

**WESTERN AUSTRALIAN
PETROLEUM (SUBMERGED LANDS) ACT 1982**

S C H E D U L E

**SPECIFIC REQUIREMENTS AS TO PETROLEUM
EXPLORATION AND PRODUCTION WESTERN
AUSTRALIAN COASTAL WATERS 2007**

SCHEDULE

SPECIFIC REQUIREMENTS AS TO PETROLEUM EXPLORATION AND PRODUCTION WESTERN AUSTRALIAN COASTAL WATERS 2007

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Definitions 103(1) In this Schedule unless inconsistent with the context or subject matter -

"API" means the American Petroleum Institute.

"ANSI" means the American National Standards Institute.

"Approval" or "approved" means the approval of or approved by the Director.

"ASEG-GDF" means Australian Society of Exploration Geophysicists - General Data Format.

"ASME" means the American Society of Mechanical Engineers.

"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 seabed to a platform.

"Drilling operations" means the making of wells by means of rotary or other drilling equipment.

"Emergency" means an emergency affecting or likely to affect the health or safety of any person, the environment or the integrity of the facilities in the adjacent area.

"Geophysical survey" means a survey carried out in the search for petroleum using one of the following methods -

- (a) seismic;
- (b) gravimetric;
- (c) magnetic;
- (d) electrical;
- (e) geochemical;
- (f) well logging; and
- (g) any other approved method.

"Good oil-field practice" means all those things that are generally accepted as good and safe in the carrying on of exploration for petroleum, or in operations for the recovery of petroleum, as the case may be.

"Intermediate casing string" means a pipe installed after the surface casing string to seal off unconsolidated formations, lost circulation zones, abnormal pressure zones and/or hydrocarbon zones.

"Liner string" means pipe which is an intermediate or production casing string but does not extend to the wellhead.

"NATA" means the National Association of Testing Authorities, Australia.

"Operator" means the representative of the titleholder responsible for overall management and control of operations for the exploration or exploitation of petroleum resources for which the title is held.

"Production casing string" means a pipe installed to isolate one or more hydrocarbon zones for testing or producing purposes.

"Production equipment" means any equipment for the regulation or measurement of the flow of petroleum or other material obtained from a well, the sampling of such petroleum or other material, the storage of such petroleum or other material, or the separation of such petroleum from such other material.

"Production test" in relation to a well means an operation (other than a formation fluid sample test into a container which has been positioned by wireline methods) carried out on that well to recover from that well petroleum or water or a sample of petroleum or water or for or in connection with estimating the rate of recovery of petroleum or water from that well.

"SAA AS" means an Australian Standard issued by the Standards Association of Australia.

"Structural or drive casing string" means a pipe -
(a) cemented in a pre-drilled hole; or
(b) driven or jetted;
to cover soft or unstable formations immediately below the seabed and to provide structural strength to the guide structure.

"Surface casing string" means a pipe installed after the conductor casing string to provide blow-out protection, and to seal off water sands, weak formations and/or lost circulation zones.

"Wireline operation" means the use of a device lowered into a well by a cable or wire for the purpose of surveying the well or its surrounding rock formation, or moving or actuating an item of subsurface equipment.

"Wireline survey" means the determination of one or more physical characteristics of a well or its surrounding rock formation as a function of depth by means of a sensor lowered into the well by a cable or wire, and the recording of those characteristics.

"Workover operation" means a maintenance operation carried out on a well in order to improve productivity or to remedy some defect.

- (2) In this Schedule a reference to the requirements of a code, standard or specification is a reference to such of those requirements as are not inconsistent with this Schedule.
- (3) In this Schedule reference to a clause without more is a reference to a clause which is part of this Schedule, reference to a sub-clause without more is a reference to a sub-clause of the clause in which such reference occurs, and reference to an appendix without more is a reference to an appendix to the Part in which such reference occurs.

Tests 104 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 -
(a) in an endorsed test document within the meaning of the By-laws of the National Association of Testing Authorities, Australia; or
(b) where the test is not a test in respect of which an endorsed test

- document of the kind referred to in paragraph (a) can be given, to the satisfaction of the Director; or
- (c) where the test is a test in respect of which an endorsed test document of the kind referred to in paragraph (a) can be given but for practical reasons acceptable to the Director the requirement for such endorsement has been waived, to the satisfaction of the Director.

Codes, 105(1) Reference in this Schedule to a code, standard Standards, or specification, unless inconsistent with the Specifications context or subject matter, is a reference to the latest edition of that code, standard or specification issued by the authority or organisation which made the code, standard or specification.

- (2) In sub-clause (1) "edition" includes an issued code, standard or specification and amendments thereto issued by the authority or organisation which made the code, standard or specification.

PART II - GENERAL

Division 1 - General Requirements

Emergency 202(1) Operations shall not be carried out unless response manual there is an approved emergency response manual which sets out the procedures to be followed and actions to be taken, and identifies the persons to be responsible for following these procedures and taking these actions, in the event of an emergency arising during the operations by reason of –

- (a) the escape or ignition of petroleum;

- (2) In the event of an emergency of a kind identified in sub- clause (1) arising, operations shall where applicable be carried out in accordance with the procedures set out in the emergency response manual referred to in sub- clause (1).

Availability of 204 All relevant Directions shall be readily available at all Directions times to every person on every platform in the adjacent area.

Oil spills 220(1) Where an escape or ignition of petroleum occurs, such action as is necessary to minimise the loss of petroleum and the pollution of the area and to protect persons and property shall be taken.

- (2) No chemical dispersants shall be used on oil spills without approval.

