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Environmental Analysis Record

For Proposed

Oil And Gas

Leasing



Coos Bay District

Oregon

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This regulation does not pertain to lands where the Federal government owns the mineral rights but not the surface rights. When he signs the notice of intent form, the geophysical operator agrees to conduct the exploration activities according to terms and conditions designed to minimize adverse impacts. The operator must also file a bond before entering the land.

When a notice of intent is received, a district staff specialist reviews the proposed operation and may meet with the operator in an effort to minimize the environmental effects of the surveys.

Upon completion of operations, the operator must restore the area as nearly as practicable to its original condition.

c. Pre-Lease Procedures

- (1) Land Use Planning. BLM's land use planning process (BLM Manual 1601-1608) is based on the concept of multiple use of the land. The Coos Bay District Management Framework Plan was updated in 1973. This plan was based on the 1969 standards, and is currently being revised to new standards adopted in 1975. The District Management Framework Plan is based on the protection of soil and water--the basic resources. The District plan does not prohibit oil and gas exploration and/or production, but oil and gas operations must be an acceptable and appropriate land use within the guidelines of the District Management Framework Plan.
- (2) Environmental Analysis. Before a decision is made to issue oil and gas leases for specific areas, the BLM prepares an environmental analysis record. After a lease is issued, Environmental Analysis will be made by the Geological Survey before a permit is issued to drill a well or enter the land. This second environmental document, although prepared by Geological Survey will have a considerable amount of BLM input. This BLM input will incorporate BLM land use guides and surface protection requirements into the Environmental Analysis prepared by Geological Survey.

Both environmental documents will describe the setting in which the action is to occur, possible environmental impacts of the proposed action, and measures to reduce adverse impacts of the proposed action.

The 24 applications considered in this EAR are among 212 applications on file as of February 9, 1976, for federal oil and gas leases in Oregon. The applications are located in seven BLM districts, and each district office will prepare an Environmental Analysis Record before decisions are reached on the applications. A statewide overview of the development which might occur if the leases are issued is included in Appendix XII.

- (3) Lease Stipulations. Information gathered in the land use planning and environmental analysis processes and other data are used by BLM to determine whether oil and gas leases will be issued for specific lands and, if so, the special conditions or stipulations to which the prospective lessees will have to agree prior to the issuance of the leases. Most of the special stipulations in oil and gas leases issued in recent years relate to the prevention or mitigation of unfavorable environmental impacts.

All oil and gas leases issued by BLM at the present time contain an open-ended set of stipulations. These stipulations insure that after the lease is issued, USGS and BLM have additional opportunities to specify measures the lessee must take to protect environmental values.

Oil and gas leases may also contain site-specific stipulations. These stipulations are developed individually for each lease area.

- (4) Classification Report. Before a lease is issued, a classification report is prepared to determine whether the lease will be issued on a competitive or noncompetitive basis. Competitive leases are issued within Known Geologic Structures (KGS's) and noncompetitive leases are issued outside KGS's.

No known geologic structures have been identified in Oregon.

The Geological Survey prepares a classification report on noncompetitive oil and gas lease applications to determine whether all or any parts of the area applied for are within a known geologic structure. An area is classified as being within a known geologic structure if it is within the trap, stratigraphic or structural, of a producing oil and gas field as best as can be determined from the geologic data available at the time. If the area is in a KGS, it is not available for leasing until it is offered at a competitive lease sale.

Prior to writing the Environmental Analysis Record, the State Historic Preservation Officer will be requested to conduct a search of properties listed on the National Historical Registry, and to respond with a list of known archeological sites, if any, that exist within the lease application areas.

d. Lease Issuance

If a tract has not been previously leased, a decision to issue a lease will be made after an environmental analysis. A lease is issued on a non-competitive basis to the first applicant if the land is legally available, if the U. S. Geological Survey determines that the land is not in a KGS, and if BLM has determined through land use planning and environmental analysis that oil and gas development is an acceptable and appropriate land use.

When leases outside KGS's expire or terminate or are relinquished or cancelled, land use plans and environmental analyses are reviewed to determine whether the tracts should be reoffered for leasing and, if so, the kind of stipulations to be added to the new lease. The tracts are reoffered by being posted on a monthly list. All applications for the posted tracts received during the filing period are considered to have been filed simultaneously. A public drawing is held, and one application is drawn for each tract.

If there are no simultaneous applications for a tract, it becomes available to the first application submitted subsequent to the drawing. Noncompetitive leases are currently issued for a primary term of 10 years.

Since Oregon has no KGS areas at this time, no competitive leasing is scheduled in the state.

Lessees must furnish bonds conditioned upon compliance with the lease stipulations. Bonds must be furnished before a competitive lease is issued and before a drilling permit is issued on a noncompetitive lease.

e. Post-Lease Procedures

During the term of the lease, the Geological Survey supervises operations of the lessee in that portion of the lease tract within the "area of operations." (See Secretarial Order 2948 in Appendix I-A-1 for a definition of the area of operations.) The Geological Survey acts on requests from lessees for approval of plans for drilling or other operations. BLM administers the oil and gas leasing regulations and terms of the lease in that portion of the lease tract outside the area of operations. This may include such items as access roads for the lease area that are constructed outside of the leased area.

The "open-ended" lease stipulation requires the lessee, prior to entry upon the land, to submit for approval to the Geological Survey a map and surface use plan explaining the nature of the anticipated activity and surface disturbance. The lessee also submits this information to BLM if the lessee proposes to conduct any activities which would disturb the environment. He will be required to obtain approval from the Survey at least once during the life of the lease. If he finds oil or gas and wishes to drill additional wells to develop the field or construct facilities needed to reach full production, he will be required to return to the Survey for approval of plans for each new stage of development. The information the lessee must furnish in the surface use plan is listed in the Geological Survey's Notice to Lessees number 6 (NTL-6); a copy is included in Appendix II-1.

For all exploratory well proposals, the USGS prepares an Environmental Analysis in consultation with BLM. The Geological Survey may also hold a joint field inspection with the operator and BLM to analyze the environmental impacts of the proposed action. Stipulations are attached to the drilling permit to minimize adverse environmental impacts. The lessee may be asked to change the proposed well site if drilling in

the original location would have severe adverse environmental impacts.

If oil or gas is discovered, lessees are required to submit additional lease development plans and permits to the Geological Survey for approval. After USGS has reviewed the proposed plans and permit applications and has consulted with and received input from BLM, the proposed plans are modified, if necessary, to insure that proper construction practices are followed. The lessee is required to prepare for contingencies such as fires, accidents, blowouts, spills, and leaks, and to notify various State and Federal agencies, such as the Environmental Protection Agency, in the event of an oil leak or spill.

The Geological Survey is responsible for final approval of abandonment operations when oil and gas operations are terminated. The Geological Survey will not approve the abandonment unless reclamation is carried out to the satisfaction of BLM. When abandonment or cessation of operations results in expiration, cancellation, or relinquishment of the lease, the Geological Survey requests BLM to inspect the leasehold area for compliance with the surface protection and reclamation stipulations in the lease and drilling permit. The lessee is required to reclaim the area insofar as practicable to its condition prior to the oil and gas operations.

3. Regulation of Oil and Gas Operations by the State of Oregon

Oregon's first oil and gas law was passed in 1923 and was administered by the counties. It prohibited waste of the resource and required plugging upon abandonment of wells. Regulatory authority was transferred to the Department of Geology and Mineral Industries in 1949. A comprehensive oil and gas conservation act was passed in 1953, patterned after the Interstate Oil Compact Commission model. Rules promulgated under the 1949 Act require bonding, blow-out prevention equipment, controlled disposal of brines, and cementing and casing of wells. The law also set well spacing limits and provided for the protection of correlative rights of landowners.

Oregon became an associate member of the Interstate Oil Compact Commission in 1954 and has since adopted many of the policies and model rules suggested by this group of state regulatory agencies. In 1961, the Legislature passed a unitization law which defines conditions for forming field-wide operating units, provides for settlements between working interests, and allows compulsory unitization when 75% of the royalty ownership favors unit operations. The Department of Geology and Mineral Industries approves casing programs, inspects blow-out prevention equipment, witnesses abandonment plugging, and collects well records. In the event of a discovery, the Department's rules require uniform development and regular reporting of storage and production. Stipulations added to the drilling permit at the request of the State Department of Environmental Quality require compliance with state air and water quality laws.

Before drilling permits are issued, the applications are reviewed by the Department of Environmental Quality, Water Resources Department, Fish and Wildlife Department, and the Department of Land Conservation and Development.

4. Summary of Standard Mitigating Measures

The preceding sections on Federal leasing procedures and State regulation of oil and gas operations refer to regulations and standard notice forms and stipulations which would apply to all geophysical explorations for oil and gas and/or activities of oil and gas lessees on national resource lands in Oregon. The notice forms, stipulations, and regulations are summarized below and are included in Appendix II.

- a. "Notice of Intent to Conduct Oil and Gas Exploration Operations," BLM Form 3040-1. Geophysical exploration companies are required to complete this form before conducting geophysical operations on national resource lands. The form contains terms and conditions under which the operations must be conducted. More detailed conditions may be established to meet the unique requirements of the area where operations will be conducted. (See Appendix II-A).

- b. Section 2, paragraph (q) of the Federal oil and gas lease form (BLM Form 3120-7), "Protection of Surface, Natural Resources, and Improvements." (See Appendix II-B).
- c. BLM Form 3109-5, "Surface Disturbance Stipulations." These are the "open-ended" stipulations referred to in Sections 1.D.2 of this EAR. They are made a part of each oil and gas lease issued by BLM at the present time. These stipulations insure that, after the lease is issued but before drilling operations are started, USGS and BLM have additional opportunities to establish conditions which the lessee will have to meet. (See Appendix II-C). Site specific stipulations are also developed individually for each lease. Examples of site specific stipulations are included in Appendix II-D.
- d. "Cultural Resource Stipulation to Oil and Gas Leases." This is the cultural resource protection stipulation included in all oil and gas leases issued in Oregon at the present time. (See Appendix II-E).
- e. 30 CFR 221. These are the Geological Survey's Oil and Gas Operating Regulations. Among other things, they include requirements relating to well casing, well abandonment, and other mitigative measures.
- f. Geological Survey Notices to Lessees and Operators of Federal Oil and Gas Leases. Notices to lessees and operators ("NTL's") transmit the Geological Survey's operating requirements to lessees.
 - (1) NTL-2B prescribes requirements for the handling, storing, and disposal of water produced from oil and gas wells. (See Appendix II-F)
 - (2) NTL-3 requires lessees to report discharges of pollutants and accidents and prescribes the contents of the reports. (See Appendix II-G).
 - (3) NTL-4 requires lessees to pay royalties on oil and gas lost because of blowouts, fires, or other reasons. (See Appendix II-H).

(4) NTL-6 formalizes the requirement by the Geological Survey that an oil and gas operator furnish a surface use and operating plan to the Survey and BLM and receive approval before entering the lease to conduct drilling operations. USGS and BLM use information in the surface use plan and other data collected by the agencies to develop environmental protection measures. The measures are included as conditions of the drilling permit issued by USGS. (See Appendix II-I).

- g. 40 CFR 112. These U. S. Environmental Protection Agency regulations identify procedures, methods, and equipment to be used to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into navigable waters. The regulations apply to owners and operators of facilities engaged in oil and gas drilling, producing, gathering, storing, and other non-transportation-related activities. Oil and gas operators are required in the regulations to prepare Spill Prevention Control and Countermeasure Plans.
- h. 40 CFR 1510. These Environmental Protection Agency regulations contain the National Oil and Hazardous Substances Pollution Contingency Plan. As stated in the regulations, the plan provides for a pattern of coordinated and integrated response by Departments and Agencies of the Federal Government to protect the environment from the damaging effects of pollution discharges. It promotes the coordination and direction of Federal and State response systems and encourages the development of local government and private capabilities to handle such discharges.

In addition to these Federal regulations, stipulations, and administrative procedures relating to Federal lands, an oil and gas operation in Oregon would be subject to State laws and regulations regarding pollution control. State laws and regulations are described in Section D.3 of Part I, "Regulation of Oil and Gas Operations by the State of Oregon."

- i. Chapter 632 of the Oregon Administrative Rules. These are the Department of Geology and Mineral Industries' regulations on oil and gas operations. (See Appendix II-J)

- j. "Special Conditions to Apply to All Deep Well Exploratory Drilling in Oregon." The Departments of Environmental Quality and Geology and Mineral Industries agreed in September 1975 that these stipulations would be made a part of future drilling permits issued by Oregon Department of Geology and Mineral Industries. (See Appendix II-K).

E. IDENTIFICATION OF THE PROPOSED ACTION

The following proposed action ranges from preliminary investigations on oil and gas leases to production and abandonment. The following proposed action assumes that production and abandonment and operations preceding these items will take place on the lease areas. There is no way to know at this point just how far the operations will progress if the leases are issued. As mentioned in the preceding background information, more specific surface protection stipulations will be put into effect if and when drilling permits are applied for.

1. Location

The lease applications are located in the Coos Bay, Oregon District, BLM, in eastern Coos and western Douglas counties. The general lease areas are divided into three parts: the Loon Lake Area, the Callahan Area, and the Coquille River Area. The locations of the general lease application areas are shown in figure 1. The specific location on federal land of the oil and gas lease applications on the Coos Bay District are shown on the maps in Appendix III. Individual lease applications are identified on these maps by serial numbers. Copies of the legal description of the lease applications are in Appendix IV.

Lease applications, Oregon serial numbers and approximate acreage are as follows:

Loon Lake Area

<u>Lease Application No.</u>	<u>Acres (Rounded)</u>
OR 9756	1753
OR 9757	2226
OR 9758	2210
OR 9759	1718
OR 9760	2377
OR 13422	716
Total	<u>11000</u>

Callahan Area

<u>Lease Application No.</u>	<u>Acres (Rounded)</u>
*OR 13387	40
OR 13388	<u>1923</u>
Total	<u>1963</u>

Coquille River Area

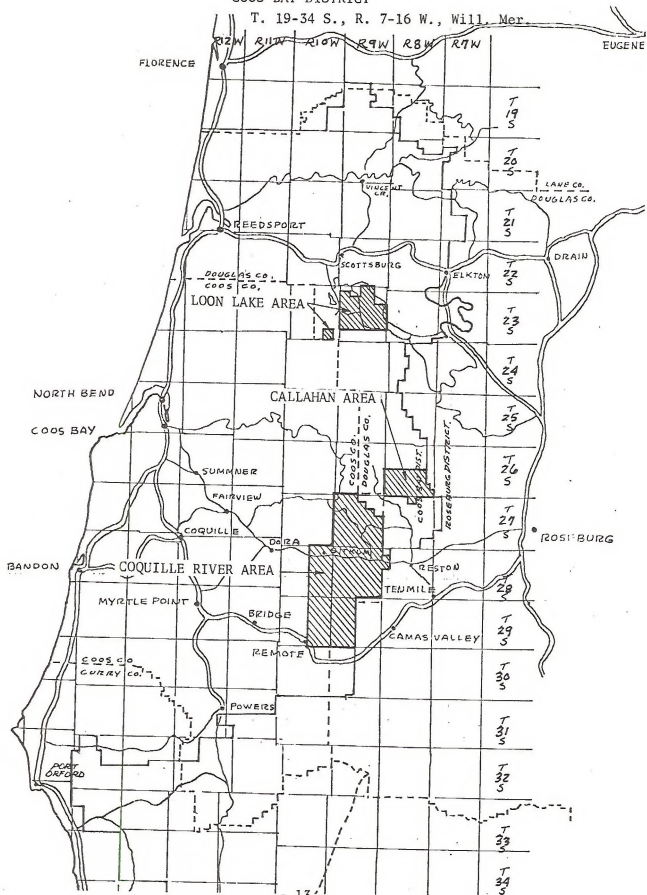
<u>Lease Application No.</u>	<u>Acres (Rounded)</u>
*OR 13304	786
OR 13308	1208
OR 13309	1932
*OR 13378	636
OR 13391	1282
OR 13392	1600
OR 13393	2406
OR 13405	1341
OR 13406	1317
OR 13407	2560
OR 13408	2560
OR 13409	2120
OR 13410	2410
OR 13411	2408
OR 13412	2520
OR 13413	2560
OR 13414	2560
OR 13415	2361
OR 13416	1882
Total	<u>36161</u>

* These lease applications overlap with the BLM Roseburg District, and will be included in the Roseburg EAR as Roseburg has the larger percentage of acreage in these applications.

FIGURE 1. GENERAL LOCATION MAP

OIL & GAS LEASE APPLICATIONS
COOS BAY DISTRICT

T. 19-34 S., R. 7-16 W., Will. Mer.





2. Size

The lease applications embrace an area of approximately 49,000 acres of National Resource Lands, which includes approximately 30,400 acres of revested Oregon and California Railroad land (O&C), approximately 16,100 acres of revested Coos Bay Wagon Road land (CBWR) and approximately 2600 acres of Public Domain land (PD).

3. Oil and Gas Operations

Oil and gas operations progress through five stages of implementation or phases:

Preliminary Investigations
Exploratory Drilling
Development
Production
Abandonment

Several phases may occur simultaneously in an area. An exploratory well may be drilled on a lease while preliminary investigations are being conducted elsewhere on the area; however, usually only one stage will be implemented at one time on a given lease area.

Exploratory wells are drilled on a small percentage of the area covered by preliminary investigations.

a. Preliminary Investigations.

Preliminary investigations often precede the issuance of a lease. They are described in this section to provide an overview of the entire range of oil and gas operations.

Preliminary investigations begin with an office review of geological and technical data available for the region. In many oil and gas producing regions, an office analysis may develop enough information to proceed with drilling without conducting additional preliminary investigations. However, the office analysis may indicate only a broad prospective area, and further preliminary investigations may be required.

Preliminary investigations are made from the air or on the ground.

- (1) Airborne investigations. Small aircraft and helicopters are used to conduct visual reconnaissance, photographic and geophysical surveys.
- (2) Surface Investigations. On-the-ground geological and geophysical surveys may involve either casual or intensive use of the land. Casual uses generally do not disturb the surface. Intensive uses include operations which require clearing of new access trails, movement of heavy equipment, or other actions which can result in substantial surface disturbance. Geological, geochemical, and soil-gas surveys normally do not involve a disturbance of the surface. Seismic surveys, one of the most frequently used methods of geophysical investigation, often require the clearing of new access trails and the movement of heavy equipment.

In seismic surveys, a shock wave is sent into the subsurface and the time required for the wave to travel to and return from a subsurface horizon is recorded. A map of the subsurface can be drawn from an analysis of the differences in the time it takes the wave to be reflected back to the surface from the various rock formations.

Explosive, thumper or vibrator methods are used to produce the shock wave.

In the explosive method, shot holes are drilled to a depth of 50 to 200 feet. Four to twelve holes are drilled per mile of line. The holes are loaded with 5 to 50 pounds of explosives and detonated. The same hole may be reloaded and shot several times to find the depth and explosive charge returning the best reflection or refraction signal.

The thumper and vibrator methods pound or vibrate the earth to create a shock wave. Less than 50 square feet of surface area is required to operate the equipment at each test site.

d. Production

Flowing oil production facilities are illustrated in Figure 2.

(1) Well Facilities

- (a) Oil Fields. Pressures in some petroleum reservoirs are great enough to force oil to the surface. The result is a flowing well. However, most oil wells in the United States require the use of some means of artificial lift to bring the oil to the surface. Pumping and a technique known as "gas lift" are the two methods of artificial lift used at present. Flowing wells and wells with gas lift facilities require a minimum of equipment at the surface and produce little or no sound. All pump systems require more surface equipment and create more noise than flowing wells and gas lift facilities.
- i. Flowing Wells. The surface equipment at the head of a flowing well may be limited to a series of valves, or "Christmas tree" and a fenced service area ranging from 15-by-15 to 50-by-50 feet around the wellhead and Christmas tree.
- ii. Artificial Lifts.
- (i) Pumping. Over 90 percent of the oil wells in the United States in 1971 were on artificial lift, and most of the artificial lift wells used sucker rod

pumps. Other pumps commonly used on oil wells are hydraulic and centrifugal pumps.

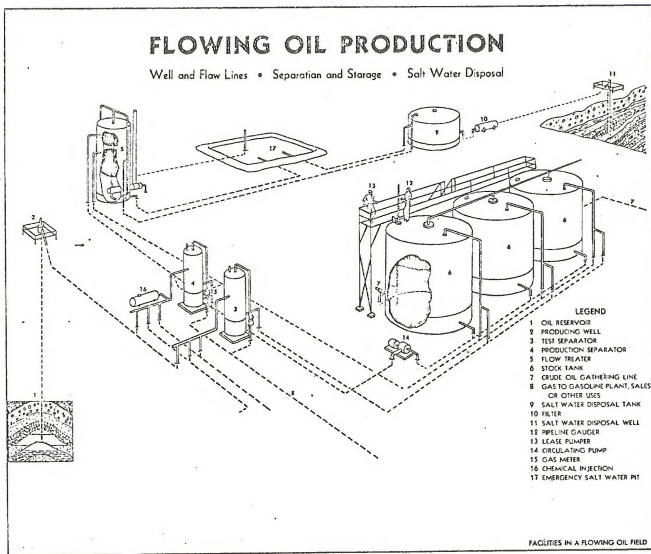
All of the pump systems require some surface equipment and fuel or electric power lines. All generate some noise, ranging from almost none for electric motors to high noise levels for single cylinder gas engines.

- (ii) Gas Lift. Gas lift is used in some oil fields where low cost, high pressure natural gas is available and where pressure in the petroleum reservoir is sufficient to force the petroleum part of the way up the well. The addition of gas lowers the specific gravity of the petroleum so that it flows to the surface. The system is quiet and uses little ground. However, it will be used less in the future as supplies of high pressure natural gas decline.

Figure 2.

FLOWING OIL PRODUCTION

Well and Flow Lines • Separation and Storage • Salt Water Disposal





- (b) Gas Fields. Most gas wells produce by normal flow and do not require pumping. Surface use at flowing gas well usually is limited to a 20-foot by 20-foot fenced area. If water enters a gas well and chokes off the gas flow, a pump may be installed to pump off the column of water.
- (2) Flowlines. Crude oil usually is transferred from the wells to a central collection point, or storage tank battery, before it is transported from the lease. Natural gas is often sold at the wellhead and transported directly off the lease. If processing is required to remove liquid hydrocarbons or water, however, the gas may be transferred to a central collection point prior to sale.

Oil and gas are transferred from the wells to central collection points in flowlines. The flowlines usually are 3 or 4 inch diameter steel pipes. They may be buried, installed on the surface, or elevated. Rights-of-way for oil and gas flowlines are usually 10 feet in width.

Collection points are storage tanks that are used at one point for storage from several leases. This method is used instead of storing on each single lease. It is assumed that central collection points are not feasible on the Coos Bay District and will not be used. This assumption is based on discussions with oil company officials.

(3) Separating, Treating and Storage Facilities

If the fluids produced at the well contain gas and water, the oil, gas and water are separated before the oil is stored in the tank battery. The batteries usually contain at least two tanks and usually are located on or near the lease.

Small leases may contain only one tank battery; large leases may contain several, with each battery containing separating, treating and storage facilities.

- (4) Disposal of Produced Water. Although most water produced with oil and gas is brackish to highly saline, some produced water is fresh enough for beneficial surface use. Ranchers and farmers in some areas have filed prior rights claims on oilfield water so they can use it for agricultural purposes.

Saline water is disposed of in evaporation pits or by subsurface injection. Evaporation pits are used mainly in arid regions where evaporation rates are high. In areas such as western Oregon where rainfall exceeds the evaporation rate, disposal by evaporation would not be feasible.

When salt water is disposed of underground, it usually is introduced into a subsurface horizon containing water of equal or poorer quality.

(5) Methods of Increasing Petroleum Recovery

- (a) Oil. Oil cannot be produced unless forces within the petroleum reservoir are great enough to drive the oil to the well bore. Primary production occurs when energy in the reservoir is sufficient to drive the oil to the well. When natural energy sources are inadequate, secondary production methods involving gas or liquid injection may be used to supplement the natural forces.

In water flooding, the most commonly employed form of secondary recovery, water is injected into the reservoir to drive additional oil to the producing wells. On the average, a successful waterflood will increase recovery by roughly 10 to 100 percent.

Other secondary techniques for improving oil recovery have been tested, including miscible flooding (injecting chemical compounds with water) fire flooding (starting a controlled fire in the reservoir) and steam flooding (injecting steam into the reservoir). Some of the techniques have been used for tertiary recovery after a waterflood.

Natural gas also is injected into some oil reservoirs during primary recovery as a pressure maintenance program.

- (b) Gas. In some gas condensate reservoirs, some of the components of the gas condense into liquid form near the well bores when production reduces pressures in the reservoir. The resulting reduction in permeability may cause a significant loss in recovery. To prevent this, gas is injected to maintain pressure above the lower condensation pressure.

- (6) Employment. The number of people required to operate an oil or gas field varies with the characteristics of the production and the number of leaseholds in the field. If the wells flow without pumping, one employee in a large, modern field can control production of about 25 wells. When wells are pumped, one employee in a large modern field can control production on 10 to 20 wells. If oil storage tanks are manually gauged and sampled, one employee can service approximately 25 tanks. If automatic gauging and sampling devices have been installed, one person can service the equivalent of 100-150 tanks. In a large, modern field, one five-man maintenance crew can service up to 50 wells.

e. Abandonment

- (1) Exploratory and Development Wells. Dry wells normally are plugged before the drilling rig is removed. This allows the operator to use the drilling rig to plug the hole and avoid bringing in other equipment. After the drilling rig is removed, the surface, including the reserve mud pit, is restored to its original condition insofar as possible.
- (2) Production and Injection Wells and Related Facilities. Before a lessee abandons a former producing well, he must demonstrate its unsuitability for further profitable production to the Geological Survey District Engineer. In some cases, wells are plugged as soon as they are depleted. In other cases, depleted wells are not plugged immediately, but are allowed to stand idle for possible later use in a secondary recovery program.

When an entire lease is abandoned, the separators, heater-treaters, tanks, and other processing and handling equipment are removed and the surface restored. Flowlines and injection lines installed on the surface are removed, but buried lines usually are left in place. The operator's bond with the Federal Government is not terminated until BLM has approved surface restorations, the Geological Survey has approved subsequent reports of abandonment, and royalties due the Federal Government have been received.

F. ALTERNATIVES TO THE PROPOSED ACTION

No Action

No action as an alternative means that none of the leases will be issued.

Surface protection items, such as no occupancy, and recommendations as to lease part of an area only, or to grant some leases while rejecting others will be considered mitigating measures. Recommendations will be based on the analysis.

Streamside (riparian) vegetation is one example. Streamside vegetation forms a network throughout all sub-biomes, varying considerably, and may include red alder (*Alnus rubra*), and where annual flooding occurs, willow (*Salix* spp.). Where streams are normally confined to their banks, streamside vegetation is more typical of the surrounding vegetative type. In the EAR area, streamside vegetation includes shrubs, herbaceous plants, conifers and broadleaves along the upland streams.

Located in the Northwest Coastal Coniferous Forest, the EAR area is situated in one of the most densely forested of coniferous forest sub-biomes. Within the sub-biomes dominated by coniferous vegetation, Franklin and Dyrness have identified five major vegetative (climax) zones. The study area is situated in the widespread Western Hemlock Zone. (Figure 8). The vegetative zones shown in Figure 8 reflect climatic conditions inherent with elevational differences that occur throughout the Northwest Coastal area.

The "cool-moist," "warm-dry" dichotomy relates to plant succession following removal of the coniferous forest. There is, for example, a tendency towards exclusion of conifers during a period of dominance by herbaceous plants following clearcutting and burning on the "warm-dry" sites within the Western Hemlock Zone.

In the mature forests of the EAR area the Douglas-fir is easily the largest and most dominant species. In the Coquille River study area, until recently, stood the world's largest Douglas-fir tree, the "Finnegan Fir," a mammoth tree, 13 feet in diameter, and 300 feet tall. This tree, after a life span of 600-700 years, was a victim of the October, 1975 windstorm. Cedar trees of 6 to 8 feet in diameter and hemlock of 3 to 4 feet in diameter are not uncommon and both will occasionally grow even larger.

Understories in these forests where open canopies are found are usually composed of a lush mixture of shrubs, herbaceous plants, lichens, mosses, liverworts, and small shade tolerant conifers. Closed canopies have sparse understories and only extremely shade-tolerant plants are found such as: fungi, lichens, and mosses, etc.

The EAR area helps to support a sustained yield timber harvest for the District's South Coast Master Unit. A mixture of logged lands in various stages of regrowth, pole timber, and virgin stands of old-growth are now found, forming a series of ecological communities, each differing in biotic development.

Plants most commonly found in the EAR area are listed in Appendix VII. No rare or endangered species are known to exist on the study area.

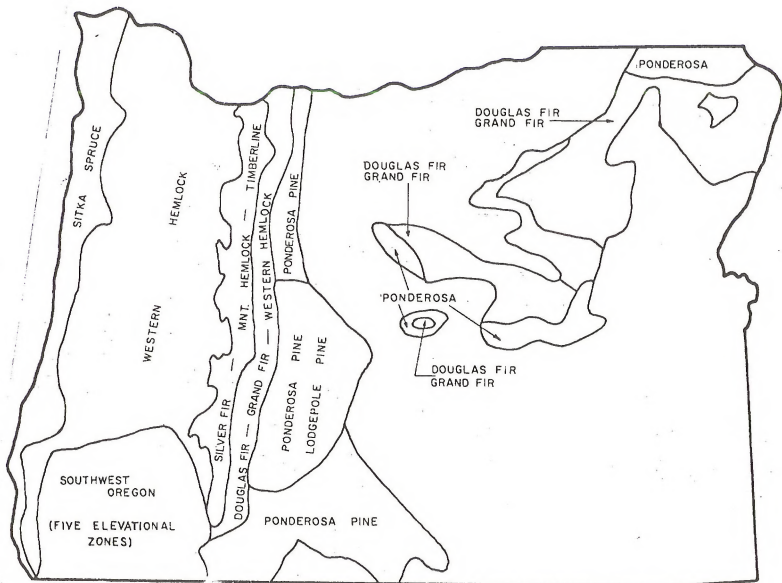


Figure 8. General location map---coniferous forest zones.



2. Animals

a. Aquatic

Historically commercial and sport fishing has played an important role in the economics of the Oregon Coastal region. The first salmon cannery was established on the Rogue River in 1876 by R. D. Hume. This cannery packed an average of 3/4 million cans of salmon annually between 1880 and 1890. A Coos Bay cannery began packing in 1880 and was followed by a Coquille cannery in 1883. The salmon fishing started to decline in the 1920's and 1930's due to overfishing and logging techniques which employed splash dams to create artificial freshets to float logs down the major streams. Smaller streams important as spawning grounds were left choked with debris. Modern hatchery techniques and increased awareness in the logging and fishing industry reversed the decline of salmon and other anadromous fish until the present day levels have been reached. Small headwater streams are no longer neglected and their importance to a continued fishery has been realized.

The most abundant aquatic animals in the study area are the vertebrates. Secondary in abundance but equally important, are the invertebrates. None of the aquatic animals found in the EAR area are on the official State or Federal list of "Threatened or Endangered Species."

The abundance of aquatic animals is limited by the quantity and quality of available habitat. Man's impacts and natural environmental conditions are variables which affect the quality of the aquatic habitat. Animal life in larger streams also varies in their distribution and seasonal or annual abundance. Some factors causing this variation in streams are floods, droughts, and wide daily and seasonal changes in water temperatures. In contrast the small, quiet, spring-fed perennial headwater tributaries are usually the most stable type of stream habitat. Even stream flow and temperature for much of the year result in a rich food source. In these waters, high numbers of aquatic animals are found.

(1) Fish

Certain species of fish are classified only as "game fish" by law (Oregon Game Code, 1973). Other species may be classed as "game fish" or "food fish," depending upon the method of harvest. Fish in Oregon are generally grouped into the following categories: anadromous fish, cold-water game fish, warm-water game fish, non-game or rough fish, and surf and bay fish.

Fish found in the study area belong to the anadromous fish, cold-water game fish, and non-game or rough fish categories.

- (a) Anadromous Fish. There are four basic salmonids found in the study area: cutthroat trout (*Salmo clarki*) steelhead (*Salmo G. gairdneri*), coho salmon (*Oncorhynchus kisutch*), and Chinook salmon (*Oncorhynchus tshawytscha*). These fish use the freshwater environment for reproduction and early growth. Anadromous fish use almost all available stream systems in the study area; physical barriers such as falls and logjams block them from some streams. Anadromous fish migrations, spawning and incubation periods, for Oregon coastal streams are shown in Table 3.

Each species has its own niche in the aquatic environment. Each leads a lifestyle different from the others, although sharing the same habitat. For example:

Chinook salmon need deep gravels and fast water. The juveniles often go to sea in their first spring, which gives them less exposure to summer heat problems.

The coho salmon uses small feeder streams for spawning and young rear in the stream for a year.

The steelhead trout use deep fast water for spawning but some use small tributaries also. They do not die after spawning. They rear in fast water at the head of stream pools for 1-2 years.

The cutthroat trout can stay in the stream, or they may migrate to the ocean. They do not die after spawning, and are the most susceptible to stream degradation.

These fish spawn in the riffles of the streams; however, gravel of the proper size must be present.

Chinook salmon require gravel that is the size of a baseball, while the coho salmon and steelhead trout spawn in gravel that ranges from pea to orange in size.

Cutthroat trout spawn in gravel the size of peas or marbles.

Pools are the rearing area of young fish and resting areas for adults.

As stated above, certain basic needs are necessary for the fish to survive and reproduce their kind. The successful reproduction of the anadromous species depends upon adequate water quality in their environment. Water temperature, dissolved oxygen, pH, total dissolved solids, suspended sediments and volume of flow, all affect the survival of the egg, larvae and juvenile stages.

Another anadromous fish found in the larger streams is the Pacific lamprey. Although widespread, this fish is not considered to be an important resource nor a significant liability.

(b) Cold-water Game Fish

Members of this group are the fish most often sought by sport anglers. The members of this group found in the study area are the cutthroat trout (*Salmo clarki*), and rainbow trout (*Salmo gairdneri*), both may be resident fish or be artificially introduced into the stream from fish hatcheries.

The key environmental factors that are necessary for continued productivity of cold-water game fish include cool water temperatures (40°-70° F.), clean water, adequate food, and available spawning areas.

Physiological adaptation to a relatively narrow range of temperatures limits the distribution of this group of fish to certain sections of streams. During this period,

cold-water fish are found at depths where temperatures and dissolved oxygen levels are adequate. Some streams will be inhabited throughout their length by fish of this group; other streams may only be inhabitable in the upper and middle sections. Generally, the lower sections of the larger rivers are uninhabitable because shading from the bank is inadequate.

Water temperature becomes even more critical during the spawning and incubation period. Egg mortality increases significantly above 55° F. due to accelerated growth of the embryo. Below 40° F., the development of the embryo is nearly stopped so incubation is prolonged. Each species has evolved spawning behavior to utilize the environmental conditions found in most small to mid-sized streams.

Clean water is important to this group because of the prolonged egg stage and because of the relationship between the fish and their food. All fish of this group deposit their eggs in or on the gravel of stream beds. The eggs are at the mercy of environmental conditions for extended periods before hatching. Turbid water during that time frequently causes a layer of fine sediment to settle over the eggs, disrupting the free interchange of dissolved oxygen and gaseous wastes. Depending on the degree of interference with the metabolism of the embryo, debilitation or death may result.

Young trout and salmon are primarily insect feeders. As they grow and become larger, a greater variety of organisms are eaten, including crustaceans and terrestrial insects that fall into streams. Mature individuals, especially cutthroat, become predaceous on small fish. An abundant population of salmonid species is therefore dependent upon a healthy food chain consisting of many small animals that feed on aquatic plants. Good quality water and habitat conditions are essential to maintain the food chain. Without clear water, the food chain is disrupted at the plant production level, reducing the productivity of the system. Turbid water interferes with the fishes' ability to see and utilize terrestrial insects that fall into the water. On smaller streams, over 30 percent of the total fish diet may be terrestrial insects (Chapman, 1961).

TABLE 3 ANADROMOUS FISH MIGRATION, SPAWNING AND INCUBATION PERIODS, OREGON COAST STREAMS

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
Cutthroat trout	o	o	o	o	o	o	o	o	o	o	o	o
Resident sea run *										_____		
										XXXXXXXXXXXXXXXXXXXXXXXXXX		
Winter steelhead *												

										XXXXXXXXXXXXXXXXXXXXXXXXXX		
Coho salmon												

										XXXXXXXXXXXXXXXXXXXXXXXXXX		
Fall chinook salmon												

										XXXXXXXXXXXXXXXXXXXXXXXXXX		

oooooooo - Main period when adults are in streams.
 _____ - Main period when spawning occurs.
 xxxxxxxxxxx - Main period when eggs and fry are in gravel.

* Fishes rear one or more years in fresh water prior to seaward migration.



(c) Non-Game Fish. The most common species of non-game fish found in coastal streams, and the EAR area, and their habitat are listed below.

Pacific lamprey (*Lampetra tridentata*) - Common in medium to large coastal streams.

Western brook lamprey (*Lampetra richardsoni*) - Common in small to medium coastal streams.

Largescale sucker (*Catostomus macrocheilus*) - Generally found in slower parts of coastal streams, i.e. Umpqua river.

Redside shiner (*Richardsonius balteatus balteatus*) - Common in coastal river watersheds.

Umpqua squawfish (*Ptychochilus umpquae*) - Common to Siuslaw and Umpqua rivers.

Blackside dace (*Rhinichthys o. nubilus*) - Lower Columbia river and coastal streams. Sometimes called black nosed dace.

Coastrange sculpin (*Cottus aleuticus*) - Inhabits riffle areas of small to large coastal streams.

Prickly sculpin (*Cottus asper*) - prefers still water and sandy bottom areas of medium to large coastal streams.

Riffle sculpin (*Cottus gulosus*) - Found in riffles of small to medium coastal streams, from tidewater to headwaters.

Reticulate sculpin (*Cottus perplexus*) - Coastal streams, resides in all types of habitat from riffles to quiet, sandy areas.

Three spined stickleback - Two subspecies (*Gasterosteus aculeatus microcephalus*) - Found in freshwater, lowland waterways of western Oregon.

(G.a.aculeatus) - Occurs primarily in marine and brackish water, but enters freshwater to spawn above the head of tidewater.

- (2) Invertebrates. This group of aquatic animals plays an important role in nature's plan. They contribute to the aquatic food chain and other complex ecological relationships in aquatic ecosystems. Without the invertebrates (animals without backbones), vertebrate life forms in the aquatic environment could not survive. Invertebrates found in the study area include:

CRUSTACEA - Crayfish and snails
INSECTA - Mayflies, caddis flies, etc.

The EAR area encompasses many streams, each harboring its own numbers of aquatic animals according to its capacity and ability to do so. The State of Oregon has divided all streams into two classifications:

"Class I Streams" means waters which are valuable for domestic use, are important for angling or other recreation and/or used by significant numbers of fish for spawning, rearing, or migration routes. Stream flows may be either perennial or intermittent during parts of the year.

"Class II Streams" means any headwater streams or minor drainages that generally have limited or no direct value for angling or other recreation. They are used by only a few, if any, fish for spawning or rearing. Their principal value lies in their influence on water quality or quantity downstream in Class I waters. Stream flow may be either perennial or intermittent.

The BLM uses the State classification of streams. The many Class I and Class II streams of the EAR study area as a whole constitute a valuable natural resource. They serve as rearing and spawning grounds for resident and anadromous fish species and many provide excellent recreational opportunities. Class II streams, as defined by the State of Oregon, are considered equally as important as the Class I streams by the BLM where such streams harbor fish life. Some of the important streams and major fish species listed by physiographic units are shown in Table 4. The streams shown are a representative grouping of the three study areas. Many streams found in these areas are unnamed but have similar characteristics and are considered equally important as habitat for aquatic animals.

Table 4. Game Fish Found in Report Areas

Stream Name	Lease Application Area	Coho	Chinook	Steelhead	Cutthroat trout
Buck Creek	Loon Lake	X		X	X
Lake Creek	Loon Lake				X
Soup Creek	Loon Lake				X
North Fork Soup Creek	Loon Lake				X
Tom Fool Creek	Loon Lake				X
Sock Creek	Loon Lake				X
Panther Creek	Callahan	X	X	X	X
Renfro Creek	Callahan	X		X	X
Cedar Lake Creek	Callahan	X	X	X	X
Tioga Creek	Coquille River	X	X	X	X
Burnt Creek	Coquille River	X	X	X	X
Brummet Creek	Coquille River				X
Deadhorse Creek	Coquille River				X
East Fork Coquille River	Coquille River	X	X	X	X
Camas Creek	Coquille River				X
Sandy Creek	Coquille River	X			
Rock Creek	Coquille River				X
Jennings Creek	Coquille River	X			X



There are streams within the study areas that are considered critical habitat areas. These streams are usually, but not always, Class I streams. Buffer strips are maintained in most instances along those critical streams, and efforts are made to keep siltation and debris to a minimum. Critical fish habitat areas are illustrated in Appendix VI-C.

b. Terrestrial Animals

Wildlife in the study area is diverse and widely distributed, generally adapted to a closed canopy of coniferous timber, interspersed with clearings or natural openings. The size of animal populations depends upon the condition of their habitat. The basic requirements of food, water, cover, and space are usually more than adequate for most species found in the EAR study area. For some, however, such as cougar, marten and spotted owls, man's encroachment upon their environment has caused their numbers to dwindle as their preferred habitat decreases. Common animal families found in the study area are listed below. A listing of animals can be found in appendix VIII.

Mammals Deer (Cervidae), Bears (Ursidae), Coyotes and foxes (Canidae), Squirrels (Sciuridae), Mice and rats (Cricetidae), Beavers (Castoridae), Wildcats and Cougar (Felidae), Rabbits and hares (Leporidae), Weasels (Mustilidae), Bats (Vespertilionidae), and Shrews (Soricidae).

Birds Hawks and Eagles (Accipitridae and Falconidae), Vulture (Cathartidae), Owls (Tytonidae and Strigidae), Jays, Magpies and Crows (Corvidae), Grouse (Tetraonidae), Ducks, Geese (Anatidae), Woodpeckers (Picidae), Wrens (Troglodytidae), and Finches and Sparrows (Fringillidae).

Reptiles and Amphibians True toads (Bufonidae), True frogs (Ranidae), Garter and Gopher snakes (Colubridae), and Lizards (Anguidae)

Insects (Orders). Grasshoppers (Orthoptera), Wasps and hornets (Hymenoptera), and Ants (Hymenoptera).

The following species found in the EAR study area are listed as rare or endangered species by the State of Oregon.

White footed vole (*Aborimus albipes*), Ringtailed cat (*Bassariscus astutus*), Northern bald eagle (*Haliaeetus leucocephalus*), and Western pigeon hawk (*Columbarius bendirei*).

The range of the white footed vole includes only western Oregon and Northeastern California. Indications are that it is extremely uncommon over its entire range and it has been termed "the rarest microtine rodent in North America" (Moser and Johnson, 1967:24). Some investigators however, indicated that they believed the species ultimately will be shown to be more common than is presently believed (Bailey, 1936: 200; Moser, 1966: 217a; E. F. Hooven). The animal was collected in an extensive portion of western Oregon and was taken in logged and burned areas dominated by seral vegetation as well as in mature coniferous forests. These data indicated that requirements of the species are compatible with present land-use practices.

The ringtailed cat was included as being found in the EAR area but should generally be considered north of its geographical range, because ecological conditions are less than optimal for the species. Only (12) of these animals have been reported in the Ringtail Fur-catch Reports for the 1955-1970 trapping seasons in Coos County. They have been protected in Oregon since 1970. Populations are probably not greatly affected by man's activities.

The northern bald eagle nests from Alaska and northern Quebec south to Oregon and the Great Lakes. In Oregon, it tends to nest in timbered edges of mountain lakes, major rivers, and the coast. An essential part of their habitat is tall snags and snag topped trees used for perching sites in the vicinity of feeding and nesting areas. Very few known nesting sites are found along the coastal strip: Yaquina Bay, Tillamook Bay, Depoe Bay, Coos Bay, and the Umpqua river area from Winchester Bay to approximately 30 miles up river.

The northern spotted owl is resident from southwestern British Columbia south to the San Francisco Bay area, in the Cascades, and in the coast ranges. West of the Cascades it is considered a permanent resident. Preferring old-growth Douglas-fir forests within the EAR area, the bird is not easily detected. This undoubtedly accounts in part for its presumed endangered status.

Big Game Animals - Elk, Deer, Bear and Cougar. "The early settlers found a bountiful supply of these larger animals in southwestern Oregon. As the first trails were blazed into the timbered ridges, along river benches, flats and lowlands, they were amazed by the abundance of deer, elk, and bear they encountered. Cougars, following the great herds of herbivores were plentiful. Great slaughters of these animals are now history. (Frances Fuller Victor, 1891):" It is estimated that not less than one thousand elk were killed in one year in Coos County alone, for the skins only." Deer and elk herds suffered a tremendous toll, slain for their hides--the carcasses left to rot.

The two ivory teeth of the great Bull elk were taken also. Both hide and teeth brought fair prices on the market.

Since that time populations of these animals fluctuated and gradually laws were enacted for their preservation. They became game animals with seasons and limits placed on them. The deer and elk are now the most highly prized of large game animals by most sportsmen.

Roosevelt Elk (*Cervus canadensis: wapiti*). There are an estimated ten elk per square mile found in the EAR area. Closed canopy forests that provide escape, shelter, and protect them from the elements are a crucial part of their habitat. Being browsers and foragers they generally follow any natural or man-made openings in the dense overstory seeking the nutritious ground vegetation springing forth in the wake of fires or logging. "Average daily distances travelled is about 1200 yards from October to June, 800 yards in July, and 500 yards in August and September." Normally elk feed over a more or less circular path, spending a few hours to two to three days. (Harper, 1971) The rutting or breeding season normally begins in late August and continues until mid-November. During the rut, bulls utilize wallows

which are often filled with stagnant water and foul smelling mud. Studies have shown only 50 percent of the female (cow) Roosevelt elk were found to become impregnated annually in western Oregon as opposed to 88 percent of the Rocky Mountain wapiti. Harper (1971) stated that reproduction in wapiti appears to be dependent upon an adequate and nutritionally sound diet which allows a cow to reach peak physical condition in the breeding season. Roosevelt elk that are lactating (giving milk), are apparently in such poor physical condition that a pattern of breeding only occurs every other year in many cows. A cow normally gives birth to a single calf; only rarely, two. Most calves are born during the last week of May and the first week of June, when the cow leaves the herd and selects a birthplace or calving area. After a week or so, the cow and her new offspring rejoin the herd. Cows during this period are, not unexpectedly, in a nervous state, highly sensitive to man's presence. It has been found that elk are unlikely to use even favored calving areas if noisy operations such as logging or construction is ongoing nearby.

Habitat considered crucial for elk survival, are shown in Appendix VI-C.

Black-tailed Deer (*Odocoileus Hemionus columbianus*). This member of the deer family is found along the entire Oregon coast. The black-tailed deer are often found sharing the same habitat with elk. Black-tailed deer are not actually forest dwellers in the sense that Bailey indicated, instead they are primarily inhabitants of the forest's edge where there are openings, and thickets to give them adequate concealment. They are not herd animals like the elk and seldom form large groups. The rutting season is in late fall and the birth of fawns is usually in May.

The home range of these deer is familiar ground over which they move freely, a series of small areas connected by trails to browse, water and rest areas, all having readily accessible escape routes. Being primarily browsers (eating woody plants) their principal diet consists of trailing blackberry, red huckleberry, salal, grasses, and forbs. In the summer and early fall they consume thimbleberry also.

The black-tailed deer adapts readily to incremental changes in its environment. Currently this animal is found throughout the EAR study area.

American Black Bear (Ursus americanus) The black bear is one of the largest mammals, and now the largest carnivore, found in Oregon. They occur along the entire Oregon coast and throughout most of the state and are found in nearly all habitat types. Black bear are probably more numerous in the Oregon Coast Range than elsewhere in the state.

Black bears are opportunistic in their feeding. They eat a great variety of green vegetation, fruits, and fungi. In addition to plant materials, they eat insects, as well as other invertebrates, mammals, birds, and carrion. Taylor and Shaw (1927) wrote of the black bear in Mount Rainier National Park: "He is an expert at pulling over garbage cans so as to get at their contents."

Like the cougar, discussed below, the populations of bears are greater where wilderness conditions prevail.

Cougar (Felis concolor) The mountain lion or cougar occurs in almost all areas not densely populated by man. Once considered a detriment to man because of livestock depredations and hunted by bounty hunters indiscriminantly, the cougar was declared a game species in 1967. Available evidence indicates they currently occupy most of the suitable areas in Oregon and are increasing in numbers. Several sightings were reported by foresters traveling through the EAR area in the past year.

