2. ALTERNATIVES

2.1 INTRODUCTION

Early in the project, a scoping process was conducted to identify environmental issues and alternatives to the proposed action held with other agencies, Tribal governments, organizations, and the public. Comments received were analyzed and summarized to represent the issues expressed by the respondents.

This chapter describes the scoping process, the issue areas identified during scoping, the identification of alternatives, and each alternative and its projected reasonably foreseeable development. It also provides a comparison of the alternatives.

2.2 SCOPING

The first step in the EIS preparation process is soliciting comments from various federal, state, county, and local agencies, Tribal governments, as well as interested organizations and individuals. The comments are used to obtain the most accurate and current environmental information and to incorporate public opinion into planning and decision making. Scoping is an information gathering process open to the public and agencies early in the course of the EIS preparation process, and is required by NEPA in Council on Environmental Quality (CEQ) regulation 40 CFR 1501.7, 1501.6 and 1508.25. The purpose of the scoping process is not only to characterize potentially significant environmental issues that warrant study or evaluation, but also to identify issues that are not significant so that the environmental analysis and EIS will remain focused, thus determining the "scope" of the analysis.

2.2.1 SCOPING ACTIVITIES

The scoping activities and results are documented in a Scoping Report dated November 2002. The Scoping Report is a part of the administrative record on file at the Custer National Forest Supervisor's Office in Billings, MT. Copies of the notices, scoping letters, and notes from public meetings can be found in Volume 06 of the administrative record. The scoping activities consisted of the following notices and meetings listed below.

2.2.1.1 Notices

Notices for the project included two letters from the Forest Supervisor; an initial and a revised Notice of Intent to produce an EIS; a news release; and various project newsletters as described below.

Scoping Letters—On March 20, 1996, a letter from the Forest Supervisor was sent to 355 persons, organizations, and agencies on the Forest Service mailing list, along with 8 Tribal governments. The letter contained a scoping document outlining the decisions to be made, a detailed description of the analysis area, a discussion of the Reasonably Foreseeable Development Scenario (RFD), a list of preliminary issues, and a list of preliminary alternatives.

Since six years had passed, on May 31, 2002, a second letter was mailed to 277 persons, organizations, and agencies, including those that responded to the initial scoping letter (78 mailings from the initial scoping effort were returned by the postal service and were removed

from the distribution list). The purpose of the letter was to verify if the issues and alternatives identified earlier were still valid.

Notice of Intent—A Notice of Intent (NOI) to prepare an Environmental Impact Statement was initially published in the Federal Register on March 21, 1996. On August 10, 1998, a second NOI was published advising of the revised schedule for completion of the Draft EIS.

News Release—A news release was sent to seven newspapers in the project area during the period May 8-10, 1996.

Newsletters—A project summary and invitation for comments was published in the Bowman-Halley Watershed Activities Newsletter (October 1996). The project was in the Custer NF Quarterly Schedule for Proposed Actions from 1996 to 2002. The Quarterly Schedule provided a series of public participation opportunities over time.

2.2.1.2 Meetings

The Forest Service attended a meeting of the Harding County Board of Supervisors and members of the Environmental Review Committees on April 2, 1996, and made a presentation that included an overview of the project, copies of the March 20th scoping letter, and a question and answer session.

A public scoping meeting was held in the community of Buffalo, South Dakota on May 14, 1996. In addition, a Place Assessment was conducted. A Place Assessment is a social analysis to gain an understanding of the association of local communities with the surrounding landscape based on their value system and quality of life. Five focus group meetings and two general meetings were conducted in Buffalo, Camp Crook, Reva, and Ludlow, South Dakota, and in Ekalaka, Montana.

On October 17, 1996, the Forest Archaeologist met with the Tribal Historic Preservation Officer of the Standing Rock Sioux Tribe for a site visit of the proposed project area.

On March 17, 1997, the Forest Supervisor met with the Chairman of the Standing Rock Sioux Tribe at the South Dakota School of Mines to discuss the Sioux Oil and Gas Leasing EIS.

