UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

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In Reply Refer To:
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EMS TRANSMISSION 01/29/99
Instruction Memorandum No. 99-051
Expires: 9/30/00

To: All State Directors

From: Director

Subject: Bureauwide Interim Guidance on Oil and Gas Drainage Protection

DISTRIBUTION: State and Field Office Fluid Minerals staff, Denver Service Center, National Training Center.

ISSUE: This Instruction Memorandum (IM) is issued as a replacement to WO IM 96-180 to provide interim guidance for performing the oil and gas drainage protection function.

OBJECTIVE: The Washington Office (WO) is responsible for providing uniform and consistent guidelines that are used in ensuring that lessees protect Federal and Indian leases from drainage of oil and gas resources by wells producing on adjacent or nearby lands.

BACKGROUND AND POLICY: In an effort to reduce internal Bureau of Land Management (BLM) regulations by fifty percent, IM 96-180 was issued to replace the 3160-2 Drainage Protection Manual. This IM expired on September 30, 1998. Although the BLM is allowed to retain useful handbook supplements that are required for guidance, the 3160-2 Drainage Protection Handbook is still in draft form and is not officially a part of the directives system. Since the existing Drainage Protection Manual is the only BLM document that provides uniform documentation of how to establish drainage cases, conduct drainage case reviews, and provide correspondence to lessees regarding their drainage protection responsibilities, the BLM has to issue internal guidelines until the Drainage Protection Handbook is revised and finalized.

IMPLEMENTATION AND SCHEDULE: Effective immediately, all field offices with drainage protection responsibilities are to use the Guidelines attached to this IM as interim guidance for performing their drainage protection responsibilities. A bureauwide team will be formed to ensure that information contained in the former Manual that is useful in

implementing the drainage protection function is incorporated into the Handbook. Once this Drainage Protection Handbook is revised and approved, the BLM will issue further instructions on the relevance of the Guidelines attached to this IM. It is expected that the Handbook will be completed and approved during Fiscal Year 1999.

COORDINATION: All Headquarters, State, and Field Office managerial, technical, and support oil and gas drainage protection staff should require that these Guidelines are being used as of the effective date so that the BLM may continue to fulfil its obligation to its customers and to ensure that Federal and Indian oil and gas resources are being protected from drainage.

BUDGET IMPLICATIONS: Since this IM does not change any existing procedures or add any new record keeping or data collection requirements, it should have only a minimal impact on the oil and gas drainage protection budget.

CONTACT: Any questions concerning this IM should be directed to Donnie Shaw, Fluid Minerals Group (WO-310) at (202) 452-0382.

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1 Attachment
1 - Drainage Protection Guidelines (32 pp)

H-3160-2 - DRAINAGE PROTECTION GUIDELINES

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.01 Purpose. This Manual Section provides guidelines, standards, and procedures for protecting leased and unleased public domain, acquired, Indian tribal, and allotted mineral interests from the loss of oil and gas or geothermal resources by drainage and the resulting loss of royalty revenues.

.02 Objectives. The objectives of this program are to prevent substantial loss of oil and gas or geothermal resources from jurisdictional lands due to drainage, and, when such loss is not prevented, to ensure that the Federal or Indian lessors are not subjected to significant revenue losses through such drainage. Professional judgment is a key element in accomplishing these objectives. Accomplishment of these objectives may take the form of requiring the lessee of the drained lease, unit, unit participating area, or communitized area to drill a protective well, pay compensatory royalty, enter into an agreement (e.g., communitization, participating area, unitization), relinquish affected acreage, modify existing agreements, or a combination of the above actions. For unleased lands, the objectives may be accomplished by leasing and requiring the lessee to take protective measures or by negotiation of compensatory royalty agreements.

.03 Authority.

A. Mineral Leasing Act of 1920, as amended (landmark amendments are Sec. 3 of the Act of August 8, 1946, 60 Stat. 951; and the Act of September 2, 1960).

B. Act of May 21, 1930 (30 U.S.C. 301-306), (sometimes referred to as the Rights-of-Way Leasing Act of 1930).

C. Acquired Lands Leasing Act of 1947.

D. Indian Mineral Development Act of 1982.

E. Federal Oil and Gas Royalty Management Act of 1982.

F. Geothermal Steam Act of 1970.

G. 43 CFR 3100-3262. The following sections from 43 CFR 3100-3262 are relevant to drainage.

1. 3100.2-1, Compensation for drainage.

2. 3100.2-2, Drilling and production or payment of compensatory royalty.

3. 3105.2, Communitization or drilling agreements.

4. 3107.9-1, Payment of compensatory royalty.

5. 3109.1, Rights-of-way.

6. 3120.8-3, Compensatory royalty agreements.

7. 3162.2, Drilling and producing obligations.

8. 3186.l, Model onshore unit agreement for unproven area, Section 17, Drainage.

9. 3261.7, Values and payment for losses.

10. 3262.3, Drilling and producing obligations.

H. 43 CFR Part 4, Subpart E, Appeals Procedures.

I. 25 CFR 211-213 and 227, all of which address leasing and operations for Indian lands.

J. Federal and Indian lease terms.

.04 Responsibility.

A. The Director and Deputy Director have responsibility for the overall management of Bureau programs, including management of drainage protection within the oil and gas programs.

B. The Assistant Director and Deputy Assistant Director for Minerals, Realty, and Resource Protection are responsible for ensuring that Federal and Indian lands are adequately protected from drainage.

C. The State Director is delegated responsibility for:

1. Identifying potential drainage situations (PDS).

2. Protecting leased Federal and Indian lands identified as PDS's by requiring protective measures.

3. Protecting unleased Federal lands through leasing with subsequent protective measures, or through compensatory royalty agreements (CRA) or other agreements.

4. Notifying the Bureau of Indian Affairs (BIA) when unleased Indian lands are identified as subject to potential drainage and recommending protective measures.

5. Issuing the demand letter to the affected lessee(s), formally notifying them of their responsibility to protect the lease from drainage, and requesting a plan for doing so.

6. Determining whether drainage is occurring or has occurred and determining the drainage factor that is applicable to each case.

7. Determining if there was ever a time when the lessee could have drilled an economic protective well.

8. When compensatory royalty is to be assessed, establishing the date from which compensatory royalty is to begin and the date or conditions upon which the assessment is to end.

9. Notifying the lessee, as appropriate, of the Bureau's assessment of compensatory royalty and of its rights of review and appeal.