The Oregon Department of Fish & Wildlife in their 1974 Annual Report lists the hunter-versus harvest ratios for the following game animals:

Roosevelt elk - 33,200 hunters harvested 3,461 elk in the 1973 season. Hunting pressure and harvest increased 31 percent in eastern Oregon and 48 percent in western Oregon over 1972.

Black-tailed deer - 170,600 hunters reported taking 62,130 deer in the 1973 general deer season in western Oregon. Hunter numbers increased 21 percent and the harvest totaled 41 percent more than in 1972.

As can be seen by these comparisons, these animals are being sought by more and more sportsmen each year. They provide revenue to the State from the sale of licenses and tags while providing the sports-minded with many thousands of hours of recreational value.

Many other smaller mammals, birds, and amphibians are also found in the EAR area. These animals found in coastal forests depend on the variety of insect life that abounds in the damp, mild environment, as well as the great mass of seeds produced by evergreen trees.

Mink, marten, otter, beaver, and muskrat favor this habitat due to the proximity of lakes and streams that afford food, bank dens, and travel routes. While waterfowl are not normally considered as representative birds of timbered habitat, many ducks use the lakes, rivers, and estuaries adjacent to the moisture-holding forest lands. Some ducks, including the golden-eye, bufflehead, and wood duck, nest in tree cavities adjacent to water.

E. ECOLOGICAL INTERRELATIONSHIPS

1. Environment

All living things, plants, animals, and humans that make up a biotic community are surrounded by conditions that affect them in their struggle for existence. All organisms share a common need for sustenance to continue their life processes and reproduction cycles. They must interact each with the other to fulfill their individual needs. The changing temperatures, light, moisture and those surroundings which a plant or animal naturally occupies. Any environment changes continually and the life that inhabits it must become adapted if it is to survive.

2. Plant-Animal Communities

Plants and animals do not ordinarily live alone; instead they live together in communities. Within the study area are many such associations, each holding its own particular set of plants and animals.

The coniferous forest of the study area is dominated by Douglas-fir trees. They make up an ecosystem that is cool, moist and shady where only certain kinds of biota can thrive. In the ground live certain decay bacteria and fungi, which change dead plant and animal matter into food for plants. In the trees and other plants are many kinds of insects that serve as food for insect-eating birds of the community. Many small mammals native to the area live on the forest floor, where they gather and feed on fruits, seeds, and small plants. These small animals in turn become food for the owls, hawks, coyotes, bobcat, and other predators of the community.

The number of organisms involved in the amount of energy passing through the food chain becomes smaller with each successive link. The animals at the lower end of the food chain are most abundant. Successive links of carnivores decrease rapidly in number until there are very few carnivores at the top. This concept is known as the pyramid of numbers and when drawn out graphically appears in the form of a triangle.

Along the forest edge and expanding outward into newly logged and older loggings is a series of ecological communities succeeding one another in stages of biotic development. At their edges, for instance, where forest and cutover lands merge, each community blends in with one or more communities. These blending-in areas are called "ecotones." Streams of the study area blend with several communities as they trace their ultimate path to the ocean, forming riparian habitat, a classic "ecotone." Life found in the streams interacts in much the same manner as described above, dependent upon factors which affect all, but somewhat more vulnerable than their terrestrial counterparts, for they cannot move from their aquatic environment and relocate elsewhere.

3. Food Chain

All food chains, directly or indirectly relate back to living plants. Plant and animal communities occur together in the same habitat and have many interrelations, forming a biotic community. The biotic community along with its habitat is termed an ecosystem. Food chains follow a general plan; however, the first link as stated is always a plant or some part of a plant. Collectively, food chains are called "food webs". These are very complex in nature.

4. Competition and Cooperation

The plants of a community compete with each other for growing space, light, soil, minerals, and other necessities. The animals compete for food and shelter, and among the same species, for mates. For both plants and animals, life is a continuous struggle against enemies and unfavorable conditions in the environment. Only the fittest survive. Yet despite all the struggle and competition, there is a great deal of cooperation among living things. Plants help animals by providing them with food and shelter, and places to raise their young. Animals help plants by spreading their seeds, by carrying pollen from one plant to another, and by destroying harmful insects and other plant enemies. The forces of competition and cooperation tend to keep the varieties and populations of plants and animals of a community at roughly the same levels year after year, as long as man does not interfere with the environment.

5. Community Structure

Biotic communities are organized in ways other than food chains. Most are arranged in horizontal layers called stratifications. The coniferous forest of the study area and adjacent lands, beginning at the soil, has four layers:

Subterranean - The soil layer, containing the roots of trees, fungi and other plants. Worms, shrews, moles and other burrowing animals are also common to this area.

Forest Floor - Composed of fallen leaves, twigs, debris and herbaceous plants, which serve as a home or feeding place for a variety of insects, mammals, and ground dwelling species of birds.

The Shrub Layer - Containing small trees, shrubs, large tree trunks, and a vast and diversified host of insects, spiders, moths, tree frogs, birds, and other animals.

The Canopy - Here are the leafy crowns of the larger trees, bearing the full brunt of the elements and shielding the layers below.

6. Community Rhythms

Plants and animals of the EAR area show day and night cycles of activity. Some animals such as the bat species found in the study area are rarely seen by the casual observer. They are usually active at night and rest during the day. Some animals, such as the deer and elk found here are most active during the early morning and late evening hours. In some communities there are more animals active during the daylight hours. In some communities the reverse is true. Seasonal rhythms are seen in the reproductive cycle of the fish and wildlife of the study area. Many species such as elk, deer, bear and anadromous fish have specific breeding or spawning periods.

7. Succession

The process of nature's changing the various plant-animal communities is known as succession. Over a period of years the environment of these communities undergoes many physical changes. As the environment changes, new kinds of plants and animals begin to replace the previous occupants, to be in turn, replaced by others. This is evidenced in the study

area by the many stands of old growth timber in staggered settings with cut-over lands. In nature, as in man's way of timber harvest, the process goes on and on, one community giving way to another until a "climax" community is reached. The "climax" community is the one best adapted to the environment which shaped it and will remain indefinitely. In the study area the coniferous forest of shade-tolerant species is a climax community.

F. HUMAN VALUES

1. Landscape Character

The Douglas-fir forests of the Coast Range present a picturesque panorama of contrasting color schemes and textures, interwoven into a changing landscape where forested uplands give way to the pastoral setting of the lower floodplains.

The EAR area hums with activity during the summer months. The shrill sounds of yarder whistles and steady roar of trucks are heard. Following the many roads carved into the hillsides a patchwork pattern of forested land emerges. Patches of oldgrowth timber are found intermingled with recent clearcuts and younger stands of timber. The dark greenish blue of the older timber canopy contrasts with the lighter hues of greens, browns, yellows, and all the other myriad of colors found nearby. Many clearcut areas with graceful curving boundaries and natural groupings blend harmoniously into the surroundings while others with boundaries marked by straight lines belie nature's way in their geometric precision.

Adjacent to the Loon Lake study area is Ash Valley. Situated in the large basin above the lake, Ash Valley is a small rural community economically dependent upon small dairy operations and the woods products industry. A small grade school reminiscent of yesteryear serves to educate the smaller children. The older children are bussed to Reedsport, nine air miles distant. Other structures are family domiciles, barns, and fences separating pasture lands. Loon Lake situated below the valley, harbors along its shores two resorts which provide services in the form of boat rentals, camping, groceries, taverns and a cafe. The BLM maintains an overnight camping facility near the outlet of the lake. Some summer homes are situated along the shoreline. Primary access into the Loon Lake area is via the Mill Creek County Road from State Highway 38 east of Reedsport.

The Coquille River study area is similar to Ash Valley described above in many respects. The small rural communities of Dora, Sitkum, and Remote situated near the study area are the hubs of the pastoral settings. Buildings, powerlines, fenced fields and other structures are viewed against a background of the sharply rising uplands.

Sightseers to the EAR area will find a not altogether unpleasing view even in areas of ongoing development. Big tree country will come to mind after sighting those giant firs looming out of the forested landscape. Some measure of solitude and remoteness is yet to be found in the area.

2. Socio-Cultural Interests

a. Educational - Scientific - Historical

White men were known to have visited the Coast of Oregon as early as 1542. It was not until 1825-1826 however, that white men were to explore those lands. The first white men in numbers came down the coast from Fort Vancouver. These men, seeking fur and gold, were members of the Hudson's Bay Company, under the leadership of Alexander R. McLeod. With occasional exceptions, such as Jedediah Smith, they were the only white men traveling these lands for several years after 1826.

These men established the first outpost near what is now known as Elkton on the banks of the Umpqua River. Later in 1850, Captain Levi Scott laid out the townsite of Scottsburg, downriver at the head of tidewater. Men exploring inland from Scottsburg in 1852 discovered Loon Lake, and Camp Creek.

In 1853 the first settlement in Coos County was established in the Coos Bay area. Isolated from the interior, construction of a stage road to Roseburg was started in 1865. The Coos Bay Wagon Road as it later became known, crosses through the EAR area following the East Fork of the Coquille River. The present day County Road closely approximates the original location.

Landform determined early settlement patterns. Generally favored were river banks and adjacent high ground. Communities, streams and mountains named for early settlers depict the history of the area. Dora and Sitkum east of the study area were once stage stops along the Wagon Road to Roseburg. Locations of early day sawmills, lumber camps, schools, hotels and settlements are present in or nearby the study area. In many cases there are no remaining structures to indicate the sites.

Other points of interest found in and near the study area are parks and timber preserves. Dora County Park and the Judge Hamilton County Park (lease Application #13506) found in the Coquille River study area are revested grant lands designated by Act of Congress as public parks and campsites "for recreational purposes and to preserve the rare groves of myrtle trees thereon." The Maria C. Jackson State Park on Brummet Creek was purchased and deeded to the State of Oregon by Save the Myrtlewoods, Inc. The Brummet Creek Reservation was withdrawn by the Secretary of the Interior, November 8, 1946 as "timber preservation areas and for the protection of their recreational and scenic values."

b. Archeology

Anthropological evidence indicates that Oregon and the Pacific northwest generally has been inhabited for about ten thousand years. Primary habitation occurred wherever lake and river shorefronts allowed settlement and provided water supply. When the last Ice Age provided a land-bridge between Asia and Alaska the first migrations into the northern part of this continent occurred, and successive waves of migrants moved progressively down the Pacific coast. Three culturally distinct but related groups of tribes settled in what we presently define as the State of Oregon, located in each of the three main regions - the plateau, the valley, and the coast. The massive distinctions between these three regions (in terms of climate and geography) determined to a large degree the cultural forms developed by each set of tribes inhabiting them. Those living on the plateau assumed a socio-cultural lifestyle similar to the semi-nomadic North American plains

Indians (most typically associated in our present day culture as representing the stereotype of the Native American). The tribes living in the valley and along the coast were surrounded by an environment more in harmony with settled living patterns. It was with members of these tribes - already established in the area for millenia - that the first white travellers to Oregon met and traded in the middle of the sixteenth century.

The Oregon coast was inhabited historically by an Athabascan speaking people, a race of Indians composed of numerous families or tribes. They lived simple lives, never travelling far. Their villages for the most part, were composed of rectangular wooden structures set about the mouths of rivers or the shorelines of bays where tidal flats were exposed. From the ocean beaches they gathered food; shellfish, crabs, fish, gull eggs, whatever the ocean offered was eaten. They also hunted deer and elk, and supplemented their diet with berries and edible roots in season. They travelled up some rivers to harvest salmon and eels. They traveled as far as the head of Camas Valley to dig camas and gather myrtle nuts.

In view of the available evidence it is doubtful if archeological sites of this early Indian culture will be found in the EAR area. These people were heavily dependent upon the coastal lands for sustenance. Game was plentiful along the coast in those times and forays deep into the rugged coast range were probably not required to take these animals. No known sites of archeological value have been discovered in the EAR area to date, and archeologists queried indicated that in all likelihood, none would be.

Upon request, the State Historic Preservation Office conducted a search of properties listed on the National Registry and found that none were located within the lease areas. The Sandy Creek covered bridge, on private land, in the Coquille River Area is listed on the statewide inventory. Also, from their inquiries, they anticipate a low density of archeological sites within the lease area, but recommend that surveys be conducted prior to ground disturbing activities.

3. Social Welfare

a. Population

The past three decades has seen the population of the Oregon Coastal area increase steadily, having more than doubled from 170,338 in 1940 to 353,680 in 1970. During this same period the growth rate of the Oregon coastal area of 2.46 percent per year was slightly faster than that of the State, which was 2.2 percent. Only during the last decade have the Oregon coastal areas failed to increase their share of Oregon's population.

Population growth in the Reedsport and Coos Bay areas of the South Coast Subarea resulted from early development of the timber resource. Water transportation on the rivers and through navigable harbors facilitated movement of the resource and gave access to coastal, intercoastal, and world markets. In recent years the timber resource has become more intensively utilized as the industry has become vertically integrated. Products are shipped into world markets and the industry has continued to expand. Population in the Reedsport area and in Coos County has increased over many years. Industries serving the forest products complex have also expanded. More recently the South Coast Subarea has become important as a tourist, recreation, and retirement area. All coastal subareas have, at various times experienced both rapidly increasing populations and stagnant or declining populations due to changes in economic opportunities.

The major communities of Coos County and their 1972 populations are Coos Bay (13,320), North Bend (8,685), Coquille (4,300), Myrtle Point (2,595), Bandon (1,895), Eastside (1,490), and Powers (835).

The major population centers of western Douglas County are Reedsport (4,039), the Tenmile area (2,559), Gardiner, and Scottsburg. The population data for Coos County is summarized below:

Population of Coos County

Year	Population	Change (%)
1900	10,324	
1910	17,959	72
1920	22,257	24
1930	28,373	28
1940	32,466	14
1950	42,265	30
1960	54,955	30
1970	56,515	3

b. Employment

Manufacturing is highly important to this coastal area; it is a critical part of the economic base, a highly specialized manufacturing economy, very dependent on forest resources. The principal industries are lumbering, shipping, fishing, agriculture, and recreation/tourism. Charleston, and Winchester Bay are two of many coastal resort towns which possess fine harbors catering to commercial fishermen, charter fleets, and sports craft. Coos County's sawmills produce twenty billion board feet of timber annually and dominate the economy of the region. Fifty-eight percent of Coos County's working force are employed by the lumber industry. The area provides hotel services, schools, utilities, food and retail services which compare favorably with other Oregon coastal areas. Table 5 shows employment data for specified coastal subareas with indices of specialization.

c. Income

Per capita personal income for Oregon is slightly higher than the United States average - \$3,163 vs. \$3,139 (1969 data). The difference is less than one percent. Per capita income of the Oregon coastal area, when compared to the state norm, has an Oregon relative of .89. This data with other relative data and comparisons of mean family income is shown in Table 6.

Table 5 Oregon Coastal Employment, Unemployment, and Indices of Specialization by Subarea, 1970

Industry	Clatsop	Tillamook	Lincoln	West. Lane	Reedsport	Coos	Curry	Int. Douglas
	County	County	County	County	County	County	County	County
	Empl. I/S	Empl. I/S	Empl. I/S	Empl. I/S	Empl. I/S	Empl. I/S	Empl. I/S	Empl. I/S
Agriculture, forestry, & fisheries	557 1.4	762 3.3	563 1.7	190 1.6	85 1.1	927 1.3	479 2.9	1256 1.6
Mining	7 .1	16 .4	50 .8	0 0	22 1.3	17 .1	--	195 2.5
Contract construction	718 1.1	366 1.0	534 1.0	216 1.2	183 1.3	933 .8	175 .6	1169 .8
Manufacturing	2651 1.0	1749 1.1	1983 3.7	1335 1.6	960 1.6	6915 1.3	1621 1.4	7124 1.3
Food & kindred products	1021 5.4	143 1.3	208 1.3	37 .7	115 2.8	304 .8	97 1.2	108 .3
Textile & apparel products	35 --	0 --	13 --	5 --	0 --	12 --	5 --	0 --
Lumber, wood prod., furniture	848 6.2	1404 7.8	836 7.2	1178 28.4	581 19.8	5483 21.2	1420 24.6	5740 20.1
Printing & publishing	114 --	33 --	75 --	26 --	21 --	150 --	25 --	149 --
Chemicals & allied products	36 --	0 --	0 --	0 --	0 --	186 --	0 --	5 --
Electric & other machinery	53 --	41 --	43 --	0 --	0 --	87 --	4 --	4 --
Transportation equipment	69 --	5 --	20 --	0 --	6 --	85 --	0 --	121 --
Other & misc. manufacturing	475 .5	123 .2	788 1.0	89 .3	237 1.6	608 .3	70 .2	997 .5
Railroads & rail-express	17 .2	25 .5	4 .1	24 1.3	20 1.3	72 .5	0 --	95 1.3
Trucking & warehousing	87 .6	46 .5	132 1.1	50 1.4	16 .7	447 1.6	31 .5	280 .7
Other transportation	342 2.4	37 .4	117 .9	46 .7	34 1.4	612 2.2	41 .6	164 .7
Communications	129 .9	46 .5	95 .8	15 .7	20 .7	241 .9	9 .1	264 .7
Utilities & sanitary service	104 .6	127 1.2	170 1.1	45 .6	23 .6	282 .8	46 .6	230 .6
Wholesale trade	217 .5	116 .5	145 .4	36 .2	23 .2	871 1.0	95 .8	517 .5
Food & dairy product stores	237 .9	132 .8	247 1.3	78 .8	79 1.2	525 1.0	130 1.2	586 1.2
Eating & drinking places	611 1.9	311 1.7	763 2.8	67 .7	80 1.3	606 1.0	181 1.4	715 1.0
Other retail trade	922 .8	557 .8	887 .9	307 1.0	199 .9	1944 .9	466 1.0	2158 1.0
Finance, insurance, real estate	313 .6	147 .5	349 .8	82 .6	48 .4	592 .6	132 .6	716 .6
Hotels & other personal services	490 1.5	259 1.4	843 3.0	120 1.3	67 1.0	427 .7	160 1.2	716 1.0
Private households	121 .8	75 .8	111 .8	44 .7	21 .7	180 .6	18 .3	259 .7
Business & repair services	202 .6	139 .7	173 .6	60 .6	41 .6	419 .7	87 .6	479 1.0
Entertainment, recreation services	103 1.3	46 .9	155 2.1	27 1.2	4 --	156 1.0	25 .8	93 1.2
Medical, other prof. services	2246 1.2	985 .9	1232 .8	380 .7	279 .7	3058 .9	577 .7	3776 1.0
Public administration	440 .8	289 .8	437 .9	72 .4	55 .4	665 .9	168 .7	933 .7
TOTAL	10,514	6,230	9,030	3,194	2,259	19,889	4,441	21,825
Unemployment	823	503	820	319	228	1,503	498	2,117

I/S: Index of Specialization

SOURCE: U.S. Department of Commerce, Census of Population.

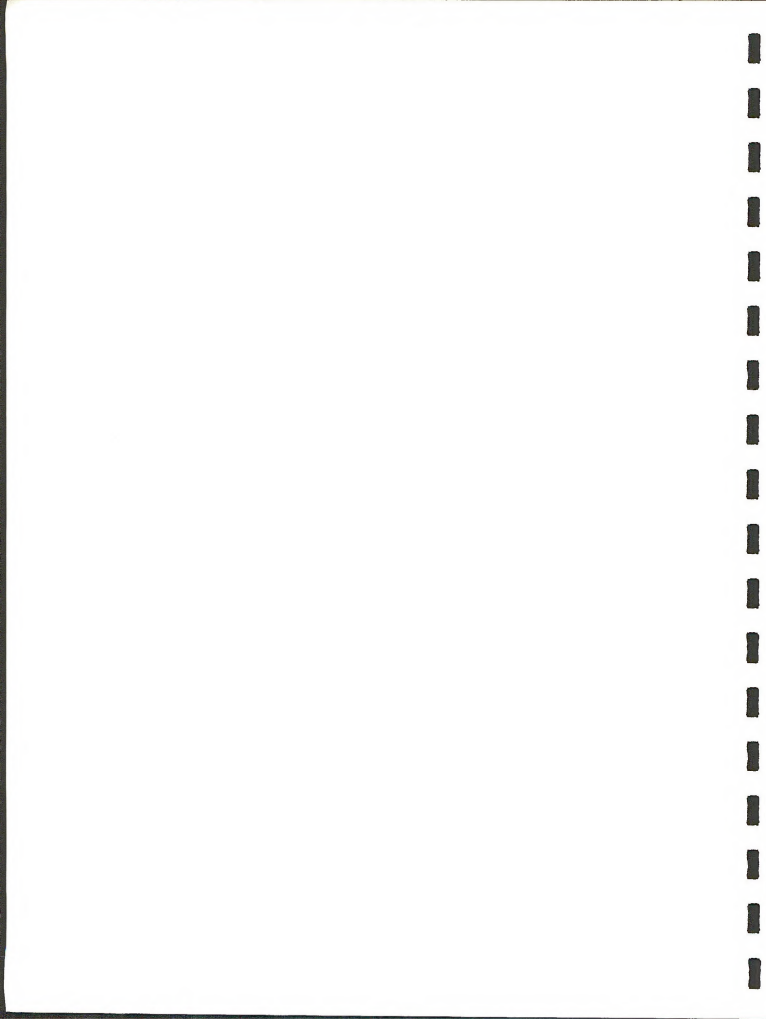


Table 6 Income Data - United States, Oregon, Coastal Area,
and Subareas, 1969

	Total personal income	Per capita income	Oregon relative per capita income	Family mean income
United States	\$637,882,468	\$3,139	-	\$9,590
Oregon	6,615,098	3,163	1.0	10,695
Oregon Coastal Area	997,818	2,822	.89	n.a. ^{a/}
Clatsop County	89,690	3,150	.996	10,335
Tillamook County	50,975	2,843	.90	9,401
Lincoln County	74,612	2,897	.92	9,031
Western Lane County	26,105	2,626	.83	9,577
Reedsport	16,551	2,686	.85	9,981
Coos County	169,488	2,999	.95	10,157
Curry County	39,304	3,022	.96	9,774
Interior Douglas County	165,199	2,519	.80	9,421
Jackson County	272,633	2,884	.91	9,624
Josephine County	93,261	2,609	.82	8,484

^{a/} n.a. - not available.

SOURCE: U. S. Department of Commerce, Census of Population



PART III

ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES

A. PREFACE

The following section describes the anticipated environmental impacts of oil and gas field operations on the surface resources within the EAR area, and recommends specific measures to lessen or preclude such impacts. If the leases are issued, a subsequent more site-specific environmental assessment will be a prerequisite to all surface exploration and/or development.

To make the analysis for this EAR certain procedures are followed, and certain constraints and conditions are assumed.

1. Procedures

Discrete operations of each phase (stage of implementation) of oil and gas leasing are listed in Appendix IX. All discrete operations have been considered in the analysis; however, the written analysis includes only those operations that were considered to have potential for significant impact.

2. Assumptions

It is assumed that all of the lessee's operations will be in conformance with applicable federal and state laws, regulations and standard lease stipulations. Such controls are detailed in Part I of this EAR.

Based on information received from the applicant, levels of exploration and development are assumed:

- a. The level of exploration is assumed to be one or two wells within the lease area. This is considered to be an extremely high level of exploration, because the applicant speaks of one or two exploratory wells in Western Oregon.
- b. A moderate oil and/or gas discovery is the maximum, reasonable level of development; any production will be transported to existing refineries for oil processing and distribution, and to existing supply pipelines for gas. A moderate oil discovery may result in one well per 40 or 80 acres within given lease or all leases. A moderate natural gas discovery could result in one well per 160 acres.
- c. Road construction associated solely with oil and gas exploration will be minimal. The existing forest road

system is highly developed in the Loon Lake and Coquille River areas. These roads are designed for log hauling, and are adequate for handling the loads associated with exploration equipment. The road system on federal land in the Callahan Area is virtually undeveloped. It is assumed that if exploration is done in this area, that road development will be necessary.

3. Contingencies

In addition to these assumptions, the following analysis must also consider the possible type of impacts associated with the unpredictable--accidents and errors in judgment; eg., oil spills, fires and well blowouts. Since they are unpredictable happenings, the size or degree of the impact is debatable. A review of recent exploration and development history may help bring some perspectives to such a debate.

In fiscal year 1975 (July 1, 1974 - June 30, 1975), according to the U. S. Geological Survey, there were 10 fires and 10 blowouts occurring on federal leases. There were 10,092 federal leases during the fiscal year 1975.

Table A in Appendix X shows a breakdown by occurrence and location of well fires and blowouts during fiscal year 1975.

Table B in Appendix X is a compilation of crude oil spills reported to the Environmental Protection Agency in five western states during 1972. The figures represent only oil spills attributed to field operations and do not include the transportation or the refining of crude oil. Of the total spills, 40 percent resulted from flowline corrosion or freezing. The remaining spills were caused by human error, mechanical failure, natural causes, poor maintenance, or in a few cases, vandalism. The statistics relate to spills on all ownerships--private and State lands as well as Federal.

B. ANTICIPATED ENVIRONMENTAL IMPACTS

Road and site construction is an important operation that could have significant impact on the components of the environment. New road construction and drilling site construction are a possibility in preliminary investigations, explorations, and development. Since the impacts of road and site construction are similar, and these items could possibly occur in several of the stages of implementation they will be analyzed as separate entities to eliminate repetition.

1. Road and Drilling Site Construction

Road and drilling site construction in the coastal watersheds could have a major adverse impact on most components of the environment. Deep cuts are necessary, excess earth from excavation sometimes must be sidecast on the downhill side and the road surface itself becomes compacted. Road construction may precipitate mass soil movements (landslides), and open more land to erosion by clearing. Approximately 12 acres per mile of clearing is necessary in the steep terrain that comprises much of the EAR area. Debris from road clearing and construction can clog stream channels and overload stream headwall areas with excess material from excavations. It is anticipated that the only new road construction that could be necessary for oil and gas operations, in most instances, will be short spur roads. This is because of the good existing road network in the study area. (See Appendix VI-B).

The impacts on air quality from road construction should be minimal. Exhausts from road building machinery and dust would be minimal (probably one or two machines) and would be of short duration, because of short lengths of road needed. Road construction impacts on the land (soil) would depend on the location. Soil structures are altered during road building and the potential of starting landslides and accelerated erosion can virtually eliminate the vegetative production capability of a large area. This is particularly true on sites that are fragile. (See Appendix VI-A)

Landslides that could be triggered by road construction can completely scour the aquatic plants and animals from stream channels, and cause sediment to be deposited downstream in critical aquatic animal production areas. (See Appendix VI-C) The less obvious, but none the less severe, pollution from erosion of road surfaces, cutbanks and outboard banks continually degrades water quality in the watersheds and reduces stream productivity.

Aquatic plants could be highly impacted by any mass earth movements precipitated by road construction.

The damage to aquatic plants could be severe where it is necessary to cross streams with a road.

Aquatic animals could be impacted by any sediments deposited as a result of road construction. The degree of impact would depend on the duration and intensity of sedimentation.

Road construction may displace some terrestrial animals and destroy a portion of their habitat; however, the small amount of construction anticipated could make this a minor impact. Road construction and use in critical elk habitat areas (See Appendix VI-C), particularly during the breeding and calving seasons, could have a major impact on these animals through harassment.

A permanent road provides access for humans. This presents a potential for a high adverse impact on terrestrial animals from harassment to possible destruction of the animals.

A high adverse impact to terrestrial plants (vegetation) is expected. Excavation exposes subsoil which is very adverse to reestablishment of plants, and the compacted nature of the roadbed itself, whether surfaced or unsurfaced, could be devoid of vegetation for a very long time.

Ecological interrelationships could be adversely impacted by roads. The exposed subsoil material and the compacted roadbed resist plant succession and the return of a balanced ecosystem within the road area.

Impacts of road building on landscape character (aesthetics) are expected to be low. Although many people consider road cuts or "scars" to be displeasing, it is anticipated that the amount of roads that would be built for oil and gas operations may go unnoticed, because of the vast existing network of logging roads in all areas except the Callahan area. The Callahan area, however, is well off the beaten path for highway travelers and general sightseers.

Road construction could destroy archeological sites if built through them.

Roads constructed in the preliminary investigation phase could be low standard temporary roads. Temporary roads can produce sediment, trigger landslides, and have the same impacts on the environment as higher standard roads. These low standard roads, however, could be built in locations that require less excavation and clearing than higher standard roads. Impacts of low standard roads could be of a lesser magnitude than roads of higher standard. The temporary roads can be revegetated after a short period of use.

Any road construction, temporary or permanent, in fragile areas (See Appendix VI-A), regardless of location or precautions taken, has a high potential for initiating landslides

and excessive erosion that could create an extremely high adverse impact on the environment. In addition to producing sediment in streams, roads built through these fragile areas have a potential through erosion and landslides to reduce the shallow soil mantle on these sites to a point where any vegetative rehabilitation is almost impossible.

The construction or enlargement of existing landings for drill rig sites could have the same impacts as road construction, because of the excavation involved.

It is a possibility that if some roads are constructed, they could be on locations that would become a part of the logging road system.

2. Preliminary Investigations

It is assumed that aerial investigations and/or truck mounted thumpers are the two types of investigative methods that will be used. Low flying aircraft or truck mounted thumpers operating adjacent to wildlife nesting, wintering or breeding areas could have an adverse impact on the wildlife. All wildlife areas for the above purposes, of course, are not identified, as these areas are widespread throughout the forest. In the case of elk, however, many of the critical habitat areas are identified (See Appendix VI-C), and harassment could occur by equipment operating in or adjacent to these areas.

3. Exploratory Drilling

Land use conflicts could occur between well drilling operations and logging operations if both were operating in the same immediate area, or utilizing the same road systems. In light of the minor amount of exploratory drilling anticipated, it is not likely that these conflicts will be serious.

Water used for drilling and mixing could have a significant impact on aquatic animals and plants, if this water is used from nearby streams and ponds during the dry seasons. It is possible that such use could dry up the streams and possibly destroy the aquatic plant and animal life inhabiting the stream.

The possibility of the mud pits used for drilling purposes breaking by some unforeseen accident or vandalism or overflowing because of excessive heavy rains, although remote,

still exists. If these pits were to overflow or break, streams could be polluted with the bentonite clay and possibly some chemical additives of the slurry. This material going into streams could be detrimental to water quality, aquatic plants and animals. Mud pit overflowing or failure could cause pollution of the soil, water and surrounding vegetation. The pollution of adjacent water and vegetation could be toxic to terrestrial wildlife drinking the water or eating the vegetation. Pollution from mud pits could be of short duration. The mud pit itself could possibly be an entrapment for animals, although the 24 hour operations of the drilling rig may deter animals from visiting the site.

Locating a well site within a critical wildlife area (terrestrial) could harass the animals to the point that they may not return to the area. The clearing of vegetation could also degrade the quality of a critical habitat area. Location of a well site in close proximity to critical aquatic habitats increases the possibility of pollutants entering the water because of the short distance to the water.

Noise from machinery could possibly harass elk, particularly if the machinery were located in or adjacent to a critical elk habitat area.

The possibility exists of salt water being brought to the surface. If not contained, the salt water could pollute streams and soil. Excessive salt water pollution could kill aquatic life in freshwater streams, and could kill some types of terrestrial vegetation. The extent of salt water pollution depends on the amount of salt water produced and the duration of its production.

There is a potential for hot water to be brought to the surface. Depending on the temperature, amount and duration of the hot water, this could raise stream temperatures if allowed to enter streams before cooling and could possibly kill some terrestrial vegetation. It is assumed that the hot water will be saline in character; if so, the impacts of temperature would be added to the impacts of salt.

Many safety precautions are employed against well blowouts and spills from storage tanks; however, they may occur, resulting in oil spills. Oil spills could pollute water courses, adversely affecting aquatic life, and could contaminate the soil, which may result in the reduction of soil productivity and vegetation.

Flaring (burning of gas from wells), if done during the dry summer months, may result in wildfires in the adjacent forest. These fires destroy vegetation, wildlife, and reduce soil productivity. Loss of vegetation due to fire could increase water temperature in streams and leave the land vulnerable to accelerated erosion.

Visual impacts of drilling rigs vary as people vary. Some people may object to an off color drill rig in the forest; however, these rigs are probably no more unsightly than the logging yarders that are present throughout the year in the area. It is safe to assume that logging yarders will far outnumber the drill rigs.

4. Development

The impacts of drilling and associated operations of development are basically the same as those described in the exploration phase in Section 3.B.3. Development of an oil field will require additional wells. A moderate development could result in a well every 80 or 120 acres on one lease, all leases, or a combination of leases. The extent of oil field development is not known at this time. The impacts of developing the roads and drill sites remain the same as the roads and drill sites in exploratory drilling, however, as the number of sites and roads increases the magnitude of the impacts could increase. More storage tanks and space for them would be needed for development, thus increasing the impacts of possible erosion and landslide. The increased number of storage tanks could increase the chance of oil spills.

Gas field development requires less total area than an oil field. In the event of a gas field discovery and subsequent development, it is possible to have gas wells spaced every 160 acres as compared to the 40-120 acre spacing of an oil field. Gas fields do not require storage tanks, therefore the impacts of erosion and landslides should be of lesser magnitude than those of an oil field, simply because less space is needed.

5. Production

Production oil and gas fields require some type of transportation from the site. In producing oil fields, the oil could be stored on the site and transported by truck or

pipeline to a shipping point. Transportation from gas fields could be by pipeline to the nearest main pipelines which are located east of the study areas in the Willamette and Umpqua valleys.

In producing fields, there is no drilling, road construction, site construction and storage facilities (oil fields). These items have been constructed during the development stage.

Production fields, however, would need transmission pipelines, particularly for gas production. Pipeline rights-of-way, for oil or gas could require about 10 feet in width. Pipeline right-of-ways differ from road right-of-ways basically in location. A road must stay on a usable grade, while a pipeline could run straight up or down a hill. Any excavation of cleared land on an up and down line could initiate serious erosion problems. Ground access for equipment to install the pipelines may be necessary. Roads, probably temporary could cause impacts as described in Section 3.B.1. on road construction. The erosion of pipeline rights-of-way could increase sediments in streams as described in Section 3.B.1, road construction, but the impact of pipeline rights-of-way on ecological interrelationships could be less than those of road construction.

Pipelines above ground may be subject to damage by adjacent timber if windthrown or cut in a timber sale. Buried pipelines can possibly leak also, but the impacts should be slight, such as the killing of some vegetation immediately above the leak.

The possibility exists for leaks to occur in any pipeline installation. Leaks from oil pipelines could have the same potential for water and soil pollution as oil spills from well drilling, depending on the intensity and duration of the leak and the position, such as a stream crossing or ridgetop.

Pipeline rights-of-way would not require the excavation that is necessary for road construction. However, the pipelines are buried about 2 to 3 feet deep, and this excavation could cause erosion and trigger landslides. This is particularly possible on fragile sites, although the impacts would probably be of lesser extent than that of roads because of the comparatively smaller amount of excavation.

Subsidence of the ground surface above an oil and gas reservoir could result from the withdrawal of large volumes of fluids from shallow, poorly consolidated formations charged at greater than hydrostatic pressures. Such subsidence could reach a maximum rate during the production phase.

Fire is a possibility, although probably remote, from leaks in a gas pipeline. A fire at a leak could possibly result in a wildfire situation. The impacts of wildfire are described in Section 3.B.3., Exploratory Drilling.

6. Abandonment

When wells are abandoned, they are plugged. Regulations require that when an exploratory well or an entire production lease is abandoned, that the wells will be properly plugged, and the sites and road be restored as nearly as possible to the original condition. The restoration of roads and drill sites could have a favorable impact on components of the environment. Returning the areas to vegetation should reduce erosion potential and accelerate the return of vegetation and a balanced ecosystem to the disturbed areas.

7. Land Use - Employment

The land use in the EAR area is almost 100% timber production. Alterations of land use patterns of surrounding communities should be very remote. Exploratory drilling crews are self-contained, as they are very mobile and move with the rig. These crews consist of about 30-35 workers (based on 24 hour operation), and their stay in an area is only temporary. In the case of a discovery, the number of workers may increase, but again they should only be temporary. There may be some hiring of local workers, but this would probably be a small number.

If extensive development and production do materialize, this is not expected to alter the local land use pattern. One employee can maintain 10 to 20 producing gas wells or 25 oil tanks. No "boom town" aspect is anticipated. In view of the above, it is not anticipated that more land will be needed for urban-suburban use as a result of oil or gas production.

Local employment opportunities should be minimal in the oil and gas fields, because this is a highly specialized trade and much of the local working force is oriented to the wood products and supporting industries. There may, however be some opportunities for local suppliers and machine owners and operators to contract for items such as road and site construction and supplies for the crews.

C. ANTICIPATED ENVIRONMENTAL IMPACTS OF ALTERNATIVE

The alternative to the proposed action is no action, i.e., not issuing any of the leases. If the leases were not granted, there would be no impacts from oil and gas leasing.

D. POSSIBLE MITIGATING AND ENHANCING MEASURES

1. Road and Drilling Site Construction

Road and drilling site construction can possibly occur in the preliminary investigation, exploration and development phases of oil and gas operations. Possible measures that could be used to reduce the impacts of landslide and erosion that could be initiated by road and drilling site construction will be treated as a separate entity. Methods used to reduce the possibility of landslides and erosion could mitigate the impacts on air quality, soil productivity, water quality, aquatic plants and animals, terrestrial plants and animals, ecological interrelationships, landscape character and cultural resources.

The following measures are possible for the mitigation of impacts from road and drill site construction:

- a. Existing roads, logging landings, quarry sites and stockpile sites could be used whenever possible.
- b. Construction could be permitted only during periods of dry weather.
- c. Roads and drilling sites could be constructed to minimum standards needed for movement of the necessary equipment.
- d. Cut and fill slopes of all new roads and drilling sites could be revegetated as soon as possible after construction.

- e. The following measures to mitigate the impacts of road and drilling site locations could be used:
- (1) Locate roads out of steep stream headwalls, toes of slumps, midslopes and stream bottoms.
 - (2) Locate all roads, if possible, in places that could later be used by the forest management program.
 - (3) Locate drilling sites in places other than sidehills.
- f. Slant drilling or other techniques could be used in lieu of constructing new roads and drilling sites on fragile sites. The opening of abandoned roads on fragile sites could be prohibited. The use of existing, maintained roads that lead directly to possible existing drill sites could possibly be used in the fragile areas. Fragile sites are found on lease application numbers: 9757, 9759, 9760 and 13422 in the Loon Lake Area; 13388 in the Callahan Area and 13406, 13407, 13408, 13409, 13410, 13411, 13413, 13414, 13415, 13416, 13391, 13392, 13393 in the Coquille River Area. (See Appendix VI-A).
- g. Slant drilling or other techniques could be used in lieu of occupying the County Park, located in lease application number 13406, as located on the map in appendix VI-A. The County Park comprises about 80 acres and is also classed as a fragile site. No occupancy could insure the recreational values of this park, which is to protect myrtlewood trees in their natural environment.
- h. Techniques such as slant drilling could be used instead of constructing new roads or drilling sites in critical wildlife habitat areas (elk and fish). See section D.3.d. for additional mitigating measures concerning these critical habitat areas.
- Critical wildlife areas for elk and fish are located in lease application numbers, 9756, 9757, 9758, 9759, 9760, 13422 in the Loon Lake Area; 13308, 13309, 13391, 13393, 13406, 13410, 13411, 13412, 13413, 13414, 13415, 13416 in the Coquille River Area. (See Appendix VI-C).
- i. Excess material resulting from road and/or drilling site construction could be end hauled to prevent sidestepping large amounts of unstable overburden that could be subject to accelerated erosion.

- j. Install waterbars in temporary roads, and surface these roads with gravel if used during wet weather. At end of use, roadway could be blocked, ripped and revegetated. Temporary drilling sites can be treated the same as temporary roads.
- k. Permanent roads and well sites used in the productive stage could be surfaced with gravel, permanent drainage installed and the roads and sites regularly maintained to insure proper drainage.
- l. Temporary crossing of streams with roads (fords) could be permitted only where the stream bottom is rocky enough to preclude the dispersion of sediment. Permanent stream crossing could be permitted only where permanent culverts or bridges designed to carry peak flows are installed. Stream channel changes, and/or removal of stream gravel could be excluded from the operations.
- m. Topsoil removed by road and drilling site construction could be stockpiled and redistributed when temporary roads and drilling sites are rehabilitated. Topsoil could be stockpiled on nearby abandoned logging roads or landings, or could be used to rehabilitate these abandoned areas in lieu of rehabilitating the area constructed for oil and gas operations.
- n. The services of a professional archeologist, who is knowledgeable about cultural resources could be obtained to determine if oil and gas operations will adversely affect or destroy any cultural resources. This could be done before a drilling permit is issued.

2. Preliminary Investigations

Aerial and truck mounted thumper activity could be excluded from proximity to critical elk habitat areas during the calving period (May through July). Critical elk habitat areas are located in lease application numbers 9757, 9759, 9760 in the Loon Lake Area; 13309, 13406, 13410, 13411, 13412, 13413, 13414, 13415, 13416 in the Coquille River Area.

3. Exploratory Drilling

- a. Contingency plans could be developed in case of accidents such as well blowouts and fires. Oil and gas field employees could be trained for these types of accidents, and blowout prevention equipment could be used. Reducing the probability of accidents to a minimum will lessen the impacts caused by air, soil and water pollution, erosion, and the destruction of terrestrial vegetation and aquatic life.
- b. Water withdrawal from streams for drilling operations could be controlled so as not to reduce the flow below minimum levels needed for aquatic plant and animal production as established by the Oregon Department of Fish and Wildlife.
- c. Mud pits could be lined with impervious material and protective dikes constructed to prevent seepage, overflowing from excessive rainfall and breaching. This will reduce the impacts on soils, aquatic plants and animals, water quality, terrestrial plants and animals. Mud pits could be fenced to prevent the entrapment of animals.

The mud pits could be drained and rehabilitated as soon as possible after drilling is completed. The mud could be disposed of at sites removed from the lease areas; this measure will reduce the impacts on the above mentioned components, by returning the area to production, and eliminating the possibility of the pit's eroding through lack of maintenance.

- d. Slant drilling for exploratory drilling could be used instead of occupying critical habitat areas for elk and fish. This could reduce the impacts of harassment, access and habitat degradation. Lease application numbers on which these critical areas are located are listed in section D.1.h. Approximate locations are shown on the maps in Appendix VI-C.
- e. Salt water produced from wells could be reinjected or contained to prevent contamination of surface waters, soils, the possible destruction of fresh water aquatic life, and possible destruction of some terrestrial vegetation. (See NTL-2B, Appendix II-F).

Hot water produced from wells could also be reinjected or contained to prevent the hot water from entering streams and raising the water temperature to levels that are detrimental to aquatic life.

- f. Slant drilling or other techniques could be required to protect streams and their buffer strips. These streams referred to are not the ones referred to in sections 3.D.1.h. and 3.D.3.d.
- g. Flaring (burning) of gas from wells could be done in accordance with State fire laws. All precautions could be taken to prevent the possibility of wildfire, which is detrimental to vegetation, water quality, soil productivity and wildlife.
- h. Sewage disposal systems could be designed specifically for the soil and ground water conditions at the site, and if not suitable, then self-contained chemical facilities could be required.
- i. Streams adjacent to drilling operations could be monitored for evidence of petroleum-related pollutants.
- j. Electrical generators and power sources could be used if a well site is located immediately adjacent to an identified critical wildlife (terrestrial) habitat area. This can reduce noise that could cause undue harassment to wildlife during calving or nesting periods.
- k. Protective dikes could be constructed around storage tanks and other facilities for the containment of oil spills. The containment of spills can minimize the impacts to water quality, soil productivity, aquatic life and vegetation.

4. Development

Although the development of oil and gas fields require more wells, roads and storage facilities (oil fields only) than exploratory drilling (Section 3.D.3.), the measures described for mitigating the impacts of exploratory drilling are basically the same. The increased number of facilities needed will require additional personnel to administer the development, especially if more than one field is being developed simultaneously.

5. Production

Measures to reduce impacts in the production phase are concerned mainly with transportation of oil or gas from the site, and accident prevention such as pipeline leaks or breaks, and geological hazards of removing oil or gas from geologic formations. Measures that are possible to mitigate spills from oil storage facilities are the same as those in Section 3.D.3., exploratory drilling.

- a. Pipelines could follow existing roads, where possible, by burying in ditchlines or adjacent to fill toe on through fill sections of road. This will eliminate the necessity of clearing, excavating and building roads for construction access. Erosion potential can be reduced and pipelines will be more readily accessible. Reduction of erosion will lessen the impacts on site production, water quality, aquatic life and vegetation.
- b. Pipeline construction could be excluded from slopes in excess of 50%. Slopes of this magnitude usually have a moderate erosion potential. Pipeline right-of-way clearings could be limited to the minimum widths possible.

Pipeline construction and associated access roads could be excluded from fragile sites or critical elk habitat areas. See Appendix VI-A and VI-C for approximate locations of these areas.

The above measures will reduce the landslide and erosion potential, thus reducing the impacts on soil productivity, water quality, aquatic life and vegetation. No occupancy of critical elk habitat areas will mitigate the impacts of alteration of the critical habitat areas.

- c. Where pipelines could be damaged by windthrown timber or logging, they could be buried. This would reduce the danger of breakage and spills.
- d. All pipeline locations could be clearly marked. This will prevent breakage and possible spills that could result from forest management practices, such as road construction or site scarification. If pipelines are located along existing roads, markers will alert maintenance crews.
- e. The impacts of subsidence could be minimized by requiring that a plan, based upon pertinent geologic data, be prepared and implemented to prevent subsidence through the monitoring of elevations and the reinjection of fluids as necessary.

The effects of oil and gas operation - induced earthquakes, should any occur, could be reduced or prevented by requiring the lessee to monitor seismic activity in the area and to alter production activity (fluid withdrawal or reinjection) if warranted by pertinent geologic investigation.

- f. Pipelines, valves and pumps could be tested periodically to reduce the potential for leaks which could result in spills or chances of starting wildfires.
- g. If powerline right-of-ways are needed, the preceding mitigating measures in sections 3.D.5.a. and 3.D.5.b., with the exception of burying, could be used. Power poles should be equipped with electrocution protection for raptors.

6. Abandonment

Measures to mitigate the environmental impacts of abandoning sites applies to exploratory wells and former producing fields.

- a. Wells could be plugged; storage tanks, structures and other facilities removed. Drilling pads, roads and facility sites could be ripped, topsoil redistributed, tilled and revegetated.

Pipelines could be left in place, flushed out and sealed. Pipeline location markers could be left in place. Residues could be disposed of at approved disposal sites.

The above process of reclamation can hasten the return of vegetation, reduce erosion and have a favorable impact on soil production, water quality, aquatic life, wildlife, and aesthetics.

- b. Wells could be properly plugged to prevent contamination of ground water aquifers. This will reduce the hazard of contaminated ground water from entering surface water and possibly destroying or inhibiting aquatic life.
- c. Locations of abandoned wells could be clearly marked.

7. Ecological Interrelationships

Measures described in preceding sections of this chapter to mitigate the impacts of oil and gas operations on other components of the environment, collectively represent actions which could be taken to maintain or expedite the return of stable ecological interrelationships.

E. RECOMMENDATIONS FOR MITIGATION OR ENHANCEMENT

1. General Oil and Gas Lease Recommendations

The following recommendations and/or stipulations should apply to all leases in the analysis area:

a. Road and Drilling Site Construction

- (1) Existing roads, logging landings, quarry and stockpile sites should be used whenever possible.
- (2) Immediately upon receipt of written notice from the Supervisor (or, in an emergency, the Authorized Officer) that weather or soil moisture conditions are such that operations will cause excessive damage to watershed, soils and aquatic habitat, Lessee should discontinue construction, earthmoving, and off-road surface disturbing exploration and development activities on the leased lands. Lessee should not resume operations prior to receipt of written authorization from the Supervisor.
- (3) It is recommended that all constructed roads and drilling sites be designed to the minimum standards and size necessary. Road subgrade widths should not exceed 22 feet in width, and grade limitations should be in accordance with Oregon state safety codes. All road and drilling site designs should be approved by the authorized BLM officer.
- (4) All cut and fill slopes resulting from construction, reopening or improvement of roads and/or drilling sites should be seeded to grass as construction progresses. Seeding should not be done between May 1 and June 30. Grass seed should be in accordance with specifications furnished by the BLM.
- (5) It is recommended that roads and drilling sites be constructed only at locations approved by the BLM, and these roads and drilling sites should be constructed and maintained in such a manner as to control and minimize channeling and other erosion.
- (6) End hauling, if necessary, should be included in road and drilling site designs, and should be approved by the BLM.

- (7) Temporary roads should be waterbarred during use, and surfaced with gravel if used during wet weather. Temporary drilling sites should be surfaced with gravel if used during wet weather.

