

Reasonably Foreseeable Development Scenario For Oil and Gas

Note: If there is a conflict between the BLM Manual Handbook H-1624-1 and the policy presented in this Instructional Memorandum, this policy prevails.

WHAT IS AN RFD SCENARIO?

A “Reasonably Foreseeable Development Scenario” (RFD) for oil and gas is a long-term projection (scenario) of oil and gas exploration, development, production, and reclamation activity. The RFD covers oil and gas activity in a defined area for a specified period of time. The RFD projects a baseline scenario of activity assuming all potentially productive areas can be open under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation or executive order. The baseline RFD scenario provides the mechanism to analyze the effects that discretionary management decisions have on oil and gas activity. The RFD also provides basic information that is analyzed in the National Environmental Policy Act (NEPA) document under various alternatives.

The RFD is a technical report typically referenced in the NEPA document. Only a summary of the RFD report should be included in the NEPA document. A copy of the report should be kept in both the field and state office for public viewing and an electronic copy should be placed on the issuing office’s web site.

The RFD is neither a planning decision nor the “No Action Alternative” in the NEPA document. In the NEPA document, the RFD baseline scenario is adjusted under each alternative to reflect varying levels of administrative designations, management practices, and mitigation measures. Under each alternative, the new adjusted level of projected oil and gas activity then leads to an analysis of related environmental effects in the “Environmental Consequences” section of the NEPA document (figure 1).

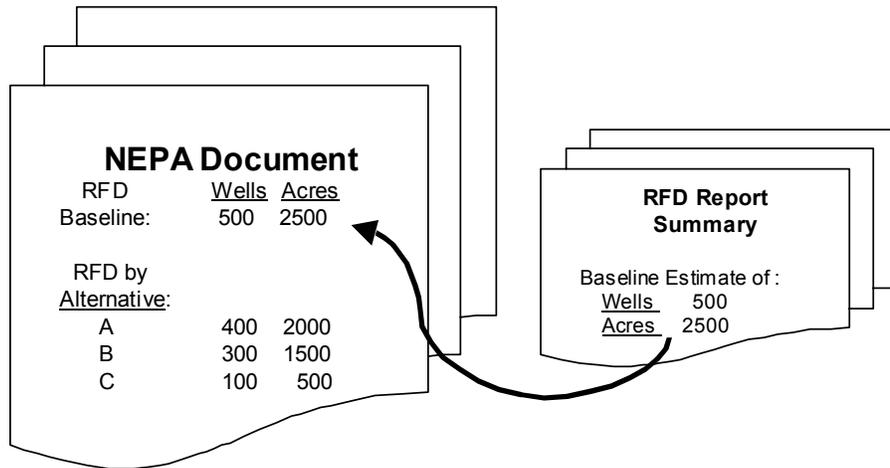


Figure 1. Information reported in the RFD Report and analyzed in the NEPA Document.

The period covered by the RFD report is usually 15 to 20 years or the planning timeframe for the Resource Management Plan (RMP). Because it is speculative to project oil and gas activity far into the future, the RFD is not expected to cover the entire life span of an area's development. It is preferred that geology, rather than "land use plan" areas defined by political or administrative boundaries, determine the area addressed in an RFD. Under certain circumstances, it may be necessary to develop an RFD scenario for an area that coincides with generally smaller areas defined by a RMP.

MONITORING EFFECTS OF OIL AND GAS ACTIVITY

Monitoring the effects of oil and gas activity is part of the Planning/NEPA monitoring process. Once the NEPA document Record of Decision or Decision Record is signed and the land use plan or amendment is approved, a program must be established that systematically tracks and compares the projections made in the selected alternative to actual activity.

The fact that the total number of wells in an area may exceed the total number of wells projected in the selected alternative does not automatically mean that a supplement to the NEPA document or a revision or amendment to the RMP is necessary. It is possible that exceeding the number of wells projected in the selected alternative may not result in exceeding the predicted level of environmental effects. Mitigation of environmental effects through successful reclamation, clustering wells on shared well locations, and minimizing pad and road construction can prevent the level of impacts from substantially exceeding the impacts analyzed in the original RMP/EIS or other NEPA documentation.