Reporting 285(1) A report shall forthwith be made to an Environmental Inspector upon escape or Ignition of the occurrence of –

petroleum and other Matreial

- (a) an escape or discharge into the sea of a mixture of petroleum and water in which the petroleum concentration was greater than 50mg/L;
- (b) an escape or discharge into the sea of more than 80 L of petroleum, not being an escape or discharge into the sea of petroleum in a mixture of petroleum and water in which the petroleum concentration was not greater than 50 mg/L; and

- (c) any uncontrolled escape or ignition of petroleum or any other flammable or combustible material causing a potentially hazardous situation.
- (2) A report in writing of any occurrence referred to in sub- clause (1) shall be submitted to the Director as soon as practicable after the occurrence specifying –
- (a) the date, time and place of the occurrence;
 - (b) the quantity or approximate quantity of liquid that escaped or burned;
 - (c) particulars of damage caused by the escape or ignition;
 - (d) the events so far as they are known or suspected that caused or contributed to the escape or ignition;
 - (e) particulars of methods used to control the escape or ignition;
 - (f) particulars of methods used or proposed to be used to repair property damaged by the escape or ignition; and
 - (g) measures taken, or to be taken, to prevent a possible recurrence of the escape or ignition.

PART IV - GEOLOGICAL AND GEOPHYSICAL ACTIVITIES

Division 1 - General Requirements

Geological and geophysical surveys approval

- 401(1) A geological or geophysical survey shall not be carried out or any modification, which constitutes a significant change to the area or duration of a survey previously approved, be made without prior approval
- (2) An application for approval to carry out a geological or geophysical survey shall be made not less than one month or such other period as is approved before the proposed commencement of the survey and shall include
- (a) the proposed date of commencement, the estimated duration and cost of the survey;
 - (b) a plan to an appropriate scale showing the area to be the subject of the survey;
 - (c) in the case of a seismic, gravity or magnetic survey, details of the equipment to be used, and a plan showing the proposed survey stations and/or traverses, a brief description of operations, procedures, the navigation and acquisition systems, and indicating in the case of airborne surveys, the proposed flying altitude; and
 - (d) such other relevant information as the Director requires-
- and in addition shall be accompanied by –
- (e) a safety manual as required under clause 201;

- (f) where applicable, a copy of current vessel classification; and
 - (g) evidence that the vessel and crew comply with the requirements of the Navigation Act 1912 and Regulations and Marine Orders issued thereunder.
- (3) A survey shall not commence unless at least 48 hours notice of the date and time of commencement, the survey duration, the survey area coordinates and, in the case of a seismic survey, the length of streamers to be towed by the survey vessel has been given to the Director or an inspector nominated by the Director.
- (4) During the survey the operator shall, as appropriate, inform;
- (a) the relevant department for administering legislation relating to fisheries in the adjacent area; and
 - (b) the Australian Search and Rescue Centre in Canberra; of movements of the survey vessel.

Seismic
Energy
sources

- 402(1) Explosives shall not be used for a seismic survey without approval.
- (2) An energy source used in a seismic survey shall be operated in accordance with good safety practices, the manufacturer's recommendations, and the requirements of sub-clauses (4) to (7) as the case may be.
- (3) While diving operations from a platform are in progress, a charge shall not be detonated underwater within –
- (a) 2 km of the platform; and
 - (b) 8 km of the platform unless adequate notification to the person in charge of the diving operations has been given of -
 - (i) the type of energy source to be used, its frequency and intensity;
 - (ii) the times at which the energy source is to be used;
 - (iii) in the case of explosive charges any misfires; and
 - (iv) any other pertinent information.
- (4) When airguns are used in a seismic survey –
- (a)
 - (i) airgun system components shall be maintained free of dirt, oil or grease;
 - (ii) air lines and electrical lines shall be regularly inspected for signs of abrasion and wear; and
 - (iii) only those fittings, valves, hoses, pipes and other components that comply with the manufacturers' specifications shall be used;
 - (b) air pressure shall be reduced to 3500 KPa for each airgun before an array is brought on board, and shall be bled off completely once on board;
 - (c) maintenance of airguns shall be carried out only after the relevant air lines and electrical lines have been disconnected;

- (d) procedures shall be followed which ensure that air lines, as numbered at the manifold, are connected to the correct sequence of guns in the array;
 - (e) any test-firing of an airgun or airgun array on deck or in the air shall be carried out only with approval; and
 - (f) all pipes or hoses subject to high pressure air shall be secured or equipped with safety chains to prevent whipping when air pressure is applied.
- (5) When gas exploders are used in a seismic survey-
- (a) welding, brazing, or smoking shall not be allowed near gas cylinders or tanks nor in reel and cable work areas;
 - (b) gas storage areas shall be properly ventilated;
 - (c) gas cylinders and tanks shall be located in specially assigned locations and warning signs of the potential hazards shall be posted conspicuously;
 - (d) propane and butane cylinders shall be stored as far away as possible from oxygen cylinders or tanks; and
 - (e) gas storage cylinders shall be protected from overheating.
- (6) When steam sources are used in a seismic survey –
- (a) high pressure and high temperature lines and vessels shall be adequately protected against damage or puncture from falling objects;
 - (b) steam safety valves shall be clearly marked with warning signs to describe possible intermittent operation; and
 - (c) testing of the source shall be done with the gun fully immersed in water.
- (7) When sparker and boomer electrical systems are used in a seismic survey –
- (a) charging and discharging circuits in the sparker or boomer electrical system shall be equipped with circuit breakers;
 - (b) sparker and boomer electrical cables shall be protected from damage, adequately insulated and grounded to prevent current leakage and electrical shock; and
 - (c) the operation of the sparker or boomer shall be tested with the gun fully immersed in water.

Person in command

403 Each person on a vessel carrying out a survey shall be informed of who is in command and the name of the person in command shall be prominently displayed on the vessel.