It is recommended that all temporary roads and drilling sites shall be closed to vehicular travel, water barred or drained, ripped, topsoil redistributed, and revegetated within six (6) months after termination of use by the particular operator involved.

- (8) Permanent roads and well sites should be surfaced with gravel, permanent drainage installed, and the roads and sites maintained to insure proper drainage.
- (9) Temporary stream crossings (fords) should be permitted only with BLM permission. Stream channels should not be blocked. No cuts or fills should be made near or in streams which will result in siltation or accumulation of debris. All damage to streams should be repaired to the satisfaction of the authorized officer.
- (10) Topsoil should be removed and stockpiled prior to removal of overburden. Stockpiles should be located so as not to be covered by spoil materials and to facilitate their use in final rehabilitation.
- (11) On surface areas where soil has been disturbed, with the exception of road and drill site cut and fill slopes as stated in section 3.E.1.a.(4), compacted areas should be ripped, topsoil redistributed, and the area revegetated.
- (12) All survey monuments, witness corners, reference monuments, and bearing trees should be protected against destruction, obliteration, or damage. Any damaged or obliterated markers should be reestablished in accordance with accepted survey practices at expense of the lessee.
- (13) All operations should be conducted with a view to avoidance of forest fires and spontaneous combustion. Open burning of carbonaceous materials should be in accordance with state of Oregon burning laws.

b. Preliminary Investigations

All recommended measures in the preceding section 3.E.1.a. should be recommended for any road or truck trail construction that may be necessary for preliminary investigations.

c. Exploratory Drilling

- (1) Contingency plans for accidents should be developed, and blowout prevention equipment should be used.
- (2) Water withdrawal from streams for drilling purposes should have the approval by the BLM, and water rights for withdrawal should be obtained from the State of Oregon prior to requesting BLM approval.
- (3) Streams that are approved for water withdrawal should be monitored by the U. S. Geological Survey during dry seasons to insure that minimum flow requirements as established by the Oregon Department of Fish and Wildlife are being met.
- (4) Mud pits should be lined with impervious material, acceptable to the BLM and U. S. Geological Survey authorized officers, to prevent seepage.
- (5) Protective dikes with at least four (4) feet of freeboard should be constructed around mud pits.
- (6) Residue from mud pits should not be disposed of on the lease areas or on any other BLM administered lands unless approved by the Authorized BLM Officer.
- (7) Mud pits should be filled and returned to a state that is susceptible to revegetation as soon as possible after drilling is completed.
- (8) Salt water and hot water, if produced during drilling operations, should be reinjected or contained in a manner that will not cause erosion, pollution of surface waters or damage to surrounding productive soils or vegetation.
- (9) No occupancy for exploratory drilling should be permitted within 200 feet of any stream, unless authorized by the BLM.
- (10) The operator should make every effort to prevent, control, or suppress any fire in the operating area. Reports of uncontrolled fires should be immediately sent to the authorized officer or his representative and the State Forest Protective Association.

Flaring (burning) of gas from wells should be done in accordance with the State of Oregon laws that pertain to burning in forested areas.

- (11) Petroleum based wastes should be disposed of by methods that will prevent soil and water pollution and fire hazards.
- (12) Streams adjacent to drilling operations should be monitored by the U. S. Geological Survey for evidence of petroleum-related pollutants.
- (13) Protective dikes should be constructed around storage tanks and other facilities. The dikes, and the area between them and the tanks should create an area that is 10% larger in volume than the tank capacity.
- (14) Storage tanks should not be permitted on sidehills with a gradient in excess of 30%.

d. Development

The preceding recommendations for road and drilling site construction (Section 3.E.1.a.), and Exploratory Drilling (Section 3.E.1.c.) should be recommended for the development phase.

e. Production

- (1) Transmission pipelines for oil or gas should traverse existing roads where possible. Lines should be buried a minimum of two (2) feet below the top ditchlines where required by the authorized officer. When necessary to cross roads with pipelines, the roadway should be restored to its original condition or better. On through fill sections of existing roads, pipelines should be buried a minimum of five (5) feet from the fill toe where required by the authorized officer.
- (2) Pipelines should be buried at all creek crossings, where required by the authorized officer; and construction of creek crossings should be permitted between June 1 and September 30 only.
- (3) Pipeline construction should not be permitted on areas other than existing roads without prior approval

of the BLM District Manager. If pipeline construction is approved on locations other than existing roads, the following items are recommended:

- (a) Pipeline construction should not be permitted on slopes in excess of 50% without prior approval of the BLM.
 - (b) Pipeline right-of-way clearings should not exceed ten (10) feet in width, and should be water barred and seeded to grass.
 - (c) All pipelines should be buried to a minimum depth of two (2) feet, where required by the authorized officer.
- (4) All pipeline locations, whether adjacent to existing roads, or cross country should be clearly marked with permanent type markers.
 - (5) Lessee shall monitor its operations during production phases and initiate changes in production activities, as required by the U. S. Geological Survey, to reduce subsidence and/or seismic activity resulting from such production. Such changes may include fluid withdrawal and/or reinjection rates.
 - (6) Wet weather operations should be permitted for producing fields, assuming that all construction is finished.
 - (7) Pipelines, valves and pumps should be monitored, by approved methods, periodically to reduce the possibility of leaks.
 - (8) Electric powerlines for producing fields should follow existing road right-of-ways. Road crossing heights for powerlines should be a minimum of 40 feet above the roadway.
 - (9) Electric power poles should be equipped with devices to prevent electrocution of birds.

f. Abandonment

- (1) Exploratory wells and producing wells, when abandoned should be plugged.

- (2) Abandoned well locations should be clearly marked.
- (3) All storage tanks, structures and other facilities should be removed from the site. Drilling pads and facility sites should be ripped, topsoil redistributed and the areas planted to vegetative types as determined by the BLM.
- (4) Roads or other improvements built by the Lessee that, in the judgment of the Authorized BLM officer, can be used for other resource management programs should not be rehabilitated. Other roads should be rehabilitated in the manner described in (3) above.
- (5) Abandoned buried pipelines should be left in place, flushed out and sealed. Residue from pipelines should be disposed of on sites other than the lease area or other BLM administered lands, unless approved by the authorized BLM officer. Pipeline location markers should be left in place.

2. Specific Oil and Gas Lease Recommendations

The following recommendations and/or stipulations are for portions of specific leases, and apply to all phases of oil and gas operations with the exception of abandonment.

- (1) No surface occupancy or soil disturbing activities should be permitted on fragile areas located in portions of lease application numbers 9757, 9759, 9760, and 13422 in the Loon Lake Area, portions of 13388 in the Callahan Area, and portions of 13406, 13407, 13408, 13409, 13410, 13411, 13413, 13414, 13415, 13416, 13391, 13392 and 13393 in the Coquille River Area. The maps in Appendix VI-A show the locations of these fragile areas. Existing maintained roads in these areas could be used for transportation needs for oil and gas operations; however, the opening of abandoned roads should not be permitted.
- (2) No surface occupancy or soil disturbing activities should be permitted in the County Park located in N $\frac{1}{2}$ NW $\frac{1}{4}$, Section 7, T. 28 S., R 9 W., WPM on

lease application number 13406. (See Appendix III). The entire County Park is also classed as a fragile area, which is shown in Appendix VI-A. There are no existing roads within the County Park area. There is, however, an existing maintained County road adjacent to the south edge of the park.

- (3) No surface occupancy or soil disturbing activities should be permitted in critical habitat areas for elk and fish. These areas are located in portions of lease application numbers 9756, 9757, 9758, 9759, 9760, and 13422 in the Loon Lake Area; portions of lease application numbers 13308, 13309, 13391, 13393, 13406, 13410, 13411, 13412, 13413, 13414, 13415 and 13416 in the Coquille River Area. Locations of these critical areas are illustrated in Appendix VI-C. Existing, maintained roads in the above areas could be used for oil and gas transportation needs. The opening of abandoned roads in the above areas should not be permitted.

F. RESIDUAL IMPACTS

This section discusses the impacts which could remain after mitigating measures recommended in section 3.E. are applied. Many of the impacts described in this section would occur only if accidents such as slides on roads or drill sites, oil spills or well blowouts occurred. The probability of such accidents occurring within the analysis area are remote; however, they cannot be completely ignored. The anticipated residual impacts discussed in this section are based on the assumptions made in Section 3.A.3 of the scope and intensity of oil and gas operations in the analysis area.

1. Road and Drilling Site Construction

Roads and drilling sites constructed for oil and gas operations could be very similar to roads and landing sites constructed in the District for other resource management practices. Observations over the past years indicate that slides sometimes occur on permanent roads and rehabilitated roads after mitigating measures have been employed. These slides have been of a minor nature in the past. Many times these slides will catch in the roadway itself, with very little or no spilling over on the outboard side. Slides have occurred in stream headwalls, but later day practices have mitigated this type of occurrence to minor proportions.

Oil and gas operations would probably construct very few roads or drilling sites. Slides from roads or drilling sites, depending on size and road location, could cause sediment to enter streams. This condition is short lived because maintenance crews clean up slides shortly after they occur. These slides usually occur during periods of heavy rainfall and streams are at a high fast moving level with a convex configuration which precludes some siltation. Slides rarely occur during dry seasons when streams are low. The subsoil exposed at the origin of the slide could preclude vegetative production, but the area is small and is still part of the cutbank of the road.

Drainage pipes (culverts) could become plugged with debris and cause erosion of fills or outboard banks. This is usually a temporary situation because maintenance crews open these pipes soon after they are plugged.

The residual impacts of road and drill site construction for oil and gas operations could be considered as minor.

2. Preliminary Investigations

No residual impacts would be expected from preliminary investigations.

3. Exploratory Drilling

Well blowouts could have an impact on vegetation, soils and aquatic life by contamination of surface water with briny or hot water. This could result in loss of some aquatic plants, but most streams in the analysis area are on a very steep gradient in the headwater, and support a minor amount of aquatic animals, particularly fish.

Oil spills into streams could have a serious impact if the oil were allowed to flow into the streams for a long period of time. Contingency plans should mitigate this possibility considerably.

Fires, if allowed to escape into forested areas can reduce low vegetative cover and open land to erosion. Wildfires may or may not destroy merchantable timber, depending on many variables.

Putting the above in perspective of the intensity and number of wells that are anticipated, if all of the above accidents happened, with the exception of wildfire, the impacts should be minor, and could possibly be mitigated satisfactorily through contingency plans.

4. Development

Development requires more area than exploratory drilling. The situations and residual impacts described in road and drilling site construction (section 3.F.1.) and exploratory drilling (section 3.F.3.) could apply to development. The fact that areas needed are larger, and more wells are involved increases the probability of accidents and the resulting residual impacts.

5. Production

Pipeline leaks are a remote possibility. They could occur, however, through accidents or other unforeseen causes. Pipeline leaks could probably be confined to the road ditches or pipeline right-of-way, and in many cases would not reach water courses. The most serious leak or break would be at a stream crossing. Leaks would probably be of short duration, thereby reducing the possibility of permanent damage to land or water environment.

6. Abandonment

The residual impacts after a road, well or production field is abandoned could be similar, if not the same, as those discussed in sections F.1., F.3., F.4, and F.5. of this section.

7. Ecological Interrelationships

Any action which alters the abiotic environment or biotic community could affect the ecological relationships to some degree, and mitigative measures may not prevent residual impacts. Despite all feasible precautions, some oil and gas operations could upset the natural balance of ecosystems at least temporarily on the area disturbed by these operations. Actions or accidents which destroy vegetation, disturb soil, expose bedrock degrade water quality, could cause some disruption of ecological interrelationships. In many cases the impact of the accidents could be mitigated. The relatively small area that is anticipated to be disturbed by oil and gas operations or accidents would probably have little overall effect on the ecosystem of the entire analysis area.

G. RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

This section focuses on the relationship between short-term use of the environment for oil and gas operations and the long term productivity of the environment and its maintenance for other uses.

"Short-term" use refers to the period during which oil and gas operations would take place. It would extend from preliminary investigation through abandonment and completion of reclamation. The "short-term" may vary from a period of several months if preliminary investigations or wildcat drilling were unsuccessful to many years if commercial amounts of oil and gas were discovered.

"Long-term" is considered to be the period of time beyond the point when all possible restoration has been completed.

The relationships in this section will keep within the scope of anticipated oil and gas activity as defined in section 3.A.2.

1. Road and Drilling Site Construction

- a. Much road and logging landing construction has occurred on the analysis area in the past for the forest management program. Road construction and the mitigating measures therefore involved in oil and gas operations are similar if not the same as for roads constructed for forest management. Logging landings are similar in size to drilling sites. In fact, the oil and gas operations could probably use many of the existing roads and landings.

It is anticipated, that the construction done by oil and gas operations will be minor, and if mitigating measures are followed, the long-term effects on environmental components such as soil and vegetative productivity, aquatic life, terrestrial wildlife and ecological interrelationships will be minor, because the acreage involved in construction will be very small by comparison to the entire analysis area.

- b. Sedimentation of streams due to road construction on steep slopes or narrow ridges can be reduced by mitigating measures, but cannot be entirely eliminated because of unforeseen actions such as road drainage being plugged by debris. These unforeseen acts can cause some temporary sedimentation of streams, but the situation is quickly remedied by the maintenance crews.

- c. Permanent roads could provide access for harassment and poaching of wildlife such as deer and elk. The amount of permanent road that is expected to be constructed by oil and gas operations, when compared to the present existing system, would probably not contribute to a long-term reduction in wildlife. The above is based on mitigating measures that would prohibit oil and gas operations in critical wildlife areas.
- d. Road and drilling site construction could alter the natural balance of ecological interrelationships if large amounts of erosion or deep road cuts exposed a large amount of bedrock. The small amount of area that is anticipated to be involved would probably have little or no long-term effect on ecological interrelationships when compared to the entire analysis area.
- e. Archeological resources could be protected, if identified, by changing locations of roads and drilling sites, therefore no long-term impacts are anticipated.

2. Preliminary Investigations

Little or no road construction is anticipated for preliminary investigations. Most roads, if built, in this phase could be temporary, and the effect on long-term productivity would be less than those described in the preceding section G.1.

3. Exploratory Drilling

- a. If ground water aquifers were inadvertently contaminated, it might take many years for the effects to be noted.
- b. Large oil spills reaching surface waters could have a detrimental long-term impact on vegetation in the vicinity of the spill. Production of aquatic vascular plants could be adversely affected, causing reduced production.
- c. Excessive use of water from streams during oil and gas operations could cause long lasting impacts on aquatic habitats and fish production if the stream flow were reduced below minimum flow requirements for an extended period of time.
- d. The loss of soil and vegetative productivity could be reduced in areas being occupied by mud pits or polluted by spills. These areas would be small, and can be

rehabilitated. Some additives used in the mud act as plant fertilizers. Long-term loss of soil or vegetative productivity is not anticipated.

- e. The projected rate of exploratory drilling on economics in the area could have very little effect. Drilling crews are small, and move out when drilling is finished, and it is anticipated that only one exploratory well will be drilled.

4. Development

- a. Development could require more roads, wells, and larger areas than exploratory drilling. The short-term, long-term relationships could be the same as those described in preceding sections G.1. and G.3. The long-term effects of the impacts would increase as the area increases, but the effect--even if large fields are developed--could be minor when compared to the entire analysis area.
- b. The short-term rate of economics on the surrounding areas could increase somewhat over exploratory drilling, but the long-term effects could be minor, because many of the crews may leave when development is completed.

5. Production

- a. If oil and gas were discovered, developed and produced, their use in the short-term would preclude long-term use of the reserves for energy or as raw material in manufacturing processes. If oil and gas activities caused geological subsidence, the effects would extend into the long-term future.
- b. The short-term, long-term effects of pipelines could be similar to those of road construction if pipelines did not follow existing roads. If mitigating measures are followed, then impacts would come from unforeseen accidents. Accidents would undoubtedly be quickly rectified and long-term productivity of soil, aquatic life and other environmental components should not be adversely affected.
- c. Curtailment of forest management practices during or after oil and gas production is not expected.

Producing wells and facilities take a small amount of space, and the roads could be used for both purposes. Most of the area used for oil and gas production, when abandoned, could be returned to forest type vegetation.

- d. The short-term effect of oil and gas production on area land use patterns and economics is expected to be negligible. Long-term effects on land use and economy of local communities would come about only if oil and gas production far exceeds anyone's expectations.

6. Abandonment

Oil and gas operations end in abandonment and rehabilitation of the sites. Mitigating measures that protect or enhance the basic resources of soil and water quality and expedite the return of vegetation would help to restore balanced ecosystems and return the land to productive use.

H. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

If oil and gas are discovered and produced, the major irreversible impact would be the extraction of oil and/or gas from the geologic formations, and the resulting reduction of natural reserves.

In the event that subsidence occurs as a result of oil and gas extraction, it is possible that some small aquifers could be permanently impaired.

There is a possibility that accidents may occur in spite of precautions taken. If ground water aquifers were contaminated by accidents in drilling operations, water quality may be impaired for long periods of time.

Where bedrock is exposed by landslide, or other unforeseen incidences, the natural balance of environmental processes can be restored only by natural processes operating over a period of geologic time. However, the incidences of such occurrences and the amount of area involved would be minimal.

PART IV

RECORDATION OF PERSONS, GROUPS AND PUBLIC

AGENCIES CONSULTED

On January 27, 1976 a letter announcing the lease applications, the preparation of this EAR and request for comments was sent to 81 individuals groups and agencies. (See Appendix XI for a complete list and copy of the letter.) In addition 11 copies were sent to local postmasters for display.

On February 2, 1976 a news release was issued to the local media. (See Appendix XI.)

Verbal consultations have been held with the following:

1. Mr. John Ely, Wildlife Biologist, Oregon Department of Fish and Wildlife.
2. Mr. James L. Guy, Mobile Oil Corporation.
3. Mr. Don Russell and Mr. John Fackler, U. S. Geologic Survey.

Upon distribution of this EAR it is anticipated that additional consultations will occur. This portion of the EAR will be updated to reflect such consultation.



PART V

INTENSITY OF PUBLIC INTEREST

To date, the intensity of public interest toward the proposed oil and gas leases could be classed as mild. Twenty written responses have been received in the following categories:

1. Government Agencies	10
2. Industry Associations	1
3. Wood Products Companies	2
4. University Student Groups	2
5. Advisory Board Members	3
6. Elected Officials	1
7. Other Individuals	1

Very little verbal inquiry has been generated by our announcement. None of the written responses could be classed as purely negative. One response recommended that the proposal had sufficient potential impact to warrant preparation of an EIS. Approximately 9 of the responses identified concerns or recommended restrictions. Wood products firms and one agency were concerned about the interaction of their operations and those of the oil companies.

Upon request, the State Historic Preservation Office conducted a search of properties listed on the National Registry and found that none were located within the lease areas. The Sandy Creek covered bridge, located on the Coquille River Area is listed on the statewide inventory. Also, from their inquiries they anticipate a low density of archeological sites within the lease area, but recommend that surveys be conducted prior to ground disturbing activities.

A number of the responses requested more information to allow more in-depth comment. A copy of the EAR will be sent to these persons. Coos County requested a meeting upon completion of the EAR.

In light of the fact that more public interest may be generated as the EAR is reviewed, it is anticipated that this section will be modified to reflect such interest.



PART VI

PARTICIPATING STAFF

This Environmental Analysis Report was prepared on the Coos Bay District, Bureau of Land Management by the following:

Bob Cooke	- Planning & Environmental Coordinator
Jack Schutte	- Chief, Branch of Forestry
John Anderson	- Fisheries Biologist
Dick King	- Wildlife Biologist
Marty Townsend	- Soils Scientist
Phil Neal	- Recreation Specialist
Gene Stark	- Forestry Technician
Ron Kaufman	- Chief, Division of Resources



PART VII

SUMMARY CONCLUSION

Major residual impacts and impacts on long term productivity would be expected to occur only as a result of accidents. The use of available industry technology, the adherence to recommended mitigating measures and the anticipated minor level of exploration and development make the probability of such accidents extremely remote. The following are a list of accidents and the major impacts which could occur:

1. Land Subsidence - Elimination of ground water aquifers which in turn would adversely impact aquatic life in small tributary streams fed by that aquifer. Impacts would affect both short term and long term production.
2. Well Blowouts - The short term destruction of a small amount of non-commercial vegetation, and the contamination of surface water with salt water or hot water could occur.
3. Oil Spills and Pipeline Leaks - Impacts would be of a major nature only if these accidents occurred in or near water. Contamination would occur which could have a short term effect on aquatic life and water quality.
4. Wildfire - Short term reduction of vegetative cover which could open the land to erosion; destruction of wildlife and wildlife habitat, and some reduction in timber values.
5. Well Casing Leaks - Oil or briny water contamination of ground water aquifer.

Some minor residual impacts would result from road and drilling site construction. The rugged topography and generally unstable nature of the analysis area would make minor slides and erosion inevitable when ground disturbing activities occur. Adherence to recommended mitigating measures and the light amount of new construction anticipated in these well roaded areas, however, would keep these impacts to a minimum.

By comparison, the construction impacts of oil and gas operations would be the same, but of less magnitude, as those construction activities experienced in the timber harvest activity in the analysis area.

The principal irretrievable commitment would be the depletion of oil and/or gas from the geologic formations. After this depletion occurred production would stop and the area would be restored as nearly to original state as possible. Roads and drill sites which may enhance other resource management activities on the area would be maintained.

To date, the public reaction to the proposed oil and gas leases on the Coos Bay District has been mild and overall supportive. It is anticipated that further public interest will be generated with the publication of this document.

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APPENDIX I

- I-A-1 Department of the Interior Secretarial Order 2948
- I-A-2 Cooperative Procedures Pertaining to Onshore Oil,
Gas, and Geothermal Resources Operations -
Implementation of Secretarial Order No. 2948.
- I-B Drilling Mud Materials



APPENDIX I-A-1

SECRETARIAL ORDER

No. 2948





United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

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October 6, 1972

ORDER NO. 2948

Subject: Division of Responsibility Between the Bureau of Land Management and the Geological Survey for Administration of the Mineral Leasing Laws - Onshore

Sec. 1. Purpose. The purpose of this Order is to set forth the administrative and management procedures for Departmental onshore mineral leasing and operating activities. The spirit and intent of this Order flow from the Department's mineral management objectives of: orderly and timely resources development, protection of the environment, and receipt of fair market value for leased mineral resources.

Sec. 1(a) Orderly and Timely Resource Development includes the Department's responsibilities to:

(1) Foster, promote, and encourage the exploration for and the production of the mineral deposits from the leasable lands; promote competition;

(2) Encourage the active development of the mineral deposits in the leasable lands in a manner compatible with the use of the same lands for other purposes; assure that mineral developers receive the acreage necessary for economic plant investment, development, and production;

(3) Encourage the maximum ultimate recovery of the mineral deposit; prevent waste; promote the conservation of the mineral resources;

(4) Assure adequate minimum production and diligent development requirements for mineral deposits.

(b) Protection of the Environment includes the Department's responsibilities to:

(1) Assure that mineral exploration and production be conducted with the maximum protection of the environment;

(2) Assure the rehabilitation of disturbed lands;

(3) Assure that precautions are taken to protect public health and safety; and

(4) Assure full compliance with the spirit and objectives of the National Environmental Policy Act of 1969, other Federal environmental legislation, and supporting Executive Orders and regulations.

(c) Receipt of Fair Market Value for Leased Mineral Resources

includes the Department's responsibilities to assure the public a fair market value return for the use of public lands and the disposition of its mineral resources.

Sec. 2. Agency Responsibilities. The BLM exercises at the Bureau level the Secretary's discretionary authority to determine whether or not leases, permits, and licenses are to be issued. The Bureau of Land Management is responsible for issuing mineral leases, permits, and licenses, and is the office of record in mineral leasing matters. The Geological Survey is responsible for all geologic, engineering, and economic value determinations for the Department's mineral management program. These determinations include: the mineral characteristics of lease and permit areas; parcelling; amounts of bonds; royalties; unit values; rentals; mineral resource evaluations; reserves; investment, diligent development, and minimum production requirements; and all other terms and conditions relating to mineral operations under leases and permits. Geological Survey exercises the Secretary's delegated authority regarding operations conducted within the area of operation by permittees, lessees, and licensees and determines the actions to be taken by them from the standpoint of the development, conservation, and management of mineral resources under the jurisdiction of the Department. GS will refer to BLM any instances of noncompliance with lease terms requiring cancellation action, and BLM will initiate the necessary action.

For the purpose of this Order, the area of operation is defined as that area of the present and planned mine, oil and gas field, or geothermal resource field exploratory, development, and production operations, as presented in an approved exploration or mining plan, drilling permit, oil, gas, or geothermal field development plan, or plan for the abandonment of wells or operations. The area of operation may cover a fraction of a lease or permit area, or it may cover several lease or permit areas. It encompasses the general area needed for storage piles, spoils piles, tailings ponds, on-project mill sites, flow lines, separators, surge tanks, storage tanks, on-project truck or rail-loading stations, drill pads, mud pits, workshops, compressors, generators, on-project power plants, and other such facilities used for on-project mine, oil and gas field, or geothermal resource field exploratory, development, and production operations.

(a) Environmental Protection. The Bureau of Land Management, in cooperation with the Geological Survey, formulates the general requirements to be incorporated in leases, permits, and licenses for the protection of the surface and non-mineral resources and for reclamation. The Geological Survey, before approving exploration and mining plans, drilling permits, oil, gas, or geothermal field development plans, or plans for the abandonment of wells or operations, consults with the Bureau of Land Management on the adequacy of the surface use, environmental protection, and reclamation aspects of the plans and will not grant approval if inconsistent with the BLM's recommendations without further discussions with BLM. If differences remain after these further discussions, the resolution is made by the Assistant Secretary--Mineral Resources and the Assistant Secretary--Public Land Management. If required, the Under Secretary resolves any remaining differences. The BLM is responsible for compliance examinations of environmental protection requirements outside the operating area and for reporting infractions to the GS for discussions with, or orders to, the permittee, lessee, or licensee. GS examines operations to ensure compliance with environmental protection and rehabilitation requirements inside the operating area. With respect to approval of access roads, pipelines, utility routes and other surface uses outside the operating area, the Bureau of Land Management has the primary responsibility but obtains the recommendations of the Geological Survey before taking final action. Orders to operators for any remedial action is the responsibility of the Geological Survey.

(b) Expertise. The Geological Survey is responsible for maintaining engineering, geologic, geophysical, economic, and other technical expertise needed by the Department to assure compliance with applicable laws, operating regulations, and the objectives of the Department's mineral management program. The Bureau of Land Management is responsible for maintaining expertise needed by the Department for action on applications filed with BLM under the mineral leasing laws to assure compliance with applicable laws, leasing regulations, and the objectives of the Department's mineral management program.

(c) Contacts with Applicants.

(1) Prior to the issuance of mineral leases, permits, and licenses, the Bureau of Land Management will represent the Secretary in dealing with applicants.

(2) After issuance and during the exploration, development, and production phases of leases, permits, and licenses, and until a lease, permit, or license has terminated (at which time management is the sole responsibility of BLM) the Geological Survey is the sole representative of the Secretary in all matters relating to the supervision of operations.

Sec. 3. Issuance of Mineral Leases, Permits, and Licenses.

(a) Applications. Prior to the issuance of mineral prospecting permits, leases, or licenses, the Bureau of Land Management refers all applications for such permits, leases, or licenses to the Geological Survey for a report as outlined in (b) below.

under the mineral leasing laws and regulations, if sufficient information is known about a mineral deposit to warrant offering the deposit for lease by competitive sale and to notify the Bureau of Land Management of its determination. If the Geological Survey finds that sufficient information is not available to warrant competitive leasing, it notifies the Bureau of Land Management of its conclusions so that the Bureau of Land Management may issue a prospecting permit or noncompetitive lease, as appropriate. The Geological Survey establishes prospecting requirements for prospecting permits. When lands are to be leased, the Geological Survey determines and reports, as appropriate, on: the mineral characteristics of lease and permit areas; parcelling; amounts of bonds; royalties; unit values; rentals; mineral resource evaluations; reserves; investments; diligent development and minimum production requirements; and all other terms and conditions pertaining to lease operations, including environmental and surface rehabilitation stipulations relating to mineral exploration and extraction. With respect to applications for licenses, the Geological Survey determines and reports as to whether the license may be issued.

(2) The Geological Survey is responsible for determining whether a prospecting permittee has demonstrated that the lands contain a mineral deposit having the characteristics required by law and regulations to qualify for a preference right lease and to notify the Bureau of Land Management.

(3) The Bureau of Land Management refers to the Geological Survey all other type applications received which, if approved, may affect operations on existing permits, leases, or licenses.

(4) The Bureau of Land Management notifies the Geological Survey of known oil, gas, and geothermal resource geophysical exploration activity, including the area involved, the type of survey employed, and the name of the operator.

(5) All applications for noncompetitive oil and gas, mineral, and geothermal resource leases filed with the Bureau of Land Management will, prior to issuance of a lease, be referred to the Geological Survey for a determination as to whether the lands are within a known geologic structure (KGS), a known geothermal resource area (KGRA), or a known leasing area (KLA).

(b) Mineral Resource Evaluation Report. GS is responsible for submitting a report of its findings, mineral resource evaluations, and resultant recommendations to the BLM, together with a summary explanation of how the resource evaluations were developed from geophysical, geologic, economic, and engineering data available at the time of the evaluation. The BLM reviews these findings and recommendations in light of multiple-use management requirements and will not issue leases or permits inconsistent with the findings and recommendations without further discussion with GS. If differences remain after further discussion, the resolution is made by the Assistant Secretary--Mineral Resources and the Assistant Secretary--Public Land Management. If required, the Under Secretary resolves any remaining differences.

(c) Competitive Lease Sales. The Bureau of Land Management advertises and conducts competitive lease sales. The Geological Survey's resource evaluations will be used and the Geological Survey will have representatives at the sale and renders a post-sale recommendation to BLM regarding acceptance or rejection of the bids, which must be confirmed in writing.

(d) Files and Records. BLM maintains the official application, permit, and lease case files and forwards to the Geological Survey a copy of each permit, lease, and license, together with copies of relevant correspondence thereafter conducted by the Bureau. The GS forwards to the BLM copies of mining and exploration plan applications, drilling permit applications, and relevant items submitted by the applicants directly to the GS, except confidential proprietary information cited under paragraph (e) below.

(e) Security of Information. The Geological Survey is responsible for receiving and protecting for the confidential use of the Federal Government all proprietary geological, geophysical, engineering, economic, statistical, or other information, mineral resource data, and well logs required to be submitted under Title 30 CFR, Parts 200, 211, 216, 221, 231, 270, and related regulations. The Survey Office receiving such information is designated the Office of Control for those data. Authorized officials of BLM or other surface-managing agencies having a need to see such information will normally make appropriate arrangements to visit the Office of Control for access to such data and for technical advice based on it pertinent to their management responsibilities.

Sec. 4. Mineral Reports. The Geological Survey is responsible for preparing and submitting to the Bureau of Land Management mineral classification and evaluation reports with respect to the leasable mineral value of lands within proposed exchanges, withdrawals, sales, land entries, or other disposals and all other land transactions. The Geological Survey, upon request, also prepares and furnishes mineral reports and other information to the Bureau of Land Management needed for its use in long-range multiple-use planning or inventory of the public lands.

Sec. 5. General Relationships. Such additional references, reports, interchange of information, and advice shall be made by or between the Bureau of Land Management and Geological Survey as may be necessary to perpetuate or improve current practice and provide effective administration of the mineral leasing laws.

The Bureau of Land Management and the Geological Survey must submit to each other for review and recommendations any proposed changes in standard lease terms, regulations, instructions, or other changes that would affect each agency's management responsibilities.

Sec. 6. Implementation of Order. It is intended that there will be no duplication by the BLM or GS of the functions assigned by this Order. BLM and GS will promptly bring their manuals and instructions into agreement with the terms and the spirit and intent of this Order.

Sec. 7. Revocation. The Secretary's instruction (procedures relating to the administration of the mineral leasing laws - General Land Office and Geological Survey) dated September 22, 1925 (51 L. D. 219) is revoked.

OCT - 6 1972

James H. Easton
Secretary of the Interior

APPENDIX I-A-2

COOPERATIVE PROCEDURES PERTAINING TO

ONSHORE OIL, GAS AND GEOTHERMAL RESOURCES

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IMPLEMENTATION OF

SECRETARIAL ORDER NUMBER 2948



COOPERATIVE PROCEDURES

These procedures provide for the mutual cooperation between U. S. Geological Survey (GS) and the Bureau of Land Management (BLM) concerning oil, gas, and geothermal resources operations in accordance with Secretarial Order No. 2948.

The designation of BLM in this agreement shall refer to the responsibilities of the BLM District Managers in the Western States or to the Director of the Eastern States Office, as applicable.

The designation of GS in this agreement shall refer to the responsibilities of the District Engineers, the Alaska Area Oil and Gas Supervisor, the Western Area Geothermal Supervisor, and in some instances, the Eastern Area Oil and Gas Supervisor, as applicable.

This agreement pertains to the cooperative procedures between the two bureaus with respect to oil, gas, or geothermal resources operations conducted within an area of operation on those leases where BLM is the responsible surface managing agency or where reserved minerals are involved.

In the event of a conflict between special lease stipulations and the instructions herein contained, this agreement shall prevail. With only those exceptions herein specified, the GS shall be the sole representative of the Secretary with respect to direct contact with the lessees and operators in matters related to operations as specified in Section 2(c)(2) of Secretarial Order No. 2948.

For the purpose of this working agreement, the Area of Operation (AO) shall be outlined on the map attached to the approved plan of operations. Such AO will involve joint GS/BLM management roles and responsibilities. Operations on that portion of the AO involving exploration, development and production of the leased mineral deposit shall be the exclusive jurisdiction of the GS. All other uses not appurtenant to the mineral operations will be the exclusive jurisdiction of the BLM. The following general guidelines are provided to describe the exterior boundaries of an AO:

1. For an exploratory well: For wells two miles or more from the nearest producing well, the AO shall be established as 160 acres if it is an oil or geothermal resources test and 640 acres if a gas test.
2. For a producing field: For wells within or adjacent to producing fields, the AO shall embrace the actual acreage then spaced for production from the target reservoir plus,

if necessary, the spacing unit for the well then under consideration. For wells outside the established productive limit of a field but within two miles thereof, the AO shall be the same size as the spacing unit then established for wells in the nearby field. However, in any instance where the well is projected to test a reservoir not then productive within two miles of the location, the AO shall be 160 acres if it is an oil or geothermal resources test and 640 acres if a gas test. However, only the surface use area delineated on the map attached to the plan of operations and approved by both the GS and BLM shall be for the exclusive use of the operator while such operations are being conducted thereon. Should a well projected as an oil test be completed as a gas well, or vice versa, any additional surface use required by such completion will be subject to the pertinent approval procedures hereinafter set forth.

Regardless of the AO so established, the GS shall be solely responsible for all oil, gas, or geothermal resources operations conducted thereon, including the enforcement of the surface protection and rehabilitation requirements, on approved surface use areas whereon such operations are normally conducted as follows:

- a. Well sites - includes the area required for drilling and/or producing the well, normally 3 to 5 acres.
- b. Tank batteries and treatment area - actual use areas as established by the approved plan of operations.
- c. Gathering lines to and from the wells to the tank batteries or treatment facilities and access roads covered by the approved plan of operations.

For additional surface uses related to operations inside the AO but outside the production facilities or operations areas defined above, and not covered by an approved plan of operations, the operator shall submit his proposed plan of operations to the GS. The GS will not approve any such plan for additional surface uses until the requirements of Part D of this agreement have been satisfied. For surface uses within the AO other than those related to operations, the BLM shall be solely responsible for authorizing such uses and the surface user (oil, gas, or geothermal resources operators or other parties such as recreationists, special use permittees, etc.) shall submit their proposals directly to BLM who shall consult with GS to prevent or reduce any surface use conflicts. BLM will not approve any surface use

within an AO which is contrary to GS recommendations without further discussions with GS. Any unresolved issues will be referred to appropriate Department officials for resolution.

All surface use requirements outside the limits of established Areas of Operations shall be the sole responsibility of the BLM.

A - PRELIMINARY FIELD INVESTIGATION (discretionary)

The Surface Disturbance Stipulations, which will be made a part of each oil and gas and geothermal resources lease, require that the operator, prior to his entry upon the land or the disturbance of the surface thereof for drilling or other purposes, shall furnish both the GS and the appropriate surface managing agency with a copy of a map and an explanation of the nature of the anticipated activity and surface disturbance. Maps furnished in this regard will not be accepted if on a scale less than one inch to the mile. Work such as surveying for a well site or access route is covered by this stipulation.

Upon receipt of the required map and the explanation of the proposed activity and if BLM is the surface managing agency, or where reserved minerals are involved, the GS will:

1. Contact both the operator and the BLM to schedule a coordinated joint field examination of the area if such inspection is deemed necessary by GS. In those instances where an inspection is considered unnecessary, the GS will not proceed further without first contacting BLM as to its need for a field inspection. If BLM desires such an inspection, GS will coordinate arrangements with the operator, participate in any such inspection, and furnish appropriate data. If neither bureau requires an inspection, no further action is necessary until such time as an application for permit to drill is filed with the GS. The time for such inspections will be scheduled as soon as possible, considering work priorities; however, the BLM will, in most instances, not be requested to set an inspection date that falls less than seven days from the date on which it is established that either one or both require an on-site examination. In no event will the GS make a commitment to the operator as to when the inspection will be conducted until after BLM and GS have agreed upon a mutually acceptable date. This time may be reduced for high priority situations. The GS will encourage operators to file such maps and explanations at least 15 days in advance of the date on which they wish to enter upon the leasehold.
2. Confer with BLM and the operator to select the most feasible and environmentally acceptable areas for:
 - a. Well sites (Geologic factors and both Federal and State regulations must be considered).
 - b. Access routes.
 - c. Any other proposed surface use.

3. Delineate on the maps supplied by the operator the AO which shall be established in accordance with the foregoing, the surface use activity areas within the AO which are directly related to the proposed operations, and the access route to the AO and the surface use areas which were tentatively approved by BLM, GS, and the operator in the joint field examination.
4. Encourage the operators to submit preliminary field development plans or drilling schedules to permit lead time for evaluating environmental considerations, resource conflicts, land use planning alternatives and revised plans prior to official submission. Furnish BLM such plans or schedules.
5. Take note of the resources which will be affected, the conflicts that may occur, and also the environmental impacts which are anticipated if the activity use takes place.
6. Furnish any information requested by BLM should BLM determine that it must prepare an environmental analysis record (EAR) as provided in item 7, page A-3.
7. Request BLM's surface protection and rehabilitation requirements for the contemplated surface use areas involved which will be made part of any subsequently approved plan of operations for such AO.
8. Prepare an Environmental Impact Statement (EIS) if the EAR prepared by the BLM, as provided for in item 7, page A-3, indicates that an EIS is necessary to comply with the requirements of Section 102(2)(c) of the National Environment Policy Act of 1969 (NEPA).

Upon receipt of the required map and the explanation of the proposed activity, the BLM will:

1. Review the Unit Resource Analysis and Management Framework plan for the Resource Area, noting existing or alternate access routes, existing and proposed resource uses in the area, what resources will be affected by the proposed use, known archaeological sites, etc.
2. Notify the GS in those instances where BLM determines that there is a need for a joint field inspection. However, in those instances where BLM considers an inspection to be unnecessary, it will participate in a joint inspection if GS desires such an examination and will, regardless of whether a joint on-site inspection is made, furnish GS with its surface protection and rehabilitation requirements.

3. Delineate on the maps furnished by the operator such items as existing or alternate access routes if not shown, and furnish the GS this information.
4. Confer with the GS and the operator to select the most feasible and environmentally acceptable areas for:
 - a. Well sites (Geologic factors and both Federal and State regulations must be considered).
 - b. Access routes.
 - c. Any other proposed surface use.
5. Delineate on the maps supplied by the operator the AO which shall be established in accordance with the foregoing, the surface use activity areas within the AO which are directly related to the proposed operations, and the access route to the AO and the surface use areas which were tentatively approved by BLM, GS, and the operator in the joint field examination.
6. Take note of the resources which will be affected, the conflicts which may occur, and also the environmental impacts which are anticipated if the activity use takes place.
7. Where significant surface disturbance will occur as a result of surveying operations, prepare an environmental analysis record (EAR) with respect to such activity.

B - PROCESSING AND ISSUANCE OF A DRILLING PERMIT
INVOLVING FEDERAL OIL AND GAS OR GEOTHERMAL RESOURCES LEASES

GS will:

1. Where BLM is the surface managing agency, or where reserved minerals are involved, send a copy of all applications for permits to drill exploratory and development wells, including the development plan and other appropriate information, to the proper BLM office immediately upon receipt of each such application (in high priority situations, the BLM will also be contacted verbally to expedite issuance of a drilling permit). Other appropriate data includes the "12-point plan" required by the GS but no subsurface data of a proprietary nature or other proprietary data or information will be furnished BLM; however, BLM can, upon request, inspect but not copy such data and information in the GS office.
 - a. If the application is based on and follows closely the arrangements tentatively agreed upon at a preliminary joint field inspection as outlined in Section A, a second joint inspection will not be necessary.
 - b. If the application deviates appreciably from the arrangements tentatively agreed upon at a preliminary joint field inspection as outlined in Section A, or if there has not been a preliminary joint field inspection, the procedure outlined in 2 and 3 below will be followed.
2. Contact the appropriate BLM office and the operator to establish a time and place to meet for a joint inspection of the drill site and access route for all exploratory well proposals and for development wells, if such inspection is deemed necessary by GS. In those instances where an inspection is considered unnecessary, the GS will not proceed further without first contacting BLM as to its need for a field inspection. If BLM desires such an inspection, GS will coordinate arrangements with the operator participate in any such inspection, and furnish appropriate data. Whether or not either bureau requires an on-site examination, BLM's surface protection and rehabilitation requirements will be requested and made a part of the approved plan of operations. The time for these inspections will be scheduled as soon as possible, considering work priorities; however, the BLM will, in most instances, not be requested to set an inspection date that falls less than seven days from the date on which it is established

either one or both require an on-site examination. In no event will the GS make a commitment to the operator as to when the inspection will be conducted until after BLM and GS have agreed upon a mutually acceptable date. This time may be reduced for high priority situations. The GS will encourage operators to file all applications at least 30 days in advance of the time they wish to enter upon the leasehold.

3. Schedule, insofar as possible, each inspection so that several future sites, access roads, etc., can be inspected at one time.
4. Prepare an environmental impact analysis (EIA) 1/ utilizing BLM input for either 1(a) or 1(b) of this Part B on all exploratory wells and on those development wells which GS determines an EIA is required. Furnish BLM a copy of the EIA (the GS worksheet, Form 2-A, will not be furnished) or a statement of why one was not prepared for inclusion in BLM's official case file. All EIA's prepared in this regard will take into consideration the total aspects of the proposed operations including access to the AO and the proposed surface use areas within the AO.

Supply relevant data requested by BLM in those instances where it is determined that an EIA is not required but BLM finds it necessary to prepare an EAR to complete its records as provided in item 3, page B-4.

5. Prepare the EIS if the EIA indicates that one is necessary in order to comply with requirements of Section 102(2)(c) of the NEPA.
6. Delineate the AO and the approved surface use areas within the AO, including the access route to the AO and the surface use areas on the maps provided by the operator and make such map a part of the approved plan of operations. If a field examination is required, the delineation of the surface use areas shall not be made until after the field examination and mutual agreement is reached with BLM.
7. Where privately owned surface is involved in the surface use areas or access thereto, the operator will be required to furnish a copy of the contract or agreement with the private surface owner.
8. Supply the operator with the name, address, and both the home and office telephone numbers of the BLM contact who will be available for consultation during construction and rehabilitation activities.

1/ Corresponds to BLM Environmental Analysis Record (EAR).

9. Furnish BLM the name address, and both the office and home telephone numbers of the GS Supervisor or the District Engineer to contact in case of emergencies or incidents of noncompliance with the surface use and rehabilitation requirements of the lease or approved plan of operations.
10. Furnish immediate notification of all approved drilling permits to the appropriate BLM office.
11. Require the operator to notify the GS of the exact day field operations will begin in areas where significant surface values, such as archaeological sites, require special protection. GS will immediately notify the BLM of such date.
12. Advise the operator that the GS will expect full compliance with the applicable laws, regulations, and the approved plan of operations; and further, that the GS will consider the operator to be fully responsible for the actions of his subcontractors.
13. Require all activities to be conducted so as to conform to the approved plan of operations and subsequent amendments made thereto by GS or requested by BLM. BLM may not directly amend any approved plan of operations but may suggest changes to GS which it believes should be incorporated as a result of circumstances not contemplated at the time the plan was first approved. The GS will not approve any plan of operations which is inconsistent with BLM recommendations as to surface protection and rehabilitation requirements. Any unresolved disagreement with the original permit conditions or proposed amendments thereto will be referred to appropriate Departmental officials for resolution under procedures established by Section 2(a) of Secretarial Order No. 2948.

BLM will:

1. Upon receipt of the application for a drilling permit forwarded by the GS, notify the GS immediately in those instances where BLM determines that there is a need for a joint field inspection. However, in those instances where BLM considers an inspection to be unnecessary, it will participate in a joint inspection if GS desires such an examination and will, regardless of whether a joint inspection is made, furnish GS with its surface protection and rehabilitation requirements.
2. Provide GS with the name, address, and both the office and home telephone numbers of the BLM representative who will be available for consultation during construction and rehabilitation activities.

3. Furnish input data to GS for use in the preparation of an EIA. Where GS determines that an EIA is not required for a development well, BLM may individually, as it determines necessary, prepare an EAR to complete its records. BLM will furnish GS with a completed copy of its EAR.
4. Make a recommendation to the GS as to whether an environmental impact statement is needed.
5. Furnish the GS with a report, within ten working days following the joint inspection or within ten working days after receipt of the application for a permit to drill, if no joint inspections were deemed necessary by either bureau, setting forth the recommendations and requirements necessary to protect the surface resources and the rehabilitation requirements to be included in the drilling permit. The report shall confirm in writing and delineate on a map the AO, the surface use areas within the AO, and the access route to the AO and the surface use areas as agreed upon among BLM, GS, and the operator during their joint inspection or as a result of discussions, or both. For high priority situations the BLM representative may, with the concurrence of the District Manager, verbally inform the GS representative of the BLM requirements for the drilling permit. This verbal communication shall be followed up with a written report to the GS within 10 days thereafter.
6. At the request of GS, work directly with the operator in the rehabilitation of disturbed areas.
7. Contact Federal and State agencies and other operators in the area for information which will be helpful in implementing a successful rehabilitation program.
8. Make available to the GS and the operator any known or new rehabilitation procedures for the specific area of operation.
9. Provide GS with a written declaration prior to commencement of drilling operations, as to whether or not a water well is desired in case the well encounters a useable fresh water zone and is later abandoned. If at abandonment BLM elects to assume further responsibility for the well, it will reimburse the operator for any recoverable casing left in the hole solely because it is to be completed as a water well. The payment shall be based upon cost figures supplied by the operator prior to abandonment.

The operator will abandon the well to the base of the deepest fresh water zone of interest as required by the GS and will complete the surface clean-up operations as required by the drilling permit. BLM will accept liability for the well after GS has approved the abandonment and the surface clean-up operations have been completed to BLM's satisfaction. BLM will furnish GS with a written acceptance of all future responsibility for the well including its proper abandonment when it is no longer needed as a water well. In the event BLM requires a quitclaim deed from the operator, a copy thereof will be furnished to GS.

C - COMPLIANCE WITH TERMS AND CONDITIONS

EMERGENCY SITUATIONS

GS will:

1. Conduct inspections to insure that the operator is in compliance with terms and conditions of the lease and is conducting operations in accordance with the applicable regulations and the approved plan of operations.
2. Seek BLM assistance and expertise in surface management problems involving noncompliance with terms and conditions or stipulations, or for modifications requested by the operator.
3. Notify BLM of noncompliance which may require rehabilitation.
4. As appropriate, request the BLM to make inspections to assure compliance with the surface protection requirements of the approved plan of operations.
5. Seek all available help, including BLM, on major accidents or spills involving flowline or lease gathering facility spills, breaks in sludge pits, etc. Seek BLM expertise in rehabilitation and clean up operations.

BLM will:

1. Conduct inspections to insure compliance with the surface protection requirements of the lease and the approved plan of operations and will note operator noncompliance therewith. Except in an emergency, no instructions or directions will be given to the operator or his subcontractors without GS approval.
2. Notify GS immediately of all such incidents of noncompliance with the surface protection requirements of the lease or approved plan of operations.
3. Contact the operator directly only in cases involving an emergency such as accidental spills, flowline breaks, or other situations endangering health, safety, or significant resources.

GS will be immediately notified of any such actions taken by BLM. At that time GS will assume jurisdiction to expedite the necessary operations to resolve the emergency and will request BLM's assistance as needed in matters of surface clean up and rehabilitation.