An actively maintained monitoring plan will enable staff to anticipate increases in oil and gas activity and to initiate new RFDs, NEPA documents, and plan amendments rather than wait for development and associated environmental effects to be exceeded. This will provide more time to work collaboratively with stakeholders to develop better land use plans, supplements, or amendments in an effective and efficient manner.

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

The RFD is based on a review of geological factors that control the potential for oil and gas resource occurrence and past and present technological factors that control the type and level of oil and gas activity. The RFD also considers petroleum engineering principles and practices and economics associated with discovering and producing oil and gas. The RFD projection can range from speculative estimates in unexplored frontier areas to estimates with higher levels of confidence in maturely developed producing areas.

Because the potential for oil and gas occurrence and development is rarely the same from one planning area to the next, the level of detail and the type of information included in an RFD is determined on a case-by-case basis. This is usually based on the location and size of the study area and whether or not the RFD is addressing a known development proposal or specific management request.

A Reasonably Foreseeable Development Scenario:

1. Is based on a reasonable, technical, and scientific estimate of anticipated oil and gas activity based on the best available information and data at the time of the study.
2. Provides the RMP/NEPA process with information needed in the review and evaluation of existing management direction and alternatives for a land use plan or plan amendment.
3. Facilitates informed decisions on the management of oil and gas resources balanced with management of other resources.
4. Provides an effective tool to determine the need to update or revise the NEPA document upon which a management plan is based.
5. Includes an evaluation of interrelated activity resulting from oil and gas exploration and development efforts regardless of land ownership or jurisdiction.
6. Provides information necessary for the identification and assessment of alternatives in a NEPA document.

7. Provides technical information for analyzing cumulative effects from oil and gas activity that could be reasonably expected as a result of a BLM decision.
8. Is prepared by specialists with technical and scientific oil and gas experience and qualifications (Petroleum Geologists and/or Petroleum Engineers with assistance from experienced Minerals Resource/Natural Resource Specialists as needed).
9. Is documented in a report subject to peer review.
10. Will be included in the administrative record of any analysis for which it is used.
11. Is a technical report that supports NEPA and planning documents that can be challenged through the administrative review process.

INFORMATION IN THE RFD REPORT

Information used to prepare the RFD does not have to be restricted to activities within the study area. For example, if wells outside the study area are currently producing in the very low permeability “X” formation and well spacing has been reduced from 320 acres to 80 acres, it may be reasonable to assume that a new discovery in the same formation within the study area may be eventually downspaced to 80 acres or less.

Another example would be a natural gas processing plant that is located some distance outside the boundary of the study area. If the RFD scenario anticipated that natural gas processing might be required, it may be reasonable to assume that processing would be done at the existing plant in lieu of constructing a new plant within the study area.

In addition to estimates concerning the presence of oil and gas resources based on geology, the RFD also considers other factors that affect oil and gas activity. Such factors include economics, changes in exploration, drilling, completion or production technology, physical limitations affecting surface access, bid performance at lease sales, oil and gas related infrastructure, and transportation.

Over time, new drilling provides additional information about the geology and nature of occurrence of oil and gas resources in the RFD study area. Advanced technological developments usually become economical and more widely used. This frequently changes the approach industry uses to develop the resource. Consequently, estimates about the occurrence and development of the resource may be different from those assumed in a previous RFD. If an RFD did not assume a significant activity, development or circumstance discovered after the RFD study is completed, a new RFD may be necessary.

In order to adequately analyze certain issues, the NEPA/RMP analyst may need very specific information from the RFD report. For example, the analyst preparing the RFD may need to predict the quality and quantity of produced water if surface disposal is anticipated. The RFD must strive to provide sufficient information and appropriate detail needed by others to address issues and assess impacts in the NEPA/RMP analysis.

