, production vessel, or unguarded working platform) shall wear a full-body harness fall-protection device. This applies to all maintenance and construction tasks that are performed above ground level and pose an additional risk.

11.13.1. Fall Protection – Key Points

The key points for fall protection are as follows:

- Working on fixed work platforms and or scaffolding requires proper railings (handrails, mid-rails and toe boards).
- 100% tie-off is required. A double lanyard may be necessary.
- User training in fall protection equipment shall be completed.
- A rescue plan shall be in place before starting the job.
- Workers shall have proper fall protection equipment that is inspected and in good condition.
- Anchorages used for attachment of personal fall-arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 2.26 metric tons per attached employee.
- Follow the general safe work procedures before beginning a job that requires fall protection.
- Fall-arrest equipment is not required when working from fixed platforms with proper railings or within the rails of scaffolding properly constructed under the supervision of a competent person. Climbing or transitioning to scaffolding requires fall protection.

More information on working at height is at:

<http://www.hse.gov.uk/work-at-height/index.htm>

<http://www.hse.gov.uk/pubns/indg401.pdf>

11.13.2. Scaffolding

Unless a scaffold is a basic configuration described in recognised guidance e.g. NASC Technical Guidance TG20 for tube and fitting scaffolds or manufacturers' guidance for system scaffolds, the scaffold should be designed by calculation, by a competent person, to ensure it will have adequate strength and stability.

Use scaffolding when there is no permanent access to an elevated work site and when the work cannot be done safely from a portable ladder, mechanical lift, or workbasket. Requirements for safe work practices and procedures for scaffolding are as follows:

- A Permit to Work is required for erecting and dismantling scaffolding.
- Scaffolding shall be erected, altered, and dismantled only by competent persons or under the supervision of a competent person.
- A tagging and inspection system shall be used for scaffolding (e.g., the Scafftag® system).
- Warning signs and barriers for incomplete scaffolds shall be displayed when erecting or dismantling scaffold and scaffolding shall be effectively isolated from entry.
- Scaffolding should not restrict access to or egress from work areas, escape routes or safety/emergency routes. Alternative measures shall be implemented to avoid restricting access or egress.
- Scaffolding shall be inspected at regular intervals of at least every seven days by a competent person, or following any modification, or as soon as practicable if the scaffold has been subject to overloading, damage, or extreme weather conditions.
- Scaffolds shall be inspected daily and before use by those using the scaffolds.
- Scaffolds shall be securely supported and able to hold required loading.
- Scaffolding shall be installed with fully secured boarding to prevent items from being dropped between floorboards. Platform planks shall be butted together and secured at both ends. Scaffolding shall have properly secured ladder access.
- Working platforms shall be of sufficient width to provide a clear passageway.
- Open sides and ends of working levels that are six feet or more above grade shall be fitted with top rails, mid-rails, and toe-boards with a top railing at 106cm above the platform level.
- Suitable work area barricades are required during the construction of scaffolding.
- When possible, steel or aluminium scaffolding planks shall be used. When wooden planks are used, follow the requirements listed in European Standard BS EN12811-1:2003.

- Scaffolding shall be used only for temporary work platforms. A register of scaffolds and records of inspection, maintenance, hazard analysis, and competencies shall be maintained.

More information can be found at:

<http://www.hse.gov.uk/construction/safetytopics/scaffoldinginfo.htm>

<http://www.hse.gov.uk/scotland/scaffolding.pdf>

<http://www.hse.gov.uk/pubns/heightsafeleaflet.pdf>

11.13.3. Ladders

Requirements for safe work practices and procedures when using ladders are as follows:

- Portable ladders shall be inspected before being used. If the ladder is in an unsafe condition, it shall be tagged for maintenance, removed from service, and reported to your supervisor. Common ladder defects include broken or bent rungs, irregular spacing of rungs, shaky or unstable ladder or legs, cracked or broken members, missing or broken feet.
- Portable ladders shall be set on a firm base and at the correct angle. The ladder base should be out one-quarter distance of the height. Extension ladders shall be equipped with anti-slip safety feet. Ladders should only be used in accordance with manufacturer specification.
- When accessing a higher landing with an extension ladder, the ladder shall extend at least 0.9m above the landing and be tied in place. If an extension ladder is not tied securely in place, it shall be held in place from below by another worker.
- Portable ladders shall be moved into position so that long reaches are unnecessary. Hips and shoulders shall be kept between ladder side rails. When working from a ladder, both feet should be kept on the ladder rungs. If the reach is over an arm's length away, the ladder shall be repositioned. Never climb a ladder higher than the designated highest standing level or never higher than the third rung from the top (second rung from the top on a stepladder).
- Personnel shall face the ladder when ascending or descending.
- While ascending or descending ladders, maintain three points of contact (two hands and one foot or one hand and two feet) at all times. Both hands shall be free to have a firm hold on the rungs. Tools shall be carried in a tool belt or raised and lowered by rope.
- Only one person shall be on a ladder at a time.
- Ladders shall not be used as scaffolding components. Metal ladders shall not be used in any Africa Oil Corporation location because of the risk of electrocution, which may occur when working with electrical equipment.

More information at: <http://www.hse.gov.uk/work-at-height/using-ladders-safely.htm>

<http://www.hse.gov.uk/pubns/indg455.pdf> & <http://www.hse.gov.uk/work-at-height/leaning-ladders.htm> & <http://www.legislation.gov.uk/ukxi/2005/735/contents/made>

11.13.4. Qualified Gas Tester

- Under MSW Safe Work Practices, a qualified gas tester is required for confined space entry work and permit-required hot work. Table 5 represents roles and responsibilities of a qualified gas tester.

Table 5: Roles and responsibilities of a qualified gas tester

Qualified Gas Tester	
Responsibilities	<p>Conduct necessary tests as required in accordance with the SWP Gas Detection. Standard (tests may be required as part of permit process, JSA requirements or from other business needs)</p> <p>Be familiar with the instrument they are using and the instrument handbook.</p> <p>Inspect and zero the instrument before each use.</p> <p>Conduct instrument field calibration checks.</p> <p>Anticipate where gases and vapours may occur and/or accumulate.</p> <p>Enter gas test results on the relevant documentation, including the date and time, and then sign the permit in the gas testing section</p> <p>If required to enter a confined space to conduct gas tests, the qualified gas tester shall also meet all the requirements of an Authorized Entrant</p> <p>Stop the work if unsafe conditions develop.</p> <p>Note: <i>Only qualified gas testers are permitted to conduct gas tests</i></p>
Minimum knowledge requirements	<p>Knowledge of the relevant SWP standards.</p> <p>Gases and vapours.</p> <p>Hazardous substances that may be encountered.</p> <p>Physical properties and hazards associated with flammable and combustible materials they are working with and around, and how best to control them</p> <p>Gas detection principles.</p> <p>Use of and limitations of portable gas testing equipment.</p> <p>Calibration and response testing of portable gas testing equipment.</p> <p>Relevant regulatory requirements.</p> <p>Relevant industry practices/standards.</p> <p>Hazards inherent in hot work and confined space entry.</p> <p>Can state their authority to stop work</p>

12. Electricity

12.1. General Electrical Safety

Requirements for safe work practices and procedures for general electrical safety are as follows:

- Only qualified electricians shall work on or alter electrical circuits, extension cords, tools, or any other type of electrical equipment.
- Isolate electrical energy using isolation of hazardous energy lock out/tag out (LO/TO) before working on any electrical circuit. After LO/TO is complete, test the circuit to make sure that it has been de-energized.
- A Permit to Work and an Isolation of Hazardous Energy (IHE) permit may be required according to those standards. (Single energy source may exempt the IHE permit. Check with your local HES specialist for clarification.)
- Before physically touching electrical equipment (i.e., breaker boxes, motors, panels), a voltage tester should be used to confirm that the equipment is not energized. After confirming that the equipment is not energized, the person should then use the “back of the hand” for their first physical touch.
- Do not touch electrical equipment while standing in water or on metal floors or ladders, or damp concrete. Do not operate electrical equipment when your skin surfaces are damp or when you are wearing wet shoes or damp clothing.
- “CAUTION” signs shall be posted on electrical equipment for voltages 600 volts and below. “DANGER” signs shall be posted on electrical equipment for voltages above 600 volts.
- Explosion-proof electrical equipment shall be installed and used on all offshore production platforms, and in any onshore facility classified as Class I/Division 1, or Class I/Division 2, according to API-RP 500.
- Electrical equipment installed in hazardous (classified) areas shall be labelled by Underwriter’s Laboratory (UL), Canadian Standards Association (CSA), or Factory Mutual (FM) as suitable for the appropriate class, group, and division (usually Class I, Group D, and Division 1 or 2).
- Bridging of fuses or circumventing the normal operation of circuit breakers is prohibited.
- Blown fuses shall not be replaced with fuses having a higher amperage or lower-voltage rating. Only qualified electrical workers shall replace blown fuses. A fuse puller shall be used to remove cartridge fuses.
- Only trained and qualified personnel may work on electrical equipment.
- Electrical repairs or maintenance will be performed on de-energized equipment whenever possible.
- Equipment in an electrical safe work condition is:
 - De-energized/isolated
 - Locked/tagged

- Tried/tested and grounded (if applicable)
- Qualified employee training is required to work on energized electrical equipment:
- An electrician's license is required for contractors to perform electrical work
- An electrician's license is required for Africa Oil Corporation employees to perform electrical work in any Africa Oil Corporation location
- Unqualified persons must maintain a minimum distance of 3m from exposed live parts.
- Minimum PPE requirements for qualified persons include hard hats, electrically approved insulating gloves, safety-toed footwear, safety glasses, face shields, and FRC appropriate for the job.

12.2. Electrical Power Tools

Power tools shall be rated for industrial use and grounded. Personnel using power tools shall make sure that all portable power tools are equipped with a three-wire grounded conductor cord and that the three-pronged plug is used only in a three-prong service outlet. A Hot Work permit is required to use portable power tools in restricted areas.

12.3. Extension Cords

Extension cords are designed and shall be used only for **temporary use**. All other electrical connections shall be made permanent by proper construction methods. All extension cords must be inspected before use. Safeguards for extension cords are as follows:

- Extension cords shall not exceed a combined length of 45m. Where two cords plug together, tape connections with electrical tape.
- Depending on the location and intended use, extension cords shall include a grounding conductor within the cable jacket and shall be equipped at each end with either explosion-proof or non-explosion-proof three-wire, grounded receptacles and plugs (but not with one of each).
- Receptacle outlets on construction sites that are not a part of a permanent building wiring system and that are in use by employees shall have approved ground-fault circuit interrupters (GFCIs) for personnel protection.
- If a cord is damaged, it shall be replaced or shortened by an electrician. Cords shall not be patched with electrical tape.
- Cords shall be protected from contact with oil, other liquids, hot surfaces, and chemicals.
- Cords shall not be hung over nails or sharp edges, shall not contain knots, and shall not be placed where vehicles may run over them or personnel may trip over them.

Before an adapter cord (cheater cord) is used in a restricted area, a Hot Work permit shall be issued. Cheater cords shall be provided with an explosion-proof plug on one end and a three-wire grounding receptacle on the other end. The non-explosion proof receptacle shall be of the locking type, or other means shall be provided so that it cannot be accidentally disconnected. These cords shall be yellow colour, and it is preferred that the plug be metal. They shall be no longer than 0.6 m in length. Always connect the non-explosion-proof connection first and disconnect it last.

12.4. Static Electricity

Requirements for safe work practices and procedures for static electricity are as follows:

- Tanks storing hydrocarbon products shall not be splash filled. A filter screen shall be placed well forward of the outlet to permit any accumulated charge to dissipate before reaching the tank.
- Barges, boats, trucks, and aircraft shall be electrically bonded to the loading or unloading lines before hoses are connected and hatch covers are opened.
- If steam or water is used to clean oil storage tanks and separators, nozzles shall be bonded to the vessel first.
- Sandblasting hoses shall be of the antistatic type or the nozzle shall be electrically bonded to the vessel being blasted.
- Plastic buckets shall not be used. A metal bucket with a metal handle can be used, provided the handle of the bucket does not have a plastic or wood grip.