10. Providing the Minerals Management Service (MMS) with appropriate data to set up compensatory royalty accounts, when applicable.

11. Providing guidance and assistance to District, Field Office, and Area Managers if delegated any of the above responsibilities.

12. Ensuring quality control of the drainage program.

D. The District or Field Office Manager may carry out any or all of the above responsibilities delegated by the State Director.

E. The Area or Field Office Manager may carry out any or all of the above responsibilities delegated by the District or Field Office Manager.

F. MMS. In accordance with the existing BLM/MMS Memorandum of Understanding of February 13, 1987, the MMS is responsible for setting up and subsequently maintaining compensatory royalty accounts. These responsibilities include determining dollar amounts, collecting any compensatory royalty due, and requesting input from the BLM if problems arise. The MMS is also responsible for providing information to the BLM to verify that compensatory royalty has been assessed and providing a quarterly report on compensatory royalty assessments and agreements.

G. BIA. The BIA is responsible for leasing Indian lands, managing lease information, and for executing agreements when applicable for tracts where there is potential drainage.

.05 References.

A. Memorandum of Understanding Between the Bureau of Land Management and Minerals Management Service Regarding Working Relationships Affecting Mineral Lease Activities, February 13, 1987, as amended.

B. BLM Handbook H-31O9-l - Leasing Under Special Acts.

C. Washington Office Solicitor's Opinion BLM.ER.0648, February 28, 1988.

D. Washington Office Solicitor's Opinion BLM.ER.0667, September 28, 1988.

E. Nola Grace Ptasynski, 63 IBLA 240, decided April 19, 1982.

F. Bruce Anderson, 80 IBLA 286, decided May 4, 1984.

G. Gulf Oil Exploration & Producing Co., 94 IBLA 364, decided December 4, 1984.

H. R. K. Teichgraeber, 96 IBLA 294, decided March 25, 1987.

I. CSX Oil and Gas Corp., 104 IBLA 188, decided September 9, 1988.

J. Atlantic Richfield Co., 105 IBLA 218, decided November 2, 1988.

K. Chevron U.S.A. Inc., 107 IBLA 126, decided February 6, 1989.

.06 Policy. Protecting the United States Government and Indian lessors from loss of royalty as a result of drainage is a prime responsibility of the Bureau of Land Management. Under the terms of both Federal and Indian leases, the lessee has the obligation to protect the leased land from drainage by drilling and producing any well(s) that is necessary to protect the lease from drainage, or in lieu thereof and with the consent of the authorized officer, by paying compensatory royalty. Prioritization of drainage case work, on the basis of a production screen or other criteria, is required.

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A. Categories of Potential Drainage Situations. Definitions of potential drainage situation (PDS) and drainage case are given in the Glossary of Terms. Handbook H-3160-2, at I., provides some examples of potential drainage situations encountered in the field; however, the examples are not all-inclusive. A potential drainage situation exists for Federal or Indian lands (see Glossary) under the following four categories:

1. Ownership. A PDS exists for Federal lands where there is production of oil or gas or geothermal resources from a well on adjacent lands not owned by the United States. A PDS exists for Indian lands where there is production of oil or gas or geothermal resources from a well on adjacent lands not owned by the Indian tribe or allottee involved.

2. Royalty Rate. A PDS exists for Federal lands where there is production of oil or gas or geothermal resources from a well on an adjoining Federal lease bearing a lower royalty rate. A PDS exists for Indian lands where there is production of oil or gas or geothermal resources from a well on an adjoining tribal/allotted lease (same tribe or allottee) bearing a lower royalty rate.

3. Lease Account. A PDS exists for Federal lands where there is production of oil or gas or geothermal resources from a well on an adjoining Federal lease when the revenues from that lease are distributed to different accounts. Specifically, this applies to wells on public domain lands draining acquired lands or wells on acquired lands draining public domain lands. See Handbook H-3160-2 for distribution of monies received.

4. Participation. A potential drainage situation exists for Federal lands where there is production of oil or gas or geothermal resources from a well from which the Federal Government receives royalties, but at a smaller participation or allocation rate than the Federal lands offended. Specifically, this applies to split mineral interests (e.g., 50 percent Federal, 50 percent State), and lower Federal participation encountered in adjacent units and CA's.

B. Prudent Operator Rule. The Interior Board of Land Appeals (IBLA) in Nola Grace Ptasynski, 63 IBLA 240 (decided April 19, 1982), 89 ID at 212, defined the prudent operator rule (POR) as follows: "Under the usual statement of the standard for prudent operation there is no obligation upon the lessee to drill offset wells unless there is a sufficient quantity of oil or gas to pay a reasonable profit to the lessee over and above the cost of drilling and operating the well." This economic test is applied to all drainage cases.

C. Compensatory Royalty. Drainage protection is an express covenant of the lease agreement. Application of the statute of limitations provides that the authorized officer must initiate action to collect compensatory royalty (CR) within 6 years after the BLM determines that compensation for drainage is due (see Washington Solicitor's opinion BLM.ER.O648, February 28, 1988). In initiating the action, the authorized officer must demonstrate that a lessee had actual or **constructive notice** of facts sufficient to alert a reasonably prudent operator that drainage is or was occurring. As explained in the Assistant Solicitor's memorandum BLM.ER.0667, September 28, 1988), **constructive notice** is achieved when the fact of the draining well's production, or its capability to produce, becomes publicly available and that any other information that is publicly available is sufficient to show that drainage may occur. The data are considered publicly available when it is on record in State Oil and Gas Commissions, available upon request in BLM offices, or published by commercial reporting services such as Petroleum Information Corporation, Dwight's EnergyData, Inc., etc. Such information would place a prudent operator, exercising reasonable diligence, on constructive notice that the lease could have been or is being drained. Assessment of compensatory royalty shall commence upon passage of a **reasonable time** following the date of actual or constructive notice of drainage as discussed above. The authorized officer shall determine the duration of the "reasonable time" period. Criteria to be considered by the authorized officer in making this determination may include rig availability, time needed to acquire an approved drilling permit, average drilling time, and other aspects specific to the area. No compensatory royalty shall be assessed for the "reasonable time" period. If compensatory royalty is assessed, it shall be due from the day next following expiration of
the "reasonable time" period allowed by the authorized officer. No compensatory royalty shall be assessed if the economic test, under the POR, demonstrates that a protective well cannot and could not have been economically drilled on the Federal or Indian lease being evaluated for drainage. Compensatory royalties, when assessed, will continue until the date that one of the following conditions is met:

1. A protective well is drilled and determined by the authorized officer to have fulfilled the lessee's obligations.

2. The draining well ceases production and is permanently plugged and abandoned.

3. The drained portion of the lease is relinquished. The relinquished portion must include all of the leased area within the drained spacing unit. When spacing orders do not exist, the relinquished portion must be aliquot parts totaling at least 40 acres in the case of oil or 160 acres in the case of gas or geothermal drainage, unless the entire lease is smaller.

