

MINUTE ITEM

60

02/06/89
W 22649.2
P. Pelkofer

REPEAL COMMISSION REGULATIONS IN
TITLE 2, DIVISION 1, ARTICLES 3.2, 3.3, AND 3.4,
AND ADOPT JOINT OFFSHORE OIL AND GAS REGULATIONS IN
TITLE 14, DIVISION 2, CHAPTER 4, SUBCHAPTER 6,
COMMENCING WITH SECTION 2000.0

Calendar Item 60 was pulled from the agenda prior to the meeting.

Attachment: Calendar Item 60.

A)
) Statewide
S)

CALENDAR PAGE

MINUTE PAGE

510-511

CALENDAR ITEM

A)
S) Statewide

60

02/06/89
W 22649.2
Pelkofer

REPEAL COMMISSION REGULATIONS IN
TITLE 2, DIVISION 1, ARTICLES 3.2, 3.3, AND 3.4;
AND ADOPT JOINT OFFSHORE OIL AND GAS REGULATIONS
IN TITLE 14, DIVISION 2, CHAPTER 4, SUBCHAPTER 6,
COMMENCING WITH SECTION 2000.0.

SUMMARY

Both the State Lands Commission and the Division of Oil and Gas of the Department of Conservation currently have separate regulations and administrative procedures for the exploration, development, and production of oil and gas in State waters. In order to reduce the number of regulations, improve administrative efficiency, eliminate potential conflicts between regulations, and provide a comprehensive integrated regulatory scheme, the two agencies have decided to jointly adopt regulations to control such activities.

STATEMENT OF REASONS

The State Lands Commission has the authority and responsibility for the management of State-owned tide and submerged lands. Part of this responsibility includes the leasing of such lands for oil and gas exploration, development, and production, and the regulation of all activities necessary for such exploration, development, and production.

The Division of Oil and Gas also has the authority and responsibility for regulating the conduct of well-drilling and production operations in State waters.

Both agencies currently have separate regulations and administrative procedures in place regarding exploration,

CALENDAR PAGE	432
MINUTE PAGE	512

CALENDAR ITEM NO. 60 (CONT'D)

development, and production operations in State waters. In order to reduce the number of regulations, improve administrative efficiency, eliminate potential conflicts between regulations, and provide a comprehensive integrated regulatory scheme, the staff of the Commission and the Division of Oil and Gas have decided to jointly adopt regulations regarding offshore oil and gas exploration, development, and production.

Staff and the Division of Oil and Gas have determined that no alternative considered by them would be more effective in carrying out the purpose for which these regulations are proposed. The repeal of their separate regulations and the adoption of the joint regulations will be more effective and less burdensome to affected private persons.

The joint regulations will cover several subject areas: general administrative provisions; well-design requirements and drilling safety; plugging and abandonment of wells; well-completion and well-work requirements and safety; requirements for underground injection; production facility safety equipment and procedures; platform design and safety; pipeline design and safety; and operating plans for the prevention and control of pollution.

Although these regulations have existed for many years, the most extensive regulatory review since 1976 has been conducted by the Division of Oil and Gas and the staff of the Commission. The current regulations of the agencies, formulated after the 1969 blowout in Federal waters, have been instrumental in protecting the offshore workers, as well as our environment, by elevating the safety level of the workplace and restricting arbitrary field practices. The proposed new joint regulations are the product of advances in technology and engineering practices as well as the observations and experiences of the two agencies.

The document, produced as a result of the review, updates, expands, and refines our regulations and answers the public requests and State mandates to reduce government duplication and cumbersome permitting processes. State Land's responsibilities as land managers and the Division of Oil and Gas's regulatory authority over California oilfields, have combined into one comprehensive code for oil and gas operators working on State lands.

CALENDAR ITEM NO. 60 (CONT'D)

The purpose of the joint regulations is to:

- (1) Fulfill the statutory requirements for both agencies;
- (2) Minimize the effort required by the operators to fulfill their obligatory operating and permitting requirements;
- (3) Eliminate any existing duplication of effort by the DOG and the SLC in their permitting and inspection processes; and,
- (4) Eliminate any existing conflict or inconsistency of regulatory effort between the two agencies.

With the adoption of Title 14, Division 2, Chapter 4, Subchapter 6, California will have the toughest and most comprehensive set of domestic offshore oil and gas regulations. This will serve to strengthen our commitment to safe, non-polluting offshore operations, and augment and continue our State's exemplary record in offshore oil and gas safety.

Staff is recommending that the existing regulations governing these activities be repealed and that the proposed joint regulations be adopted by the Commission.

Office of Administrative Law procedures have been followed, including giving the appropriate notices, review and comment by the public, and response and explanation by the staff.

AB 884

N/A

EXHIBIT: A. Proposed Joint Regulations.

IT IS RECOMMENDED THAT THE COMMISSION:

1. FIND THAT THIS ACTIVITY IS EXEMPT FROM THE REQUIREMENTS OF THE CEQA, PURSUANT TO 14 CAL. CODE REGS. SEC. 15061 BECAUSE IT IS NOT A PROJECT AS DEFINED IN P.R.C. 21065 AND 14 CAL. CODE REGS. SEC. 15378.
2. REPEAL ARTICLES 3.2, 3.3, and 3.4 of CHAPTER 1, DIVISION 3, TITLE 2 OF ITS REGULATIONS, AND ADOPT AND APPROVE FOR FILING WITH THE OFFICE OF ADMINISTRATIVE LAW THOSE CHANGES IN ITS REGULATIONS AS ARE SET FORTH IN EXHIBIT "A" ATTACHED.

CALENDAR ITEM NO. 60 (CONT'D)

3. DELEGATE AUTHORITY TO THE EXECUTIVE OFFICER TO MAKE MINOR NON-SUBSTANTIVE CHANGES TO THE PROPOSED REGULATIONS, AS MAY BE REQUIRED BY THE OFFICE OF ADMINISTRATIVE LAW.
4. AUTHORIZE THE EXECUTIVE OFFICER TO DEVELOP AND EXECUTE A MEMORANDUM OF UNDERSTANDING WITH THE DIVISION OF OIL AND GAS WHICH WILL PROVIDE FOR ADMINISTRATIVE PROCEDURES FOR ACTIVITIES GOVERNED BY THE REGULATIONS.
5. AUTHORIZE STAFF TO TAKE ALL OTHER ACTIONS NECESSARY AND APPROPRIATE TO GIVE EFFECT TO THE ABOVE DECISIONS, ADOPTIONS, AND DELEGATIONS.

OFFSHORE OIL AND GAS REGULATIONS
TABLE OF CONTENTS

		Page
ARTICLE 1.	GENERAL PROVISIONS	1
2000.0	SCOPE AND PURPOSE	1
2001.0	DEFINITIONS	1
	(a) "Division"	1
	(b) "Commission"	1
	(c) "Staff"	1
	(d) "Rework"	2
	(e) "Well Maintenance Work"	2
2002.0	ADMINISTRATION	2
2002.1	GENERAL	2
2002.2	NOTICES OF INTENT	2
	(a) Applications	2
	(b) Notifications of Well Maintenance Work	3
2002.3	APPROVALS	3
	(a) Written Approvals	3
	(b) Emergency Approvals	3
	(c) Extension of Approvals	4
	(d) Other Approvals	4
2002.4	REPORTS	4
	(a) Final Reports of Well Work	4
	(b) Other Well Reports	5
	(c) Accidents/Incidents Relating to Facilities	5
	(d) Oil Spills	5

	Page
2003.0 GENERAL REQUIREMENTS	
(a) Conduct of Operations.	5
(b) Approval of Emergency Plans.	5
(c) Approved Well Program at Well Site	5
(d) Deviation from Approved Well Program	6
(e) Notification for Inspection	6
2004.0 WELL AND FACILITY IDENTIFICATION	
(a) Well Designation	6
(b) Structure Designation	6
(c) Mobile Vessel Identification	6
ARTICLE 2. DRILLING OPERATIONS	7
2005.0 GENERAL PROVISIONS	
2005.1 FIELD RULES	7
2005.2 DAILY DRILLING REPORTS	7
2005.3 WELL SITE INVESTIGATION	8
2005.4 DRILLING PROGRAM	8
(a) Detailed Programs	8
(b) Drilling Hazards	8
(c) Safety Program for Running Surface Casing Mobile Vessel	9
(d) Rig Specifications	9
(e) Emergency Plans	9
2005.5 WELL CASING REQUIREMENTS	
(a) Casing Setting Depth Criteria	10
(b) Formation Fracture Gradients	10
(c) Abnormally Pressured Zones	10
(d) Casing Inspection	11
(e) Casing Program - General	11