Division 2 - Reporting and Data Submission

Basic data retention 450 Where a geological or geophysical survey has been carried out all basic data relevant to the survey, including seismic field tapes and observer's logs, shall be stored and maintained in an approved manner so as to prevent undue deterioration, and shall be retained in Australia except as otherwise approved.

Clear 451 All data that are to be lodged with the Director shall be labelling clearly labelled with all necessary information to identify of data them.

Periodic Reports 452(1) Weekly Reports
When a geological or geophysical field survey is in progress, a weekly report on survey operations shall be submitted to the Director as soon as practicable.

(2) Quarterly Reports

There shall be made available and distributed as directed by the Director not later than one month after the expiration of the period to which they relate two copies of a quarterly progress report for the three month period starting from the date of granting the title or special prospecting authority, or from the day following the last day covered by the previous quarterly report.

If no operations have been carried out during the quarterly period, a statement to that effect shall be made.

(3) A quarterly progress report referred to in sub-clause (2) shall include –

- (a) a review of operations for exploration for petroleum carried out in the adjacent area during the period;
- (b) a brief outline of geological and geophysical interpretations made as a result of the exploration operations, including any reprocessing or reinterpretation of basic data;
- (c) estimated expenditure for the quarter;
- (d) survey statistics; and
- (e) such other relevant information as the Director requires.

(4) Annual Reports

There shall be made available and distributed as directed by the Director not later than one month after the expiration of the period to which they relate two copies of an annual report.

This annual report may take the place of the fourth quarterly progress report required under sub-clause (2).

(5) An annual report referred to in sub-clause (4) shall –

- (a) be of a more comprehensive nature than that of the quarterly report;
- (b) include a general discussion of operations carried out;

- (c) give conclusions derived from the operations;
- (d) mention reports submitted during the year;
- (e) give an outline of work plans for the next year;
- (f) include, where appropriate, updated interpretation maps of seismic and potential field data at an appropriate scale; and
- (g) include a summary of annual expenditure.

Survey data submission 453(1) When a geological or geophysical field survey has been carried out, the following information shall, unless otherwise approved, be made available as soon as practicable, but in any event within one month of completion of processing of data, and distributed as directed by the Director-

- (a) where a gravity or magnetic survey has been carried out, and where applicable, -
 - (i) one copy of processed magnetic tapes of both located and gridded data in the ASEG- GDF format;
 - (ii) two stable base transparent copies of Bouguer gravity, free air gravity, total magnetic intensity and, if prepared vertical gradient, first derivative, second derivative and residual contour maps;
 - (iii) (iii) two stable base transparent copies of computer generated profile data; and
 - (iv) one copy of analog monitor records, diurnal records and altimeter records

and any maps or profiles made available pursuant to this clause shall annotate line position, line number, registration marks and processing parameters;

- (b) where a seismic survey has been carried out, and where applicable,-
 - (i) two stable base transparent copies of shotpoint location and bathymetric maps together with two copies of magnetic tapes of shotpoints co-ordinates (geographic and Australian Map Grid) and the corresponding water depth in United Kingdom Offshore Operator Association format and related to the Australian National Spheroid or the global spheroid model (WGS 84) or equivalent datum;
 - (ii) two stable base transparent copies and one paper print of final processed sections having vertical scale of not less than 10 cm/sec, and, if prepared, migrated sections;
 - (iii) for 3D, or simulated 3D surveys one stable base transparent copy of inline and crossline vertical time sections extracted from the 3D volume in a square grid of 2000m, or smaller if directed by the Director; and
 - (iv) one copy of velocity analysis data on microform or in a format acceptable to the Director;

- (c) where a wireline survey has been carried out and where appropriate,-
 - (i) two stable base transparent copies and two paper prints of each log at each scale run in the survey; and
 - (ii) two stable base transparent copies and two paper prints of computer processed interpretation logs; and
- (d) where a survey, other than a gravity, magnetic, seismic or wireline survey, has been carried out, such information or material as requested by the Director.

(2) Where a geological or geophysical field survey has been carried out, the following basic survey data and supporting material shall be lodged in accordance with the instructions of the Director not less than one month prior to the data becoming publicly releasable under section 118 of the principal Act, or not less than 3 months prior to the last day of the current term of the title, whichever is the earlier, or at such other time as directed or agreed by the Director-

- (a) where a seismic survey has been carried out;
 - (i) one copy of field tapes accompanied by observer's logs in an acceptable format; and
 - (ii) one copy of post common depth-point stack tapes, in a specified, SEG standard format, and upon request of the Director, one copy of other processed tapes.
 - (iii) for 3D surveys one copy of the digital field data, one copy of the digital unfiltered migrated 3D data volume, one copy of the unscaled digital filtered migrated 3D data volume and one copy of the digital 3D velocity field data;
- (b) where a wireline survey has been carried out, one copy of all available digital log data on magnetic tapes in an appropriate edited format (LIS or its equivalent) and on floppy disk if available.

(3) All magnetic tapes submitted shall be of at least manufacturers certified "error free" quality.

(4) At the request of the titleholder, the Director may extend the time of lodgement specified in sub-clause (2) by periods not exceeding three years each provided -

- (a) the titleholder provides and continues to provide access to the data to the Director and his nominees on request; and
- (b) the data is stored in conditions approved by the Director.

(5) All data referred to in sub-clauses (1), (2) and (3) which has not already been lodged with the Director, must be lodged with the Director prior to the surrender, expiry or cancellation of the whole or relevant part of the title or special prospecting authority.