12.5. Overhead Power Lines

Requirements for safe work practices and procedures for overhead power lines are as follows:

- Assume that all power lines are live until de-energized by a qualified electrician.
- Personnel who operate equipment that could come into contact with overhead power lines shall be trained on potential hazards and precautions.
- All equipment, including crane booms, must clear energized electrical overhead lines by a minimum of 3m. The fall radius of the crane must be considered when determining the clearance required. Cones should be used to mark vertical 3m clearance limits. Crane boom "rotation stops" may be used to maintain the minimum 3m clearance. Crane boom clearance must be checked if the crane is moved.
- A spotter must be present when there is equipment working near an overhead power line. The spotter must have a clear view of the power line and the equipment operator, and be able to immediately inform the operator of any danger.
- All vehicles with loads that extend greater than 4.3 m in height must be escorted on Africa Oil Corporation property and leases.
- If equipment cannot be moved or operated around the tolerances indicated for energized lines, the lines must be de-energized, relocated, or insulated using insulation blankets. This work must be performed by a qualified electrician. If equipment does accidentally contact an overhead power line:
 - Stop equipment immediately.
 - Do not attempt to back off of power lines.
 - Remain in the cab of the vehicle/equipment unless it is on fire or immediate medical attention is necessary.
 - If the operator must abandon the vehicle as a last resort, leap as far away from the vehicle as possible. Do not contact the vehicle and ground at the same time.
 - Remain a minimum of 3.6 m from the vehicle.
 - Immediately notify the facility supervisor or an electrician.

- Do not attempt to clear downed lines from the roadway, equipment, facility, or personnel.

Note: Other work operations, such as gin pole trucks for removing/setting pumping units or logging trucks using a mast, will use the same procedures.

When working within 3m of any power line, de-energize the lines with proper lock out/tag out procedures and ground them with an appropriate electrical authority certifying that they are de-energized.

When spacing does not provide 3m of clearance in the fall radius area based on the height of the equipment plus appendages, the line should be de-energized.

When equipment is being moved, the route must be surveyed in advance: “CAUTION – ENERGIZED OVERHEAD POWER LINE” signs shall be positioned to be physical barriers at all overhead power line crossings to prevent the equipment from passing under the lines until the signs/barriers are removed. Spotters shall remove the signs/barriers and watch for proper clearance when equipment is passing under the power lines.

When equipment is working near power lines, Post “CAUTION – ENERGIZED OVERHEAD POWER LINE” sign and/or physical barriers to warn against potential overhead power line hazards.

Overhead Power-Line Safety – Rigs: Contractors must complete a rig inspection checklist prior to rig up. Visually inspect drilling line, guy wires, emergency derrick escape line (Geronimo line), and mast for clearance to power lines before and during rig up. Establish rig position as far as possible from power lines with fall line/lane parallel to the power line.

13. Drilling and Well Servicing Operations

13.1. Drilling, Completion, Work-over, and Well Service Operations

All Africa Oil Corporation employees and contractors acting as Africa Oil Corporation representatives will be given Well Control training as a part of this competency assurance program. Certain supplier supervisors and support workers who may be involved in well control duties are required to hold certification from an accredited Well Control program e.g. IWCF.

All prescribed training will be delivered by suppliers accredited in the Well Control program. Qualified trainers and training administrators will conduct the courses as specified in the Well Control accreditation process. Africa Oil Corporation employee and contractor crew records and documentation will be readily available and furnished upon request.

Africa Oil Corporation will use one or more of the following assessment tools to verify that all workers can perform their assigned well control duties:

- Informal worker interviews.
- Written assessments.
- Hands-on skill demonstrations.
- Observations during well control drills.
- Verification of rig supervisor certification of well control training.

<http://www.hse.gov.uk/COSHH/industry/offshore.htm> use this link for COSHH.

Each location shall be checked for all underground lines (power lines, gas lines, and injection lines) and flow-lines properly marked where they cross the location. When a mast is rigged up or down, it shall clear all energized power lines by the spacing requirements described in Section 12.5. Do not extend anchor lines or Geronimo lines under or over energized power lines. Vehicles should be located outside the guy wire pattern. If it is necessary to bring a vehicle inside the guy wire pattern of the rig, the vehicle should be carefully monitored while being spotted.

Before rigging up on a well, the onsite person in charge will have the following:

- Defined and documented procedure.
- Well bore diagram

13.2. Safe Practices and Procedures for Working Near Power Lines

Requirements for safe work practices and procedures for working near power lines are as follows:

- Derricks, cranes with their attachments/extended parts or other equipment (including guy lines, safety escape lines, and antennas) shall be operated no closer than 3 m to a power line except when the lines have been de-energized, visibly grounded, and LO/TO procedures have been implemented or if barriers are present to prevent physical contact with the lines. (The 3m ruling is for lines 50 kV or less; power lines with voltages above 50 kV require 3m plus 100mm for each 1 kV over 50 kV). (See Table 6).
- Contractors are responsible for initiating a job-site-specific Think Incident Free form that lists safety PPE requirements and known hazards at work sites.
- A responsible person should be designated to observe equipment clearance and if recommended clearances cannot be maintained, sound a warning to the operator.
- The use of cage-type boom guards, insulating guy lines, insulating links, or proximity warning devices on rigs or guy lines do not alter the requirements.
- Overhead lines should be considered energized (live) unless visibly grounded and either the electric system owner demonstrates them to be non-energized or knowledgeable electrical authorities test and find them to be non-energized.

Table 6: Minimum clearances between power lines and derricks, masts, or guy lines

Rig Status	Line Voltage(Volts)	Minimum Clearance(Feet)
Operating rigs	All	3m plus 100mm for each 10 kV over 50 kV
Transit (lowered mast)	Up to 50 kV	1.2m
Transit (lowered mast)	Above 50 kV	1.2m plus 100mm for each kV over 50 kV

13.2.1. Job Site Safety Requirements for Working Near Power Lines

Job site safety requirements for working near power lines are as follows:

- When working within 3m of any power line, AOC requires that lines be de-energized with proper lock out/tag out procedures and grounded with appropriate electrical authority certifying that they are de-energized.
- Where spacing does not provide 3m of clearance in the fall radius area for the height of the equipment plus appendages de-energize as discussed in the preceding paragraph and assure that work crews are trained in recognizing the extraordinary electrical hazards before starting work.
- Post “CAUTION – ENERGIZED OVERHEAD POWER LINE” sign to warn against potential overhead power line hazards or unsafe practices.
- Conduct tailgate safety meeting on electrical and rig safety. Identify hazardous energy sources and proper lock out/tag out procedures (i.e., electrical, mechanical, hydraulic, pneumatic, chemical, and thermal).
- Establish rig position as far as possible from power lines with fall line/lane parallel to the power line. Vehicles used for communication or transport should be kept out of the fall line and radius.
- Visually inspect drilling line, guy wires, emergency derrick escape line (Geronimo line), and mast for unsafe condition (clearance to power lines) before and during rig up.

- Make sure that contractors have an Emergency Response plan for working around overhead power lines.

Note: Other work operations, such as gin pole trucks for removing/setting pumping units, or logging trucks using a mast, will use the same procedures

13.2.2. Hazard Areas for Rig Operations Near Electric Power Lines

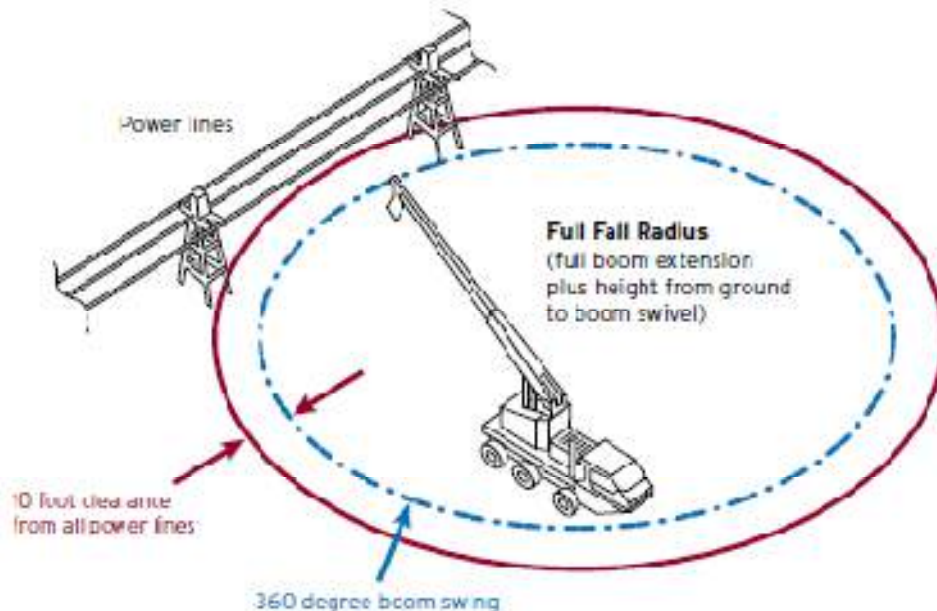
Appendix 4 is provided to clarify requirements for rig operations near electrical power lines. The illustration shown in Figure 1 identifies the areas of concern as follows:

3-meter radius from rig structure and guy lines.

Fall line/lane Height of rig (tallest part, including antennas, etc.) plus 3m

The 3m radius (depending on power line voltage) around power pole guy lines and escape path is not shown in red, but they should be considered “red zones” when working or rigging up/down in such areas.

Figure 1: Power line clearance must include full fall radius



13.3. Rig Equipment Grounding

Rig equipment grounding requirements are as follows:

- All grounding shall comply with the National Electric Code Article 250, unless preempted by other governmental regulations.
- Each generator frame/skid shall be grounded to the earth.
- All electrically equipped buildings or skids shall be grounded to the earth or bonded to equipment that is grounded.

- Ground fault detection systems with visual alarm devices should be installed on all silicon-controlled rectifier (SCR) AC and DC systems.
- All living quarters and lab trailers shall be grounded.
- All electric equipment shall be externally bonded to a grounded or bonded skid including all motor switches.
- During wire line operations, ground lines shall be properly installed and connected to the rig or wellhead.
- Power tools, grinders, and appliances shall be grounded by an equipment-grounding conductor in the cord or cable supplying the tool or device. “Listed” tools and appliances protected by a system of double insulation or its equivalent do not need to be grounded. Power tools shall be properly classified for the area used.
- Trucks transporting hydrocarbons shall be bonded to the tanks being loaded or unloaded at the rig location.

13.4. Derrick Ladders

Hands should be kept free of all encumbrances at all times when climbing, working on, or descending a ladder. Articles that are too large to be carried by personnel should be lifted and lowered by a hand line. Smaller articles should be attached by a hobble or other means to prevent the article from falling. Hook or other types of ladders used in structures should be positively secured to prevent the ladder from being accidentally displaced. Anti-fall devices shall always be used to climb up or down the derrick ladder. The use of a climb assist is recommended but shall not be considered as a personal fall-arrest system.

13.5. Lifting of Personnel With Air Hoist or Hydraulic Winch

Contractors must use well-maintained, UL-approved man-rider air hoist/hydraulic winches in conjunction with certified work-positioning harnesses to achieve primary fall protection during hoisting or lowering of personnel in the derrick. When hoisting or lowering personnel, secondary fall protection is achieved by using self-retracting lifelines or cable-grab systems attached to the derrick.

Hydraulic or air winch lines with proper rating capacity are permissible as a personnel lift device if they meet the following API 154 6.11 standards:

Self-centring that when released, returns to the centre position and has locking/braking capability.

Control lever shall be attended at all times while lifting, stabilizing, or lowering personnel.

Lifting cable will be a minimum of $\frac{3}{8}$ -in. diameter and all hoisting equipment shall have a minimum workload of 1,815lb.

All connections shall meet ANSI standards.

Develop a rescue plan and discuss the plan before any personnel-hoisting operations begin.

Riding an air hoist line or winch line should be avoided. When certain drilling and well servicing operations require riding the hoist, the following procedures shall be followed:

The rider shall wear a full-body harness, with attached seat and attached by positive means (clevis attachment or industry-approved double-locking, inward-opening, snap hook), which allows the rider to be in a sitting position before being raised. A separate secondary means of fall protection shall be attached to the full-body harness back “D” ring.

Cat heads or cat lines shall **not** be used to lift personnel. Only ANSI A 10.22 approved workers’ hoists should be used for lifting personnel. An ANSI-approved personnel workbasket may also be used for lifting personnel. Hand signals and/or a radio for giving directions must be used. Consider the use of a work permit for these operations in conjunction with a risk assessment and JHA.

All cables, hoists, connections, harnesses, and approved safety latches shall be inspected before each use to make sure they are in good repair.

