

Schedule of onshore petroleum exploration and production requirements 2017

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PART I - INTRODUCTORY

101 Applicability of the Direction Implementing this Schedule

Notwithstanding anything to the contrary in this Schedule, the direction implementing this Schedule applies only to or in relation to acts, omissions, matters, circumstances or things touching, concerning, arising out of or connected with the exploration or exploitation of the soil and subsoil for petroleum.

102 Exemptions

- (1) Where the Minister is satisfied that:
- (a) compliance with a requirement of this Schedule in a particular case is unnecessary, impracticable or undesirable; and
 - (b) alternative action that is at least as safe will be taken and that in the particular circumstances it is appropriate,
- the Minister may exempt any person or class of persons from the duty to comply with the particular requirement subject to such conditions as the Minister thinks applicable.
- (2) Where:
- (a) a person contravenes or fails to comply with a condition of an exemption; or
 - (b) the Minister is satisfied that the circumstances under which an exemption was granted have altered,
- the Minister may revoke the exemption (either as it applies to a particular person, or generally) in writing at any time.

103 Independent Validation and Verification

The construction, alteration or reconstruction of drilling and production equipment, wells, safety systems and emergency facilities shall not be undertaken without approval and, where required by the Minister, validation and or verification by an independent validator.

104 Definitions

In this Schedule, unless inconsistent with the context or subject matter:

- **the Act**, means the Northern Territory *Petroleum Act, 1984*, as amended, or the *Petroleum (Prospecting and Mining) Act* as the context requires
- **API**, means a code, bulletin, recommended practice, specification, or standard published by the American Petroleum Institute or equivalent international standard accepted by the Minister
- **approval** or **approved**, means the approval of or approved by the Minister
- **ASEG-GDF**, means Australian Society of Exploration Geophysicists General Data Format

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- **appraisal well**, means a well drilled principally to define more accurately the extent or nature of a previously discovered oil or gas accumulation
- **Australian Standard (or AS)**, means a standard published by the Standards Association of Australia
- **basic data**, includes all data acquired in the field or laboratory including physical and chemical measurements conducted as part of the analysis of fluid or core and cutting samples
- **blooey line**, in relation to air or gas drilling, means a system of pipes arranged to carry away from the drilling rig any air or gas that has returned to the surface
- **blowout preventer**, means a device attached immediately above the casing, which can be closed to shut in the well
- **circulation**, means the passing of fluid down the drill pipe, casing or tubing in a well and back up to the surface, or the passing of fluid in the reverse direction
- **completion**, means a flowpath in a well that allows the production of fluids from a discrete formation interval through the well, or the injection of fluids into a discrete formation interval through the well, and includes the necessary sub-surface equipment independent of other flowpaths in the well
- **conductor casing string**, means a pipe installed to cover unconsolidated surface formations, and which may provide a means for return of drilling fluid from the well before the surface casing is installed
- **contractor**, means a person engaged to perform work for an Operator under contract (not being a contract of employment)
- **cubic metre**, in relation to gas or liquid, means the amount of gas or liquid in a cubic metre of space at standard conditions of 101.325 kilopascals absolute pressure (14.7 psia) and 15 °C (60 °F) temperature
- **depth**, is true vertical depth unless otherwise indicated
- **development well**, means a well that is drilled within the expected limits or boundaries of a petroleum accumulation and that is drilled principally to produce, or to facilitate the production of, the petroleum reserves from that accumulation
- **diverter**, means device attached to the wellhead to close the vertical flow path and direct well flow away from the drillfloor and drilling rig
- **drilling rig**, means the equipment used in connection with rotary or other drilling, including a workover or well service rig, but does not include a seismic shot hole drilling rig
- **drilling operations**, means the making of wells by means of rotary or other drilling
- **enhanced recovery**, means increasing the recovery of petroleum from a reservoir so that it produces a quantity greater than the quantity that would have been achieved by the action of natural reservoir energy on the naturally occurring reservoir fluids, but does not include fracture stimulation, localised wash treatments, or artificial lift
- **exploration well**, means a new field wildcat well drilled with a view to discovering a new oil or gas accumulation, or to obtaining stratigraphic information that may assist in the discovery of a new oil or gas accumulation
- **fluid**, in relation to production, means petroleum or a mixture of petroleum and water

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- **gas oil ratio**, means the ratio of total gas (expressed in standard cubic metres) to clean oil (expressed in standard cubic metres) produced during a stated period
- **geophysical survey/surveying**, means geophysical investigation by any generally recognized method including seismic, gravimetric, magnetic, electrical, geochemical, or radioactive methods, but excludes operations conducted wholly or partly within a well
- **independent validator**, in relation to a validation or verification, means a person who has the necessary competence and ability, and access to data, in relation to the matters being validated or verified, to arrive at an independent opinion on the matters
- **inspector**, means a person appointed as an Inspector under the Act
- **interest holder**, means a person holding a petroleum interest for the activity
- **intermediate casing string**, means a pipe installed in a well after the surface casing string to seal off unconsolidated formations, lost circulation zones, abnormal pressure zones and/or hydrocarbon zones
- **interpretative information** means a conclusion or opinion based wholly or partly on basic data analysis or other documentary information
- **installation**, means a drilling or a production installation or a related construction site or camp site
- **liner string**, means a pipe which is an intermediate or production casing string but does not extend to the wellhead
- **the Minister**, has the same meaning as under the *Petroleum Act*
- **multiple completion well**, means a well that has more than one completion
- **notified**, means the sending of a written notice to the Minister, unless otherwise specified
- **operation** or **petroleum operation**, means any activity relating to exploration for, or the production, processing or transportation of, petroleum
- **Operator**, means the representative of the interest holders appointed in accordance with Clause 108
- **person-in-charge**, a person appointed by an Operator to provide onsite management and control of any specified operation
- **plant**, includes:
 - (a) any machinery, equipment, vehicle, implement, tool or article used in, or in connection with, an operation;
 - (b) any tank, vessel, pit or dump used in, or in connection with, an operation;
 - (c) any pipeline, but excludes a pipeline under the Energy Pipelines Act.
- **production casing string**, means a pipe installed in a well to isolate one or more zones for testing or production purposes
- **production equipment** means equipment for flow regulation or measurement, for sampling or storage of fluid from a well, or for separation of fluid components
- **production facility/installation**, means a system (other than a short term or temporary system) made up of plant (other than pipelines) that is used in a production, processing or transportation operation, or in an operation to treat or dispose of waste materials that result from petroleum production
- **production test**, means an operation (other than formation fluid sampling into a container positioned by a wireline operation) carried out on a well to recover reservoir fluids for or in connection with estimating well productivity

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- **quarter**, means any three calendar month period commencing on 1 January, 1 April, 1 July or 1 October in any year
- **reservoir**, means any subsurface formation or geological sequence containing a petroleum pool
- **reservoir measurements**, means measurements of reservoir pressure, temperature, fluid characteristics and movement of fluids or fluid interfaces within a reservoir
- **reservoir pressure**, means the static or stabilized pressure that exists, or that is inferred to exist, in a reservoir at a given datum
- **separator**, means an apparatus used at the surface to separate fluids produced from a well
- **validation**, means:
 - (1) a statement in writing from an independent validator verifying that:
 - (a) the plan, design, construction and or installation of petroleum wells or facilities is suitable for the purposes for which they are intended; and that
 - (b) the plan, design, construction and or installation complies with relevant codes, standards and specifications; and that
 - (c) the plan, design, construction and or installation meets the criteria as may be required by the Minister from time to time.
 - (2) a validation must cover the full scope of the activity for which approval is sought in accordance with this Schedule.
- **verification**, means a statement in writing from an independent validator verifying that the construction and or installation of petroleum wells or facilities is performed in accordance with approved plans, codes and standards and passed all tests necessary to verify the suitability for the purposes for which they are intended
- **wellhead**, means the casing head and includes any casing hanger or spool, or tubing hanger, and any flow control equipment up to and including the wing valves
- **well control manual**, means a well control manual, handbook and or procedures in force for well control during well construction operations as approved by the interest holder
- **well logging**, means recording one or more physical properties, formation characteristics or reservoir measurements as a function of depth of a well
- **workover**, means any operation carried out on a well in order to improve productivity or remedy a down hole mechanical defect, including but not limited to recovering tubing, (re-)perforating, (re-)completing, stimulating, or in any way altering the down hole configuration of the well

105 Codes, Standards and Specifications

- (1) Reference in this Schedule to a code, standard or specification, unless inconsistent with the context or subject matter, is a reference to the latest issued edition of that code, standard or specification.
- (2) Where a document, standard, rule, code or specification adopted by this Schedule, whether in part or in whole, refers to another document, standard, rule, code or specification that document, standard, rule, code or specification shall be deemed to be incorporated with, and form part of, the document, standard, rule, code or specification.

- (3) Where a document, standard, rule, code or specification adopted by this Schedule is inconsistent with this Schedule, this Schedule shall prevail, unless otherwise specified, in writing, by the Minister.

106 Personnel Competence

- (1) A person carrying out an operation shall have any certificate of competence, authorization or qualification required by the Minister.
- (2) The Minister may at any time require that evidence be furnished to enable him to determine whether a person is competent to be engaged in a particular operation.

107 Tests

Except where otherwise specified in this Schedule any test required under this Schedule shall be carried out in such a manner as will enable the results to be recorded and certified:

- (1) in an endorsed document within the meaning of the By-laws of the National Association of Testing Authorities, Australia; or
- (2) where the test is not a test in respect of which an endorsed document of the kind referred to in paragraph (a) can be given, to the satisfaction of the Minister; or
- (3) where the test is a test in respect of which an endorsed document of the kind referred to in paragraph (a) can be given but for practical reasons acceptable to the Minister the requirement for such endorsement has been waived, to the satisfaction of the Minister.

108 General Duties and Responsibilities of Interest Holders, Operators and Contractors

- (1) Operations shall be carried out under the overall management and control of an Operator, appointed in writing by the interest holder(s). No appointment or replacement of an Operator shall be effective until the Minister is notified.
- (2) Subject to this Schedule:
 - (a) it is the duty of an interest holder, Operator and any contractor to ensure compliance with these requirements and any other requirements as the Minister sees fit; and
 - (b) in the event of a contravention, or failure to comply with a provision, of these requirements, the interest holder, Operator and contractor may all be liable for an offence.
- (3) In addition to the operation of Sub-Clause (1), if a requirement provides that a particular person shall perform or discharge a function or duty under the requirement, that person is guilty of an offence if the person contravenes, or fails to comply with the requirement.
- (4) Subject to any express provision in a particular requirement:

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- (a) the Operator shall provide, install and maintain such plant as is necessary to enable compliance with this Schedule; and
 - (b) where a contractor has been engaged to perform particular work, the contractor shall also, in relation to the performance of that work, provide, install and maintain such plant as is necessary to ensure compliance with this Schedule.
- (5) It is a defence to a charge for an offence against this Schedule for the accused to prove:
- (a) that the offence relates to a matter which the accused did not know and could not reasonably have been expected to have known; or
 - (b) that it was not reasonably practicable for the accused to comply with the relevant direction in the circumstances of the particular case; and
 - (c) that the accused took alternative action that was at least as safe and effective as the terms of the relevant requirement.