	Page
(1) Conductor Casing	12
(2) First Surface Casing	12
(3) Second Surface Casing	12
(4) Intermediate Casing	12
(5) Production Casing	13
a. Test of Water Shut-off	13
2005.6 CASING CEMENTING REQUIREMENTS	14
(a) Conductor and Surface Casings	14
(b) Intermediate, Protective and Production Casings	15
(c) Cement Bond Surveys	15
(d) Surveys Filed with Division and Staff	15
(e) Minimum Compressive Strength	15
2005.7 PRESSURE TESTING OF CASING.	16
2005.8 DIRECTIONAL SURVEYS	17
(a) Frequency	17
(b) Survey Results	17
2005.9 BLOWOUT PREVENTION AND EQUIPMENT REQUIREMENTS	18
2005.10 MUD PROGRAM	18
(a) Mud Quantities	18
(b) Mud Control	19
(c) Mud Testing Equipment	19
(d) Mud Logging Equipment	19
(e) Mud Monitoring Equipment	20
2005.11 DRILLING PRACTICES	20
(a) Observing for Changes in Mud Volume	20
(b) Posting Maximum Permissible Casing Head Pressure	20

CALENDAR PAGE	438
MINUTE PAGE	518

	Page
(c) Rate of Pulling Drill Pipe	20
(d) Handling Drill Stem Test Formation Fluid	21
2005.12 SUPERVISION AND TRAINING	21
(a) Operator's Drilling Supervisor On-Site 24 Hours	21
(b) Well Control Training Certification Requirement	21
(c) Well Control Drill Plan and Frequency	22
2005.13 HYDROGEN SULFIDE	22
(a) Definitions	22
(b) Hydrogen Sulfide Gas Detection and Alarm System	23
(c) Hydrogen Sulfide Contingency Plan	23
(d) Personnel Training Program	24
(e) Personnel Protective Equipment	25
(f) Visual Warning System	26
(g) Audible Warning System	27
(h) Ventilation Equipment	28
(i) Flare Systems	28
(j) Notification of Regulatory Agencies	28
(k) Drilling, Completion and Workover Fluids Program	28
(l) Kick Detection and Well Control	29
(m) Well Testing in a Zone Known to Contain H2S	30
(n) Metallurgical Properties of Equipment	31
(o) General Requirements When Operating in a H2S Zone	31
(1) After penetration of an H2S zone	31
(2) Coring	31
(3) Logging	31
(4) Stripping operations	32
(5) Gas cut fluid or well Kick	32
(6) Flare system	32

	Page
(7) Corrosion monitoring	32
(8) BOPE and lubricator seals and sealing elements	32
(9) Fuel and/or instrument gas	33
(10) Water disposal	33
 2006.0 REDRILLING AND DEEPENING	 33
(a) Determination of Existing Casing Adequacy by Survey	33
(b) Pressure Test of Existing Casing in Lieu of Survey	33
(c) Pressure Test of Existing Casing if Surveyed	33
(d) Corrective Measures if Existing Casing Inadequate	34
(e) Survey Filing with Staff	34
(f) Determination of Adequacy of Existing Casing Cement	34
(g) Abandonment Prior to Redrilling	34
(h) Cementing Off Shallow Low-Pressure Zones	34
 2007.0 PLUGGING AND ABANDONMENT OF WELLS	 35
 2007.1 GENERAL	 35
(a) Detailed Program to be Approved Prior to Work	35
(b) Verbal Approval to Plug During Approved Operations	35
 2007.2 PERMANENT ABANDONMENT	 35
(a) Isolation of Zones in Open Hole	36
(b) Isolation of Open Hole from Casing	36
(c) Plugging or Isolating Perforated Intervals	36
(d) Miscellaneous Cementing Points	37
(e) Isolation of Zones Behind Uncemented Casings	37
(f) Isolating Zones Behind Cemented Casings	37

CALENDAR PAGE	440
MINUTE PAGE	520

	Page
(g) Junk in Hole or Collapsed Casing	37
(h) Plugging of Casing Stubs	37
(i) Plugging of Annular Space	38
(j) Surface Plug Requirement	38
(k) Testing of Plugs	38
(l) Mud	39
(m) Clearance of Location	39
(n) Alternate Procedures	39
(o) Record of Abandonment	39
2007.3 TEMPORARY ABANDONMENT	39
2007.4 WITNESSING OF ABANDONMENT OPERATIONS	40
2008.0 RECORDS AT WELL SITE	40
2009.0 MAINTENANCE OF RECORDS	40
ARTICLE 3. PRODUCTION OPERATIONS	41
2010.0 WELL COMPLETION	41
2010.1 WELL COMPLETION PROGRAM	41
2010.2 WELLHEAD EQUIPMENT	41
2010.3 BLOWOUT PREVENTER REMOVAL	42
2010.4 SEALING OF CASING - TUBING ANNULUS	43
2010.5 PERFORATION AND WIRELINE OPERATIONS UNDER PRESSURE	43
2010.6 SUBSURFACE SAFETY VALVES	43
2010.7 WELLHEAD SURFACE SAFETY VALVES	45
2010.8 WELLS ON ARTIFICIAL LIFT	46
2010.9 PRODUCTION HEADERS	46
2011.0 REMEDIAL AND WELL-MAINTENANCE WORK	47
2011.1 REMEDIAL WORK	47
2011.2 NONROUTINE WELL-MAINTENANCE WORK	47
2011.3 ROUTINE WELL-MAINTENANCE WORK	48
2011.4 BLOWOUT PREVENTION EQUIPMENT REQUIREMENTS	48

0.584

	Page
2011.5	SUPERVISION AND TRAINING 49
2012.0	ANOMALOUS CASING ANNULUS PRESSURE 50
2013.0	APPROVAL OF UNDERGROUND INJECTION OR DISPOSAL PROJECTS 51
2013.1	PROJECT DATA REQUIREMENTS 51
2013.2	DATA REQUIRED FOR CYCLIC STEAM INJECTION PROJECT APPROVAL 53
2013.3	DATA REQUIRED FOR GAS STORAGE PROJECT APPROVAL 54
2013.4	FILING, NOTIFICATION, OPERATING AND TESTING REQUIREMENTS 54
2014.0	PRODUCTION FACILITY SAFETY EQUIPMENT AND PROCEDURES 58
2014.1	INTEGRATED SAFETY-CONTROL SYSTEM 58
2014.2	SAFETY DEVICES ON VESSELS AND TANKS 59
2014.3	PRESSURE RELIEF VALVES 60
2014.4	FIREFIGHTING SYSTEM 61
2014.5	COMBUSTIBLE GAS DETECTOR AND ALARM SYSTEM 63
2014.6	HYDROGEN SULFIDE GAS DETECTION AND PRECAUTION 63
(a)	Hydrogen Sulfide Gas Detection and Alarm System 64
(b)	Hydrogen Sulfide Contingency Plan 64
(c)	Personnel Training Program 65
(d)	Personnel Protective Equipment 66
(e)	Visible Warning System 68
(f)	Audible Warning System 69
(g)	Ventilation Equipment 69
(h)	Flare System 69
(i)	Drilling Operations 69
(j)	Remedial and Well Maintenance Operations 69
(k)	Notification of Regulatory Agencies 70
2014.7	ELECTRICAL EQUIPMENT AND SYSTEMS 70
2014.8	WELDING PRACTICES AND PROCEDURES 70

CALENDAR PAGE	442
MINUTE PAGE	522

	Page
ARTICLE 4. FIXED OFFSHORE PLATFORMS	72
2015.0 GENERAL REQUIREMENTS	72
2015.1 PLATFORM SAFETY AND SURVIVAL EQUIPMENT	74
2015.2 PLATFORM SITE INVESTIGATION	74
2015.3 PLATFORM APPLICATION	74
2015.4 REPORTS	75
ARTICLE 5. OFFSHORE PIPELINES	75
2016.0 GENERAL REQUIREMENTS	75
2016.1 PIPELINE ROUTE SURVEY	76
2016.2 "AS BUILT" SURVEY	76
2016.3 PIPELINE APPLICATION	77
2016.4 SAFETY EQUIPMENT REQUIREMENT	78
2016.5 PIPELINE OPERATIONS AND MAINTENANCE	79
(a) General Requirements	79
(b) Maximum Operating Pressures	80
(c) Communications	80
(d) External Corrosion Control	81
(e) Internal Corrosion Control	81
(f) Pipeline Inspections	81
(g) Reports of Inspection	83
ARTICLE 6. POLLUTION CONTROL	83
2017.0 GENERAL	83
2017.1 WASTE DISPOSAL	84
2017.2 CONTAINMENT OF POLLUTANTS	84
2017.3 OIL SPILL CONTINGENCY PLAN	85
2017.4 POLLUTION CONTROL AND REMOVAL EQUIPMENT	85
2017.5 CRITICAL OPERATION AND CURTAILMENT PLAN	87
2017.6 POLLUTION REPORTS	90