4. If requested, furnish help during and after the emergency for clean up operations, and also furnish expertise for any required rehabilitation.

The agency responsible for seeking curative action on instances on non-compliance with the terms and conditions of the lease or the approved plan of operations will take the necessary action when notified of the non-compliance by the other agency.

D - MAINTENANCE OF FIELD ACTIVITIES

INSIDE THE AREA OF OPERATION

GS will:

1. Require operators to file for approval a suitable plan with GS prior to undertaking any new construction, reconstruction or alteration of facilities, including roads, dams, reservoirs, etc., which will result in additional surface disturbance.

The operator must submit to GS enough information concerning the proposed activity to allow evaluation of possible surface disturbance.

2. Notify BLM of the proposed surface disturbing activity and furnish all available information.
3. Process the proposed plan only after receiving the input of BLM with respect to surface protection and rehabilitation requirements and make such requirements a part of the approved plan.
4. Make its approval of the plan subject to such conditions as shall be mutually agreeable to both the GS and BLM.
5. Make periodic inspections to assure that the operator is properly maintaining the facilities.

BLM will:

1. Respond timely to GS's notification that a plan has been filed for additional surface use within an AO by providing its recommended surface protection or rehabilitation requirements.
2. When requested by the GS, assist in resolving noncompliance with the terms and conditions or stipulations of any approved plan.
3. Make periodic inspections to assure that the operator is complying with the surface protection and rehabilitation requirements of the lease and the approved operating plan and will notify GS when it becomes aware of any operating condition warranting correction. The BLM, on its own initiative, may make recommendations to GS for the maintenance or rehabilitation of existing conditions adversely affecting the surface or other resources within an AO.

4. Notify GS of all applications which involve other surface uses of lands within the AO for GS recommendations prior to approval of the application.

E - SURFACE USE MANAGEMENT OUTSIDE

THE AREA OF OPERATION

BLM will:

1. Resolve surface use conflicts to the satisfaction of all users if possible; failing this, BLM will take appropriate steps to eliminate the conflict generally with priority consideration given to the continued mineral development. In that regard the comments and recommendations of the GS will be requested.
2. Work directly with all surface users in the area, including operators, regarding maintenance of roads and other support facilities, preventing damage to the surface resources, and encouraging public health and safety awareness.
3. Notify GS of all applications involving lands outside the AO where surface use may cause conflicts. Approval of applications will be based upon all considerations including recommendations from the GS.

GS will:

1. Contact BLM immediately if it becomes aware of any conflicts involving surface use.
2. Make recommendations to BLM if production facilities are being vandalized so protection measures, such as limiting or restricting public access into the area, may be initiated.
3. Make recommendations to both the operator and BLM to improve public health and safety conditions and other conditions such as road maintenance in the general area.
4. Work with BLM to resolve any surface use conflicts which may arise.

F - ABANDONMENT

GS will:

1. Notify BLM of cancellation or termination of any approved plan of operations under which no activity has taken place.
2. Send BLM a copy of all notices of intention to abandon. If the lease is to remain in effect, any proprietary data contained in a notice will be deleted. If that portion of the approved plan of operations covering surface rehabilitation does not contain information as to whether the well's casing is to be cut off below the ground surface or the abandonment marker is to be waived, or both, the BLM will be orally contacted for its recommendations.
3. Approve the surface and subsurface plugging program to be followed by the operator.
4. Not approve the abandonment of a well where BLM has furnished a written declaration of its interest in acquiring that well should it encounter useable fresh water, without first supplying BLM with the operator's estimated cost of the casing to be left in the hole and the opportunity to assume future responsibility for the well. GS will provide as much advance notice as is possible but it is recognized that in many instances it will be necessary that BLM's decision be made within a few hours after notification of the proposed abandonment.
5. As necessary, request that BLM work directly with the operator concerning surface rehabilitation.
6. Approve the subsequent report of abandonment only after a joint inspection by BLM and GS confirms that surface rehabilitation requirements of the approved plan of operations have been completed satisfactorily.

BLM will:

1. Upon being notified of the pending abandonment of a well which encountered useable fresh water and being furnished with the operator's estimated cost of the casing to be left in the hole, make a decision within the time allowed by GS as to whether it wants the well and will pay the attendant costs thereof. (See item 9, page B-4).

2. Upon request, advise GS if the well's casing should be cut off below ground surface.
3. Upon request, advise the GS whether the required surface abandonment marker should be waived.
4. When requested by GS, work directly with the operator concerning surface rehabilitation.
5. Notify GS of any failure on the part of the operator to undertake surface rehabilitation measures which are required by the approved plan of operations.
6. Initiate action to have the operator's surety company perform the required rehabilitation if all efforts to secure the operator's compliance with the pertinent provisions of the approved plan of operations are unsuccessful.
7. Contact the surface owner where private lands are involved to ascertain acceptance of the surface rehabilitation. In no event shall the operator be required to perform less surface rehabilitation than that required by his prior contract or agreement with the private surface owner (See item 7, page B-2).
8. Notify GS of the operator's satisfactory completion of surface rehabilitation.

G - GENERAL

GS will:

Coordinate and communicate with lessees and operators and BLM concerning area development plans and other information requirements prior to submission of drilling applications.

BLM will:

If requested by GS, communicate with lessees and operators prior to submission of drilling applications to expedite BLM's input concerning surface management and rehabilitation requirements.

BLM and GS will:

1. Periodically hold joint meetings with lessees, operators, contractors, and other involved parties to discuss problems, stipulations working agreements, and other items of common concern.
2. Meet together periodically at the BLM State Office and GS Area Office level to discuss past and future procedures under these instructions. Where appropriate, the State Director and Area Supervisors may consummate regional cooperative agreements to supplement this agreement, subject to approval of such agreement by the Washington Offices of the GS and BLM.
3. Offer suggestions for revision of these procedures to their Washington Offices for improving their workability and to reduce duplication of effort in conducting these cooperative activities.



APPENDIX I - B

DRILLING MUD MATERIALS



DRILLING MUD MATERIALS

FUNCTION	MATERIALS	WHY USED
Lubricants	Certain oils, graphite powder and soaps.	To reduce down-hole friction.
Flocculants	Salt, Hydrated lime, Gypsum and Sodium Tetraphosphates.	To increase gel strength. Causes some solids to settle out.
Filtrate Reducers	Bentonite clays, Sodium carboxy-methyl cellulose (CMC) and pregelatinized starch.	Reduce filter loss. Prevent "water loss" to porous formations.
Foaming Agents	Anionic foaming chemicals.	Causes formation water to foam helping gas or air drilling to continue.
Lost Circulation	Asphalt Emulsions, Asbestos Fibers, Shredded Plastics, Mica Flakes, Nut Hulls, Cedar Fibers, Cottonseed Hulls and many other materials.	To stop mud loss to porous zones.
Shale Control Inhibitors	Gypsum, Sodium Silicate, Chrome Lignosulfates, Lime and salt.	To stop or prevent swelling of shales or clays.
Surface Active Agents	Surfactant Chemicals	To permit better mixing. Example-water and oil.
Thinners and Dispersants	Quebracho, some Polyphosphates and lignitic materials.	To prevent too high a viscosity, improve pumpability, better solids distribution in muds.
Viscosifiers	Bentonite, CMC, Attapulgitic clays and Asbestos Fibers.	To increase viscosity for cuttings removal and gel strength.
Preservatives	Formaldehyde	Prevent starch mud from fermenting.

DRILLING AND MATERIALS (Cont.)

FUNCTION	MATERIALS	WHY USED
Cement Contamination	Sodium Bicarbonate	Prevents mud destruction.
Calcium Removers	Caustic Soda, Soda Ash, Certain Polyphosphates (SAPP) and Sodium Bicarbonate.	To prevent mud destruction by Gypsum or Anhydrite.
Weight Materials	Barite, Lead Compounds, Iron Oxides and high specific gravity compounds.	To increase mud weight (pounds per gallon) to hold formation fluids in place and prevent hole caving.
Corrosion Inhibitors	Hydrated Lime, Amine Salts and Dichromate salts.	To prevent corrosion of drilling equipment and casing.
Oil Emulsion	Special Emulsifiers or Soaps.	To make oil-in-water or water-in-oil emulsions for "oil base" mud.

Sources:

American Association of Oilwell Drilling Contractors... Toolpusher's Manual, Section O. September 1970.

Gatlin, Carl. Petroleum Engineering, "Drilling and Well Completions," Chapter 6. Prentice-Hall, Inc. New York. 1960.

APPENDIX II

- II-A Notice of Intent to Conduct Oil and Gas Exploration Operations, BLM Form 3041-1.
- II-B Section 2, Paragraph (g) of the Federal Oil and Gas Lease (BLM Form 3120-7), "Protection of Surface, Natural Resources and Improvements."
- II-C Surface Disturbance Stipulations, BLM Form 3109-5.
- II-D Examples of Site - Specific Oil and Gas Lease Stipulations.
- II-E Archeological Stipulation to Oil and Gas Leases Issued in Oregon.
- II-F U. S. Geological Survey NTL - 2B (proposed).
- II-G U. S. Geological Survey NTL - 3.
- II-H U. S. Geological Survey NTL-4.
- II-I U. S. Geological Survey NTL-6 (proposed).
- II-J Chapter 632 of the Oregon Administrative Rules, Department of Geology and Mineral Industries.
- II-K Special Conditions to Apply to all Deep Well Exploratory Drilling in Oregon, Departments of Environmental Quality and Geology and Mineral Industries.



APPENDIX II-A

NOTICE OF INTENT TO CONDUCT
OIL AND GAS EXPLORATORY OPERATIONS

(BLM Form 3041-1)



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NOTICE OF INTENT TO CONDUCT OIL AND GAS EXPLORATION OPERATIONS

Name

Address (include zip code)

hereby files this "Notice of Intent to Conduct Oil and Gas Exploration Operations" across and upon (give description of lands by township(s) and range)

The type of operation to be pursued is magnetometer seismograph other (specify)

Approximate date of commencement of operations _____ Upon completion of _____
the Bureau of Land Management District Manager shall be furnished a "Notice of Completion of Oil and Gas Exploration Operations."

The undersigned agrees that oil and gas exploration operations will be conducted pursuant to the following terms and conditions:

1. Exploration operations shall be conducted in compliance with all Federal, State and County laws, ordinances or regulations which are applicable to the area of operations including, but not limited to, those pertaining to fire, sanitation, conservation, water pollution, fish and game. All operations hereunder shall be conducted in a prudent manner.
2. Due care will be exercised in protecting lands in this notice. All necessary precautions shall be taken to avoid any damage other than normal wear and tear, to gates, bridges, roads, culverts, cattle guards, fences, dams, dykes, vegetative cover and improvements, and stock watering and other facilities.
3. Appropriate procedures shall be taken to protect any shafts, pits or tunnels, and shot holes shall be capped when not in use to protect the lives, safety, or property of other persons or of wildlife and livestock.
4. All vehicles shall be operated at a reasonable rate of speed, and due care must be taken to safeguard all live-

stock and wildlife in the vicinity of his operations. Bulldozers shall not be used without advance notification to the District Manager. Existing roads and trails shall be used wherever possible; if new roads and trails are made, care should be taken to follow natural contours of the lands where feasible and restoration and/or reseeded, as requested by District Manager shall be made.

5. Upon expiration, revocation or abandonment of operations conducted pursuant to this "Notice," all equipment shall be removed from the land and the land shall be restored as nearly as practicable to its original condition by such measures as the District Manager may specify. All geophysical holes must be safely plugged. Upon leaving the land, the District Manager shall be informed.
6. Upon request, the location and depth of water sands encountered shall be disclosed to the District Manager.
7. The party conducting such operations shall contact the District Manager prior to actual entry upon the land in order to be apprised of the practices which should be followed or avoided in the conduct of his operations in order to minimize damages to property of the United States.

(Signature)

(Signature of Geophysical Operator)

(Address including zip code)

(Address including zip code)



APPENDIX II-B

SECTION 2, PARAGRAPH (g) of the FEDERAL

OIL AND GAS LEASE (BLM Form 3120-7)



Section 2, Paragraph (g) of Federal Oil and Gas Lease, ^{1/} "Protection of Surface, Natural Resources, and Improvements"

(g) *Protection of surface, natural resources, and improvements.* The lessee agrees to take such reasonable steps as may be needed to prevent operations on the leased lands from unnecessarily: (1) causing or contributing to soil erosion or damaging crops, including forage, and timber growth thereon on Federal or non-Federal lands in the vicinity; (2) polluting air and water; (3) damaging improvements owned by the United States or other parties; or (4) destroying, damaging or removing fossils, historic or prehistoric ruins, or artifacts; and upon any partial or total relinquishment or the cancellation or expiration of this lease, or at any other time thereto when required and to the extent deemed necessary by the lessor to fill any pits, ditches and other excavations, remove or cover all debris, and so far as reasonably possible, restore the surface of the leased land and access roads to their former condition, including the removal of structures as and if required. The lessor may prescribe the steps to be taken and restoration to be made with respect to the leased lands and improvements thereon whether or not owned by the United States.

^{1/} BLM Form 3120-7



APPENDIX II-C

SURFACE DISTURBANCE STIPULATIONS

(BLM Form 3109-5)



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Area Oil and Gas Supervisor or
District Engineer (Address, include zip code)

SURFACE DISTURBANCE STIPULATIONS

Management Agency (name)

Address (include zip code)

1. Notwithstanding any provision of this lease to the contrary, any drilling, construction, or other operation on the leased lands that will disturb the surface thereof or otherwise affect the environment, hereinafter called "surface disturbing operation," conducted by lessee shall be subject, as set forth in this stipulation, to prior approval of such operation by the Area Oil and Gas Supervisor in consultation with appropriate surface management agency and to such reasonable conditions, not inconsistent with the purposes which this lease is issued, as the Supervisor may require to protect the surface of the leased lands and the environment.

2. Prior to entry upon the land or the disturbance of the surface thereof for drilling or other purposes, lessee shall submit for approval two (2) copies of a map and explanation of the nature of the anticipated activity and surface disturbance to the District Engineer or Area Oil and Gas Supervisor, as appropriate, and will also furnish the appropriate surface management agency named above, with a copy of such map and explanation.

An environmental analysis will be made by the Geological Survey in consultation with the appropriate surface management agency for the purpose of assuring proper protection of the surface, the natural resources, the environment, existing improvements, and for assuring timely reclamation of disturbed lands.

3. Upon completion of said environmental analysis, the District Engineer or Area Oil and Gas Supervisor, as appropriate, shall notify lessee of the conditions, if any, to which the proposed surface disturbing operations will be subject.

Said conditions may relate to any of the following:

- (a) Location of drilling or other exploratory or developmental operations or the manner in which they are to be conducted;
- (b) Types of vehicles that may be used and areas in which they may be used; and
- (c) Manner or location in which improvements such as roads, buildings, pipelines, or other improvements are to be constructed.



APPENDIX II-D

EXAMPLES of SITE-SPECIFIC

OIL and GAS LEASE

STIPULATIONS



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MINERAL LEASING STIPULATIONS

SURFACE MANAGEMENT REQUIREMENTS
FOR EXPLORATION, MINING, AND RECLAMATION

Stipulations may be selected from the following list for inclusion in permits or leases. Care must be exercised to assure that any stipulation used apply specifically to the need for such stipulation. Other stipulations may be drafted as needed to meet specific problems.

1. Activities employing wheeled or tracked vehicles shall be conducted in accordance with industry practices and in such a manner as to minimize surface damage.

2. Trail widths shall be kept to the minimum necessary and may not exceed feet. Surface may be cleared of timber, stumps, and snags. Care must be taken to avoid scarring or removal of ground vegetative cover.

3. Drainage systems shall not be blocked. No cuts or fills shall be made near or in streams which will result in siltation or accumulation of debris. All damage to streams must be repaired to the satisfaction of the authorized officer.

4. All operations must be conducted so as not to change character or cause pollution of streams, lakes, ponds, meadows, seeps, and marshes or cause damage to fish and wildlife resources.

5. Surface damage which causes soil movement and/or water pollution must be corrected to the satisfaction of the authorized officer.

6. Vegetation must not be disturbed within 300 feet of any waters designated in a (prospecting permit) (lease) (contract) except at authorized stream crossings.

7. No explosives may be used without prior written consent of the authorized officer.

8. Trails and campsites must be kept clean. All garbage and foreign debris must be eliminated by removal or burial. Burning is permissible only by prior written consent of the authorized officer.

9. Existing roads and trails shall be used whenever possible.

10. All survey monuments, witness corners, reference monuments, and bearing trees must be protected against destruction, obliteration, or damage. Any damaged or obliterated markers must be reestablished in accordance with accepted survey practices at expense of (permittee) (lessee).

The operator shall make every effort to prevent, control, or suppress any fire in the operating area.

Reports of uncontrolled fires must be immediately sent to the authorized officer or his representatives.

12. Fill all holes, pits, and excavations to the extent agreed in the approved mining plan and grade to the natural contour.

13. When surface operations are conducted, overburden or other waste shall be returned to the excavation, as set forth in the mining plan and except in instances when the district manager or state director determines that it would be desirable to use an excavation for the permanent impoundment of water or for other beneficial uses.

14. Disposal sites shall be selected and prepared so as to avoid downward percolation of pollutants into aquifers.

15. Disposal systems for solid and liquid wastes shall be designed and constructed so as to avoid landslides, control wind and water erosion, and establish conditions conducive to vegetative growth in the disposal area.

16. Casual accumulations of water on waste piles shall be avoided, and, where necessary, surface waters shall be directed around the piles.

17. Final grading of backfilled and other unconsolidated materials shall be so performed as to present a surface susceptible to vegetation or desired land form.

18. Excavations used for the permanent impoundment of water shall be graded to establish safe access to water for persons, livestock, and wildlife.

19. No solid rock face or bench face shall exceed feet in height. Appropriate access suitable for persons, livestock, and wildlife shall be provided for every feet of continuous rock or bench face.

20. Except for solid rock faces, bench faces, and excavations used for impoundment of water, those surface areas of the leased premises disturbed by operations conducted by the lessee shall be revegetated when their use is no longer required by the operator. (*Species, methods, and season of seeding or planting, etc. should be specified. These requirements should be practical and generally should not require vegetative rehabilitation beyond level of production.*)

21. Backfilling, final grading, and vegetation shall be completed within two (2) years after the completion or termination of the particular operation involved unless the district manager extends the time.

22. Drill holes shall be permanently sealed or filled as required by the district manager upon completion of operations.

23. Surface buildings, supporting facilities, and other structures which are not required for particular operations shall be removed and the area graded and revegetated.

24. All operations shall be conducted with a view to avoidance of range and forest fires and spontaneous combustion. Open burning of carbonaceous materials shall be in accordance with suitable practices for fire prevention and control.

25. The lease or contract premises shall be appropriately posted and fenced or otherwise protected to minimize injury to persons, livestock, and wildlife.

26. All access, haul, and other support roads and trails shall be constructed and maintained in such a manner as to control and minimize channeling and other erosion. Roads and trails shall be constructed only at locations approved by the authorized officer.

27. All roads constructed in the operation shall be closed by barricades or protected from erosion by placing of water control bars as required by the district manager.

28. All existing improvements including, but not limited to, fences, gates, cattle guards, roads, trails, culverts, pipelines, bridges, public land survey monuments, and water development and control structures shall be maintained in serviceable condition. Damaged or destroyed improvements shall be replaced, restored, or appropriately compensated for.

29. When agreed by lessee and lessor, the lease site shall be available for other public uses including, but not limited to, livestock, grazing, hunting, fishing, camping, hiking, and picnicking.

30. Topsoil shall be removed and stockpiled prior to removal of overburden. Stockpiles shall be located so as not to be covered by spoil materials and to facilitate their use in final backfilling and grading.

EXAMPLES OF SITE-SPECIFIC OIL AND GAS LEASE STIPULATIONS

1. All of the land in this lease is included in (recreation or special area, etc.). Therefore, no occupancy or disturbance of the surface of the land described in this lease is authorized. The lessee, however, may exploit the oil and gas resources in this lease by directional drilling from sites outside this lease. If a proposed drilling site lies on land administered by the Bureau of Land Management, a permit for use of the site must be obtained from the BLM District Manager before drilling or other development begins.
2. No access or work trail or road, earth cut or fill, structure or other improvement, other than an active drilling rig, will be permitted if it can be viewed from the (road, lake, river, etc.).
3. No occupancy or other activity on the surface of (legal subdivision) is allowed under this lease.
4. No occupancy or other surface disturbance will be allowed within _____ feet of the _____ (Road, Trail, River, Creek, Canal, etc.). This distance may be reduced when specifically approved in writing by the District Engineer, Geological Survey, with the concurrence of the District Manager, Bureau of Land Management.
5. No drilling or storage facilities will be allowed within _____ feet of (live water, the reservoir, etc.) located in (legal subdivision). This distance may be reduced when specifically approved in writing by the District Engineer, Geological Survey, with the concurrence of the District Manager, Bureau of Land Management.
6. No occupancy or other surface disturbance will be allowed on slopes in excess of _____ percent, without written permission from the District Engineer, Geological Survey, with the concurrence of the District Manager, Bureau of Land Management.
7. In order to (minimize watershed damage, protect important seasonal wildlife habitat, etc.) exploration, drilling, and other development activity will be allowed only during the period from _____ to _____. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Engineer, Geological Survey, with the concurrence of the District Manager, Bureau of Land Management.
8. In order to minimize watershed damage, during muddy and/or wet periods the District Manager, Bureau of Land Management, through the District Engineer, Geological Survey, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells.

9. The _____ (Trail/Road) will not be used as an access road for activities on this lease.
10. To maintain esthetic values, all semi-permanent and permanent facilities will be painted or camouflaged to blend with the natural surroundings. The paint selection or method of camouflage will be subject to approval by the District Engineer, Geological Survey, with the concurrence of the District Manager, Bureau of Land Management.

APPENDIX II-E

ARCHEOLOGICAL STIPULATION

To OIL and GAS LEASES

ISSUED IN OREGON



CULTURAL RESOURCE STIPULATIONS TO
OIL AND GAS LEASES
ISSUED IN OREGON

Prior to any operations under this lease, the Lessee will engage a qualified professional, acceptable to the Authorized Officer, to make a survey of the land to be disturbed or occupied. A certified statement, signed by the qualified professional, setting out the steps taken in the survey and the findings thereof as to the existence of antiquities or other objects of historic or scientific interest, shall be submitted to the Authorized Officer. If the statement indicates the existence of such materials which might be disturbed by operations under this lease, the Lessee shall take such mitigating actions as may be required by the Authorized Officer, including, but not limited to, archeological salvage or protective measures or avoidance of the site, to protect and preserve such objects. Such objects shall remain the property of the Lessor, or the surface owner if other than the Lessor.

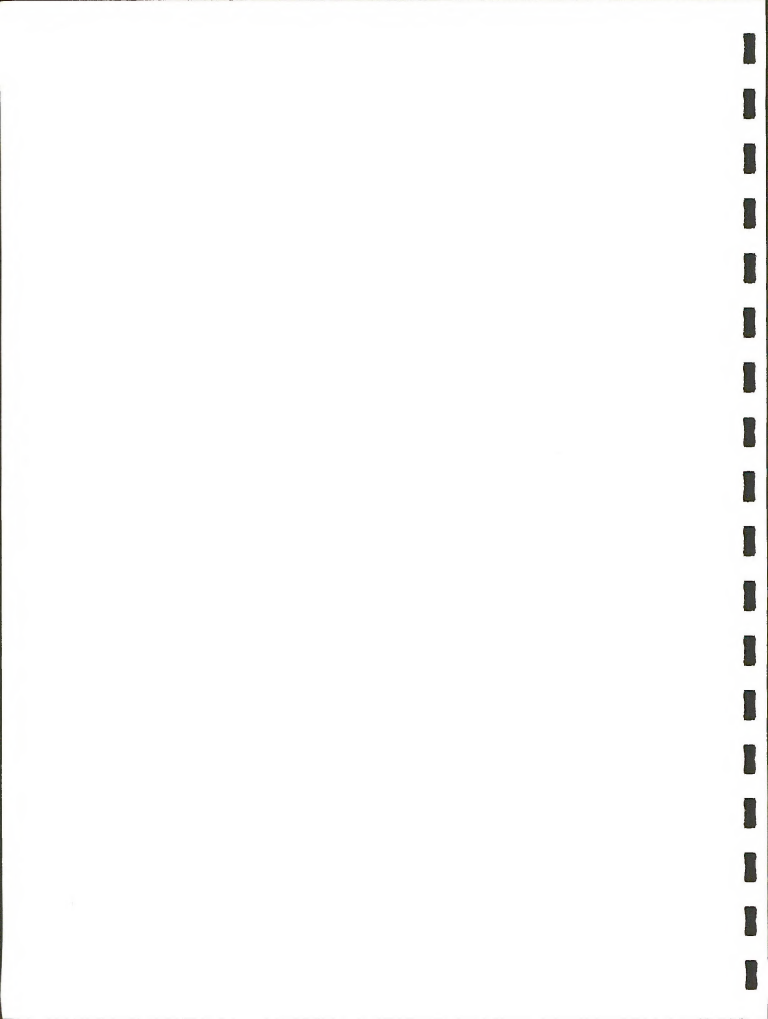
If a cultural resource is discovered during project operations, activities will be stopped until a survey of the materials is completed by a professional engaged by the lessee and acceptable to the Authorized Officer, including but not limited to archeological salvage or protective measures or avoidance of the site, to protect and preserve the materials. Such materials shall remain the property of the Lessor, or the surface owner if other than the Lessor.



APPENDIX II-F

U. S. GEOLOGICAL SURVEY

NTL - 2B



JUSTICE DEPARTMENT

Law Enforcement Assistance
Administration

NAL ADVISORY COMMITTEE ON CRIMINAL JUSTICE STANDARDS AND PRACTICES, PRIVATE TASK FORCE

Meeting

Notice is hereby given of a correction in the location of a meeting previously announced in the FEDERAL REGISTER.

An ad hoc working committee of the Private Security Task Force to the National Advisory Committee on Criminal Justice Standards and Goals is scheduled to meet Friday and Saturday, August 22 and 23, 1975, in Philadelphia, Pennsylvania. The meeting is still scheduled to convene at 9:00 a.m. Friday August 22, in the East Conference Room, 12th Floor, I.N.A. Building, at 1600 Arch Street. The location of Saturday's portion of the meeting has been changed to the Citizens' Crime Commission Office, 12 South 12th Street, also in Philadelphia.

Discussion at this meeting will focus upon the area of private security personnel training and education. The meeting will be open to the public.

For further information, please contact: Mr. William T. Archey, Director, Policy Analysis Division, Office of Planning and Management, LEAA, U.S. Department of Justice, 638 Indiana Avenue, N.W., Washington, D.C. 20531, 202/376-3762.

GERALD H. YAMADA,
Attorney-Advisor,
Office of General Counsel.

Doc. 75-21452 Filed 8-14-75; 8:45 am

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

OUTER CONTINENTAL SHELF OFFSHORE, SOUTHERN CALIFORNIA

Availability of Final Environmental Impact Statement Regarding Proposed Oil and Gas Lease Sale

Pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969, the Department of the Interior has prepared a final environmental impact statement relating to a proposed Outer Continental Shelf (OCS) general oil and gas lease sale of 207 tracts of submerged lands on the OCS offshore southern California.

The final environmental impact statement has been submitted to the Council on Environmental Quality and made available to government agencies and the public for review for a 30-day period from the date of availability. During this period, comments on any aspect of the final statement will be accepted and considered by the Department of the Interior. This comment period will overlap in part with the 60-day comment period for the OCS Programmatic FEIS. This is the last of three commenting periods provided by the Department of the Interior in the review of a site-specific environmental impact statement for this

proposed lease sale. The first two commenting periods were announced in the FEDERAL REGISTER editions of February 21, 1975 (40 F.R. 7692) (site-specific DEIS comment period from February 21 through May 23, 1975) and April 8, 1975 (40 F.R. 15917-15918) (comments on site-specific DEIS, and FEIS when issued, during 60-day OCS Programmatic FEIS comment period which commenced on July 21 and will extend through September 9, 1975).

Single copies of the final environmental statement can be obtained from the Office of the Manager, Pacific Outer Continental Shelf Office, Bureau of Land Management, 7603 Federal Building, 300 North Los Angeles Street, Los Angeles, California 90012, and from the Office of Public Affairs, Bureau of Land Management (1301), Washington, D.C. 20240.

Copies of the final environmental statement will also be available for review in the main public libraries in various coastal cities in the sale area.

CURT BERKLAND,
Director,

Bureau of Land Management.

Approved:
Stanley D. Doremsus,
Deputy Assistant Secretary
of the Interior.

August 1, 1975.

[FR Doc. 75-21092 Filed 8-14-75; 8:45 am]

Geological Survey

DISPOSAL OF PRODUCED WATER

Comments Requested

On May 13, 1975, the Geological Survey published in the FEDERAL REGISTER (Vol. 40, No. 83, pp. 20854-20858), a Notice which (1) suspended the performance dates prescribed in NTL-2 and NTL-2A; (2) advised of the intent to modify and combine the requirements of said Notices into a new NTL; and, (3) invited the submission of written comments in that regard by July 15, 1975.

Written and oral comments received by the Geological Survey have been carefully considered in the preparation of a proposed new Notice. All written comments are on file with the Geological Survey. Certain of these comments have been adopted or essentially satisfied, and the Geological Survey has made other changes on its own motion. The principal changes are discussed below:

FORMAT. The format has been changed to incorporate all requirements for the disposal of produced water into a single Notice.

APPROVAL AUTHORITY. Approval of applications and compliance enforcement has been made the responsibility of the District Engineer.

APPLICATIONS. The information to be submitted with the application for approval of each type disposal system has been specified.

DISPOSAL IN UNLINED PITS. The criteria under which the disposal of produced water in unlined pits will be permitted has been clarified.

TIME FOR COMPLIANCE. The compliance date has been extended to October 1, 1977.

Due to the number of changes in both format and content, the Geological Survey is soliciting written comments, suggestions, and objections concerning the requirements of the proposed Notice. Such comments are to be submitted to the Chief, Conservation Division, U.S. Geological Survey, Mail Stop 650, 12301 Sunrise Valley Drive, Reston, Virginia 22002, by September 12, 1975.

It is hereby certified that the economic and inflationary impacts of proposed Notice to Lessees and Operators, NTL-2B, have been carefully evaluated in accordance with OMB Circular A-107.

V. K. McKELVEY,
Director.

[NTL-2B]

DISPOSAL OF PRODUCED WATER

NOTICE TO LESSEES AND OPERATORS OF
FEDERAL AND INDIAN OIL AND GAS LEASES

This Notice supersedes NTL-2 and 2A dated -----, and March 1, 1975, respectively, and is issued pursuant to the authority prescribed in 30 CFR 221.4 and 221.32.

Lessees and operators of onshore Federal and Indian oil and gas leases or fee and State leases committed to federally-supervised unutilized or uncommenced areas shall comply with the following requirements for the handling, storing, or disposing of water produced from oil and gas wells on such leases.

I. Disposal Requirements and Applications for Approval of Disposal Methods

By October 1, 1977, all produced water must be disposed of by (1) injection into the subsurface; (2) lined pits; or (3) by other acceptable methods. All such disposal methods must be approved in writing by the District Engineer. Any method of disposal which has not been approved as of October 1, 1977, will be considered as an incident of noncompliance and will be grounds for issuing a shut-in order until an acceptable manner of disposing of said water is provided and approved by the District Engineer.

No additional approval is required for facilities previously approved by the Geological Survey which involve the disposal of produced water into the subsurface or in lined surface pits. Likewise, no further approval is necessary for existing injection facilities utilized for pressure maintenance or secondary recovery operations.

Lessees and operators who are presently disposing of water in unlined surface pits must timely file applications with the District Engineer for approval of present or proposed disposal methods.

Likewise, lessees and operators who are presently disposing of produced water in the subsurface or in lined surface pits without approval of the Geological Survey must also file applications for approval thereof by the District Engineer. At a minimum, such applications must specify the method of disposal and provide information concerning the quantity, quality, and source of the produced water, i.e., the daily average volume and a water analysis which includes total dissolved solids, Ph, and the concentration of chlorides and sulphates. Additional information may be required by the District Engineer.

A. Disposal in the Subsurface

If approval is requested for subsurface disposal, the lessee or operator must also furnish information with respect to:

1. The injection formation and interval.
2. The quality of the fluids in the injection interval, i.e., total dissolved solids.
3. The slug weight, grade, and casing points of all casing strings, the size hole drilled to accommodate each string, the amount and type of cement used in cementing the separate strings and the top of the cement behind each string.
4. The total and plugged back depth of the well.
5. The present or proposed method of completing the well for injection including the type and size of tubing and packer to be utilized, the setting depth of the packer, anticipated injection pressure, and information concerning any corrosion inhibitor fluid which is to be used in the tubing-casing annulus. Plans for monitoring the system to ensure that injection is confined to the injection interval.

In order to be approved, subsurface disposal must be confined to formations which contain connate water of similar or poorer quality than the injected water. In general, it will be required that subsurface disposal be accomplished through tubing utilizing a packer which is designed to hold pressure from above and below. The packer should be set at a depth where the casing is protected by competent cement but usually not more than 50 feet above the injection interval. Other procedures or methods of subsurface disposal may be approved by the District Engineer when justified by the lessee or operator.

B. Disposal in Lined Pits

Where approval is requested for surface disposal in a lined pit, the lessee or operator must also supply information with respect to:

1. Size and location of pit.
2. Evaporation rate for the area compensated for annual rainfall.
3. Method for periodic disposal of precipitated solids.
4. Type of material to be used for lining the pit and the method of installation.
5. Method to be employed for the detection of leaks.

The material used in lining pits must be durable, weather-resistant, and not

subject to deterioration when contacted by hydrocarbons, aqueous acids, alkalis, fungi, or other substances likely to be contained in the produced water. Lined pits constructed after the issuance of this Notice must have an underlying gravel-filled sump and lateral system or other suitable devices for the detection of leaks. The District Engineer shall be provided an opportunity to inspect the leak detection system prior to the installation of the pit liner.

C. Disposal in Unlined Pits

Surface disposal into unlined pits will not be approved unless the lessee or operator can show by application that such disposal meets any of the following criteria:

1. The water to be disposed of does not contain more than 5,000 ppm of total dissolved solids on an annual weighted average basis, provided that such water does not contain objectionable or toxic levels of any constituent.
2. The volume of water to be disposed of per facility does not exceed five barrels per day or the quantity of dissolved solids does not exceed 600 pounds on a monthly basis, whichever is greater.

For the purpose of determining the total dissolved solids in produced water, the Geological Survey will use the following formula:

$$\text{Pounds/Month} = \text{Parts/Million (PPM)} \times 60000 \times \text{Barrels/Month}$$

3. That all or a substantial part, of the produced water is being used for beneficial purposes. For example, produced water used for irrigation, livestock, or wildlife watering shall be considered as being beneficially used.

4. The specific method of disposal has been granted a surface discharge permit under the National Pollutant Discharge Elimination System (NPDES).

5. The water to be disposed of is not of poorer quality than the surface and subsurface water in the area which reasonably might be affected by such disposal.

Applications for approval of unlined surface pits must include the following additional information:

1. Size and location of the pit.
2. Evaporation rate for the area compensated for annual rainfall.
3. Percolation rate.
4. Where beneficial use is the basis for the application, written confirmation from the user(s). The water analysis submitted must also include the oil and grease content, temperature, chemical oxygen demand, and the concentration of other constituents which are toxic to animals, birds, or aquatic life.
5. If disposal is pursuant to an NPDES permit, a copy of the approved permit and the most recent "Discharge Monitoring Report."
6. Where an assertion is made that surface and subsurface fresh waters will not be affected by disposal in an unlined pit, the justification must include:
 - a. Analyses of all surface and subsurface waters in the area which might reasonably be affected by the proposed disposal.

b. Maps or plats showing the location of surface waters, fresh water wells, and existing water disposal facilities within two miles of the proposed disposal facility.

c. Reasonable geologic and hydrologic evidence showing that the proposed disposal method will not adversely impact on existing water quality or major uses of such waters, the depth of the shallowest fresh water aquifer in the area, and the presence of any impermeable barrier(s).

II. General Requirements for Permanent Surface Pits

Lined and unlined pits approved for water disposal shall:

1. Have adequate storage capacity to safely contain all produced water even in those months when evaporation rates are at a minimum.
2. Be constructed, maintained, and operated to prevent unauthorized surface discharges of water. Unless surface discharge is authorized, no siphon, except between pits, will be permitted.
3. Be fenced, when necessary, to prevent livestock or wildlife entry to the pit.
4. Be kept free from surface accumulations of liquid hydrocarbons by use of approved skimmer pits, settling tanks, or other suitable equipment.
5. Have a continuous embankment surrounding the pit to prevent entrance of surface water.

III. Temporary Use of Surface Pits

Unlined surface pits may be used for handling or storage of fluids used in drilling, redrilling, reworking, deepening, or plugging of a well provided that such facilities are promptly emptied and restored upon completion of the operations. Unless otherwise specified by the District Engineer, unlined pits may be used for well evaluation purposes for a period of 30 days.

Unlined pits may also be retained as temporary containment pits for use only in an emergency provided such pits have been approved by the District Engineer. Any emergency use of unlined pits shall be reported to the District Engineer as soon as possible and the pit shall be emptied and the liquids disposed of in an approved manner within 48 hours following such use, unless such time is extended by the District Engineer.

IV. Disposal Facilities for New Wells

With the approval of the District Engineer, produced water from wells completed after the issuance date of this Notice may be temporarily disposed of into unlined pits for a period of 30 days. During this period, an application for approval of the permanent disposal method along with all required water analysis and other information must be submitted for the District Engineer's approval. Failure to timely file an application within the time allowed will be considered an incident of noncompliance and will be grounds for issuing a shut-in order until the application is submitted. Disposal may be continued pending the District

Engineer's determination. Once the District Engineer has determined the proper method of disposal, the lessee or operator until October 1, 1977, or 60 days after receipt of the District Engineer's determination, whichever is the longer, in which to make any changes necessary to bring the disposal method into compliance.

V. Unavoidable Delay

A single extension of time not to exceed three months may be granted by the District Engineer where the lessee or operator conclusively shows by application that, despite the exercise of due care and diligence, he has been unable to timely comply with the requirements of this Notice, provided that such delay will not adversely affect the environment.

VI. Reports

All unauthorized discharges or spills from disposal facilities must be reported to the District Engineer in accordance with the provisions of NTL-3.

An annual report for each facility which identifies the total volume disposed of during the reporting period and a current water analysis which provides the same type of information required for approval of the original application.

VII. Compliance

Compliance with this Notice does not relieve a lessee or operator of the responsibility for compliance with more stringent applicable Federal or State water quality laws or regulations or with other written orders of the Geological Survey.

Area Oil and Gas Supervisor.

APPROVED: RUSSELL G. WATLAM,
Chief, Conservation Division.

(FE Doc 78-51475 Filed 8-14-76, 8:45 am)

GEOOTHERMAL RESOURCES OPERATIONAL (GRO) ORDER NO. 4

Central and Western Regions

Notice is hereby given that pursuant to 30 CFR 270.3, the Chief, Conservation Division, U.S. Geological Survey, has approved GRO Order No. 4 for the Central and Western Regions.

The purpose of GRO Order No. 4 is to provide General Environmental Protection Requirements for geothermal production operations in the Central and Western Regions.

The proposed Order was published in the FEDERAL REGISTER on January 28, 1975, (Vol. 40, No. 19, pages 4165-4169), with a solicitation for comments. All comments on the proposed Order were considered in preparing the final version of GRO Order No. 4. In addition, the Geological Survey, on its own motion, has revised some sections of the proposed Order to strengthen and clarify it.

Significant modifications made in the draft Order and the rationale for them are:

The introduction has been amended to reflect recent changes in the Freedom of Information Act (P.L. 93-487, as amended by P.L. 93-502), with respect to treatment of proprietary data submitted under this Order and to clarify the necessary acquisition of environmental baseline data one year prior to submission of a plan for production as required by 30 CFR 270.34(d).

Paragraph 2, LAND USE AND RECLAMATION, has been amended to consider vehicular traffic in environmentally fragile areas and temporary fencing, as needed, to facilitate revegetation in reclaimed areas.

Paragraph 4, RECREATION, has been amended to provide for the relocation of recreation sites and/or access routes thereto where such relocation is approved by the Supervisor with the concurrence of the Authorized Officer.

Paragraph 5, SLOPE STABILITY AND EROSION CONTROL, has been broadened to ensure that sites for wells and surface facilities in potentially unstable areas are designed by and constructed under the supervision of a qualified engineer or engineering geologist.

Paragraph 6, BIOTA, has been extensively revised and clarified with respect to soliciting expert advice and assistance from other Government agencies or private groups to detect adverse floral and faunal trends and to provide realistic mitigation measures. A section has been added which requires responsible replacement of species or their habitat which are significantly damaged by a lessee's operations.

Paragraph 8, SUBSIDENCE AND SEISMICITY, has been broadened to include seismicity. The introduction has been reworded for clarification of surveying and data required.

Subparagraph 8B, BENCH MARKS, has been modified to include periodic re-surveying of bench marks as necessary.

Subparagraph 8D, SEISMICITY, has been retitled and modified to require monitoring and remedial actions where production or injection results in induced seismicity.

Subparagraph 9A (1), LIQUID DISPOSAL, has been modified to allow liquid waste disposal by means other than injection if all applicable water quality standards are met.

Subparagraph 9A (3) has been retitled AIR QUALITY.

Subparagraph 9A (6), PITS AND SUMPS, has been reworded for clarification, and has been modified to require fencing of unattended pits and sumps when necessary to protect wildlife, livestock, and the public.

Subparagraph 9B (2), POLLUTION REPORTS, has been changed to eliminate distinction between "minor" and "substantial" spills, and now requires a uniform reporting procedure for all pollution incidents.

Subparagraph 9C (1), PLAN OF INJECTION, has been modified to eliminate the requirement that a lessee furnish a copy of his plan of injection to adjacent leasees.

Subparagraph 9C (3), INSPECTION, has been expanded to require the immediate cessation of injection operations in the event of an injection well failure which may damage surface or fresh water aquifers.

Paragraph 10, WATER QUALITY, has been clarified regarding water analysis requirements and to provide for a suspension of a production where a health hazard exists.

Subparagraph 11C, NOISE CRITERIA, has been clarified with respect to the conditions under which a noise level of 65 dB(A) may be exceeded.

It is hereby certified that the economic and inflationary impacts of Geothermal Resources Operational Order No. 4 have been carefully evaluated in accordance with OMB Circular A-107.

V. E. McEWEENY,
Director.

UNITED STATES DEPARTMENT OF THE
INTERIOR

GEOLOGICAL SURVEY CONSERVATION DIVISION

Geothermal Resources Operational
Order No. 4

Effective August 1, 1975

General Environmental Protection
Requirements

This Order is established pursuant to the authority prescribed in 30 CFR 270.11 and in accordance with 30 CFR 270.2, 270.34(b), 270.37, 270.41, 270.42, 270.43, 270.44, and 270.70. Lessees shall comply with the provisions of this Order. All variances from the requirements specified in this Order shall be subject to approval pursuant to 30 CFR 270.48. Enforcement in this Order to approvals, determinations, or requirements are to those given or made by the Area Geothermal Supervisor (Supervisor) or his delegated representative.

All data submitted under this Order shall be available for inspection in accordance with the Freedom of Information Act of 1968 (P.L. 90-609), as amended in 1974 (P.L. 93-502), except information such as geological, geophysical, reservoir, trade secrets, and financial data and interpretations of such data, maps, and related files for which a lessee requests proprietary status, provided that such status is determined by the Supervisor to be warranted and is approved by appropriate officials of the Department of the Interior.

Protection of the environment includes the lessee's responsibility to: conduct exploration and development operations in a manner that provides maximum protection of the environment; rehabilitate disturbed lands; take all necessary precautions to protect the public health and safety; and conduct operations in accordance with the spirit and objectives of all applicable Federal environmental legislation and supporting executive orders. Adverse environmental impacts from geothermal-related activity shall be prevented or mitigated through enforcement of applicable Federal, State, and local standards, and the application of exist-



APPENDIX II-G

U. S. GEOLOGICAL SURVEY

NTL - 3



UNITED STATES
DEPARTMENT OF THE INTERIOR
CONSERVATION DIVISION
PACIFIC AREA

NOTICE TO LESSEES AND OPERATORS OF PUBLIC DOMAIN
ACQUIRED AND INDIAN OIL AND GAS LEASES
(NTL-3)

This notice is issued pursuant to the authority prescribed in 30 CFR 221.7 which provides as follows:

"The supervisor shall prescribe the manner and form in which records of all operations, reports, and notices shall be made by lessees and operators."

Operators shall comply with the following reporting requirements:

POLLUTION REPORTS

The following incidents, when occurring on the subject leases, shall be reported to the appropriate District Engineer as soon as practical but within a maximum of 18 hours:

1. All surface discharges of pollutants (oil, saltwater, and other liquid, or combination thereof) in excess of 10 barrels;
2. All surface discharges of pollutants, regardless of size, which have entered or threaten to enter freshwater streams, lakes, ponds, navigable waters, or that occur in environmentally sensitive areas;
3. All blowouts (loss of control of any well);
4. All accidents involving life-threatening injuries or loss of life;
5. All fires or explosions which cause damage to property, equipment, loss of oil or gas, or result in injuries to personnel; and
6. All subsurface loss of production, or other contamination or pollution.

WRITTEN REPORTS

A written report shall be submitted in triplicate to the District Office no later than fifteen (15) days following the control or containment of any of the above incidents. Such reports shall provide information on:

1. The specific nature and cause of the incident;
2. The location where the incident occurred;
3. A description of the resultant damage and estimated volume of pollutant discharged;
4. The date and time of occurrence;
5. The length of time required to control the incident or contain the pollutants;
6. Actions that have been or will be taken to prevent recurrence of said incident;
7. Measures being taken to clean up pollutants;
8. The make or manufacturer, size, working and test pressure, date of installation, type of use, physical damage, etc. of any equipment causing or indirectly involved with the incident; and
9. Other Federal or State agencies notified of incident.

Spills of pollutants involving less than 10 barrels which have been contained and cleaned up without entering a freshwater stream, lake, or pond can be reported in writing without immediate verbal notification. Accidents not involving injury or loss of life may be reported in a similar manner. A sample reporting form is attached to this notice.

CONTINGENCY PLANS

A copy of any Spill Prevention Control and Countermeasure Plan (SPCC Plan) required by the (Federal) Environmental Protection Agency (EPA) under Part 112 of 40 CFR or other contingency plan must be submitted upon request of the appropriate District Engineer.

F. J. Schambeck

F. J. Schambeck
Oil and Gas Supervisor
Pacific Area

December 31, 1974

Date

Attached are a plat(s) and data showing District boundaries, office locations, addresses, and telephone numbers of District engineering personnel. (NOTE: Data to be compiled and attached by Area personnel.)

(Submit in triplicate)

To: District Engineer
U. S. Geological Survey
309 Federal Building
800 Truxton Avenue
Bakersfield, California 93301

From:

Subject: Pollution Report

Spill _____ Discharge _____ Blowout _____ Accident _____ Fire or
Explosion _____

1. Specific Nature and Cause of Incident
2. Location of Incident
3. Description of Resultant Damage and Volume of Pollutant Discharged
4. Date and Time of Occurrence
5. Length of Time Required to Control Incident or Contain Pollutants
6. Action Taken to Prevent Recurrence
7. Measures Taken to Clean Up Pollutants

8. The make or manufacturer, size, working and test pressures, date of installation, type of use, physical damage, etc., of any equipment causing or directly involved with the incident

9. Other Federal or State Agencies Notified of Incident

Signature _____ Date _____

Title _____

PACIFIC AREA

Bakersfield District Office:

U. S. Geological Survey
309 Federal Building
800 Truxton Avenue
Bakersfield, California 93301

Phone: 805-861-4186

Donald F. Russell, District Engineer
Home Phone: 805-871-4620

John P. Wagner, Assistant District Engineer
Home Phone: 805-872-2240

The Bakersfield District includes the states of Arizona, California, Idaho, Nevada, Oregon and Washington.



APPENDIX II-H

U. S. GEOLOGICAL SURVEY

NIL-4



UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
ONSHORE OIL AND GAS OPERATIONS
PACIFIC AREA

November 15, 1974

NOTICE TO LESSEES AND OPERATORS OF FEDERAL
ONSHORE OIL AND GAS LEASES
(NFL-4)

Royalty Payment on Oil and Gas Lost

This Notice supersedes the Notice issued July 25, 1974 concerning the payment of royalties on oil and gas lost.

Attached are copies of memorandums dated May 17 and May 30, 1974, from the Office of the Solicitor, Department of the Interior, concerning the payment of royalties on oil and gas lost.