4. The drained lease is adequately protected by an agreement.

.07 File and Records Maintenance. Documentation requirements are found at .11B4.

.08 Drainage Identification Data Standards. Most potential drainage situations are identified through examination of field maps or plats. Because drainage identification is a dynamic process, it is imperative to maintain a set of "official" maps in each office having drainage responsibilities. These maps are updated continuously as to wells (well status and completion horizon), boundaries of leases, units, unit participation areas, and communitized areas. A base map or information generated by the Geographic Information System (GIS) for the pertinent portion of the jurisdictional area must be established prior to conducting well reviews. The base map must reflect the mineral status for the jurisdictional area and differentiate between public domain, acquired lands, and Indian tribal or allotted lands, and must reflect whether these lands are leased or unleased.

.09 Base Map Standards. Base maps shall conform to the following standards:

A. A scale of 1:24,000 (unless compelling reasons exist for using another scale).

B. Required data.

1. Public land or legal survey.

2. Well locations (use industry standard symbols and identification).

3. Unit and participating area boundaries.

4. Communitization agreement boundaries.

5. Federal/Indian mineral estate.

6. A legend that includes well symbols and boundary symbols (unit, CA, PA).

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.1 Guidelines and Procedures. The following guidelines and procedures are outlined in the Drainage Procedures Flowchart in the Handbook.

.11 Well and Administrative Review. All wells will be evaluated to determine the possibility of drainage by reviewing the contiguous spacing units by reservoir.

A. Well Review. The well review may result in a PDS as follows.

1. Identify all well completions and recompletions. Note that surface location and bottom-hole location can differ.

2. Identify and separate all wells, by completions, into two categories: (l) completions that do not create PDS's (document and record method of determination); and (2) completions that do create PDS's (these completions will require a detailed administrative review). All wells on or adjacent to jurisdictional land may create PDS's. Wells on fee land not adjacent to jurisdictional land do not create PDS's.

3. Identify Federal and Indian wells shut-in but capable of production that offset potentially draining wells. Selective shut-in of such wells, while the offset wells are still producing, may create drainage situations.

4. A production or similar type of screen, based on professional judgment and experience in the area, must be used at this point to retire potential drainage situations that are not likely to cause drainage. Screening processes used to retire cases must be well documented and a record must be kept of all cases retired. No potential drainage situation is to be counted as a case unless it passes this screen.

B. Administrative Review. When potential drainage situations are identified during the well review, further administrative review should be made to determine if there is an administrative resolution by which the Federal or Indian lessors are already, or can be, protected. See example checklist under IV. in the Handbook for a list of the data which must be reviewed and included, either by copy or reference, in the case file.

1. Identify jurisdictional lands where uncompensated loss of revenue could occur from different ownership, royalty rates (royalty rates can differ on portions of a lease or can differ by horizon), lease revenue accounts and participation or allocation differential. This would require a review of the spacing unit in which the potentially draining well is located, plus all adjoining spacing units.

2. Identify the existence of or need for any agreement that would protect jurisdictional lands from drainage, for example, unit agreement, unit participating area, communitization agreement, compensatory royalty agreement, and other agreements.

3. Identify, on a spacing unit and reservoir basis any actual or proposed drilling, producing, or abandoned jurisdictional wells that may satisfy the requirements of protective wells. Such wells would include:
a well that is producing from the same reservoir(s), a well that formerly produced from that reservoir and is now depleted, or a well that sufficiently but unsuccessfully tested the reservoir.

4. Prepare a drainage work file/case file folder for each PDS. Work files may be kept separate from the official case file so that extraneous material, such as well logs and other raw data, is not made part of the legal record in case of appeal. The official case file must contain a complete record of all decisions, including the Geologic, Engineering, and Economic Reports and all pertinent correspondence.

a. For each PDS, establish a unique drainage case number(s). The method will be the prerogative of the Field Office. The Handbook, under I., gives examples of PDS and drainage cases.

b. Enter case into drainage tracking system. The method will be the prerogative of the Field Office. However, automated tracking systems are recommended. At a minimum, the tracking system should correlate draining well, drained lease number, drained area, reservoir, and drainage case number. Data should be kept so that both Field and Washington Office statistical reporting obligations are met. The Handbook, at VIII., provides a detailed explanation of reporting obligations.

C. Case Prioritization. Assign a priority classification to each case. The prioritization method should ensure that royalty is not permanently lost, due to, for example, unleased lands, statute of limitations, etc., and that the review of the drainage workload is done efficiently. The method used to prioritize cases is the prerogative of each office and must be documented.

D. Initial Notification Letter. At the conclusion of the administrative review, an initial contact letter is sent to the lessee(s), as appropriate, informing it of the potential drainage situation and the drainage protection obligations, and requesting protective action or technical data. See the Handbook, Illustration 29, for an example of an initial contact letter.

.12 Expired Leases. If the former lessee of an expired lease allowed the lease to be drained during its active lease term, the former lessee is liable for payment of compensatory royalty during the time that the former lessee held the lease while it was being drained. Therefore, drainage cases can be initiated to collect compensatory royalty on expired leases. Drainage cases should not be initiated to collect compensatory royalty on leases whose active terms have been expired for 6 years or more prior to the discovery of the potential drainage situation (see Washington Solicitor's Opinion BLM-ER-O648, February 28, 1988). The commencement date for any compensatory royalty shall be the date established through the constructive notice procedures described at .06C. However, prior to the assessment of compensatory royalties a prudent operator economic test must be conducted to determine if an economic well could have been drilled during the time that drainage was occurring. The termination date of such compensatory royalty will be the date of lease expiration or the date of last production of the draining well, whichever occurs first.

.13 Technical Review. A technical review is conducted where an administrative review establishes a case. The technical review consists of a combination of geologic and reservoir engineering reviews. The geologic review provides appropriate maps and reservoir parameters for comprehensive geologic reports. The reservoir engineering review examines the reservoir and establishes the reservoir energy mechanism, the original resources in place, the estimated ultimate recovery, and the probable areal extent of drainage. Both the geologic and engineering reviews must make clear recommendations to continue or retire the case.