110 Inspectors

- (1) Where an Inspector considers:
- (a) that the integrity of any operating system, well, pipeline or facility has been, or is in danger of being, compromised; or
 - (b) that work being carried out:
 - (i) is contravening a provision of the Act, these requirements, or any additional conditions imposed by the Minister; or
 - (ii) is compromising, or may compromise, the integrity of an operating system; or
 - (iii) is not in accordance with good oilfield practice,
- the Inspector may, by a notice in writing, refer the matter to the relevant Operator.
- (2) The notice shall specify a day by which the Operator shall report to an Inspector on the action taken in relation to the notice.
- (3) An Inspector may:
- (a) direct that no further work be carried out until the matter referred to in the notice is remedied;
 - (b) give directions as to the measures to be taken to remedy the matter referred to in the notice, which directions may include:
 - (i) that plant be repaired or replaced;
 - (ii) that any part of the environment be restored or rehabilitated;
 - (iii) that a particular work practice be altered or discontinued.
- (4) An Operator shall not contravene, or fail to comply with, a notice given under this requirement.
- (5) An Operator shall not re-commence operations without approval.

111 Operations Near, or Interference with, Public Utilities

- (1) An operation shall not be carried out in a manner that interferes with a road, railway or pipeline, a telephone or power line or cable, a radio or television mast, or any other form of public utility or facility.

- (2) When an operation is to be carried out on a track ordinarily used by the public, or in the vicinity of an inhabited area, the Operator shall give written notice to any council, or land owner, in whose area the road, track or inhabited area is situated.

114 Resolution of Conflict with Other Requirements

- (1) Where requirements within this Schedule conflict with statutory requirements administered by NT WorkSafe the conflict shall be resolved as follows:
 - (a) where the NT WorkSafe requirements are the more stringent the Operator shall follow those requirements; but
 - (b) where the NT WorkSafe requirements are the less stringent the Operator shall consult with the Department and with NT WorkSafe for their collaborative determination of the course to be followed.
- (2) The requirements of this Schedule are separate to and distinct from those in the *Petroleum (Environment) Regulations*. If applicable and to the extent applicable, all requirements of this Schedule must be incorporated into an environment management plan under the *Petroleum (Environment) Regulations*.

115 Application to Territory Waters

- (1) These requirements extend, with such modifications as may be necessary, to petroleum operations in submerged lands within the limits of the Territory.
- (2) Where an operation is carried out in an area referred to in sub-Clause (1), these requirements will be taken to include, with such modifications as may be determined by the Minister, the requirements of the Petroleum (Submerged Lands) Act.

116 Identification and Security of Wells

The Operator shall, after the release of a rig, ensure that the well is adequately secured and clearly marked in a permanent manner with the well name and well number and details of the operator.

PART II - SAFETY & SYSTEM INTEGRITY

Division 1 - General Requirements

201 General Duty of Care

An Operator and any contractor shall minimize the risk to health, safety, the environment and system integrity in respect to an operation, so far as is reasonably practicable by:

- (1) providing and maintaining:
 - (a) a safe working environment;
 - (b) safe systems of work;
 - (c) plant and substances in a safe condition;
 - (d) environment protection.
- (2) providing to any person carrying out work as part of that operation such information, instruction and training as are reasonably necessary to ensure that the person is safe from injury or risk to health.
- (3) complying with all occupational health and safety requirements of NT WorkSafe and the legislation it administers.
- (4) complying with a current environment management plan in accordance with the *Petroleum (Environment) Regulations* for regulated activities and avoiding or minimising and rectifying any adverse impact on the environment for non-regulated activities under the *Petroleum (Environment) Regulations*.

202 System Integrity Manual

- (1) Operations shall not be carried out unless subject to and in accordance with an accepted system integrity manual.
- (2) In the event of any conflict or inconsistency between an approved system integrity manual and the requirements of this Schedule, these requirements shall prevail.

203 Emergency Response Plans

- (1) Operations shall not be carried out unless there are approved Emergency Response Plans that set out procedures to be followed, actions to be taken and personnel responsibilities during reasonably foreseen emergencies.
- (2) All facilities must be fitted with a remote emergency shutdown device.

204 Updating of Plans

Emergency Response Plans and Operational Management Plans shall be updated as required by changed circumstances or as required by the Minister, and any update of the plans shall be submitted to the Minister for approval.

205 Availability of Plans, Procedures and Directions

Emergency Response Plans and Operational Management Plans and all relevant Procedures and Directions shall be readily available at each installation, and all persons at an installation shall be made aware of them.

206 Instruction of Personnel

- (1) All documentation referred to in Clause 205 shall be drawn to the attention of every person on or before the date on which that person commences to be engaged in operations in the petroleum interest area, and each such person shall be advised to comply with them.
- (2) Any amendments to the documents referred to in Clause 205 shall be drawn immediately to the attention of every person engaged in or concerned with operations in the petroleum interest area and each such person will be advised to comply with them.
- (3) On entering the work place for the first time each person shall be required to sign an acknowledgement that the documents referred to in Clause 205, and the Schedule of Requirements (and any amendments thereto) have been drawn to their attention and that they have been advised to comply with them.
- (4) Records of all acknowledgements shall be held by the Operator for a period of not less than 5 years and made available to an Inspector.

207 Admittance to an Operational Site

A person who is not engaged in or directly concerned with the carrying on of operations or the execution of works shall not be admitted to an installation without approval by the person-in-charge and, where such approval has been granted, that person shall be given all necessary instructions required by the plans and procedures referred to in Clause 205 and all relevant Directions on or before the arrival at the site.

208 Person-in-Charge

- (1) The name of the person-in-charge of any operation shall be clearly displayed on the site of that operation.
- (2) The person-in-charge shall ensure to the best of his ability that all personnel in his charge know and comply with all relevant requirements and safety procedures applicable to the operations under his control.

209 Communication

- (1) Radio or telephone communication facilities shall be maintained at each main operational location, main tank farm, main pumping station and main compressor station and shall also be available in connection with any well drilling, or servicing operations.

- (2) All communication equipment shall be maintained in good working condition.

210 Command of English

A person shall not be engaged, whether as employee, agent or contractor, in carrying out of operations, unless they have a command of English sufficient to enable them to readily understand written and spoken directions in English on matters which may affect safety.

213 Radioactive Substances

- (1) The Minister shall be informed, in writing, whenever it is proposed to use any radioactive material, other than in routine well logging or non-destructive testing.
- (2) A person engaged in the handling of, or the use of, radiation apparatus or radio-active substances shall comply with the requirements of all applicable radiation control legislation.
- (3) All reasonable precautions shall be taken at production facilities or at any other location where a build-up of naturally occurring radioactive materials may be present.

216 Emergency Drill Exercises

All persons at an installation shall participate in emergency drill exercises, at a frequency specified in the approved emergency response plan(s), under the control of the designated person in charge and a record shall be kept of such drills.

229 Debris Constituting a Fire Hazard

- (1) Any rubbish, debris or oil refuse that could constitute a fire hazard shall be removed or drained to a safe distance of not less than 45 metres away from all buildings, installations, wells and production facilities.
- (2) The rubbish, debris or oil refuse shall then be disposed of in a proper manner that is consistent with the approved environment management plan for the operation.

230 Flares, Flare Pits and Flare Lines

- (1) A flare pit or the end of a flare line shall not be located within 45 metres of a well, separator, below-ground pipeline, storage tank or temporary production facility, or within 45 metres of an unprotected source of flammable vapour.
- (2) A flare pit or the end of a flare line shall not be located within 100 metres of an established road, railway, above ground pipeline or building.
- (3) An access road shall not be sited within 25 metres of a flare pit or the end of a flare line.

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- (4) A flare line shall be safely secured and of an appropriate rating for the operating conditions.
- (5) All permanent flare installations shall be fenced off and an approved method, acceptable to an Inspector, shall be provided to ignite the flare.
- (6) A flare pit shall be sited and constructed so as not to create a hazard to property or natural vegetation.
- (7) Proper supervision and firefighting equipment and materials shall be available to meet an emergency during flaring operations.
- (8) Where a flare could be extinguished during production or testing operations, provision shall be made for relighting the flare by a device acceptable to an Inspector.

236 Fuel Tanks

All reasonable precautions shall be taken to ensure that any leakage or spillage from any fuel storage tank will be adequately contained to prevent any damage to the immediate environment.

238 Swabbing at Night

An oil or gas well shall not be swabbed into production during the hours of darkness.

239 Temporary Cessation of any Operation

- (1) Prior to, or immediately following, the cessation or temporary shutdown of any drilling, workover or production operation, each well and all plant shall be made safe in accordance with good oilfield practice; and
- (2) The Operator shall keep the Minister informed about the cessation of operations and the proposed duration of cessation of operations at least every three months; and
- (3) The operator must comply with Clause 424 in relation to completed wells.

240 General Safety Precautions

- (1) All buildings and other structures, machinery and equipment shall be inspected on a regular basis and a proper record of the inspection, signed by the person who conducted the inspection, shall be entered in the tour report or a log book or in some other similar system.
- (2) A log book, or similar system, shall be kept at each operational site or the central field office.
- (3) Any information recorded in a tour report or log book (or other system) shall be accurate and include all relevant dates and times.
- (4) Records must be retained at least 5 years after the petroleum interest has been surrendered.

Division 2 - Air and Gas Drilling

271 General

- (1) This division applies whenever air or gas is used as a circulating fluid in rotary drilling operations.
- (2) If there is an inconsistency between a Clause under this Division and another Clause, the Clause under this Division prevails to the extent of the inconsistency.
- (3) The person in charge of an operation that uses air or gas drilling shall, especially in relation to wellhead design and blowout prevention equipment, ensure compliance with API.
- (4) While air or gas drilling is in progress, materials and equipment shall comply with API.

272 Warning Notices

A warning notice that complies with this Schedule and that states

CAUTION--GAS DRILLING IN PROGRESS;

or

CAUTION--AIR DRILLING IN PROGRESS;

(whichever is applicable) shall be prominently displayed at each entrance to a drilling location where gas or air drilling is being carried out.

273 Delivery Lines

- (1) Where a high pressure gas delivery line is not buried, warning notices that comply with this Schedule and that state

CAUTION--HIGH PRESSURE GAS

shall be displayed to indicate the route of the line.

- (2) The main air or gas supply line shall be positioned so that:
 - (a) it does not interfere with vehicular access to the drilling location; and
 - (b) it does not cross areas on the drilling location frequented by vehicles and persons.
- (3) A check valve shall be installed on the delivery line at or near the standpipe.
- (4) Each pipe and fitting connected to or used in an air or gas circulating system shall have a rating sufficient to withstand the maximum supply pressure.
- (5) All pressure lines shall be properly restrained and all hoses fitted with clamps and wire rope that is at least 15 millimetres in diameter, or a fastening of equal strength, and secured to adequate supports to prevent dangerous movement in the event of coupling or hose failure.

274 Vehicles

Any vehicle that is not required for an operation on a well shall be kept at least 45 metres from the well.

275 Fire Precautions

- (1) At least four 9 litre and one 68 litre dry-chemical type extinguishers (or their equivalent) shall be kept at strategic locations or around the rig.
- (2) At least one water or mud nozzle shall be permanently mounted under the substructure and pointed directly at the rotating blowout preventer assembly.
- (3) The line between the high pressure pump and the nozzle shall be controlled by a single valve situated at the pump end of the line.
- (4) If the mud pump is not to be kept in continuous operation, pump starting controls shall be installed both at the pump and at the driller's control panel.

276 Siting of Compressors

- (1) Where practicable compressors and boosters used in drilling shall be located at least 45 metres from the rig and the gas separator shall be positioned so that it is visible to the driller.
- (2) Oil and diesel fuel shall be stored at least 15 metres from the compressors.

277 High Pressure Lines and Manifolds

- (1) The entire gas or air supply system shall be designed to meet maximum expected operating pressures.
- (2) Any main valve in the supply system that may need to be closed in the event of an emergency shall be rapid acting, clearly labelled and readily accessible.