CALENDAR PAGE	443
MINUTE PAGE	523

Enact Title 14, Division 2, Chapter 4, Subchapter 6

SUBCHAPTER 6

JOINT OFFSHORE OIL AND GAS REGULATIONS

ARTICLE 1. GENERAL PROVISIONS

2000.0 Scope and Purpose

- (a) These regulations have been adopted by the Division of Oil and Gas and the State Lands Commission to govern the safe conduct of oil and gas drilling and production operations on lands within the offshore territorial boundaries, inland bays and waterways of the State of California.
- (b) The State Lands Commission limits its regulatory authority under these regulations to operations conducted on lands under State oil and gas leases or permits.
- (c) To provide continuity and convenience, certain regulatory requirements mandated by only one of the agencies are included in these regulations. Accordingly, the sections containing these requirements will note the statutory authority and reference of the Agency adopting the specific rule.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3203-3220, 3227-3237, 6216, and 6873(d), PRC

2001.0 Definitions

Unless the context otherwise requires, the following definitions shall apply to these regulations:

- (a) "Division", in reference to the government of this state, means the Division of Oil and Gas in the Department of Conservation.
- (b) "Commission" means the State Lands Commission.
- (c) "Staff" shall mean the Executive Officer or other authorized member of the Staff of the State Lands Commission.

CALENDAR PAGE	444
MINUTE PAGE	524

- (d) "Rework" shall mean any well work other than the initial drilling or final abandonment that permanently alters in any manner the well casing or well function.
- (e) "Well maintenance work" means any well work performed to restore or improve production without altering the well casing or the producing intervals.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2002.0 Administration

2002.1 General

- (a) These regulations shall be administered jointly by the Division and Staff. These regulations have been designed in great detail; however, the Division and Staff recognize that situations may arise which are not specifically covered herein and that emergency situations may arise which will require immediate decisions. In such situations, the Division and Staff shall authorize appropriate procedures to be followed.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2002.2 Notices of Intent to Perform Work and Other Applications.

- (a) Application. Notices of intent for well drilling, completion, reworking, abandonment and supplementary work filed under Sections 3203 and 3229 of the Public Resources Code and proposed applications for fluid injection projects shall be submitted by the operator in quadruplicate to the Staff for its review and approval. Upon issuance of its written approval, the Staff shall then transmit duplicate copies of each approved notice and application to the Division for its review, modification if warranted, and approval and

issuance of a Division permit. Any modification by the Division shall require concurrence by the Staff. The date on which the Division receives the notice from the Staff shall be the date of filing the notice with the supervisor or district deputy under Sections 3203 and 3229 of the Public Resources Code. Applications concerning offshore structures, production facilities and pipelines shall be submitted in duplicate to the Staff.

- (b) Notification of Well Maintenance Work. With the exception of routine well maintenance work such as pump changes and wire line work not effecting a change in production interval, the operator shall provide prior written notification to the appropriate Division district office and to the Staff of its intention to perform well maintenance work on any well. (Refer to Subsections 2011.2 and 2011.3).

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 3203, 3229, and 6216, PRC

2002.3 Approvals.

- (a) Written Approvals. Staff approvals of notices of intent for well drilling, completion, reworking, abandonment, and supplementary work, and for applications for fluid injection projects shall be issued in writing to the operator upon transmittal of the notice or application by the Staff to the Division. Division approvals of the aforementioned notices and applications shall then be issued prior to commencing the proposed work or project. Approval of applications concerning offshore structures, production facilities and pipelines shall be issued only from the Staff.
- (b) Emergency Approvals. Emergency verbal approval to commence well-work operations delineated in Subsection 2002.3(a) above, may be granted by the appropriate

Division district office and the Staff when operations are necessary to avert a threat to life, health, property, or natural resources, or when approved operations are in progress and newly discovered well conditions are such that immediate corrective or abandonment operations are required. Such approval shall be granted only after the operator has provided all information pertaining to the condition of the well, including but not limited to, geological, mechanical information, and the results of tests and surveys. Notwithstanding any such emergency approval, the operator shall immediately file a confirming written application as required in Subsection 2002.2(a).

(c) Extension of Approvals. If operations have not commenced within one year of receipt of the notice, the notice will be considered cancelled. However, an approval for proposed operations may be extended for one year if the operator submits a supplementary notice pursuant to Subsection 2002.2 of these regulations prior to expiration of the one-year period and can show good cause for such extension, and if this supplementary notice is approved by both the Staff and the Division, pursuant to Subsection 2002.3 of these regulations.

(d) Other Approvals. Other approvals shall be obtained from the Division and/or Staff as hereinafter specified.

Authority: Sections 3013, 3106, and 6108, PRC
Reference: Sections 3106, 6216, and 6873(d), PRC

2002.4 Reports

(a) Final Reports of Well Work. Final written reports of well drilling, completion, reworking and abandonment work, and copies of electric logs and other well information shall be submitted in duplicate to the

Division and Staff within 60 days after completion of the work.

- (b) Other Well Reports. Other reports and well information shall be submitted to the Division and/or Staff as hereinafter specified.
- (c) Accidents/Incidents Relating to Facilities. Well blowouts, fires, hazardous oil or gas leaks, disasters, major accidents, or similar incidents on or emanating from an oil or gas drilling, producing, or treating facility shall be reported to the Division and Staff immediately.
- (d) Oil Spills. Oil spills or slicks shall be reported immediately to the Division and Staff in accordance with the applicable Oil Spill Contingency Plan.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 3203, 3229, 6216, and 6873(b),(d), PRC

2003.0 General Requirements

- (a) Conduct of Operations. All operations shall be conducted in a proper and workmanlike manner and in accordance with good oil field practice.
- (b) Approval of Emergency Plans. When filing a notice of intent to drill a well or perform remedial and/or well maintenance work, the operator shall submit or shall have previously submitted to the Staff the appropriate plans (in quadruplicate) that are required in Subsection 2005.4(e) and further plans described in Subsections 2005.12(c), 2005.13(b), 2011.5(d), 2014.6(b), 2017.3 and 2017.5. Upon its review and approval, the Staff will transmit the plans to the Division for its review and approval in accordance with Subsection 2002.2. These plans include a Well Control Drill Plan, Hydrogen Sulfide Contingency Plans, Oil Spill Contingency Plan, and a Critical Operations and Curtailment Plan.

- (c) Approved Well Program at Well Site. A copy of the approved well-work program and subsequent approval forms issued by the Division and the Staff shall be available at the well site while conducting the work.
- (d) Deviation from Approved Well Program. Operators shall not deviate from the approved basic well-work program without prior approval of the Division and Staff in accordance with Subsection 2002.3(b); additional requirements may be made at that time.
- (e) Notification for Inspection. Operators shall give adequate prior notice to the appropriate Division or Staff office of the time for inspection or witnessing of tests as hereinafter required.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 3213, 6216, and 6873(d), PRC

2004.0 Well and Facility Identification

- (a) Well Designation. The well designation shall be affixed to the wellhead or guard rail of each completed well. Wells completed from two or more zones shall have the zones individually identified at the wellhead. The Division may approve other well identification methods if they substantially comply with the intent of this section. Identifying signs shall be maintained in a legible condition.
- (b) Structure Designation. Platforms, islands, or other fixed structures shall be identified by at least two signs. The signs shall be located at diagonal corners of the platform or structure using letters and figures that are not less than 12 inches in height. The following information shall be indicated on these signs:
 the platform or structure designation, the name of the lease operator, and the lease designation. The Division may approve abbreviations.

CALENDAR PAGE	449
MINUTE PAGE	529

0.592

(c) Mobile Vessel Identification. Mobile offshore drilling vessels shall be identified by one (1) sign affixed to the derrick or to the heliport so as to be visible to approaching traffic. The signs shall indicate the name of the operator and the lease designation in letters and figures not less than 12 inches in height.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

ARTICLE 2. DRILLING OPERATIONS

2005.0 General Provisions.

All exploratory wells and initial development wells shall be drilled in accordance with the provisions of these regulations until field rules are established. After field rules are established, development wells shall be drilled according to such rules.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.1 Field Rules.