A. Geologic Review. The geologic review (GR) is conducted after the administrative review and prior to, or in conjunction with, the reservoir engineering review to determine whether it is geologically possible for drainage to occur. The GR will further identify or eliminate cases based on geology and provide reservoir parameters to the engineer. Supporting geologic documentation may include evidence for faults, permeability/porosity barriers, gas/oil-water contacts, and other structural/stratigraphic limitations. For geothermal drainage, it may also include temperature gradient, gravity anomaly, and seismic activity maps. Other supporting documentation such as well logs, isopach and structure contour maps, field reports, etc., must, when appropriate, be included or referenced by the geologist in the work file to substantiate the conclusions of the review. A report that documents the geologic review is required. A case can be retired at this point if the geologist concludes that drainage is not geologically possible. An example of a summary format that contains the minimum standards to be documented in all geologic reviews is provided in Illustration 19 of the Handbook.

B. Reservoir Engineering Review. A reservoir engineering review (RER) follows the GR, except in cases where the GR precludes drainage. The RER determines the estimated ultimate recoverable reserves and drainage area of the potentially draining well. It is necessary to determine if the area drained by the potentially draining well intersects a property boundary. If the drainage configuration of the potentially draining well crosses a property boundary, compensable drainage may be indicated. A determination is made to continue the case if drainage is likely, or to close the case if no significant drainage is probable. Supporting documentation and calculations must be included or referenced in the work file to substantiate the conclusions of this review. Two examples of summary formats containing the minimum standards to be documented in all reservoir engineering reviews are found in Illustration 20 of the Handbook.

.14 Unleased Federal and Indian Lands. Unleased Federal and Indian lands identified as potential drainage situations must be leased and protected as soon as possible. The procedures for resolving these situations are identified below:

A. Unleased Federal Lands. If the administrative and technical reviews indicate unleased Federal lands are subject to potential drainage, then the BLM adjudication office must be notified by memorandum from the authorized officer in order to initiate leasing of the subject lands. Certain Federal lands (for example, National Park lands, Wildlife Refuges, Wild and Scenic Rivers lands, Wilderness Areas) may not be subject to leasing or surface occupancy, unless a drainage situation exists. If leasing is not possible and it is determined that drainage is occurring, attempts shall be made to work with the surface managing agency and the operator of the draining well to resolve the situation.

1. Drainage Stipulation. When the subject lands are offered for lease, a special drainage stipulation shall be made part of the notice of sale and of the lease. See Handbook H-3160-2, Illustration 28, for an example of a drainage stipulation.

2. Compensatory Royalty Agreement. If attempts to lease unleased acreage are unsuccessful, the negotiations for a compensatory royalty agreement (CRA) or other agreement with the operator of the draining well shall be pursued jointly with the adjudication staff. See BLM Adjudication Handbook H-3l09-l, Leasing Under Special Acts. A CRA file should be maintained. If negotiation of a CRA is unsuccessful, the unleased acreage, when available, shall be offered on subsequent lease sales. See Handbook H-3160-2, Appendix 2, for an example of an agreement that may be executed to resolve drainage situations for unleased Federal lands.

B. Unleased Indian Lands. If the administrative review indicates unleased Indian tribal or allotted lands may be subject to drainage, then the BIA must be notified by memorandum in order to initiate leasing or negotiate an agreement that would afford protection for the lease. An example of such a memorandum is provided as Illustration 26 in the Handbook.

.15 Demand Letter. When the technical review indicates that drainage may exist for the subject lands, a demand letter is issued to all responsible lessees. The demand letter is sent Certified Mail, Return Receipt Requested, with a response due within 60 days from the date indicated on the return receipt. Copies of the letter may be sent to other affected parties at the discretion of the responsible office. The demand letter informs the affected lessees of their responsibility to protect the lease from drainage, and requires them to submit a plan for protecting the Federal or Indian lease from drainage. The lessees may alternatively submit geologic, reservoir engineering, or economic data sufficient to show that no drainage has occurred or is occurring, or that an economic protective well began. The demand letter defines the affected lessee's options, which include the drilling of a protective well(s), payment of compensatory royalty, partial or total lease relinquishment, establishment of protective agreements, or any combination of the above that will resolve the drainage situation by protecting the Federal or Indian lessors from loss of revenue. Once the BLM has determined that available geologic and reservoir data indicate that drainage may be occurring, the burden of proof is on the responsible lessee to dispute the assertion or drainage. An example of a demand letter is provided as Illustration 30 in the Handbook.

.16 Drainage Case Resolution. After the demand letter is issued, no further evaluation will be required until the lessee is given a reasonable amount of time to respond to the demand letter. If no response from the lessee is received within the designated time, a follow-up letter may be sent specifying consequences of failure to file the requested information. Failure to comply with an order of an authorized officer could result in a noncompliance assessment. The authorized officer may grant an extension of time in which to file documentation if a justifiable request is made by a lessee.

A. Lessee Takes Protective Action. If the lessee agrees drainage is occurring and will take steps to protect the lease, evaluate the proposal to protect the lease. The authorized officer is the final authority as to the adequacy of the proposed protection based on the Bureau's independent evaluation. Determine separately the adequacy of the protective measures for each case that may be resolved. Determine whether compensatory royalty assessment is due pursuant to .06C of this Manual Section for drainage that may have occurred prior to the drainage protection. If compensatory royalty is due, complete the Final Technical Analysis to determine the drainage factor. In the case Indian lessors who refuse to accept BLM's finds: (1) Specify to the BIA the reasons for the drainage recommendation; (2) notify the allottee/Indian tribe through BIA that failure to accept our recommendation could result in the uncompensated loss of Indian minerals; (3) recommend to the allotted Indian/Indian tribe that they discuss the case with the appropriate BLM office and seek independent counsel.

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B. Lessee Disputes Drainage or Economics. If the lessee disagrees that drainage is occurring or that an economic protective well could have been drilled, conduct an independent technical analysis and evaluate any new data submitted by the lessee. If the Bureau's findings conclude that no drainage is occurring or has occurred, the drainage case is closed and an appropriate decision letter is issued (see Section VII. of the Handbook). However, if the Bureau's findings indicate drainage is occurring and a favorable economic well determination is made, the lessee will be advised by decision letter of the assessment of compensatory royalty. If the Bureau's findings indicate that drainage is occurring but that an economic protective well could not have been drilled since the obligation to protect from drainage began, the lessee is notified that no compensatory royalty is due for any drainage that has already occurred but that future economic conditions may require drainage protection. A sample decision letter pertaining to this situation is shown in Illustration 32 of the Handbook. The case is monitored for such economic changes and reevaluated when warranted.