278 Blooey Line

- (1) A blooey or bleed-off line shall extend at least 45 metres from the wellhead and shall, where practicable, be laid downwind of the well, or at right angles to the direction of the prevailing wind.
- (2) Any geological sample catcher installed on a blooey line shall be designed to avoid flashback and to protect persons from dust.
- (3) A space shall be cleared around the end of a blooey or bleed-off line so as to prevent the ignition of vegetation.
- (4) Where dust discharged by drilling causes a risk to the health of any person, water shall be injected into the blooey line to suppress the dust.

- (5) Any gas discharged from a blowby or bleed-off line shall be immediately ignited by a safe and reliable method acceptable to an Inspector.

279 Substructure Ventilation

The rig substructure shall be kept adequately ventilated (either by natural ventilation or by fans).

280 Supply Line Valves

- (1) The main air or gas supply line shall have at least two valves, one on the standpipe and accessible from the rig floor, and the other at least 25 metres from the well.
- (2) In the case of high pressure gas drilling, the main supply line shall have a valve at least 45 metres before the place where the first item of major equipment is connected to the delivery line (but in this case the second valve referred to in Sub-Clause (1) need not be fitted).

281 Drillstring Float

A downhole float valve shall be fitted in the drilling string and both top and bottom kelly cocks shall be installed when appropriate.

282 Mud Stocks

Mud stocks that are adequate to fill the hole and to establish and maintain circulation shall be kept in good condition by frequent mixing to enable use at any time.

283 Gas Detection Equipment

At least one portable gas detector, of a kind acceptable to an Inspector, shall be available for use where air or gas drilling is in progress.

Division 3 - Reporting

284 Reporting of Death and Serious Injury

- (1) In this Clause and this Schedule a serious injury is one which requires immediate attention by a medical practitioner.
- (2) Where a person dies or suffers a serious injury:
- (a) a report shall forthwith be made to the Minister; and
 - (b) a report in writing giving full particulars and all related circumstances shall be transmitted to the Minister as soon as practicable after the occurrence; and
 - (c) the above reports shall be in addition to, and not take precedence over, reports required by NT WorkSafe.

286 Reporting Serious Damage other than Environmental Harm

- (1) In this Clause and this Schedule serious damage to property means:
 - (a) the loss or destruction of property with a value exceeding \$50,000;
 - (b) damage to property, the repair of which damage would cost an amount exceeding \$50,000; or
 - (c) a loss, destruction or damage to any property by reason of which any person dies or suffers serious injury.
- (2) Where serious damage to property occurs:
 - (a) a report of each occurrence shall forthwith be made to an Inspector; and
 - (b) a report in writing shall be submitted to the Minister as soon as practicable specifying:
 - (i) the date, time and place of such occurrence;
 - (ii) particulars of the damage;
 - (iii) the events so far as they are known or suspected that caused or contributed to the occurrence;
 - (iv) particulars of repairs carried out or proposed to be carried out to damaged property; and
 - (v) measures taken, or to be taken, to prevent a possible recurrence.

287 Reporting a Potentially Hazardous Event

Where an event occurs which is not in the normal or ordinary course of a particular operation and which is professionally considered to have been likely to cause injury to a person or serious damage to property:

- (1) a report of the event shall forthwith be made to an Inspector; and
- (2) a report in writing of the event shall be submitted to the Minister as soon as practicable specifying measures taken or to be taken to prevent a possible recurrence.

288 Reporting Damage other than environmental damage Less Than \$50,000

Where damage to property occurs which is not serious damage to property but which results in a significant loss of structural integrity or load bearing capacity in the property damaged or results in some other significant unsafe condition:

- (1) a report of the damage shall forthwith be made to the Minister; and
- (2) a report in writing shall be submitted to the Minister as soon as practicable specifying measures taken or to be taken to prevent a possible recurrence.

290 Reporting of Emergencies

Any emergency shall be reported forthwith to the Minister without delay.

PART III - DRILLING, WELL RE-ENTRY AND WORKOVER OPERATIONS

Division 1 - General Requirements

301 Approval to Drill

- (1) Operations to drill a new exploration, development or appraisal well, re-enter a well or workover of an existing well shall not be commenced without prior approval.
- (2) An application under Sub-Clause (1) shall be made not less than one month, or such other period as may be approved, prior to the commencement of operations and shall include:
 - (a) proposed well name and number;
 - (b) location, elevation and co-ordinates of the well site;
 - (c) programmed depth;
 - (d) estimated spud-in date;
 - (e) estimated drilling time and costs;
 - (f) name and address of drilling contractor;
 - (g) type of rig and blow-out prevention equipment, including description of equipment and method of operation;
 - (h) names and addresses of other contractors involved in the operations and the nature of the services they will perform;
 - (i) detail of the drilling, re-entry or workover program, including particulars of casing program (including grade, design safety factors for burst, collapse and tension), complete casing cementation program, drilling fluid and formation evaluation procedures (cuttings and fluid sampling, coring, and wireline and mud logging) and proposed tests, barriers and procedures confirming well integrity throughout the well construction program;
 - (j) name of person responsible for communications with the Minister;
 - (k) proposed well path;
 - (l) drilling procedures and well control manuals including bridging plans if applicable;
 - (m) geological prognosis which includes well objectives and, for exploration wells, play definition (source, seal, reservoir, trap configurations) accompanied by a time or depth maps of near target horizon(s) and seismic sections where possible;
 - (n) emergency response plans and pollution control measures (including a spill contingency plan);
 - (p) evidence of adequate comprehensive insurance, including, but not limited to, public liability, loss of well control (including blowouts), relief well drilling, containment and clean-up; and
 - (q) such other information as the Minister requests.
- (3) The drilling program shall, in the case of an exploration well in a permit area, be accompanied by a current plan showing the existing land tenure i.e., reserves, private property, etc. in relation to the proposed drill site and access road and shall make reference to any other wells, public utilities or any other structure within 2,000 metres of the proposed well location.
- (4) Any information not available at the time of initial application must be forwarded no later than one month prior to the expected spud date.

- (5) An approved application shall not be varied without approval and shall be carried out in accordance with any conditions to which the approval is subjected specified on any approval instrument.

303 Equipment to Conform to Certain Standards

- (1) Materials and equipment used in drilling, re-entry and workover operations shall conform to API.
- (2) Equipment used in drilling, re-entry and workover operations shall be equipped with an emergency shutdown device.

304 Location Survey

- (1) As soon as practicable after the spudding of a well but no later than rig release, its exact location shall be determined by an independent suitably qualified surveyor to a location accuracy of not less than 1 metre based on the Geocentric Datum of Australia including the well's geographic coordinates (GDA94) and elevation (both ground level and kelly bushing or other measurement datum) tied to the Australian Height Datum to within 0.1 m accuracy.
- (2) A certificate shall be issued to the department for verification with specifics of the estimated error in the horizontal position and elevation of the well.

305 Prohibited Drilling Areas

A well shall not be drilled so that any part of it is less than 300 metres from a petroleum interest boundary, except in accordance with a consent in writing of the Minister.

306 Casing

- (1) The design and placement of casing strings shall take into account known or predicted formation strength, known or predicted formation pore fluid pressures and programmed drilling fluid densities, and the maximum performance properties used in the design of casing strings shall be those indicated as minimum performance properties pursuant to API.
- (2) Casing strings shall be run and cemented at the approximate setting depths specified in the drilling program and any significant variations to the prescribed setting depths shall be notified to the Minister prior to running casing.
- (3) All casing strings and liner strings shall be capable of withstanding all anticipated collapse and burst pressures, tensile loadings, temperatures, and environments likely to be encountered.
- (4) All casing strings, other than liner strings shall extend to the wellhead.

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- (5) Casing recovered from a well shall not be re-used in another well unless inspection in accordance with API compliance with Sub-Clause (3) is established.
- (6) A conductor casing string shall be installed to protect a well and equipment against surface formation instability and to enable the circulation of drilling fluid from the well before surface casing is installed.
- (7) Surface casing shall be set at least 30 metres into a competent formation and, unless otherwise approved, to a depth of at least:
 - (a) 200 metres; and
 - (b) in relation to an exploration well where normal pressure gradients are anticipated, at least 15 per cent of the total depth to which uncased hole will be drilled to a depth of 2,500 metres, plus 5 per cent of the incremental depth of uncased hole beyond 2,500 metres; or
 - (c) in relation to an appraisal or development well where normal pressure gradients are known to exist, at least 10 per cent of the total depth to which uncased hole will be drilled.
- (8) The design of the surface casing string shall take into account the support of other casing strings and the BOP stack.
- (9) Where evidence indicates the possibility of above normal formation pore pressure, the surface casing design shall be considered on a well by well basis.
- (10) Consideration shall be given to setting an intermediate casing string where:
 - (a) abnormal pressure, lost circulation or unstable zones are known or expected; or
 - (b) artesian water, high mud weights or extensive drilling time may lead to down-hole problems.
- (11) When a liner string is installed there shall be an overlap of at least 30 metres between the top of the liner string and the shoe of the next larger casing string previously run.
- (12) After cementing, all casing strings, except the conductor casing string, shall be pressure tested in accordance with API and records of such tests shall be submitted to the Minister prior to the continuation of well construction activities.
- (13) Drilling operations or operations to complete or test a well shall not commence until a satisfactory pressure test pursuant to Sub-Clause (12) has been obtained.

307 Cementing of Casing

- (1) Unless otherwise approved conductor casing strings (other than those placed by jetting or driving) shall be cemented with sufficient cement to fill the annular space between the casing string and the wall of the hole from the shoe to surface.

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- (2) All other casing strings shall be cemented with sufficient cement to fill the annular space between the casing string and the borehole and or previous casing string to surface unless otherwise approved.
- (3) All casing string cementations shall be carried out in accordance with API and the details of the cementing operations shall be recorded in the driller's log and the daily drilling report. If there is any reason to suspect a faulty cementing operation, the Minister shall be notified.
- (4) After the cementing of casing strings, unless otherwise approved, drilling shall not be commenced until a time lapse of:
 - (a) 24 hours; or
 - (b) 8 hours under pressure for the surface casing string and 10 hours under pressure for all other casing strings.
- (5) For the purpose of Sub-Clause (4)(b) the cement is considered to be under pressure if, during the time referred to, the cement is restrained from movement by the use of float valves or other approved equipment.
- (6) If the cementing requirements of this Clause have not been achieved by primary cementing operations, endeavours shall be made to meet those requirements by re-cementing or by remedial cementing, unless otherwise approved. n.b. the Minister shall be notified of the failure to achieve the cementing requirements prior to commencing these endeavours.
- (7) Following the setting of casing, cementing and testing (including any pressure testing, logging, volumetric and or lab analysis etc.) the Operator shall submit a full report in an approved format to the Minister with an interpretation of the results confirming whether or not well integrity has been achieved in accordance with objectives unless otherwise approved.

308 Blow-out Prevention Control

- (1) Blow-out preventers and related well control equipment shall be installed, operated, maintained and tested generally in accordance with API and shall be adequate to control expected pressures.
- (2) Unless otherwise approved, prior to drilling below the conductor casing string in exploration wells, or in development or appraisal wells in those areas having known shallow gas accumulations, a diverter system incorporating a pipeline of adequate diameter with control valves shall be installed so as to safely divert hydrocarbons and other fluids in the event of pressurised fluids occurring below the shoe of the conductor string.
- (3) Prior to drilling below the surface casing string the blow-out prevention equipment shall comply with API.
- (4) An inside blow-out preventer assembly (back pressure valve) and a full opening drill string safety valve in the open position shall be kept on the rig floor at all times whilst operations are in progress, with suitable crossover substitutes to enable installation on all drill pipe, drill collars and tubing in use.
- (5) A kelly cock shall be installed immediately below the swivel and another at the bottom of the kelly, of such design that it can be run through the blow-out preventers if applicable for the type of drilling rig used with appropriate pressure retention devices installed as per API.