Safety harnesses shall have a safety certification by ANSI or by the manufacturing company that makes the safety harness. This certification shall state that it meets or exceeds the load weight that may be imposed on it.

Riding a hoist line while the line is loaded is prohibited.

Rotating equipment shall not be engaged, or blocks moved, while a person is riding the hoist.

There shall be visual contact between the operator of the hoist and the person riding the hoist at all times.

The operator of the hoist shall remain at the controls at all times while someone is suspended by the hoist.

An easily accessible emergency power isolation control shall be attached to the hoist.

Deviation from the above guidelines must be approved by the appropriate Africa Oil Corporation manager.

13.6. Fall Protection During Rig Moves

Fall protection requirements applicable to rig moves are as follows:

- During rig moves when the permanent rails on the rig floor are removed, temporary railings should be installed. If it is not possible to install temporary railings, a body harness with a lanyard attached shall be worn in the area, attached to a stationary support or a properly strung tie-off cable. The cable should be strung before removing the permanent rails.
- When dismantling the derrick and substructure, fall protection shall be continually used.

13.7. Emergency Drills

All emergency drills including fire, H₂S releases, emergency response, and well control will be conducted regularly by contractor personnel to comply with the contractor’s requirements,

Africa Oil Corporation requirements, and regulatory requirements. Documentation for subject drills will be maintained on location and furnished upon request.

13.8. Training Requirements for Well Service Rigs

The rig supervisor should make sure the rig operator and crew are knowledgeable in the areas of kick detection and shut-in procedures, and proficiency is demonstrated. Drills must be repetitive and frequent enough so that shutting-in the well is automatic when a kick is detected.

Normally, certain warning signals precede a kick. Detection of these early warning signals will help prevent disastrous blowouts. Rig operator/crew knowledge and recognition of these kick indicators should include, but not be limited to:

- Gas/oil/water cutting while circulating.
- Incorrect fill-up volumes on a trip.
- A decrease in pump pressure while circulating.
- Change in string weights.
- An increase in flowline temperature while circulating.

It is extremely critical for contractor well-site personnel to have established guidelines for shutting in and securing the well upon detection of a kick as well as upon suspension of daily operations. Rig operator/crew knowledge should include, but not be limited to, establishing guidelines for shutting in and securing the well.

Some examples of the guidelines requiring knowledge include:

- Establishing minimum length of kill string requirements.
- Ensuring that the correct size safety valve (with handle) for the tubing string is available on the rig floor.
- Installing and operating the safety valve on top of the tubing string.
- Closing the pipe ram preventers.
- Manually locking pipe ram preventers in the closed position.
- Landing the kill string and locking down the tubing hanger.
- Ensuring that all valves on the choke/kill/fill-up lines are in the appropriate open/closed position.
- Blowout prevention equipment (BOPE) testing and maintenance procedures.

Rig operators/crew knowledge should incorporate such fundamental information that may be required to assure familiarity with well conditions. Some of the information that should be incorporated into the well control program includes:

- Well history
- Tubular (and subsurface) details.
- Casing and cementing data.
- Wellhead details.
- Workover fluid program.
- Current mechanical conditions.
- Expected reservoir pressures.

Note: All rig supervisors and rig operators should maintain Well Control certification as well conditions in some situations may require this certification.

13.9. Well Control Drills

Africa Oil Corporation vision of sustained incident-free operations is also predicated on maintaining well control. It is AOC's expectation that contractors will ensure that all personnel will be appropriately trained.

For drilling rig operations, well control drills will be conducted as warranted by the potential loss of control hazards. For example, on some wells, drills will not need to be conducted until after intermediate casing is set, while for other wells, drills may need to start after surface casing is set. Drill frequency shall be sufficient to make certain that crews on each tour understand their responsibilities in a well control situation. Drill documentation shall be maintained on location and furnished upon request.

For well service/work-over rig operations, the crew will be required to complete a minimum of one well control drill per month. More frequent well control drills will be determined by the Africa Oil Corporation representative. Well conditions may dictate the requirement for more frequent well control drills.

13.10. Blowout Prevention Equipment Tests

Blowout prevention equipment (BOPE) is emergency equipment and must be maintained in proper working condition at all times. Blind rams will be placed on the bottom of the manual blowout prevention stack during work-over operations, without exception.

The object of BOPE testing is to eliminate all leaks and to determine that the equipment will perform under threatened blowout conditions. BOP equipment must be pressure and function tested when initially installed. Following installation, function tests shall be conducted at least every seven days. Periodic pressure tests must be conducted at intervals not to exceed 21 days. BOPE test charts and documentation shall be maintained on location and furnished upon request.

Note: Well/reservoir history/conditions and potential well work may require initial pressure testing and more frequent pressure testing of BOPE. These potential situations should be discussed before moving on the well.

13.11. Well Service/Workover Rigs

13.11.1. Process for Conducting Rig Inspections

Each well service rig will be inspected at least once per month using the Africa Oil Corporation Safety Checklist for Workover and Production Rigs (see Appendix 5). However, considerations of the rig and crew performance and scope of the job may dictate that inspections be conducted on a more frequent basis. Workover operations require an inspection immediately upon rigging up on each project and additional inspections as scope or conditions change. Rigs involved in daily routine repair and maintenance operations (rod/tubing/pump jobs) may require more frequent

inspections prompted by performance of the crew and conditions of the rig or location.

Any new rigs hired by Africa Oil Corporation will require a recent (within 30 days) well service company maintenance inspection before entering onto the Africa Oil Corporation property. All gaps must have been properly addressed and documented. The Africa Oil Corporation rig inspection will be initiated before rigging up and completed immediately after rig up.

All critical issues recognized in the inspection will be documented and will require immediate corrective action before continuing the job.

All important component gaps recognized during the inspection will be documented and will require closure within 30 days.

Africa Oil Corporation rig inspections will be conducted cooperatively between Africa Oil Corporation workover representatives/artificial lift/corrosion representatives/operations supervisors and contractor crew chiefs/rig supervisors.

Corrective actions taken during the inspection and/or required to fulfil rig compliance should be documented on the inspection form. If a critical component is corrected during the inspection, the corrective actions taken should be detailed on the form. For all important components, corrective action items, timeframe, and ownership of assignment should be detailed on the form.

The note section of the inspection form provides space for the Africa Oil Corporation representative to list hazards specific to the location. For example, this could include overhead power lines within 23 m of wellhead or the well has an uncovered cellar. The Africa Oil Corporation representative is expected to document these hazards and review documentation prepared by the well service crew on a TIF or Stop form, demonstrating the crew has recognized and discussed these hazards

Non-rig inspections will be handled in a similar manner (see Appendix 6). The inspections will be carried out with cooperation between the fracturing and cementing, the logging and slick line, and the coil tubing crew supervisors and the Africa Oil Corporation representative. Notations, paperwork, and action items will also be handled in a manner similar to that for the well service and workover rig checklist.

13.11.2. Recommendations to Govern Tubing Block Speeds

Africa Oil Corporation provides the following operating guidelines to govern tubing block speeds on well service/workover rigs. These recommendations apply specifically to the tasks of running/pulling tubing, drill collars, or drill pipe in and out of the hole. Africa Oil Corporation's expectation is that any related task be attempted at a reasonable pace to reduce exposure to injury.

The speed of the tubing blocks shall not exceed 122m per minute. To ensure this speed is governed by a mechanical means for the task described as running/pulling

tubing, drill collars, drill pipe in/out of the well bore, one of the following rig set-ups that best meets the needs of the particular operations will be expected:

For rigs running tubing blocks on four lines, the blocks shall be limited to a single fast line.

For rigs running tubing blocks on six lines, the blocks may be set on double or single fast line.

Transmission gear selection will be altered to provide that third and fourth gears are physically locked out, leaving second gear as the desired choice. Once proven, new technology in the form of control devices designed to monitor, alarm, and collect data on rig performance may also provide capability to govern or control the pace of the tubing blocks (i.e., KeyView).

These requirements limit the speed of the blocks to assure a safe operating pace for the activity. The maximum speed the blocks are expected to travel is 400 ft per minute. Other conditions such as weather, loads, condition of the rig or material providing the loads, and the skills and experience of the crew may dictate a much slower pace.

13.11.3. Workover/Well Service Safety and Environment Guidelines

The following is condensed from Africa Oil Corporation Contractor's Handbook, Workover/Well Service Safety and Environment Guidelines and provides guidelines for Workover/Well Servicing operations. A laminated copy of the actual checklist for posting at the rig site is available from the Africa Oil Corporation representative.

13.11.4. Additional Operator/Crew Chief Roles and Responsibilities

In addition to the operator/crew chief key job responsibilities, the crew chief must:

- Conduct one maintenance checklist monthly in addition to routine daily checklists.
- Document corrective maintenance activity performed.
- Maintain a copy of rig maintenance compliance checklist at the rig at all times.
- Maintain a copy of worker training and certification at the rig at all times.
- Maintain and update Job Safety Analysis documentation at the rig at all times.
- Conduct job safety observations through effective use of a BBS/Stop process, Job Safety Observations, and Emergency Response plans. Be recognized as the safety responsible person representing the well service company on location.

13.12. Rotary Drilling Rigs

13.12.1. Process for Conducting Rotary Rig Inspections

Each drilling rig will be inspected at least once per month using the Africa Oil Corporation Safety Checklist for Rotary Drilling Rigs. However, considerations of the rig and crew performance and scope of the job may dictate that inspections be conducted on a more frequent basis. Drilling operations require an inspection

immediately upon rigging up on each project and additional inspections as scope or conditions change.

Any new rigs hired by Africa Oil Corporation will require a recent (within 30 days) drilling contractor maintenance inspection before entering onto the Africa Oil Corporation property. All gaps must have been properly addressed and documented. The Africa Oil Corporation rig inspection will be initiated before rigging up and completed immediately after rig-up before spudding the well.

All critical issues recognized in the inspection will be documented and will require immediate corrective action before continuing the job.

All important component gaps recognized during the inspection will be documented and will be actively tracked to closure within 30 days.

Africa Oil Corporation rig inspections will be conducted cooperatively between Africa Oil Corporation drilling representatives and contractor representatives.

Corrective actions taken during the inspection and/or required to fulfil rig compliance should be documented on the inspection form. If a critical component is corrected during the inspection, the corrective actions taken should be detailed on the form. For all important components, corrective action items, timeframe, and ownership of assignment should be detailed on the form.

13.13. Forklifts

When a forklift is required, the following safety procedures should be followed:

- Only trained personnel shall be allowed to operate a forklift. Training shall be conducted in accordance with 29 CFR 1910.178. Forklift training shall be conducted by certified training personnel. Training shall be documented and kept on file at the location where a forklift is operated. Documentation shall be furnished upon request. The training shall consist of a written test as well as an operational test.
- Unauthorized personnel shall not ride on forklifts. Each forklift should have a "NO RIDERS" sign posted in a visible area on the forklift.
- Forklifts shall have an audible backup alarm.
- When loading/unloading tubulars from trucks, the operator of the forklift shall make sure that all personnel are a safe distance from the forklift and truck. If necessary, a tag line should be used.
- When a forklift is left unattended, forks shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels of the forklift shall be chocked at all times when unattended.
- Before unloading a truck, forklift drivers shall make sure that the truck is properly parked and chocked.
- Seat belts shall be worn when operating a forklift.

13.14. Tubular Handling

All personnel shall be a safe distance from the truck while tubulars are being loaded or unloaded. However, personnel may be within 6 m when tubulars are less than 3 m where a

person is required to be on the float bed (i.e., crew picking up single joints from float). If it is necessary to use a forklift to assist in installing or removing chocks on float beds, the forklift shall be in position and stationary before any personnel may approach the truck.

Appropriate equipment should be required for unloading/loading tubulars on trucks. When more than a single tubular is to be handled, a forklift should be required. The forklift should be capable of reaching across the float of a truck. The loading and unloading of tubulars with a gin pole truck is prohibited. A truck equipped with a winch line should deliver single piece tubular movements (e.g., drilling jars). Chocks should be installed properly, i.e., if the chock requires two nails, two nails should be installed.

For tubular loads, the following requirements are provided:

- All tubular loads bottom layer should be stripped and chocked; 200mmx200mm stripping is preferred whenever possible, 100mmx200mm stripping may be used if 200mm x 200mm stripping is impracticable.
- The top layer of the load should be strapped with a minimum of one strap per 3m.
- The load height should not exceed the height of the headache rack on the truck.
- Improperly loaded trucks will not be allowed to be unloaded on an Africa Oil Corporation location or to leave an existing Africa Oil Corporation location.
- A minimum of two straps should be used on all loose pieces of equipment.