On June 6-8, 1997, the Forest Supervisor participated in a three-day meeting entitled "Reclaim our Sacred Sites 'Cave Hills'", sponsored by the Standing Rock Sioux Tribe and hosted by the Custer National Forest. This meeting was held at the Picnic Springs Campground near Buffalo, SD, and was attended by over 75 people, including representatives from each of the 12 tribes of the Teton Sioux. The agenda included a discussion of the National Historic Preservation Act, management of federal lands, the federal agency consultation process, the Sioux Oil and Gas Leasing EIS, and maintaining an oral history of Native American traditions.

On July 16, 1998, the Forest Supervisor attended the Mni Sose Board of Director's meeting in Flandreau, SD. The Forest Supervisor, along with Tim Mentz, the Standing Rock Sioux Tribe's Tribal Historic Preservation Officer, gave brief presentations regarding the Sioux Oil and Gas Leasing EIS and were available to answer questions following the meeting.

2.2.2 SCOPING RESULTS

A total of 37 written responses and 2 Tribal resolutions were received as a result of the public scoping conducted in March of 1996 and May of 2002. Foster Wheeler Environmental, Inc. (FWENC), the project consultant, analyzed the content of the responses and reported the results to the Forest Service. FWENC then conferred with the Forest Service Interdisciplinary (ID) Team for the project to discuss the results. The ID Team made recommendations to the Forest Supervisor regarding issues and alternatives to be addressed in the study and EIS. The Forest Supervisor approved the issue statements on July 18, 2002.

One of the most important tasks of scoping is to identify and focus the EIS on potentially significant impacts and reasonable alternatives that mitigate environmental consequences of the proposed action. The ID Team, based on their knowledge of the Forest and previous Forest wide scoping efforts, established a preliminary list of issues and alternatives. The issues and the alternatives were refined as a result of the responses received.

2.3 ISSUE IDENTIFICATION, DEVELOPMENT, AND MANAGEMENT

The Forest Service initially identified 16 preliminary issue categories that were included in the March 20, 1996 scoping letter. As a result of responses received, the initial 16 categories were revised and 5 new categories were created. Due to the length of time that had elapsed since the initial scoping letter, the Forest Supervisor decided that a second scoping letter requesting public input on the 21 revised issue categories should be mailed on May 31, 2002.

All of the following preliminary issue areas identified in the May 2002 scoping letter were also considered issue categories by the respondents. Many respondents were concerned about potentially significant impacts in the traditional cultural properties, cultural resources, and wildlife categories.

2.3.1 PRELIMINARY ISSUE AREAS

1) *Biological Diversity*
2) *Cultural Resources*
3) *Traditional Cultural Properties*
4) *Scenic or Visual Resources*
5) *Economic Resources*
6) *Social Resources*
7) *Dispersed / Developed Recreation / Wilderness*
8) *Soil Resources*
9) *Hydrologic Resources*
10) *Noxious Weeds*
11) *Air Quality*
12) *Abandoned Uranium Mines / Human Health & Safety*
13) *National Natural Landmarks*
14) *Research Natural Areas*
15) *Public Access*
16) *Paleontological Resources*

17) *Wildland Fire and Fuels Management*
18) *Jurisdiction*
19) *Deterioration of County Roads*
20) *Geologic Type Sections*
21) *Cretaceous/Tertiary Boundary*

2.3.2 ADDITIONAL ISSUES NOT CONSIDERED IN FURTHER DETAIL

Respondents to the May 2002 scoping letter identified three additional issue areas, listed below, which were not considered in detail in the analysis:

1) Defer Oil and Gas Leasing Decision to Next Forest Plan Update
2) Utilize Alternative Renewable Sources of Energy Instead of Oil and Gas
3) Coalbed Methane

2.3.3 SITE-SPECIFIC CONCERNS

Certain respondents to the May 2002 scoping letter expressly requested no leasing be allowed in or around the specific areas listed below. The issue or alternative that addresses these site-specific concerns is shown in parenthesis.