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- (6) During operations there shall be a clearly marked control panel for operating blow-out preventers and choke manifolds, located at such a distance from the drill floor as to ensure safe and ready access in an emergency.
- (7) Each choke manifold shall have pressure gauges, clearly visible to the choke operator when standing in his normal operating position for either the remotely or hand adjustable chokes, which indicate:
 - (a) the drill pipe pressure at the drill floor; and
 - (b) the casing string/drill string annulus pressure at a known point upstream of the choke.
- (8) Installed blowout prevention equipment must not be repaired or removed until reasonable steps are taken to ensure that the well is safe.
- (9) The Minister must be notified:
 - (a) whenever blowout prevention equipment is removed for any reason other than pre-approved operations and in accordance with safe operating procedures; and
 - (b) whenever blowout prevention equipment is re-installed.
- (10) A notification under Sub-Clause (9)(a) above must include the reason for the removal of the equipment and the steps taken to make the well safe.

309 Pressure Testing Blow-out Prevention Equipment

- (1) After setting the blow-out preventer stack the pipe rams, the wellhead connection, and the choke and kill lines shall be tested in accordance with API:
 - (a) when installed;
 - (b) before drilling out of each casing string;
 - (c) not less than fortnightly whilst drilling;
 - (d) following repairs that require disconnecting a pressure seal in the assembly; and
 - (e) before perforating or production testing, unless a valid pressure test has occurred in the past 48 hours.
- (2) The blind rams shall be function-tested at the times stipulated in Sub-Clause (1) provided that, after installing each casing string, they shall be pressure tested in accordance with API.
- (3) The blow-out preventers shall be function-tested on each round trip but not more frequently than once per day with the exception of the annular type blow-out preventers where a weekly function test is required.
- (4) In the event that a test indicates that equipment is not operating correctly, operations shall be discontinued until the deficiencies have been corrected and the equipment subjected to another test.
- (5) The results of each blow-out preventer test shall be recorded in the driller's log and the daily drilling report and records shall be kept at the wellsite for inspection.

310 Mud Monitoring System

Unless otherwise approved the following mud system monitoring equipment shall be installed and used during all drilling operations after setting and cementing the conductor casing string:

- (1) a recording mud pit level indicator to determine mud pit volume gains and losses, including a visual and audio warning device;
- (2) a mud volume measuring device for accurately determining the mud volumes required to fill the hole on trips;
- (3) a mud return or full hole indicator to determine when returns have been obtained or when they occur unintentionally, as well as to determine that returns essentially equal the pump discharge rate;
- (4) a pump stroke counter;
- (5) a gas separator, gas knockout pot or a mud degasser; and
- (6) a mud gas monitoring device to determine the concentration of gas in the drilling mud.

311 Penetration Rate Monitoring

A drilling rig, while engaged in drilling operations, must be fitted with equipment that provides a continuous recording of the penetration rate unless otherwise approved.

312 Accumulators

- (1) Accumulators shall be located a minimum of 15 metres away from the rig floor and, without accumulator pump assistance, shall have sufficient capacity at all times to:
 - (a) open or close the hydraulically operated choke line valve;
 - (b) close or open the annular type blow-out preventer; and
 - (c) close or open all blow-out preventer pipe rams.
- (2) Accumulator pumps shall be capable of re-building fluid pressure in the accumulators in accordance with API to:
 - (a) open the hydraulically operated choke line valve; and
 - (b) close the annular type blow-out preventer
- (3) Accumulators shall be connected to the blow-out preventers with lines of working pressure at least equal to the working pressure of the accumulator and any lines located under the substructure shall be of steel construction unless completely sheathed with adequate fire resistant sleeving.
- (4) Accumulator pumps shall have two independent sources of power.

313 Blow-out Prevention Drills

- (1) Blow-out prevention drills shall be conducted weekly and in accordance with the well control manual by each drilling crew to ensure that all equipment is operating and that crews are properly trained to carry out emergency duties.
- (2) All blow-out prevention drills and response times shall be recorded in the driller's log and the daily drilling report and records kept at the wellsite for inspection.
- (3) A notice on the rig floor, shall provide details of the well control procedures proposed to be followed in the event that indication of a well kick is observed and all drilling crews shall be trained in those procedures.
- (4) All on-site personnel holding the position of driller (including any person who may temporarily stand in for the driller) or more senior shall attend, at least once every 24 months, an accredited well-control school or refresher course in well-control and obtain a certificate of proficiency which must be presented to an Inspector upon request.

314 Formation Integrity Testing

- (1) A formation integrity test shall be conducted after drilling out the casing shoe of surface and intermediate casing strings to establish that cementation and formation strength at the shoe are adequate to sustain the maximum anticipated pressures which may be imposed during subsequent drilling operations.
- (2) Where a test requires that the approved drilling and casing program be amended, any such amendments shall be submitted to the Minister for approval.
- (3) Where formations are encountered below a casing shoe which require the use of drilling fluid densities not anticipated in the approved drilling program and which could result in excessive pressures being imposed at the casing shoe an additional formation integrity test shall be performed and, if the result differs from that performed at the casing shoe, the Minister shall be notified forthwith and the casing program amended if necessary.
- (4) All formation integrity test results shall be recorded in the driller's log and the daily drilling report.

315 Drilling Fluid

- (1) The characteristics and use of the drilling fluid shall provide adequate control of any sub-surface pressures likely to be encountered.
- (2) Wherever possible the well shall be maintained full of such drilling fluid.
- (3) Sufficient reserves of drilling fluid and supplies of drilling fluid materials shall be available at the well site for immediate use to comply with Sub-Clauses (1) and (2).

- (4) Tests consistent with API shall be performed on a regular basis while drilling and the results recorded in the driller's log and the daily drilling report.
- (5) Drilling fluids shall not contain oil, diesel and/or any benzene, toluene, ethylbenzene or xylene (BTEX) at detectable levels.

316 Deviation Surveys

- (1) Unless otherwise approved, deviation surveys shall be taken at intervals of not more than 200 metres to ascertain the deviation of a well from vertical.
- (2) A well shall not be directionally drilled without approval, except for a short distance to straighten a hole, side-track junk or correct other mechanical difficulties.

318 Oil or Gas Lost or Used During Repair Operations

The quantities of all oil or gas lost by burning, venting to the atmosphere, flaring or mixing with other circulating fluids in the course of any well repair, recompletion or other similar operation shall be reported to the Minister as soon as practicable after the relevant event.

319 Evaluation of an Occurrence of Petroleum

If the Minister considers that an Operator is not adequately evaluating a potential occurrence of petroleum, he may require the Operator to carry out such coring, logging, sampling or testing operations as he thinks reasonable in the circumstances.

320 Core and Cutting Samples

- (1) Where cuttings are recovered from a well, samples, each a minimum of 200 grams dry weight per interval, shall be washed, dried in an approved manner and placed in suitable plastic bags or plastic bottles that are clearly and permanently labelled for identification and lodged in accordance with departmental geological sample submission procedures.
- (2) Where whole cores are recovered they shall where practicable be slabbed vertically and at least one vertical half of the core shall be placed in suitable labelled core tray and lodged as in Sub-Clause (1).
- (3) Full diameter core samples may, where approved, be retained for special studies provided that:
 - (a) they are retained in Australia unless otherwise approved and any residual material is returned to Australia on completion of the studies;
 - (b) applications to send core overseas for analysis must include details of sample intervals and depths;
 - (c) care is taken to protect them from unnecessary damage; and
 - (d) all residues are lodged with the Minister on completion of the studies.

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- (4) All core and cutting samples should be lodged with the Minister within six (6) months of rig release.
- (5) Side-wall cores shall not be sent out of Australia unless otherwise approved, and all residues remaining after any studies on the cores shall be preserved and lodged with the Minister.
- (6) In relation to any samples retained overseas for further analysis, a report on progress shall be included in the annual report.

321 Reports on Analysis of Core and Cuttings

- (1) Where an investigation, analysis or study is conducted on cuttings or cores, a copy of the report of the work and its conclusions shall be included in the interpretative well completion report or, in the case where this report has already been submitted, the annual report.
- (2) Palynological slides and residues, palaeontological material and petrological slides prepared from cuttings or cores shall be properly labelled, stored and together with a list of the material lodged with the Minister prior to the surrender, expiry or cancellation of that part of the petroleum interest to which the material relates.

323 Fluid Samples

- (1) All formation fluid recovered from formation tests or non-routine production tests shall, as far as practicable, be sampled in accordance with API.
- (2) Samples shall be labelled and analysed, and liquid samples shall be preserved for at least six months.
- (3) If collected, a 1 litre sample of liquid hydrocarbons or other fluid or 300 cm³ sample of gaseous hydrocarbons from formation or production tests shall be offered to the Minister and if required by the Minister, supplied in an API approved safety container.
- (4) Results obtained from the analysis of samples shall be included in the annual report.

324 Well Evaluation Logs

- (1) Before a well is cased (other than with surface casing), completed, suspended or abandoned, an approved suite of logs shall be run and recorded.
- (2) The suite shall at least be sufficient to provide a proper determination of:
 - (a) formation porosity;
 - (b) formation fluid saturations;
 - (c) stratigraphic correlation with surrounding wells; and
 - (d) if inadequate control exists in the vicinity of the well, velocity control.
- (3) The following shall be furnished to the Minister:
 - (a) a copy of each log run, which shall be forwarded as soon as possible after it is recorded;

- (b) a copy of each log run data in standard format (ASCII or LAS), which shall be forwarded as soon as possible after it is recorded.

325 Protection of Aquifers

- (1) All reasonable steps shall be taken during well construction and any other well or production operations to prevent communication between, leakage from, or the pollution of, aquifers.
- (2) As soon as a person becomes aware of communication between, leakage from, or the pollution of, an aquifer he shall notify the Minister and take appropriate steps to mitigate any adverse effects on the aquifer.

326 Production or Drill Stem Tests

- (1) A person shall not conduct a production or drill stem test in an exploration, development or an appraisal well not yet producing without approval.
- (2) An application for approval to conduct a production or drill stem test shall be accompanied by particulars of:
 - (a) the date and time of test;
 - (b) the equipment proposed to be used for the test including accurate flow measurement device(s);
 - (c) the proposed testing program;
 - (d) the proposed test intervals;
 - (e) the proposed duration not exceeding 90 days;
 - (f) the maximum quantity of petroleum or water proposed to be produced; and
 - (g) the proposed method of disposal of the petroleum, water or gas produced.
- (4) In addition to Clause 331, the following conditions shall pertain to drill-stem tests or production tests:
 - (a) When production testing is to be performed in the vicinity of an inhabited area, all reasonable steps shall be taken to warn persons who could be affected, and the tests shall be conducted in a manner that minimizes the risk of injury or damage to property;
 - (b) All personnel shall be familiar with the relevant emergency procedures;
 - (c) All flowlines, valves and equipment used in a production test shall have a rated working pressure in excess of all anticipated pressures and, where appropriate, shall be tested prior to initial use at each well to at least those anticipated pressures;
 - (d) Open hole formation tests shall not be opened for flow during the hours of darkness except with the prior approval of the Minister;
 - (e) Subject to Sub-Clause (f), if formation fluids are produced into the test string, they shall be reverse circulated from the test string before it is pulled from the hole;
 - (f) In a cased hole, formation fluids in the test string may be displaced back into the formation from which they were produced;
 - (g) During formation testing, or the removal of any pipe after a formation test, a competent person must remain at the rig and oversee the operation;
 - (h) During formation testing, all motors, engines and lights that are not required for the operation shall be shut off;

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- (i) During formation testing, the annular space of the well shall be kept full of drilling fluid of a density adequate to control formation pressure;
 - (j) Fluids brought to the surface during formation testing shall be safely disposed of through an independent test manifold and choke;
 - (k) Any choke equipment that forms part of the blow-out prevention equipment shall not be used for flow control during a formation test;
 - (l) If swivel joints or flexible hoses are used in the system during formation testing, they shall be equipped with wire rope or chain safety lines capable of containing any movement or whipping of the pipe or hose in the event of failure;
 - (m) All test strings shall be equipped with the means to reverse circulate out their contents;
 - (n) Well stimulation operations, such as swabbing or acidizing, shall not be initiated during the hours of darkness, or continued beyond the hours of daylight, without approval.
- (5) If a test results in the discovery of a new pool of petroleum, the Operator shall notify the Minister as soon as practicable after the discovery is made and furnish:
- (a) a copy of the relevant operational reports;
 - (b) a legible copy of the pressure recorder chart for each test taken on the well; and
 - (c) an interpretation of those tests.