Final reports on wells and surveys

454(1) Unless otherwise determined by the Director, where a geological or geophysical study or survey or the drilling of a well has been completed, two copies of a report and maps in an appropriate format shall be made available as soon as practicable within 6 months or such other period as is approved after such completion and distributed as directed by the Director.

(2) A report referred to in sub-clause (1) relating to the drilling of a well shall where appropriate include the following particulars -

- (a) the name and location of the well;
- (b) the depth of sea water in which the well was drilled;
- (c) the true vertical depth and measured depth of the well;
- (d) the dates of the start and finish of the drilling of the well;
- (e) the name of the drilling unit used;
- (f) a statement whether the well has been -
 - (i) completed as a producing well;
 - (ii) suspended as a potential producing well; or
 - (iii) abandoned;
- (g) the results of formation fluid sampling tests, production tests and analyses carried out;
- (h) the equipment installed in or on the well;
- (i) the cementing operations carried out in or on the well;
- (j) the depths and descriptions of geological samples such as cuttings sidewall and conventional cores;
- (k) all surveys and measurements made in the well, including any detailed interpretations if made;
- (l) the geological interpretation of the observations made;
- (m) where available interpretations of all wireline log data;
- (n) where available all fluid sample analyses;
- (o) reports on cores and cuttings required by clause 456; and
- (p) a summary of costs of drilling of well, subsequent tests and sampling.

(3) A report referred to in sub-clause (1) relating to a geological or geophysical study or survey shall include the following particulars -

- (a) name and location of the survey;
- (b) dates of start and finish of the survey;
- (c) names of the contractors used to carry out the survey;
- (d) data acquisition report detailing the operations carried out;
- (e) system and equipment used for positioning and/or navigation;

- (f) geological/geophysical techniques and equipment used;
- (g) data processing report;
- (h) summary of the costs of the study or survey;
- (i) list of magnetic tapes with index of contents and format; and
- (j) interpretations, including maps, made as a result of the survey.

Cores,

455(1) Where cuttings are recovered in connection with the drilling of a well two sets of samples of cuttings, each a minimum of 100g dryweight, shall be washed, dried in an approved manner and placed in suitable plastic bags that are properly labelled for identification and distributed in accordance with sub-clause (7).

(2) Where cores, other than side-wall cores, are recovered in connection with the drilling of a well the cores shall where practicable be slabbed vertically and two samples, each of which is at least one-quarter of the core, shall be placed in suitable containers that are properly labelled for identification and distributed in accordance with sub-clause (7).

(3) Full diameter core samples may, where approved, be retained for special studies.

(4) Where core samples are retained in accordance with sub-clause (3) -

- (a) the samples shall be retained in Australia unless otherwise approved;
- (b) in the course of such studies care shall be taken that the core is subjected to no more damage than is necessary for the purpose of the studies; and
- (c) all residues remaining shall be lodged with the Director on completion of the studies.

(5) Side-wall cores which are recovered shall be retained in Australia unless otherwise approved, and all residues remaining after any studies have been made on the cores shall be preserved and lodged with the Director on completion of such studies.

(6) Where approval has been given for the export of cuttings, core plugs or whole cores, any skeletal material from whole cores shall be returned to Australia within 12 months of the approval being given, and residues from exported core plugs or cuttings shall be returned at the conclusion of the analyses and all such residue retained in Australia. In relation to any core plugs or cuttings retained overseas for further analysis, an annual report on the progress of these studies shall be sent to the Director.

(7) Two sets of samples of cuttings and cores prepared in accordance with this clause shall be made available and distributed as directed by the Director.

(8) Fluid samples recovered in the course of wireline or other testing shall upon request be made available and distributed as directed by the Director.

Reports 456(1) Where an investigation, analysis or study is conducted on cuttings or cores, two copies of the report of the investigation, analysis or study shall be made available as soon as practicable after the completion of the investigation, analysis or study, and distributed as directed by the Director.

(2) Where approval has been given to the export of cuttings or cores, two copies of the report on the investigation, analysis or study of the cuttings or cores shall be made available upon completion and distributed as directed by the Director.

(3) Palynological and palaeontological and petrological slides prepared from cuttings or cores shall be stored and maintained in an appropriate manner and shall be lodged with the Director when requested or in any event prior to the surrender, expiry or cancellation of the title.

PART V - DRILLING

Division 1 - General Requirements

Approval to drill 501(1) An application for approval to drill a new exploration or development well, or to re-enter an existing exploration or development well shall be made in duplicate not less than one month or such other period as is approved prior to the commencement of the operation, and such an operation shall not be commenced without prior approval.

(2) An application under this clause shall include -

(a) proposed well name and number;

(b) location and water depth;

(c) programmed depth;

(d) estimated spud-in date;

(e) estimated drilling time;

(f) number and type of attendant craft, including aircraft, to be used in servicing the mobile drilling unit;

(g) name and address of drilling contractor;

(h) type of rig and blow-out prevention equipment, including description of equipment, and method of operation;

(i) names and addresses of other contractors involved in the operations and the nature of the services they will perform;

(j) detail of the drilling program, including particulars of coring, casing (including design parameters, assumptions and rationale consistent with clause 503), drilling fluid and logging;

(k) name of person responsible for communications with the Director;

(l) deviation and directional survey programs and proposed well path;

- (m) drilling procedures manual;
- (n) geological prognosis of the area and the objectives of the well;
- (o) pollution control measures; and
- (p) such other information as the Director requests.

(3) An approved programme shall not be varied without approval.