Effective December 1, 1974, royalty or other compensation will be due on the value of all oil and gas which is produced pursuant to or for the benefit of all onshore Federal oil and gas leases except that gas production specifically exempted by section 3 of this Notice. Onshore Federal leases subject to this Notice are those which are now in effect and those subsequently issued pursuant to the Mineral Leasing Act of February 25, 1920, as amended and supplemented (30 U.S.C. 181-263) (except those previously issued pursuant to sections 18 or 19 thereof), the Mineral Leasing Act for Acquired Lands of August 7, 1947 (30 U.S.C. 351-359), and the implied authority of the Executive Branch as defined in the Attorney General's Opinion of April 2, 1941 (Vol. 40 Op. Atty. Gen. 41).

Oil production subject to royalty shall include (1) that oil which is produced and sold either on a lease basis or that which is allocated to a lease under the terms of an approved communitization or unitization agreement; (2) that oil which is used on a lease, communitized tract, or unitized area for production purposes; (3) that oil which is lost in well tests, spills, blowouts, and fires which occur on a lease, communitized tract, or unitized area; and, (4) that oil which is unavoidably or otherwise lost on a lease, communitized tract, or unitized area.

Gas production subject to royalty shall include (1) that gas (both dry and casing-head) which is produced and sold either on a lease basis or that which is allocated to a lease under the terms of an approved communitization or unitization agreement; (2) that gas which is vented or flared in well tests (drill-stem, completion, or production) on a lease, communitized tract, or unitized area; and, (3) that gas which is otherwise vented or flared on a lease, communitized tract, or unitized area with the prior written authorization of the Area Oil and Gas Supervisor (Supervisor).

Where gas (both dry and casing-head) is lost (1) because of line breaks, equipment malfunctions, blowouts, and fires that occur on a lease, communitized tract or unitized area due to negligence, failure to take reasonable precautions, or as a result of the violation of lease terms, applicable regulations, provisions of the approved operating plan, or the written orders of the Supervisor; or, (2) as a result of the venting or flaring of gas through well tests, or otherwise, on a lease, communitized tract, or unitized area without the prior approval of the Supervisor, shall not be considered unavoidably lost and the compensation due the United States will be the full value, or allocated portion thereof, of the gas so wasted.

The volume of oil and gas lost and the amount of royalty or compensation accruing to the United States as a result of these losses shall be reported monthly on Lessee's Monthly Report of Sales and Royalty, Form 9-361. Payment of royalty or compensation shall be made on these volumes of oil and gas subject to the determination by the Supervisor that such royalty or compensation values are properly calculated pursuant to 30 CFR 221.12 and 30 CFR 221.35.

The Supervisor may require additional measurement equipment at any production facility where he considers present methods to be inadequate to satisfy the purposes of this Notice.

The operator shall comply with the following specific requirements:

1. Volume Determination

A. Oil or Gas Lost After Measurement

When the amount of oil or gas lost has been measured pursuant to 30 CFR 221.43 or 221.44, that measurement shall be the basis for the volume determination.

B. Oil or Gas Lost Prior to Measurement

The volume of oil or gas lost prior to measurement shall be determined as follows:

- (1) Emergencies. During emergency situations, the volume of oil or gas lost shall be estimated by comparison with the last measured throughput from the production facilities on the lease, communitized tract, or unitized area where the loss occurs considering such factors as the duration of the emergency, individual well tests, daily lease production rates, historical production data, or by such other methods as may be approved by the Supervisor.
- (2) Well Purging and Evaluation Tests. The results of previous production tests of the well from which the oil or gas is lost and of other wells in the area and, the duration of the test period shall form the basis

for determining the volume of oil or gas lost during well evaluation tests. The volumes of oil or gas lost as a result of well purgings shall be similarly determined, unless more reliable information is available.

- (3) Venting or Flaring. The volume of casing-head gas vented or flared shall be estimated on the basis of the latest available gas-oil ratio tests and the most recent data concerning the daily oil production rates of the oil wells which produce into the facility where the venting or flaring occurs. The Supervisor may require additional testing if no recent well tests have been made. The volume of dry gas vented or flared shall be estimated by comparison with the last measured throughput of the facility which occurred without venting or flaring and by consideration of such factors as individual well tests, daily production rates, and historical production data or, if such information is not available, by such other method as shall be approved by the Supervisor.

2. Value Determination for Royalty or Compensation Purposes

A. Oil or Gas

In computing the royalty or other compensation due on oil or gas which is lost, the value shall be computed in the same manner as the Supervisor calculates the value of other oil or gas sold from the lease, communitized tract, or unitized area, field, or general area in accordance with 30 CFR 221.47.

3. Gas Production on Which Royalty Will Not Accrue

A. Lease Use

No royalty will be due on gas (dry or casing-head) that is used on or for the benefit of the leased land provided that it is used for production purposes as provided below:

- (1) Reinjected Gas. Gas which is produced pursuant to a lease, communitization agreement, or unitization agreement, and which is reinjected in accordance with a plan first approved by the Supervisor into a well or formations subject to that lease or agreement to aid in the recovery of oil or gas in a manner which renders that gas reasonably subject to later extraction, will not be subject to the payment of royalty until finally produced and not so reinjected. However, the operator shall report monthly to the Supervisor the volume of gas so produced and reinjected on Lessee's Monthly Report of Operations, Form 9-329.
- (2) Other Use. Gas produced pursuant to a lease, communitization agreement, or unitization agreement and used, with the prior approval of the Supervisor, for operations or

production purposes on that same lease, communitized tract, or unitized area shall not be subject to royalty if that gas is (1) used as a fuel in lifting oil or gas; (2) used as a fuel in heating oil or gas for the purpose of placing it in a merchantable condition; (3) used as a fuel in compressing gas for the purpose of placing it in a marketable condition; or, (4) used for the purpose of operating automatic valves at production facilities.

B. Unavoidably Lost Gas

No royalty shall be collected on gas which is unavoidably lost as defined below:

- (1) Gas Vapors. Gas vapors which are released from storage tanks or other low-pressure production vessels and which are not collected by a vapor recovery unit or similar system shall be considered unavoidably lost when it is not feasible to require the collection or the measurement of such vapors.
- (2) Other Gas. Gas which is lost because of line breaks, equipment malfunctions, blowouts, fires, and otherwise shall be considered unavoidably lost and no royalty or compensation shall accrue unless (i) there has been negligence on the part of the lessee, or (ii) the lessee has failed to take all reasonable precautions against such loss, or (iii) there has been a violation of the lease terms, applicable regulations, provisions of the approved operating plan, or the written orders of the Supervisor (see paragraph 2, page 2 hereof). Where gas is intentionally flared or vented, the gas shall not be considered unavoidably lost and royalty or compensation shall accrue.

4. Additional Royalty Obligations

It is anticipated that a notice of proposed rulemaking will be published shortly in the Federal Register. That notice will be for the purpose of advising interested parties of an intent to revise those provisions of the current onshore oil and gas operating regulations (30 CFR Part 221) which allow produced gas to be used royalty free on the lease for production purposes and those provisions which preclude the payment of royalty on that gas which is determined to have been unavoidably lost.

In addition, all lessees are advised that on August 26, 1974, the Chairman, Conservation and Natural Resources Subcommittee of the House Committee on Government Operations requested the Comptroller General to determine the validity of the Geological Survey's past practice of exempting from the payment of royalty that gas which is used for production purposes or unavoidably lost. Moreover, the Comptroller General was asked, if the past practice is ruled invalid, whether royalty should be collected retroactively.

Should the Department subsequently decide that royalty payments are required for that gas used for production purposes or unavoidably lost, the exemptions granted by sections 3(A)(2) and 3(B)(2) hereof will no longer be allowed. Because it is possible that royalty will be required to be paid retroactively, lessees should keep records of the volume of the gas so used or unavoidably lost and which is presently exempt from royalty under the provisions of sections 3(A)(2) and 3(B)(2).

F. J. Schambeck

F. J. Schambeck
Oil and Gas Supervisor
Pacific Area

Attachments



APPENDIX II-I

U. S. GEOLOGICAL SURVEY

NIL-6



of the Nevada State Multiple Use Advisory Board will be held December 10 and 11, 1975 at 9 a.m. at the Plowman Inn, 221 B. Virginia Street, Reno, Nevada.

The Nevada State Multiple Use Advisory Board was established to advise and counsel the Bureau of Land Management and the Secretary of the Interior on national resource land management.

This will be the first meeting of the newly appointed board under its charter approved by the Secretary of the Interior on August 5, 1975. The purpose of the meeting is to orient the board members to BLM's programs, to elect officers and to discuss necessary committees. The following topics will be discussed during the meeting: Role and organization of the board including committees, current issues nationally and in Nevada, BLM Nevada district organization study, current legislation affecting BLM and the board's perceptions of the BLM.

The meeting is open to the public. Interested persons may make oral presentations to the board or file written statements. Such requests should be made to the office listed below at least 5 days prior to the meeting.

Further information concerning this meeting may be obtained from Carl A. Hildum, Chief, Public Affairs Staff, Bureau of Land Management, Nevada State Office, Room 5000 Federal Building, 300 South Street, Reno, Nevada 89502, telephone 755-5459.

Minutes of the meeting will be available for public inspection and copying for weeks after the meeting at the Bureau of Land Management, Nevada State Office, Room 5041, Federal Building, 300 South Street, Reno, Nevada 89502.

E. I. ROWLAND,
State Director, Nevada.

NOVEMBER 3, 1975.

[FR Doc. 75-30244 Filed 11-10-75; 8:45 am]

[OR 1853 (Wash.)]

WASHINGTON

Notice of Termination of Proposed Withdrawal and Reversion of Lands

OCTOBER 30, 1975.

Notice of an application Serial No. OR 853 (Wash.), for withdrawal and reversion of lands was published as Final Reviser Document No. FR 75-6053 1 page 12131 of the issue for March 17, 1975. The applicant agency has cancelled a application which involved the lands described below. Therefore, pursuant to regulations contained in 43 CFR 81.2-5(b), such lands will be at 10 a.m. 1 December 5, 1975, relieved of the restrictive effort of the above-mentioned application.

The lands involved in this notice of termination are:

WILLAMETTE MERIDIAN WENATCHEE NATIONAL FOREST Liberty Historical District

T. 20 N., R. 17 E.

Sec. 1, portions of SW $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$, NW $\frac{1}{4}$, and NW $\frac{1}{4}$, SW $\frac{1}{4}$.

Sec. 2, portions of NE $\frac{1}{4}$, SW $\frac{1}{4}$.

Further described as follows:
Beginning at Corner No. 1, the $\frac{1}{4}$ Section Corner continues to rock 1 and 2, T. 20 N., R. 17 E.

From Corner No. 1 by miles and bounds:
N. 73° 57' E., 1065.80 feet to Corner No. 2; N. 90° 00' E., 346.54 feet to Corner No. 3; S. 0° 50' E., 129.49 feet to Corner No. 4; S. 67° 36' W., 256.95 feet to Corner No. 5; S. 24° 13' W., 128.93 feet to Corner No. 6; S. 60° 35' W., 1372.50 feet to Corner No. 7; N. 30° 53' W., 291.00 feet to Corner No. 8; S. 61° 48' W., 238.00 feet to Corner No. 9; S. 65° 05' W., 307.23 feet to Corner No. 10; N. 0° 00' E., 342.10 feet to Corner No. 11; N. 73° 57' E., 708.97 feet to Corner No. 1; the place of beginning.

The area described contains approximately 23.76 acres in Kittitas County, Washington.

HAROLD A. BERENNS,
Chief, Branch of Lands
and Minerals Operations.

[FR Doc. 75-30244 Filed 11-10-75; 8:45 am]

Geological Survey

[NTL-6]

FEDERAL AND INDIAN OIL AND GAS LEASES

Approval of Operations

Notice is hereby given that the Geological Survey proposes to formalize its procedures for approval of all applications for permits to conduct operational or construction activities on onshore Federal and Indian oil and gas leases. The proposed Notice also prescribes the information which a lessee or operator must submit in support of applications to conduct operations.

Interested parties may submit written comments, objections, and suggestions to the Chief, Conservation Division, U.S. Geological Survey, National Center, Mail Stop 650, 12201 Sunrise Valley Drive, Reston, Virginia 22092, on or before December 14, 1975.

It is hereby certified that the economic and inflationary impacts of proposed Notice to Lessees and Operators, NTL-6, have been carefully evaluated in accordance with OMB Circular A-107.

V. E. MCKEEVEY,
Director.

NOTICE TO LESSEES AND OPERATORS OF FEDERAL AND INDIAN ONSHORE OIL AND GAS LEASES (NTL-6)

Pursuant to the National Environmental Policy Act of 1969 (43 Stat. 852), the Department of the Interior is charged with the responsibility of assuring that oil and gas operations on leased lands

under its jurisdiction are conducted with due regard for the protection of the environment. Therefore, all operations which are conducted on onshore Federal and Indian oil and gas lease must conform to the requirements of this Notice as well as those contained in the lease and in the Oil and Gas Operating Regulations, Title 26 CFR Part 221.

I. GENERAL

In order that the environmental impact of proposed operations may be properly evaluated, all applications to conduct leasehold operations or construction activities must be accompanied by an appropriate surface use plan. As a minimum, such applications and surface use plans must provide a detailed description of the technical aspects of the proposed operation or activity, the magnitude of surface disturbance involved, and the procedures to be followed in rehabilitating the surface once the operation or construction activity has been completed. Specific requirements in this regard are set forth in Sections II(B), III, and V hereof. One copy of the surface use plan must be attached to each copy of the application to conduct operations or construction activities.

Applications to conduct operations or construction activities with attached surface use plans should be filed at least 30 days in advance of the contemplated starting date of any operation or construction activity in order to allow sufficient time in which to schedule and conduct, if necessary, a joint field inspection by appropriate personnel of the Geological Survey, the Federal surface management agency, the lessee or operator, and, if practical, the lessee's or operator's contractors and subcontractors who will perform the work. However, the early filing of an application is no guarantee that approval thereof will be granted within the 90-day period, as environmental considerations or current workload in the affected Federal agencies may result in further delay.

Lessees and operators have the responsibility to see that their exploration, development, production, and construction operations are conducted in a manner which: (1) affords maximum safeguards for the environment; (2) results in the proper rehabilitation of disturbed lands; and, (3) assures the protection of the public health and safety. In that regard, lessees and operators will be held fully accountable for their contractors' and subcontractors' compliance with the applicable laws, regulations, and the requirements of the approved permit and surface use plan.

All approvals of proposed operations as well as subsequent instructions and regulation thereof will come from the District Engineer or Area Oil and Gas Supervisor of the Geological Survey. However, the Federal surface management agency will establish the rehabilitation requirements and will be available for consultation during rehabilitation

operations. Names, addresses, and phone numbers of appropriate personnel of the Geological Survey and the Federal surface management agency, as well as the surface use area, will be furnished by the lessee or operator on its application. A copy of the permit and surface use plan.

Lessees and operators, as well as their contractors and subcontractors, must not commence any operation or construction activity on a lease without the prior approval of the appropriate official of the Geological Survey. Likewise, the terms and conditions of an approval of permit and surface use plan may not be altered unless the Geological Survey has approved an amended or supplemental permit and/or plan covering any such modifications. Approval of subsequent operations is addressed in Section V of this notice.

II. DRILLING OPERATIONS

A. PRELIMINARY ENVIRONMENTAL REVIEW

A preliminary environmental review will be required on all future drilling operations prior to entry on the ground for the purpose of defining the location, access roads, and other surface use areas. The lessee or operator, upon finalizing plans to drill but prior to the actual surveying, must file with the Geological Survey's District Engineer or Area Oil and Gas Supervisor and the appropriate office of the involved Federal surface management agency, a topographic map (or equivalent) of a scale not less than 1 inch = 1 mile which shows the preferred location and the general topographic features in the area. This will permit the surface management agency to estimate the lessee's or operator's expenditure of time and money for surveys, to review its records for any potential conflicts with other resource values. If conflicts are noted, a joint conference or field inspection, as appropriate, by the Geological Survey, the Federal surface management agency, and the operator may be scheduled to resolve problem areas.

B. APPLICATION FOR PERMIT TO DRILL

All drilling operations must be conducted in accordance with a permit or development plan which has the prior approval of the District Engineer or Area Oil and Gas Supervisor.

The permit or development plan filed for approval will consist of the application for permit to drill on Form 9-230C, and a multi-point surface use and operations plan. Where private surface is involved, it should also include a copy of the written agreement between the lessee or operator and the surface owner or a letter setting forth the rehabilitation requirements of the surface owner. The requirements for surface use and operations plans and the rehabilitation of private surface are contained in Sections III and VI, respectively, of this notice.

The application for permit to drill must provide information concerning (1) the location in feet and direction from the nearest line of an established boundary as determined by a registered sur-

vveyor or engineer; (2) the elevation above sea level of the ground and derrick floor at rotary Kelly bushing; (3) the geologic name of the surface formation; (4) the type of tools and other equipment to be utilized; (5) the proposed drilling depth; (6) the estimated tops of important geologic markers; (7) the estimated depths at which water, oil, gas, or other mineral deposits are expected to be encountered; (8) the proposed casing program including the size, grade, weight, and safety factors for collapse, tension, and burst of each string; (9) the proposed casing cement schedule, grade, and amount and type of cement; (10) the anticipated pressures and equipment which is to be used and a schematic diagram thereof; (11) the type and characteristics of the proposed drilling medium or mediums to be employed; (12) the testing, logging, and coring programs to be followed; (13) any abnormal pressures or temperatures expected to be encountered or potential hazards such as hydrogen sulfide gas and plans for mitigating such hazards; (14) the anticipated starting date and duration of the operation; and, (15) any other facets of the proposed operation which are pertinent to the application. The District Engineer or Area Oil and Gas Supervisor may require additional information as warranted.

A copy of approved application for permit to drill and the accompanying surface use and operations plan shall be posted at the derrick site.

III. MULTI-POINT SURFACE USE AND OPERATIONS PLAN

A surface use and operations plan in sufficient detail to permit a complete appraisal of the environmental effects associated with the proposed project must be submitted. In accordance, to the District Engineer or Area Oil and Gas Supervisor with the application for permit to drill.

The Geological Survey will send a copy of such plan to the Federal surface management agency. When possible, a preliminary field development plan or drilling schedule should also be submitted to allow lead time for evaluating environmental considerations, resource conflicts, and land use planning alternatives.

The plan shall in its context provide for and assure adequate protection of surface resources, other environmental components, and include adequate provisions for reclamation of disturbed lands. The plan shall be developed in conformity with the provisions of the lease, attached stipulations, and the guidelines provided by this Notice. In developing the plan, the lessee or operator will make use of such information as is available from the Federal surface management agency concerning the surface resources, environmental considerations, and land reclamation procedures. The plan will be reviewed for adequacy by the Geological Survey and the Federal surface management agency. Approval of proposed activities that would result in hazardous

or extensive damage to the environment will be withheld until the plan is modified, additional mitigating measures are provided, or alternatives to the proposed action are agreed upon.

A. GUIDELINES FOR THE PREPARATION OF SURFACE USE AND OPERATIONS PLANS

In the preparation of surface use and operations plans, lessees and operators should adhere closely to the following:

1. **Existing roads.** A possible map (USGS topographic or county road map) of a scale not less than 1 inch = 1 mile shall be used for locating the proposed well site in relation to a town or other locatable reference point. The proposed route to the location including appropriate distances from the reference point to the point where the access road exits the highway or county road shall be shown. All proposed access roads shall be appropriately labeled or color coded. Additionally, all existing roads within a radius of three miles from the location of a proposed exploratory well should be shown. An exploratory well is a well which is located two miles or more from the boundary of a known geologic structure or a productive well. For all other drilled (development wells) existing roads within a one-mile radius of the location should be shown.

Any plans for the improvement and/or maintenance of existing roads should also be stated.

Information required by item Nos. 3 and 4 of this subsection may also be shown on this map if appropriately labeled.

2. **Planned access roads.** Information in this regard is to be submitted on a large scale map (not less than 4 inches = 1 mile) and shall appropriately identify all permanent and temporary access roads that are to be constructed, or reconstructed in connection with the drilling and production of the proposed well. Width, maximum grade, turnouts, drainage design, location and size of culverts, and surfacing material, if any, shall be stated. At the time of submission, the location of all proposed new or reconstructed roads shall be stated. However, modification of proposed road design may be required after the plan is accepted.

Information should also be provided to indicate where existing fences will be cut and whether gates or endditches will be used. Additionally, the discussion should make reference to any existing gates which are to be replaced by cattle-gates.

3. **Location of existing wells.** This information should be submitted on a map of suitable scale and include all wells (producing, abandoned, temporary abandoned, shut-in, injection, disposal, and drilling) within a two-mile radius of the proposed location of an exploratory well or within a one-mile radius of the proposed location of a development well.

4. **Intersecting roads to well locations.** The information submitted in this regard should be shown on a map of suitable scale and include all existing and proposed lateral roads to all well locations

one-mile radius of the proposed

location of tank batteries, production facilities, and production, gathering, and service lines. For the tank batteries, production facilities and production, gathering, and service lines within a one-mile radius of the proposed location which are owned or controlled by the lessee or operator should be shown on a map or plat of suitable scale. The type of each present facility and the exact nature of each existing line (oil, gas, gas gathering line, injection line, or water disposal line) should be identified and it should be noted which, if any, of said lines are buried. If new facilities (tank battery, other production equipment, and lines) are contemplated in the event production is established and these facilities are to be located at other than on the well site itself, the map or plat furnished in this regard must also indicate the location of all proposed new facilities. Future prospects for additional development of the leasehold should be considered in the siting of new facilities. However, final approval to construct such new facilities will not be granted until after detailed plans have been submitted and evaluated pursuant to Section V hereof.

6. *Location and type of water supply (trough, creek, lakes, ponds, and wells).* This information may be shown by quarter-quarter section on a plat or map of suitable scale or may be a written description. The source of all water to be drilled on the proposed well should be stated. The method of transporting the water shall be stated and any access roads needed to haul the water will be described in Items Nos. 1 or 2, as appropriate. However, the Survey's approval of the surface use and operations plan does not relieve the lessee or operator from obtaining any other authorization which may be required for the use of such water. Moreover, if a water supply well is to be drilled on the lease, it must be so stated under this item and the District Engineer or Area Oil and Gas Supervisor may require the filing of a separate application for permit to drill.

7. *Source of construction materials.* This information may be shown by quarter-quarter section on a plat or map of suitable scale or may be a written description. The proposed source, characteristics, and use of all construction materials such as sand, gravel, stone, and soil material should be stated. Any access roads needed to haul such materials should be described in Item No. 1 or 2, as appropriate.

8. *Methods for handling waste disposal.* A brief, written description should be given of the methods and location for safe containment and disposal of each type of waste material (cuttings, paraffin, salts, chemicals, and sewage) which result from the drilling of the proposed well. Likewise, the narrative should include plans for the eventual disposal of any fluids and any produced oil or gas recovered during testing operations.

9. *Ancillary facilities.* The plan or subsequent amendments to such plans shall identify all ancillary facilities such as camps and airstrips as to their location, land area required, and the methods and standards to be employed in their construction. Such facilities shall be shown on a map of suitable scale and shall be staked on the ground.

10. *Well site layout.* A plat of suitable scale (not less than 1 inch = 50 feet) including cross section diagrams of the drill pad and the relation to topography are required. The plat should also include the proposed location of the mud tanks, plus (reserve, burn, and trash), pipe racks, access road, burn-around areas, parking areas, living facilities, soil material storage, and the orientation of the rig with respect to the pad and other facilities. Plans to line the reserve pit should be indicated.

The exterior dimensions of the pad and reserve pit shall be specified and will be staked on the ground.

11. *Plans for restoration of the surface.* State the proposed program for surface restoration upon completion of the operation such as stockpiling topsoil, leveling, reseed, and seed mixture. Such plans will be reviewed for adequacy by the appropriate Federal surface management agency. A proposed timetable for the commencement and completion of rehabilitation operations must be provided.

12. *Other information.* Include a general description of the topography, soil characteristics, formation lithologies, geologic features, flora, fauna, and other aspects of the area such as other surface use activities.

The surface ownership (Federal, Indian, State, or private) at the well location and for all lands which are to be crossed by newly constructed roads should be indicated.

Any available information which would be useful in evaluating the environmental impact of the proposed operation, including proximity to steep hillsides and gulches, water wells, ponds, lakes, or streams, occupied dwellings, or other facilities, and archeological, historical, or cultural sites should be included. Information concerning required cuts and fills during the construction of roads and the location should also be furnished.

All construction practices necessary to accommodate potential geologic hazards should be discussed under the appropriate Items of the plan.

13. *Lessee's or operator's representative.* Include the name, address, and phone number of the lessee's or operator's field representative who is responsible for assuring compliance with the approved surface use and operations plan.

14. *Certification.* The following statement is to be incorporated in the plan and must be signed by the lessee's or operator's field representative who is identified in Item No. 13 of the plan:

I hereby certify that I, or per me, under my direct supervision, have reviewed the pro-

posed drillsite and access roads; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by _____ and its contractors, subcontractors in conformity with this plan and the terms and conditions under which it is approved.

Date

Name and Title

IV. ENVIRONMENTAL ANALYSIS REQUIREMENTS

When an application for permit to drill is received, an on-site inspection normally will be required. If made, it will include the District Engineer or Area Oil and Gas Supervisor, the lessee or operator, the Federal surface management agency, and others including the dirt contractor, as appropriate. The purpose of this inspection will be to select the most feasible and environmentally acceptable areas for well sites (considering geologic factors and Federal and State regulations), access roads and other proposed surface measures. Accordingly, lessee and operator are encouraged to designate future development or drilling sites so that several locations may be inspected at one time.

When such an inspection is made, an environmental study will usually be prepared by the District Engineer or Area Oil and Gas Supervisor. Soil analysis will identify methods for minimizing the potential adverse or environmental effects associated with the proposed operation and will be the basis of the approving official's determination as to whether approval of the proposed activity would constitute a major Federal action significantly affecting the quality of the human environment as defined by Section 102(2)(C) of the National Environmental Policy Act of 1969. Any surface protection and rehabilitation requirements specified by the Federal surface management agency will normally be made a part of any subsequently approved permit or end-of-the-surface use and operations plan.

Due to the probability of a required on-site inspection, the required input from other Federal agencies, and the variations in the level of drilling activity, lessee and operators are encouraged to file application well in advance of the time when it is desired to commence operations.

V. APPROVAL OF SURFACE OPERATIONS

Before repairing, deepening, or conditioning a well, a detailed written statement of the plan of work must be filed on Form 9-331 or 9-331C with the District Engineer or Area Oil and Gas Supervisor and approval obtained before the work is started. Any proposed change in any such plan of work must also receive the prior approval of the District Engineer or Area Oil and Gas Supervisor.

Lessee and operators are also required to submit for the approval of the District Engineer or Area Oil and Gas Supervisor

NOTICES

When prior to undertaking any new construction, reconstruction, or alteration of existing facilities, including roads, dams, lines or other production facilities on any lease when additional surface disturbance will result. Sufficient information must be submitted to permit a proper evaluation of the proposed surface disturbing activities as well as any planned accommodations necessary to mitigate potential adverse environmental effects.

The environmental analysis procedures discussed in Section IV of this Notice will also apply to such subsequent operations which have the potential for significant surface disturbance although these requirements may be somewhat less in established producing areas.

VI. AGREEMENT FOR REHABILITATION OF PRIVATELY-OWNED SURFACE

Where the surface is privately owned or is owned by an Indian allottee, each application for permit to drill or to conduct other surface disturbance activities, shall contain information concerning the surface owner's rehabilitation requirements. A written agreement between the lessee or operator and the surface owner is not necessary if a letter from the lessee or the operator setting forth the surface owner's rehabilitation requirements is furnished. Payment of damages in lieu of full restoration will not be an acceptable substitute for a normal cleanup and restoration program.

Arrangements have been made, or if information concerning such arrangements is not furnished, the District Engineer or Area Oil and Gas Supervisor will request the Federal surface management agency to recommend the necessary surface restoration requirements. In such cases, the lessee or operator will be expected to comply with these rehabilitation requirements, if any, regardless of the arrangement made with the surface owner. Provided, however, that subsequent reasonable requests by the surface owner that pits, roads, and other facilities be left intact may be honored. If written proof of prior arrangements has been provided, the Federal surface management agency will be asked to recommend surface rehabilitation requirements to the District Engineer or Area Oil and Gas Supervisor or giving full consideration to the preferences of the landowner.

VI. WELL ABANDONMENT

No well abandonment operations may be commenced in the absence of the prior approval of the District Engineer or Area Oil and Gas Supervisor. However, the Federal surface management agency may request additional surface rehabilitation measures at abandonment and these requirements are normally made a part of the Geological Survey's approval of abandonment. Upon completion of abandonment and rehabilitation operations, the lessee or operator should advise the District Engineer or Area Oil and Gas Supervisor that the location is ready for inspection. However, final abandonment will not be approved until

the surface rehabilitation work required by the drilling permit or abandonment notice has been completed and the required vegetation is established to the satisfaction of the appropriate Federal surface management agency.

VII. WATER WELL CONVERSION

The complete abandonment of a well which has encountered usable fresh water will not be approved if the Federal surface management agency determines it wants to acquire the well. If, at abandonment, the Federal surface management agency elects to assume further responsibility for the well, it will reimburse the lessee or operator for the cost of any recoverable casing left in the hole solely because it is to be completed as a water well. The lessee or operator will abandon the well to the base of the deepest fresh water zone of interest as required by the District Engineer or Area Oil and Gas Supervisor and will complete the surface cleanup and rehabilitation as required by the drilling permit or abandonment notice immediately upon completion of the conversion operations.

[PR Doc 75 29641 Filed 11-10-75; 8:45 am]

National Park Service BOSTON NATIONAL HISTORICAL PARK ADVISORY COMMISSION

Notice of Meeting

Notice is hereby given in accordance with the Federal Advisory Committee Act, Public Law 93-463, that a meeting of the Boston National Historical Park Advisory Commission will be held at 10:00 a.m. on December 8, 1975, at the North Atlantic Regional Office, Room 715, 150 Causeway Street, Boston, Massachusetts.

The Commission was established by Public Law 93-431 to advise the Secretary of the Interior on matters relating to the development of the Boston National Historical Park.

The members of the Advisory Commission are as follows:

- Mr. Richard A. Peterson, Chairman, Brookline, Massachusetts.
- Dr. Evelyn Murphy, Lexington, Massachusetts.
- Mr. Byron D. Rushing, Boston, Massachusetts.
- Mrs. Katherine D. Kane, Boston, Massachusetts.
- Mr. Maurice F. O'Shea, Charlestown, Massachusetts.
- Mr. Guy A. Beninati, Boston, Massachusetts.

The matters to be discussed at this meeting include:

1. The role of National Park Service advisory commissions.
2. The organization of the Commission.
3. Status of funding.
4. Status of park administration and operations.
5. Status of cooperative agreement.
6. A review of alternative plans for the management, development and use of the resources included within the Boston National Historical Park.

The meeting will be open to the public. However, facilities and space are limited, and it is expected that not more than 25 persons will be able to attend

the sessions. Any member of the public may file with the committee a written statement concerning the matters to be discussed.

Persons wishing further information concerning this meeting, or who wish to submit written statements, may contact Hugh D. Gurney, Project Manager, Boston National Historical Park at 617-233-3777. Minutes of the meeting will be available for public inspection four weeks after the meeting at the office of the North Atlantic Region, 150 Causeway Street, Boston, Massachusetts.

Dated: October 23, 1975.

JERRY D. WAGNER,
Regional Director.

[PR Doc. 75-30370 Filed 11-10-75; 8:45 am]

NORTH ATLANTIC REGION ADVISORY COMMISSION

Notice of Meeting

Notice is hereby given in accordance with the Federal Advisory Committee Act, that a meeting of the North Atlantic Region Advisory Commission will be held at 9 a.m., e.d.t. on December 4, 1975 through 4:30 p.m. on December 5, 1975, at Minute Man National Historical Park, Lexington, Massachusetts.

The purpose of the Commission is to provide for the free exchange of ideas between the National Park Service and the public, and to facilitate the solicitation of advice or other counsel from members of the public on problems and programs pertinent to the North Atlantic Region.

The members of the Commission are as follows:

- Mr. John N. Cole, Brunswick, Maine.
- Ms. Antoinette F. Downing, Providence, Rhode Island.
- Mrs. Arthur Fenske, Green Village, New Jersey.
- Mr. Charles H. W. Foster, Needham, Massachusetts.
- Mr. George T. Hamilton, Dover, New Hampshire.
- Mr. John P. Keith, Hartland, New York.
- Mr. Frederick E. Michs, Ontario, New York.
- Mr. William A. Niering, Galois Ferry, Vermont.
- Mr. William B. Pinney, Charlotte, Vermont.

The purpose of this meeting is as follows:

1. Briefing by the North Atlantic Regional Director on current events in the Region.
2. Discuss and prepare final report of Springfield Armory visit.
3. Receive and discuss report of Acadia National Park visit.
4. The final discussion of Urban Park and Recreation.
5. Discussion of National Park Service Planning Procedure.

The meeting will be open to the public. However, facilities and space for accommodating members of the public are limited, and persons will be accommodated on a first come, first served basis. There will be a tour of Minute Man National Historical Park beginning at the Sheraton Lexington, Concord at 9 AM, December 4, 1975 and ending at 12 noon at the

APPENDIX II-J

CHAPTER 632 of the OREGON

ADMINISTRATIVE RULES

Department of Geology and

Mineral Industries



OREGON ADMINISTRATIVE RULES

CHAPTER 632

DEPARTMENT OF GEOLOGY AND MINERAL
INDUSTRIES

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OREGON ADMINISTRATIVE RULES
GENERAL

Authority for Publication:
ORS 183.360 (1)

Contents:

Text of administrative rules or reference thereto for all agencies coming within the purview of ORS 183.310-183.510.

Replacement Pages:

Additions, amendments or repeals will be published in loose-leaf form and distributed as new or replacement pages with directions for inclusion in the compilation.

Record of Past Rules:

Replaced rules should be retained in a separate file for future reference to the prior wording of the amended or repealed rules.

HOW TO CITE

Cite all material in this compilation by the chapter and section number. Example: Oregon Administrative Rules, Chapter 274, Section 10-110. (Short form: OAR 274-10-110)

INDEX AND TABLE OF CONTENTS

An index and table of contents will be published with each chapter. Consideration will be given to the publication of a master index and table of contents upon completion of the compilation.

[ED. NOTE: Unless otherwise specified, sections 10-002 through 10-200 of this chapter of the Oregon Administrative Rules Compilation were adopted by the Department of Geology and Mineral Industries January 14, 1954 and filed with the Secretary of State January 27, 1954 as Administrative Order GMI 1.]

Statutory Authority: ORS 520.095

(ORS citations indicate the statutory reference concerning the matter regulated.)

10-002 GENERAL RULES. General rules shall be state-wide in application unless otherwise specifically stated and applicable to all lands within the jurisdiction of the State of Oregon.

10-004 SUPREMACY OF SPECIAL RULES. Special rules will be issued when required and shall prevail as against general rules if in conflict therewith.

10-006 SECRETARY TO THE BOARD. The director of the State Department of Geology and Mineral Industries shall act as secretary to the Board.

10-008 DEFINITIONS. As used in sections 10-010 to 10-200, unless otherwise required by context:

(1) "Allowable" shall mean the quantity of natural gas or oil allowed by order of the Board to be produced within a stated period.

(2) "Atmospheric Pressure" shall mean the pressure of air at sea level, equivalent to about 14.7 pounds to the square inch.

(3) "Barometric Pressure" shall mean the pressure or weight of air determined by the use of a barometer at a given point.

(4) "Barrel" shall mean 42 U. S. gallons equaling approximately 231 cubic inches to the gallon.

(5) "Blow-Out" shall mean a sudden or violent escape of oil or natural gas, as from a drilling well, when high formation pressure is encountered.

4-1-61

(6) "Blow-Out Preventer" shall mean a heavy casing-head control filled with special gates or rams which may be closed around the drill pipe, or which completely closes the top of the casing.

(7) "Bottom Hole Pressure" shall mean the pressure in pounds per square inch at or near the bottom of an oil or gas well determined at the face of the producing horizon by means of a pressure recording instrument, adopted and recognized by the oil and gas industry, and corrected to the predetermined plane.

(8) "Casing Pressure" shall mean the pressure built up between the casing and tubing when the casing and tubing are packed off at the top of the well.

(9) "Casing-Head Gas" shall mean any gas or vapor, or both gas and vapor, indigenous to an oil stratum and produced from such stratum with oil.

(10) "Combination Well" shall mean well productive of both oil and gas in commercial quantities from the same common source of supply and which has sufficient natural pressure to cause gas to enter a pipe line carrying more than atmospheric pressure.

(11) "Common Source of Supply" is synonymous with pool.

(12) "Condensate" shall mean hydrocarbons existing in the gaseous state in the reservoir, by condensing to a liquid at pressures or temperatures below those of the reservoir. For the purpose of brevity, the use herein of the word "oil" shall include condensate as defined herein, unless otherwise provided. For instance, oil well shall mean not only an oil well but also a condensate well.

(13) "Connate Water" shall mean the water which was present with the deposition of solid sediments in an oil or gas reservoir and which has not, during the oil accumulation, been displaced.

(14) "Correlative Rights" as used in these regulations shall mean that each owner or producer in a pool is privileged to produce therefrom only in such manner or amount as not to injure the reservoir to the detriment of others or to take an undue proportion of the oil or gas obtainable therefrom, or to cause net drainage between developed units.

(15) "Cubic Foot of Gas" shall mean

the volume of gas expressed in cubic feet computed at standard pressure base of 14.65 pounds per square inch absolute and a standard temperature base of 60 degree F.

(16) "Day" shall mean a period of twenty-four consecutive hours from 7 a.m. one day to 7 a.m. the following day.

(17) "Development" shall mean any work which actively looks toward bringing in production, such as erecting rigs, building tanks, drilling wells, etc.

(18) "Developed Area or Developed Unit" shall mean a proration unit having a well completed thereon which is capable of producing oil or gas in paying quantities; however, in the event it be shown, and the Board finds, that a part of any unit is nonproductive, then the developed area of the unit shall include only that part so found to be productive.

(19) "Differential Pressure" shall mean in the case of wellhead measurement the difference between the tubing pressure and the casing pressure; in the case of an orifice meter, the pressure difference between the up-stream and the down-stream sides of the orifice, a pressure difference measured with a differential gauge or with a manometer (U tube).

(20) "Director" shall mean the director of the State Department of Geology and Mineral Industries.

(21) "Edge Water" shall mean water that holds the oil or gas, or both oil and gas, in a higher structural position usually encroaching on a pool as the oil or gas is recovered.

(22) "Field" shall mean the general area overlaid by one or more pools.

(23) "Gas" shall mean all natural gas, including casinghead gas and other hydrocarbons not defined as oil in subsection (5) of this section.

(24) "Gas Allowable" shall mean the amount of natural gas authorized to be produced by order of the Board.

(25) "Gas-Oil Ratio" shall mean the relation of the gas in cubic feet to the production of oil in barrels as accepted by pipe lines.

(26) "Gas Repressuring" shall mean the introduction of gaseous substances into a pool by artificial means in order to

replenish, replace, or increase the reservoir energy.

(27) "Gas, Sour" shall mean gas which contains hydrogen-sulphide, sulphur, or other deleterious substances, in sufficient quantities to render it unfit for domestic light and fuel.

(28) "Gas Well" shall mean (a) a well which produces natural gas only; (b) that part of a well where the gas producing stratum has been successfully cased off from the oil, the gas and oil being produced through separate casing or tubing; (c) any well capable of producing gas in commercial quantities; or (d) a well producing from a reservoir containing no liquid hydrocarbons.

(29) "Illegal Gas" shall mean gas which has been produced within the State from any well or wells in excess of the amount allowed by any rule, regulation, or order of the Board, as distinguished from gas produced within the State not in excess of the amount of allowed production by any such rule, regulation, or order which is legal gas.

(30) "Illegal Oil" shall mean oil which has been produced within the State from any well or wells in excess of the amount allowed by any rule, regulation, or order of the Board, as distinguished from oil produced within the State not in excess of the amount so allowed by any such rule, regulation, or order which is legal oil.

(31) "Illegal Product" shall mean any product of oil or gas, any part of which was processed or derived, in whole or in part, from illegal oil or illegal gas or from any product thereof, as distinguished from legal product, which is a product processed or derived to no extent from illegal gas or illegal oil.

(32) "Indices of Productive Value" shall mean the factors to be considered in ascertaining the productivity of all property in a pool for the purpose of fixing the allowable production. These indices can mean, at the discretion of the Board, potential acreage, gas-oil ratios, static reservoir pressures, flowing pressures, fluid level draw-downs, the well or wells, or any other pertinent factors.

(33) "Mud-laden Fluid" shall mean

any approved mixture of water and clay or other material as the term is commonly used in the industry which will effectively seal the formation to which it is applied.

(34) "Net Drainage" shall mean the drainage or migration of oil or gas within the reservoir which is not equalized by counter-drainage.

(35) "Nomination" shall mean the statement made by a purchaser as to the amount of oil or gas he is willing to purchase for a given period.

(36) "Oil" shall mean crude petroleum oil and any other hydrocarbons, regardless of gravity, which are produced at the well head in liquid form and from gas by ordinary production methods.

(37) "Oil Allowable" shall mean the amount of oil authorized to be produced by order of the Board.

(38) "Oil Well" for the purpose of the rules, shall mean any well not a gas well capable of producing oil or condensate in paying quantities.

(39) "Operator" shall mean any person who, duly authorized, is in charge of the development of a lease or the operation of a producing well.

(40) "Overage, Overproduction" shall mean the oil or gas produced in excess of the allowable fixed by the Board.

(41) "Owner" shall mean the person who has the right to drill into and produce from a field or pool, or to appropriate the production therefrom, or both, either for himself or for himself and others."

Hist: Filed 6-20-55 as GMI 2.

(42) "Period Allowable" shall mean the period as designated in which an allowable may be produced.

(43) "Person" shall mean any natural person, partnership, corporation, association, receiver, trustee, guardian, fiduciary, executor, administrator, representative of any kind, or the State of Oregon and its political subdivisions.

(44) "Pipe Line Oil" shall mean oil free from water and basic sediment to the degree that it is acceptable for pipe line transportation and refinery use.

(45) "Pool" shall mean an underground

reservoir containing or appearing to contain a common accumulation of oil and natural gas. A zone of a structure which is completely separated from any other zone in the same structure is a pool.

(46) "Potential" shall mean the computed daily ability of a well to produce oil as determined by a test made in conformity with rules prescribed by the Board.

(47) "Pressure Maintenance" shall mean (a) the reintroduction (in the early stages of field development) of gas or fluid produced from an oil or gas well to maintain the pressure of the reservoir; (b) the introduction of gas or fluid for the same purpose but obtained from an outside source.

(48) "Producer" or "owner" shall mean a person who has the right to drill into and to produce from any pool and to appropriate the oil or gas he produces therefrom either for others, for himself or for himself and others.

(49) "Product" shall mean any commodity made from oil or gas, and shall include refined crude oil, crude tops, topped crude, processed crude petroleum, residue from crude petroleum, cracking stock, uncracked fuel oil, fuel oil, treated crude oil, residuum, gas oil, casing-head gasoline, natural gas, gasoline, kerosene, benzene, wash oil, waste oil, blended gasoline, lubricating oil, blends or mixtures of oil with one or more liquid products or by-products derived from oil or gas, and blends or mixtures of two or more liquid products or by-products from oil or gas.

(50) "Proved Oil or Gas Land" shall mean the area which has been shown by development or geological information to be such that additional wells drilled thereon are reasonably certain to be commercially productive of oil or gas, or both.

(51) "Purchaser" shall mean any person who directly or indirectly purchases, transports, takes or otherwise removes production to his account from a well, wells, or pool.

(52) "Recycle" - See Pressure Maintenance.

(53) "Repressure" - See Pressure Maintenance.

(54) "Run" shall mean oil or gas piped from one place to another.

(55) "Separator" shall mean an apparatus for separating oil, gas, water, etc., with efficiency as it is produced.

(56) "Share, Fair" shall mean that part of the authorized production for the pool which is substantially in the proportion that the quantity of recoverable oil and gas in the developed area of a tract in the pool bears to the recoverable oil and gas in the total developed area of the pool, insofar as these amounts can be practically ascertained.

(57) "Shortage of Underage" shall mean the amount of production less than the allowable.

(58) "Spacing Unit" shall mean the maximum area in a pool which may be efficiently and economically drained by one well.

(59) "Storage" shall mean produced oil, gas, or both confined in tanks, reservoirs, or containers.

(60) "Storage, Underground" shall mean underground cavities either natural or artificial or both which are suitable for storage of natural gas, produced petroleum, and petroleum products. The term may also mean the produced petroleum and petroleum products confined in underground cavities.

(61) "Survey" shall mean all tests made for the purpose of obtaining information concerning the productive possibility of any geological formation and shall include electrical and directional surveys.

(62) "Waste" in addition to its ordinary meaning, shall mean "physical waste" as that term is generally understood in the petroleum industry. It includes:

(a) Underground waste and the inefficient, excessive or improper use or dissipation of reservoir energy, including gas energy and water drive, of any pool; and the locating, spacing, drilling, equipping, operating or producing of any oil well or gas well in a manner which results or tends to result in reducing the quantity of oil or gas ultimately recoverable from any pool;

(b) Surface waste and the inefficient storing of oil and the locating, spacing, drilling, equipping, operating or produc-

ing of oil wells or gas wells in a manner causing or tending to cause unnecessary or excessive surface loss or destruction of oil or gas. [1953 c 667, section 2.]

(63) "Well" shall mean a well drilled in search of oil or gas, but shall not include core test wells, stratigraphic test wells or wells drilled for information purposes only as distinguished from wells drilled for the purpose of producing oil or gas if found. [1953 c. 667 section]]

(64) "Well Log" shall mean the written record progressively describing the strata, water, oil or gas encountered in drilling a well with such additional information as to give volumes, pressure, rate of fill-up, water depths, caving strata, casing record, etc., as is usually recorded in normal procedure of drilling, also to include electrical survey or logging.

(65) "Wildcat Well" shall mean a drilling or producing well in an unproved area.

(66) Additional definitions may be found in ORS 520.005 and 520.015.

10-010 APPLICATION AND PERMIT TO DRILL. "Before any person shall spud in and begin the actual drilling of any well in search of oil or gas, such person shall file with the Board his application, in such form as the Board shall require for a permit to drill said well. The application shall be accompanied by the sum of \$25.00, which sum is fixed as a fee for granting of a permit. When satisfied that the application and the bond are in conformance with law, the Board, shall issue a permit to the applicant, in such form as it may have established by its rules and regulations; and the number appearing upon such permit shall at all times be conspicuously displayed on the derrick used in drilling such well.

"As a further condition precedent to the granting of a permit for drilling any oil or gas well, the operator shall furnish a bond in the sum of \$4,000, conditioned as provided by law and on a form supplied by the Board. The surety on the bond shall be a corporate surety

authorized to do business in the State of Oregon." (See ORS 520.025).

Hist: Filed 6-20-55 as GMI 2.

10-012 CHANGES OF LOCATION OR OWNERSHIP. (1) If, prior to the drilling of a well, the person to whom the permit was issued desires to change the location, he shall submit a letter so stating and another application properly filled out showing the new location. No additional fee is necessary; but drilling shall not be started until the transfer has been approved and the new permit posted at the new location.

(2) If, while a well is drilling or after it has been completed, the person to whom the permit was issued disposes of his interest in the well, he shall submit a written statement to the director setting forth the facts.

(3) Before the transfer of any well, the person who is to acquire it must obtain a permit and post a bond as required by section 10-010.

Hist: Filed 6-20-55 as GMI 2.

10-014 DRILLING PRACTICES. (1) **Pits for Drill Cuttings:** There shall be provided at every well before the actual drilling has been started, one or more pits of adequate and approved size for holding the drill cuttings removed from such well.

(2) **Casing and Sealing Off Formations:** Each oil, gas, brine, or fresh-water stratum above the producing horizon shall be cased and sealed off to prevent effectively the migration of oil, gas, brine, or fresh water to other areas. Such casing and sealing off shall be effected and tested in such manner and by such methods and means as may be prescribed by the director.

(3) **Mud-laden Fluid to be Applied:** No gas sand or stratum upon being penetrated shall be drilled or left open more than two days without the application of mud-laden fluid to prevent the escape of gas during further drilling in or through such sand stratum.

(4) **Well-Head Equipment:** No well shall be drilled into any formation where oil or

gas under high pressure is expected to be found until the innermost strata of casing shall have been equipped with an adequate high-pressure master gate valve and blow-out preventer securely anchored.