327 Flammable Vapours

All flammable vapours shall be collected in appropriate vessels and equipment and safely vented to atmosphere, and any significant volume of gas shall be burnt through a flare system.

328 Approval to Abandon or Suspend a Well

- (1) A well shall not be abandoned or suspended without prior approval, except as provided for in Sub-Clause (4).
- (2) Subject to Sub-Clause (4), while drilling operations are being undertaken a well shall not be left in a condition which, in the opinion of the person-in-charge or the Minister, is unsafe. Prior to the cessation of drilling operations, even temporarily, a well shall be made safe in accordance with the well control manual unless otherwise approved.
- (3) Subject to Sub-Clause (4), where casing is being installed, if a well encounters or has encountered:
 - (a) hydrocarbons;
 - (b) abnormally pressured water;
 - (c) unstable coals or shales; or
 - (d) lost returns;the drilling operations shall be continued to the next competent casing seat point at which point the hole will be logged, cased and secured at the surface.
- (4) In the event of an emergency or adverse weather conditions requiring, in the opinion of the person-in-charge or the Minister, cessation of drilling operations, the well shall be made safe in accordance with the well control manual.

- (5) An application for approval to suspend a well shall give particulars of:
 - (a) the reason for suspension and proposed duration of suspension not exceeding 2 years;
 - (b) a risk assessment based on the condition of the well, its operating history and any risks identified with appropriate risk treatment;
 - (c) the proposed suspension program including the method by which the well will be made safe and monitoring program; and
 - (d) such further information as the Minister may require.
- (6) An application for approval to abandon a well shall give particulars of:
 - (a) the reason for abandonment;
 - (b) the proposed abandonment program including the method by which the well will be made safe; and
 - (c) such further information as the Minister may require.

329 Abandonment of a Well

Well abandonment shall comply with the following:

- (1) In uncased hole, cement plugs shall be placed such as to provide a minimum of 100 metres of cement above and a minimum of 50 metres of cement below any significant oil, gas or fresh water zones.
- (2) Where there is open hole immediately below the casing string, there shall be placed in that casing string:
 - (a) a cement plug placed by displacement method so as to extend at least 50 metres above and at least 50 metres below the casing shoe; or
 - (b) a cement retainer with effective back pressure control set at least 10 metres, but not more than 30 metres, above the casing shoe with a cement plug calculated to extend at least 50 metres below the casing shoe and at least 50 metres above the retainer; or
 - (c) where lost circulation conditions exist or are anticipated, a permanent type bridge plug set within 45 metres above the casing shoe with at least 50 metres of cement on top of the bridge plug.
- (3) If the casing string is cut and recovered, a cement plug shall be placed to extend at least 50 metres above and at least 50 metres below the cut end of the casing string, and a retainer may be used in setting the required plug.
- (4) Where the casing string has been perforated:
 - (a) a cement plug shall be placed opposite the perforations to extend from at least 50 metres below to 100 metres above the perforated interval; or
 - (b) the perforated interval may be plugged by means of a cement retainer set in the casing string no more than 45 metres above the top of the perforated interval with a cement plug extending at least 50 metres above the retainer, provided the perforated interval is isolated from open hole below; or
 - (c) subject to Sub-Clause (b) where a succession of retainers is used to isolate a series of perforated test intervals, only the topmost retainer need have a minimum of 50 metres of cement plug placed above it.

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- (5) In a cased hole containing a liner string or strings, a cement plug, of at least 50 metres height, shall be placed immediately above each liner hanger.
- (6) A surface cement plug extending at least 15 metres below the surface to 50 metres below the base of the deepest aquifer shall be placed in the innermost string of casing that extends to the surface.
- (7) Any annular space that extends to the surface, and which is open to drilled hole, shall be plugged with sufficient cement to fill the annular space if cement to surface was not previously installed.
- (8) The location and integrity of cement plugs placed in accordance with Sub-Clauses (2), (3), (4), (5) and (6) shall be verified by the application of weight, or other methods as approved.
- (9) Any intervals of cased hole between cement plugs shall be filled with fluid that is of an appropriate density and suitably inhibited to prevent corrosion of the casing.
- (10) Blow-out preventers shall not be removed until all plugs required to isolate the open hole have been set and their location and integrity satisfactorily determined.
- (11) No casing may be recovered if its recovery would expose any abnormal pressure, lost circulation, petroleum or water zone.
- (12) All casing strings shall be cut 2 metres below the surface and covered with a minimum of 30 cm of cement. A steel plate shall be installed on top of the cement detailing the well name, number and total depth and covered with soil to restore the natural environment.
- (13) The exact location of the well shall be confirmed by an independent suitably qualified surveyor to a location accuracy of not less than 1 metre based on the Geocentric Datum of Australia including the well's geographic coordinates (GDA94) and elevation (both ground level and kelly bushing or other measurement datum) tied to the Australian Height Datum to within 0.1 m accuracy. A certificate shall be issued to the department for verification with specifics of the estimated error in the horizontal position and elevation of the well.

330 Well Completion

- (1) The surface and subsurface equipment of a completed well shall (where applicable) be arranged to permit the measurement of the pressure and temperature at the wellhead and at the bottom of the hole (closed in or flowing), and to permit any other generally recognized test to be carried out.
- (2) The surface equipment shall be fitted with sampling connections.
- (3) The Operator shall, on completion and any recompletion of a well, keep and make readily available to an Inspector an accurate record of all subsurface equipment and junk in the well.
- (4) Before opening a well to production and after every major repair, recompletion or workover, the wellhead and flow line connection shall be pressure tested.

331 Disposal of Produced Oil and Gas

- (1) Any oil or gas that is circulated out of or produced from a well during a drilling, testing or repair operation, and that is not flowed through the well's flowline to a gathering facility, shall be flowed through an appropriate manifold and safely secured, properly rated temporary flow line to a storage tank or flare.
- (2) Clean-up operations and tests that use temporary well site facilities shall not be commenced during the hours of darkness.
- (3) If petroleum is flowed to a flare it shall be kept, as far as possible, continuously alight and comply with Clause 230.

332 Rehabilitation of Site

A well site area shall be rehabilitated in accordance with a current environment management plan.

Division 2 - Reporting and Data Submission

333 Discovery of Petroleum and Estimate of Petroleum Resources

- (1) In addition to fulfilling the requirements of the Act with respect to reporting a discovery of petroleum, the results of the evaluation of the discovery including preliminary estimates of petroleum resources shall be conveyed in writing to the Minister within 3 months of the date of discovery, unless otherwise approved.
- (2) Each year, the interest holder shall provide the Minister with his current estimate of the petroleum resources in a petroleum pool in accordance with the Society of Petroleum Engineers "Petroleum Resources Management System", unless otherwise approved.
- (3) An estimate referred to in Sub-Clause (2) shall be in an approved form accompanied by any specific reports produced during the period and shall specify:
 - (a) the location of the petroleum pool;
 - (b) the reservoir rock and fluid properties; and
 - (c) the data, assumptions and methodologies upon which the estimate is based.
- (4) When a study resulting in a revised estimate of petroleum resources has been carried out, a report of the study and the revised estimate shall be sent to the Minister as soon as practicable after completion of the work.

334 Daily Report of Drilling or Workover Operations

- (1) Each day before midday Australian Central Standard Time (ACST) a daily report of the drilling or workover operations for the previous 24 hours shall be sent to the Minister.

- (2) The daily report shall be in an approved format and shall include but is not limited to:
- (a) the name of the well;
 - (b) the drilled depth;
 - (c) the operations carried out to the nearest 15 minutes;
 - (d) the lithology of formations penetrated and the interpreted depth of any marker horizons;
 - (e) any indications of petroleum;
 - (f) results of surveys made in the well bore; and
 - (g) estimated daily and cumulative well costs.

335 Report on Modification, Abandonment or Suspension of Well

A report providing details of any repair, modification, recompletion, production test, abandonment or suspension of a well shall as soon as practicable be sent to the Minister.

336 Well Completion Report

- (1) Where a well has been plugged and abandoned, suspended or completed a basic well completion report and basic data shall be furnished to the Minister in accordance with section 76 of the Act.
- (2) A final or interpretative well completion report must be submitted within 12 months after rig release.
- (3) A basic well completion report relating to the drilling of a well shall include, but not necessarily be limited to, the following:

General Data

- (a) The name and number of the well, and if the well is a sidetrack, the name of the parent well;
- (b) Exploration Permit, Retention Lease or Production Licence, 100k mapsheet name and number and seismic line location or shotput number or other geophysical location identifier;
- (c) A statement of well objectives and the degree to which the objectives have been met;
- (d) The depth reference (eg. kelly bushing, rig floor) and the surveyed height of depth reference above the surface for onshore wells and above mean sea level for offshore wells;
- (e) The surveyed well location in latitude and longitude with reference to the Geocentric Datum of Australia 1994 (GDA94);
- (f) In the case of a well that has deviated from an approximately vertical path:
 - (i) the surveyed path of the well;
 - (ii) the coordinates of the bottom hole location; and
 - (iii) in the case of a potential producer, the coordinates at the intersection of the reservoir horizon;
- (g) The drilling contractor and drilling rig used;
- (h) The spud date, date of reaching total depth and date of rig release;

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- (i) The along hole measured depth and the true vertical depths reached in metres;
- (j) A statement whether the well has been:
 - (i) completed as a producer;
 - (ii) suspended; or
 - (iii) abandoned.
- (k) The depth of any perforations.

Drilling

- (a) Particulars of the equipment installed in or on the well;
- (b) Particulars of the casing and equipment installed in or on the well complete with schematics showing major dimensions;
- (c) Particulars of all deviation surveys;
- (d) Particulars of cementing operations carried out and interpretative information about the well integrity;
- (e) Bit records including detailed information about the bottom hole assembly including measurement while drilling and logging while drilling equipment, including names of LWD and MWD tools;
- (f) Particulars of drilling fluids used and any fluid losses incurred.

Formation Evaluation

- (a) List of well evaluation logs including measurement-while-drilling logs, pressure detection logs and mud logs, wireline logs velocity surveys, tiltmeter surveys and micro-seismic surveys.
- (b) List of cores, cuttings and samples taken including depth and interval;
- (c) Particulars of the operation and results including full raw pressure-time listings for all formation fluid sample tests and production tests carried out;
- (d) Particulars of any hydrocarbon indicators and flow potential.

Geology

- (a) The along hole and true vertical depths of seismic marker and reservoir horizons and bottom hole formation.