Truck drivers should not work on location without the proper safety equipment, meeting the specifications provided in Section 4, which includes as a minimum:

- Hard hats.
- Safety-toed footwear.
- Safety glasses with side shields.
- Gloves.
- Personal H₂S monitor when continuous monitoring is not available on locations where H₂S may be present

13.15. Pipe Racks

Walking on tubulars or pipe racks shall not be permitted. Pipe shall be chocked immediately after being placed on the rack. When rolling tubulars:

- Push pipe away from the body when possible.
- Place hands in a safe position (on back of pipe).
- Rolling pipe with the feet is prohibited.
- Always watch for pinch points when rolling pipe.
- Do not leave the end of the stripping protruding more than a few inches beyond the racked pipe.

13.16. Winch and Gin Pole Trucks

For winch and gin pole trucks, the following requirements are provided:

- All lines, slings, and bridles should be maintained in good working order.

- Wire rope should not be used if signs of excessive wear, corrosion, or defect are indicated.
- Wire rope should not be secured by tying with knots.
- All wire rope clips or clamps should be installed per OSHA 29 CFR 1926.251.
- Riders shall not be permitted on the exterior of winch or gin pole trucks.
- Protruding ends of strands in splices on slings and bridles should be covered or blunted.
- Tables H-3 through H-14 of 29 CFR 1926.251 should be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications, and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five is maintained.
- Swaged endings – Rotary swaging is the cold flowing or forging of metal fittings around wire rope. The union thus formed between rope and fittings is approximately the catalogue strength of the wire rope.
- When U-bolt wire rope clips are used to form eyes, Table H-20 of 29 CFR 1926.251 shall be used to determine the number and spacing of clips.
- When used for eye splices, the U-bolt shall be applied so that the “U” section is in contact with the dead end of the rope.
- Swampers should be required to stand back a safe distance from a load that is being lifted or tail boarded on a truck or trailer.
- Hydraulic wire rope cutters should be used.

13.17. Blow Down, Choke Manifold, and Return Lines

Secure and hobble all return/blow down lines, and pipe them to a safe place from the wellhead and working areas down wind. Secure or fasten the rotary hose and all other flexible, pressurized hoses with a safety chain.

Choke manifold, vent, and flare lines should be secured by concrete anchors, earth anchors, hobbles with wire rope, chain, or Kevlar®. When possible, limit access to the area using caution or danger tape.

Hobbles with wire rope or chains should be used on the pump discharge lines from reverse circulation pumps.

Whip checks should not be used for lines with pressure exceeding 150 psi.

13.18. Rig Floor Tools

13.18.1. Slips

For slips, the following requirements are provided:

Slips should be properly maintained (lubricated as needed). MPI and NDT test should be carried out monthly.

Slips should be handled by as many people as there are handles. Never work short-handed.

Slips should never be kicked into place.

Broken or worn slips should be replaced.

Dies shall be checked regularly and replaced as necessary with proper keepers installed. Always use original equipment replacement handles.

13.18.2. Tongs

For tongs, the following requirements are provided:

- Tong counterbalance weights should be properly maintained (weight balance and well lubricated) for vertical movement of the tongs.
- Tong counterbalance weights should be completely secured and safety hobbled to prevent from falling.
- The tongs should be snubbed to an anchor post or a derrick leg.
- When tubulars require high torque to make up or break out, personnel working in the area should position themselves clear of the arc of the tongs.
- Latches should always be clean and lubricated.
- Dies should be kept clean and sharp with keepers in place.
- Broken dies should be replaced and correct keepers used.
- Tongs should be latched on the pipe one set at a time.
- A piece of chain or other material should never be used to make the tongs "bite." Always use proper size jaws for the pipe being used.
- When replacing tong dies, a full-face shield should be worn.
- Tongs should never be latched around moving pipe.
- Tongs should be hung in the mast so that they swing away from drill pipe when unlatched. When not in use, tongs should be hooked back in the derrick.

13.18.3. Other Tools

Proper sized drill collar clamps should be used and dies should be kept clean and sharp with proper keepers.

13.18.4. Casing Handling

A safety meeting for casing crews shall be held prior to running casing. The meeting shall include all personnel involved in the casing process. Topics discussed, hazards identified, and attendance at this meeting shall be documented and such documentation shall be furnished to Africa Oil Corporation upon request.

Deformed or damaged tools should not be used. Modified tools should not be used unless approved by the manufacturer.

The following shall apply during the casing process:

- When picking up pipe with an air hoist, the cable shall be attached at the end of the pipe rather than down the pipe.
- The bottom of the V-door shall be free of debris and personnel.
- Equipment, such as pick-up lines, cable hooks, elevators, etc., shall never be modified without consulting the manufacturer.

- Communications shall be maintained between all parties involved in the casing process.
- Stabbing pipe standing on a rig girt shall not be allowed. Pipe shall be stabbed from an adjustable stabbing board located in the derrick. The mounting of a permanent or semi-permanent adjustable stabbing board on the rig should be done whenever possible. The mounting of an adjustable stabbing board is not always possible on small derricks. Short joints of casing may come out of the trough quicker than long joints. The person running the draw works shall pay particular attention so that the casing is not lifted too high.
- Low-pressure centrifugal pumps are recommended during fill-up. Hooking up to high-pressure pumps are not permitted.
- An ANSI-approved full-body harness and fall protection shall be used while on the stabbing board.
- Safety switches shall be installed on tongs to assure that they are not operated unless tongs are closed.
- Hands shall never be placed on the floor pole of the lay-down/pick-up machine.
- A drill collar clamp shall be used for securing the lay-down machine pole in the mouse hole, and a guard shall be provided to cover the clamp and mouse hole.
- The doors on tongs that close the front of the tongs shall have a positive latching mechanism to keep the door shut.
- The hydraulic unit that runs the casing tongs should be placed a minimum of 7.6 m from the well bore.
- Under no circumstances shall anyone be on the catwalk or under the V-door area while the pick up/lay-down bucket is in operation. If lift arms are to be adjusted, the pick-up/lay-down machine shall be shut down completely and proper lock out/tag out procedures shall be used to immobilize equipment. Refer to Section 9.6 of this manual for more information regarding the isolation of hazardous energy (lock out/tag out) process.
- The cement crew will not be allowed on the floor until the casing crew has left the floor. There should be a safe means of lowering thread protectors from the rig floor to the ground. Unsecured thread protectors should not be lowered in the bucket.

13.19. Cementing

Before each cementing operation, contractors and all affected personnel shall hold a safety meeting to review safety policies and procedures. Topics discussed, hazards identified, and attendance at this meeting shall be documented and such documentation shall be furnished to Africa Oil Corporation upon request. No cementing operations shall commence until all safety policies and procedures are understood and proper safety equipment is in place.

During cementing:

- Cement lines shall be laid flat on the ground.

- Chicksans shall be supported by the hoist when tubulars are being reciprocated during cementing operations.
- The cement line that goes from the ground to the floor of the rig shall be chained or supported on the floor.
- If practical, a permanent line shall be considered.
- Cement lines shall be tied off to the bails at the cement head.
- Fall protection procedures shall be followed.
- Appropriate lighting should be maintained between trucks and the location.
- No samples shall be taken from the blenders with the agitator in operation. It is suggested that a sampling line be installed.
- Catch pans should be used to contain any leaking hydraulic fluid, oil, transmission fluid, etc.
- Openings on truck work platforms shall be barricaded.
- Climbing over high-pressure lines, pumps, and blender tanks is prohibited.

13.20. Perforating and Wire Line Operations

- Before any perforating or wire line work is done, proper job planning shall take place to identify appropriate safeguards and to eliminate hazards that may be present.
- The following precautions shall be taken:
- Signs or personnel shall be posted at entrances to the location to notify visitors that explosives are being used.
- All electric detonators should have a minimum of 50 ohms resistance, per API RP 67.
- Before starting work, a meeting shall be held with all rig crews and other personnel on the location to review safety procedures. Topics discussed, hazards identified, and attendance at this meeting shall be documented and such documentation shall be furnished to Africa Oil Corporation upon request.
- All personnel not involved in handling the explosives shall be warned to stay away from the work area.
- Hazards from static electricity that might develop from approaching electrical storms, blowing dust or snow, or other conditions should be evaluated and proper precautions taken.
- Wire line shall be isolated from the firing panel until shot/gun reaches a minimum depth of 61 m. The shot/gun shall be locked out and shorted out above 61m feet when removing from the well bore.

13.21. Coiled Tubing Unit

Coiled tubing units shall not be rigged up until the Africa Oil Corporation representative has approved the well preparations.

Workers on coiled tubing operations shall keep in contact with the Africa Oil Corporation representative concerning safety precautions and shall follow Africa Oil Corporation's recommended safe practices.

No deviations shall be made from these recommended practices without the Africa Oil Corporation representative's prior approval. The Africa Oil Corporation

representative shall be consulted when any changes of surface pressures, circulating rates, pipe weights, or pipe drag occur.

13.22. Snubbing Unit/High Pressure Coil Tubing

Preparing for a snubbing operation shall begin with thorough up-front planning between Africa Oil Corporation and the contractors. A pre-job safety meeting shall be held with all personnel on location and the Africa Oil Corporation representative to review assignments, job procedures, and objectives.

Items that may be considered during the pre-job safety meeting include:

- Emergency response
- Equipment inspections and layout
- BOP equipment
- Producing operations
- H₂S contingency plan
- Communications.
- Hazardous materials.
- Hot work procedures.
- Confined space.
- Fire prevention.
- Medical services.
- Operational hazards.

Choke manifold vent and flare lines should be secured by one of the following methods:

- Concrete anchors.
- Earth anchors.
- Hobbles with wire rope, chain, or Kevlar®

When possible, limit access to the area using caution or danger tape.

Remote flare line igniters shall be provided for all 5,000 psi and higher pressure gas well drilling locations, all H₂S locations, and any other locations where the venting of gas is likely to be a necessity.

Derrick escape lines (Geronimo lines) shall be installed as specified by the manufacturer.

14. Alcohol and Drugs

All Africa Oil Corporation and contractor employees shall report to work “fit for duty” and not be under the influence of alcohol or any illegal drug that might affect job performance. For alcohol, “fit for duty” is defined as blood alcohol content (BAC) of less than 0.04%. Any persons not meeting this requirement are prohibited from entering AOC premises, engaging in AOC business, or operating on AOC premises.

Any Africa Oil Corporation or contractor employee who is using a legal drug that might affect job performance shall notify his or her supervisor immediately upon reporting to work. Any such drugs must be kept in the container in which they were originally dispensed.

The use or possession of illegal or unauthorized drugs or drug paraphernalia is prohibited at all AOC locations, and on all company and chartered vehicles, aircraft, and boats.

The use of alcohol is prohibited during working hours at all AOC locations. Local management shall establish policies controlling the use of alcohol outside working hours at each location.

Any transportation shall not be operated by anyone under the influence of alcohol.

Africa Oil Corporation retains the right to conduct workplace searches and screening, without prior announcement, to help enforce this policy. Local management should establish procedures for conducting “for cause” searches and testing in situations such as serious accidents to determine whether drugs or alcohol might have contributed to the cause of the accident.

Contractors shall keep records documenting their compliance with the requirements of the Drug, Alcohol, and Search policy, described in the contract documents, for at least 24 months. Africa Oil Corporation shall have the right to audit and reasonably access such records. Africa Oil Corporation shall not have access to a person’s controlled substance or alcohol test results where applicable law prohibits such access.

Upon request, contractors shall provide Africa Oil Corporation with a report detailing their compliance with the requirements of the Drug, Alcohol, and Search policy. The report should state the number of:

- Pre-work tests performed.
- Other tests performed.
- Positive test results.
- Persons who declined to be tested.
- Persons removed from work under the service agreement.

The cut-off levels for a contractor’s drug testing program should be no greater than those recommended by the UK Department of Transportation (DOT).

Violators of this Drug and Alcohol policy are subject to disciplinary action, up to and including termination.

15. Explosives and Firearms

AOC prohibits the **unauthorized** use, possession, transportation, or sale of explosives, unauthorized flammable materials, firearms, ammunition or other weapons by personnel on AOC premises, engaged in AOC business, or operating AOC equipment.

Contractors who are required to use explosives in their work activities shall provide AOC with written notification regarding the proposed use, storage, and handling of such explosives, and shall ensure that their personnel are properly qualified for the type of work being done.