C. Lessee Does Not Respond to Demand Letter. If the lessee does not respond, conduct an independent technical analysis with available data. If the Bureau findings conclude that no drainage is occurring, the case will be closed. However, if the Bureau's findings indicate drainage is occurring, and a favorable economic well determination is made, the responsible lessee will be advised via a decision letter, Certified Mail, Return Receipt Requested. Compensatory royalty is assessed until such time that the lessee provides an alternative method of protection that is acceptable to the authorized officer. An example of such a decision letter is provided in Illustration 33 of the Handbook.

.17 Final Technical Analyses. Independent final technical analyses shall be conducted by Bureau petroleum engineers and geologists when the lessee response has been received or the allotted time for a response has passed. A comparison of the Bureau's independent findings and the lessee's submittal shall be made. Any significant differences shall be resolved or explained, and final geologic and engineering reports shall be completed for the case file. These consist of a geologic analysis and report and a reservoir engineering/economic analysis and report.

A. Geologic Analysis. The geologic analysis is a final comprehensive examination of the lithologic, structural, and stratigraphic components of the subject area to determine whether drainage is geologically possible. The subject reservoir is analyzed as to its limits and physical characteristics using all available data. Similarities and differences between the Bureau's independent geologic analysis and the lessee's geologic analysis, if submitted, are discussed and resolved in the final report. The report describes in detail how the geology affects drainage in the subject area. The technical components necessary to complete the final geologic analysis and subsequent final report are outlined as follows:

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1. Use all available well logs from the draining well and well logs from as many surrounding wells as necessary and prepare geologic maps and cross sections to determine:

a. Areal extent and net pay of the producing reservoir(s).

b. Trapping mechanism (structural/stratigraphic).

c. Position of gas /oil/water contacts, if they exist.

d. Geologic conditions that would preclude or otherwise influence the drainage pattern, such as:

(l) Structural dip.

(2) Faults, folds, fractures.

(3) Stratigraphic pinch-outs, facies changes.

(4) Porosity/permeability barriers.

2. Correlate well logs from the draining well with the well logs from the surrounding wells. Analyze the well logs to determine:

a. Lithologic characteristics of the reservoir.

b. Net pay.

c. Porosity.

d. Water saturation.

e. Formation temperature.

f. Gas/oil/water contacts, if they exist.

g. Other geologic features or properties that may influence drainage.

3. Substantiate and support the findings.

a. Consult published and unpublished literature covering the geology of the field.

b. Consult published and unpublished structure contour maps, structural and stratigraphic cross sections, and isopach maps of the field.

4. Geologic Map Standard. Geologic maps may be plotted on standard base maps. Each geologic map shall contain the following.

a. A border line.

b. A legend block that includes:

(l) Title, author, and study completion date (same date as report).

(2) North arrow.

(3) State and county boundaries.

(4) Signature of the geologist and date (dated same as report).

(5) Signature of reviewers and date reviewed.

(6) Bar scale.

(7) Line(s) of cross section (when applicable).

(8) Definitions of all symbols used on map.

c. Supporting geological data. Examples are:

(l) Structural closure on an anticline or dome.

(2) Isopach of a porous and permeable body containing oil or gas.

(3) Oil/gas/water interface(s).

(4) Porosity/permeability barriers.

(5) Faults.

(6) Other geologic characteristics that restrict the movement of oil, gas, or geothermal fluid.

5. Geologic Report. Document the geologic analysis above and file a complete, signed, and dated comprehensive geologic report with appropriate maps.

B. Reservoir Engineering/Economic Analysis. The reservoir engineering/economic analysis is the final examination of the reservoir performance, production history, and economic determinants to determine whether drainage is occurring or has occurred and whether an economic protective well could have been drilled. Evaluate any data submitted by the lessee and resolve or explain any significant differences.

1. Ultimate Recoverable Reserves. Use the geologic and engineering data and information available from such sources as RER, GR, lessees, operators, approved BLM software, publications, analogy wells, etc., to compute the Estimated Ultimate Recovery (EUR) attributable to the draining well. The method of analysis will be determined by the parameters available and may include material balance, production decline curves, pressure analysis, and volumetric or geometric calculations. Document the method, including formulae used in the analyses and the parameters used and their source. As necessary, examine the reservoir and fluid properties from the wells, surrounding the draining well as necessary to determine:

a. Pressure history.

b. Recovery factor.

c. Permeability.

d. Net pay.

e. Residual oil saturation.

f. Production history.

g. Reservoir energy mechanisms.

h. Reservoir boundaries.

i. Specific gravity.

j. Compressibility.

k. Formation volume factor.

1. Viscosity.

m. Gas/oil ratio.

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2. Drainage Area and Configuration. After the recovery factor and the ultimate recoverable reserves of the draining well have been estimated, determine the drained volume and estimate the probable drainage area and configuration. This requires a combined effort of reservoir engineering and geology. All known or calculated flow boundaries, such as faults, permeability barriers, interference from nearby wells, etc., should be considered in determining the drainage configuration. If the bottom-hole location differs significantly from the surface location, the location in the drained reservoir should be used to determine the drainage configuration.

3. Determine Whether Drainage Occurs. After the drainage configuration has been determined, establish if the drainage area of the well intersects a property boundary. If it does, determine the reserves in the drained portion of the lease and the drainage factor. The drainage factor is the percentage of the draining well's production attributable to the drained jurisdictional lease. It is calculated as the percentage of the draining well's total drainage volume that lies below the drained lease.

4. Assessment Factor. The drainage factor is the percentage of the draining well's production attributable to the involved Federal or Indian lease being drained. The drainage factor established by the authorized officer is used by MMS to compute the amount of the monthly compensatory royalty assessment for each product using the following equation:

Monthly Compensatory Royalty Charge	=	Product Sold from Draining Well	X	Product Value	X	Royalty Rate of Drained Area	X	Drainage Factor	X	Special Factors (as needed)*

*Special factors may include differences in royalty rates or allocation factors if both the draining tract and drained tracts are Federal, Indian tribal, or Indian allotted, and other applicable considerations.