Equipment 502 Unless otherwise approved, materials and equipment used in drilling operations shall conform to such standards as are listed below so as to safely withstand the conditions likely to be encountered during such operations for -

- (a) derricks and masts API Std 4A, Specification for Steel Derricks (including Standard Rigs), API Std 4D, Specification of Portable Masts, or API Std 4E, Specification for Drilling and Well Servicing Structures;
- (b) rotary drilling equipment API Spec 7, Specification for Rotary Drilling Equipment;
- (c) well casing, tubing and drill pipe, API Spec 5A, Specification for Casing, Tubing and Drill Pipe, API Spec 5AX, Specification for High Strength Casing, Tubing and Drill Pipe, or API Spec 5AC, Specification for Restricted Yield Strength Casing and Tubing;
- (d) wellhead equipment API Spec 6A, Specification for Wellhead Equipment;
- (e) hoisting equipment API Spec 8A, Specification for Drilling and Production Hoisting Equipment;
- (f) wire rope API Spec 9A, Specification for Wire Rope; and
- (g) cement API Spec 10, Specification for Materials and Testing of Well Cements.

Well casing

503(1) The design and placement of casing strings shall be such as to prevent the release of well fluids into the surrounding environment, and shall take into account pressures that could be exerted on the casing whilst drilling to total depth or the next casing depth, or whilst performing any operation such as testing or production in that casing. The maximum performance properties used in the design of casing strings shall be those indicated as minimum performance properties in API Bulletin 5C2 on Performance Properties of Casing, Tubing, and Drill Pipe.

(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 must be notified to the Director prior to running casing. The setting depth of the surface and intermediate strings shall take into account known or predicted formation strength, known or predicted pore fluid type and pressure, and estimated influx volume in the case that the well kicks, so as to -

- (a) avoid the pressure in the well bore whilst killing the well, or performing any other operations, exceeding the leak off pressure of the formation to be exposed below the casing shoe; and
- (b) avoid the pressure of the mud required to control the well, including circulation pressure losses, exceeding the minimum fracture propagation pressure of the formation to be exposed below the casing shoe.

(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. In particular -

- (a) design burst pressure of surface and intermediate casing shall be calculated assuming a column of gas to surface in equilibrium with the anticipated leak off pressure of the formation to be exposed beneath the casing shoe, or in equilibrium with the maximum anticipated pore pressure to be encountered beneath the casing shoe, whichever gives the lesser surface pressure; and
- (b) design burst pressure of production casing shall be calculated assuming a pressure to be exerted at surface on the column of casing fluid or packer fluid to be that of the closed in tubing pressure of the well during the production life, or the maximum anticipated pressure to be exerted on the casing during the life of the well, whichever is the greatest.

(4) All casing strings, other than liner strings shall extend to the wellhead.

(5) Casing recovered from a well shall not be re-used in another well unless it has first been inspected in accordance with API RP5CI, Recommended Practice for Care and Use of Casing and Tubing and the physical characteristics established by such inspection enable compliance with subclause (3).

(6) The normal sequence of installation of casing strings shall be as follows:

- (a) structural or drive casing string;
- (b) conductor casing string;
- (c) surface casing string;
- (d) one or more intermediate casing strings, which may include liner strings;
- (e) production casing string, which may include liner strings.

(7) Where the nature of the surface formation is unknown -

- (a) a structural or drive casing string shall be installed; and

- (b) where requested by the Director, evidence that the proposed structural or drive casing string is adequate for the proposed well site shall be submitted.

(8) Where the surface formation is known to be stable, the structural casing string may, upon approval, be combined with the conductor casing string.

(9) For drilling operations carried out from a mobile drilling unit (other than a jack-up platform) the conductor casing string -

- (a) shall include the means to install a marine riser to return drilling fluids from the seabed to the mobile drilling unit;
- (b) shall be designed to take account of lateral loading on the casing string due to riser reaction as a result of the motion of the mobile drilling unit and wave and water current forces; and
- (c) may have a wellhead installed of adequate strength to support the full blow-out preventer stack.

(10) For drilling operations carried out from a mobile drilling unit (other than a jack-up platform) the surface casing string shall provide for the installation of a wellhead of adequate strength to support the full blow-out preventer stack, unless such wellhead element has previously been installed on the conductor casing string as provided for in paragraph 9(c).

(11) The design of the conductor or surface casing string shall take into account the support of other casing strings.

(12) Where drilling operations are carried out from a fixed platform or a jack-up platform, the design of the casing strings shall take into account support for blow-out prevention equipment and other casing strings.

(13) When a liner string is installed in a well 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, unless otherwise approved.

(14) Pressure testing requirements include -

- (a) after cementing and before drilling out of the casing shoe, all surface and intermediate casing strings shall be pressure tested to the design burst pressure as in sub-clause (3)(a) but not exceeding 70% of the minimum internal yield pressure, and not less than 5550 kPa;
- (b) after cementing the production casing and before any completion or production testing operations are performed, the production casing shall be pressure tested to design burst pressure (see sub-clause (3)(b)) not exceeding 70% of the minimum internal yield pressure; and
- (c) pressure tests shall be held for as long as necessary (but not less than 10 minutes) to ascertain that there is no continuous pressure drop, and the result recorded in the drillers log.

(15) Drilling operations or operations to complete or test the well shall not commence until a satisfactory result in a pressure test pursuant to sub-clause (14) has been obtained.

Cementing of casing strings

504(1) Structural casing strings and 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 or next outer casing string from the casing shoe of the structural or conductor casing string to the seabed if possible.

(2) Surface casing strings shall be cemented with a volume of cement sufficient to fill the annular space between the casing string and the hole to a height of at least 450 metres above the shoe of the casing string or to the seabed if such casing string is less than 450 metres in length. Unless otherwise directed -

- (a) any excess return cement slurry as a result of cementing the conductor pipe or surface casing may be discharged to the sea
- (b) the column of cement slurry used for commissioning and acceptance testing of cementing equipment may be discharged to the sea.