Explosive materials shall be properly identified and stored in a safe, secure, and environmentally sound location. They shall be transported in acceptable containers or magazines and shall be transported separately from detonating devices. All potentially explosive materials shall be manifested before shipment.

Material safety data sheets (MSDS) shall be maintained for all explosives, and all explosives use shall be consistent with the guidelines and specifications contained in such MSDS.

Africa Oil Corporation reserves the right to conduct random searches at AOC locations to verify compliance with these requirements.

16. Traffic Safety

16.1. Motor Vehicle Operation

Africa Oil Corporation and contractor employees who operate any vehicles must adhere to the following requirements while on Africa Oil Corporation property:

Hold and have on their person, a valid driver's license for the class of vehicle being operated. Africa Oil Corporation may require a site-specific driving permit for Africa Oil Corporation locations. Drivers must immediately notify their supervisor if their driver's license has been suspended or revoked.

Drive within posted speed limits or at lesser speeds as dictated by road and weather conditions. Drivers who do not follow safe driving rules or who drive without due care and attention will be subject to disciplinary action. Careless or reckless driving will not be tolerated.

Where possible, park vehicles so that the first move is forward upon leaving an area. A spotter should be used when it is necessary to back in busy locations, tight locations, rig locations, or inside guy wires. The driver must maintain eye contact with the spotter at all times while backing.

Any form of cellular phone use by the driver of a motor vehicle is strictly prohibited while the vehicle is in motion. This includes receiving incoming calls. Cell phones may be left on while driving to alert drivers of an incoming call, however, calls should not be answered. Drivers should stop their vehicle in a safe location well off the road and away from traffic to retrieve messages and return calls.

Note: Africa Oil Corporation employees on company business are strictly prohibited from using personal electronic devices (PED), such as a cellular phone, while operating a motor vehicle. Passengers in the vehicle should exercise good judgment and avoid distracting the driver

Distractions such as hand-held radios, computers, and paper work are also prohibited by the driver of the vehicle in motion.

Make sure that all passengers wear seat belts at all times in vehicles that are equipped with them. Africa Oil Corporation employees operating motor vehicles shall visually verify seatbelts are secured before putting the vehicle in motion.

Picking up hitchhikers along roadways can create a hazard for your personal safety, as well as other vehicles and pedestrians; therefore, this act is strongly discouraged. Assisting a stranded motorist is allowed, but care is required when stopping your vehicle to make sure that you can safely pull off the road and safely exit your vehicle before helping.

All motor vehicle accidents must be reported immediately.

17. Aircraft Safety

17.1. General

Pilots are responsible for the safety of aircraft and are in charge of the aircraft and passengers at all times. Passenger safety procedures and precautions are as follows:

- Wait at the designated staging area.
- Follow ground crew, flight crew, and pilot instructions at all times.
- Approach within full view of the pilot.
- Store baggage in baggage compartments and other approved areas. Baggage is not allowed in the passenger cabin of helicopters.
- Do not smoke in or around aircraft.
- Report any apparent unusual internal or external conditions to the pilot (e.g., oil or grease leaks, doors that fail to lock, loose covers or straps, etc.).
- Fasten seat belts when boarding aircraft. Leave your seat belt fastened during takeoff, in flight, and during landing. Do not change seats while in flight. Do not unbuckle seat belts, take off lifejackets, or remove ear protection until the pilot signals that it is clear to do so.
- Observe the locations of emergency exits, fire extinguishers, life rafts, and first-aid kits. Pay attention to the pilot's emergency briefing.

17.2. Helicopter Safety

Helicopter safety procedures and precautions are as follows:

- No passengers will fly in helicopters until they have received a pre-flight safety briefing.
- The wearing of flip-flops, sandals, and similar open-toed footwear are not permitted onboard company helicopters. Only closed-toed shoes are acceptable.
- Personnel should not approach helicopters in operation unless accompanied by trained aviation personnel.
- Wait in designated areas for helicopter transportation.
- Maintain eye contact with the pilot when approaching a helicopter. Passengers shall approach or leave an operating helicopter only after receiving a signal from the pilot or helicopter landing officer.
- Always approach a helicopter from the side, never from the back. Never go farther behind the helicopter than is necessary to remove cargo from the baggage compartment. Stay away from the tail rotor (see Appendix 7).

- Always approach a helicopter from an area that has the same or lower grade elevation as the landing area. Personnel on offshore platforms shall remain on the next lower level until the helicopter has landed on the helideck and reduced power to idle. Personnel shall not wait for the helicopter on the stairs leading to the helideck.
- Crouch slightly when standing under the helicopter blades. Never put your hands or other objects above your head because some helicopters have a very low profile, which creates a lower clearance between the main rotor blade and the ground in front of the aircraft. Hold long objects, such as pipes and poles, in a horizontal position to avoid striking the helicopter rotor blade.
- Before approaching a helicopter, remove and safely stow lightweight (cloth) caps and hats. Before approaching and departing the helicopter, secure loose and lightweight articles such as hard hats, jackets, and rags to prevent them from being drawn into the rotor blades or engine inlets.
- Before entering the helicopter, don hearing protection provided.
- Upon entering the helicopter, fasten your seat belt, follow the pilot's instructions, and remain seated with seat belt fastened at all times.
- When boarding or leaving a helicopter, be careful not to step on the inflatable pontoons or their inflation tubing.

17.3. Transportation of Hazardous Materials

Advise the aviation supervisor 24 hours in advance before releasing any hazardous material such as explosives, flammables, paints, compressed gases, and radioactive substances, for transportation by air. Make sure that all hazardous materials shipments conform to International Air Transporters Association (IATA) requirements regarding identification, hazard classification, proper shipping name, packaging, marking, labelling, and manifesting. Materials not conforming to this procedure will be returned to the shipper.

17.4. Helideck Safety

Helidecks are not designed or intended for material storage. Materials should be moved off helidecks as soon as it is safe to do so.

Helidecks on larger facilities are equipped with more than one means of egress. The primary exit is marked with a broad black line to direct transit passengers to it. Passengers shall exit the helideck by means of the primary exit unless otherwise instructed in an emergency.

17.5. Emergency Water Landings

Inflatable personal flotation devices (PFD) are provided on all helicopters. Helicopter passengers shall wear securely fastened PFDs at all times.

In Alaska, immersion suits are an additional requirement because of cold water.

In the event of a forced landing in the water, the pilot will be in charge of directing all personnel. No passenger should depart the helicopter until the pilot has given the order, unless the pilot is incapacitated. Departing from the helicopter should be as quick and orderly as possible. The inflatable life jackets should not be inflated until clear of the helicopter. Each person should be aware of fellow passengers and be ready to help.

17.6. Fixed-Wing Aircraft Safety

Passenger safety procedures and precautions are as follows:

- Stay clear of the propeller or jet engines and follow the instructions of the pilot, crew, or trained aviation staff at all times.
- Passengers shall not approach any operating aircraft without being accompanied by trained aviation personnel. Passengers shall board or deplane only upon a signal from the pilot or flight crew.
- Watch footing and use hand holds on aircraft when boarding and deplaning.
- PFDs are located under each seat or in the pouch on the back of the seat. Aircraft personnel will advise you when these PFDs are needed.

18. Water Safety

18.1. Personal Flotation Devices

18.1.1. Selecting personal buoyancy equipment

When selecting the correct personal buoyancy equipment, you will need to consider a number of factors such as frequency of use, size/weight of the wearer, ability to swim, protective clothing in case of foul weather, use of tool belts or other loads, likely weather/water conditions at site and availability of help. Combined British and European Standards (BS ENs) exist for buoyancy equipment. Each Standard is intended to be suitable for different activities in various risk situations. Buoyancy equipment needs to be selected from the appropriate Standard, taking into account the factors already mentioned.

18.1.2. Lifejacket standards for work over water

- BS EN 393:1994 Lifejackets and personal buoyancy aids: Buoyancy aids: 50 N. These have a buoyancy of no less than 50 Newtons for the average adult and are intended for use in sheltered waters when help is close at hand and the user is a swimmer; and in circumstances where more bulky or buoyant devices would impair the user's activity or actually endanger them.
- BS EN 395:1994 Lifejackets and personal buoyancy aids: Lifejackets: 100 N. These have a buoyancy of no less than 100 Newtons for the average adult and are intended for relatively sheltered waters when normal clothing is being worn and the wearers remain capable of helping themselves.
- BS EN 396:1994 Lifejackets and personal buoyancy aids: Lifejackets: 150 N. These have a buoyancy of no less than 150 Newtons for the average adult and are intended for use in tidal waters or when foul weather clothing is being used; and where the wearers may not be capable of helping themselves due to injury or exhaustion (or where there may be a delay in rescue).
- BS EN 399:1994 Lifejackets and personal buoyancy aids: Lifejackets: 275 N. These have a buoyancy of no less than 275 Newtons for the average adult and are intended for use in tidal waters in extreme conditions, when heavy protective clothing is being worn or loads such as tool belts are being carried; and where the wearers may not be capable of helping themselves due to injury or exhaustion (or where there may be a delay in rescue).
- BS EN 394:1994 Lifejackets and personal buoyancy aids: Additional items. This standard deals with the emergency lights, safety harnesses, protective covers etc. When deciding on the design of buoyancy equipment to be used, you need to consider whether to provide extra items.

The final decision on the design and level of buoyancy needed depends on the results of a suitable risk assessment and should only be made after discussion with the supplier/manufacturer on the intended use.

Note: Where the Maritime and Coastguard Agency (MCA) is the enforcing authority for an operation, all relevant life saving appliances (including lifejackets) should meet their standards.

Accidental drowning can usually be linked to one or more of the following factors:

- failure to provide personal buoyancy equipment;
- failure of buoyancy equipment to operate correctly;
- disregard or misjudgement of a hazard;
- lack of supervision, especially of the young;
- inability to cope once a problem arises;
- the absence of rescuers and rescue equipment;
- failure to take account of weather forecasts.

Falling unexpectedly, fully clothed into cold water, and trying to swim or co-operate with rescuers, is often extremely difficult. Even strong swimmers may experience problems.

- PFD shall be worn according to the manufacturer's recommendations.
- PFD shall be securely and properly fastened and in good condition when in use.
- Boat captains shall refuse to allow persons not adhering to the PFD rules to board their vessels.
- All supervisors or designated persons in charge shall be responsible for having personnel under their supervision adhere to the rules governing the wearing of PFD.

18.2. Lifejackets for abandonment from an offshore installation

18.2.1. Introduction

Knowledge of required lifejacket performance has improved during the last few years. This information identifies the various features of abandonment lifejackets, which should normally be provided for offshore installations, in addition to those lifejacket features provided for compliance with SOLAS. Duty holders should review their lifejacket assessments in accordance with this guidance.

This sheet applies specifically to lifejackets to be used for abandonment from an offshore installation. It does not apply to lifejackets used for other purposes, such as for helicopter travel or for overside working.

18.2.2. Background

In emergency conditions, the course of events is not fully predictable and a single system to enable persons to leave an offshore installation could fail. The Offshore Installations (Prevention of Fire, Explosion and Emergency Response) Regulations (PFEER)^[1] recognise this by requiring the provision of three complementary systems on an offshore installation:

- (i) arrangements for evacuation,
- (ii) means of escape in case arrangements for evacuation fail, and
- (iii) arrangements for recovery and rescue of persons. Provision of suitable lifejackets is a key element of each of these systems.

The features of abandonment lifejackets should take account of the severe weather conditions which may be encountered in the North Sea, that typical North Sea performance standards allow up to two hours for recovery of a person from the sea, and that persons will be wearing immersion suits.

To comply with PFEER, dutyholders carry out an assessment to determine the types, numbers and locations of personal survival equipment to be provided on the installation. In the past, this has usually resulted in the selection of SOLAS approved auto-inflating lifejackets, although in many cases with additional features such as spray hoods, and crotch or thigh straps.