Appendices

- (a) Basic well completion data in approved format including:
 - (i) raw data, edited field data and processed data for all wireline logs, MWD and LWD logs;
 - (ii) field log and processed log display for all wireline, MWD and LWD logs;
 - (iii) mudlog data and display;
 - (iv) raw data, processed data, checkshot and time/depth analysis;
 - (v) velocity survey display; and
 - (vi) photography of the core and sidewall core, in both natural and UV light if taken;
 - (b) a well index sheet.
- (4) An interpretive final well completion report shall include, but necessarily be limited to, the following:

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- (a) Copy of the well index sheet submitted in sub-Clause (3)(x);
- (b) Geological interpretations of the well data including, but not limited to, for exploration wells:
 - (i) lithology and stratigraphy;
 - (ii) reservoir properties and quality;
 - (iii) geochemistry of source rocks;
 - (iv) depositional environment;
 - (v) hydrocarbon indications; and
 - (vi) trap integrity;and, for development or appraisal wells, details of changes to the current reservoir model;
- (c) For exploration wells, a discussion of the relevance of the well data to the evaluation of the hydrocarbon potential of the area;
- (d) For development or appraisal wells, the implications for future field management.
- (e) Reports of technical studies on velocity surveys, logs, samples, cores and sidewall cores (including petrophysical analysis, palaeontology, reservoir characteristics, fluid saturations, relative permeability, capillary pressure, fluid analysis and geochemical analysis) including:
 - (i) a composite well log including, where appropriate, wireline logs, sampling and testing details, interpreted formation tops and lithology of intervals penetrated;
 - (ii) interpretative log analysis; and
 - (iii) petrophysical, geochemical and other samples analyses.
- (f) Report of revised structure maps and appropriate interpreted seismic sections illustrating the post-drill structural and stratigraphic interpretation of the well.

Division 3 - Special Services

337 Special Services

- (1) Special services include logging, perforating, testing, cementing or portable laboratory services, power-tong services, wireline services, coiled tubing operations, acidizing, fracturing, artificial lift or similar services carried out at a well location.
- (2) The installation and operation of well pumping units, and the operation of wireline and coiled tubing services, acidizing, fracturing, cementing, hot oil operations and other special services shall be carried out in accordance with these directions and the applicable recommended practices set forth in accordance with API.

338 Equipment

Where a system of high pressure piping, hoses and swivel joints is used in well stimulation or similar operations, the swivel joints, piping and hoses shall be appropriately secured.

340 Swabbing

- (1) While swabbing operations are being carried out all engines, motors and other possible sources of ignition that are not essential to the operation shall be shut down.
- (2) During swabbing operations, the swabbing line shall be packed off at the surface so that fluids are directed as much as possible through a closed flow system.
- (3) During swabbing operations produced fluids shall be piped directly to a production facility, flare pit or tank.
- (4) As noted in Sub-Clause 326(4)(n) swabbing operations shall not be initiated during the hours of darkness, nor continued beyond the hours of daylight, without approval.

341 Diagnostic Fracture Injection Testing

- (1) Operations to conduct Diagnostic Fracture Injection Testing (DFIT) shall not be commenced without prior approval.
- (2) An application under Sub-Clause (1) shall be submitted to the Minister and shall include:
 - (a) Technical program of DFIT;
 - (b) Comprehensive risk assessment of operations; and
 - (c) Well monitoring program during the pressure recording period.
- (3) Daily operations report shall be submitted to the minister before noon.
- (4) Prior to perforation the operator shall conduct Cement Bond Log (CBL) and submit it to the Minister with the interpretation of the CBL.
- (5) The operator shall submit the DFIT interpretation report to the Minister within 3 months after the completion of the pressure recording.

342 Hydraulic Fracturing

- (1) Hydraulic fracturing operations shall not be commenced without approval.
- (2) An application under Sub-Clause (1) must be submitted to the Minister accompanied by a Technical Works Program describing all aspects of hydraulic fracturing operations including:
 - (a) Status of the well prior to the operations;
 - (b) Pressure testing of the well;
 - (c) Interpretation of cement evaluation log(s);
 - (d) Perforations details;
 - (e) Design and stages of the hydraulic fracturing program;
 - (f) Procedures of hydraulic fracturing operations;
 - (g) Mechanical properties of the casing;
 - (h) Geological hazards;
 - (i) Geomechanical hazards;
 - (j) Modeling of the fracture propagation;
 - (k) Details of all aquifers;

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- (l) Analysis of hydraulic fracturing operations including fracture gradient, half-length of fracture, propped half-length of fracture, fracture height, average fracture width, conductivity, maximum pumping pressure and estimated return volume of fluid;
 - (m) Returned fluid management plan;
 - (n) Details of Frac Tree;
 - (o) The monitoring program, if the applicant plans to conduct any monitoring survey concurrent with hydraulic fracturing such as Tilt meter survey, MicroSeismic Monitoring or use of tracers; and
 - (p) Such other information as the Minister requires.
- (3) BTEX compounds must not be added to hydraulic fracturing fluids and any presence of BTEX in flowback fluids must be reported to the Minister without delay.
 - (4) Specific information regarding chemicals used must be released to the department and the general public.
 - (5) Hydraulic fracturing operations shall conform to API.
 - (6) Daily operations report shall be submitted to the minister before noon Australian Central Standard Time (ACST).
 - (7) If the operator has the plan to conduct micro-seismic monitoring, for the purpose of the drilling of monitoring well it shall submit an application under Clause 301.
 - (8) For monitoring operations, a weekly report shall be submitted to the Minister.
 - (9) The operator shall submit the pressure test copy to the Minister as soon as it is recorded.
 - (10) Detailed records shall be kept of flowback fluids and a chemical analysis report of flowback fluids shall be submitted to the Minister within 6 months from the start of well clean-up when required by the Minister.

PART IV - PRODUCTION OPERATIONS

Division 1 - General Requirements

401 Approval of Production Equipment and Safety Systems

- (1) Production operations including operations for:
 - (a) the enhanced recovery or recycling of petroleum;
 - (b) the processing, storage or disposal of petroleum;
 - (c) the disposal of produced formation water; and
 - (d) the injection of petroleum or water into an underground formation;but excluding a production test of a well, shall not be carried out unless the production equipment and safety systems have been approved.
- (2) The installation or modification of production equipment and safety systems shall not be undertaken without approval.
- (3) An application for approval to install or modify production equipment or safety systems shall be accompanied by descriptions, plans and drawings containing such details as the Minister requires.
- (4) Certain equipment, including pressure vessels, cranes, and hoists, will require registration under legislation administered by NT WorkSafe.

402 Production Facilities

A production facility shall be designed, manufactured, constructed, tested, operated, inspected and maintained in accordance with relevant Australian and or API Standards or codes of practice, or to specifications and practices acceptable to the Minister.

404 Production Isolation Valves

A production facility shall be equipped with clearly marked and accessible isolation and emergency shutdown valves that permit the flow of oil or gas to be safely shut off in the event of a fire, loss of containment or other emergency.

405 Initial Production Tests

- (1) A new well completion shall be subjected to a production test to determine, as far as practicable:
 - (a) initial reservoir pressure and temperature;
 - (b) representative chemical analyses of fluids, as they exist in the reservoir;
 - (c) the production capacity of the well; and
 - (d) the formation characteristics, including reservoir fluid and rock properties, that exist at least 10 metres from the well bore.
- (2) The production test of oil and gas completions shall be undertaken as soon as practicable after stabilized flow has been achieved.

- (3) Unless valid data are in existence, where a completion is to be subjected to a major stimulation procedure (such as fracturing or acidizing), a test shall be carried out no more than six months before the stimulation and then, unless otherwise approved, a further test shall be carried out not more than three months after the completion of the stimulation.
- (4) A test under Sub-Clause (3) shall determine as far as practicable any changes in fluid composition, production capacity and formation characteristics.
- (5) To the extent that the equipment installed may permit, where a test is carried out under Sub-Clauses (1), (2) or (3), the closed in and flowing bottom hole pressures shall be measured.
- (6) A detailed report on the results of a production test shall be furnished to the Minister within three months after the completion of the test (although the results of a test prior to a major stimulation may be combined with the results of the test after the stimulation).
- (7) Where an extended production test is approved a monthly report detailing pressure information, quantities of fluids produced and transfer or export of gas or hydrocarbon liquids shall be submitted to the Minister.

406 Reservoir Management Plan

- (1) Subject to Sub-Clause (2) and Clause 407, as applicable, a completion shall not be brought into production except in accordance with a reservoir management plan approved by the Minister that maximises ultimate recovery of petroleum from the reservoir.
- (2) The Minister may require that a reservoir management plan be revised from time to time.

407 Evaluation of Potential for Retrograde Condensation

- (1) Subject to this requirement, before production from a gas, gas condensate or volatile oil reservoir is commenced, the Operator shall carry out well sampling and evaluate the possibility of retrograde condensation occurring in the reservoir.
- (2) If it is not practicable to comply with Sub-Clause (1) before production is commenced, a program of work to carry out such an evaluation during the course of production shall be submitted for approval before production is commenced.
- (3) Where, on the commencement of these requirements, a reservoir is already in production, an evaluation of the potential for, or the documentation of the historical lack of evidence of, retrograde condensation shall be carried out and submitted to the Minister within one year after the commencement of these requirements.

- (4) Where, as a result of an evaluation under this requirement, there appears to be the possibility of retrograde condensation occurring in a reservoir, a full pressure-volume-temperature study shall be carried out and submitted to the Minister with the reservoir management plan.

408 Rate of Recovery of Petroleum

- (1) The production policy for a reservoir shall be in accordance with an approved reservoir management plan unless production is the subject of a specific direction under the Act.
- (2) An application under Sub-Clause (1) shall include proposed production policy and rate of recovery, past performance, predicted future performance and estimate of ultimate recovery from the reservoir.
- (3) A periodic review of reservoir description, production policy and current reservoir performance shall be submitted at the request of the Minister to demonstrate that a reservoir is being developed and produced in a manner consistent with sound reservoir management practices and maximises ultimate recovery.

409 Production Tests on Producing Wells

A production test to estimate the rate of recovery of reservoir fluids shall be carried out on each producing well at least once each month unless the rate of recovery is measured continuously or unless otherwise approved.

410 Gas Reservoir and Well Performance Monitoring

- (1) Bottom hole pressure build-up surveys shall be conducted on each gas completion at intervals of production not exceeding 10% of the currently estimated original proved plus probable recoverable reserves of the petroleum pool, in accordance with the approved reservoir management plan.
- (2) Each producing gas completion shall be tested, at intervals not exceeding four years, to determine changes in flow characteristics.
- (3) Well stream gas analysis shall be determined in conjunction with each test carried out under Sub-Clause (2), and at such other times as the Minister may require.
- (4) Each gas completion that is capable of production shall be tested to determine water production in a manner acceptable to the Minister at intervals not exceeding six months.
- (5) Gas completions shall be tested using a properly calibrated subsurface pressure gauge.
- (6) While a gas completion is being cleaned up or tested, the amount of gas flared shall be kept to a minimum in accordance with good oilfield practice.

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- (7) The results of all gas completion tests shall be furnished to the Minister within one month after the end of the month in which the tests are carried out.
- (8) If a test indicates the production of formation water that had not been previously identified:
 - (a) a full separator test shall be carried out;
 - (b) a chemical analysis of the produced water shall be carried out; and
 - (c) further separator tests shall then be carried out at intervals acceptable to the Minister.

411 Oil Reservoir Pressure Build-up Surveys

Unless otherwise approved, bottom hole pressure build-up surveys shall be conducted, where downhole equipment permits, on each well completed in a pool from which oil is being produced, at intervals not greater than:

- (1) one year; or
- (2) the time required to produce 10% of the currently estimated original proved plus probable recoverable reserves of the petroleum pool,

whichever is greater, in accordance with the approved reservoir management plan.