A) Entire project area *(covered by No Action alternative)*
B) Ludlow Cave *(Issue 3)*
C) North Cave Hills rock art areas *(Issue 2)*
D) Castles and Capitol Rock National Natural Landmarks *(Issue 13)*
E) Traditional cultural properties in Cave Hills and Slim Buttes *(Issue 3)*
F) All rocky outcrops *(Raptor Habitat – Issue 1)*
G) Wildlife Areas (Management Area D) *(Issue 1)*
H) Research Natural Areas *(Issue 14)*
I) Steep slopes and fragile soils *(Issue 8)*
J) Crucial winter ranges and birthing areas for big game species *(Issue 1)*
K) Campgrounds, picnic areas, and other developed recreational facilities *(Issue 7b)*
L) Raptor nesting and feeding areas *(Issue 1)*
M) Crucial habitat for indicator species *(Issue 1)*
N) Wetlands, riparian zones, ponds, streams, reservoirs *(Issue 9)*
O) Scenic areas and heavily used undeveloped recreational areas *(Issues 3 and 7a)*

2.3.4 ISSUE MANAGEMENT

As required by the Code of Federal Regulations, which provides direction for NEPA implementation (40 CFR 1500-1508), environmental analyses are intended to focus on and disclose effects based on significant issues related to the proposed action under consideration. Significant issues are 1) used to formulate alternatives, 2) utilized to analyze effects, and 3) used to identify mitigation not part of the proposed action. Issues may be considered, dismissed, or

not considered in detail for a variety of reasons. For example, existing law, regulation, and policy may address them; they may inherently be a part of the proposed action; they may be considered for analysis purposes to display effects; or may have been addressed in the Forest Plan and won't be considered in greater detail in this analysis. Issues may be dismissed because they are beyond the scope of the decision to be made or they will not be considered in greater detail because information has been presented that shows rationale not to consider it further.

Table 2-1 below describes each preliminary issue, which type it is, how it will be managed, and how it is measured and monitored in this document.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS

Issue Description	Type	Measure and/or Monitor
Issue 1: Biological Diversity		
Oil and gas exploration, development, and production may affect threatened and endangered species, or sensitive species. There are concerns that proposed oil and gas exploration, development, production, and rehabilitation could affect habitats, resulting in a change of plant and wildlife populations. The project area may contain federally listed threatened and endangered species or their seasonal or transitional habitats. The bald eagle is known to migrate through the project area. Plant and animal species identified by the Northern Region of the US Forest Service and BLM as sensitive species are known to reside in portions of the project area throughout the year. Management Indicator Species, as identified by the Custer National Forest, are also found in the project area and may be affected by the proposal. No BLM sensitive plant species or their required habitats are known within the analysis area. Concern was also expressed regarding impacts to biological corridors.	Basis of Alternative Formulation	The unit of measure for this issue will be acres of habitat affected for management indicator and threatened, endangered, and sensitive species.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 2: Cultural Resources There is concern that recorded and unrecorded cultural sites may be affected by oil and gas exploration, development, and production activities. Internationally recognized rock art is located in the North Cave Hills, of which 102 sites are currently listed on the National Register of Historic Places. The Cave Hills have been recognized as having the highest site density in the Northern Great Plains. Many of these sites have the potential to contribute valuable information on the prehistory of the Northern Plains and are the focus of several research-oriented studies (Lightening Springs, North Cave Hills Rock Art, Ludlow Cave, etc.). There is concern regarding effect upon the Ludlow Cave Archaeological District Proposal. There is concern oil & gas development would impact stratigraphic records of pollen and phytoliths. Site vandalism and unauthorized site excavation may occur more frequently due to increased access to the project area and resultant traffic.	Basis of Alternative Formulation	The unit of measure will be the number and type of cultural resources whose integrity and NRHP eligibility status are affected.
Issue 3: Traditional Cultural Properties and Culturally Sensitive Sites There is concern from the Native American communities that traditional cultural properties, including plant and mineral gathering areas, may be affected by oil and gas development and production activities. Arapaho, Cheyenne, Hidatsa, Mandan, Crow, and Sioux have expressed concern over the proper treatment of traditional cultural properties and burials located in the project area. Ludlow Cave is located in the North Cave Hills and is considered one of the most important sites in the State of South Dakota as well as being considered sacred to the Arikara, Arapaho, Assiniboine, Cheyenne, Crow, Mandan, Hidatsa, and Sioux. Introduction of noise, pollutants, and visual intrusions may threaten the seclusion and serenity necessary for traditional cultural practices.	Basis of Alternative Formulation	The unit of measure will be the number and type of traditional cultural properties whose integrity and NRHP eligibility status are affected. This issue is difficult to measure and may be more a qualitative measure than a quantitative one. Unit of measure may include effects to viewshed, EPA/rural standards, and estimates of audio and olfactory intrusion.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 4: Scenic or Visual Resources		
Each of the five geographic areas (buttes) within the project area stand out like islands from the sea of prairie and agricultural development surrounding them. Their striking contrast to the terrain around them results in a unique visual experience, different from that of the surrounding range and croplands. Oil and gas exploration, development, production, and rehabilitation activities may affect this visual experience.	Basis of Alternative Formulation	This issue will be measured by change in viewshed.
Issue 5: Economic Resources		
The communities within and near the project area rely on income from numerous resources, including livestock production, crop farming (primarily wheat, oats and barley), tourism, recreation, and some oil and gas development. The decision on this analysis may affect the opportunity for oil and gas exploration, development, and production, which may have an economic effect to the adjacent communities, the State of South Dakota, and the Federal Treasury.	Issue will be tracked and effects disclosed	Effects will be measured by the number of jobs created, and the total income potential for the local communities and governments including the State of South Dakota, generated directly and indirectly from oil and gas activities on federal minerals within the project area. Additional effects by alternative will be shown to reflect the projected volume of oil produced, the projected total value of that oil, and the total royalties paid by industry based on the value of oil produced. Federal oil royalty and lease revenues will be used as indicators.
Issue 6: Social Resources		
Results from the Place Assessment show that there are some close personal ties to the land units from those who live near them. Residents returning home from long distance trips use the area as a sign that they are home or getting close to home. Harding County has experienced a population decline over the last 20 years and is very sparsely settled and populated. Although the overall population has decreased, the social organization of the community and ties among county residents remains strong.	Issue will be tracked and effects disclosed	Effects will be estimated on the basis of the anticipated immigrating oil and gas work force and changes in the visual environment, and the resulting potential effects to the existing Harding County social organization and lifestyles and well being, including sense of place.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 7a: Dispersed Recreation		
Within the project area, there are numerous dispersed sites and several caves. The area is popular for hunting deer, turkey, antelope, and grouse. Oil and gas development activities have the potential to affect recreation values and activities within the project area in several ways. Travel over National Forest System Roads (NFSRs) may be affected during exploration, drilling, and production operations. Expectations of a high quality visual experience, scenic driving (the nation's number one recreational activity), hunting, and other recreational activities could be affected by commercial traffic, drilling, and production activities.	Issue will be tracked and effects disclosed	Effects will be measured by change in miles of open road. An estimation of additional use of the land management units and increased traffic due to oil and gas activities will be presented.
Issue 7b: Developed Recreation		