Knowledge of required lifejacket performance has improved as follows:

- Those designing or buying immersion-protective equipment need to ensure that their chosen combination of immersion suit and lifejacket performs as an integrated survival system^[2].
- The British/European standard for personal flotation devices, BS EN ISO 12402-2 2006, indicates that a 275 Newton lifejacket is likely to be necessary to right an unconscious person wearing an immersion suit. (However this passive self righting ability will also depend on the immersion suit type and on the lifejacket design, so that a lesser buoyancy may still be sufficient in some circumstances).
- Published information indicates that a lifejacket spray hood should be provided if a person is to be given the best chance of survival in rough seas. This provides protection of the airways from water splash.
- Published information about fatal accidents, for example about the loss of the Ouzo^[4], highlights the importance of crotch straps or thigh straps or equivalent solution to ensure the lifejacket stays in place and does not rise up during use.
- Like any other equipment, a lifejacket auto-inflating system or buoyancy chamber can fail^[5]. However, commercial lifejackets are now available which are intended to significantly reduce the vulnerability of the lifejacket to a single component failure. These lifejackets have a duplicated auto-inflation system and a second buoyancy chamber, or are a hybrid which combines auto-inflation with some inherent lifejacket buoyancy.
- Inherently buoyant lifejackets impose a significant limitation on the height from which a wearer can safely jump or fall into the water. The upward force on an inherently buoyant lifejacket can be considerable, and may be transmitted to the user's head and neck. In any event, all types of lifejacket and survival suit are normally only tested to 4.5 metre jump height. Emergency plans should not rely on persons jumping into the sea from above this height.
- Because they are bulky, inherently buoyant lifejackets may compromise the correct securing of persons in a lifeboat, especially in a freefall lifeboat. Inherently buoyant lifejackets may also contribute to difficulties in ensuring adequate space for persons in a freefall or davit lifeboat.
- In addition to compliance with SOLAS requirements, selected lifejackets are now likely to comply with the European standard for personal flotation devices (EN ISO 12402). This standard defines various required features of lifejackets, but it covers many differing types of lifejackets for a wide variety of uses. As per EN ISO 12402-10

Section 4.4, a suitable lifejacket must be selected depending on an evaluation of the risks to which the user is likely to be exposed. Note also that this standard does not define every lifejacket feature which may be appropriate, such as provision of a suitable light, or provision of a buddy line.

18.2.3. Required features of abandonment lifejackets

Lifejackets for abandonment from offshore installations should normally have the following features, in addition to any other features selected as a result of the dutyholder's assessment which has been conducted for compliance with PFEER.

1. Lifejacket design should be such that, when worn over the installation immersion suit, the lifejacket will ensure adequate airway protection.

The features required to ensure adequate airway protection are:

- a. Lifejacket chamber configuration/buoyancy such as to ensure the righting of an unconscious person wearing the installation immersion suit.
- b. Neck support and buoyancy such as to ensure sufficient mouth-to-water distance (120 mm) for an unconscious person wearing the installation immersion suit.
- c. A suitable spray hood which is easy to deploy with cold or gloved hands, designed to sit away from the face, and which limits the opportunity for the build up of CO₂ from exhaled breath.
- d. A suitable lifejacket securing system (such as crotch or thigh straps) which prevents the lifejacket rising up.

Features (a) and (b) depend on the lifejacket/suit compatibility, and provision of these features will need to be demonstrated. HSE has previously issued guidance on how compatibility tests may be carried out ^[6], although test details may need to be modified to suit the dutyholder's circumstances. The testing assumes increased importance if the lifejacket provides less than 275 Newton buoyancy.

It will also be necessary to check that (a) and (b) are achieved when the abandonment lifejacket is worn with the helicopter transit suit, if this transit suit is to be used during abandonment to sea.

Note: SOLAS requires feature (a) to apply to a lifejacket worn over ordinary clothing, but fails to take account of reduced lifejacket performance which may arise when wearing an immersion suit.

2. Auto-inflating abandonment lifejackets should have a twin buoyancy system to ensure adequate reliability. This should normally involve twin buoyancy chambers, twin gas bottles each providing 100% of the required buoyancy, and twin water activation heads. Note that although SOLAS requires lifejackets to have twin chambers, a SOLAS compliant design does not necessarily provide the other features.

3. If the lifejackets include inherent buoyancy, the dutyholder will have to show that this will not prevent the correct securing of persons in the offshore installation lifeboats.
4. Other lifejacket features should be considered and included depending on the dutyholder's assessment. Various features are defined by SOLAS, and by BS EN ISO 12402. Further features for consideration include a buddy line; and a light which can withstand a jump into water from 4.5 metre, which comes on automatically on contact with water, and which can be relocated by the wearer to an optimum position. Also account should be taken of whether the lifejacket may be worn while using an escape chute.

18.2.4 Action required

Dutyholders should review their lifejacket assessments to check they are providing lifejackets with sufficient performance.

Dutyholders will need to be able to justify any lifejacket provisions which do not have the features listed in the section above.

References

The Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 Regulation 5 "Assessment"; and the associated Approved Code of Practice, paragraph 56, L65 Second edition HSE Books 1997 ISBN 0 7176 1386 0

Essentials of Sea Survival Golden F, Tipton M. Human Kinetics Press 2002 ISBN 0736002154.

Link: [Buoyancy Aids and Lifejackets](#) RYA website.

18.3. Boat Transportation

Alaska operations transport personnel by boat when weather conditions have shut down helicopter operations for a number of hours.

Safe operation of a charter vessel is the exclusive duty of the captain of the vessel. The captain has the authority to refuse passage to anyone who does not follow instructions and obey the rules, including:

- Following the captain and crew's instructions concerning seating arrangements, loading procedure, storage of luggage and cargo, and smoking restrictions. If you are unfamiliar with the safety features of the boat, inform the boat captain or a crew member so that you can be briefed appropriately.
- Personnel shall advise the boat captain before transporting any hazardous material (including, but not limited to explosives, flammables and compressed gases, and radioactive substances). The boat captain shall accept for transportation only hazardous materials that have been properly identified, classified, named, packaged, marked, labelled, and manifested.
- Always wear a securely and properly fastened PFD when boarding or off-loading from the boat, unless the boat is parked at a dock and you are protected by handrails. The boat captain shall refuse to allow persons not adhering to the PFD

rules to board a vessel. Boats are equipped with at least one PFD (Type I) for each person aboard. The boat crew is familiar with the location of these PFDs.

- Man overboard: If a person falls into the water, immediately inform the boat captain by shouting “man overboard!” Assist in the rescue as directed by the boat captain.

18.3. Direct Transfer To/From a Passenger Boat

Before boarding a passenger boat, hand over any parcels, materials, or tools to the deck hand. Put on a PFD if required.

After boarding the passenger boat, proceed inside the cabin and find a seat. Passengers must remain seated while the boat is in motion.

Before disembarking, hand over any parcels, materials, or tools to the deck hand before climbing the ladder. After disembarking, take off the PFD and give it to the deck hand. Do not throw it on the bow of the boat.

18.4. Transfers From Boat to Boat

Transferring personnel from one supply boat to another in open water is not allowed except in an emergency. Even then, it should only be done after all other means of transfer have been evaluated and the safety of the transfer is considered.

18.5. Personnel Baskets

Safety procedures for the proper use of personnel baskets are as follows:

- Personnel baskets shall be provided with a tag line. The end of the tag line shall be whipped to prevent it from unravelling.
- Only luggage and small, hand-carried items shall be placed inside the personnel basket.
- Personnel shall never stand under a personnel basket.
- Do not exceed the capacity of personnel baskets. The maximum number of riders may be reduced at the discretion of the facility supervisor or crane operator, depending on weather and sea conditions.
- Personnel shall wear PFD when using personnel baskets over water.
- Personnel shall stand on the outside rim of the personnel basket and securely grasp the upright basket ropes using a double arm lock grip. Keep knees slightly bent and be prepared for unexpected moves, particularly in rough seas.
- Personnel using Frog™ transfer capsules sit rather than stand in the device.

18.6. Material Transfers

Transfers of material to and from boats should be conducted in accordance with U.K. Coast Guard, MMS, and other applicable regulations. If there is heavy or bulky material, use the crane.

18.7. Life Floats and Life Rings

Each offshore platform is equipped with escape capsules.

Each offshore platform shall have at least two life rings installed on each deck. Each life ring shall be equipped with a marker light. The condition of life rings shall be checked monthly. Damaged or weathered life rings shall be promptly replaced.

For normal daily operations, life floats and life rings are not required on well jackets because of the low risk compared to the high maintenance costs of the floats and rings.

19. Waste Management

19.1. General Waste-Handling Guidelines

Africa Oil Corporation operates under the following waste-handling hierarchy guidelines:

- Reduce the amount of waste at the source by only ordering the amount of chemicals or other materials needed to do a job.
- Return to the vendor unused portions of the chemicals or materials.
- Reuse a material if it is not too contaminated for continued use.
- Recycle or regenerate wastes for continued use.
- Dispose of waste. This must be done with waste disposers or recyclers that meet Africa Oil Corporation “Acceptable for Use” standards.

When dealing with waste, it is important to identify the material and use it as intended or find an alternate user. If the material cannot be used, keep it segregated and obtain guidance from an Africa Oil Corporation representative on how to identify and dispose of it. Waste transported from locations must be accompanied with the proper paperwork and have the correct markings. Guidance for handling, storing, documenting, and disposing of waste can be found in the local Africa Oil Corporation office’s Waste Management plan.

19.2. Contractor Waste Management Requirements

Waste generated by contractors (such as paint waste from painting the contractor’s equipment or used motor oil resulting from an oil change in the contractor’s equipment) is the contractor’s responsibility to handle, document, and dispose of in accordance with all applicable government regulations.

Each contractor is required to report to Africa Oil Corporation’s, on a quarterly basis, the following data as it occurs while performing services on Africa Oil Corporation property:

- Identify any hazardous waste as defined by requirements of the U.K. Environmental Protection Agency (EPA) or applicable government agency
- Report quantity of hazardous waste in tons generated by month.
- Location where hazardous waste was shipped for treatment or disposal.
- Description of waste minimization or waste management improvement efforts and successes.
- Identification of how the weight of hazardous waste was determined

19.3. Waste Categories

19.3.1. Hazardous Waste

This is a waste that is ignitable, corrosive, reactive, toxic, or is a specific hazardous waste as defined by the Environmental Protection Agency (EPA) Control of substances hazardous to health (COSHH) regulations, or applicable government requirements. In delegated areas, refer to applicable laws and regulations). When

transported, hazardous waste must be accompanied by a Uniform Hazardous Waste Manifest. Identification and management from the generating point is especially critical for hazardous waste. There are time limits on how long hazardous waste can be kept at the point of generation before it is properly disposed.

19.3.2. Exploration and Production Waste

The drilling and production of oil and gas wells generate these waste streams. This type of waste is specifically exempted from EPA hazardous waste regulations if it is handled and disposed under Subtitle D of RCRA (non-hazardous) regulations.

19.3.3. Other Waste

Examples of solid wastes are:

- Commercial solid waste.
- Construction/demolition debris.
- Industrial solid waste.
- Residential solid waste.
- Waste in any physical form (including liquids).
- Garbage/Trash.

19.3.4. Other Regulated Waste

Requirements in addition to RCRA or analogous state provisions must also be considered when handling or disposing of certain types of waste. Examples of waste included in this category are:

- Asbestos.

NORM PCB waste – Regulated under the COSHH

19.4. Pollution Prevention

Africa Oil Corporation expects and requires contractors and their subcontractors, in connection with their operations, to be responsible for pollution prevention. Furthermore, Africa Oil Corporation expects contractors and their subcontractors to comply with all local, and national laws, rules, and regulations relative to and concerned with spill prevention and pollution control. Accordingly, certain general instructions are set out hereinafter, and are specifically intended to be used only as an aid to contractors and their subcontractors in carrying out their responsibilities and are not intended to nor do they cover every situation that might arise:

If contractors and/or their subcontractors encounter or foresee a potential pollution hazard or spill event occurring during an operation, immediate steps must be taken to eliminate the hazard and/or minimize the effect. The responsible Africa Oil Corporation representatives must be notified of the event.

Africa Oil Corporation expects contractors and their subcontractors to maintain their immediate work areas free of all harmful spillage, discharge, or other pollutants.

Africa Oil Corporation will furnish the status and other necessary information on wells, systems, or pressure vessels, where appropriate, at the beginning of or during a particular operation.

If work involves pressure, the wells or system may be bled down before service work is initiated. Flowlines may be displaced with water where practicable to prevent pollution. Performance of these activities should be coordinated with the responsible Africa Oil Corporation representative.

Drip pans or equivalent containment devices should be positioned to catch oil that may have to be drained or allowed to run out of lines or equipment to allow work to progress. Additionally, appropriate plugs must be in place.

In the performance of all work, contractors and their subcontractors must perform the same in accordance with the best technical procedures and in a professional manner, and shall obey and comply with all applicable local, state, and national laws, rules, and regulations.