The scope and detail of the RFD is dependent on the amount of data available to describe the resource, existing activity, and management requirements. In hydrocarbon producing areas, there may be thousands of wells that have been producing for decades. An RFD in one of these areas could be quite extensive. In non-producing “frontier” areas, data might be limited to only a few exploratory dry holes and very generalized estimates of potential resources from the USGS or other sources. While the RFD report for a “frontier” area might be short, the analysis still requires a reasonable estimate of potential for oil and gas occurrence and development.

SURFACE DISTURBANCE ESTIMATES

The RFD report must include an estimate of the gross and net area of potential surface disturbed as a result of oil and gas activity for the number of years covered by the study. This estimate applies to all land in the area regardless of land or mineral ownership or administration, and should categorize surface disturbance by ownership. The net surface disturbance analysis must account for future reclamation activity typically performed by the oil and gas industry. Surface disturbance analyses are area specific and must be supported by technical data and reasonable assumptions. Surface disturbance should be described in terms of type, duration, severity, and areal extent. The following formulas should be used to calculate surface disturbance.

$$\textit{Gross surface disturbance} = \textit{current disturbance} + \textit{future disturbance}$$

$$\textit{Net surface disturbance} = \textit{current disturbance} + \textit{future disturbance} - \textit{reclamation}$$

The RFD scenario should be presented in terms of the nature, size and duration of disturbances, not just in terms of the numbers of wells. It should not only address anticipated future activity, but also existing activity and anticipated changes in existing activity. Changes in existing activity such as plugging a well and subsequent reclamation of the well site serve to reduce overall net surface effects of oil and gas activity. Thus, the RFD shows not only the existing and projected surface disturbance, but also the total acres reclaimed over the period covered by the RFD. It may be reasonable to assume that a very large percentage of a well site will be reclaimed after the well has been completed and placed on production. In developing these figures, the projection must consider a reasonable rate of reclamation. Just because a well is plugged (“abandoned”), however, does not mean the site is fully reclaimed (recontoured, successfully revegetated, and stabilized).

In the context of presenting the RFD in terms of disturbance, certain unique characteristics of projected oil and gas activity may be significant with respect to the analysis of cumulative effects

in the subsequent NEPA document. Anticipated production of natural gas with high concentrations of H₂S, CO₂, or natural gas liquids (NGLs) may require the construction of processing facilities if they are not available or lack the appropriate extraction process or capacity. Gas production rates in excess of local gathering and transmission capacity may require the construction of pipelines, pumping stations, compressor stations and other infrastructure. Produced water quality and quantity may require treatment facilities and/or disposal wells. Estimates of disturbance need to be made for all that apply.

PEER REVIEW

A scientific or technical expert with qualifications as a geologist or petroleum engineer plus experience forecasting future oil and gas reserves, resources, and exploration and production activity should review the RFD report for completeness, accuracy, and reasonableness of assumptions and projections. The reviewer should not be involved in the original preparation of the RFD study and may be from inside or outside the BLM. The reviewer should engage in a dialogue with the author(s) when clarifications are required or differences exist. Comments, suggestions, and other documentation developed in the review process should be summarized in a peer review memorandum. The peer review becomes part of the RFD's administrative record.

RECOMMENDED CRITERIA FOR AN ADEQUATE RFD STUDY AND REPORT

The results of the RFD study should be presented in a report with a concise summary of its findings. The report should be presented in a manner that is easily understood. The study must be credible, supported by technical information, well documented, and incorporate reasonable assumptions as a basis for estimates of future activity. Maps, graphs, tables and other exhibits must be clearly legible.

Documentation supporting the RFD study and the final report should be assembled in a logical format and maintained in the field office for public review. The RFD documentation should include, but is not limited to, all map products and associated narratives describing data, data sources, and any limitations in applying and interpreting the information. Non-proprietary information used to prepare the RFD, including information from non-government sources, will be available to the public after the RFD is completed. Proprietary/confidential or otherwise sensitive information used to prepare the RFD can be exempted from public review or FOIA requests (BLM MS 1278.3). A brief description of the author(s) qualifications should be included in the RFD report.