When sufficient geological and engineering information has been compiled on a field from exploratory and initial development well drilling, the Division and Staff may establish field rules. The operator may also make application to the Division and Staff for the establishment or change of field rules. The Division and Staff shall jointly review and approve the field rules. Field rules generally include casing setting depths, casing cementing requirements, and wellhead and blowout prevention equipment. Before adopting a field rule or change, the Division and Staff shall distribute the proposal to affected operators and provide at least 15 days for comments. The Division and Staff shall jointly notify operators in writing of the establishment or change of any field rule.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.2 Daily Drilling Reports.

The operator shall provide daily reports of drilling and rework activities as required by the Division and Staff.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.3 Well Site Investigation.

Prior to commencing drilling operations on any well from a mobile drilling rig, the operator shall investigate the conditions of the ocean floor and near sub-bottom including sediment characteristics in the area of the proposed well site. The investigation shall be adequate to (1) ascertain the presence of shallow geological anomalies and gather other information to be used as an aid in the design of a safe well drilling and casing program, and (2) determine the presence and location of significant cultural resources. A report of the findings and provisions for mitigating any problems disclosed by the investigation shall be provided to and must be approved jointly by the Division and Staff. Where a number of wells are proposed to be drilled, the area of study may be expanded to cover all the well sites. The plan(s) of investigation shall be in accordance with guidelines provided by the Staff. This investigation may be conducted concurrently as part of any required environmental review.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.4 Drilling Program.

The operator shall submit as part of its notice of intention to drill, a detailed drilling program which shall contain the following information:

- (a) Detailed Programs. Well location map; proposed well course; detailed drilling procedures; casing and cementing program; blowout prevention program; drilling mud program; directional survey program; electrical

logging; mud logging and sampling programs; and well testing procedures.

- (b) Drilling Hazards. In all exploratory well drilling proposals, the operator shall provide in the detailed procedures, a description and depth of the possible drilling hazards that might be encountered in drilling the well. The drilling hazards shall include, but not be limited to, possible unstable bottom sediments, shallow gas-charged sediments, zones of lost circulation, oil and gas bearing zones and abnormally pressured zones.
- (c) Safety Program for Running Surface Casings on Mobile Vessel. In drilling operations using a mobile drilling rig, the operator shall provide in the detailed drilling procedures, an operational program which describes procedures and personnel assignments to be employed for rig and personnel safety while drilling the hole and for running the surface casing(s). The program shall cover, but not be limited to, requirements and procedures for testing and use of the diverter system; establishment of safe penetration rates; monitoring of mud returns for indication of gas and loss of circulation; evaluation of drilling breaks; evaluation of severity of gas shows or kicks; stand-by liquid mud and its use in well control; emergency plugging of the well; safeguards while removing the drilling riser for running and cementing the surface casing(s); precautionary measures for fire prevention; and emergency movement of drilling rig off location.
- (d) Rig Specifications. The specifications and performance data of the drilling rig to be used.
- (e) Emergency Plans. Well Control Drill Plan; Critical Operations and Curtailment Plan; Oil Spill Contingency

Plan, and Hydrogen Sulfide Contingency Plan and a Facility Emergency Evacuation Plan.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.5 Well Casing Requirements.

All wells shall be cased and cemented in such a manner as to protect all zones that contain oil, gas or fresh water and to provide well control during drilling operations.

- (a) Casing Setting Depth Criteria. The casing setting depths shall be based upon all relevant geological and engineering factors, including the presence of shallow geological anomalies, the presence or absence of hydrocarbons, formation fracture gradients, formation pore pressures, water depth, and zones of lost circulation or other unusual characteristics.

Casing setting depths of the intermediate casing(s) shall be justified by calculations of the competency of the preceding casing seat to withstand anticipated mud weights, as well as the pressure generated by simulated well kicks from known or potential gas bearing zones, taking into consideration actual or estimated reservoir pressures, formation fracture gradients, minimum programmed mud weights and anticipated kick volumes.

The known and estimated factors and calculations used to determine the casing setting depths, as well as the casing design safety factors and specifications shall be shown in the casing and cementing program required in Subsection 2005.4(a).

- (b) Formation Fracture Gradients. In situations where formation fracture gradients are not known, a formation leak-off or predetermined equivalent mud weight test shall be conducted to obtain estimated formation fracture gradients for use in the calculations. These tests shall be conducted after drilling a maximum of 50

feet of new hole below the shoe of the second surface and intermediate casings. The results of all the tests shall be recorded on the driller's log and reported to the Division and Staff.

- (c) Abnormally Pressured Zones. The operator shall utilize current technological methods during drilling operations to aid in the prediction of possible abnormally pressured zones in order to minimize the potential for the development of a formation flow or kick.
- (d) Casing Inspection. All casing shall be new pipe or the equivalent and shall be inspected by the operator prior to running it into a well. The inspection shall be sufficient to detect transverse and longitudinal defects, to determine wall thickness, pipe eccentricity and grade uniformity, and shall include a 100 percent thread check of the exposed threads. Casing inspection reports shall be maintained by the operator in its district office for a period of five years, and shall be available to the Division and Staff.
- (e) Casing Program - General. Except in cases where casing requirements have been established by field drilling rules or where the Division and Staff determine that geological and engineering factors, including those provided by the operator, indicate that a different program should be used, the following casing and setting-depth requirements shall be included in all well casing programs. All depths refer to true vertical depth (TVD) below the ocean floor or ground level unless otherwise specified. In order of normal installation, the casings are identified as conductor, first and second surface, intermediate, and production casing.

- (1) Conductor Casing (Referred to as drive or structural casing in 30 CFR 250.54(b)).
This casing shall be set by drilling, driving, or jetting to a depth of approximately 100 feet below the ocean floor or ground level in order to support unconsolidated sediments and thereby provide hole stability for initial drilling operations. If drilled or jetted in, the fluid circulated to the ocean floor shall be a type that will not pollute the ocean environment.
- (2) First Surface Casing (Referred to as conductor casing in 30 CFR 250.54(b)).
This casing shall be set at a depth between 300 feet and 500 feet below the ocean floor; provided, however, that this casing shall be set before drilling into shallow formations known to contain oil and gas or, if unknown, upon encountering such formations.
- (3) Second Surface Casing (Referred to as surface casing in 30 CFR 250.54(b)).
This casing shall be set at a depth between 1,000 feet and 1,200 feet below the ocean floor, but may be set as deep as 1,500 feet in the event the first surface casing is set at least 450 feet below the ocean floor.
- (4) Intermediate Casing.
Intermediate casing shall be set in accordance with the requirements of Subsection 2005.5(a). Notwithstanding these requirements, the Division and Staff may specify the use and setting depth of the intermediate casing. Also, intermediate casing shall be set at any depth below the second surface casing when required by well conditions such as abnormal pressure, loss of circulation, hole problems, and for the protection of

productive zones while performing deeper drilling. A blank liner may be used as intermediate casing provided the existing casing string is of adequate strength for conducting deeper drilling. The top of the liner shall overlap a minimum of 100 feet into the next larger casing string. The lap shall be tested for fluid entry to determine whether a seal between the liner top and next larger string has been achieved. The test may be witnessed and approved by a Division or Staff inspector. The test shall be recorded in the driller's log. If the test indicates an improper seal, the top of the liner shall be squeezed with cement and retested.

(5) Production Casing.

Production casing shall be set before completing the well for production. A blank or combination liner may be run and cemented as production casing providing the existing intermediate casing string is of adequate strength for the safe conduct of production operations. The overlap requirement and the testing of the seal between the liner top and next larger casing shall be conducted as specified in Subsection 2005.5(e)(4) for intermediate liners. The surface casing shall not be used as production casing.

- a. Test of Water Shut-Off. When required by the Division, a test of water shut-off shall be made above the zones to be produced or injected into. The test may be witnessed and approved by a Division inspector before completing the well for production or injection. If the water shut-off test fails, the casing shall be squeezed with cement and retested. In injection wells, the Division

CALENDAR PAGE	456
MINUTE PAGE	536

may approve the demonstration of the shut-off by running of a survey within 30 days after injection commences. The survey must show that injection fluid is confined to the approved injection interval. Duplicate copies of the survey shall be filed with the Division and Staff within 60 days.