Appendix 1. SSE Exception Worksheet

Contractor Short-Service Employee Form

Contractors must complete and submit this form to the AOC location representative prior to working on location. The Africa Oil Corporation location representative (Operations Supervisor, Drilling Rep, Workover Rep, etc.) must acknowledge individual Short Service Employee (SSE) worker before the worker arrives on location or in order to be removed from SSE status. For purposes of submitting this form, "Contractor Management" is a contractor manager or supervisor at least one level above crew level.

Contractor Co. Name: _____ Request Date: _____

SSE Name: _____

Date of Employment: _____ Years Oil Field Exp.: _____

Current Job Title: _____

Experience in Present Position: _____ Years _____ Months

Employment Record: (Last 3 years – Please explain gaps between employment)

Previous Employer(s) Start Date Departure Date

Previous Employer(s)	Start Date	Departure Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

1. Is this worker trained to safely perform this job? Yes No

2. Is this worker in compliance with your Substance Abuse program? Yes No

3. Has SSE reviewed AOC's and Contractor's HES Policy? Yes No

With Whom? _____

4. Who has been assigned as the SSE worker mentor? _____

5. List all of the training you provided for List Previous special training: the SSE worker:

Contractor's Management: _____ Date: _____

AOC Location Representative (Operations Supervisor, Drilling Rep, Workover Rep, etc.)

Removal from SSE program:

_____ Date: _____

Contractor's Management: _____ Date: _____

AOC Location Representative (Operations Supervisor, Drilling Rep, Workover Rep, etc.)

Justification for early removal from SSE program: _____

Contractor Crew SSE Exception Worksheet

Submit completed form to the AOC location representative (Operations Supervisor, Drilling Representative, Workover Representative, Facilities Representative, etc). The AOC location representative must approve exceptions to the SSE crew complement before arrival on location. For purposes of submitting this form, "Contractor Management" is a contractor manager or supervisor at least one level above crew level.

SSE workers will be identified by SSE decals and hard hat (colour) _____

Crew Members	Job Title (Describe if Needed)	SSE Yes/No	Remarks
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	

Contractors Plan to Mitigate Risk

Contractor's Management: _____ Date: _____

SSE Crew Complement Requirements

For crews with 9 persons or less: For crews with 10 persons or more:

Single-person crew cannot be a SSE < 20% of crew complement SSE

2 to 9-person crews, no more than 1 SSE permitted

Based on the above plan, an exception to the above requirements for SSE workers is approved.

Location Representative (Field Supervisor, Drilling Supervisor, Based on the above plan, an exception for more than 50% SSE workers is approved.

VP Ops or Drilling Mgr

Appendix 2. Required Eye Protection

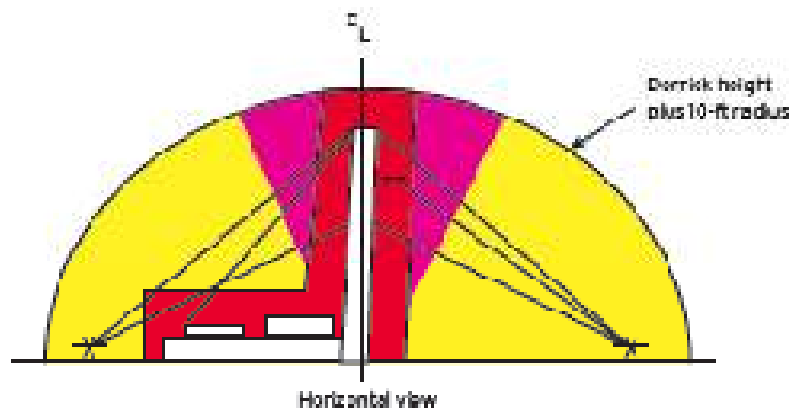
Type of work	Possible danger to eyes	Eye Protection Needed
Acetylene - burning, cutting, or welding	Sparks, harmful rays, molten metal, flying particles	Welding goggles; Erector-type tinted lenses, or Coverspec-type tinted lenses, or tinted plate lenses
Bleeding down a pressure line or vessel	Flying particles	Goggles; Flexible fitting - regular ventilation
Changing a choke	Flying particles	Goggles; Flexible fitting - regular ventilation
Chemical handling	Chemical splash, acid/alkali burns, mists, fumes, and vapors	Follow MSDS guidance. Splash-proof goggles; Flexible fitting - hooded ventilation. For severe hazard, add a face shield ¹
Chipping	Flying particles	Goggles; Flexible fitting - regular ventilation
Curling wire	Flying particles	Goggles; Flexible fitting - regular ventilation
Electric (Arc) welding	Sparks, intense UV rays, molten metal, fumes	AWS-approved welding helmet and spectacles; Erector-type side shields - tinted lenses
Fire Watch (welding)	Flying particles	Goggles; Flexible fitting - regular ventilation
Firefighting	Falling debris, water streams	Face shield ¹
Grinding	Flying particles	Goggles; Flexible fitting - regular ventilation and face shield ¹
Hammering	Flying particles	Goggles; Flexible fitting - regular ventilation
Laboratory	Chemical splash, acid/alkali burns, glass breakage	Splash proof goggles; Flexible fitting - hooded ventilation
Machining	Flying particles	Goggles; Flexible fitting - regular ventilation
Sandblasting	Flying particles	Masking hood and spectacles - erector-type side shields
Spray Painting	Mists, vapors	Goggles; Flexible fitting - regular ventilation
Wire brushing	Flying particles	Goggles; Flexible fitting - regular ventilation

¹ Face shields alone do not provide adequate protection.

Appendix 3. Safe Hot Work Area Validation Checklist

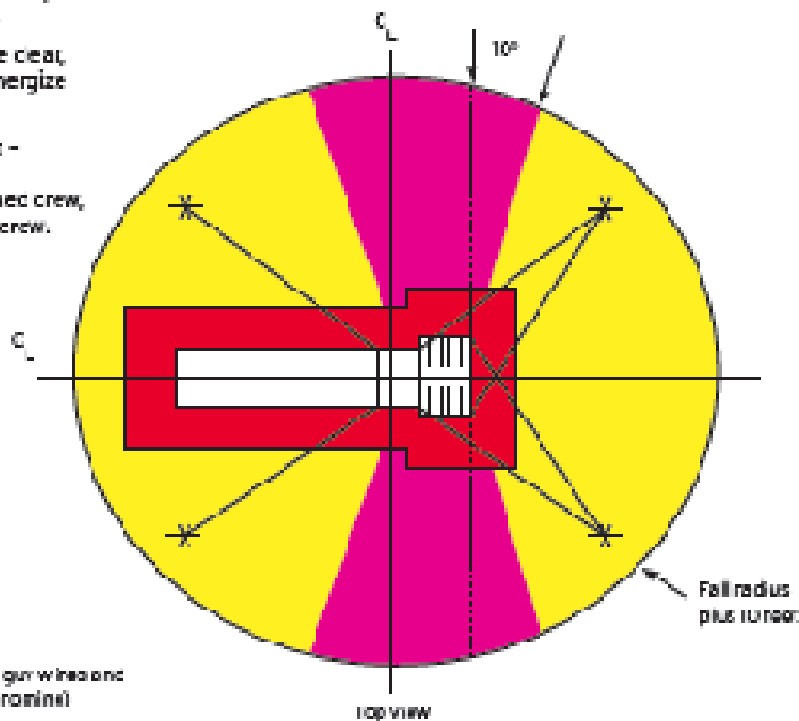
Safe Hot Work Area Validation Checklist			
Date: _____ Facility: _____ Job Site Location: _____ _____	Work Description: _____ _____ _____		
Safe Hot Work Area - Valid From: _____	Valid time not to exceed 12 months		
Start Date: _____ End Date: _____			
	Items/Conditions that must be examined prior to declaring a site a Safe Hot Work Area.	Note: If any item/Condition has received a No answer, the area cannot be designated as a Safe Hot Work Area.	
Checklist		YES	NO
	Has the area been assessed and has it been determined that the area does not contain uncontrolled flammable material nor is there a possibility that flammable material would be present during hot work?		
	Is the area free of combustible or flammable material within 35 feet of the area?		
	Is the area free of potential sources of flammable vapors within 50 feet of the area (onshore)?		
	Is the area free of potential sources of flammable vapors within 35 feet of the area (offshore)?		
	Is the area free of flammable atmospheres?		
	Have Simultaneous Operations which might impact the Safe Hot Work Area been considered?		
Additional Precautions: _____ _____ _____			
Pre-Job	A comprehensive Job Safety Analysis must be conducted prior to commencing any work in a Safe Hot Work Area. If conditions in this area change, STOP WORK IMMEDIATELY and contact Chevron Management indicated below.		
Signature/Authorization	The location where this Safe Hot Work Area is to be located has been examined and all necessary precautions taken.		
	HSE Representative: P: In Name: _____ Signature: _____		
	Chevron Management: P: In Name: _____ Signature: _____		
	Note: Hot Work carried out in this designated Safe Hot Work Area does not require a Hot Work Permit, except when hot work is being performed on equipment that may have contained a flammable gas or liquid.		

Appendix 4. Hazard Areas for Rig Operations near Electrical power-lines



Legend

- * 10-ft area - Must de-energize power lines in this area.
- ** Fall line/line - Leave clear, reposition unit, or de-energize power lines.
- Fall radius plus 10 feet - If energized lines exist, de-energize or use trained crew, or give/get training for crew.



- * 10 ft radius required around guy wires and emergency escape path (Geromine)
- ** If lines must be left energized, use trained crew and/or get training for crew that includes precautions to abate this hazard.

Appendix 5. Workover & Production Rigs Checklist

Workover and Production Checklist

✓	Discussed and confirmed by contractor before starting work at Africa Oil Corporation location
	Entrance to location and rig floor signs present to advise visitors and contractor employees of reporting procedures, “No Smoking,” and personal protective equipment requirements
	Job-site-specific Think Incident Free (TIF) form discussed and posted at location
	Employees trained for the jobs they will perform
	Contractor holding regularly scheduled safety meetings
	Daily TIF safety meetings being held for all personnel on location including Africa Oil Corporation representatives
	Accident and spill reporting plans in place
	Accident and spill discussions being held among crews
	Hazard communication program in place and personnel trained
	Material safety data sheets updated and in place for products on location
	Emergency response plans in place and personnel trained (fire, severe weather, well control, and spill containment)
	Spill prevention, control, and countermeasure plan in place on location and personnel trained (if required)
	Emergency response and blow-out prevention (BOP) drills held weekly and documented in tour book
	Confined space program in place, personnel trained, and discussions held
	Lock out/tag out program in place, personnel trained, and discussions held
	Hot work permitting program in place, personnel trained, and discussions held
	H ₂ S contingency plan in place, personnel trained, discussions held, and equipment available
	Each crew has trained personnel in CPR/First Aid
	Africa Oil Corporation’s contractor safety program handbooks have been given to operator and tool pushers
	All personal protective equipment available for job
	Rig inspection done prior to spud for new contractor (if required)
	All electrical equipment and camp housing grounded
	Contractors’ short service employee program in place, and employees identified and assigned a mentor
	Location of adequate size and construction
	Sufficient fire extinguishers on hand at location and inspected
	Company vehicle safety equipment available and maintained
	Derrick and Hoisting Equipment
	Four ground to crown guy wires and two tubing board guy wires available
	Minimum of 3m clearance from guy wires and fall lane of derrick to overhead power lines
	Documentation of API inspection (as per API Spec. 8B, Category III) for all elevators, bails, and other hoisting equipment by a competent person within the last year available
	Documentation of API inspection (as per API Spec. 4G) for derrick and carrier by a competent person within the last two years available