(3) Intermediate and production casing strings and liner strings shall be cemented with sufficient cement to fill the annular space between the casing string and the wall of the hole or next outer casing string as follows -

- (a) from each cementing point (including the casing shoe) to a height of at least 150 m above the cementing point;
- (b) to a height of at least 100 metres above any zone not previously cased containing fluid hydrocarbons;
- (c) additionally, in case of a liner string which is used as an intermediate or production casing string, the overlap between the liner string and the next larger casing string previously set shall be cemented with sufficient cement to fill at least 30 metres measured length of the annular space between the liner string and the next larger casing string, unless provision is made for the overlap to be sealed in some other effective manner or unless otherwise approved.

(4) All casing string cementations shall be carried out in accordance with good oilfield practice and the details of the cementing operations shall be recorded in the driller's log. If there is any reason to suspect a faulty cementing operation, the Director shall be notified.

(5) After the cementing of casing strings, 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.

(6) For the purpose of sub-clause (5)(b) the cement is considered to be under pressure if during the time lapse referred to in that sub-clause the cement after placing is restrained from movement by the use of float valves or other approved equipment.

(7) If the cementing requirements of this clause have not been achieved by primary cementing operations, endeavours shall be made to meet those requirements by recementing or by remedial cementing, unless otherwise approved.

Formation integrity testing 509(1) Unless otherwise approved, a formation integrity test shall be conducted after drilling out the casing shoe of surface and intermediate casing strings to establish that the casing shoe cementation and the formation strength at the casing shoe are adequate to sustain the maximum anticipated pressures which may be imposed at the casing shoe during the subsequent drilling operations. The results of the test shall be recorded in the driller's log.

(2) Where the result of a test referred to in sub-clause (1) requires that the approved drilling and casing programmes need to be amended, any such amendments shall be submitted to the Director 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 programme and which could result in pressures being imposed at that casing shoe in excess of those determined by the test referred to in sub-clause (1) an additional formation integrity test shall be performed, and if the result of that additional test differs from that performed at the casing shoe, the Director shall be notified forthwith and the casing programme shall be amended if necessary.

Formation monitoring 510 Adequate procedures shall be implemented for pressure ensuring that indications of a change in formation pressure can be detected when drilling below the conductor casing shoe.

Drilling fluid 511(1) The characteristics and use of the drilling fluid shall provide adequate control of any sub-surface pressures likely to be encountered in the well.

(2) 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 RP I3B, Recommended Practice for Standard Procedure for Testing Drilling Fluids, shall be performed on a regular basis while drilling and the results of such tests recorded in the driller's log.

Approval for production or drill stem tests 512(1) A production or drill stem test on a well, other than a monthly production test referred to in clause 610, shall not be conducted without prior approval.

(2) An application for approval pursuant to sub-clause (1) shall include the particulars of -

(a) the equipment to be used;

- (b) the testing programme;
- (c) the intervals in the well to be tested;
- (d) the expected duration of the test; and
- (e) the method of disposal of the produced fluids.

(3) The production test for which approval has been given for the purpose of this clause shall not be conducted unless the Director has been given not less than 24 hours notice of the date and time of that test.

(4) A production or drill stem test on a well shall not commence during the hours of darkness except with prior approval, or unless the zone being tested or another zone in the same reservoir has previously been tested and the reservoir pressure and formation fluids in the zone of the reservoir have been determined by such earlier testing.

(5) All formation fluids which are produced into the test string shall be reverse circulated from the test string before pulling the test string, except that for tests in a cased hole any produced formation fluids in the test string may be displaced back into the formation.

(6) A reverse-circulating device shall be included in the test string above the tester valve, except that such device shall be optional in the case of tests in cased holes.

Approval to 513
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 on a platform, a well shall not be left in a condition which in the opinion of the person in command of the platform or the Director, is unsafe. Prior to the cessation of drilling operations, even temporarily, the well shall be made safe in accordance with good oilfield practice.

(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 scheduled casing 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 command of the platform or the Director, cessation of drilling operations, the well shall be made safe in accordance with good oilfield practice.

(5) An application for approval to abandon or suspend a well shall give particulars of:

- (a) the name of the well;
 - (b) the reason for abandonment or suspension;
 - (c) the proposed abandonment or suspension program including the method by which the well shall be made safe; and
 - (d) such further information as the Director may require.
- (6) The abandonment or suspension program referred to in sub-clause (5)(c) shall conform with the relevant requirements of clauses 514 and 515, unless otherwise approved.

Abandonment 514 For abandonment of a well the following applies –
of a well

- (1) In the uncased portions of a well, cement plugs shall be placed such as to provide a minimum of 30 metres of cement above and a minimum of 30 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 30 metres above and at least 30 metres below the casing shoe; or
 - (b) a cement retainer with effective back pressure control set at least 10 m, but not more than 30 m, above the casing shoe with a cement plug calculated to extend at least 30 metres below the casing show and at least 15 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 show with at least 15 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 30 metres above and at least 30 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 and shall extend from at least 30 metres below to 30 metres above the perforated interval; or
 - (b) the perforated interval may be plugged by means of a cement etainer set in the casing string no more than 45 metres above the top of the perforated interval with a cement plug extending at least 15 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 15 metres of cement plug placed above it.

(5) In a cased hole containing a liner string or strings, a cement plug shall be placed immediately above each liner string hanger to extend at least 30 metres above the liner string hanger.

(6) A surface cement plug extending at least 45 metres in height shall be placed in the innermost casing string which extends to the seabed with the top of the plug at a depth no greater than 45 metres below the seabed.

(7) No annular space which extends to the seabed shall be left open to drilled hole below the annular space.