412 Measurement of Produced Petroleum and Water

- (1) Petroleum including gaseous fluids and water shall not be recovered, flared, vented, disposed of or used in recovery operations unless approved equipment and procedures are used on each completion enabling both the quantity and composition of such fluids to be determined.
- (2) Where the Minister considers that inadequate production information is being obtained, the Minister may require that additional testing be carried out.
- (3) Petroleum shall not be recovered simultaneously from more than one reservoir in a well unless the quantity and composition of petroleum and water from each reservoir are determined.
- (4) Petroleum recovered from different reservoirs and from more than one well shall not be commingled until the petroleum and water pass a point where the quantity and composition of petroleum and water from each well and from each reservoir are determined.
- (5) A metering device used on or in an oil or gas well, gathering system, production facility or pumping station shall conform to a recognized standard.
- (6) A meter or other device used to measure the production of oil, gas or water shall be proved and certified as to its accuracy in a manner, and at a frequency, acceptable to the Minister.

413 Measurement of Production to Determine Royalties

- (1) The Minister may, for the purposes of determining the royalty payable, select a suitable metering device for the accurate and secure fiscal metering of oil, gas and associated liquids to be installed at a well or production facility, or on a pipeline, tank or other receptacle that is used for the storage or transportation of oil, gas or other fluids.
- (2) Except in an emergency, any metering device approved and installed under Sub-Clause (1) shall not be tampered with or removed without written approval.
- (3) Notice acceptable to the Minister shall be given of an intention, for Royalty purposes, to prove a petroleum meter or to sample a petroleum stream.

414 Pressure below Bubble Point

An oil completion shall not be produced so that the sandface pressure is below the bubble point pressure except in accordance with an approved reservoir management plan or production policy.

415 Surface Connections

Each well from which petroleum is recovered shall be provided with such surface connections and equipment as are necessary to prevent the injection of petroleum or water into the well from another well or from production equipment.

416 Segregation of Zones

- (1) An Operator shall, in relation to each multiple completion well, demonstrate that segregation between the completions has been achieved and maintained:
 - (a) after the initial well completion, after any change of subsurface equipment and after any other operation that may disturb, or exert abnormal differential pressures on, subsurface equipment; and
 - (b) at least once a year, or at such other intervals as the Minister may require or approve.
- (2) An Operator shall, within one month after completing a test referred to in Sub-Clause (1), furnish the Minister with a report of the test which includes all relevant data and an analysis and interpretation of the results to prove or confirm segregation.
- (3) If a test carried out or the production characteristics of a well indicate that segregation between completions is ineffective, the Minister shall be immediately informed.
- (4) All reasonable steps shall be promptly taken to re-establish segregation and, if those steps are not successful, the Minister may order that one or more of the completions be sealed off.

- (5) If an Operator fails to demonstrate to the Minister that segregation between completions has been achieved, the Minister may require that the well be shut-in or produced in a specified manner.
- (6) An Operator shall give the Minister at least three days' notice of an intention to carry out a test for the purposes of this requirement.

417 Minister May Give Directions in Relation to Enhanced Recovery

In order to prevent undue residual petroleum left in the reservoir unrecovered, the Minister may, by written notice to the Operator require that:

- (1) an enhanced recovery scheme be used in a reservoir, or in a part of a reservoir, and may, for the purposes of that scheme, require that gas, water or some other substance be injected into the reservoir; and
- (2) any gas produced from a reservoir be injected into an underground reservoir for storage or other purposes.

418 Waste or Contamination of Petroleum or Water

- (1) Where, in the opinion of the Minister, there is a reasonable possibility that oil, gas or water is being wasted or contaminated, the Operator shall carry out such tests and within such time as the Minister may specify.
- (2) If it is established that waste or contamination is occurring, the Operator shall take such steps as may be necessary or the Minister may require to remedy or prevent it.
- (3) The results of any test carried out under this requirement shall be furnished to the Minister as soon as practicable after they are obtained by the Operator.

419 Approval to Vent or Flare

Except in an emergency, petroleum shall not be flared or vented without approval, either directly or as part of an approved operation or plan.

420 Monitors and Control Mechanisms

Approved monitors and control mechanisms shall be used to:

- (1) control the rate of recovery of petroleum or water from a well;
- (2) control the pressure in pressure vessels and associated piping so that the safe working pressures are not exceeded;
- (3) prevent the escape of petroleum;
- (4) shut down any artificial lift device and close in a well in the event of:
 - (a) a break in a pressure vessel or associated piping receiving or conveying petroleum or water from the well;

- (b) a failure of any control mechanism associated with the well which might result in the escape of petroleum or water or an unsafe condition; or
 - (c) any fire or explosion in the vicinity of the well; and
- (5) activate fire control mechanisms in the event of the outbreak of fire or an explosion.

421 Safety Devices

Unless otherwise approved, a well that is capable of producing petroleum by natural flow shall be equipped with an approved safety device, which shall be:

- (1) designed so that it automatically stops the flow of petroleum or water from the well if the flow line or associated production equipment is damaged in such a way that would allow the escape of petroleum or water;
- (2) located in an approved position;
- (3) operated and tested at six (6) monthly intervals unless otherwise approved; and
- (4) where a test indicates that it may not operate correctly, repaired or replaced forthwith.

422 Workover of Wells

- (1) An application for approval to work over a well, required by this Schedule, shall include particulars of:
 - (a) any zone in the well proposed to be abandoned;
 - (b) any zone in the well proposed to be developed;
 - (c) any proposed changes to the equipment in or on the well; and
 - (d) procedures proposed to be used.
- (2) Where a well is to be worked over for gas lift operations, an approved pressure test that will prove the integrity of the well production casing, tubing and associated equipment shall, unless otherwise approved, be carried out within six (6) months prior to the commencement of gas lift operations.

423 Wireline Operations in Wells

Except in an emergency, notice acceptable to the Minister shall be given of an intention to conduct a non-routine wireline survey in a well or to move an item of subsurface equipment in a well.

424 Protection of Completed Wells

- (1) Reasonable steps shall be taken to protect a completed well and a notice warning persons of the danger that exists shall be kept on display in the vicinity of the well.
- (2) A well that has not been suspended or plugged and abandoned shall be inspected at intervals not exceeding six months.

- (3) On an inspection under Sub-Clause (2):
 - (a) all tubing and annulus pressures shall be measured;
 - (a) any evidence of communication shall be evaluated;
 - (b) integrity of surface equipment including valves, gauges, vents and joints shall be assessed; and
 - (d) the extent of any necessary repairs or maintenance shall be determined.
- (4) At approved intervals but not less frequent than 5 years the Operator shall run corrosion logs to determine the rate of corrosion of the production casing.
- (5) An Operator shall, at the end of each month, furnish the Minister with a report on the wells that have been worked over during the previous month.

425 Decommissioning Plans

Clauses 426, 427 and 428 shall be subject to an approved decommissioning plan submitted to the Minister no later than six (6) months prior to the cessation of production activities.

426 Plugging of Wells

- (1) Unless otherwise approved, on completion of production activities and prior to the surrender of a production licence all wells shall be plugged and abandoned.
- (2) The Minister may require that a well be plugged and abandoned:
 - (a) in the interest of safety;
 - (b) for the protection of the environment; or
 - (c) for the purpose of the elimination of waste or contamination.

427 Removal of Facilities

- (1) Upon completion of production activities and within 2 years after the surrender of a production licence, every production facility shall be dismantled and removed or decommissioned in accordance with a plan submitted and approved under Clause 425 and in accordance with an approved Environment Management Plan under the *Petroleum (Environment) Regulations* unless otherwise approved.
- (2) Production facilities may remain intact in a licence area up until two years after the surrender of the production licence only with approval from the Minister, subject to an inspection and maintenance plan.
- (3) The Minister may require that any part or all of a production facility be dismantled and removed or decommissioned within a reasonable timeframe:
 - (a) in the interest of safety;
 - (b) for the protection of the environment; or
 - (c) for the purpose of the elimination of waste or contamination.

428 Rehabilitation of Lands

Following the completion of production activities and within two (2) years after the surrender of a production licence, the land surrounding or affected by production facilities and wells shall be restored in accordance with a current environment management plan.

Division 2 - Reporting and Data Submission

429 Program of Work and Annual Reporting Requirements

- (1) In accordance with section 59 of the Act the interest holder shall submit an annual report to the Minister in accordance with Clause 603.
- (2) An interest holder shall two (2) months prior to the commencement of each 12 month period submit to the Minister a program of work proposed to be carried out in the licence area during that 12 month period unless otherwise approved.

430 Estimate of Petroleum Resources

- (1) An interest holder shall, in each year, send to the Minister a report detailing the amount of petroleum resources in each petroleum pool in the licence area which shall include:
 - (a) the location of the petroleum pool;
 - (b) the estimated amount of petroleum resources by classification in accordance with the Society of Petroleum Engineers "Petroleum Resource Management System" reporting guidelines;
 - (c) the data, assumptions and methodologies upon which the estimates are based;
 - (d) a description of the reservoir (simulation) models used, a comparison of results with those previously obtained and a discussion of any implications regarding petroleum recovery; and
 - (e) any specific reports prepared during the year by the interest holder and or independent third party in connection with reserves estimation and classification, reservoir performance and production optimization.
- (2) When a study resulting in a revised estimate of recoverable or in-place petroleum in a pool has been carried out, a report of that study shall be sent to the Minister.
- (3) Not less frequent than every five (5) years an interest holder must submit an independent expert report to the Minister with an assessment of petroleum resources in the production licence area in accordance with the "Petroleum Resource Management" guidelines unless otherwise approved.

431 Monthly Production Report

Not later than the 15th day of each month a production report in respect of each field, in an approved form, relating to the last preceding calendar month shall be sent to the Minister including:

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- (1) the total quantities of petroleum and water produced, injected, used, flared, vented, stored and delivered from the area;
- (2) the cumulative quantities of liquid and gaseous petroleum and water produced or injected as at the end of the month; and
- (3) for each well:
 - (a) its identification name and number;
 - (b) a summary of all work performed on it during the previous month;
 - (c) the result of any production test including the choke size used and the tubing and separator pressures observed during the test;
 - (d) its status at the end of the month;
 - (e) the number of days of production or injection;
 - (f) the total estimated quantities of liquid, gaseous petroleum and water produced or injected during the month, their corresponding daily average rates, average gas oil ratios and water cut data; and
 - (g) the cumulative quantities of liquid and gaseous petroleum and water produced or injected as at the end of the month.

432 Production Facility Maintenance Reporting

- (1) Reports shall be furnished to the Minister as soon as practical after any:
 - (a) mechanical damage, corrosion or erosion that could affect the safety or integrity of a production facility to an extent that necessitates a change in operations; and
 - (b) non-routine corrosion investigation (such as instrumented pigging, acoustic emission testing and pipe examinations).
- (2) A report under Sub-Clause (1) shall include, or be followed by, a report on any repairs carried out.
- (3) Where a pressure test is carried out on a section of a production facility, a report on the results and interpretation, shall be sent to the Minister within one month after the completion of the test.
- (4) In addition to the other requirements of this Clause, the Operator shall, commensurate with reporting requirements under sub-Clause 429(1) after the end of each year send to the Minister a report:
 - (a) summarizing the routine corrosion and other surveys carried out on a production facility during the year;
 - (b) assessing the condition of the production facility as at the end of that year; and
 - (c) summarizing forward maintenance plans including any plant shutdowns in the following five (5) years.