5. Economic Well Determination. If drainage is indicated, an economic well determination shall be conducted to determine if a prudent operator can or could have drilled a protective well on the lease being evaluated for drainage. This analysis should be conducted using a discounted cash flow (DCF) procedure to calculate before Federal income tax (BFIT) rate of return (ROR). An economic protective well could be drilled if the analysis of the well returns a positive net present value when using the applicable discount rate as established in these Guidelines (see .l7B5g below) or, equivalently, results in a DCFROR greater than the discount rate. See Illustration 21 of the Handbook for a summary sheet that may be used for an economic well determination.

a. Gross Production. The ultimate recoverable reserves are the total oil, gas, or geothermal reserves that a protective well could be expected to produce at the time an economical well could first be drilled. The production of these reserves are to be projected and modeled using conventional reservoir engineering methods (volumetrics, decline curve analysis, material balance, etc.) when applicable. The modeling may be based on the draining well or other area wells, considering all pertinent reservoir factors. The condition of the reservoir at the time the well is expected to be drilled must also be considered in determining the EUR and the projected production.

b. Net Production. Net production is calculated by multiplying the gross annual production by the revenue interest of the lessee. The revenue interest is 100 percent less the Federal or Indian royalty.

c. Product Price. The value for oil and gas pricing is based on the sale prices of similar nearby wells during the appropriate time period. The current price per barrel of oil, per thousand standard cubic feet (MCF) of gas, or per pounds of steam or per kilowatt-hour is based on the particular quality of the resource in the specific geographic area. Escalation of current prices should be consistent with the escalations used at the time the project is to be started. Industry standard projections for the time the well was to have been drilled should be used.

d. Net Revenue. The net revenue is calculated by multiplying the net production by the product price. The net revenue is projected annually until the economic limit of the well is reached. The economic limit is reached when the operating costs of the well equal the net revenue.

e. Expenses. The primary expenses associated with drilling an economic well are drilling, completing, and operating expenses. These expenses are cash expenses and are obtained from industry, professional publications, paying well determinations for similar wells, or experience in specific producing areas. The expenses of the draining well and other similar nearby wells should be reviewed with respect to the prudent operator rule, that is, the costs used should not be those of a particular operator but of a prudent operator. Escalation of operating expenses should be consistent with the relevant market conditions, reviewed with particular attentiveness because they may not be the same as the escalations used for product prices as, for example, when dramatic worldwide oil price declines in 1985-1986 reduced oil prices more than one-half, but operating expenses remained high. Costs, prices, and expected escalations should be those that were appropriate at the time the project is to be started, rather than the actual subsequent prices or costs.

f. Taxes. Certain taxes are to be considered in the economic evaluation. These include severance, ad valorem, and, where applicable, wind fall profits taxes. Severance tax is a sales tax based on production. Ad valorem tax is property tax based on a diminishing asset. These taxes vary between States, and current rates for each particular area should be used. The Windfall Profits Tax (WPT) is a Federal excise tax on production and is regulated by the 1980 WPT Act. It has no effect on production that is under approximately $18 per barrel and is currently being phased out. However, historical cases can require its application.

g. Reasonable Rate of Return and Discount Rate. The minimum reasonable rate of return to be used for these analyses is listed in the Handbook, ROR 1926 through 1988. The rate to be used is that of the date the well was to have been drilled. The list shall be updated regularly for later time periods. The rate includes the components of the time value of money, inflation expectations, and perceived risk. The time value of money and the inflation expectations are independent of the borrower and can be estimated by the intermediate-term Government bond yield rate. The perceived risk for this type of project is similar to that of "B" bonds. To isolate the risk component of the yield for "B" bonds, the yield for the Government bond, which is perceived to be risk-free, is subtracted. Although there have been variations in the difference between the two rates, for the time data were available, the spread stayed fairly constant at around 3.38 percent. This value was projected back to 1926, the earliest date data were available for Government bond yield rates.

6. Reservoir Engineering/Economic Report. Document the procedures and methods, including formulae and parameters, used to determine the reserves and the economics. File a complete, signed and dated comprehensive engineering report with appropriate maps.

.18 Quality Control. Drainage cases that are prosecuted or retired (either administratively or technically) must comply with the established standards and procedures of these Guidelines, and must have complete records of analyses and decisions. Regular quality control is necessary for the defense of appeals and audits. Quality control reviews are required for monitoring the review process. Implementation of the quality control program is the responsibility of each State Office.

A. Technical Review. The technical review may be performed by peers with expertise in petroleum evaluations as applied to the Reservoir Management Program. The objectives of the review are to ensure that (l) established policy and procedures are followed, (2) normal technical principles and procedures are applied as appropriate, (3) all reasonably available information is considered, and (4) the analysis is technically accurate. A sufficient number of Quality Control Reviews must be conducted to ensure that program objectives are being met. Checklists are provided in the Handbook (Illustrations 23, 24, and 25) as examples of the documentation required for the quality control review.

B. State Office Role. The State Office must continually monitor the drainage program to ensure quality control. Oversight responsibilities may include:

1. Ongoing communication with the technical staff.

2. Routine visits to Field Offices conducting drainage reviews.

3. Review of drainage documentation and tracking systems.

4. Review of training needs and ensuring that the need for adequate training funds is recognized and utilized by District or Field Offices.

5. Review of automation needs and ensuring that the technical staff has appropriate hardware and software.

6. Coordination with the appropriate Field Offices and Field Solicitor on appeals and State Director Reviews.

.19 Coordination and Documentation. At this point, the authorized officer notifies the responsible lessee and affected agencies of the final decision in the appropriate sequence. In Indian cases, the BIA's concurrence is documented prior to sending a decision letter to the lessee(s) and affected parties.