(8) The location and integrity of cement plugs shall be verified in an approved manner.

(9) Any intervals of cased hole in a well between cement plugs shall be filled with mud fluid of appropriate density suitably inhibited to prevent the corrosion of casing string.

(10) All casing string and piling shall be severed and removed at least 5 metres below the seabed and the well location shall be cleared of any debris and obstructions.

(11) An approved method shall be used to ensure that, wherever practicable, an area as determined by the Director surrounding the well location is free of debris and obstructions likely to become a hazard to other operations within the adjacent area.

Suspension of a well 515(1) Subject to sub-clauses (2) and (3), for suspension of well the relevant requirements of clause 514 shall apply unless otherwise approved.

(2) Approved equipment and protection devices shall be installed on the well head to facilitate future re-entry of the well.

(3) Approved means shall be provided to minimize hazards to other marine operations.

Disposal of drilling fluids 516 The concentration of petroleum in any drilling fluid, at the point where it is discharged from the platform into the sea, shall be controlled within approved limits and by approved methods.

Deviation of directional surveys 517(1) Unless otherwise approved a deviation survey giving information on depth and inclination of the well shall be made at intervals of not more than 300 metres, or at the nearest bit change.

(2) The application under Clause 501(1) shall include a deviation and/or directional survey program designed to ensure that the location of the well trajectory is recorded during drilling with sufficient accuracy to allow for relief well drilling.

Division 2 - Reporting and Data Submissions

Discovery of petroleum and estimate of petroleum in place 550(1) In addition to fulfilling the requirements of the Act with respect to reporting of a discovery of petroleum, the results of the appraisal of the discovery including preliminary estimates of petroleum in-place shall be conveyed in writing to the Director within 3 months of the date of discovery or such further period as the Director allows.

(2) In the month of September or such other month as the Director nominates in each year two copies of a current estimate of the amount of in-place petroleum in a petroleum pool in a title area shall be made available and distributed as directed by the Director.

(3) An estimate referred to in sub-clause (2) shall be in an approved form and shall specify -

- (a) the location of the petroleum pool;
- (b) the amount of in-place petroleum in the pool; and
- (c) the data upon which the estimate is based; and shall be accompanied by any specific reports produced during the period.

(4) When a field study resulting in a revised estimate of the amount of in-place petroleum in the pool has been carried out, two copies of a report of the study and the revised estimate shall be made available and distributed as directed by the Director.

Daily report of drilling operations 551(1) Each day before midday two copies of the daily report of the drilling operations for the previous 24 hours shall be made available and distributed as directed by the Director

(2) The daily report shall contain -

- (a) the name of the well;
- (b) the drilled depth;
- (c) the work carried out;
- (d) the lithology of formations penetrated;
- (e) any indication of petroleum;
- (f) results of surveys made in the well bore;
- (g) estimated daily and cumulative well costs; and
- (h) rig inspection reports (the rig inspection report is only required to be submitted as part of the daily report one day each week).

Report on modification abandonment or suspension of well 553 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 Director.

PART VI - PETROLEUM PRODUCTION

Division 1 - General Requirements

Consent for 601(1) The recovery of petroleum, other than recovery of petroleum during a production test of a well, shall not be carried out unless approved production equipment, safety systems, personnel emergency facilities and accommodation have been constructed, and -
production equipment and recovery of petroleum

(d) the Director has given consent in writing to the recovery of petroleum from the field in the licence area using a specific offshore facility.

Other 602 Operations for –
Operations

- (a) the enhanced recovery or recycling of petroleum;
- (b) the processing, storage or disposal of petroleum;
- (c) the disposal of produced formation water; or
- (d) the injection of petroleum or water into an underground formation -

shall not be carried out unless the method and the equipment for carrying out those operations have been approved.

Workover 608(1) A well shall not be worked over without prior approval. of wells

(2) An application for approval to work over a well shall include particulars of -

- (a) the zone in the well proposed to be abandoned (if any);
- (b) the zone in the well proposed to be developed (if any);
- (c) proposed modification and changes of the equipment in the well;
- (d) proposed changes (if any) in the wellhead and production equipment; and
- (e) procedures proposed to be used.

(3) 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 12 months prior to the commencement of gas lift operations.

Rate of 609(1) For a fully developed reservoir, the annual rate of recovery of petroleum from that reservoir shall be subject to approval unless the rate of recovery of petroleum from that reservoir is the subject of a direction given to the licensee under section 58 of the principal Act.
recovery of petroleum

(2) The licensee's application under sub-clause (1) for approval of the rate of recovery of petroleum from a fully developed reservoir shall include a proposed rate of recovery, past performance of wells and the reservoir, prediction of future performance and estimate of ultimate recovery from the reservoir.

(3) For a reservoir under development, a periodic review of the reservoir description, production policy and current reservoir performance shall be submitted at the request of the Director to demonstrate that it is being developed in a manner consistent with sound reservoir management practices and compatible with optimum long-term recovery.

Production tests on producing wells 610(1) A production test to estimate the rate of recovery of petroleum from the well, shall be carried out on each producing well at least once each month unless –

- (a) the rate of recovery of petroleum from the well is monitored continuously; or
- (b) the testing of the well at intervals greater than one month has been approved.

(2) An application for approval of the testing of a well at intervals greater than one month shall be accompanied by a statement of the reasons for the application.

Surface connections 611 Unless otherwise approved, 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.

Production from more than one reservoir from one well 612 Unless otherwise approved, petroleum shall not be recovered simultaneously from more than one reservoir in a well unless provision is made to maintain in a well separation of petroleum and water recovered from each reservoir until the petroleum and water pass a point the quantity and composition of petroleum and water from each reservoir is determined in accordance with clause 614.