Authority: Sections 3013, 3106, and 6108 PRC

Reference: Sections 3106, 3220, 3222, 6216, and 6873(d), PRC

2005.6 Casing Cementing Requirements.

The operator shall utilize appropriate cementing technology and casing equipment in order to achieve adequate cement fill- up and bonding on all casing cementing operations.

- (a) Conductor and Surface Casings. The conductor (if drilled or jetted) and surface casings shall be cemented with sufficient cement to fill the annular space back to the surface or ocean floor. Cement fill shall be verified by the observation of cement returns. The cementing operation may be considered adequate if cement is circulated to the surface or ocean floor within the range of the calculated hole volume. In the event that cement returns are not obtained or cement channeling occurs during cementing of the surface casings, the operator shall run a temperature and/or cement bond survey and/or pressure test the casing shoe to evaluate the adequacy of the cement job. If the casing is determined to be inadequately cemented, the operator shall re-cement the casing string or perform other operations as jointly approved by the Division and Staff to ensure the competency of the cement job. In cases where cement has filled annular space back to the ocean floor, while conducting cementing operations from a mobile rig, the cement may be washed out to a

depth of 40 feet below the ocean floor or the depth of the conductor, whichever is less.

- (b) Intermediate, Protective and Production Casings. The intermediate casings shall be cemented with sufficient cement to fill the annular space a minimum of 200 feet into the preceding larger casing string. The protective and production casings shall be cemented in a manner such that cement will cover or isolate zones of unusually high or low pressure and zones containing hydrocarbons. Sufficient cement shall be used to provide annular fill-up at least 500 feet above the zones to be covered or isolated or above the casing shoe in cases where zonal coverage is not required.
- (c) Cement Bond Surveys. A cement bond survey shall be run following primary cementing of the intermediate and production casings to aid in determining whether the casings are adequately cemented. If a casing is thereby determined not to be adequately cemented, the operator shall re-cement the casing as necessary to achieve annular fill-up and isolation of zones. If, following a primary cementing operation, it has been determined without the aid of a cement bond survey that remedial cementing is necessary, the running of such survey may be deferred until after re-cementing. The operator shall verify the adequacy of the remedial cementing operations by running a cement bond survey or by other methods jointly approved by the Division and Staff.
- (d) Surveys Filed with Division and Staff. A copy of each temperature and cement bond survey shall be filed immediately with the Division and Staff.
- (e) Minimum Compressive Strength. After cementing any of the above casings, drilling shall not be commenced until sufficient time has elapsed for the cement to reach a compressive strength of at least 500 pounds per

square inch for the bottom 500 feet of the casing string. To determine the time at which a minimum compressive strength of 500 pounds per square inch has been attained, the operator shall pretest the cement slurry at the projected hole temperature and pressure at the cementing depth in accordance with "API Specification for Materials and Testing for Well Cements", API Spec. 10. Records of cement pretests shall be available for review by the Division and Staff.

Authority: Section 3013, 3106, and 6108, PRC

Reference: Sections 3106, 3220, 6216, and 6873(d), PRC

2005.7 Pressure Testing of Casing.

- (a) Prior to drilling out the plug after cementing, all casings except the conductor casing shall be pressure tested to at least the minimum pressure shown in the table below. In the event that the cement is under-displaced, the pressure test shall be conducted just before drilling out the casing shoe. This test shall not exceed 70 percent of the minimum internal yield pressure for the casing. If during the test, the pressure declines more than 10 percent in 30 minutes, or if there is another indication of a leak, corrective measures shall be taken so that a satisfactory test is obtained.

<u>Casing String</u>	<u>Minimum Surface Test Pressure</u>
First Surface	200 psi
Second Surface	1,000 psi
Intermediate, Production, Liner and Liner Lap	1,500 psi or 0.2 psi.ft. whichever is greater.

- (b) All casing pressure tests shall be witnessed and approved by a Division inspector prior to drilling out of the casing or perforating opposite possible oil and gas zones. Inspection of data recorded by a device

approved by the Division may be substituted for witnessing.

- (c) In the event of prolonged drill pipe operations which could cause damage to the casing, the casing shall be pressure-tested, calipered or otherwise evaluated to determine its adequacy for continued drilling operations.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 3220, 6216, and 6873(d), PRC

2005.8 Directional Surveys.

Each well shall be drilled in accordance with the approved well course.

- (a) Frequency. All wells drilled shall be directionally surveyed as drilling progresses giving both inclination and azimuth measurements. Directional survey shots shall be taken below the setting depth of the conductor casing string at intervals not exceeding 250 feet during the normal course of drilling and at intervals not exceeding 60 feet in angle changing portions of the hole. A multi-shot directional survey shall be run at casing setting depths and/or total depth. For wells whose average hole deviation does not exceed three degrees, a composite directional survey or a directional survey extracted from a continuous dipmeter log may be substituted for the multi-shot directional survey requirement.

- (b) Survey Results. Results of directional and inclination survey shots shall be reported promptly to the Division and Staff. Copies of all composite and multi-shot directional surveys shall be filed with the Division and Staff.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

CALENDAR PAGE	460
MINUTE PAGE	540

2005.9 Blowout Prevention and Related Well-Control Equipment Requirements.

Blowout prevention equipment shall be installed, tested, used, and maintained in a manner necessary to prevent an uncontrolled flow of fluid from a well. Specific blowout prevention equipment requirements, mud monitoring systems, and relevant elements and procedures are set forth in the Division of Oil and Gas Manual No. M07 entitled "Blowout Prevention in California". Division and Staff personnel shall use Manual No. M07 as a guide for the determination of blowout prevention equipment requirements for individual wells and field rules for development drilling and well work.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3219, 6219, and 6873(d), PRC

2005.10 Mud Program.

The characteristics, use, and testing of drilling mud properties, and the related procedures to be followed during drilling operations, shall be designed so as to prevent loss of well control. Adequate quantities of mud materials shall be maintained at the drill-site and shall be readily accessible for use in well control.

(a) Mud Quantities.

(1) The lessee shall include in the drilling mud program a tabulation by well depths of the minimum quantities of mud material to be maintained at the drill site. The minimum quantities of mud materials required shall be at least equal to the capacity of the downhole and active surface mud system. Sufficient weight material shall be maintained in order to condition the reserve mud to the maximum density programmed.

(2) A daily inventory of the mud materials shall be recorded and maintained at the drill site. Drilling operations shall be suspended whenever the required

minimum quantities of mud materials are not maintained at the drill site.

(b) Mud Control.

(1) Before starting out of the hole with the drill pipe, the mud shall be circulated with the drill pipe just off bottom, until the mud is properly conditioned. Proper conditioning requires, at a minimum, circulation to the extent that the annulus volume is displaced to ensure that the hole is clean and zonal pressures are being controlled by the mud column. When pulling the drill pipe, the annulus shall be filled with mud so that the mud level does not drop below a calculated depth of 100 feet below the derrick floor. The number of stands of drill pipe and drill collars that may be pulled before stopping to fill the hole and their equivalent mud displacement volumes shall be calculated and posted at the driller's station. A mechanical, volumetric, or electronic device shall be utilized for accurate measurement of the amount of mud used to fill the hole.

(2) A degasser and mud/gas separator shall be employed on all wells unless not required by field rules. This equipment shall be installed on the mud system prior to commencement of drilling operations, and shall be maintained for use throughout the drilling and completion of the well.

(c) Mud Testing Equipment. Mud testing equipment shall be maintained on the drilling rig at all times, and mud tests that are consistent with good operating practice shall be performed at least once each 8-hour period while drilling, or more frequently if conditions warrant.

(d) Mud Logging Equipment. Continuous mud logging equipment shall be employed on all exploratory drilling.

- (e) Mud Monitoring Equipment. Mud-system monitoring equipment, as specified in the Division of Oil and Gas Manual No. M07, shall be installed with indicators located at the driller's station and used throughout the period of drilling after setting and cementing the conductor casing.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.11 Drilling Practices.

- (a) Observing for Changes in Mud Volume. The volume of mud required to fill the hole shall be carefully observed, and if at any time there is an indication of swabbing or influx of formation fluids, the necessary safety device(s) shall be installed on the drill pipe. The drill pipe shall be run to bottom and the mud properly conditioned to stabilize the well. The mud shall not be circulated and conditioned except on or near the bottom, unless well conditions prevent the running of pipe to bottom.
- (b) Posting Maximum Permissible Casing Head Pressure. The operator shall post at the driller's station, for each casing, the maximum permissible pressure that is allowed to build up against the blowout preventers before controlling the pressure by bleeding through the choke. This limiting pressure shall be based upon the formation fracture gradient at the depth of the casing shoe.
- (c) Rate of Pulling Drill Pipe. The rate of pulling or running drill pipe shall be controlled to ensure that the hole is not being swabbed, or that formations exposed to the well bore will not be broken down. Special precautions shall be observed to prevent swabbing when full-hole tools are employed.