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A. The Decision Letter. A decision letter is prepared that documents the drainage protective actions, if any, that are required. The decision letter to assess compensatory royalty shall be conveyed initially only to the responsible lessee(s) and always sent Certified Mail/Return Receipt Requested. The decision letter shall contain the following information:

1. Lease serial number.

2. Description of drained tract and formation(s).

3. Summary of the drainage determination.

4. Drainage factor, if applicable.

5. Draining well(s) name(s) and location(s).

6. Period of compensatory royalty assessment, if applicable.

7. State Director Review and appeal rights pursuant to 43 CFR 3l65.3(b), 3165.4, 4.411 and 4.413.

B. Notification and Request to MMS. The MMS is notified once the appeal period is exhausted or, if appealed, once MMS is notified once a decision by the authorized officer, or by the State Director if a State Director Review (SDR) is requested, is final. If for Federal lands, the decision is appealed to IBLA, MMS will not be notified unless IBLA renders a final decision upholding the authorized officer. If for Indian lands, the decision is appealed to IBLA, MMS shall be notified once the appeal is taken and shall be advised that the decision/determination is on appeal to IBLA. The MMS is notified with a copy of the certified decision letter, supplied the required information, and requested to compute, bill, and collect the monies owed. See the Handbook, Illustration 34, for an example letter to MMS. The required information to be provided when notifying MMS of a decision to assess compensatory royalty for drainage is as follows:

1. Draining Well.

   a. Operator's name.

   b. Well name and/or number.

   c. Well location (quarter-quarter and/or footages, section, township, range, principal meridian, county, and State).

d. If a jurisdictional well (i.e., one located on a Federal or Indian lease or on a tract within and committed to a federally approved and supervised communitization or unitization agreement), provide, as appropriate, the complete lease serial number, or communitization agreement number, or unit agreement name and number.

e. The formation name (and depth of the producing interval) in which the drainage is occurring.

f. The date on which compensatory royalty is to begin.

g. If established, the date on which compensatory royalty is to terminate; otherwise, indicate that compensatory royalty is to continue until MMS is subsequently notified of its termination.

h. The average gravity of the oil or condensate produced from the formation involved.

i. The average BTU content of the gas produced from the formation involved.

j. As appropriate, the established Natural Gas Policy Act (NGPA) category for the well as to the gas produced from the formation involved or, if not determined, the predicted NGPA category based on available information. Also, indicate the period of time during the assessment of compensatory royalty that such category determination is applicable since most NGPA categories are now deregulated.

k. For all jurisdictional wells (see .19B1d, above), a copy of, or the necessary information from, the applicable Monthly Report of Operations (Form 9-329 and/or 3160-6) for each month that compensatory royalty is to be assessed. If compensatory royalty is to continue beyond the date of the initial advice to MMS, MMS will obtain the necessary information from the State or payor. Where any such reports are unavailable because the lease, communitization agreement, or unit participating area has been or subsequently was converted to the Production Accounting and Auditing System (PAAS), that fact should be brought to the attention of MMS.

1. For nonjurisdictional wells, information regarding the monthly production and sales of oil and gas for the draining well from the beginning of the assessment period through the conclusion thereof or the available production to date should be provided to MMS. If the assessment is to continue beyond the initial advice, MMS should thereafter obtain the needed information from the State or payor.

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2. Drained Acres.

a. The drainage factor and special factor, if applicable.

b. As appropriate to the acreage being drained, the complete serial number of the Federal or Indian lease, or the communitization agreement number, or the unit agreement name and number.

c. The name of the lessee(s)/operator responsible for protecting the lease, communitized area, or unit area from drainage.

d. Where a communitized area is being drained, the complete serial number of each Federal and/or Indian lease within the communitized area and the respective percentage of participation attributable to each such lease.

e. Where a unit area is being drained, the complete serial number of all Federal and Indian leases within the affected participating area and the respective percentage of participation attributable to each such Federal and Indian lease. Where the unit acreage being drained is not in a participating area, the complete serial number of all Federal and Indian leases affected and the respective percentage of the drainage factor attributable to each such lease.

f. Where the drainage is occurring between jurisdictional leases having the same mineral ownership and distribution of funds (for example, a public land lease draining another public land lease or a Navajo tribal lease draining another Navajo tribal lease) because of diverse royalty rates, include the applicable royalty rate for both the draining and drained lease.

3. The aforementioned information shall be addressed to Chief, Royalty Compliance Division, at the following address:

Minerals Management Service
Royalty Compliance Division
P. O. Box 25165
Denver West, MS 3600
Denver, Colorado 80225-0165

C. Notification from MMS to BLM. When compensatory royalty is assessed, MMS will notify the BLM that a collection account for the recommend assessment of compensatory royalty has been established for the case. The case is not closed or retired until the notification from MMS is received.

D. Reporting Requirements. The reporting requirements of the drainage portion of the Quarterly Fluid Minerals Report is explained at VIII.A of the Handbook. The basic reporting elements are the number of cases retired during the investigation process and through protective measures, and the estimated revenues from the latter. All elements are to be reported on a case basis as established in this Manual under the procedures for Administrative Review (.11B) and Case Prioritization (.11C).

.2

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.2 Appeals. Any lessee who is adversely affected by a decision letter sent by the authorized officer in regard to drainage of its lease has the right to request an SDR and, if adversely affected by the SDR decision, to appeal that decision to IBLA. The filing of an SDR or an appeal to IBLA shall not result in a suspension of the requirement for compliance with the order or decision from which the appeal is taken. For Federal lands, MMS shall not be requested to assess compensatory royalty until the decision is final, although the royalty is accruing during that time if IBLA upholds the decision of the State Director. The reviewing officer may, under appropriate circumstances, order suspension of the requirement for compliance with an order or decision upon the timely filing of a request for SDR or appeal to IBLA. Drainage appeals processes are shown on three time lines in Illustrations 15 and 16 in the Handbook.

.21 The SDR. If the lessee or other adversely affected party wishes to obtain an SDR for a decision on drainage, the request must be made in accordance with 43 CFR 3l65.3(b). The SDR procedures should essentially follow the guidelines presented in Technical Review (.18A), and should be restricted to the issues raised in the request for SDR. Technical issues must be reviewed by qualified petroleum geologists or reservoir engineers, as appropriate. A report may be required to substantiate the decision of the SD and should be placed in the official case file. Additional data submitted by the appellant should be evaluated as part of the SDR unless the data were not reasonably available to the appellant prior to the original decision. State Director Review decisions are appealable to IBLA. Use Form 1842-1 to notify the lessee of the right of appeal to the IBLA.

.22 Notice of Appeal to IBLA. All appeals to IBLA must strictly follow the regulations in 43 CFR Part 4. If an SDR decision is appealed, the appellant must file the notice of appeal to the IBLA in the office of the authorized officer that issued the decision within 30 days from the appellant's receipt of the decision, so that the case file can be transmitted to the Board. A complete copy of the case file should be made and the original file sent to the Board within 5 working days of the receipt of the notice. The case file should contain the lease document, all pertinent correspondence, the Final Technical Reports, a map or plat of the drainage situation, and any other relevant material. The notice of appeal may include a Statement of Reasons for the appeal. However, if it does not include a Statement of Reasons, the appellant must file such a Statement with the Board within 30 days after the notice of appeal was filed.