433 Records of Periodic Inspections

- (1) Accurate records shall be maintained of all periodic inspections of facility equipment and piping.
- (2) Records shall include the particulars of the inspections, testing or proving of:
 - (a) pressure vessels;
 - (b) meters;
 - (c) pressure relief valves;

- (d) control valves; and
 - (e) wells including wellheads, valves, gauges, vents, joints, sub-surface safety valves and other downhole equipment; and
 - (f) any other items, equipment or piping reasonably determined by the Minister.
- (3) Records of inspections for corrosion shall be maintained for the production facility, equipment piping and wells.
- (4) All records shall be entered into a digital maintenance management system.

434 Commingled Production Records and Reports

Where oil, gas or water from two or more wells is commingled before it is measured, the Minister may, on the application of an Operator, allow records to be kept and reports to be furnished on a combined basis but, in that event, the production from each individual well shall be estimated in a manner acceptable to the Minister to determine, so far as may be practicable, the actual production from each well (and that estimate will represent the production of that well for the purposes of the Act).

435 Reports on Downhole Surveys

- (1) Where a downhole survey is conducted in a well, a report of the survey, together with any records made for the purpose of the survey, shall be submitted to the Minister not later than the last day of the succeeding month.
- (2) A report of a downhole survey shall include;
- (a) one digital copy in native file format and one digital copy in portable document format of each log at each scale run in the survey unless otherwise approved; and
 - (b) one digital copy in portable document format of computer processed interpretation logs if generated, unless otherwise approved.

PART V - GEOPHYSICAL AND GEOLOGICAL SURVEYS

Division 1 - General Requirements

501 Application

An Operator shall ensure that all geophysical and geological surveys are conducted in accordance with the requirements of this Schedule, any conditions as per the approval instrument and a current environment management plan.

502 Person-in-charge

- (1) The Minister shall be notified of the name and contact details of the person-in-charge of any geological or geophysical party not less than 14 days prior to the commencement of operations and shall be clearly displayed at the site of that operation.
- (2) The person-in-charge shall ensure that all personnel in his charge know and comply with all relevant requirements of this Schedule, applicable legislation and safety procedures and the environment management plan.

503 Approval to Carry out Geophysical and Geological Surveys

- (1) A person shall not carry out a geophysical or geological survey without approval.
- (2) An application for approval to carry out a geophysical or geological survey shall include:
 - (a) the type of survey and the expected date of commencement, duration and cost;
 - (b) a plan showing the area of the survey and existing land tenures, roads, tracks, mines, quarries and habitations;
 - (c) in the case of seismic survey, details of the energy source to be used and a plan of the proposed survey traverses;
 - (d) in the case of gravity, magnetic or other geophysical or geochemical survey, a plan showing the proposed survey stations and/or traverses (aerial, aquatic or terrestrial) and a brief description of operations;
 - (e) either;
 - (i) where the *Petroleum (Environment) Regulations* are not applicable, a statement of proposed environmental protection and rehabilitation measures in relation to the survey; or
 - (ii) where the *Petroleum (Environment) Regulations* are applicable, a copy of the "current plan" under the *Petroleum (Environment) Regulations* in relation to the survey; and
 - (f) names and addresses of any contractors to be employed; and
 - (g) a statement of arrangements with any other parties having an interest in the land affected.

- (3) An application to carry out a geological or geophysical survey shall be submitted at least one month prior to the commencement of operations.

504 Protection of the Environment

A person carrying out a seismic survey shall operate in accordance with the approved environmental protection and rehabilitation measures under Clause 503(2)(e) if the operations are not covered under a current environment management plan.

506 Operations on Roads and in Inhabited Areas

- (1) Seismic survey operations shall comply with an approved traffic management plan.
- (2) Where a seismic survey is to be carried out in the vicinity of a building or public utility, all reasonable steps shall be taken to ensure that the operation does not cause any damage or inconvenience to any person.

508 Energy Sources

- (1) A person shall not operate a vibrator within 20 metres of any gas, oil or water pipeline, electric cable or other utilities or installations without the approval of the operator of the facility.
- (2) Prior to operating an energy source in areas where there are gas or water pipelines, the pipeline Operator should be advised.
- (3) If a seismic line is to cross a pipeline the pipeline Operator shall be given opportunity to inspect the site.
- (4) If required by the pipeline Operator, an earth ramp or other load-bearing structure shall be constructed over the pipeline before heavy vehicles begin crossing the pipeline.

Division 2 - Reporting

512 Weekly Reports

A weekly report shall be forwarded to the Minister stating progress of the survey. When a survey has been completed, a summary stating the start and completion dates and the number of kilometres or samples acquired (including geochemical samples) shall also be forwarded.

513 Basic Data Retention and Submission

- (1) Where a geological or a geophysical survey has been carried out, all basic data and original field records pertinent to the survey shall be retained in Australia unless otherwise approved, properly stored and maintained so as to prevent undue deterioration and submitted as required by sub-Clause (3).

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- (2) All data that are submitted shall be clearly identified and labelled in approved digital storage media and in approved formats.
- (3) When a geological or geophysical field survey has been carried out, the following acquisition and processed data shall, unless otherwise approved, be submitted within 12 months of completion of data acquisition:
 - (a) where a geophysical survey other than seismic survey has been carried out, and where applicable:
 - (i) raw and processed located data;
 - (ii) gridded data; and
 - (ii) final processed image(s).
 - (b) where a 2D seismic survey has been carried out, and where applicable:
 - (i) navigation data in in the form of x, y and z co-ordinates for each shotpoint or fullfold polygon outline;
 - (ii) seismic field data;
 - (iii) observers logs and associated support data including uphole data and itemised field tape listing in accordance with sub-Clause (3)(b)(ix);
 - (iv) raw and final stacked data, including near/mid/far sub-stacks if generated;
 - (v) raw and final migrated data, including PSTM, PSDM and near/mid/far sub-stacks;
 - (vi) final processed navigation, elevation and bathymetry data;
 - (vii) shotpoint to common depth point (CDP) relationship;
 - (viii) data for both stacked and migrated velocities, including line number, shotpoint and time versus root mean square (RMS) pair;
 - (ix) itemised process tape listing showing:
 - tape number;
 - survey name;
 - line number;
 - shotpoint range;
 - common depth point (CDP); and
 - data type.
 - (c) where a 3D seismic survey has been carried out and where applicable:
 - (i) data submission shall be as per Sub-Clause (3)(b);
 - (ii) final navigation data in the form of:
 - final processed (grid) bin coordinates; and
 - polygonal position data (outline of the full fold area)
 - (iii) data for both stacked and migrated velocities, including:
 - bin number; and
 - time versus root mean square (RMS)
 - (iv) 2D data subset, if production is required by the Minister.
- (4) All magnetic tapes or other digital media submitted shall be of at least manufacturer's certified "error free" quality and be accompanied by suitable verification testing.
- (5) Where seismic reprocessing, an analysis, study or operation not covered by Sub-Clause (1) is undertaken to satisfy the work commitments of the petroleum interest, a written report of the activity and interpretation results as per Clause 514(4) shall be forwarded to the Minister as soon as possible.

- (6) Activities referred to in Sub-Clause (5) include but are not limited to geophysical and geological studies and seismic reprocessing. Acquisition and processing data submission for seismic reprocessing is not required unless requested by the Minister.

514 Final Reports on Geophysical and Geological Surveys

- (1) Where a geophysical or geological survey has been completed separate acquisition, processing and interpretation report shall be submitted not later than 12 months after the completion of the project.
- (2) An acquisition report relating to a geophysical or geological survey shall include but not be limited to:
- (a) the name and location of the survey, including a location map;
 - (b) petroleum interests covered and name of petroleum interest holder/s and Operator;
 - (c) the start and end dates of acquisition;
 - (d) the names of acquisition contractors used;
 - (e) the final line kilometres recorded, and for a 3D seismic survey, the full fold area acquired;
 - (f) The number and length of lines and number of data acquisition points along each line;
 - (g) geometry of the acquisition parameters;
 - (h) particulars of the system and equipment used for data acquisition, positioning and navigation;
 - (i) results of any data processing;
 - (j) results of systems tests, calibrations and diagnostics; and
 - (k) itemised field tape listing showing tape number, survey name, line number, shot point range and data type.
- (3) A processing report relating to a geophysical or geological survey shall include, but not be limited to:
- (a) name of the survey as per the acquisition report;
 - (b) the start and end dates of processing;
 - (c) name of processing contractors;
 - (d) the purpose of the processing;
 - (e) a summary of the data acquisition parameters;
 - (f) details of all processing sequences and techniques;
 - (g) for a geophysical survey a sample Extended Binary Coded Decimal Interchange Code (EBCDIC) header from the final data set;
 - (h) a list of processed data;
 - (i) for a 3D seismic survey – a description of the position of the survey polygon and a calculation for the 3 dimensional line numbering convention;
- (4) An interpretation report relating to a geological or geophysical survey shall include, but not be limited to:
- (a) the survey name as per the acquisition and processing reports;
 - (b) a description of the objectives of the interpretation;
 - (c) a discussion and justification of the interpreted results;
 - (d) for a seismic survey;
 - (i) a list of the surfaces interpreted;
 - (ii) a justification of the surfaces interpreted, including synthetic seismograms if available;

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- (iii) the velocity field used to convert time to depth and the basis for the velocity field; and
- (iv) time slices to describe the deposition environment if available.
- (e) index of maps and sections;
- (f) digital images of interpretative maps in approved format; and
- (g) conclusions drawn from the interpretation.

PART VI - REPORTING REQUIREMENTS FOR PETROLEUM INTERESTS

601 Periodic Reports for Exploration Permits

- (1) Annual reports required under the Act shall include:
 - (a) a general discussion of permit status and operations carried out (including office studies);
 - (b) technical conclusions derived from the year's operations;
 - (c) a list of reports submitted during the year;
 - (d) an outline of work plans for the next year;
 - (e) a summary of annual expenditure; and
 - (f) reports on desktop studies, geological surveys, core sampling reports, consultant reports or any other geoscience information not submitted with drilling or geophysical reports should be submitted in separate files as appendices to annual reports. Annual reports remain confidential, however appendices will be publically released as interpretative studies.
- (2) The annual report must clearly identify the interest holder's performance against the agreed minimum work program and provide explanations for any variations.

602 Periodic Reports for Retention Licences

- (1) Annual reports required under the Act shall include:
 - (a) a general discussion of Retention Licence status and operations carried out, if any (including desktop studies);
 - (b) technical conclusions derived from the year's studies and/or operations;
 - (c) a list of reports submitted during the year;
 - (d) an outline of work plans for the next year;
 - (e) a summary of annual expenditure; and
 - (f) as per Clause 601(1)(f) if applicable.
- (2) The annual report must provide the Minister with a comprehensive understanding of the interest holders' activities during the year and the basis for any opinions about the future commerciality of the Petroleum Interest or otherwise
- (3) Six months prior to the expiry of the final year in the Retention Licence term, should the interest holder wish to extend the retention Licence, the interest holder must submit to the Minister a Marketing Report in support of the request for an extension.

603 Annual Operations Reports for Production Licences

- (1) Annual reports required under the Act shall include but are not limited to:
 - (a) a general discussion of Production Licence status and operations carried out (including office studies);
 - (b) technical conclusions derived from the year's operations;
 - (c) a list of reports submitted during the year;
 - (d) an outline of work plans for the next year; and
 - (e) a detailed summary of capital and operational expenditure incurred during the previous 12 month period and a summary of field expenditure to date.
 - (f) a forecast of capital and operational expenditure for the upcoming five (5) year period and a level 2 schedule of major field works and planned shutdowns.
 - (g) a reserves and resources update.
- (2) The annual report must provide the Minister with a comprehensive understanding of the status of the Production Licence and the interest holders plans to maximise the returns from the petroleum resource.

~END~