- (d) Handling Drill-Stem Test Formation Fluid. All formation fluid produced during drill-stem testing shall be directed to the producing or test facilities, and fluid remaining in the drill string after drill-stem testing shall be reverse-circulated from the drill pipe. The mud shall be adequately conditioned prior to pulling the drill-stem test tools.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.12 Supervision and Training.

- (a) Operator's Drilling Supervisor On-Site 24 Hours. The operator shall provide on-site company supervision (company toolpusher) of drilling operations on a 24-hour basis, unless it is determined upon the request of the operator and confirmed in writing by the Staff and Division that some lesser amount of supervision is appropriate. At least one member of the drilling crew or the toolpusher shall maintain rig-floor surveillance at all times, unless the well is secured with blowout preventers, bridge plugs, or cement plugs.
- (b) Well Control Training-Certification Requirement. Except as provided below in Subsection 2005.12(c), the operator and drilling contractor personnel engaged in drilling operations shall be trained and qualified in well-control equipment, operations and techniques in accordance with the provisions of the Minerals Management Service Outer Continental Shelf Standard No. T-1, "Training and Qualifications of Personnel in Well-Control Equipment and Techniques for Drilling on Offshore Location," (MMSS-OCS-T1). Written certification shall be filed with the Division and Staff to confirm compliance with this provision before commencing drilling operations.

- (c) Well Control Drill Plan and Frequency. In addition to the Well Control Drill Plan required in Section 4 of document MMSS-OCS-T1 referred to above, well control drills shall be held for each crew on a daily basis until each crew demonstrates its ability to effect proper closure of the well within the time established by the Well Control Drill Plan. Thereafter, the drills may be held on a weekly basis for each crew as set forth in Section 4. The performance of well control drills shall be recorded in the driller's log.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3106, 6216, and 6873(d), PRC

2005.13 Hydrogen Sulfide Gas Detection and Precaution During Drilling, Reworking and Maintenance of Wells.

(NOTE: For applicable regulations concerning PRODUCTION FACILITIES in an H₂S environment, please see section 2014.6.)

When drilling operations are planned which will penetrate reservoirs known or expected to contain hydrogen sulfide (H₂S), or in those areas where the presence or absence of H₂S is unknown, or when reworking or maintaining wells completed in reservoirs known to contain H₂S that could potentially result in an atmospheric concentration of 10 ppm or greater, the operator shall abide by the preventive measures and the operating practices set forth in this section. The requirements of this section are not applicable to operations in zones where the absence of H₂S has been confirmed.

- (a) Definitions. As used in this section, the terms shall have the following meanings:

"Facility" means a vessel, a structure or platform or an artificial island used for drilling, well completion, well workover and/or any other well work.

"Well-control fluid" means drilling mud, completion fluid, or workover fluid as appropriate to the particular operation being conducted.

(b) Hydrogen Sulfide Gas Detection and Alarm System.

(1) A separate automatic hydrogen sulfide (H₂S) gas detector and alarm system shall be provided. This equipment shall be capable of sensing a minimum of five parts per million (ppm) H₂S in air, with sensing points located in all enclosed and hazardous areas where gas handling facilities are located, as well as any living quarters and other areas where H₂S might accumulate in hazardous quantities. The H₂S detection devices shall activate audible and visible alarms when the concentration of H₂S reaches 20 ppm in air.

(c) Hydrogen Sulfide Contingency Plan. A contingency plan shall be developed prior to the commencement of operations and, as applicable, encompass all phases of the work to be done. The plan and any subsequent revisions thereto shall be submitted for joint approval by the Division and Staff. A copy of the approved plan shall be located at the facility. The plan shall include the following:

- (1) General information and physiological responses to H₂S and SO₂ exposure.
- (2) Safety procedures, equipment, training and smoking rules.
- (3) Procedures for normal operating conditions and for H₂S emergency conditions.
- (4) Responsibilities, duties and procedures when the concentration of H₂S in the atmosphere reaches the following:
 - a. 10 ppm level,
 - b. 20 ppm level,
 - c. 50 ppm level.
- (5) Designation of briefing areas as location for assembly of personnel during an emergency condition. At least two briefing areas shall be established on each facility. Of these two areas,

the one up wind at any given time is the safe briefing area.

- (6) Evacuation plan.
 - (7) Agencies to be notified in case of an emergency (must include the State Lands Commission and the California Division of Oil and Gas).
 - (8) A list of medical personnel and facilities, including addresses and telephone numbers.
- (d) Personnel Training Program.
- (1) To promote efficient safety procedures, an on-site H2S safety program, which includes training sessions and drills, shall be established. Records of attendance shall be maintained on the production facility.
 - (2) A training session and drill shall be conducted for each person within 24 hours after arrival on the facility and biweekly thereafter.
 - (3) All regularly assigned working personnel shall have completed a basic first-aid course applicable to victims of H2S exposure. During on-site training sessions and drills, emphasis shall be placed upon rescue and first aid for H2S victims.
 - (4) Each facility shall have the following equipment, and the facility operator and each crew member shall be thoroughly familiar with the location and use of these items:
 - a. A first-aid kit appropriately sized for the normal number of working personnel.
 - b. Resuscitators, complete with face masks, oxygen bottles and spare oxygen bottles.
 - c. At least one litter or equivalent device.
 - (5) All personnel, whether regularly assigned, contracted or employed on an unscheduled basis, shall be informed as to the hazards of H2S and SO2. They shall also be instructed in the proper

use of personnel safety equipment which they may be required to use and be informed of H2S detectors and alarms, ventilation equipment, prevailing winds, briefing areas, warning systems and evacuation procedures.

(e) Personnel Protective Equipment.

- (1) All facilities, and all marine vessels serving the facilities, shall have proper personal breathing apparatus immediately available for all personnel serving on board and additional equipment for possible use in evacuations. The protective breathing apparatus used in an H2S environment shall conform to all applicable Occupational Safety and Health Administration regulations as set forth in the Code of Federal Regulations 29 CFR 1910.134 and American National Standards Institute standards. Additional equipment, such as nose cups and spectacle kits, shall be available for use as needed.
- (2) A system of breathing-air manifolds, hoses and masks shall be provided on the facility and in the briefing areas. A cascade air bottle system shall be provided to refill individual protective breathing apparatus bottles. The cascade air bottle system may be recharged by a high pressure compressor suitable for providing breathing quality air, provided the compressor suction is located in an uncontaminated atmosphere. All breathing air bottles shall be labeled as containing breathing quality air fit for human usage. The compressor and compressed air system shall comply with 29 CFR 1910.134 (OSHA).
- (3) The storage locations of protective breathing apparatus shall be such that they are quickly and

easily available to all personnel. Storage locations shall include the following:

- a. Facility operator's office
 - b. Each working deck
 - c. Crew quarters
 - d. Equipment storage room
 - e. Designated briefing areas
 - f. Heliport access.
- (4) Workboats attendant to facility operations shall be equipped with a protective breathing apparatus for all workboat crew members. Additional protective breathing apparatus shall be available for evacuees. When possible, boats shall be stationed up wind from the facility.
- (5) Helicopters attendant to facility operations shall be equipped with protective breathing apparatus for the flight crew.
- (6) The following additional personnel safety equipment shall be available for use as needed.
- a. Portable H2S detectors.
 - b. Retrieval ropes with safety harnesses to retrieve incapacitated personnel from contaminated areas.
 - c. chalkboards and note pads at convenient locations for communication purposes.
 - d. Bull horns and flashing lights.
 - e. Resuscitators.
- (f) Visual Warning System.
- (1) Wind direction equipment shall be installed at prominent locations to indicate to all personnel, on or in the immediate vicinity of the production facility, the wind direction at all times for determining safe up wind areas in the event that H2S or SO2 is present in the atmosphere.

- (2) Operational danger signs shall be displayed from each side of the facility, and a number of rectangular red flags shall be hoisted, and other visual alarms shall be activated in a manner visible to watercraft and aircraft.

The signs shall have a minimum width of 8 feet and a minimum height of 4 feet and shall be painted a high-visibility yellow color with black lettering of a minimum of 12 inches in height, reading as follows:

DANGER -- HYDROGEN SULFIDE -- H2S

Each flag shall be a minimum width of 3 feet and a minimum height of 2 feet. When in use, all signs and flags shall be illuminated under conditions of poor visibility and at night. These signs and flags shall indicate the following conditions and operations requirements.