RFD CONTENT AND ORGANIZATION

In order to develop consistency and standards for the RFD analysis and report, the following is a suggested guideline for content and organization. While all listed items

should be considered when preparing the RFD, professional judgment and management guidance must be used to determine the appropriate level of detail necessary for a technically sound and defensible RFD study.

I. Summary

- Estimates of future activity (wells, roads, infrastructure) needed in the NEPA/RMP analysis
- Estimates of surface disturbance needed in the NEPA/RMP analysis

II. Introduction

III. Description of Geology

- Subsurface stratigraphy and structure
- Reservoirs, traps, source rocks, seals, hydrocarbon generation and migration
- Summary of USGS or other play descriptions

IV. Past and Present Oil and Gas Exploration Activity

- Geophysical and geochemical surveys
- Exploratory drilling and success rates
- New field and reservoir discoveries

V. Past and Present Oil and Gas Development Activity

- Leasing activity, unit descriptions, spacing requirements, well locations by class and type
- Drilling and completion statistics, fields, development plans, EOR projects
- Horizontal or deviated drilling practices
- Oil, gas, water, condensate production by field, reservoir, operator, depth, vintage
- Oil API gravity, gas characteristics, CO₂, H₂S, and He, NGLs, gas/oil ratios
- Production profile for field(s) or formation(s). Well production profile “type curves” for well life determination
- Oil and gas prices, finding and development costs
- Gathering, processing, compression and transmission costs
- Field production equipment and field operation practices
- Field gathering and storage facilities, tank batteries, and measurement stations
- Gas transmission pipelines and associated capacity, compressor stations
- Gas processing facilities, extraction process, processing capacity, average intake
- Electrical power (lines, generators), roads
- Conflicts with other mineral development
- Gas storage fields, operations, and facilities

VI. Oil and Gas Occurrence Potential

- Review of RFD(s) prepared for areas adjacent to the study area
- Resources, plays, oil and gas assessments
- Map showing estimated areas of relative oil and gas occurrence potential (high, medium, low, very low and no known) and level of certainty
- Rationale for selecting values of occurrence potential and certainty

VII. Oil and Gas Development Potential

- Review of RFD(s) prepared for adjacent areas to consider, and avoid unreasonable “border” conflicts of estimates of development potential
- Proven reserves, field outlines, wells by completion status
- Map showing estimated areas of relative oil and gas development potential (high, medium, low, very low and no known including a quantitative description of each potential) and level of certainty
- Map(s) showing the spatial distribution of estimated ultimate reserves, initial production rates, cumulative production
- Rationale for selecting values of development potential and certainty

VIII. RFD Baseline Scenario Assumptions and Discussion

- Assumes all potentially productive areas are open under standard lease terms and conditions (i.e., lease form without stipulations) except those areas designated as closed to leasing by law, regulation or executive order (for example, wilderness areas, and nearly all national monuments)
- Graphs or tables showing forecast of exploration and development wells, and associated oil, gas, and water production rates
- Assumptions made in determining the type and level of projected activity should be clearly stated and referenced to sources of information
- Identify mineral estates under different ownerships and estimates of amount (percent) of activity likely to occur on lands under those authorities (Federal, State, and private)

IX. Surface Disturbance Due to Oil and Gas Activity On All Lands

- Estimates of future surface disturbance should consider the temporal nature of each type of disturbance activity
- Estimate the current surface disturbance resulting from oil and gas activity
- Estimate the future surface disturbance for well pads, roads, and oil and gas related infrastructure that may result from projections of future activity
- Estimate the staged future surface reclamation of disturbance activity

- Estimated total surface disturbance
- Estimated total net surface disturbance is equal to current disturbance plus future disturbance minus future reclamation
- Estimated number and type of infrastructure facilities that may impact air quality
- Estimated quantity and quality of produced water disposed on the surface

X. References

XI. Acknowledgements

XII. Statement of Qualifications

XIII. Appendix

- Maps, graphs, and tables can be included here or in the body of the report if appropriate.
- List of data files, GIS layers, metadata, contacts, sources of data and definitions.