.23 Preparing the Response to the Statement of Reasons. The Regional or Field Solicitor is responsible for filing an answer to the Statement of Reasons within 30 days of receipt, unless an extension is requested and granted. The office issuing the decision appealed should request a copy of the Statement of Reasons and should forward the information below to the Solicitor to assist in preparing the answer. The Solicitor will forward this response as the answer to the Statement of Reasons and will address any legal issues as requested by the Bureau.

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A. A case chronology including the draining well's spud, completion, and date of first production, lease effective date, term and ownership of record title and operating rights, as appropriate, all related correspondence and attempts to resolve the drainage situation, and the dates determined for constructive notice, reasonable time, and assessment.

B. An explanation of the Bureau's position with respect to all technical points cited in the appeal.

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Glossary of Terms

- A -

administrative review: conducted to determine if lands being reviewed for drainage are or could be protected by existing agreements, protective wells, or well tests.

- B -

bench price: the price that is used to determine when a drainage case warrants a reevaluation due to economic factor It may be, for example, the estimated dollar value per barrel of oil or a ratio of product price to drilling cost per foot at which it is estimated that a prudent operator would drill a protective well on a lease based on the estimated ultimate recoverable reserves, drilling, completion, operating costs, taxes, and other economic factors.

- C -

compensatory royalty agreement: a negotiated agreement by which the Federal government is compensated for lost royalties due to drainage on unleased lands.

compensatory royalty assessment: royalty assessed by the BLM to compensate the lessor for the loss of royalty caused by the failure of the lessee to take appropriate protective measures.

- D -

decision letter: letter sent to the responsible lessee which either assesses compensatory royalty for failure to take appropriate protective measures if drainage is occurring and an economic protective well could be drilled, or, if drainage is not occurring or an economic protective well could not have been drilled since the obligation to protect from drainage began, informs the responsible party that no drainage protection is required at this time.

demand letter: letter sent to the lessee informing the lessee that a PDS exists on its lands and requires the lessee to protect the leased lands from drainage. The demand letter explains the lessee's options for protecting the lease, which include drilling a protective well(s), executing protective agreements, paying compensatory royalty, relinquishing all or part of the lease, or any combination of the above that protects the Federal or Indian lease. The demand letter requires the lessee to submit a plan to protect the lease from drainage or to submit geologic, reservoir and economic data sufficient to show that either drainage is not occurring or that an economic protective well cannot and could have not been drilled.

discount rate: the rate at which future cash flow is discounted in order to calculate the present value of an investment.

drainage: the uncompensated loss of hydrocarbons, inert gases or geothermal resources from Federal, Indian tribal or Indian allotted mineral lands from wells on adjacent nonjurisdictional lands or jurisdictional lands with lower participation, allocation, royalty rate, or distribution of funds, resulting in revenue losses to the Federal or Indian lessors.

drainage case: exists for each Federal or Indian lease or unleased tract affected by each potential drainage situation that is not eliminated during the well review. A drainage case is fully defined by the following: (l) lease or agreement number, (2) area drained,(3) potentially draining well, and (4) drained reservoir. The Handbook provides details and examples of drainage cases.

drainage case file: the file created for each drainage case for each lease or unleased tract that is subject to potential drainage. The findings of all reviews and decisions are documented in this file.

drainage factor: the percentage of the draining well's production attributable to the lease being drained.

-E-

economic determinants: factors that pertain to an economic well determination, e.g., prices, costs, minimum rate of return, etc.

economic limit: the time at which current operating costs of a well equal the current net revenue from production.

economic well: a well that, if drilled, would have realized a reasonable rate of return based on the technical and economic data and projections available at the time of drilling.

express covenant (drainage): the specific intent of the lease terms pertaining to the responsibility of the lessee to protect Indian and Federal leases from the uncompensated loss of mineral interests.

Indian: references to Indian and Indian interests throughout these Guidelines apply to all Indian tribes and allottees for which the United States has minerals management responsibility, except for those lands within the Osage Indian Reservation, Oklahoma.

jurisdictional lands: land for which the Federal Government holds mineral interests or Indian tribal or allotted mineral interests for which the Federal Government has trust responsibility.

-L-

lessee: the person or entity holding the record title interest in a lease issued by the United States. Record title includes operating rights unless the operating rights have been severed from record title.

lessor: the Federal or Indian royalty interest owner.

-N-

net revenue from production: income from the production of a well after royalties have been paid.

-O-

operating expenses: the direct costs for producing and maintaining production from a well.

operator: for Federal or Indian lands, any person or entity, including, but not limited to, the lessee, operating rights owner, or designated agent or operator, who has stated in writing to the authorized officer that it is responsible under the terms and conditions of the lease for the operations conducted on the leased lands or a portion thereof. For fee lands, the individual or entity who drills and/or operates a well.

-P-

potential drainage situation (PDS): a PDS exists when Federal or Indian lands are offset by a producing well on adjoining fee land, lower royalty, participation or allocation Federal or Indian land, different ownership Indian land, or Federal land for which the revenues are distributed to different accounts, provided the Federal or Indian spacing unit, or common well development or spacing pattern, is not protected by (l) a well that is then producing from the same reservoir(s); (2) a well that formerly produced from said reservoir(s) and is now exhausted; or (3) a well that sufficiently but unsuccessfully tested said reservoir(s). When such a Federal or Indian spacing unit (pattern) is offset by multiple wells and/or wells with multiple completions, each well and reservoir involved is a separate potential drainage situation.

protective action: action taken to protect jurisdictional lands from drainage. These actions include: (1) drilling a protective well;(2) executing a communitization agreement, compensatory royalty agreement, unit agreement, or unit participating area agreement; or (3) paying compensatory royalty.

protective well: the well drilled on a Federal or Indian lease to protect the lease from drainage by an offset well.

- R -

reservoir: for the purpose of drainage determinations, a reservoir is defined as the individual continuous accumulation of oil, gas, or geothermal resources within a geologic container.

- S -

spacing unit: the development pattern established by State or Federal order roughly. encompassing the area that can abe efficiently and economically drained by one well. Spacing units typically vary by formation, depth, or product produced. Field orders may also stipulate where, within a spacing unit, a well can be drilled.

- U -

uncompensated loss: production of oil or gas or geothermal resources for which the Federal or Indian lessor does not receive the appropriate royalty.