- a. When H2S is present, signs shall be displayed.
- b. When H2S is determined to have reached or exceeded a level of 20 ppm in environmental areas, red flags shall be hoisted, other visual alarms shall be activated, and protective equipment shall be worn by all personnel in those areas. Nonessential personnel shall be removed to a safe location or evacuated as appropriate. Radio communications shall be used to alert all known aircraft and watercraft in the immediate vicinity of this condition.

- (4) Audible Warning System. A public address system and a siren, horn or other audible warning device with a unique sound used only for H2S warnings shall be installed at appropriate locations on the facility. When the warning devices are activated, (at the 20 ppm

threshold level) the designated responsible persons shall inform personnel of the level of danger and issue instructions on the initiation of appropriate protective measures.

- (h) Ventilation Equipment. All ventilation devices shall be explosive proof when used in areas where H2S may accumulate. Moveable ventilation devices shall be provided in work areas and be multidirectional and capable of dispersing H2S or SO2 vapors away from working personnel.
- (i) Flare Systems. The flare system shall be designed to safely gather and burn H2S gas. Flare lines shall be located as far from the other facilities as feasible, in a manner to compensate for wind changes. The flare system shall be equipped with a pilot and an automatic igniter. Backup ignition for each flare shall be provided.
- (j) Notification of Regulatory Agencies. The following agencies shall be notified immediately if H2S has been determined to have reached or exceeded a level of 20 ppm or greater at the facility or in the environmental areas.
 - (1) State Lands Commission.
 - (2) Division of Oil and Gas.
 - (3) United States Coast Guard.
- (k) Drilling, Completion and Workover Fluids Program When Operating in Zones Known to Contain H2S.
 - (1) Either oil or water base fluids may be used in drilling or working in formations containing H2S.
 - (2) If H2S is detected by air sensors, the mud or other hold fluids shall be checked for soluble sulfides by any appropriate test available (such as the Garrett Gas Train). Personnel conducting such tests shall don breathing equipment when air concentrations exceed 20 ppm.

- (3) Additives for the control of H₂S, (such as zinc and iron compounds) fluid pH, (caustic materials) and corrosion of equipment (such as oxygen scavengers and amines) shall be maintained on the facility.
 - a. When H₂S is detected in the drilling fluid, appropriate scavengers shall be added as needed. If needed, drilling should be suspended until the entire system can be treated with such materials.
 - b. Additives for the control of pH (and fluid rheology) shall be added to water based drilling fluids in sufficient quantities to maintain the pH of the fluid above 10.0, if H₂S is encountered in significant quantities.
 - c. Additional corrosion inhibitors may be added if the pH is not over 10 or it is deemed desirable.
- (4) Well fluids containing H₂S shall be degassed and the gases shall be collected and burned in a closed flare system.
- (1) Kick Detection and Well Control. In the event of a kick, the disposal of the well influx fluids shall be accomplished by one of the following alternatives, giving consideration to personnel safety and possible environmental damage.
 - (1) Contain the well fluid influx by shutting in the well and pumping the fluids back into the formation.
 - (2) Control the kick by using appropriate well control techniques to prevent formation fracturing in an open hole within the pressure limits of the well equipment (drill pipe, work string, casing, wellhead, BOP system and related equipment). The disposal of H₂S and other gases shall be through

pressurized or atmospheric mud-gas separator equipment depending on volume, pressure and concentration of H₂S. The separated gas shall be collected and burned in a closed flare system. The recovered well control fluid shall be treated to neutralize the H₂S in solution and restore and maintain the proper qualities.

- (m) Well Testing in a Zone Known to Contain H₂S.
- (1) Prior to initiation of a well test, safety meetings shall be conducted for all personnel who will be on the facility during the test. The meetings shall emphasize the use of protective breathing equipment, first aid procedures and the Contingency Plan.
 - (2) Well testing shall be performed with the minimum number of personnel in the immediate vicinity of the rig floor and with the appropriate test equipment to safely and adequately perform the test. During the test, H₂S levels shall be continuously monitored.
 - (3) All produced gases shall be vented and burned through a flare which meets the requirements of paragraph (o)(6) of this section. Gases from stored test fluids shall be vented into the flare outlet.
 - (4) Downhole test tools and wellhead equipment shall be suitable for H₂S service.
 - (5) Tubulars suitable for H₂S service shall be used for well testing. Water cushions shall be thoroughly treated in order to prevent hydrogen embrittlement and corrosion. The test string shall be flushed with fluid treated for this purpose after completion of the test.
 - (6) All surface test units and related equipment shall be designed for H₂S service.

- (n) Metallurgical Properties of Equipment for Use in a Zone Known to Contain H₂S.
- (1) Equipment used in H₂S environments shall be constructed of materials whose metallurgical properties resist or prevent stress cracking or hydrogen embrittlement.
 - (2) Tubulars shall also be designed for H₂S service.
 - (3) Wellhead and BOPE components exposed to H₂S bearing fluids shall conform to NACE standard MR-01-75 or a design shown to be a suitable equivalent.
 - (4) Temporary or permanent downhole devices, such as packers and bridge plugs, shall be designed for H₂S service.
- (o) General Requirements When Operating in H₂S Zone.
- (1) After penetration of an H₂S zone, H₂S levels shall be continuously monitored in the work areas, in addition to monitoring requirements stated above, during the following operations.
 - a. When it is necessary to pull a wet string of drill pipe or workover string;
 - b. While circulating bottoms up after a drilling break or trip;
 - c. During cementing and logging operations; and
 - d. While circulating to condition mud or other well control fluids.
 - (2) Coring. Protective breathing equipment shall be worn by those personnel in the working area at least ten stands in advance of retrieving a core barrel. Cores to be transported shall be sealed and marked for the presence of H₂S.
 - (3) Logging. Well control fluid in use for logging operations shall be conditioned and treated to minimize the effects of H₂S on the logging equipment.

- (4) Stripping operations. Displaced well control fluid returns shall be monitored, and protective breathing equipment shall be worn by those personnel in the working area when the atmospheric concentration of H₂S reaches or exceeds 20 ppm.
- (5) Gas cut fluid or well kick. Should a decision be made to circulate out a kick, protective breathing equipment shall be worn by those personnel in the working area prior to and subsequent to bottoms up and throughout the kill operation.
- (6) Flare system. The flare outlet shall be of such diameter to allow easy nonrestricted flow of gas. Flare line outlets shall be located on the downwind side and as far from the facility as is feasible, taking into account the prevailing wind directions, the wake effects caused by the facility and adjacent structure(s), and the height of all such facilities and structures. The flare outlet shall be equipped with an automatic pilot gas source or an equivalent system. Alternate methods shall be available for igniting the flare. All vents from production process equipment, tanks, relief valves, burst plates and similar devices shall be piped to the flare system used for H₂S.
- (7) Corrosion monitoring. Specific corrosion monitoring and mitigating measures shall be taken in areas of unusually severe corrosion or where high solution concentrations of H₂S exist.
- (8) BOPE and lubricator seals and sealing elements. All blowout prevention equipment and lubricator seals and sealing elements which may be exposed to the well fluids shall be of H₂S resistant materials.

(9) Fuel and/or instrument gas. No gas containing H₂S shall be used for fuel or instrument gas.

(10) Water disposal. Formation water from tests shall be treated for removal of H₂S.

Authority: Sections 3013, 3106 and 6108, PRC

Reference: Sections 3105, 6216, 6108 and 6973(d), PRC

2006.0 Redrilling and Deepening.

Pursuant to Subsection 2002.2(a), the operator shall submit a detailed rework program for approval prior to commencement of redrilling or deepening operations. Drilling operations to redrill or deepen a well shall be conducted in accordance with the foregoing drilling regulations and the additional regulations listed below.

- (a) Determination of Existing Casing Adequacy by Survey. A well shall not be redrilled or deepened unless it is determined that the casing exposed in the well will provide adequate strength for the proposed drilling and for subsequent production operations. Where well conditions permit, a casing inspection survey, indicating actual remaining wall thickness and internal diameter, shall be run to determine the condition of the casing and whether or not it is of adequate strength.
- (b) Pressure Test of Existing Casing in Lieu of Survey. If it is not possible to run a casing inspection survey, the casing shall be pressure tested to 70 percent of minimum internal yield pressure or 1.25 times the anticipated surface pressure that it might be subjected to either during the drilling operations or subsequent production operations (including injection), or to the amount stipulated in Subsection 2005.7, whichever is greater.
- (c) Pressure Test of Existing Casing if Surveyed. If the casing inspection survey indicates that the casing

strength is adequate, then the casing also shall be pressure tested as provided in Subsection 2006(b).

