

MINISTRY OF ENERGY AND ENERGY INDUSTRIES

**APPROVED PROCEDURES FOR THE PARTIAL OR TOTAL PLUGGING AND
ABANDONMENT OF OIL AND GAS WELLS**

**PROCEDURES FOR THE PLUGGING AND ABANDONMENT
OF OIL AND GAS WELLS**

1. **GENERAL**

1.1 Authority

These procedures are established pursuant to the authority prescribed in the Petroleum Act 1969 and in the Petroleum Regulations 1970.

1.2 Procedures

The Operator should be guided by the following minimum plugging and abandonment procedures for:-

- (a) all wells drilled for oil and gas, or
- (b) for particular zones which are to be abandoned.

1.3 Approval Required

Plugging and abandonment operations must not be commenced prior to obtaining approval from the Ministry of Energy.

1.4 Minimum Considerations for Proper Abandonment

- (a) location should be cleared and restored to condition acceptable to the Ministry.
- (b) abnormally high or low pressured zones must be identified and isolated from normally pressured zones.
- (c) shallow, fresh-water reservoirs must be isolated and protected.
- (d) zones which are oil and gas bearing must be isolated to prevent migration of fluids in or out of these zones.
- (e) open hole must be isolated from cased hole.

- (f) all annular spaces which are open to formations (and which extend to the surface) must be plugged.
- (g) a surface cement plug must be set.
- (h) for onshore wells, surface casing should be cut off at an appropriate depth and a marker should be installed.

2. PERMANENT ABANDONMENT

2.1 Isolation of Zones in Uncased Hole

In uncased portions of oil and gas wells, cement plugs shall be placed to extend 30 meters below the bottom to 30 meters above the top of any zones bearing oil, gas and fresh-water so as to isolate them in the strata in which they are found.

2.2 Isolation of Open Hole

Where there is open hole (i.e. uncased and open into a casing string above) below the casing, plugging shall be done by one of the following methods:-

- (a) a cement plug placed by the displacement method to extend a minimum of 30 meters above and 30 meters below the casing shoe.
- (b) a cement retainer set not less than 15 meters nor more than 30 meters above the casing shoe with a cement plug calculated to extend at least 30 meters below the casing shoe and 15 meters above the retainer.
- (c) if loss circulation is anticipated, a permanent-type bridge plug set within 45 meters above the casing shoe with 15 meters of cement placed on top of the bridge plug.

This plug shall be tested prior to placing subsequent plugs.

2.3 Plugging or Isolating Perforated Intervals

2.3.1 Using a Work String

One of the following may be used:-

(a) Displacement Method

A cement plug shall be placed opposite all open perforations, extending a minimum of 30 meters above and 30 meters below the perforated interval, or down to the plug-back total depth, whichever is less.

(b) Squeeze Cementing

If the perforations are isolated from the hole below, squeeze cementing shall be accomplished using a cement retainer, retrievable cementing tool, existing production packer, or by the bradenhead method.

(c) Use of a Permanent Bridge Plug

If the perforations are isolated from the zone below, a permanent-type bridge plug shall be set within 45 meters above the top of the perforated interval and capped with a minimum of 15 meters of cement.

2.3.2 Using Through-Tubing Methods

The following methods may be used to abandon perforated intervals:-

(a) Using Through-tubing Bridge Plug

A through-tubing bridge plug shall be set in the casing above the perforated interval, provided the perforations are isolated from the hole below. The bridge plug shall be capped with cement.

(b) Squeeze Cementing

Perforated intervals shall be abandoned by bull head squeezing cement through the tubing into the perforations.

(c) Using Bridge Plugs

Where there are several perforated intervals open but isolated by packers, abandonment shall be accomplished by setting a plug in the tubing between the zones to be isolated, except the uppermost interval which shall be squeeze cemented.

(d) Placing Cement Plugs

If squeezing cement into perforated intervals is not feasible, tubing should be perforated and a cement plug spotted in the tubing-casing annulus and in the tubing as well.

2.4 Plugging of Casing Stubs

Abandonment may be accomplished by one of the following methods if the casing is cut and recovered, thereby leaving a stub inside the next larger string:-

- (a) A cement plug should be placed so as to extend 30 meters above and 30 meters below the stub.
- (b) A retainer may be set at least 15 meters above the stub and a volume of cement calculated to extend a minimum of 45 meters should be pumped below the retainer. The retainer should be capped with a minimum of 15 meters of cement.
- (c) A permanent bridge plug may be set at least 15 meters above the stub with a minimum of 15 meters of cement on top of the bridge plug.
- (d) For stubs terminating in open hole

below the casing string, Paragraphs 2.1 and 2.2 apply.