(5) **Well Records (Logs):** During the drilling or deepening of every well, exclusive of stratigraphic test wells and/or holes drilled solely for the purpose of seismograph operations, the owner, operator, contractor, driller, or other person responsible for the conduct of drilling operations, shall keep at the well a detailed and accurate record of the well, reduced to writing from day to day, which shall be accessible to the director upon order of the Board at all reasonable times. A copy of the records shall be furnished to the director within 30 days after the completion or abandonment of any well, but shall be kept confidential for a period of two years from the date of filing with the director.

(6) **Deepening:** Every person, owner, or producer who desires to deepen a well to a depth below that to which it was originally drilled shall file a written notice of intention to deepen. The notice shall set forth in detail the new proposed total depth, the plan for sealing off any oil, gas, brine, or fresh-water strata to be found or expected to be found in the deepening. If the method set forth is satisfactory and the person, owner, or producer is not in violation of the law or the rules of the Board, the director shall issue a deepening permit. The actual deepening shall not be started until the deepening permit has been posted at the well location.

10-016 IDENTIFICATION OF WELLS.

Hereafter, every person drilling for oil or gas or operating, owning, or controlling or in possession of any well drilled for oil or gas, shall paint or stencil and post and keep posted in a conspicuous place near the well, the name of the person drilling, operating, owning, or controlling the well, the name of the lease, the number of the well, and the number of the permit for the well, together with the Section, Township, and Range.

10-018 ORGANIZATION REPORTS. Every person acting as principal or agent for another or independently engaged in drilling for oil or gas or in the production, storage, reclaiming, treating, or processing of crude oil or natural gas produced in Oregon shall immediately file with the Board in the form of an affidavit: the name under which such business is being conducted or operated; the name and postoffice address of such person, the business or businesses in which he is engaged; the plan of organization and, in case of a corporation, the law under which it is chartered and the name and postoffice address of any person acting as a trustee, together with the name of the manager, agent, attorney-in-fact, or principal executive thereof, and the name and postoffice address of each officer thereof. In each case where such business is conducted under an assumed name, such report shall show the names and postoffice addresses of all owners in addition to the other information required and also the name of the county in which the certificate of assumed name is filed. Immediately after any change occurs as to the facts stated in the report filed, a supplementary report under oath shall be immediately filed with the Board with respect to such change.

Hist: Filed 6-20-55 as GMI 2.

10-020 SURFACE EQUIPMENT. Meter fittings of adequate size to measure the gas efficiency for the purpose of obtaining gas-oil ratios shall be installed on the gas vent-line of every separator. Well-head equipment shall be installed and maintained in first-class condition so that static bottom hole pressure may be obtained at any time by the duly authorized agents of the Board or the director. Valves shall be installed so that pressures can be readily obtained on both casing and tubing.

10-122 BLOW-OUT PREVENTION. In drilling in areas where high pressures are likely to exist, all proper and necessary precautions shall be taken for keeping the well under control, including the

use of blow-out preventers and high-pressure fittings attached to casing strings properly anchored and cemented.

10-124 DRILLING FLUID. At any time of drilling any well by rotary method, the operator shall continuously maintain in the hole, from top to bottom, good mud-laden fluid in accordance with recognized safe practice.

10-126 CLEANING WELLS. All wells shall be cleaned into a pit not less than one hundred fifty (150) feet from the derrick floor and one hundred fifty (150) feet from any fire hazard.

10-128 BOILER OR LIGHT PLANT. No boiler or electric lighting generator shall be placed nearer than 100 feet to any producing well or oil tank.

10-130 RUBBISH OR DEBRIS. Any rubbish or debris that might constitute a fire hazard shall be removed to a distance of at least 150 feet from the vicinity of wells, tanks, and pump stations. All waste shall be burned or disposed of in such manner as to avoid creating a fire hazard or polluting streams and fresh-water strata.

10-132 TUBING. All wells shall be equipped with, and produce through, tubing of not more than three inches in diameter. The bottom of tubing on flowing wells shall not be higher than 100 feet above the top of the producing sand. If the tubing is perforated, the perforations shall not extend above the top of the producing horizon. Tubing shall be free from obstructions, and have orange-peel weld or bar on the bottom in order to permit the free entrance of bottom hole instruments.

10-134 CHOKES. All flowing wells shall be equipped with chokes or beans adequate to control the flow thereof.

10-136 SEPARATORS. All flowing wells must be produced through an approved oil and gas separator.

10-138 FIRE WALLS. Every permanent

oil tank, or battery of tanks, must be surrounded by a dike or fire wall with a capacity of one and one-half times that of the tank or battery of tanks.

10-140 SLUSH PITS TO BE FILLED IN. Slush pits at producing oil wells must be filled in within a reasonable time after the completion of the well.

10-142 DEVIATION. Except by special permission of the Board the maximum point at which a well penetrates the producing formation shall not vary more than 60 feet from the vertical drawn from the center of the hole at the surface for each 1,000 feet of depth.

10-144 REPORT OF RESULT OF SHOOTING, PERFORATING OR TREATING OF WELL. Within 30 days after either the shooting or chemical treatment of a well, a report shall be filed with the director by the owner, giving the condition of the well after shooting, perforating, or treating, the size and depth of the shot or amount of chemical used, the daily production of oil, gas, and water after shooting or chemical treatment, the name of the person rendering such service, and any other pertinent information. Such report shall be signed and sworn to.

10-146 VACUUM PUMPS PROHIBITED.

The use of vacuum pumps or other devices for the purpose of putting a vacuum on any gas or oil-bearing stratum is prohibited, unless, upon application and hearing, and for good cause shown, the Board shall permit the use of vacuum pumps.

10-148 PRODUCTION PRACTICE. Naturally flowing wells shall be produced at a continuous uniform rate as far as is practical, in keeping with the current allowable, unless the Board specifically permits stop-cocking to reduce the gas-oil ratio.

10-150 PULLING OUTSIDE STRINGS OF CASING. In pulling outside strings of casing from any oil or gas well, the space outside the casing left in the hole

shall immediately be filled, and shall at all times be kept full of mud-laden fluid of adequate specific gravity to seal off all fresh and salt water strata and any strata bearing oil or gas which is not producing.

10-151 NOTIFICATION OF FIRE, BREAKS, LEAKS, OR BLOW-OUTS. (1) All persons controlling or operating any oil and gas wells, or receiving tanks, storage tanks, or receiving and storage receptacles into which crude oil is produced, received, or stored, shall immediately notify the Board by letter giving full details concerning all fires which occur at such oil or gas wells or tanks or receptacles on their property, and all such persons shall immediately report all tanks or receptacles struck by lightning and any other fire which destroys oil or gas, and shall immediately report any breaks in or from tanks or receptacles and pipe lines from which oil or gas is escaping or has escaped.

In all such reports of fires, breaks, leaks, or escapes, or other accidents of this nature, the location of the well, tank receptacle, or line break shall be given by Section, Township, Range, and property so that the exact location thereof can be readily located on the ground. Such report shall likewise specify what steps have been taken or are in progress to remedy the situation reported and shall detail the quantity of oil or gas lost, destroyed, or permitted to escape.

In case any tank or receptacle is permitted to run over, the escape thus occurring shall be reported as in the case of a leak. The report hereby required as to oil losses shall be necessary only in case such oil loss exceeds five barrels in the aggregate.

10-152 PRODUCING FROM DIFFERENT STRATA THROUGH THE SAME CASING STRING. No well shall be permitted to produce either oil or gas from different strata through the same string of casing without first applying for a hearing before the Board. The operator requesting such permission must present to the Board full and complete facts relative

to the operation and the reasons for requesting such permission. If a stratum should be encountered bearing either oil or gas and it is desired to drill deeper, the stratum first penetrated and likewise each and every formation in turn shall be closed and sealed off to prevent waste, either surface or underground.

10-154 DETERMINING AND NAMING POOLS. Wells shall be classified as to the pool from which they produce and pools shall be determined and named by the director, provided, that in the event any person is dissatisfied with any such classification, an application may be made to the Board for such classification as the applicant deems proper, and the Board will hear and determine the same.

10-156 SPACING UNITS. Immediately upon the discovery of any pool or at any time after the effective date of this rule, the Board may prescribe spacing units for each pool and specify the size, shape, and location thereof.

10-158 LOCATION AND SPACING OF WELLS. (1) Spacing Plan: Unless a different well-spacing plan is adopted by the director will, simultaneously with the establishment of spacing units for each pool, prescribe well-spacing plans therefor, the boundaries of which shall coincide, if possible, with the boundaries of such spacing units, which plan shall require a minimum of a 40 acre spacing unless a different spacing shall be required or approved by the Board.

(2) Location of Well: Each well permitted to be drilled upon any spacing unit shall be drilled approximately in the center thereof with such exceptions as may be reasonably necessary where it is shown, after notice and upon hearing, and the Board finds, that the unit as established is partly outside the pool, where it is partly nonproductive, or, that for some other reason, a well approximately in the center of the unit would be nonproductive, or topographical conditions are such as to make the drilling in the center of the unit unduly burdensome.

(3) Exceptions: Whenever a uniform spacing plan has been prescribed for any pool exceptions thereto may be permitted if the Board finds, after notice and hearing, that conditions within such pool are such that reasonably uniform spacing would be impracticable.

10-160 POOLING OF SMALL TRACTS.
When two or more separately owned tracts of land are embraced within a spacing unit which has been established by the Board, the owners thereof may pool their interests and develop their lands as a unit. Where, however, such owners have not agreed to pool their interests, the Board, for the prevention of waste or to protect correlative rights, may limit the allowable of each such owner to his reasonable prorate share of production from such spacing unit.

10-162 ILLEGAL PRODUCTION.
No purchaser, producer, operator or any other person shall produce any crude oil, natural gas, or waste oil from any spacing unit or pool in this State except in accordance with the rules, regulations and orders of the Board: Provided that tank splitting shall not be required.

10-164 COMMINGLING OF PRODUCTION PROHIBITED. The production from one pool shall not be commingled with that from another pool in the same field before delivery to a purchaser, unless otherwise ordered by the Board.

10-166 REPORTS BY PURCHASERS AND PRODUCERS. (1) Purchasers: Each purchaser or taker of any oil or gas from any well, lease, or pool shall on or before the 25th day of each month succeeding the month in which the purchasing or taking occurs, file with the director on a form furnished by the Board, a verified statement of all oil or gas purchased, or taken from any such well, lease, or pool during the preceding month.

(2) Producers: The producer or operator of each and every well or spacing unit in prorated pools shall each month submit to the director a sworn statement showing the amount of production made by each well and by each such spacing

unit upon forms furnished therefor.

10-168 USE OF EARTHEN RESERVOIRS. Oil shall not be stored or retained in earthen reservoirs or in open receptacles.

10-170 RESERVOIR SURVEYS. By special order of the Board, periodic surveys may be made of the reservoirs in this State containing oil and gas. These surveys will be thorough and complete and shall be made under the supervision of the petroleum and natural gas engineers of the Board. The condition of the reservoirs containing oil and gas and the practices and methods employed by the operators shall be investigated. The volume and source of crude oil and natural gas; the reservoir pressure of the reservoir as an average; the areas of regional or differential pressure; stabilized gas-oil ratios; and the producing characteristics of the field as a whole and the individual wells within the field shall be specifically included.

10-172 OPERATORS TO ASSIST IN RESERVOIR SURVEYS. All operators of oil wells are required to permit and assist the agents of the Board and the director in making any and all tests including bottom hole pressure and gas-oil ratio determinations that may be required by the Board or director on any or all of their wells.

10-174 MEASUREMENT OF POTENTIAL OPEN-FLOW OF GAS WELLS. The potential open-flow of a gas well may be ascertained by U.S. Bureau of Mines back pressure method, or by other approved methods.

10-176 SUPERVISION OF OPEN-FLOW AND PRESSURE TESTS. All tests made in determining the potential flow and shut-in well-head or bottom hole pressure of a gas well and used in calculating the allowable of the spacing unit which the well is located shall be made under the supervision of representatives of the Board.

10-178 DURATION OF TESTS. The tests for open-flow and pressure of gas wells

shall be made at such intervals and shall continue for such time as may be necessary to effect accurate determination, and in the case of pressure tests the shut-in period shall be not less than 24 hours.

10-180 NOTICE OF TESTS. Open-flow and pressure tests of gas wells may be witnessed or observed by a representative of any producer in the field, and the owners of the adjoining or offset leases must be notified by the owner of the well on which the test is to be taken, stating the time when such test will commence.

10-182 GAS TO BE METERED. (1) Meters: All gas when produced or sold shall be metered with an approved meter of sufficient capacity, provided that gas may be metered from a lease or unitized property as a whole if it is shown that ratable taking can be maintained; provided that meters shall not be required for gas produced and used on the lease for development purposes and lease operations.

(2) Meter Charts and Records: Purchasers shall keep meter charts and records on gas purchased in a permanent file, for a period of at least two years, and such information shall be made available to the Board and director.

(3) By-Passes: By-passes shall not be connected around meters in such manner as to permit the improper taking of gas.

10-184 DIRECT WELL PRESSURE. The use of direct well pressure to operate any machinery is hereby prohibited.

10-186 GAS-OIL RATIO. No well shall be permitted to produce gas in excess of the maximum ratio determined for a pool unless all gas produced in excess thereof is returned to the pool from which it was produced.

10-188 GAS-OIL RATIO SURVEYS AND REPORTS. Gas-oil ratios and surveys shall be taken in the manner prescribed by the Board for individual fields where upon gas-oil ratio limits have been fixed and in accordance with the rules prescribed for each individual pool.

(1) Flowing Wells Intermittently (Stop-

rocked) Produced: In computing the operating gas-oil ratio the total volume of gas and the total barrels of oil that are produced in order to obtain the daily oil allowable must be used regardless of the flowing time in the 24-hour period.

(2) Gas Lift or Jet Wells: The total volume of gas to be used in computing the operating gas-oil ratio is the total output volume minus the total input volume.

(3) Pumping Wells: Should gas be withdrawn from the casing in an attempt to maintain a fluid seal, or for any other reason, this volume of gas must be added to the gas produced through tubing in computing the gas-oil ratio.

10-190 GAS UTILIZATION. After the expiration of two days from the time of encountering gas in a gas well, no gas from such well shall be permitted to escape into the air, and no gas produced therefrom shall be utilized except for domestic or commercial purposes.

10-192 DISPOSAL OF BRINE OR SALT WATER. In addition to the requirement of the Act to prevent the escape of oil or gas out of one stratum to another and to prevent the pollution of fresh water supplies by oil, gas, or salt water, and in addition to any regulations of the State Sanitary Authority, the following conditions shall control the disposal of brine or salt water liquids, and any other means or methods of disposal, except re-injection into the formation, are hereby prohibited: (1) Disposal in Earthen Pits: Brine or salt water may be disposed of by evaporation when impounded in excavated earthen pits, which may be used for such purpose only when the pit is underlain by tight soil such as heavy clay or hardpan.

Impounding of brine or salt water in earthen pits that are porous and closely underlain by a gravel or sand stratum hereby is prohibited. Earthen pits used for impounding brine or salt water shall be so constructed and maintained as to prevent the escape of fluid.

The Board shall have authority to condemn any pit which does not properly impound such water and order the disposal of such water into an under-

ground formation, as herein provided.

The level of brine or salt water in earthen pits shall at no time be permitted to rise above the lowest point of the ground surface level. All pits shall have a continuous embankment surrounding them sufficiently above the level of the surface to prevent surface water from running into the pit. Such embankment shall not be used to impound brine or salt water.

At no time shall brine or salt water impounded in earthen pits be allowed to escape over adjacent or into streams.

(2) Disposal by Injection: Salt water may also be disposed of by injection into the strata from which produced or other proved salt water bearing strata.

10-194 WATER INJECTION AND WATER FLOODING OF OIL AND GAS PROPERTIES. (1) Application and Approval: The owner or operator of any well may inject water under pressure into the formation containing oil or gas for the purpose of obtaining oil or gas from the reservoir, upon application to and approval by the Board.

(2) Casing and Cement: Wells used for the injection of water into the producing formation or repressuring wells shall be cased with sound casing so as not to permit leakage and the casing cemented in such manner that damage will not be caused to oil, gas, or fresh water resources.

(3) Application, Contents, Notice, Objection, Hearing, and Approval: (a) No water injection or water flooding program shall be instituted until it has been regularly authorized by the Board.

(b) The application therefor shall be verified and filed with the Board, showing:

(A) The location of the intake well.
(B) The location of all oil and gas wells, including abandoned and drilling wells and dry holes, and the name of landowners and lessees within one-half mile of the intake well.

(C) The formations from which wells are producing or have produced.

(D) The name, description, and depth of the formations to be flooded

(E) The depths of each formation into

which water is to be injected.

(F) The elevations of the top of the oil or gas bearing formation in the intake well and the wells producing from the same formation within one-half mile radius of the intake well.

(G) Log of the intake well or similar information as is available.

(H) Description of the intake well casing.

(I) Description of the liquid, stating the kind, where obtained, and the estimated amounts to be injected daily.

(J) The names and addresses of the operators.

(K) Such other information as the Board may require to ascertain whether the flooding may be safely and legally made.

(c) Applications may be made to include the use of more than one intake well on the same lease, or on more than one lease.

(d) Applications shall be executed by all operators who are to participate in the proposed water injection or water flooding plan.

(e) No order approving water injection or water flooding of oil properties shall be issued until after notice has been given by the Board to each operator in such pool, and hearing has been had before the Board.

(4) Notice of Commencement and Discontinuance of Water Injection or Water Flooding Operations:

(a) Immediately upon the commencement of water injection or water flooding operations, the applicant shall notify the Board stating the date of commencement.

(b) Within 10 days after the discontinuance of water injection or water flooding operations the applicant or the one in charge thereof shall notify the Board of the date of such discontinuance and the reasons therefor.

(c) Before any intake well shall be abandoned, notice shall be served on the Board, and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

(5) Records: The owner or operator of an intake well shall keep an accurate record of (a) the amount of water injected into the intake wells, (b) the total amount

of water produced, and (c) the total amount of oil produced from the area flooded. Such information shall be made available to the Board or its agents.

10-196 GAS INJECTION OF OIL AND GAS PROPERTIES. (1) Application and Approval: The owner or operator of any well may inject gas under pressure into the formation containing oil or gas for the purpose of obtaining oil or gas from the reservoir, upon application to and approval by the Board.

(2) Casing and Cement: Wells used for the injection of gas into the producing formation shall be cased with sound casing so as not to permit leakage and the casing cemented in a manner that damage will not be caused to oil, gas, or fresh water resources.

(3) Application, Contents, Notice, Objection, Hearing and Approval: (a) No gas shall be injected into a well for gas injection purposes until so ordered by the Board pursuant to application and notice as herein required.

(b) The application shall be verified and filed with the Board showing:

(A) The location of the intake well.

(B) The location of all oil and gas wells, including abandoned and drilling wells and dry holes, and the name of landowners and lessees within one-half mile of the intake well.

(C) The formations from which wells are producing or have produced.

(D) The name, description, and depth of the formations to be injected.

(E) The depths of each formation into which gas is to be injected.

(F) The elevations of the top of the oil or gas bearing formation in the intake well and the wells producing from the same formation within one-half mile of the intake well.

(G) The log of the intake well, or similar information as is available.

(H) Description of the intake well casing.

(I) Description of the gas, stating the kind, where obtained, and the estimated amounts to be injected daily.

(J) The names and addresses of the operators.

(K) Such other information as the Board

may require to ascertain whether the gas injection plan meets the requirements of the law and safety.

(c) Applications may be made to include the use of more than one intake well on the same lease or on more than one lease.

(d) Applications shall be executed by all operators who are to participate in the proposed gas injection plan.

(4) Notice of Commencement and Discontinuance of Gas Injection: (a) Immediately upon commencement of gas injection operations, the applicant shall notify the Board stating the date of commencement.

(b) Within 10 days after the discontinuance of gas injection operations, the applicant or the one in charge of the operations shall notify the Board of the date of discontinuance and the reasons therefor.

(c) Before any intake well shall be abandoned, notice shall be served on the Board and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

(5) Records: The owner or operator of the gas injection project shall keep an accurate record of (a) the amount of gas injected into the intake wells, (b) the amount of gas produced and (c) the amount of oil produced from leases affected by the gas injection. Such information shall be made available to the Board or its agents.

10-198 ABANDONMENT, UNLAWFUL ABANDONMENT, SUSPENSION, WELL PLUGGING, (1) Oil, Gas, and Water to be Protected: Before any well or any producing horizon encountered therein shall be abandoned, the owner or operator shall use such means, methods, and procedure as may be necessary to prevent water from entering any oil or gas-bearing formation, and to protect any underground or surface water that is suitable for domestic or irrigation purposes from waste, downward drainage, harmful infiltration and addition of deleterious substances.

The operator of any hole drilled for oil and gas which penetrates a usable fresh-water horizon, except those drilled for the purposes of seismic prospecting,

shall be required to set casing through this formation and cement such casing from top to bottom, unless special exception is granted by the Board.

(2) Suspension; Removal of Equipment: Application; Extension: The Board may authorize a permittee to suspend operations or remove equipment from a well for the period stated in the Board's written authorization, given upon written application of the permittee and his or its affidavit showing good cause. The period of suspension may be extended by the Board, upon written application made before expiration of the previously authorized suspension, accompanied by affidavit of the permittee showing good cause for the granting of such extension.

(3) Abandonment; Notice of Intention; Presumptions: (a) Before any work is commenced to abandon any well drilled for oil or gas, the permittee shall give written notice to the Board of his intention to abandon such well. The notice shall be upon forms supplied by the Board and shall contain the permit number of the well and such other information as reasonably may be required by the Board.

(b) After operations on or at a well have been suspended with the approval of the Board pursuant to subsection (2) of this rule, if operations are not resumed within six months from the date specified in such approval of suspension, an intention to abandon and unlawful abandonment shall be presumed unless the permittee has obtained from the Board an extension of time of such suspension, upon his or its written application and affidavit showing good cause for the granting of such extension.

(c) Whenever operations on or at any well shall have been suspended for a period of six months without compliance with these regulations, the well shall be presumed unlawfully abandoned.

(d) A well shall be deemed unlawfully abandoned if, without notice given to the Board as required by these rules, any drilling or producing equipment is removed.

(e) Any unlawful abandonment under these regulations shall be declared by the Board and such declaration of abandonment shall be entered in the Board

minutes and written notice thereof mailed by registered mail both to such permittee at his last known post office address as disclosed by the records of the Board and to the permittee's surety; and the Board may thereafter proceed against the permittee and his or its surety.

(f) All wells abandoned or declared abandoned as herein provided shall be plugged as required by law and by these regulations.

(g) The bond furnished by permittee shall not be released until all procedures required by these regulations shall have been completed and the Board in writing shall have authorized such release.

(4) Plugging Methods and Procedure: The methods and procedure for plugging a well shall be as follows: (a) The bottom of the hole shall be filled to the top of each producing formation, or a bridge shall be placed at the top of each producing formation, and in either event a cement plug not less than 15 feet in length shall be placed immediately above each producing formation whenever possible.

(b) A cement plug not less than 15 feet in length shall be placed approximately 50 feet below all freshwater bearing strata.

(c) A plug shall be placed at the surface of the ground in each hole plugged in such manner as not to interfere with soil cultivation.

(d) The interval between plugs shall be filled with an approved heavy mud-laden fluid.

(e) The operator shall have the option as to the method of placing cement in the hole by (A) dump bailer, (B) pumping through tubing, (C) pump and plug, or (D) other method approved by the Board.

(5) Affidavit on Completion: Copies: Within 20 days after the plugging of any well has been accomplished, the owner or operator thereof shall file an affidavit with the director setting forth in detail the method used in plugging the well. Such affidavit shall be made on a form supplied by the Board. Copies of well-

plugging records and affidavits filed, except those relating to core drilling and seismic or other wells drilled for geological data, will be furnished to anyone requesting them on payment of 50 cents per copy.

(6) Seismic Core and Other Exploratory Holes, to be Plugged: Methods: Affidavit: Before abandoning any hole drilled for seismic, core, or other exploratory purposes, which hole penetrates a usable fresh-water horizon, it shall be the duty of the owner or driller of such hole to plug the same in such manner as to protect properly all water-bearing formations; and within 60 days after the plugging, an affidavit shall be filed with the Director by the owner or driller, setting forth the location of the holes and the method used in plugging the same to protect water-bearing formations.

(7) Wells Used for Fresh Water: (a) When the drilled well to be plugged may safely be used as a fresh-water well and such use is desired by the land owner, the well need not be filled above the required sealing plug set below fresh water; provided, however, authorization for use of any such well shall be obtained from the State Engineer, in conformance with chapter 708, Oregon Laws 1955.

(b) Application for leaving the well partially unplugged as a fresh-water well may be made to the Board by the land owner, accompanied by his affidavit as to his need of water and the intended use of the well, together with certified copy of the State Engineer's order or permit, or that officer's statement that no permit is required.

(c) The operator shall leave the fresh-water well in a condition approved by the Board.

Hist: Filed 4-3-56 as GMI 3.

10-200 CONFIDENTIAL INFORMATION. No information herein required to be furnished to the Board shall be disclosed by any employee of the Board except as expressly authorized by the Board.



APPENDIX II-K

SPECIAL CONDITIONS TO APPLY TO

ALL DEEP WELL EXPLORATORY

DRILLING IN OREGON

Departments of Environmental Quality
and Geology and Mineral Industires





State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: Mr. R. E. Corcoran, State Geologist
Department of Geology and Mineral Industries

Date: September 2, 1975

From: Mr. Loren Kramer, Director *LK*
Department of Environmental Quality

Subject: SPECIAL CONDITIONS TO APPLY TO ALL DEEP WELL EXPLORATORY DRILLING IN OREGON

1. If a geothermal, mineral or petroleum resource of commercial interest is discovered, no drilling of additional wells or operations in connection therewith shall commence until an Environmental Impact Statement has been prepared for utilizing and developing the resource.
2. Prior to commencement of any drilling activities where drilling depth is expected to be in excess of 1,000 feet, detailed plans and specifications shall be submitted to and approved by the Department of Environmental Quality for collection and disposal of drill cuttings and mud, and other potential waste materials.
3. A contingency plan shall be submitted to the Department of Geology and Mineral Industries prior to any deep well drilling activities outlining the following information procedures.
 - a. Measures taken to prevent emergency conditions or unplanned discharges, such as blowouts.
 - b. A description of preventive facilities to contain or treat unplanned discharges.
 - c. The reporting system to be used to alert facility management and appropriate legal authorities.
 - d. A list of personnel and equipment available to respond to emergency conditions.
4. Upon determination of the Director of the Department of Environmental Quality or the Director of the Department of Geology and Mineral Industries that any activities conducted by the permittee in relation to its drilling operations or activities may tend to or will cause damage, hazards, pollution or risk to the environment of Oregon or may violate any conditions of permits issued by the aforementioned departments, the permittee shall when notified either orally or in writing by the Director of either department immediately cease and desist its drilling operations or activities until the problem has been corrected.
5. All drilling processes and all waste mud and waste waters collection, treatment and disposal facilities shall be operated and maintained at all times in a manner which will prevent a direct discharge or indirect discharge of any waste mud and waste waters to the waters of the state.

Mr. R. E. Corcoran
September 2, 1975
age. 2

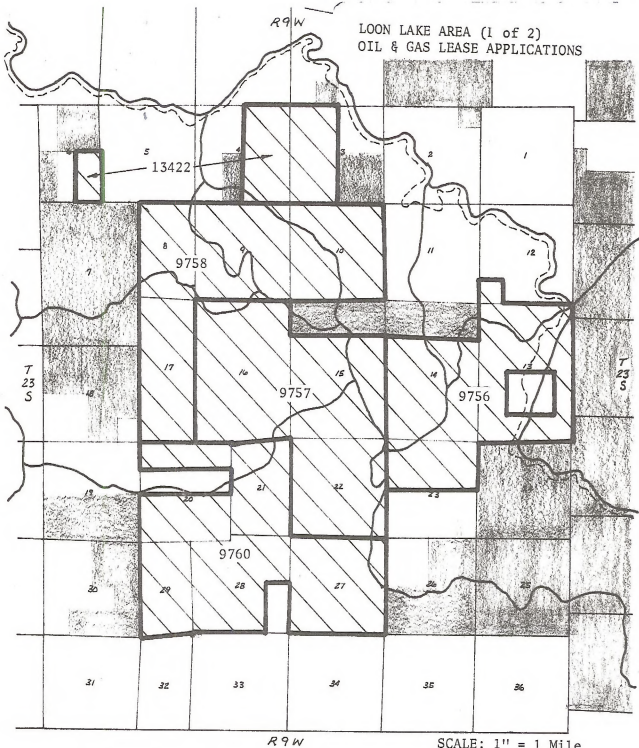
6. All waste mud and waste waters are to be discharged into self-contained, non-overflow holding ponds.
7. All access roads, trails, drainage systems and the drilling site shall be constructed and maintained to minimize soil disturbances, control erosion and prevent channeling.
8. All refuse shall be disposed of at a refuse site which has a valid permit from the Department of Environmental Quality.
9. No geothermal waters, mineralized waters, oily waters or other waters or substances which might cause the Water Quality Standards of the State of Oregon to be violated shall be discharged or otherwise allowed to reach any of the waters of the state unless a permit for the discharge has been issued by the Department of Environmental Quality.
10. Sanitary wastes shall be disposed of in chemical or gas fired toilet facilities which have been installed in accordance with the recommendations of the Department and the local county health department or by other approved means.
11. In the event a breakdown of equipment or facilities causes a violation of any of the conditions of this permit or results in any unauthorized discharge, the permittee shall:
 - a. Immediately take action to stop, contain and clean up the unauthorized discharges and correct the problem.
 - b. Immediately notify the Department of Environmental Quality and the Department of Geology and Mineral Industries so that an investigation can be made to evaluate the impact and the corrective actions taken and determine additional action that must be taken.
 - c. Submit a detailed written report describing the breakdown, the actual quantity and quality of resulting waste discharges, corrective action taken, steps taken to prevent a recurrence and any other pertinent information.Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or the resulting liability for failure to comply.
12. Authorized representatives of the Department of Environmental Quality or the Department of Geology and Mineral Industries shall be permitted access to the premises of all facilities owned and operated by the permittee at all reasonable times for the purpose of making inspections, surveys, collecting samples, obtaining data and carrying out other necessary functions related to this permit.

APPENDIX III

MAPS OF SPECIFIC FEDERAL LAND LOCATIONS OF OIL AND GAS LEASE
APPLICATIONS ON THE COOS BAY DISTRICT




LOON LAKE AREA (1 of 2)
OIL & GAS LEASE APPLICATIONS





R 9 W


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LEGEND

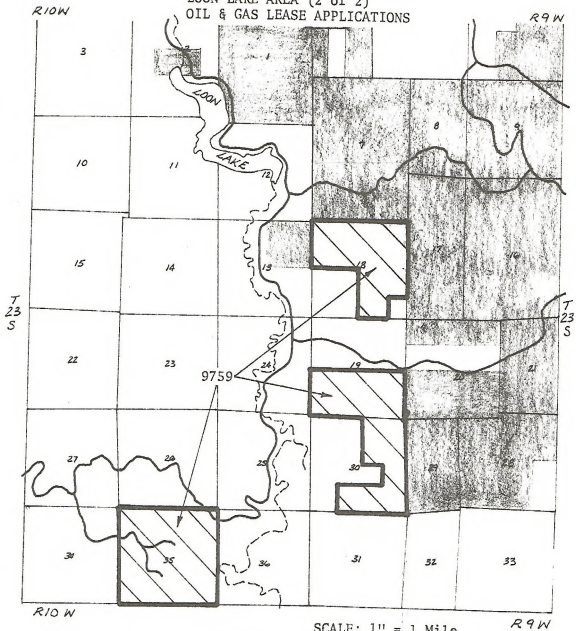
 OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)

 ADDITIONAL FEDERAL LAND

 ROADS

 STREAMS

LOON LAKE AREA (2 of 2)
OIL & GAS LEASE APPLICATIONS



LEGEND




OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)

 ROADS

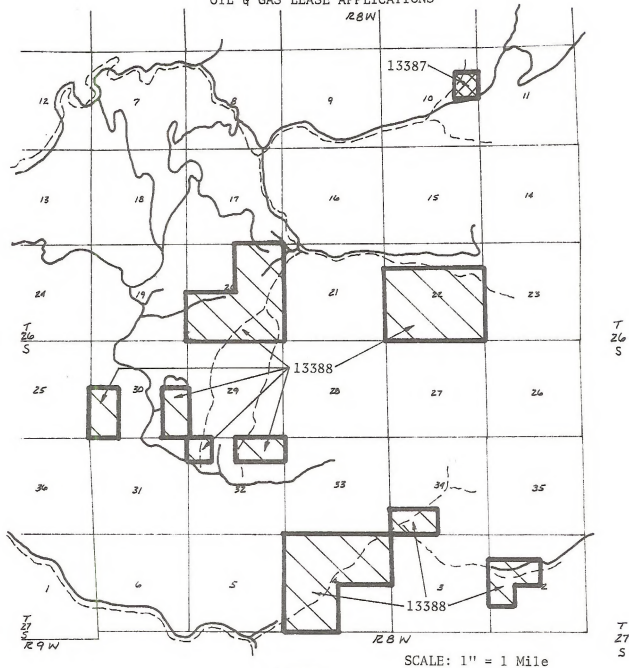


ADDITIONAL FEDERAL LAND



 STREAMS



SCALE: 1" = 1 Mile

CALLAHAN AREA
OIL & GAS LEASE APPLICATIONS



LEGEND

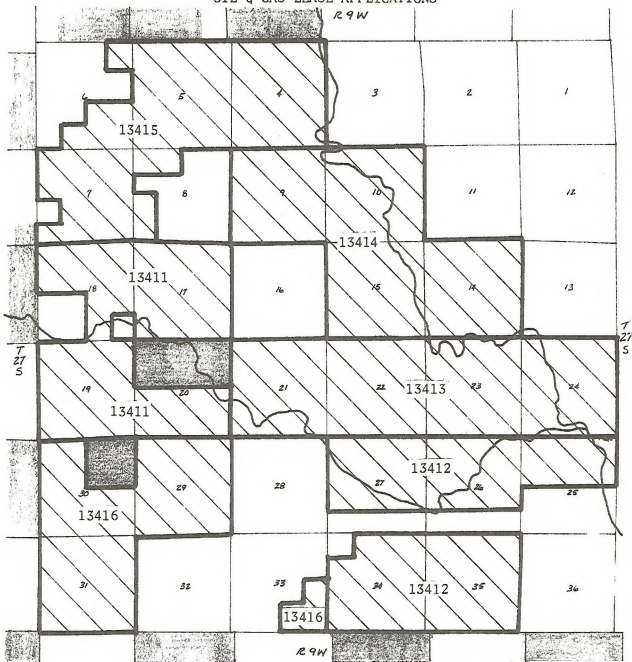
-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  COOS BAY DISTRICT LEASE APPLICATIONS IN ROSEBURG DISTRICT EAR (FEDERAL LAND)

-  ROADS
-  STREAMS

SCALE: 1" = 1 Mile



COQUILLE RIVER AREA (1 of 5)
OIL & GAS LEASE APPLICATIONS

R 9 W

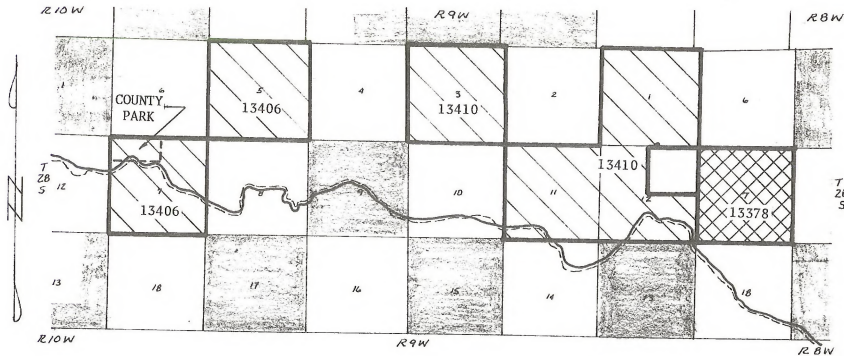


SCALE: 1" = 1 Mile

LEGEND

-  OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND




 ROADS





COQUILLE RIVER AREA (2 of 5)
OIL & GAS LEASE APPLICATIONS

LEGEND

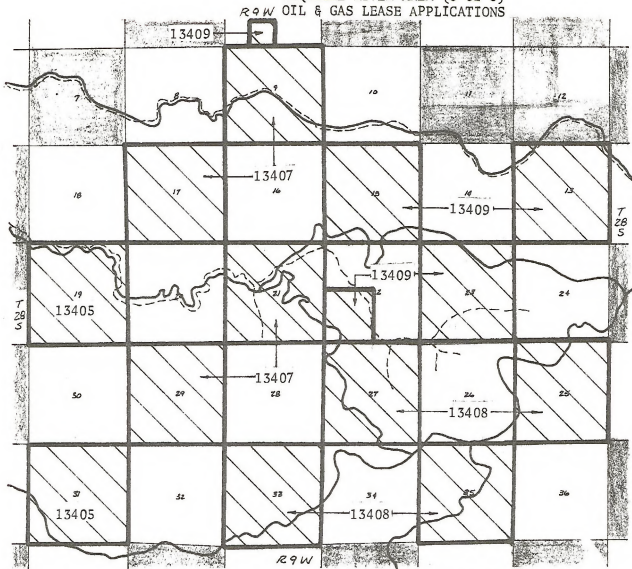
SCALE: 1" = 1 Mile

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  COOS BAY DIST. LEASE APPLICATIONS IN ROSEBURG DISTRICT EAR (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
-  STREAMS



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COQUILLE RIVER AREA (3 of 5)
OIL & GAS LEASE APPLICATIONS



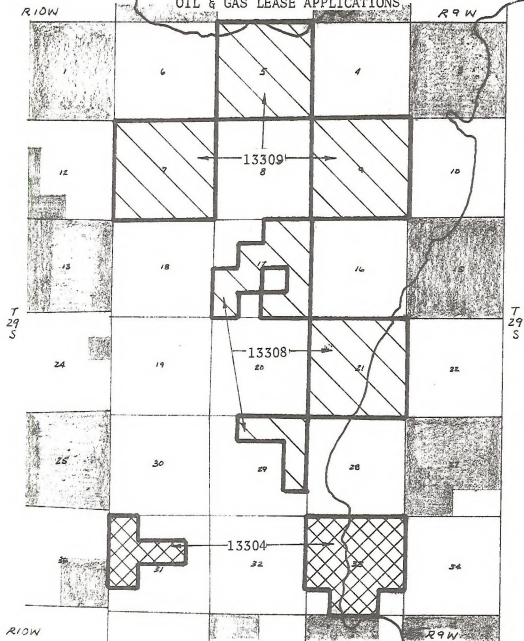
SCALE: 1" = 1 Mile

LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND


-  ROADS
-  STREAMS

COQUILLE RIVER AREA (4 of 5)
OIL & GAS LEASE APPLICATIONS




SCALE: 1" = 1 Mile

LEGEND

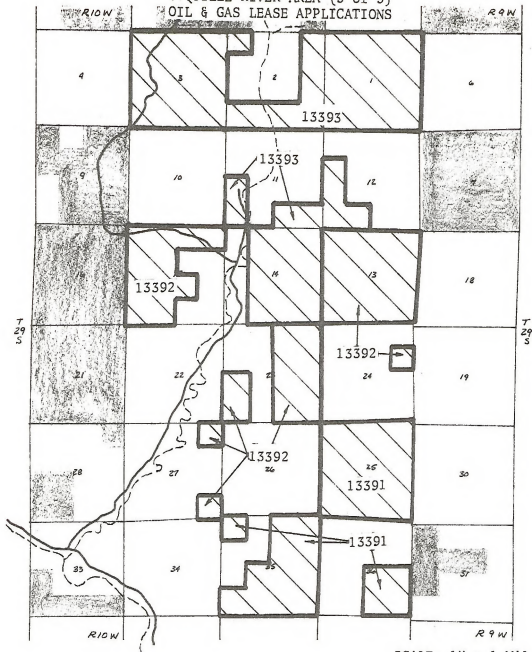
 OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)

 ADDITIONAL FEDERAL LAND

 COOS BAY DISTRICT LEASE
APPLICATIONS IN ROSEBURG
DISTRICT EAR (FEDERAL LAND)



 ROADS



COQUILLE RIVER AREA (5 of 5)
OIL & GAS LEASE APPLICATIONS



SCALE: 1" = 1 Mile

LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
-  STREAMS

APPENDIX IV

LEGAL DESCRIPTIONS OF OIL AND GAS LEASE APPLICATIONS

ON THE COOS BAY DISTRICT



Legal Reference	File Code	Serial Number
Oil and Gas Act of February 25, 1920 (41 Stat. 437, 30 USC sec. 181)	3111 A	OR 9756
Name and Mailing Address		
Mobil Oil Corporation 610/6666/61666/66666 666/66666/66/66666 P.O. Box 5444, Terminal Annex Denver, CO 80217		
Description of Land		
T. 23 S., R. 9 W., W.M., Oregon Sec. 12: SW $\frac{1}{4}$ SW $\frac{1}{4}$ Douglas County 13: Lots 1 through 13, inclusive, 16, 17 and 18, 1752.82 acres S $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ 14: Lots 9 through 16, inclusive, S $\frac{1}{2}$ 23: N $\frac{1}{2}$		
DATE OF ACTION	ACTION TAKEN	
August 4, 1972	Application received. bkl	

Legal Reference	File Code	Serial Number
Oil and Gas Act of February 25, 1920 (41 Stat. 437, 30 USC sec. 181)	3111 A	OR 9757
Name and Mailing Address Mobil Oil Corporation BLR/BOREB/FLORBE/BLRBE LBB/ABELEBL/CA/BOOBL P.O. Box 5444, Terminal Annex Denver, CO 80217		
Description of Land T. 23 S., R. 9 W., W.M., Oregon Douglas County Sec. 15: Lots 9 through 16, inclusive, S $\frac{1}{2}$ 2225.53 acres 16: All 22: All		
DATE OF ACTION	ACTION TAKEN	
August 4, 1972	Application received. bk1	

Legal Reference	File Code	Serial Number
Oil and Gas Act of February 25, 1920 (41 Stat. 437, 30 USC sec. 181)	3111 A	OR 9758
Name and Mailing Address Mobil Oil Corporation 5121/5000th/Flower/Street Local Address/CA/00051 P.O. Box 5444, Terminal Annex Denver, CO 80217		
Description of Land T. 23 S., R. 9 W., W.M., Oregon Sec. 8: All 9: All 10: All 17: All Douglas County 2210.49 acres		
DATE OF ACTION	ACTION TAKEN	
August 4, 1972	Application received. bkl	

Legal Reference	File Code	Serial Number
Oil and Gas Act of February 25, 1920 (41 Stat. 437, 30 USC sec. 181)	3111 A	OR 9759
Name and Mailing Address		
Mobil Oil Corporation 1001 S. 17th St., Denver, CO 80202 1001 S. 17th St., Denver, CO 80202 P.O. Box 5444, Terminal Annex Denver, CO 80217		
Description of Land		
T. 23 S., R. 9 W., W.M., Oregon Sec. 18: Lots 1 and 2, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$ 19: Lots 3 and 4, SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$ 30: NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$	Douglas County 1718.20 acres	
T. 23 S., R. 10 W., W.M., Oregon Sec. 35: All		
DATE OF ACTION	ACTION TAKEN	
August 4, 1972	Application received. bkl	

Oil and Gas Act of February 25, 1920
(41 Stat. 437, 30 USC sec. 181) 3111 A

OR 9760

Mobil Oil Corporation
612 South Flower Street
Los Angeles, CA 90051

T. 23 S., R. 9 W., W. M., Oregon
Sec. 20: N $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$
21: All
27: All
28: Lots 1, 2, 3, 4, 5, NE $\frac{1}{4}$,
SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$
29: All

Douglas County
2377.41 Acres

August 4, 1972 Application received. faw

Legal Reference <p>Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)</p>	File Code <p>3111 A</p>	Serial Number <p>OR 13304</p>
Name and Mailing Address <p>Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051</p>		
Description of Land <p>2. Land requested: State Oregon County Coos & Douglas T. 29 S.: R. 9 W.: Meridian Willamette</p> <p>Section 23: W/2; W/2 NE/4; NE/4 NE/4; NW/4 SE/4. Section 27: N/2; N/2 S/2; S/2 SW/4. Section 31: SW/4 NE/4; SE/4 NW/4; and Govt. Lots 1, 2 and 3. Section 33: N/2; N/2 S/2; SE/4 SW/4; SW/4 SE/4. Section 35: S/2; SW/4 NW/4; SE/4 NE/4.</p> <p>Total Area 2225.58 Acres</p>		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)		File Code 3111 A	Serial Number UR 13308
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051			
Description of Land			
2. Land requested: State Oregon County Coos & Douglas T. 29 S.: R. 9 W. Meridian Willamette			
Section 13: NE/4; S/2 NW/4; W/2 SW/4.			
Section 15: All.			
Section 17: W/2 SW/4; NE/4 SW/4; S/2 SE/4; NE/4 SE/4; S/2 NE/4; SE/4 NW/4; and Govt. Lots 1 and 2.			
Section 21: All.			
Section 29: N/2 NE/4; SE/4 NE/4; NE/4 SE/4; NE/4 NW/4.			
Total Area 2247.62 Acres			
DATE OF ACTION	ACTION TAKEN		
August 30, 1974	Application recd.faw		

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OR13309
Name and Mailing Address		
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
2. Land requested: State Oregon County Coos & Douglas T. 29 S. : R. 9 W. Meridian Willamette		
Section 5: All.		
Section 7: All.		
Section 9: All.		
Section 11: S/2; NW/4; S/2 NE/4.		
Total Area 2492.36 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR13378
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land 2. Land requested: State Oregon County Douglas T. 28 S. : R. 8 W. : Meridian Willamette Section 5: All. Section 7: All. Section 8: NE/4. Section 29: N/2 N/2; NW/4 SW/4; SE/4. Total Area 1795.65 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference <p style="text-align: center;">Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)</p>	File Code <p style="text-align: center;">3111 A</p>	Serial Number <p style="text-align: center;">OR 13387</p>
Name and Mailing Address <p style="text-align: center;">Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051</p>		

Description of Land		
2. Land requested: State Oregon	County Douglas	T. 26 S. : R. 8 W. : Meridian Willamette
Section 1: SW/4; S/2 NW/4; Govt. Lots 3 & 4; E/2 SE/4; SE/4 NE/4.		
Section 10: SE/4 NE/4.		
Section 12: SE/4 NW/4; NW/4 SE/4.		
Section 13: E/2; NW/4; E/2 SW/4.		
Section 24: E/2; S/2 SW/4; SW/4 NW/4.		
Total Area 1557.75 Acres		

DATE OF ACTION	ACTION TAKEN
August 30, 1974	Application recd.faw

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR 13388
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land 2. Land requested: State Oregon County Douglas T. : R. : Meridian <u>T. 26 S., R. 8 W., Willamette Meridian</u> Sec. 20: S/2; NE/4. Sec. 22: S/2; S/2 N/2. Sec. 30: E/2 SE/4; Govt. Lots 3 and 4. Sec. 32: NW/4 NW/4; Govt. Lots 1 and 2. Sec. 34: S/2 SW/4. <u>T. 27 S., R. 8 W., Willamette Meridian</u> Sec. 2: S/2 NW/4; NW/4 SW/4. Sec. 4: SW/4; S/2 N/2; Govt. Lots 1, 2, 3 and 4. Total Area 1922.95 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number UR13391
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
<p>1. Land requested: State Oregon County Coos T. 29 S.; R.10 W.; Meridian Willamette</p> <p>Section 25: All. Section 35: Govt. Lots 1, 2, 4, 5, 6, 7; SW/4 NE/4; W/2 SE/4; E/2 SW/4; SW/4 SW/4. Section 36: SE/4.</p> <p>Total Area 1281.61 Acres</p>		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OR13392
Name and Mailing Address		
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
2. Land requested: State Oregon County Coos T. 29 S. : R. 10 E. : S. 3 Meridian WPAmette		
Section 13: All. Section 15: W/2; N/2 NE/4; NW/4 SE/4. Section 23: NE/4; Govt. Lots 1, 2, 4, 5, 7 and 8. Section 24: Govt. Lot 4. Section 27: NE/4 NE/4; SE/4 SE/4.		
Total Area 1600.16 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR 13393
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
<p>3. Land requested: State Oregon County Coos T. 29 S.: R. 10 W.: Meridian Willamette</p> <p>Section 1: All. Section 2: S/2 S/2; NE/4 SE/4; SE/4 NE/4; Govt. Lots 1 and 4. Section 3: All. Section 11: W/2 SW/4; S/2 SE/4. Section 12: S/2 SW/4; NW/4 SW/4; SW/4 NW/4. Section 14: E/2; E/2 W/2.</p> <p>Total Area 2406.16 Acres</p>		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

(March 1965)
(formerly 4-954)

SERIAL REGISTER PAGE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Legal Reference <p>Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)</p>	File Code <p>3111 A</p>	Serial Number <p>OK13405</p>
Name and Mailing Address <p>Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051</p>		
Description of Land <p>1. Land requested: State Oregon County Coos T. 28 S.: R. 9 W. : Meridian Section 19: All. Willamette Section 31: All.</p> <p>Total Area 1341.12 Acres</p>		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR 13406
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Name and Mailing Address

Mobil Oil Corporation
612 So. Flower Street - Land Dept.
Los Angeles, CA 90051

Description of Land

2. Land requested: State Oregon County Coos T. 28 S. : R. 9 W. Meridian Willamette

Section 5: All.
Section 7: All.