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	Cutting and slipping of drill line documented
	Drilling line inspected at location in accordance with the Association of Energy Services Companies (AESCC) recommended safe procedures and guidelines for oil and gas well servicing
	Geronimo unit installed
	Derrick ladder straight and secure
	Derrick climber that provides 100% fall protection installed
	Ram stabilizer and locking dogs engaged
	Swab line free of kinks and frays
	Safety chains/lines on all tubing board fingers present
	Complete railings on tubing board and rod basket present
	Air hoist anchored with guard, line installation present
	Elevators sized and manufactured for tubing in use
	Rod transfers and cable installed with clevis
	Weight indicator installed and calibrated prior to heavy lifting or extended stuck-pipe/fishing job
	Mast specification plate present and legible
Carrier and Rig Floor	
	Hand rails present on all stairs with more than four steps. Guard rails also behind driller and on floor when higher than four feet
	Walkways level, clear of obstruction, and free of grease and oil
	Rig shifted from road to winch position
	Rig foundation, spotting, and guyed to manufacturer's specifications
	Belly jacks installation, derrick pins installed with keepers
	Back up cable installed on tongs, door guard used, stiff arm installed with bolts nut, and retainer clip available
	Tubing, rod tongs, and slips rated for job and condition
	Stops exist on both ends of pipe racks
	Spare hydraulic hoses and fittings on location
	Switches, panels, and disconnects marked
	Electrical wires are not exposed to possible damage
Circulating Equipment	
	All pump lines, nipples, and Kelly hoses certified by contractor to be rated at 3,000 psi working pressure (<i>Note: If higher pressure is required, indicate in remarks</i>)
	Shear relief valve installed and fitted with shear pin
	Spare swabs, liners, rods, and valves readily available
	Tank walkways installed with handrails and steps. Walkway(s) have non-skid tread surface
	All manual valves have hand wheels with keepers installed
	Piping to wellhead and tubing secured at least twice per joint
	Manifold installed to circulate in either direction without breaking lines
	Safety clamps/chains on circulating tubing hose
	Open-ended flowlines secure
	Full opening safety valve on floor fitted for tubing sizes in use
	Pumps, tanks, and other auxiliary equipment exhausts positioned crosswind or upwind and away from the wellhead
	Exhaust systems insulated and with spark arrestors
	Kill switches installed on the rig, pump, and light plant
	Blow Out Preventer (BOP) Equipment
	Controls are operable, handy, and clearly marked
	Hand wheels installed

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	BOPs inspected and tested on a regular basis
	Locking devices operable and used when the well is shut in
	Rig hydraulic system meets minimum required volume and closing pressure for BOPs in use
	Remote closing unit volume, pressures, fluid level, and nitrogen backup
	Rams close in 15 seconds
	Sign or other device used when BOPs are closed
	Well control pre-recorded sheet present (if applicable)
Personal Protective Equipment	
	Confirmed by contractor
	Employee clothing in compliance
	Hard hats worn by all personnel
	Safety steel-toed shoes worn by all personnel
	Hearing protection available and worn by all employees
	Safety glasses/face shields available and worn by all employees when necessary
	Extra full-body harnesses available and used when necessary
	100% fall protection available and used
	Drinking water and disposable cups on hand
	Respirators available and used when necessary
	In all circumstances, new and existing permanent anchors must be pull tested to a minimum of 16,000 lb (See API Spec. 4G)
	Anchors tested and tagged within the 24 months prior to work. Testing companies' documentation available and anchor tagged
	Buried/surface lines identified, marked, and protected
	Down-hole rental equipment delivered with inspection documents
	Radioactive materials handled and maintained in accordance with state and federal laws. Affected employees trained in the proper handling of radioactive material and the use of protective equipment used when handling radioactive material.

Appendix 6. Non-Rig Checklist

General Safety

Discussed and confirmed by contractor before starting work at Africa Oil Corporation location:

- Entrance to location and rig floor signs present to advise visitors and contractor employees of reporting procedures, “No Smoking,” and personal protective equipment requirements
- Job-site-specific Think Incident Free (TIF) form discussed and posted at location
- Employees trained for the jobs they will perform
- Contractor holding regularly scheduled safety meetings
- Daily TIF safety meetings being held for all personnel on location including Africa Oil Corporation representatives
- Accident and spill reporting plans in place
- Accident and spill discussions being held among crews
- Incident recurrence prevention measures in place
- Hazard Communication program in place and personnel trained
- Material safety data sheets updated and in place for products on location
- Emergency response plans in place and personnel trained (fire, severe weather, well control, and spill containment)
- Emergency response and blow-out prevention (BOP) drills held weekly and documented in tour book
- Spill prevention, control, and countermeasure plan in place on location and personnel trained (if required)
- Confined Space program in place, personnel trained, and discussion held
- Lock out/tag out program in place, personnel trained, and discussion held
- Hot work permitting program in place, personnel trained, and discussion held
- H₂S contingency plan in place, personnel trained, discussions held, and equipment available
- Each crew has a trained personnel in CPR/First Aid
- Africa Oil Corporation’s contractor safety program handbooks have been given to drillers and tool pushers
- All personal protective equipment available for job
- Africa Oil Corporation inspection done prior to job for new contractor (if required)
- Oil leak cleanup and disposal plans in place
- Sufficient fire extinguishers on hand at location and inspected
- All electrical equipment and camp housing grounded
- Location of adequate size and construction
- Contractors’ short service employee program in place, and employees identified and assigned a mentor
- Company vehicle safety equipment available and maintained

Fracturing and Cementing

- Fire extinguishers on location, with current inspection tag visible.
- Pump lines, nipples, and unions certified by contractor to be rated for anticipated working pressure.
- Walkway on tanks with handrails and steps. Walkway(s) and stair(s) made of non-skid material.
- Valve(s) condition, and certified by contractor to be of adequate pressure rating.
- Piping to and from wellhead anchored down.
- Relief valve (pop-off) with shear pin installed, relief line anchored, and condition communicated to all personnel on location
- Anticipated pressures discussed before beginning work
- All open-ended flowlines secured
- Pop-off relief valves and rupture disc certified by contractor to be of proper size and rating and in good condition
- Safety valve(s) installed on wellhead ahead of flowback manifold and certified by contractor to be tested and pressure rated for the job

Logging/Slick Line Operations

- Fire extinguishers on hand at location, one at each truck and one near wellhead with current inspection tags
- Size of sheaves and load ratings in compliance for wire being used.
- Braided wire rope inspected on location in accordance with the AESC Recommended Safe Procedures and Guidelines for Oil and Gas Well Servicing
- Weight indicator installed and calibrated.
- Cutting of slick and electric wire line documented and a program for monitoring line wear is in effect
- Documentation available per 8B, Category III, for hoisting equipment within the last year
- Walkways clean, level, clear of obstruction, free of grease and oil.
- Hand rails present on all walkways and stairs with more than four steps.
- Spare hydraulic hoses and fittings on location.
- Switches, panels, and disconnects marked.
- Logging truck, wiring, receptacles, and components confirmed by contractor to be grounded.
- Locking devices for wire line BOPs and crane operable, and confirmed by contractor to be used when the well is shut in for the night
- Explosives stored, handled, clearly marked, and communicated to all personnel on location
- Safety signs posted: “Explosives in Use,” “Turn Off Radios & Telephones”.
- Grease injectors and low-pressure lubricators certified by contractor to be of proper pressure ratings and tested

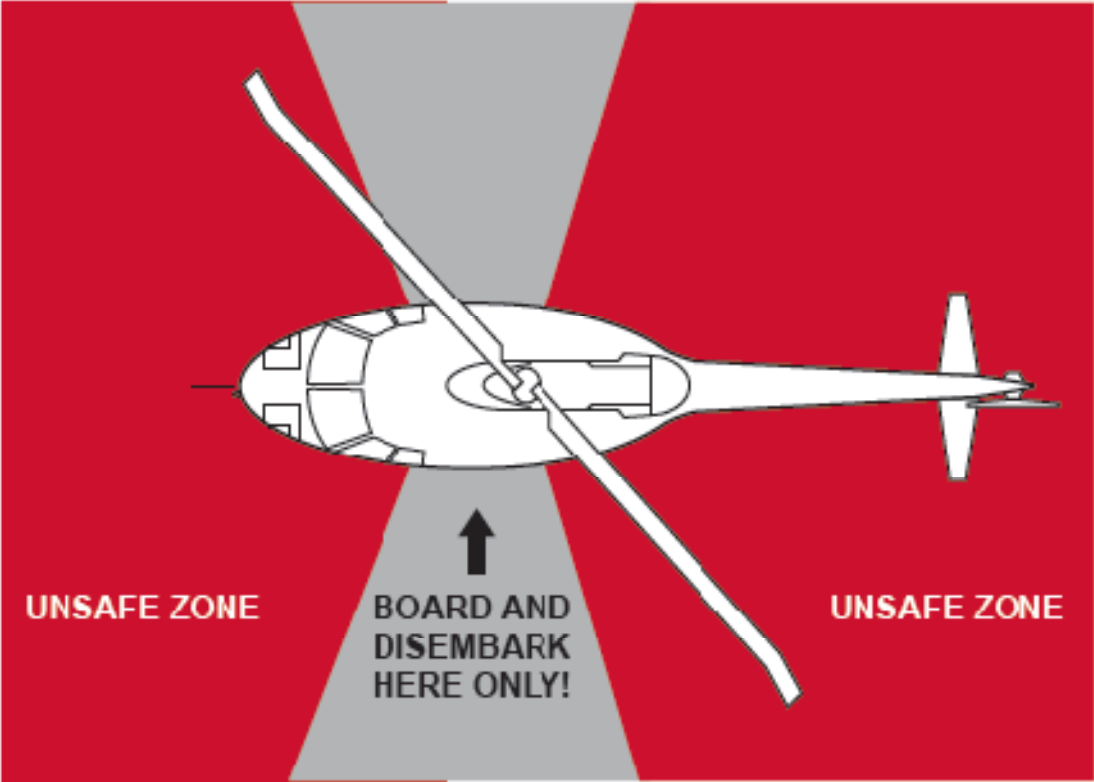
Coil Tubing Operations

- Fire extinguishers on hand at location with current inspection tags.
- All coil tubing and crane controls operable, handy, and clearly marked.
- Documented inspection per 8B, Category III, of all hoisting equipment within the last year available.
- Documented crane inspection (as per manufacturer's recommendation) within the last year available.
- Hand rails present on all stairs with more than four steps. Guard rails also behind driller and on floor when higher than four feet.
- Weight indicator installed and calibrated.
- Walkways clean, level, clear of obstruction, free of grease and oil.
- Spare hydraulic hoses and fittings on location.
- Electrical wires free from damage and protected from abrasion and trampling.
- Wiring, receptacles, and components confirmed by contractor to be grounded.
- BOPs certified by contractor to be inspected and tested prior to job.
- Hydraulic system certified by contractor to meet minimum required closing pressure for BOPs in use.
- All rams can be closed in 15 seconds.
- Anticipated pressures discussed with personnel before starting work.
- Nitrogen (N₂) unit set up as far as practical upwind from the wellhead. Communication of personal danger(s) with N₂ liquids when cooling down or releasing pressure.
- Relief valve (pop off), used on casing during pump operations, set tested, and communicated to all personnel
- All piping and unions certified by contractor to be rated at 5,000 psi working pressure.
Note: If higher pressure is required, indicate in remarks
- All lines secured.
- All valves certified by contractor to be of adequate pressure rating.
- Personal Protective Equipment
- Hard hats and safety shoes worn by all personnel.
- Employee clothing in compliance.
- Extra full body harnesses available and used when necessary.
- Hearing protection available and worn by all employees.
- Eye and face protection available and worn by employees.
- Respirators available and worn by employees as necessary.
- Drinking water on hand with disposable cups.

AOC Representatives

- Company policy sign posted ("No drugs, guns, right to search, etc.") at entrance of field.
- H₂S sign, equipment, and training of all hands assured when applicable

Appendix 7. Acceptable Approach to Helicopters



Appendix 8. Personal Flotation Device (PFD) Requirements

Activity	Type I Life Preserver	Type V Work Vest
When transferring to or from any watercraft.		✓
When transferring to or from a platform with a personnel basket.		✓
When working on over-water locations that do not provide handrail protection on all sides. When crossing from a work barge to an offshore platform on a temporary gangway.	✓	✓
When below the cellar deck of an offshore structure. Work areas completely enclosed by handrail protection are exempt.		✓
When outside the cabin or wheelhouse of a watercraft, including barges.		✓
When riding in an open or semi-open watercraft.	✓	✓
When fire drills or emergency drills are being conducted.	✓	
When traveling in helicopters over open water.	✓	
Any other time deemed necessary by the boat captain, supervisor, pusher, or pilot (e.g., in fog, haze, rough seas)	✓	✓

Note: For Alaska personnel, immersion suits are an additional requirement when travelling offshore.

Appendix 9. Emergency Contact Information

9.1 For worker to complete after discussion with Supervisor

In case of emergency contact the following number: _____

Contact your supervisor on this number: _____

My Muster Location is at: _____

My HSE Specialist is : _____

HSE Specialist contact: _____

Other emergency numbers: _____

Training Completed:

General Orientation date: _____

Site Specific Orientation date: _____

SSE Orientation date: _____