2.5 Plugging of Annular Space

Annular spaces which are open to formations and which extend to the surface must be plugged with cement.

2.6 Surface Plug

A cement plug of at least 45 meters shall be placed in the smallest string of casing which extends to the surface. In the case of land wells, this plug should extend to a few meters below the surface. In the case of marine wells, the top of the plug shall be 45 meters or less below the ocean floor.

2.7 Testing of plugs

The setting and locating of the first plug below the 45 meters surface plug shall be verified by either:-

- (a) placing a minimum pipe weight of 15 000 pounds on the plug or
- (b) testing with a minimum pump pressure of 6900 KPa (1000 psig).

2.8 Clearance of Location - Marine Wells

All casing and protective structures shall be removed to clear the well site of any obstructions.

2.9 Restoration of Location - Land Wells

- (a) All well producing equipment shall be removed from the premises.
- (b) surface area should be restored, as far as practical, to condition acceptable to the Minister of Energy.
- (c) surface pipe shall be cut off below

the surface and a plate welded on top of the pipe.

- (d) Abandoned land wells shall be appropriately marked for easy identification using either a concrete slab or tombstone. The marker shall indicate Name of Oil Company, Well Name and Date Abandoned.

3.0 TEMPORARY ABANDONMENT

Any well which is to be suspended or temporarily abandoned should be cemented as recommended for permanent abandonment except for clearance of location.

4.0 ABANDONMENT OF A ZONE OR ZONES DURING RECOMPLETION

Any zone or zones which are to be abandoned should be cemented as recommended for permanent abandonment.

Reference for Policy Document -
Plugging and Abandonment of Wells.

1. API RP 51 1st Edition October 1974

"API Recommended Onshore Production Operating Practices for Protection of the Environment."

2. API RP 54 1st Edition January 1981

"API Recommended Practices for Occupational Safety and Health for Oil and Gas Well Drilling and Servicing Operations."

3. API RP 57 1st Edition January 1986

"API Recommended Practices for Offshore Well Completion, Servicing, Workover, and Plug and Abandonment Operations."

4. API RP 52 1st Edition 1975

"API Recommended Land Drilling Operating Practices for Protecting of the Environment."

5. Code of Federal Regulations - Title 30 Chapter 4.
6. OCS Orders 1-14 January 1977
US Department of the Interior.
7. USGS "BAST" Program April 1980.

8. IP Code of Safe Practice Part 8 1972.
"Drilling and Production in Marine Areas."
9. Drilling and Production Regulations -
Ministry of Energy (Province of British Columbia).
10. Petroleum Regulations 1970 (Laws of Trinidad and Tobago).

5.0 PROCEDURES FOR ABANDONMENT OF RADIOACTIVE SOURCES DOWNHOLE

PURPOSE : To protect persons property and the environment now and in the future from any radioactive contamination.

1. In the event it is necessary to abandon a radioactive source downhole, the Operator is required to obtain Ministry's approval prior to abandonment. The following information must be provided to the Ministry:-
 - (1) Details/Schematic of the tools and radioactive sources to be abandoned.
 - (2) Procedures of abandoning the tool/radioactive sources.
 - (3) Schematic of the planned abandonment of the well.
2. In the case of permanent abandonment of a well with an irretrievable source, the usual requirements of a permanent abandonment are adequate .
3. If the well is to be sidetracked:
 - (1) A 30 meter cement plug must be placed above the fish and a deflection device shall be set atop the plug. In addition, red dye should be added to the cement slurry for identification purposes.
 - (2) The sidetracked borehole should not approach closer than 30 meters to the radioactive source.
4. Upon abandonment of a radioactive source onshore, the operator shall provide a permanent plaque, constructed of long lasting material at the well with the following information:
 - (1) The word 'CAUTION' in large letters
 - (2) The radiation Symbol.
 - (3) The date of Abandonment.
 - (4) Well Name
 - (5) The sealed source(s) by radionucleide and quantity of activity.
 - (6) The source depth and plug back depth.
5. A written report must be filed with the Ministry of Energy

within 30 days of abandonment, giving description of attempts to recover the source and results of retrieval attempts, steps taken to isolate and protect the source, all pertinent well information and, for onshore wells, information contained on the permanent identification plaque.

6. All relevant information of the abandonment must form part of the Operator's permanent well file system.

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