Total Area 1317.52 Acres

DATE OF ACTION	ACTION TAKEN
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August 30, 1974	Application recd.faw
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Legal Reference	File Code	Serial Number																																				
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OK13407																																				
Name and Mailing Address																																						
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051																																						
Description of Land																																						
<table border="1"><thead><tr><th data-bbox="103 480 269 500">2. Land requested: State</th><th data-bbox="269 480 383 500">Oregon</th><th data-bbox="383 480 486 500">County</th><th data-bbox="486 480 663 500">Coos</th><th data-bbox="663 480 828 500">T.28 S. : R.9 W. :</th><th data-bbox="828 480 953 500">Meridian</th></tr></thead><tbody><tr><td data-bbox="103 521 186 541">Section 9:</td><td data-bbox="186 521 269 541">All.</td><td data-bbox="269 521 383 541"></td><td data-bbox="383 521 486 541"></td><td data-bbox="663 521 828 541"></td><td data-bbox="828 521 953 541">Willamette</td></tr><tr><td data-bbox="103 541 186 562">Section 17:</td><td data-bbox="186 541 269 562">All.</td><td data-bbox="269 541 383 562"></td><td data-bbox="383 541 486 562"></td><td data-bbox="663 541 828 562"></td><td data-bbox="828 541 953 562"></td></tr><tr><td data-bbox="103 562 186 583">Section 21:</td><td data-bbox="186 562 269 583">All.</td><td data-bbox="269 562 383 583"></td><td data-bbox="383 562 486 583"></td><td data-bbox="663 562 828 583"></td><td data-bbox="828 562 953 583"></td></tr><tr><td data-bbox="103 583 186 603">Section 29:</td><td data-bbox="186 583 269 603">All.</td><td data-bbox="269 583 383 603"></td><td data-bbox="383 583 486 603"></td><td data-bbox="663 583 828 603"></td><td data-bbox="828 583 953 603"></td></tr><tr><td colspan="5" data-bbox="714 672 849 692">Total Area 2560</td><td data-bbox="890 672 942 692">Acres</td></tr></tbody></table>			2. Land requested: State	Oregon	County	Coos	T.28 S. : R.9 W. :	Meridian	Section 9:	All.				Willamette	Section 17:	All.					Section 21:	All.					Section 29:	All.					Total Area 2560					Acres
2. Land requested: State	Oregon	County	Coos	T.28 S. : R.9 W. :	Meridian																																	
Section 9:	All.				Willamette																																	
Section 17:	All.																																					
Section 21:	All.																																					
Section 29:	All.																																					
Total Area 2560					Acres																																	
DATE OF ACTION	ACTION TAKEN																																					
August 30, 1974	Application recd.faw																																					

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR13408
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land 2. Land requested: State Oregon County Coos T.28 S. : R. 9 W. : Meridian Willamette Section 25: All. Section 27: All. Section 33: All. Section 35: All. Total Area 2560 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	0813409
Name and Mailing Address		
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
2. Land requested: State Oregon County Coos T. 28 S.: R. 9 W. : Meridian		
Section 4: SE/4 SW/4. Section 13: All. Section 15: All. Section 22: SW/4. Section 23: All.		
Total Area 2120 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

Legal Reference	File Code	Serial Number
Act of February 25, 1920; <u>Oil and Gas</u> (41 Stat. 437, 30 USC Sec. 181)	3111 A	UK13410
Name and Mailing Address		
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
2. Land requested: State Oregon County Coos T. 28 S.: R. 9 W. Meridian Willamette		
Section 1: All. Section 3: All. Section 11: All. Section 12: S/2; NW/4.		
Total Area 2410.26 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

<p>Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)</p>	<p>File Code 3111 A</p>	<p>Serial Number 0113411</p>
<p>Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051</p>		
<p>Description of Land</p> <p>2. Land requested: State Oregon County Coos T. 27 S.: R. 9 W. Meridian Willamette</p> <p>Section 17: All. Section 18: N/2 SE/4; SW/4 SE/4; Govt. Lots 5, 6, 7, 8, 9, 10, 11, 12. Section 19: All. Section 20: S/2.</p> <p>Total Area 2048.17 Acres</p>		
<p>DATE OF ACTION</p>	<p>ACTION TAKEN</p>	
<p>August 30, 1974</p>	<p>Application recd.faw</p>	

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OR13412

Name and Mailing Address

Mobil Oil Corporation
612 So. Flower Street - Land Dept.
Los Angeles, CA 90051

Description of Land

2. Land requested: State Oregon County Coos T. 27 S. : R. 9 W. : Meridian Willamette

Section 25: N/2.
Section 26: N/2; N/2 S/2.
Section 27: N/2; N/2 S/2.
Section 34: S/2; NE/4; S/2 NW/4; NE/4 NW/4.
Section 35: All.

Total Area 2520 Acres

DATE OF ACTION	ACTION TAKEN
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August 30, 1974	Application recd.faw
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(March 1965)
(formerly 4-954)

SERIAL REGISTER PAGE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OR 13413
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land 2. Land requested: State Oregon County Coos T. 27 S.: R. 9 W. Meridian Willamette Section 21: All. Section 22: All. Section 23: All. Section 24: All. Total Area 2560 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

(March 1965)
(formerly 4-954)

SERIAL REGISTER PAGE

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	UR 13414

Name and Mailing Address

Mobil Oil Corporation
612 So. Flower Street - Land Dept.
Los Angeles, CA 90051

Description of Land

2. Land requested: State Oregon County Coos T. 27 S.: R. 9 W. : Meridian
Willamette

Section 9: All.
Section 10: All.
Section 14: All.
Section 15: All.

Total Area 2560 Acres

DATE OF ACTION	ACTION TAKEN
August 30, 1974	Application recd.faw

278

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	UR 13415
Name and Mailing Address		
Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land		
1. Land requested: State Oregon County Coos T. 27 S. : R. 9 W. : Meridian Willamette		
Section 4: All. Section 5: All. Section 6: SE/4; SE/4 SW/4; Govt. Lot 1. Section 7: NE/4; E/2 NW/4; Govt. Lots 1, 2, 3, 4, 5, 7, 8, 9, 10. Section 8: W/2 SW/4; N/2 NW/4.		
Total Area 2361.48 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	

(March 1965)
(formerly 4-954)

SERIAL REGISTER PAGE

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Legal Reference	File Code	Serial Number
Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	3111 A	OR 3416

Name and Mailing Address

Mobil Oil Corporation
612 So. Flower Street - Land Dept.
Los Angeles, CA 90051

Description of Land

2. Land requested: State Oregon County Coos T. 27 S.: R. 9 W. Meridian: Willamette

Section 29: All.
Section 30: SE/4; E/2 W/2; Govt. Lots 1, 2, 3 and 4.
Section 31: All.
Section 33: S/2 SE/4; NE/4 SE/4.

Total Area 1881.64 Acres

DATE OF ACTION	ACTION TAKEN
August 30, 1974	Application recd.faw

Legal Reference Act of February 25, 1920; Oil and Gas (41 Stat. 437, 30 USC Sec. 181)	File Code 3111 A	Serial Number OR13422
Name and Mailing Address Mobil Oil Corporation 612 So. Flower Street - Land Dept. Los Angeles, CA 90051		
Description of Land 2. Land requested: State Oregon County Douglas T. 23 S. : R. 9 W. : Meridian Willamette Section 3: S/2 NW/4; SW/4; Govt. Lots 3 & 4. Section 4: S/2 NE/4; SE/4; Govt. Lots 1 & 2. Section 6: E/2 SE/4. Total Area 716.05 Acres		
DATE OF ACTION	ACTION TAKEN	
August 30, 1974	Application recd.faw	



APPENDIX V

SOIL ASSOCIATION DESCRIPTIONS



Jory Association (Symbol B)

This association occurs on moderately sloping foothills along the Umpqua River between Elkton and Scottsburg. They developed in fine textured colluvium from sedimentary and volcanic rocks in areas receiving less than 60 inches of precipitation. They are dry for long periods each summer. White oak and poison oak are common on these soils. This association makes up about 2 percent of the area.

Deep, red, clayey Jory soils make up about 70 percent of the area and occur on old stable rounded foothills and uniform sideslopes. Other xeric soils, that were not mapped in the District because of their small extent, make up about 30 percent of the area. They include the moderately deep, red clayey Nekia soils and unclassified xeric, loamy-skeletal soils.

The soils of this association are used for farming, timber production, wildlife habitat and watershed. The long dry period during the summer is a chief limitation for timber production.

Blachly-Preacher-Bohannon Association (Symbol D)

This association occurs on gently sloping to steep ridgetops, sideslopes and slump benches between the East and Middle Forks of the Coquille River and on Callahan Ridge. They developed in fine and medium textured colluvium from sedimentary rocks in areas receiving between 60 and 80 inches of precipitation. The soils are not dry for as much as 45 days during the summer. Douglas fir is the dominant tree on these soils. This association makes up about 10 percent of the area.

Deep red, well developed, fine Blachly soils make up about 50 percent of the area; deep, brown fine loamy Preacher soils make up about 30 percent of the area; and moderately deep, brown fine loamy Bohannon soils make up about 20 percent of the area. The Blachly soils are mostly on the gentle sloping, slumpy ridgetops and sideslopes. The Preacher soils are mostly on moderately steep, slumpy sideslopes. The Bohannon soils are on the steep sideslopes and finger ridges. Mingled with the Blachly soils are minor inclusions of red, clayey Honeygrove soils. Mingled with the Preacher and Bohannon soils are minor inclusions of the moderately deep, loamy skeletal Digger soils and of the shallow brown loamy skeletal Jason soils.

The soils of this association are used for timber production, farming, wildlife habitat and watershed. Compaction susceptibility is a hazard on the Blachly soils.

Preacher-Blachly-Bohannon Association (Symbol E)

This association occurs on gently sloping to steep ridgetops, sideslopes and slump benches widely scattered between Catching Slough and Fairview, and between Tioga Creek and the Middle Fork of the Coquille River east of Sandy Creek. They developed in fine and medium textured colluvium from sedimentary rocks in areas receiving between 60 and 80 inches of precipitation. The soils are not dry for as much as 45 days during the

summer. Douglas fir is the dominant tree on these soils. This a association makes up about 20 percent of the area.

Deep, brown, fine loamy Preacher soils make up about 50 percent of the area, deep, red, fine Blachly soils make up about 30 percent of the area, and moderately deep, brown, fine loamy Bohannon soils make up about 20 percent of the area. The Preacher soils are mostly on moderately steep, slumpy sideslopes. The Blachly soils are mostly on the gently sloping, slumpy ridgetops and sideslopes. The Bohannon soils are on the steep sideslopes and finger ridges. Mingled with the Preacher soils are minor inclusions of moderately deep, brown, loamy skeletal Digger soils. Mingled with the Blachly soils are minor inclusions of deep, red, well developed, clayey Honeygrove soils. Mingled with the Bohannon soils are minor inclusions of the shallow, brown, loamy skeletal Jason soils.

The soils of this association are used for timber production, farming, wildlife habitat and watershed. Compaction susceptibility is a hazard on the Blachly soils.

Preacher-Slickrock-Bohannon-Association (Symbol S)

This association occurs on gently sloping to steep ridgetops, sideslopes and slump benches in the vicinity of Ferntop, Little Mill Creek and Steampot Ridge, north of Scottsburg, Oregon. They developed in medium-textured colluvium from sedimentary rocks in areas receiving between 70 and 90 inches of precipitation. The soils are not dry for as much as 45 days during the summer. Douglas fir is the dominant tree on these soils. This association makes up about 1 percent of the area.

Deep brown, fine loamy Preacher soils make up about 50 percent of the area, deep, black, Slickrock soils make up about 30 percent of the area, and moderately deep, brown, fine loamy Bohannon soils make up about 20 percent of the area. The Preacher soils are mostly on gently sloping, slumpy ridgetops and sideslopes. The Slickrock soils are mostly on gently sloping and moderately steep slump benches and uneven sideslopes. The Bohannon soils are on the steep sideslopes and finger ridges. Mingled with the Preacher soils are minor inclusions of the deep, red, fine Blachly soils. Mingled with the Slickrock soils are minor inclusions of the deep, brown, clayey Apt soils. Mingled with the Bohannon soils are minor inclusions of the shallow, brown, loamy skeletal Jason soils.

The soils of this association are used for timber production, farming, wildlife habitat and watershed. Landslide and erosion susceptibility are hazards on Slickrock soils.

Preacher-Digger-Jason Association (Symbol F)

This association occurs on gently sloping to extremely steep ridgetops, sideslopes, slump benches and headwalls in the Burnt Mountain Area at the headwaters of the East Fork Coquille River and in the vicinity of Mehl Creek and Waggoner Creek south of Elkton in the Loon Lake Resource

Area. They developed in medium textured and coarse textured colluvium from sedimentary rocks in areas receiving between 60 and 80 inches of precipitation. The soils are not dry for as much as 45 days during the summer. Douglas fir is the dominant tree on these soils. This association makes up about 5 percent of the area.

Deep, brown, fine loamy Preacher soils make up about 50 percent of the area; moderately deep, brown, loamy skeletal Digger soils make up about 30 percent of the area, and shallow, brown, loamy skeletal Jason soils make up about 20 percent of the area. The Preacher soils are mostly on the gently sloping slumpy ridgetops and sideslopes. The Digger soils are mostly on the steep sideslopes and finger ridges. The Jason soils are mostly on the very steep sideslopes and headwalls. Mingled with the Preacher soils are minor inclusions of the deep, red, fine Blachly soils. Mingled with the Digger soils are minor inclusions of the moderately deep, brown, fine loamy Bohannon soils and the deep, brown, loamy skeletal Unnamed 166 soils. The soils of this association are used for timber production, farming, wildlife habitat and watershed. Landslide and erosion susceptibility is a hazard on Jason soils.

Bohannon-Jason-Preacher Association (Symbol G)

This association occurs on steep to very steep ridgetops, sideslopes and headwalls throughout Coos County. They developed in medium-textured and coarse textured colluvium from sedimentary rocks in areas receiving between 60 and 100 inches of precipitation. The soils are not dry for as much as 45 days during the summer. Douglas fir is the dominant tree on these soils. The association makes up about 10 percent of the area.

Moderately deep, brown, fine loamy Bohannon soils make up about 50 percent of the area; shallow, brown, loamy skeletal Jason soils make up about 30 percent of the area; and deep, brown, fine loamy Preacher soils make up about 20 percent of the area.

The Bohannon soils are mostly on the steep sideslopes and finger ridges. The Jason soils are mostly on the very steep sideslopes and headwalls. The Preacher soils are on the gently sloping and moderately steep slumping ridgetops and sideslopes. Mingled with the Bohannon soils are minor inclusions of the moderately deep, brown, loamy skeletal Digger soils. Mingled with the Jason soils are minor inclusions of the brown, Lithic, loamy skeletal Umpcoos soils and Rockland Miscellaneous Land-Type. Mingled with the Preacher soils are minor inclusions of the deep, red, fine Blachly soils.

The soils of this association are used for timber production, farming, wildlife habitat and watershed.

Digger-Jason-Rockland Association (Symbol J)

This association occurs on very steep and extremely steep narrow ridgetops, finger ridges, sideslopes and headwalls throughout the Coos Bay

District. They developed in coarse textured colluvium from sedimentary rocks in areas receiving between 60 and 100 inches of precipitation. The soils are not dry for as much as 45 days during the summer. Douglas fir is the cominant tree on these soils. This association makes up about 5 percent of the area.

Moderately deep, brown, loamy skeletal Digger soils make up about 45 percent of the area. Shallow, brown, loamy skeletal Jason soils make up about 35 percent of the area, and Rockland Miscellaneous Land Type makes up the remaining 20 percent of the area.

The Digger soils are mostly on the very steep finger ridges and sideslopes. The Jason soils are mostly on the narrow ridgetops and very steep to extremely steep sideslopes and headwalls. The Rockland is on the extremely steep sideslopes and rock headwalls. Mingled with the Digger soils are minor inclusions of the deep, brown, loamy skeletal Unnamed 166 soils and the moderately deep, brown, fine loamy Bohannon soils. Mingled with the Jason soils and the Rockland Miscellaneous Land Type are the Lithic, brown, loamy skeletal Umpcoos soils.

The soils of this association are used for timber production, wildlife habitat and watershed.

One common characteristic shared by nearly all of the soil series linked by the various soil associations listed above is their susceptibility to mass soil movements and slumping. On slopes of only moderate steepness, (35% to 60%), undisturbed slopes in seemingly stable areas will sometimes fail when triggered by extended periods of heavy rainfall. Areas touched by man's activities, road construction, logging, etc., seem to accelerate these movements. In the EAR area, roads that have been constructed for years have suddenly failed after periods of heavy rains.

APPENDIX VI

- VI-A Fragile Site Locations within Lease Application Areas.
- VI-B Existing Road System - Lease Application Areas and Vicinity
- VI-C Critical Wildlife (elk & fish) Habitat Locations within the Lease Application Areas.

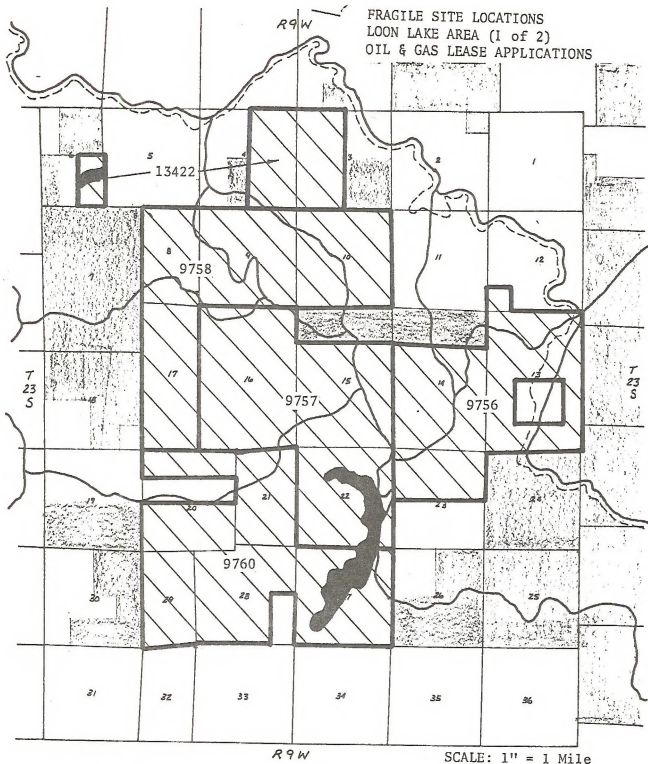


APPENDIX VI-A

FRAGILE SITE LOCATIONS
WITHIN THE LEASE APPLICATION AREAS








FRAGILE SITE LOCATIONS
 LOON LAKE AREA (1 of 2)
 OIL & GAS LEASE APPLICATIONS



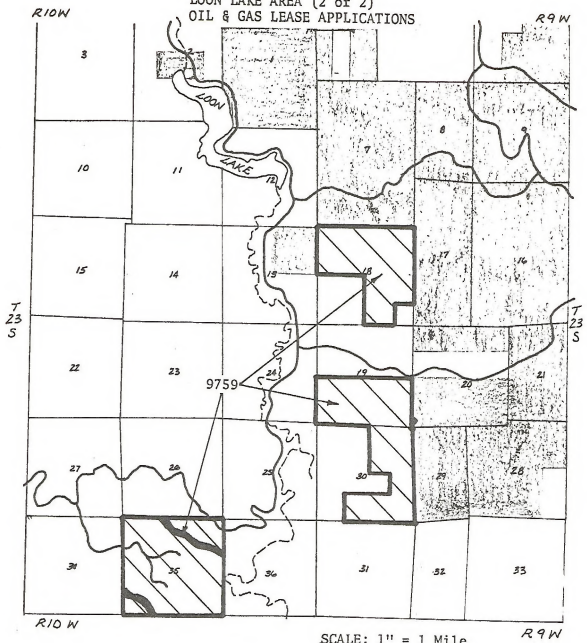
SCALE: 1" = 1 Mile

LEGEND



-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND




-  ROADS
-  STREAMS
-  FRAGILE AREAS

LOON LAKE AREA (2 of 2)
OIL & GAS LEASE APPLICATIONS



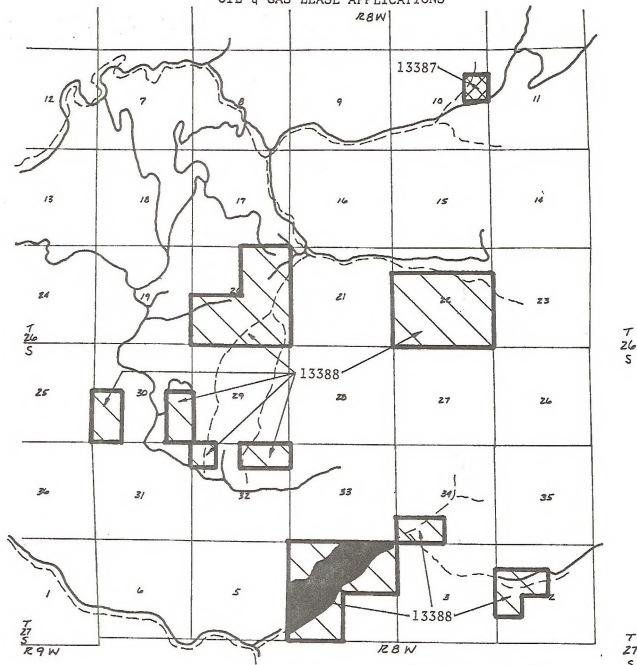
LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
-  STREAMS
-  FRAGILE AREAS






SCALE: 1" = 1 Mile

FRAGILE SITE LOCATIONS
 CALLAHAN AREA
 OIL & GAS LEASE APPLICATIONS



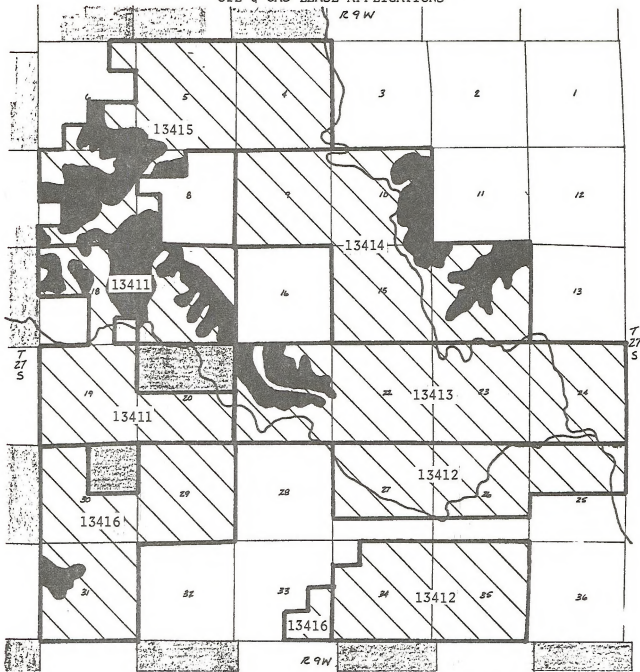
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LEGEND

- | | | | |
|---|--|---|---------------|
|  | OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND) |  | ROADS |
|  | COOS BAY DISTRICT LEASE
APPLICATIONS IN ROSEBURG DISTRICT
EAR (FEDERAL LAND) |  | STREAMS |
| | |  | FRAGILE AREAS |



PROPOSED OIL & GAS LEASE LOCATIONS
COQUILLE RIVER AREA (1 of 5)
OIL & GAS LEASE APPLICATIONS



R 9 W



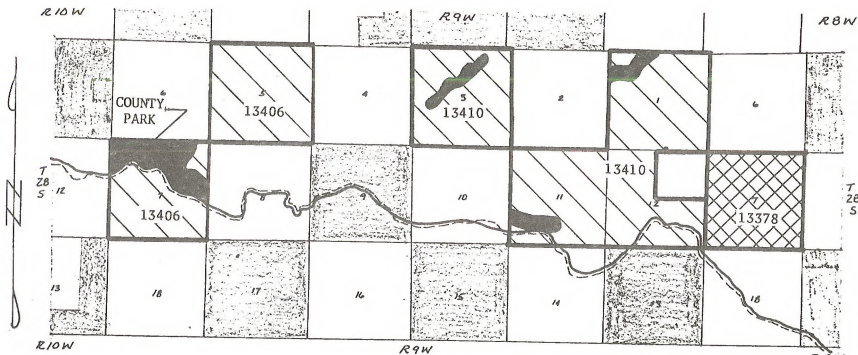
T 27 S

LEGEND

 OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)
 ADDITIONAL FEDERAL LAND

 ROADS
 FRAGILE AREAS




SCALE: 1" = 1 Mile






FRAGILE SITE LOCATIONS
 COQUILLE RIVER AREA (2 of 5)
 OIL & GAS LEASE APPLICATIONS

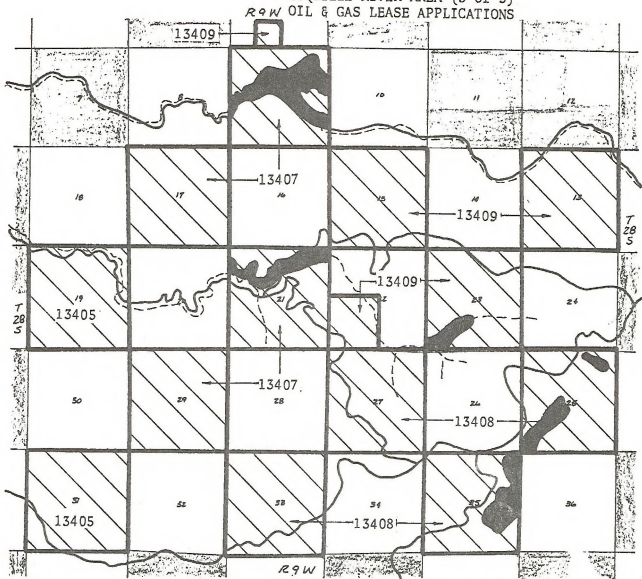
LEGEND

SCALE: 1" = 1 Mile

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  COOS BAY DIST. LEASE APPLICATIONS IN ROSEBURG DISTRICT EAR (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
-  STREAMS
-  FRAGILE AREAS

FRAGILE SITE LOCATIONS
 COQUILLE RIVER AREA (3 of 5)
 OIL & GAS LEASE APPLICATIONS



SCALE: 1" = 1 Mil.

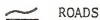
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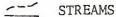
OIL & GAS LEASE APPLICATIONS
 (FEDERAL LAND)



ADDITIONAL FEDERAL LAND



ROADS

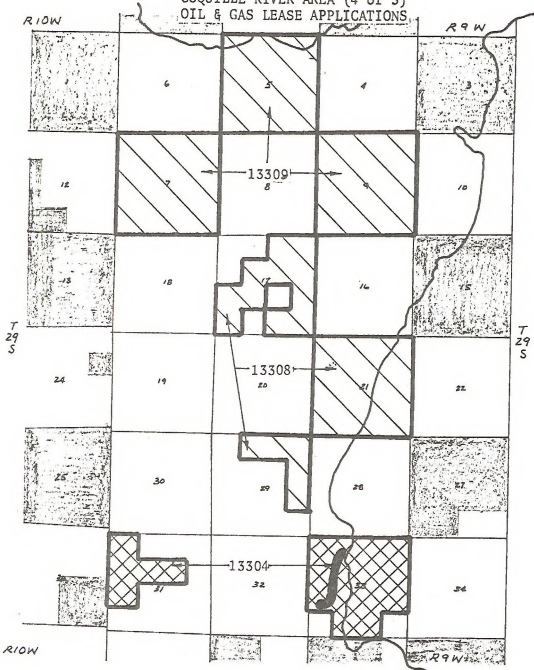


STREAMS




FRAGILE AREAS


FRAGILE SITE LOCATIONS
 COQUILLE RIVER AREA (4 of 5)
 OIL & GAS LEASE APPLICATIONS




SCALE: 1" = 1 Mile

LEGEND

 OIL & GAS LEASE APPLICATIONS
 (FEDERAL LAND)

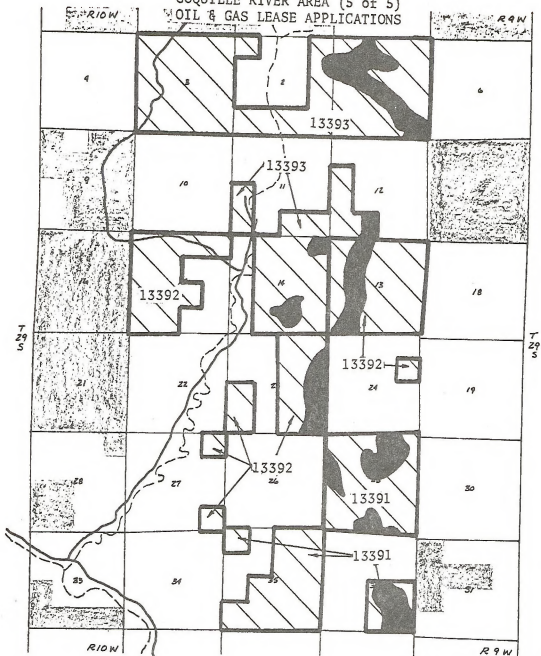
 COOS BAY DISTRICT LEASE
 APPLICATIONS IN ROSEBURG
 DISTRICT EAR (FEDERAL LAND)

 ADDITIONAL FEDERAL LAND

 ROADS



 FRAGILE AREAS




FRAGILE SITE LOCATIONS
 COQUILLE RIVER AREA (5 of 5)
 OIL & GAS LEASE APPLICATIONS



SCALE: 1" = 1 Mile

LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
-  STREAMS
-  FRAGILE AREAS

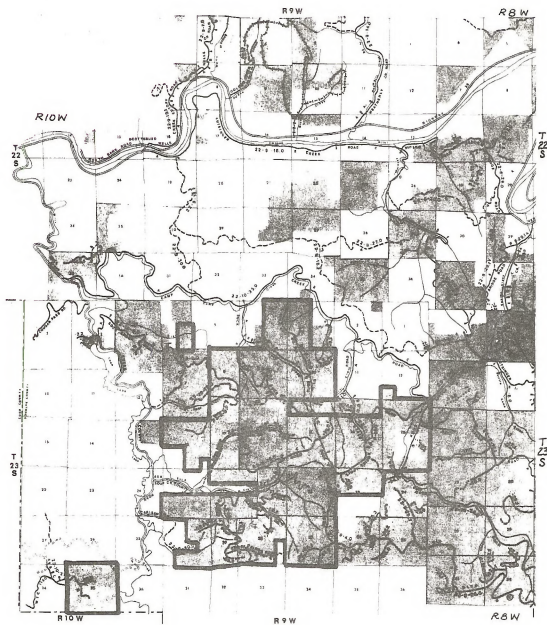
APPENDIX VI-B

EXISTING ROAD SYSTEM - LEASE APPLICATION

AREAS AND VICINITY



ROAD SYSTEM
LOON LAKE AREA

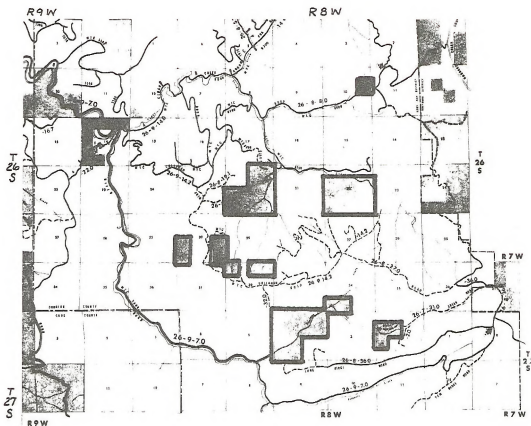


SCALE: 1/2" = 1 Mile

LEGEND

— LEASE AREA GENERAL BOUNDARY

ROAD SYSTEM
CALLAHAN AREA

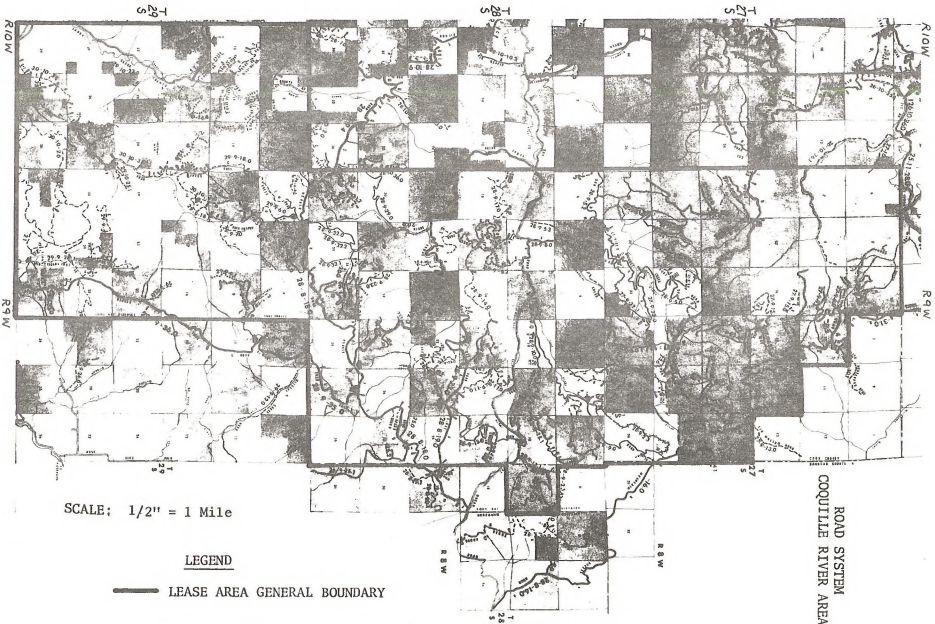


SCALE: 1/2" = 1 Mile

LEGEND

—— LEASE AREA GENERAL BOUNDARY

ROAD SYSTEM
COQUILLE RIVER AREA



SCALE: 1/2" = 1 Mile

LEGEND

— LEASE AREA GENERAL BOUNDARY

305

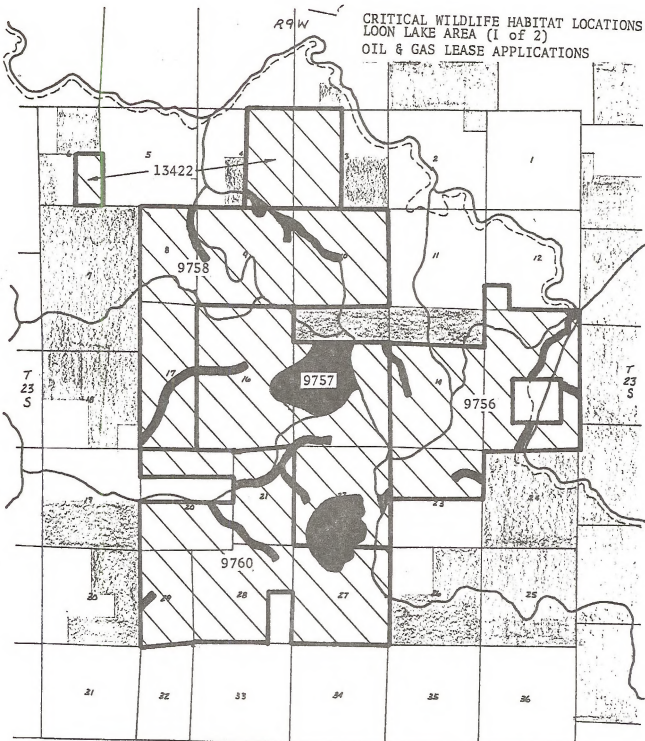


APPENDIX VI-C

CRITICAL WILDLIFE (ELK & FISH) HABITAT
LOCATIONS WITHIN THE LEASE APPLICATION AREAS





CRITICAL WILDLIFE HABITAT LOCATIONS
 LOON LAKE AREA (1 of 2)
 OIL & GAS LEASE APPLICATIONS




SCALE: 1" = 1 Mile

LEGEND

 OIL & GAS LEASE APPLICATIONS
 (FEDERAL LAND)

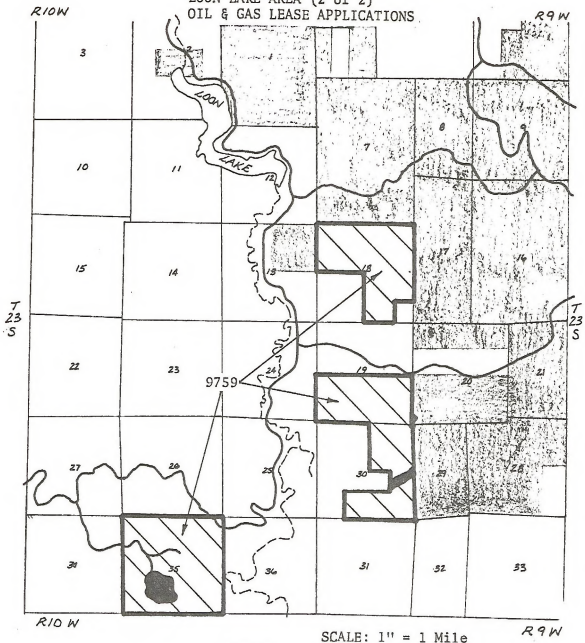
 ADDITIONAL FEDERAL LAND

 ROADS

 STREAMS







 ELK } CRITICAL WILDLIFE
 FISH } HABITAT AREAS

CRITICAL WILDLIFE HABITAT LOCATIONS
 LOON LAKE AREA (2 of 2)
 OIL & GAS LEASE APPLICATIONS

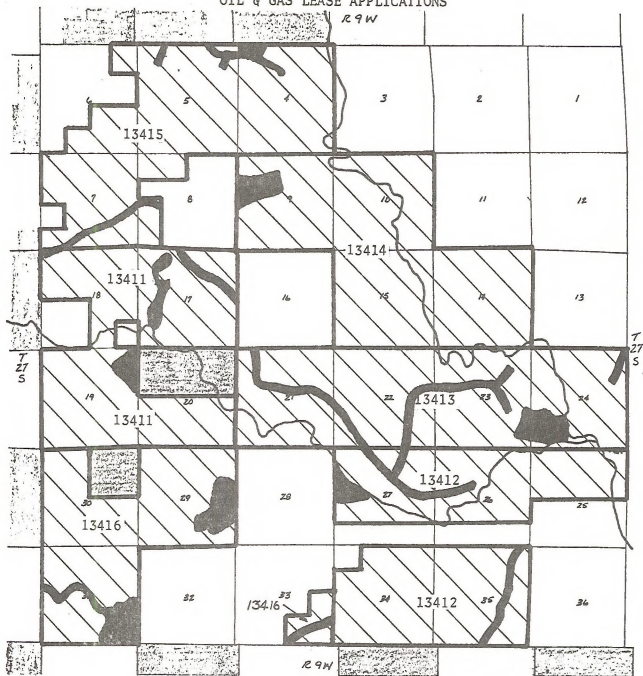


SCALE: 1" = 1 Mile



LEGEND




- | | | | |
|---|--|---|-----------------------------------|
|  | OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND) |  | ROADS |
|  | ADDITIONAL FEDERAL LAND |  | STREAMS |
| | |  | } CRITICAL WILDLIFE HABITAT AREAS |
| | |  | |

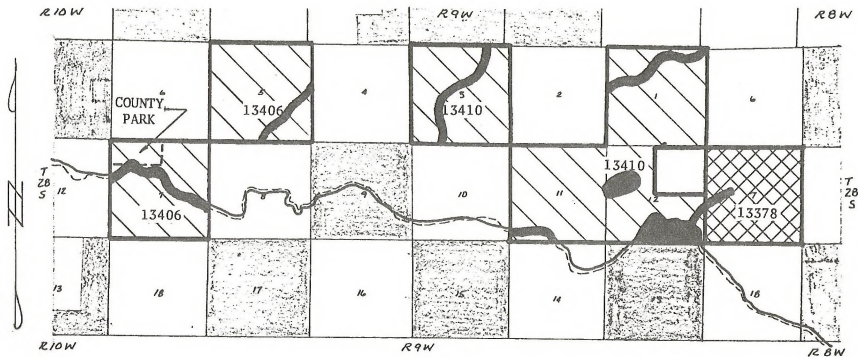
CRITICAL WILDLIFE HABITAT LOCATIONS
 COQUILLE RIVER AREA
 OIL & GAS LEASE APPLICATIONS



LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND




-  ROADS
 -  ELK
 -  FISH
- } CRITICAL WILDLIFE HABITAT AREAS







CRITICAL WILDLIFE HABITAT LOCATIONS
 COQUILLE RIVER AREA
 OIL & GAS LEASE APPLICATIONS

SCALE: 1" = 1 Mile

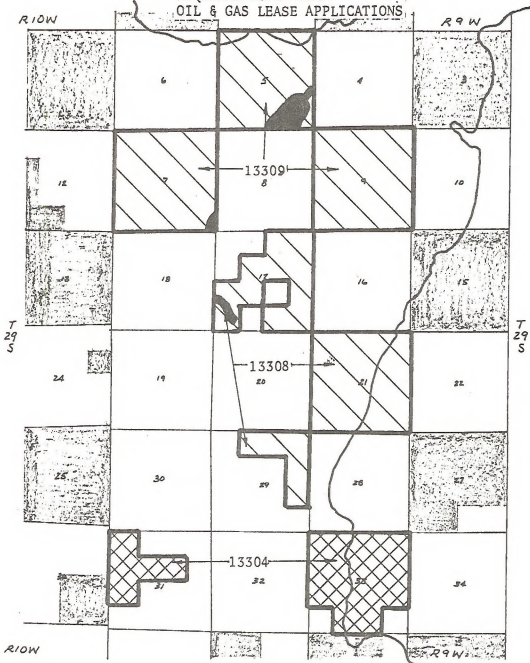
LEGEND

-  OIL & GAS LEASE APPLICATIONS (FEDERAL LAND)
-  COOS BAY DIST. LEASE APPLICATIONS IN ROSEBURG DISTRICT EAR (FEDERAL LAND)
-  ADDITIONAL FEDERAL LAND

-  ROADS
 -  STREAMS
 -  ELK
 -  FISH
- } CRITICAL WILDLIFE HABITAT AREAS


2/1


CRITICAL WILDLIFE HABITAT LOCATIONS
COQUILLE RIVER AREA
OIL & GAS LEASE APPLICATIONS



SCALE: 1" = 1 Mile

LEGEND

 OIL & GAS LEASE APPLICATIONS
(FEDERAL LAND)

 COOS BAY DISTRICT LEASE
APPLICATIONS IN ROSEBURG
DISTRICT EAR (FEDERAL LAND)



ADDITIONAL FEDERAL LAND



ROADS



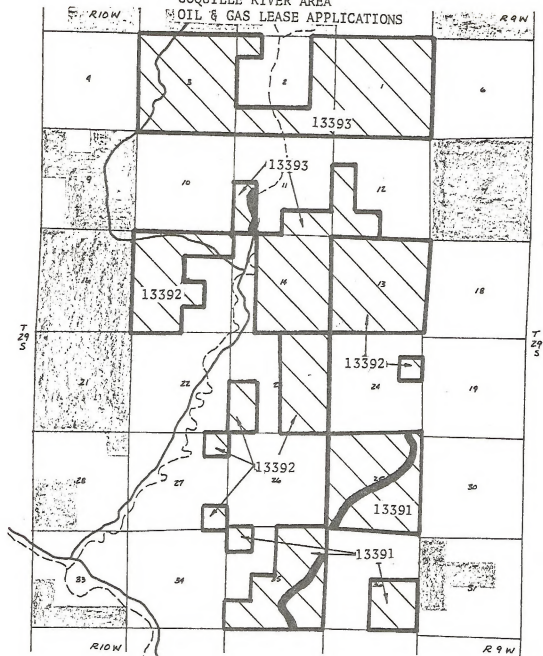
ELK



FISH


} CRITICAL WILDLIFE
HABITAT AREAS


CRITICAL WILDLIFE HABITAT LOCATIONS
 COQUILLE RIVER AREA
 OIL & GAS LEASE APPLICATIONS





SCALE: 1" = 1 Mile

LEGEND

 OIL & GAS LEASE APPLICATIONS
 (FEDERAL LAND)

 ADDITIONAL FEDERAL LAND

 ROADS

 STREAMS

 ELK } CRITICAL WILDLIFE
 FISH } HABITAT AREAS

APPENDIX VII

PARTIAL LISTING OF COMMON NATIVE
PLANT SPECIES IN THE REPORT AREA



Partial Listing of Common Native Plant Species
in the Report Areas

Conifers

Douglas-fir
Incense cedar
Port Orford cedar
Sitka spruce
Western Hemlock
Western redcedar

Pseudotsuga Menziesii
Libocedrus decurrens
Chamaecyparis lawsoniana
Picea sitchensis
Tsuga heterophylla
Thuja plicata

Hardwoods

Bigleaf maple
Golden chinkapin
Oregon-myrtle
Pacific madrone
Red alder
Wild cherry
Willow

Acer macrophyllum
Castanopsis chrysophylla
Umbellularia californica
Arbutus menziesii
Alnus rubra
Prunus spp.
Salix spp.

Shrubs

Blackberry
Blue myrtle
California hazel

Devilsclub
Evergreen huckleberry
Foxglove
Oceanspray
Oregongrape
Ovalleaf huckleberry
Pacific dogwood
Pacific poison oak
Red Elderberry

Red huckleberry
Rhododendron
Salal
Salmonberry
Thimbleberry
Varnishleaf
Vine maple
Western yew
Wild rose

Rubus spp.
Ceanothus Thyrsiflorus
Corylus cornuta var.
californica
Oplopanax horridum
Vaccinium ovatum
Digitalis purpurea
Holodiscus discolor
Berberis nervosa
Vaccinium ovalifolium
Cornus nuttallii
Rhus diversiloba
Sambucus racemosa var.
arborescens
Vaccinium parvifolium
Rhododendron macrophyllum
Gaultheria shallon
Rubus spectabilis
Rubus parviflorus
Ceanothus spp.
Acer circinatum
Taxus brevifolia
Rosa spp.

Herbs

Australian fireweed
Deerfern
Evergreen violet
False lily-of-the-valley
Ladyfern
Lupine
Oregon iris
Oregon oxalis
Pacific peavine
Pearly everlasting
Rustyleaf
Smith's fairybells
Snowqueen
Swordfern
Twinflower
Western fescue
Western maidenhair fern
Western prince's pine
Whipple vine
White trillium
Wild ginger

Erechtites prenanthoides
Blechnum spicant
Viola sempervirens
Maianthemum dilatatum
Athyrium filix-femina
Lupinus spp.
Iris tenax
Oxalis oregana
Lathyrus polyphyllus
Anaphalis margaritacea
Menziesia ferruginea
Disporium smithii
Synthyris reniformis
Polystichum munitum
Linnea borealis
Festuca occidentalis
Adiantum pedatum
Chimaphila umbellata
Whipplea modesta
Trillium ovatum
Asarum caudatum

APPENDIX VIII

LIST OF MAMMALS, BIRDS, REPTILES AND
AMPHIBIANS FOUND IN THE ANALYSIS AREA



All Mammals Found in the Following List are Year-Around Residents to the Planning Unit

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>POPULATION STATUS</u>
Roosevelt Elk	<u>Cervus canadensis</u>	Forest and Forest edge	S
Black-tailed deer	<u>Odocoileus hemionus</u>	Forest and Forest edge	I
Black Bear	<u>Ursus americanus</u>	Forest and Rough terrain	I
Mountain Lion	<u>Felis cancolor</u>	Rugged Forest Areas	I
River Otter	<u>Lutra canadensis</u>	Streams and Stream banks	I
Beaver	<u>Castor canadensis</u>	Streams, Swamps, Ponds	I
Marten	<u>Martes americana</u>	Mature Forests	U
Muskrat	<u>Ondatra zibethica</u>	Marshes, Streams	U to I
Raccoon	<u>Procyon lotor</u>	Near Streams in Forest	U to D
Mink	<u>Mustela vison</u>	Near Streams	U
Coyote	<u>Canis latrans</u>	Brushy Areas, Cut-overs	I
Striped Skunk	<u>Mephitis mephitis</u>	Mixed Forest, Brush land	U
Spotted Skunk	<u>Spilogale putorius</u>	Brushy areas near Streams	U
Short-tailed Weasel	<u>Mustela erminea</u>	Brushy, Forests, near water	I
Long-tailed Weasel	<u>Mustela Frenata</u>	Forests, Brush near Water	I
Ring-tailed Cat	<u>Bassariscus astutus</u>	Rocky Forest Area Near Water	U

Population Status - I, Increasing, S, Stable, D, Decreasing, U, Unknown.