Production from more than one reservoir from more than one well 613 Unless otherwise approved, 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 in which these wells are completed and determined in accordance with clause 614.

Measurement of petroleum and water 614(1) Petroleum shall not be recovered from any reservoir unless equipment and procedures approved in accordance with sub-clause (4), are used enabling the quantity and composition of all petroleum to be determined.

(2) Petroleum shall not be flared, vented, disposed of, or used in recovery operations unless equipment and procedures approved in accordance with sub-clause (4), are used enabling both the quantity and composition of such petroleum to be determined.

(3) Water shall not be recovered from a petroleum reservoir and disposed of unless equipment and procedures approved in accordance with sub-clause (4) are used enabling both the quantity and composition of the water to be determined.

(4) Equipment and procedures used to determine the quantity and composition of petroleum and water require approval -

(a) by the Director

Approval flare 615 Except in an emergency, the flaring or venting of petroleum shall not be carried out without approval.

Pollution 616(1) Every reasonable precaution shall be taken to avoid pollution of the environment.

(2) Waste gas from vents and pressure vessels shall be disposed of using safe methods.

(3) Subject to sub-clause (6) the flow into the sea of crude oil, oil sludge or an emulsion of petroleum and water, shall be prevented.

(4) Produced formation water shall not be discharged into the sea unless -

(a) there is approved equipment which ensures that the concentration of petroleum in the discharged formation water specified in sub-clause (6) is not exceeded;

(b) there is approved equipment which monitors and records the concentration of petroleum in the discharged formation water;

(c) an approved test is conducted at regular intervals not less frequently than weekly to check the performance of the equipment referred to in paragraph (b) and the test results are recorded; and

(d) the records referred to in paragraphs (b) and (c) are available to an inspector for a period of at least 6 months from the date on which the record is made.

(5) An application for the purposes of clause 602 for approval of the method and the equipment for carrying out the disposal of produced formation water shall include the following particulars -

(a) the distance offshore of the proposed point of discharge and the water depth at that point;

(b) the characteristics of any petroleum in the formation water;

(c) the average rate of discharge of the treated formation water;

(d) the description of pollution-sensitive zones and species near the point of discharge; and

(e) any other matter which the Director or licensee considers relevant.

(6) The concentration of petroleum in any formation water discharged into the sea shall not be greater than 50 mg/L at any one time and the average content over each 24 hours shall be less than 30 mg/L unless otherwise approved.

Wireline operations in wells 617(1) Except in an emergency, notice acceptable to the Director shall be given of an intention to conduct a wireline survey in a well or to move an item of subsurface equipment in a well.

(2) Wireline operations shall be conducted in such a way as to minimise leakage.

Sampling petroleum Streams 618 Notice acceptable to the Director shall be given of an intention to sample for Royalty purposes a petroleum stream.

Meter proving 619 Notice acceptable to the Director shall be given of an intention to prove for Royalty purposes a petroleum meter.

Division 2 - Reporting and Data Submission

Programme of work 650 A licensee shall before 30th September, or such other date as the Director nominates, in each year submit to the Director a programme of work proposed to be carried out in the licence area by the licensee during the period of 12 months commencing on 1st January or 3 months after that nominated date.

Estimate of recoverable and in-place petroleum 651(1) In the month of September or such other month as the Director nominates in each year a licensee shall make available and distribute as directed by the Director two copies of a report in accordance with this clause in respect of the amount of recoverable and in-place petroleum in a petroleum pool in the licence area of the licensee.

(2) A report referred to in sub-clause (1) shall be in an approved form and shall specify -

- (a) the location of the petroleum pool;
- (b) the estimated amount of recoverable petroleum in a commercial pool or in-place petroleum in a currently non-commercial pool; and
- (c) the data upon which the estimates used in the report are based

and shall be accompanied by any specific reports made during the last preceding year in connection with reservoir performance and production optimisation.

(3) When a field study resulting in a revised estimate of the amount of recoverable or in-place petroleum in a pool has been carried out, two copies of a report of that study and the revised estimate shall be made available and distributed as directed by the Director.

Monthly production report 652 Not later than the 15th day of each month two copies of a monthly production report in respect of each field in a licence area, in an approved form, relating to the last preceding calendar month and containing the following information shall be made available and distributed as directed by the Director -

- (a) the total quantities of -
 - (i) liquid and gaseous petroleum, and water produced;
 - (ii) liquid and gaseous petroleum used;
 - (iii) gaseous petroleum flared or vented;
 - (iv) liquid and gaseous petroleum, and water injected;
 - (v) liquid petroleum stored; and
 - (vi) liquid and gaseous petroleum delivered from the area -

and the cumulative quantities of liquid and gaseous petroleum, and water, produced or injected as at the end of the month; and

- (b) for each well -
 - (i) its identification name and number;
 - (ii) a summary of all work performed on each well in the licence area during the previous month unless those details of work performed have been described in a report submitted under clause 553;
 - (iii) the result of the production test required by clause 610, including the choke size used and the tubing and separation pressures observed during the test;
 - (iv) its status at the end of the month;
 - (v) the number of days of production; and
 - (vi) the total estimated quantities of liquid and gaseous petroleum, and water, produced or injected during the month and the cumulative quantities of liquid and gaseous petroleum, and water produced or injected as at the end of the month.

Reports on wireline surveys 653(1)Where a survey using wireline techniques is conducted in a well during any month, one copy of a report of the survey, together with any records made for the purpose of the survey, shall, unless otherwise approved, be submitted to the Director not later than the 15th day of the next succeeding month.

Records of petroleum in Discharged formation water 655 A summary of the records referred to in sub-clause 616(4) shall be submitted at 3 monthly intervals in a form acceptable to the Director.