- (d) Corrective Measures if Existing Casing Inadequate. In the event it is determined that the condition of the casing is inadequate, drilling shall not be initiated until corrective measures jointly approved by the Division and Staff are taken by the operator. The casing shall then be tested to the minimum pressure stipulated above in Subsection 2006(b).
- (e) Survey Filing with Staff. A copy of the casing inspection survey shall be filed immediately with the Division and Staff.
- (f) Determination of Adequacy of Existing Casing Cement. Prior to redrilling or deepening a well the operator shall demonstrate that the casing is adequately cemented above the point of new drilling. In the event it is thereby determined that the casing is not adequately cemented the operator shall properly recement the casing. The operator shall verify the adequacy of the remedial cementing operations by running a cement bond survey or other methods jointly approved by the Division and Staff.
- (g) Abandonment Prior to Redrilling. Prior to redrilling a well, all oil, gas and water zones exposed in the well below the kickoff depth shall be properly abandoned in accordance with the plugging and abandonment requirements in Section 2007.0.
- (h) Cementing Off Shallow Low-Pressure Zones. If a well is to be redrilled or deepened to a zone(s) having a pressure significantly higher or lower than that of the shallower producing zone(s), which drilling might cause lost circulation and thereby endanger the well, the shallower producing zones shall be squeeze cemented or

cased and cemented, prior to penetrating the lower zone(s).

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3013, 3106, 6216, and 6873(d), PRC

2007.0 Plugging and Abandonment of Wells.

2007.1 General.

- (a) Detailed Program to be Approved Prior to Work. The operator shall submit a detailed well abandonment program together with the notice of intent to abandon pursuant to Subsection 2002.2(a). The program shall show the present condition of the well, freshwater-saltwater interface, all oil and gas bearing zones and the proposed method of abandonment.
- (b) Verbal Approval to Plug During Ongoing Approved Operations. In the case of a newly drilled dry hole or where approved operations on a well are in progress, the operator may commence plugging operations by securing verbal approval from the Division and Staff as to the abandonment procedure and the time that plugging operations are to begin. The operator shall furnish the Division and Staff a description of the mechanical condition of the well, depth and description of all oil and gas shows and tests, and any other well data necessary for review of the abandonment procedure. The operator shall immediately submit an abandonment program in accordance with Subsection 2002.2(a) for confirmation of the approved abandonment procedure.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3210-3214, 6108, 6216, and 6873(d), PRC

2007.2 Permanent Abandonment.

The operator shall plug and abandon all wells in accordance with the following minimum requirements.

- (a) Isolation of Zones in Open Hole. In the open hole portion of the well, cement plugs shall be placed to extend from 100 feet below to 100 feet above each oil or gas bearing zone or zone that is productive of hydrocarbons elsewhere in the field, and a cement plug at least 200 feet long shall be placed across the intrazone freshwater-saltwater interface, so as to isolate fluids in the strata in which they are found and to prevent them from migrating into other strata.
- (b) Isolation of Open Hole from Casing. Where there is open hole below the casing, a cement plug shall be placed in the deepest casing by (1) or (2) below, or in the event lost circulation conditions exist or are anticipated, the plug may be placed in accordance with (3) below:
- (1) A cement plug placed by displacement method so as to extend from 100 feet below to 100 feet above the casing shoe.
 - (2) A cement retainer with effective back-pressure control, set not less than 50 feet, nor more than 100 feet, above the casing shoe with a cement plug calculated to extend from 100 feet below the casing shoe to 50 feet above the retainer.
 - (3) A permanent type bridge plug set within 150 feet above the casing shoe with 50 feet of cement placed on top of the bridge plug. This plug shall be tested prior to placing subsequent plugs.
- (c) Plugging or Isolating Perforated Intervals. A cement plug extending from 100 feet below to 100 feet above the perforations shall be placed opposite all open perforations. Other procedures such as cement squeezing through a retainer or bridge plug may be specified or authorized by the Division and Staff as circumstances justify.

- (d) Miscellaneous Cementing Points. A cement plug shall be placed across all liner tops, stage cementing collars, cemented perforations, and known bad spots in the casing. Each plug shall extend at least 100 feet below to a minimum of 100 feet above the referenced cementing points.
- (e) Isolation of Zones Behind Uncemented Casing. All oil, gas or freshwater bearing zones located behind casing in the uncemented portion of the hole shall be squeeze cemented to isolate fluids in the strata in which they occur.
- (f) Isolating Zones Behind Cemented Casing. Inside cemented casing, a 100 foot cement plug shall be placed above each oil or gas zone and above the shoe of the intermediate or second surface casing. A cement plug at least 200 feet long also shall be placed across the intrazone freshwater-saltwater interface.
- (g) Junk in Hole or Collapsed Casing. A diligent effort shall be made to recover junk when such junk may prevent proper abandonment of the hole. In the event that junk cannot be removed from the hole, cement plugs shall be placed as follows:
- (1) Sufficient cement shall be squeezed through the junk to isolate the lower oil, gas, or freshwater zones and 100 feet of cement placed on top of the junk.
 - (2) If the top of the junk is opposite uncemented casing, the casing annulus immediately above the junk shall be squeeze-cemented with sufficient cement to insure isolation of the lower zones.
- (h) Plugging of Casing Stubs. If casing is cut and recovered, a cement plug shall be placed so as to extend from 100 feet below the casing stub to 100 feet above the top of the casing stub.

- (1) If the stub extends up into the next larger casing, then a retainer may be set 50 feet above the top of the stub and cement placed 150 feet below and 50 feet above the retainer. If the foregoing methods cannot be used, a bridge plug shall be set 50 feet above the top of the stub and capped with 50 feet of cement.
- (2) If the stub is below the next larger casing, plugging of the open hole interval above the stub shall be accomplished in accordance with Subsection 2007.2(a) and, then in addition, a cement plug shall be placed so as to extend from 100 feet below to 100 feet above the casing shoe that is exposed above the stub in accordance with Subsection 2007.2(b).
- (i) Plugging of Annular Space. No casing annular space that extends to the ocean floor shall be left open to the drilled hole below. If this condition exists, 200 feet of the annulus immediately above the shoe of the preceding casing shall be plugged with cement. If an uncemented inner casing is cut and recovered to accomplish this requirement, this casing stub shall be plugged in accordance with Subsection 2007.2(h).
- (j) Surface Plug Requirement. A cement plug of at least 100 feet, with the top of the plug not more than 150 feet or less than 50 feet below the ocean floor, shall be placed in the well. Prior to the placement of the surface plug all inside casings which are uncemented at the surface plugging depth shall be cut and recovered. Casing cutting methods shall be employed that will not damage the well casing so as to prevent re-entry of the well.
- (k) Testing of Plugs. The location and hardness of all cement plugs shall be tested by placement of drill

string weight (10,000 pounds minimum) on the plug, and by application of pump circulation.

- (l) Mud. Each of the respective intervals of the hole between the various plugs shall be filled with mud fluid of sufficient density to exert a hydrostatic pressure exceeding the greatest formation pressure encountered while drilling such intervals.
- (m) Clearance of Location. All casing and anchor piling shall be severed and removed from below the ocean floor at a depth approved by the Staff. The area in the vicinity of the well shall be inspected and the ocean floor shall be cleared of any other obstructions. A method shall be employed to sever or cut the casing that will not damage the well casing so as to prevent re-entry of the well.
- (n) Alternate Procedures. Other procedures may be specified or authorized by the Division and Staff as circumstances justify.
- (o) Record of Abandonment. All plugging and abandonment operations shall be recorded on the driller's log.

Authority: Sections 3013, 3106, and 6108, PRC

Reference: Sections 3210-3214, 6108, 6216, and 6873(d), PRC

2007.3 Temporary Abandonment.

- (a) Any well that is to be temporarily abandoned shall be mudded and cemented as required for permanent abandonment, but the requirements of Subsection 2007.2 (d), (f), (i), (j) and (m) may be deferred. In lieu of a surface cement plug, for ocean floor and platform sites, a bridge plug (retrievable or drillable) may be set in the well between 15 and 200 feet below the ocean floor.

For land fill, pier, and island sites, the well shall be securely capped or closed at the surface until operations are resumed.