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All Mammals Found in the Following List are Year-Around Residents to the Planning Unit

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>POPULATION STATUS</u>
Brush rabbit	<u>Sylvilagus bachmani</u>	Brushy Areas	I
Townsend Chipmunk	<u>Eutamias Townsendi</u>	Coniferous Forest and Brush	S
Western Gray Squirrel	<u>Sciurus griseus</u>	Open Forest Edge Areas	S
Northern Flying Squirrel	<u>Glaucomys sabrinus</u>	Coniferous and Mixed Forest	S to D
Mountain Beaver	<u>Apodontia rufa</u>	Moist Forest Areas	S
Deer Mouse	<u>Peromyscus maniculatus</u>	All types of Habitat	I
Towbridge shrew	<u>Sorex towbridgei</u>	Coniferous Forest	U
Townsend Mole	<u>Scapanus Townsendi</u>	Forest and Grassy Areas	U
Big Brown Bat	<u>Eptesicus fuscus</u>	Forested Areas, Caves	U
Porcupine	<u>Erethizon dorsatum</u>	Brushy Areas and Forest	I
Shrew Mole	<u>Neurotrichus gibbsi</u>	Moist Areas along Streams	S
Pocket gopher	<u>Thomomys bottae</u>	Meadows, Valleys	U
Wood Rat (Bushy-tailed)	<u>Neotoma cinerea</u>	High Rocky Areas	U
Dusky Tree Mouse	<u>Phenacomys silvicola</u>	Coniferous Trees	U

Population Status-I, Increasing, S, Stable, D, Decreasing, U, Unknown.

ABUNDANCE KEY

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Ruffed grouse	<u>Banasa umbellus</u>	Mixed Forest	Resident	Fairly Common
Blue grouse	<u>Dendragapus obscurus</u>	Forest, wooded slopes	Resident	Fairly Common
Mountain quail	<u>Oreortyx picta</u>	Woodlands and Forests	Resident	Fairly Common
California quail	<u>Lophortyx californicus</u>	Woodlands and Brush	Resident	Common
Band-tailed pigeon	<u>Columbia fasciata</u>	Coast Forest and Brush	Summer Res	Fairly Common
Mourning dove	<u>Zensidura macroura</u>	Fields, Orchards	Resident	Fairly Common
Pheasant	<u>Phasianus calchicus</u>	Agricultural Areas	Resident	Uncommon

Upland game bird hunting is normally carried out incidental to other hunting within the Planning Unit with the exception of Band-tailed pigeons.*

*Hunted along Smith River, Sandy Creek Bridge area, Cherry Creek, Blue Ridge and along B.P.A. power line R/W areas to name a few. (See table #22)

RAPTORS

FAMILY ACCIPITRIDAE

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Bald Eagle	<u>Haliaeetus leucocephalus</u>	Coastal Rivers and lakes	Migrate during Fall - Return Jan.	Uncommon
Golden Eagle	<u>Aquila chrysaetos</u>	High Elevation-near openings	Migrates During Fall Returns Spg.	Rare
Red-tailed Hawk	<u>Buteo jamaicensis</u>	Clear cuts & Forested Areas	Resident	Common
Goshawk	<u>Accipiter gentilis</u>	Coniferous Forest	Summer Resident	Rare
Sharp-Shinned Hawk	<u>Accipiter striatus</u>	Forest, Mixed Woodlands	Resident	Uncommon
Coopers Hawk	<u>Accipiter cooperii</u>	Woodlands & Draws	Resident	Uncommon
Marsh Hawk	<u>Circus cyaneus</u>	Open Fields, Marshes	Resident	Common

FAMILY PANDIONIDAE

Osprey	<u>Pandion haliaetus</u>	Coastal lakes & Rivers	Summer Resident	Uncommon
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FAMILY FALCONIDAE

Pigeon Hawk	<u>Falco columbarius</u>	Woodland areas	Resident	Rare
Sparrow Hawk	<u>Falco sparverius</u>	Woodland - open	Resident	Common

FAMILY TYTONIDAE

Barn Owl	<u>Tyto alba</u>	Barns & abandoned Bldgs.	Resident	Common
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RAPTORS (CONT.)

FAMILY STIGIDAE

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Screech Owl	<u>Otus asio</u>	Decidious Forest	Resident	Common
Great Horned Owl	<u>Bubo virginianus</u>	All Arcas	Resident	Common
Snowy Owl	<u>Nyctea scandiaca</u>	Open Areas-Fields	Winter Resident	Irregular
Pygmy Owl	<u>Glaucidium gnoma</u>	All areas	Resident	Common
Spotted Owl	<u>Strix occidentalis</u>	Old Growth Forest	Resident	Rare
Long-eared Owl	<u>Asio otus</u>	Mixed Wood-open	Winter Resident	Rare
Short-eared Owl	<u>Asio flammeus</u>	Open Areas - Marshes	Winter Resident	Uncommon
Saw-Whet Owl	<u>Aegolius acadicus</u>	Mixed Forest	Resident	Uncommon

WOODPECKERS

FAMILY PICIDAE

Red-shafted Flicker	<u>Colaptes cafer</u>	Mixed Forest	Resident	Common
Pileated Woodpecker	<u>Dryocopus pileatus</u>	Snags, Coniferous Forest	Resident	Uncommon
Acorn Woodpecker	<u>Melanerpes formicivorus</u>	Oak Groves, Tan Oak, etc.	Resident	Common
Lewis Woodpecker	<u>Asyndesmus lewis</u>	All Forests	Resident	Uncommon

WOODPECKERSFAMILY PICIDAE

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Yellow-bellied Sapsucker	<u>Sphyrapicus varius</u>	Mixed Forest	Resident	Uncommon
Hairy Woodpecker	<u>Dendrocopos villosus</u>	Mixed Wood-conifers	Resident	Uncommon
Downy Woodpecker	<u>Dendrocopos pubescens</u>	Mixed Forest -Deciduous	Resident	Uncommon

FAMILY CARTHARTIDAE

Turkey Vulture	<u>Cathartes aura</u>	All Areas	Summery Resident	Common
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OTHER BIRDS , Including water associated, song, humming birds, scavengers, and general common birds within the Planning Unit. See .36 of the URA for Scientific names.

Common egret	Marshes and Lakes	Summer Resident	Uncommon
Great Blue Heron	Streams	Resident	Common
Black-crowned night Heron	Marshy Areas	Resident	Uncommon
American bittern	Marshy Areas	Resident	Uncommon
White faced Ibis	Marshy Areas	Summer Resident	Accidental
Sandhill Crane	Farms, Fields, Marshes	Summer Resident	Very Common
Virginia Rail	Marshes	Residence	Uncommon
Sora	Marshes	Summer Resident	Uncommon
Yellow Rail	Marshes	Accidental	Accidental

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OTHER BIRDS

<u>COMMON NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Killdeer	Fields & Mudflats	Resident	Very Common
Western Kingbird	Ranches, Farms	Summer Resident	Occasional
Tropical King Bird	Mixed Brush	Accidental	Accidental
Trails' Flycatcher	Forested Streams	Summer Resident	Uncommon
Hammards' Flycatcher	Coniferous Forests	Summer Resident	Uncommon
Dusky Flycatcher	Brushy Hillsides	Summer Resident	Uncommon
Western Flycatcher	Deciduous Forest	Summer Resident	Uncommon
Western Wood Peewee	Coniferous & Mixed W.	Summer Resident	Common
Olive-sided Flycatcher	Mixed Forest	Summer Resident	Uncommon
Horned Lark	Open Fields - High C.	Resident	Common
Barn Swallow	Around Water	Summer Resident	Very Common
Cliff Swallow	Steep Rocky Areas	Summer Resident	Very Common
Violet-green Swallow	Around Water	Summer Resident	Very Common
Tree Swallow	Streams, Lakes	Summer Resident	Very Common
Bank Swallow	Around Water	Summer Resident	Uncommon
Rough-winged Swallow	Around Water	Summer Resident	Rare
Purple Martin	Around Water	Summer Resident	Uncommon

OTHER BIRDS

<u>COMMON NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Scrub jay	Brush fields	Resident	Very Common
Gray jay	High Forests Lands	Resident	Uncommon
Common Raven	High Country, Variabilty	Resident	Uncommon
Common Crow	Open Areas, Farms	Resident	Very Common
Chestnut-backed Chickadee	Conifers, Mixed Woods	Resident	Very Common
Mountain Chickadee	Coniferous Forest	Resident	Uncommon
Common Bushtit	Hardwood Areas	Resident	Very Common
Wrentit	Coastal Mixed Forest	Resident	Common
328 Dipper	Streams	Resident	Uncommon
White-breasted Nuthatch	Mixed Forest, Dec.	Resident	Common
Red-breasted Nuthatch	Mixed Forest, Conif.	Resident	Common
Brown Creeper	Coniferous, Mixed Forest	Resident	Uncommon
House Wren	Brush, Dec. Forest	Summer Resident	Uncommon
Winter Wren	Dense Coniferous Forest	Resident	Common
Bewick's Wren	Deciduous Forests	Resident	Common

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OTHER BIRDS

<u>COMMON NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
American Robin	Fields, Residential	Resident	Very Common
Varied Thrush	Coniferous & Mixed Hard.	Resident	Common
Townsend's Solitaire	Conifers	Resident	Rare
Hermit Thrush	Coniferous & Deciduous	Resident	Uncommon
Swainson's Thrush	Coniferous & Hardwood	Summer Resident	Common
Western Bluebird	Open Woods	Resident	Uncommon
Mountain Bluebird	Fields & Forest edge	Resident	Occasional
Golden-crowned Kinglet	Coniferous	Resident	Common
289 Ruby-crowned Kinglet	Mixed Forest	Resident	Uncommon
Water Pipit	Fields & Hills	Resident	Very Common
Cedar Waxwing	Open Woods-near water	Resident	Very Common
Northern Shrike	Fields	Winter Visitor	Uncommon
Logger Sheike	Forest edge	Resident	Rare
Starling	Open Fields, Farms	Resident	Very Common
Solitary Vireo	Deciduous Forest	Summer Resident	Uncommon
Hutton's Viro	Conifers & Hardwoods	Resident	Rare

OTHER BIRDS

<u>COMMON NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Warbling Vireo	Deciduous Forest	Summer Resident	Common
Orange-crowned Warbler	Brush Areas	Summer Resident	Common
Yellow Warbler	Stream Bottoms	Summer Resident	Common
Myrtle Warbler	Streams	Winter Visitor	Common
Audubon's Warbler	Stream Bottoms	Resident	Common
Townsend's Warbler	Coniferous Forest	Winter Resident	Uncommon
Black-throated gray warbler	Mixed Forest	Summer Resident	Uncommon
Yellow throat	Fresh-water Marsh	Summer Resident	Common
Yellow-breasted Chat	Moist Thickets	Summer Resident	Uncommon
Wilson's Warbler	Deciduous Areas	Summer Resident	Common
House Sparrow	Residential, Farm	Resident	Very Common
Western MeadowLark*	Open Areas	Resident	Common
Yellow-headed Blackbird	Fresh-water Marshes	Summer Resident	Uncommon
Red-winged Blackbird	Fres-water Marsh	Resident	Very Common
Brewer's Blackbird	Fields & Farms	Resident	Very Common
Brown-headed Cowbird	Fields & Farms	Summer Resident	Uncommon
Bullock's Oriole	Valleys-water	Summer Resident	Rare

*State Bird

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OTHER BIRDS

<u>COMMON NAME</u>	<u>PREFERRED HABITAT</u>	<u>STATUS</u>	<u>ABUNDANCE</u>
Western Tanager	Coniferous Forest	Summer Resident	Common
Black-headed grosbeak	Deciduous Forest	Summer Resident	Common
Evening grosbeak	Coniferous Mixed Forest	Resident	Uncommon
Lazuli bunting	Thickets	Summer Resident	Uncommon
Purple finch	Conif. & Hardwood Forest	Resident	Uncommon
House Finch	Residential, Farms	Resident	Common
Pine Siskin	Coniferous & Hard. Forest	Resident	Common
American Gold Finch	Grassy Areas	Resident	Common
Lesser Goldfinch	Grassy Areas	Resident	Uncommon
Rufous-sided Towbee	Thickets	Resident	Very Common
Savannah sparrow	Open Fields & Prairie	Resident	Very Common
Vasper Sparrow	Fields, Farms	Summer Resident	Uncommon
Lark sparrow	Forest Edge	Summer Resident	Accidental
Slate-colored junco	Bruxh, Forest Edge	Winter Visitors	Rare
Oregon junco	Conif. & Dec. Forest	Resident	Very Common
Chipping Sparrow	All open Areas	Summer Resident	Uncommon

REPTILES

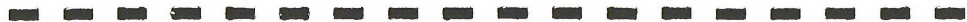
All reptiles found in the following list are year around residents to the Planning Unit.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>ABUNDANCE</u>
Western pond turtle	<u>Clemmys marmorata</u>	Streams, Ponds, Water always	Occasional
Western Fence lizard	<u>Sceloporus occidentalis</u>	Forest Floor & Rocky areas	Common
Western Skink	<u>Eumeces skiltonianus</u>	Mixed Forest, rotten logs	Common
Northern alligator Liz.	<u>Gerrhonotus coeruleus</u>	Mixed Forest, Brush, Damp Areas	Common
Rubber snake (Boa)	<u>Charina bottae</u>	Coniferous Forests, Damp Areas	Occasional
Western rattle snake	<u>Crotalus viridis</u>	Brushy, rocky forest edge	Occasional
Racer Snake	<u>Coluber constrictor</u>	Brushy Areas, Meadows	Uncommon
Western ring-neck Snake	<u>Diadophis ambilis</u>	Mixed Forest, Under debris	Common
Gopher Snake	<u>Pituophis melanoleucus</u>	Mixed Forest, Brush	Common
Common garter snake	<u>Thamnophis sirtalis</u>	Along or in Streams, Meadows	Very Common
Northwestern garter S.	<u>Thamnophis ordinoides</u>	Clear Cut areas, Damp Areas	Common
Western Terr. Garter S.	<u>Thamnophis elegans</u>	Streams with Brush banks	Common

AMPHIBIANS

All amphibians found in the list are year around residents to the Planning Unit.

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>	<u>PREFERRED HABITAT</u>	<u>ABUNDANCE</u>
Long-toed salamander	<u>Ambystoma macrodactylum</u>	Rotting wood, ponds	Common
Northwestern Salamander	<u>Ambystoma gracile</u>	Streams, under wood	Common
Pacific giant Salamander	<u>Dicamptodon ensatus</u>	Coniferous forests, cool	Uncommon
Olympic Salamander	<u>Rhyocotriton olympicus</u>	Near Streams, shaded	Uncommon
Rough-skinned newt	<u>Taricha granulosa</u>	Mixed Forests, near streams	Very Common
Del Norte Salamander	<u>Plethodon elongatus</u>	Streams, Rocks, moss	Common
Dunn's Salamander	<u>Plethodon dunni</u>	mossy rocks near streams	Common
W. Red-backed Salamander	<u>Plethodon vehiculum</u>	Streams, under litter	Fairly Common
California Slender Sal.	<u>Batrachoseps attenuatus</u>	Coniferous Forest, Moist	Uncommon
Tailed Frog	<u>Ascaphus truei</u>	Streams if cold	Uncommon
Pacific Tree frog	<u>Hyla regilla</u>	Near Water & Brush	Common
Red-legged frog	<u>Rana Aurora</u>	Near Damp Beg. ponds	Uncommon
Yellow-legged frog	<u>Rana boylei</u>	Slow streams, Rocky	Common
Bull frog	<u>Rana catesbeiana</u>	Quiet Water	Fairly Common
Western Toad	<u>Bufo boreas</u>	Near Water - not specific	Fairly Common



APPENDIX IX

PHASES AND DISCRETE OPERATIONS OF OIL
AND GAS OPERATIONS CONSIDERED IN THIS ANALYSIS



OIL AND GAS OPERATIONS CONSIDERED IN THIS ANALYSIS

List of Phases and Discrete Operations
of Oil and Gas Operations Considered in this Analysis

Phase - Preliminary Investigations

Discrete Operations - Airborne, truck mounted thumper,
Road Construction

Phase - Exploratory Drilling

Discrete Operations - Move-in of drilling equipment, Use of existing roads and sites for drilling, improvement of existing roads or sites for drilling, road construction, site construction, drilling, mud pits, mud additives, water supply, storage tanks and related facilities.

Phase - Development - Oil Field

Discrete Operations - Those operations considered in exploratory drilling. Well spacing possibilities (40-80 acres per well), flowlines, injection wells, separators, additional area and roads needed as compared to exploratory drilling.

Phase - Development - Gas Field

Discrete Operations - The operations considered in exploratory drilling and oil field development are considered in gas field development. Additional and/or different operations than above are well spacing of 160 acres per well, no storage tanks needed, transmission pipelines needed.

Phase - Production - Oil & Gas Fields

Discrete Operations - Flowing wells, pumping wells, flowlines - surface, flowlines - subsurface, separators, heaters, disposal of produced saline and/or fresh water, water flooding, miscible flooding, transportation from field - truck (oil), pipelines (gas).

Phase - Abandonment - Exploratory Wells, Production Fields

Discrete Operations - Plugging, casing, marking location of abandoned wells, flowlines removed or left in place, removal of facilities, restoration of cleared areas, and abandoned roads.

APPENDIX X

TABLE A - WELL FIRES AND BLOWOUTS

DURING FISCAL YEAR 1975

TABLE B - CRUDE OIL SPILLS DURING OIL

AND GAS DEVELOPMENT AND PRODUCTION

ACTIVITIES IN FIVE WESTERN STATES IN 1972



TABLE A

WELL FIRES AND BLOWOUTS DURING FISCAL YEAR

1975* (10,092 FEDERAL LEASES)

Fires

Wyoming	- 7
Oklahoma	- 2
Mississippi	- <u>1</u>
	10

Blowouts

Wyoming	- 2
New Mexico	- 4
Colorado	- 2
Utah	- 1
California	- <u>1</u>
	10

* July 1, 1974 - June 30, 1975

TABLE B

Crude Oil Spills During Oil and Gas Development and Production Activities in
Five Western States in 1972

<u>State</u>	<u>Total Reported</u>	<u>Total Barrels 1/ Spilled</u>	<u>Average Number of Barrels per Spill</u>	<u>Wells in 2/ Production</u>	<u>Number of Spills per 100 Wells in Production</u>
Colorado	37	896	24	2,700	1.4
Montana	27	1,960	73	4,210	0.6
N. Dakota	19	813	42	1,490	1.3
Wyoming	74	9,676	131	9,300	0.8
Utah	16	1,434	90	900	1.8

1/ 646 bbls will cover one acre to a depth of 1 inch (646 bbl = 1 acre-inch).

2/ 1971 figures.

Source: Environmental Protection Agency, Region 8, Denver, Colorado

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APPENDIX XI

LETTER AND NEWS RELEASES REQUESTING
PUBLIC PARTICIPATION, MAILING LIST OF
GROUPS, AGENCIES AND INDIVIDUALS



BLM seeks comments

EMPIRE
BUILDER
2-5-76

Public comments about the environmental impacts of proposed oil and gas leasing are invited by the Bureau of Land Management (BLM), according to Edward G. Stauber, Coos Bay District manager.

He noted that 27 oil and gas lease applications covering approximately 49,000 acres in the Coos Bay district are awaiting action. The lands are located as follows: 1) just east of Loon Lake in T. 23 S., R. 9 W., 2) the Callahan area in T. 26 S., R. 8 W., and 3) the Coquille River area, in four townships situated approximately 20 miles east of Coquille. Prior to issuance or rejection of the applications, an environmental analysis will be made of the probable impact of leasing.

"We will appreciate receiving factual information concerning the net impact on the environment which likely would result if oil and gas leases were issued, exploration conducted, and production undertaken," Stauber said. He added that comments could be most useful if received before the end of February as BLM's analysis proceeds. Factors to be considered include impacts on air, land, water, plants, animals, ecological processes, landscape character, sociocultural interest, and others.

Environmental analysis records relating to oil and gas leasing are being prepared in each of seven BLM districts in Oregon where oil and gas lease applications have been filed.

United States Department of the Interior



BUREAU OF LAND MANAGEMENT
Coos Bay District Office
P. O. Box 1139
Coos Bay, OR 97420

JAN 27 1976

Robert R. Van Leer
510 North Ellensburg
Gold Beach, OR 97444

Dear Mr. Van Leer:

The Coos Bay District Office of the Bureau of Land Management is in the process of preparing an environmental analysis concerning the effect of oil and gas leasing and possible development on the approximate area of the enclosed map. There are 27 pending oil and gas lease applications covering approximately 49,000 acres on the Coos Bay District.

Factors which will be considered in the preparation of the environmental analysis document include impacts on air, land, water, terrestrial and aquatic plants and animals, ecological processes, landscape character, sociocultural interests, and others. If you have any comments on the effect of oil and gas leasing on the environment of this area, we would appreciate your comments by February 26, 1976.

If this letter generates sufficient interest and comment to justify a public meeting, a meeting will be held. Your comments are welcomed.

Sincerely yours,

District Manager

Enclosure:

Map of Approximate
Lease Application Areas

CONSERVE
AMERICA'S
ENERGY



Save Energy and You Serve America!

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United States Department of the Interior

1784 - 12

BUREAU OF LAND MANAGEMENT

Coos Bay District
333 South Fourth Street
P. O. Box 1139
Coos Bay, OR 97420
Phone: 269-5880

COOS BAY DISTRICT MULTIPLE USE ADVISORY BOARD

Term ending December 31, 1975

<u>Interests Represented</u>	<u>Members</u>	<u>Addresses</u>	<u>Telephones</u>
Recreation	/ Edwin A. Troyer	705 South Broadway Coos Bay, OR 97420	(Bus) 267-4612 (Res) 756-6152
Wildlife	/ Ronald R. Carpani	School District #9 Coos Bay, OR 97420	(Bus) 267-3104 (Res) 267-7138
Timber	/ J. Daisy Brannian	Reedsport Mill Co., Inc. P. O. Box 146 Reedsport, OR 97467	(Bus) 271-2460 (Res) 271-2767
Agriculture	/ Harold L. Knapp	P. O. Box 678 Port Orford, OR 97465	(Res) 332-6292
Timber	/ A. P. Stinchfield	P. O. Box 588 North Bend, OR 97459	(Bus) 756-5171 (Res) 756-4850 (Res) 759-3372
Land Use Planning	/ Flora L. Burch	9394 Coast Highway North Bend, OR 97459	(Res) 759-3460
Environmental Education	/ William D. Arbus	Terramar-Camp Arago Nichols Road Coos Bay, OR 97420	(Bus) 888-4753 (Res) 756-4261
County Government	/ Claude E. Waldrop	Coos County Courthouse Coquille, OR 97423	(Bus) 396-3121 (Bus) 269-5713 (Res) 347-2941
Business	/ Charles A. Tresidder	P. O. Box 1099 Coos Bay, OR 97420	(Bus) 269-5171 (Res) 267-2706
Public	/ Robert R. Van Leer	510 North Ellensburg Gold Beach, OR 97444	(Bus) 247-6643 (Res) 247-7275

STATE AGENCIES - OREGON

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Water Resources Department
1158 Chemeketa Street, NE
Salem, OR 97310

William S. Cox, Director
Division of State Lands
1445 State Street
Salem, OR 97310

Administrator
Oregon Dept. of Environmental Quality
1234 SW Morrison (P.O. Box 231)
Portland, OR 97204
229-5395

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Assistant to Governor, Natural
Resources
109 State Capitol
Salem, OR 97310
378-3109

John W. McKean, Director
Oregon Fish & Wildlife Commission
P.O. Box 3503
Portland, OR 97208

Leslie Lehmann
State Clearing House
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Salem, OR 97310
378-3732

Raymond E. Corcoran, State Geologist
Oregon Dept. of Geology & Mineral Industries
1069 State Office Bldg.
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Honorable Bob Straub
Governor of Oregon
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Salem, Oregon 97310

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North Bend, OR 97459

William N. Grannell
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North Bend, OR 97459

Ed Stevenson
933 South First Avenue
Coquille, OR 97423

LOGGING/LUMBER FIRMS

✓ Elkside Lumber Co.
P. O. Box 107
Lakeside, OR 97449

✓ Georgia-Pacific Corporation
P. O. Box 610
Coquille, OR 97423

✓ International Paper Company
P. O. Box 43
Gardiner, OR 97441

✓ Menasha Corporation
P.O. Box 588
North Bend, OR 97459

✓ Roseburg Lumber Co.
P. O. Box 218
Coquille, OR 97423

✓ Champion International Corporation
P. O. Box 10228
Eugene, OR 97401

✓ Weyerhaeuser Company
P. O. Box 389
North Bend, OR 97459

✓ D. & F. Logging, Inc.
P. O. Box 460
Elkton, OR 97436

✓ Ben Henderson Logging
3144 Maple Drive
Reedsport, OR 97467

✓ Leep Logging Corp.
P. O. Box 398
Myrtle Point, OR 97458

✓ Moore Mill & Lumber Co.
P. O. Box 277
Bandon, OR 97411

✓ Standley Logging Co.
Route 1, Box 65
Camas Valley, OR 97416

✓ Coos Head Timber Company
P. O. Box 750
Coos Bay, OR 97420

✓ Reedsport Mill Company, Inc.
P. O. Box 146
Reedsport, OR 97467

✓ Faye Stewart
Bohemia, Inc.
P. O. Box 1819
Eugene, OR 97401 97401

✓ Roseburg Lumber Co.
P. O. Box 1088
Roseburg, OR 97470

INTEREST GROUPS

Joe Walicki, Oregon Representative
Wilderness Society
Box 533
Eugene, OR 97401
686-0185

Izaak Walton League
James A. Potter, Secretary
P.O. Box 58
Gladstone, OR 97027

Museum of Natural History
University of Oregon
Eugene, OR 97403

Corvallis Center for Environmental
Services

Student Activity Center
Oregon State University
Corvallis, OR 97330

Mr. Edward C. Rochette
NW Environmental Defense Center
10015 SW Terwilliger Blvd.
Portland, OR 97215

Michael Storper, Conservation Assist.
Friends of the Earth, Inc.
529 Commercial
San Francisco, CA 94111

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Executive Director
Oregon Environmental Council
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Portland, OR 97201

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Oregon Student Public Interest
Research Group (OSPIRG)
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Portland, OR 97204

Keep Oregon Green Association
P.O. Box 471
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Salem, OR 97308

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Oregon Conservation Coordinator
Sierra Club, Pacific NW Chapter
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Eugene, OR 97403
342-7805

Thomas Vaughan, Director
Oregon Historical Society
1230 SW Park Avenue
Portland, OR 97205
SW Oregon Chapter
Northwestern Steelheaders Council of
Trout Unlimited
P. O. Box 852
Coos Bay, OR 97420

Audubon Society of Oregon
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Portland, OR 97210

Environmental Studies Center
University of Oregon
Eugene, OR 97403

Oregon State University
Water Resources Research Institute
Air Resources Center
Covell Hall 115
Corvallis, OR 97331

Mervyn L. Filippini
Extension Service, Peavy Hall 005
Corvallis, OR 97331

George Reed, Executive Director
Oregon Wildlife Federation
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Portland, OR 97212

Survival Center, ASUO
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University of Oregon
Eugene, OR 97403

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Eugene, OR 97403
686-3845

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Washington, D.C. 20510

Senator Robert W. Packwood
U. S. Senate
6327 New Senate Office Bldg.
Washington, D.C. 20510

Rep. Les AuCoin
House of Representatives
329 Cannon House Office Bldg.
Washington, D. C. 20515

Rep. Al Ullman
House of Representatives
2410 Rayburn House Office Bldg.
Washington, D.C. 20515

Rep. Robert Duncan
House of Representatives
330 Cannon House Office Bldg.
Washington, D.C. 20515

Rep. James Weaver
House of Representatives
1723 Longworth House Office Bldg.
Washington, D. C. 20515

PRIVATE FIRMS

Requests for information and comments should be sent to all oil and gas lease applicants in each area.

Mr. Henry W. Wright
Western Oil & Gas Association
609 South Grand Avenue
Los Angeles, Calif. 90017
CA.

SUPPLEMENTAL OIL & GAS LEASING COORDINATION LIST

FEDERAL AGENCIES

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Pacific Northwest Region
P.O. Box 3621
Portland, OR 97208
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Bonneville Power Administration
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Doris Koivula
Chief, Branch of Upland Leasing (721)
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Energy and Minerals
Denver Federal Center
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Denver, CO 80225

Charles Shipp
Section of Powersite Lands
Bureau of Power
Federal Power Commission
825 N. Capitol Street
Washington, D.C. 20426

Donald H. Reese, Regional Supervisor
Division of River Basin Studies
Fish and Wildlife Service
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234-3361, ext. 5263

John Welch, Realty Specialist
Bureau of Reclamation - Box 043
Boise, Idaho 83724

T.A. Schlapfer, Regional Forester
Forest Service, USDA - Region
Attention: Zeon Moore
P.O. Box 3623
Portland, OR 97208

COUNTY AGENCIES

Coos County Commissioners (3 copies)

Coos County Courthouse
Coquille, OR 97423

Gentlemen

Douglas County Commissioners (3 copies)

Douglas County Courthouse
Roseburg, OR 97470

Gentlemen

Coos County Economic Development & Coordinating Committee
c/o Secretary, Cal Heckard
Coos Bay-North Bend Water Board
2305 Ocean Boulevard
Coos Bay, OR 97420

Coos-Curry-Douglas Economic Improvement Association
c/o Executive Director, Tony Kuhn
874 S.E. Steven
Roseburg, OR 97470

POSTMASTER

BROADBENT, OR 97414
BANDON, OR 97411
COQUILLE, OR 97423
COOS BAY, OR 97420
ELKTON, OR 97436
FAIRVIEW, OR 97024
MYRTLE POINT, OR 97458
REEDSPORT, OR 97467
REMOTE, OR 97468
SCOTTSBURG, OR 97474
POWERS, OR 97466

Planning Department
Coos County Courthouse
Coquille, OR 97423

Planning Department
Douglas County Courthouse
Roseburg, OR 97470



APPENDIX XII
STATEWIDE OVERVIEW OF POSSIBLE
DEVELOPMENT ON FEDERAL OIL
AND GAS LEASES IN OREGON



STATEWIDE OVERVIEW OF POSSIBLE
DEVELOPMENT ON FEDERAL OIL
AND GAS LEASES IN OREGON

Introduction

This appendix is an overview of the development which could occur on Federal oil and gas leases in Oregon. The number and location of leases and pending applications in the State are described; and the possible levels of ensuing oil and gas exploration and production activities are considered.

The anticipated environmental effects of exploration and production activities are analyzed in the main body of environmental analysis records prepared for individual blocks of lease applications.

If commercial quantities of oil or gas are found in the State, transportation facilities would be required; and discoveries of oil could lead to the construction or enlargement of refineries. Analysis of the environmental effects of transportation and refining facilities is beyond the scope of the environmental analyses of the lease applications. However, the potential for, and possible magnitude of, pipeline and refinery construction are examined in this appendix. The principal environmental permit and certification processes required of proposed pipeline and refinery projects in Oregon are also described.

As of February 9, 1976, 212 applications for Federal oil and gas leases were on file in Oregon. The applications covered 387,636 acres. In addition, 193,467 acres were already under lease. The total area included in both existing leases and pending applications was 581,103 acres. Areas containing Federal leases and pending lease applications in Oregon are shown in Figure 1.

Exploratory Drilling

If pending lease applications were approved, at least four or five exploratory wells probably would be drilled on Federal or intermingled private or State land during the next several years. If early tests were favorable, 20 or more wildcat wells might be drilled on lease blocks containing Federal lands.

Many Federal oil and gas leases expire without being explored for oil and gas. This is particularly true outside areas classified by the U.S. Geological Survey as known geologic structures. Since there are no known geologic structures in Oregon, exploratory oil and gas wells probably would be drilled on a relatively small percentage of the leases during the next several years. If oil or gas were discovered, additional exploratory wells would be drilled.

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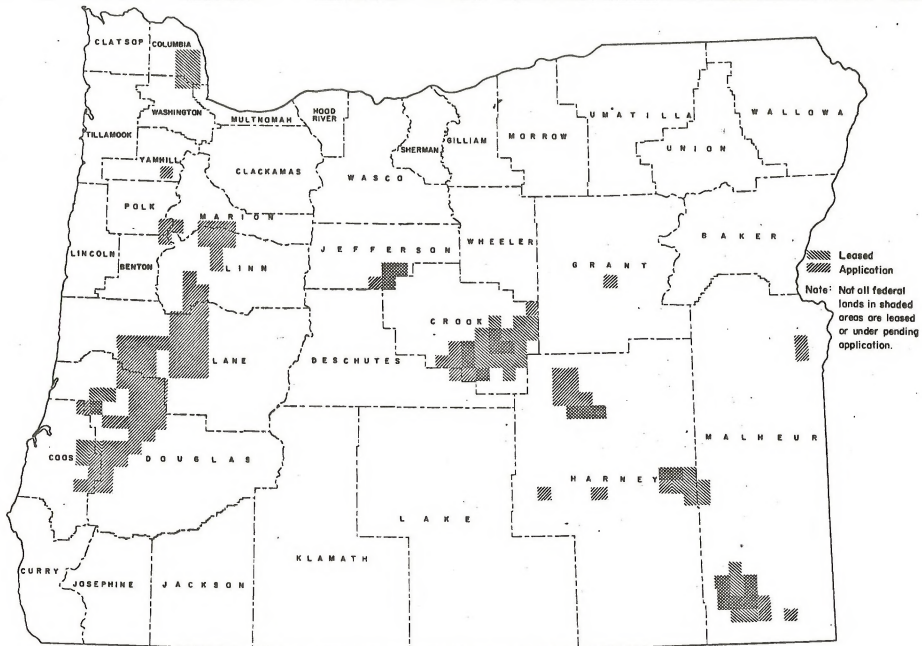


FIGURE 1 Areas containing Federal Oil and Gas Leases and Pending Application for Federal Oil and Gas Leases in Oregon, as of February 9, 1976.

The petroleum industry's interest in exploration for oil and gas in Oregon has fluctuated over the years, but it now appears to be increasing. One indication of industry interest in the State is the acreage of Federal oil and gas leases. The total area included in Federal leases in Oregon dropped from a peak of 1,079,740 acres in 1956 to 22,892 acres in 1967. Since 1967, the acreage leased or under application has risen steadily; in early 1976, it stood at 581,103 acres. Oil companies also were reported to be leasing substantial areas of private land in 1975 and early 1976, particularly in the Willamette Valley.

Exploration activities increased in the State in 1975, and it appears that the momentum will extend at least through the next two to three years. Mobil Oil, the major applicant for Federal leases in western Oregon, conducted geophysical and geochemical sampling surveys in the State. Reichold Energy Corporation and Northwest Natural Gas Company drilled four dry holes in western Oregon in 1975 in search of natural gas.

The number and location of lease and lease application blocks provide a general indication of the number and location of exploratory wells which might be drilled during the next several years. Identification of lease blocks in some areas is complicated by the intermingling of leaseholds and lease applications of two or more companies. However, there appear to be about 15 lease or lease application blocks on Federal lands in the State at the present time.

If the first well drilled in a lease block is unsuccessful, it might be the only well drilled in the block during the current cycle of exploratory activity. Many years may pass before the current or a succeeding lessee concludes that another well is warranted. Wells might not be drilled in some blocks if exploration of nearby blocks is unsuccessful. Other blocks might remain unexplored because of the inability of the lessee to secure financing for a drilling operation. In a large block held by a large company, two or more dry holes might be drilled before drilling operations are stopped.

Almost all of the pending lease applications for Federal lands in western Oregon were filed by Mobil Oil; and if a significant portion of the applications is approved, it is likely that more than one exploratory well will be drilled in the company's large lease block. A petroleum engineer for the Oregon Department of Geology and Mineral Industries believes that the company is planning to drill several deep test holes in the next two to three years. (1)

Approximately one acre is required for the drill pad for an exploratory well. Somewhat more land would be needed on sloping land. On a well-per-well basis, more land might be disturbed in the construction of drill pads in western than in eastern Oregon. Because of the road system already developed to harvest timber and the cost of road construction in steep terrain, most wildcat wells in western Oregon probably would be drilled in locations which minimize the need for temporary access roads. In eastern Oregon, wildcat wells would be more likely to require the construction of access roads.

Oil and Gas Production

Recent experience of the oil and gas industry in the United States may provide a general indication of the possible outcome of oil and gas exploration in Oregon. As indicated in Table 1, the chances of discovering a significant recoverable reserve of oil or gas in the nation in 1974 were approximately 1 in every 59 new-field wildcat wells drilled. When a significant discovery was made in 1974, the odds were greater than 9 to 1 that the area of the field would be less than 2 square miles.

TABLE 1

NEW-FIELD WILDCAT WELLS DRILLED IN U.S. IN 1974:
NUMBER AND PERCENT OF DRY HOLES
AND PRODUCERS BY CLASS OF OIL AND GAS FIELD

Class of Field	3/ Total Recoverable Reserves by Field Class		1/ Area of Oil Fields		2/ Number and Percent of New-Field Wildcats Drilled in 1974, by Field Class	
	Oil	Gas	Denver-Julesburg Basin. Co.	California	Number	Percent
	(Mill. Brls.)	(Bill. Cu. Ft.)	(Sq. Mi.)	(Sq. Mi.)		
I. <u>Producers</u>					805	14.24
A. <u>Significant</u>					(96)	(1.70)
A	+50	+300	--	--	0	0
B	25-50	150-300	9.7	1.7	1	0.02
C	10-25	60-150	5.2	1.1	7	0.12
D	1-10	6-60	1.4	0.4	88	1.56
B. <u>Not Significant</u>						
E	Less than 1	Less than 6	0.6	0.2	707	12.51
F	Abandoned				2	0.3
II. <u>Dry Holes</u>					4847	85.76
Total New-Field Wildcats Drilled in U.S. in 1974					5652	100.00

1/ H. W. Menard and G. Sharmen. 1975. "Scientific Uses of Random Drilling Models." Science, Vol. 190, No. 4212.

2/ F. J. Wagner. 1975. "North American Drilling Activity in 1974." Bulletin of the American Association of Petroleum Geologists, Vol. 58, 1273.

3/ Field classifications and "significance" criteria established by American Association of Petroleum Geologists.

All of the 189 oil and gas wells drilled in Oregon since 1902 have been dry holes. In the opinion of the staff of the Oregon Department of Geology and Mineral Industries, however, "There is still potential for finding deposits of oil and gas in Oregon in spite of many past drilling failures Results of deep drilling have been generally discouraging, but they have shown that there is a thick section of marine sedimentary rocks and that at many locations porous and permeable sands exist within the stratigraphic section." (2) Past drilling in the State has produced numerous shows of oil and gas, but none has been in commercial quantities.

One indication of the chances of discovering commercial quantities of oil and gas in Oregon may be the discovery rate for all new-field wildcat wells in the country. As indicated in Table 1, of the 5652 new-field wildcat wells drilled in the United States in 1974, 805--or one in seven--were finished as producers. However, only 96--or one in 59--resulted in the discovery of fields with significant recoverable reserves.(3) The American Association of Petroleum Geologists considers significant reserves to be those over one million barrels, the amount required to meet the country's petroleum demand for one and one-half hours. The percentage of significant oil or gas finds in total new-field wildcat wells drilled in the United States declined from over three percent in the late 1940's to 1.7 percent in 1974.(4)

Recent drilling experience also provides an indication of the size of field most likely to be discovered. Over the years, a growing percentage of the significant discoveries has been in smaller fields. In the late 1940's, 20 to 25 percent of the significant oil and gas discoveries were in Class "D" fields, the smallest fields in the American Association of Petroleum Geologists' rankings.(5) As indicated in Table 1, 88 of the 96 significant new-field discoveries in 1974, or 92 percent, were in Class "D" fields. From 1968 to 1974, 84 percent of the significant discoveries were in Class "D" fields.

Table 1 also relates classes of oil and gas fields, as determined by total recoverable reserves, to the area of oil fields in Colorado and California. Class "D" fields average approximately one-half square mile in California and one and one-half square miles in the Denver-Julesburg Basin in Colorado. The average sizes of the fields in each class in the Denver-Julesburg Basin approximate those for the nation as a whole.(6)

It appears, therefore, that if oil or gas is found in Oregon, the chances are better than even that the field will be less than two square miles in size.

The American Association of Petroleum Geologists refers to Class "A" oil and gas fields as "giants." From 1968 to 1974, only 3.1 percent of the significant discoveries in the United States was in giant fields. No giant fields were discovered in the country in 1973 and 1974 (1975 data are not available).(7) Although the chances of a giant field being discovered in Oregon are probably slight, the possibility remains. Examples of large

oil fields in California include the 46-square mile Midway Sunset and 60-square mile Elk Hills fields. The Rio Vista and Sutter Buttes fields are large gas fields in California; both are approximately one square township, or 36 square miles, in area. (8)

The amount of land used in a field for roads, well sites, and other oil and gas field facilities depends largely upon the well spacing pattern. Gas wells tend to be more widely spaced than oil wells. Typical spacing patterns in recently developed fields in California are 10 acres per well in oil fields and 160 acres per well in gas fields. (9) In the Rocky Mountain area, spacing patterns range from 40 to 160 acres per well in most oil fields developed in recent years and from 160 to 640 acres per well in gas fields. (10)

The administrative rules of the Oregon Department of Geology and Mineral Industries require a minimum spacing pattern of 40 acres per well unless a different spacing pattern is approved by the department's governing board.

With a 40-acre-per-well spacing pattern, approximately 12.8 acres per square mile may be used for well sites, roads, and other facilities; with a 320-acre-per-well spacing pattern, about 6.4 acres per square mile may be used.

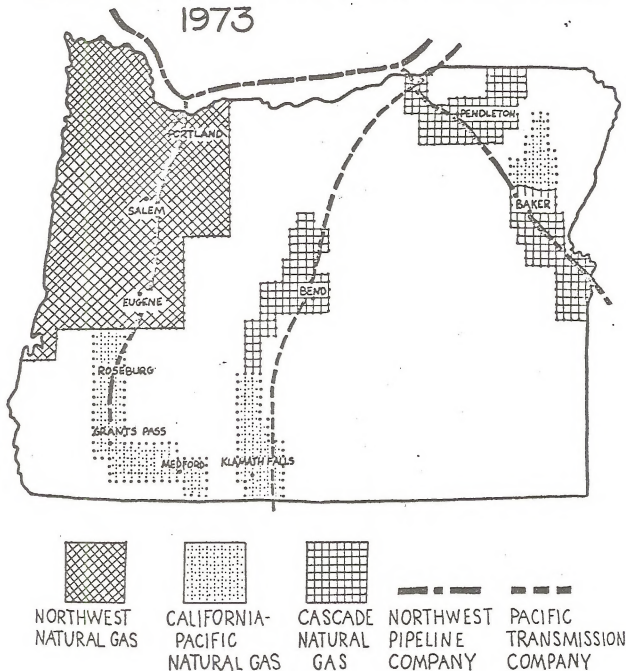
If a small, two-square mile field is discovered in Oregon, the amount of land used in the field may range from approximately 13 to more than 25 acres. If a large, 50-square mile field is discovered, more than 640 acres may be used for roads, well sites, and other facilities.

Transportation and Refining Facilities

If commercial quantities of natural gas were discovered in Oregon, it probably would be sold to natural gas utilities with marketing areas or pipelines in the vicinity of the gas fields. The boundaries of Oregon's natural gas utility districts and major pipeline routes are shown in Figure 2. (The West Coast leg of the proposed Alaska Natural Gas Transportation System natural gas pipeline would parallel all but 21.4 miles of the existing Pacific Gas Transmission Company route shown on the map). Except for those in southeastern Oregon, the lease and lease application blocks are located within a relatively short distance of major existing natural gas pipelines.

If the route of a proposed gas pipeline crossed Federal lands, the land-administering agency would prepare an environmental assessment or analysis record before issuing a right-of-way. (The environmental impacts of flowlines--as distinct from pipelines--constructed on the leasehold to carry gas from the wellhead to a central collection point would be analyzed by the U.S. Geological Survey and the land-administering agency after the lessee submitted a proposed surface use plan for the leasehold.) If anticipated environmental impacts of the proposed pipeline or public interest were determined to be significant, an environmental impact statement would be prepared.

OREGON NATURAL GAS UTILITY DISTRICTS & PIPELINES 1973



SOURCE: Oregon Office of Energy Research and Planning,
Transition: A Report to the Oregon Energy Council.
January 1, 1975.

In 1975, the Oregon Legislature passed legislation requiring proponents of natural gas pipelines 16 inches or greater in diameter and 5 miles or longer in length to obtain a site certificate from the Oregon Energy Facility Siting Council. The certificate is to contain conditions "for the protection of public health and safety." The council is authorized to commission a study of "any aspect of the proposed energy facility." (11) The Oregon Department of Energy, the Council's administrative arm, published draft site certificate application rules for pipelines in February 1976. The proposed rules would require pipeline proponents to describe the environmental impacts of the proposed pipeline.

The Office of Pipeline Safety, U.S. Department of Transportation, and the Oregon Public Utility Commission regulate the construction and operation of gas pipelines to insure safety standards are met.

Oil produced on Federal leases in Oregon could be refined (a) within the State at existing refineries, refineries now being planned, or refineries built specifically to refine crude oil produced in the State; or (b) in neighboring states such as California or Washington.

At the present time, there are three small refineries in Oregon; all are located in Portland (12):

<u>Company</u>	<u>Capacity</u>
Chevron Asphalt	18,000 barrels asphalt per day
Nu-Way Oil	2,000 barrels lubricants per day
Ager & Davis Refining	3,500 barrels mixed grade oil per day

Plans have been announced for three new refineries in the State (13):

<u>Company</u>	<u>Proposed Location</u>	<u>Proposed Capacity</u>
Columbia Independent Refiners	Portland	50,000 barrels per day
Cascade Energy	Rainier	30,000 barrels per day
Charter Energy	St. Helens	52,400 barrels per day

If oil were produced in Oregon, it might replace some of the feed stocks which the new refineries would otherwise have to import from outside the State.

If oil produced in Oregon were not refined within the State, it probably would be transported either to refineries in the Puget Sound area in Washington or to California. At present, about 60 percent of the petroleum products consumed in Oregon are refined in the Puget Sound area. (14)

Unlike natural gas, many miles of new pipeline might be constructed to transport oil produced in the State. There are two petroleum product pipelines but no crude oil pipelines in the State. Other transportation modes might also be used.

The site certification process cited previously for natural gas pipelines in Oregon also applies to crude oil and petroleum product pipelines six inches or greater in diameter and five miles or longer in length. If a proposed petroleum pipeline crossed Federal lands, the environmental impacts of the pipeline would be assessed by the land-administering agency.

At the present time, the Oregon Energy Facility Siting Council's site certification process for energy facilities does not apply to refineries. (15) However, before a refinery could be built in Oregon, air contaminant and waste discharge permits would be required from the Oregon Department of Environmental Quality.

Air Contaminant Discharge Permit: In addition to requiring the permit applicant to limit emissions to levels stipulated in State regulations, the State permit also is used to implement the U.S. Environmental Protection Agency's regulations in Title 40, Code of Federal Regulations, Part 60, "Standards of Performance for Certain New Stationary Sources." Performance standards for particulate matter, carbon monoxide, and sulfur dioxide emissions from petroleum refineries are included in Subpart A of the Federal regulations and in Section 25-000.70, Chapter 340 of the Oregon Administrative Rules.

Waste Discharge Permit: Waste discharge permits prescribe limitations on the discharge of wastes into public waters or elsewhere into the environment in a manner that may affect the quality of public waters. If discharges into navigable waters are proposed, the State's permit also serves as the permit required under the U.S. Environmental Protection Agency's regulations in 40 CFR 125 on the National Pollutant Discharge Elimination System. Permits for refineries are based on State water quality standards and EPA's Effluent Guidelines and Standards for Petroleum Refining Point Source Category (40 CFR 419).

Proponents of a refinery probably would also be required to prepare a Spill Prevention Control and Countermeasure Plan. The Environmental Protection Agency's regulations on "Oil Pollution Prevention in Non-Transportation Related Onshore and Offshore Facilities (40 CFR 112) require such a plan for non-transportation related facilities ". . . that have discharged or could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines. . . ." Most refineries probably would be located at sites where there would be a reasonable expectation that harmful quantities of oil could be discharged.

References

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