Within the project area, there are two developed campgrounds (Reva Gap and Picnic Springs) and two concentrated use areas (Deer Draw and Brown's Pond). The Castles National Natural Landmark is accessed from Reva Gap Campground. Oil and gas development activities may affect developed recreation through changing what visitors see from these areas; what they hear while in these areas, and what they smell while there.	Issue will be tracked and effects disclosed	Effects will be measured by assessing the impact on the opportunity for developed recreation experiences
Issue 7c: Wilderness Potential		
There is a concern that oil and gas development could impact the wilderness character of roadless areas and lessen the potential for wilderness consideration.	Issue has been addressed by law, regulation, or policy	The wilderness issue has already been addressed in federal regulation and policy. All of the land units under consideration are roaded and do not meet criteria for wilderness consideration. This issue has been addressed and will not be examined in any more detail in this analysis.
Issue 8: Soil Resources		
Oil and gas exploration, development, and production may adversely affect soil properties such as productivity, permeability, and erodability. Potential effects include mass wasting, increased sediment generation, and compaction.	Issue will be tracked and effects disclosed	The unit of measure for assessing effects to soils resources will be acres disturbed and anticipated loss of productivity.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 9: Hydrologic Resources		
Oil and gas development may affect water resources including wetlands and riparian areas. There are a number of concerns related to this issue. Groundwater may be affected by drilling, resulting in the possibility of mixing water from one aquifer with that of another. Migration of salt water or water mixed with oil into aquifers used for potable water is of particular concern. Oil, hazardous materials, and other fluid spills from production facilities, trucks, and pipelines may affect surface water quality, as well as other resource values.	Issue will be tracked and effects disclosed	The effect to water quality will be qualitatively discussed relative to the potential for increased sedimentation, the capacity to meet state and federal water quality standards, and impacts to ground water.
Issue 10: Noxious Weeds		
Noxious weeds, such as leafy spurge, Canada thistle, and spotted knapweed, are present within the project area. Current control efforts utilize an array of techniques ranging from biological control to herbicides. There is concern that vehicles and equipment, as well as the construction of drilling pads and roads for oil and gas exploration, development, and production, may provide suitable transport and habitat, respectively, for noxious weeds to infest new and larger areas.	Issue will be tracked and effects disclosed	Effects will be displayed as acres disturbed.
Issue 11: Air Quality		
Sulfur dioxide and hydrogen sulfide, as well as other noxious gases, are common emissions from oil wells in some areas of the Williston Basin. There is the potential to exceed established air quality standards from noxious gasses emitted from oil and gas development. Consultation with the Air Quality Division of the South Dakota Department of Environment and Natural Resources, the department that monitors and regulates air quality in South Dakota, shows that none of the wells in Harding County produces sulfur dioxide or hydrogen sulfide. Therefore, this will be considered through the analysis in order to comply with regulations implementing the National Forest Management Act found at 36 CFR 219.27 (a)(12) and the Clean Air Act.	Issue will be tracked and effects disclosed	The number of forecast wells operating at one time will be used as an indicator for these issues. Effects will be measured by increased emissions, and comparison with state and federal standards.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 12: Riley Abandoned Uranium Mine Twelve mined bluffs covering approximately 328 acres in the North Cave Hills have been determined to constitute a hazardous situation to human health and safety. The conditions meet the criteria for initiating a removal action under 40 CFR Section 300.415(b)(2) of the National Contingency Plan (NCP). Development of oil and gas resources within or adjacent to these locations may serve to complicate the legal actions which may result from the removal action. Based on potential legal conflicts, these acres will not be made available for lease.	Issue tracked and effects disclosed	Effects will be measured in terms of loss of development within these areas.
Issue 12a: Abandoned Uranium Mines Throughout the Cave Hills and Slim Buttes land units, there are approximately 34 abandoned uranium mines that have been mapped by the Montana Bureau of Mines. As with the Riley mines discussed in Issue 12, these areas have not been reclaimed. Oil and Gas activities may impact these areas.	Issue will be tracked and effects disclosed	The method of measurement will be abandoned mine acres affected or proximity of oil & gas development
Issue 12b: Human Health and Safety This issue ties with issue 12 above. The high uranium content in the area may be affected by oil and gas activities. Disturbance of these areas may result in exposure of increased hazards.	Issue will be tracked and effects disclosed	The method of measurement will be the increase in health and safety risk.
Issue 13: National Natural Landmarks The Castles National Natural Landmark. This NNL was designated by the Secretary of the Interior and was added to the National Register of Natural Landmarks in 1978, is 1,005 acres in size, and is located in the northern part of the Slim Buttes land unit. It was designated based on its scenic beauty, spectacular erosion forms, exposed stratigraphy, and fossil record. The NNL is not withdrawn from mineral entry because of this designation; however, Forest Plan Amendment #1 allows leasing with no surface occupancy. Allowing occupancy along the boarders of the NNL could affect the scenic value of the landmark.	Issue will be tracked and effects disclosed	The unit of measure will be the potential to affect the scenic or other values used as the basis for NNL nomination

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 14: Research Natural Areas		
Proposed Deer Draw Research Natural Area A portion of Deer Draw in the Slim Buttes land unit has been proposed as an RNA. Deer Draw features vegetation types that are absent from other designated natural areas within the region. Of primary importance is the presence of an interconnected series of woody draws in good to excellent ecological condition. There is concern that proposed oil and gas activities may alter the features and values that make Deer Draw an important RNA opportunity.	Issue will be tracked and effects disclosed	The unit of measure will be the potential to disturb the ecological condition of the proposed RNA.
Issue 15: Public Access		
Improved roads and increased access that may be a result of proposed oil and gas activities may result in more motorized and non-motorized public access on and off roads and may result in resource damage.	Issue will be tracked and effects disclosed	Effects will be measured by changes in road miles and standard open acres. The off-road travel portion of this issue has been addressed through the Off Highway Vehicle Decision. The roaded portion of this issue is mitigated by design and location.
Issue 16: Paleontological Resources		
Much of the analysis area is rich in vertebrate and invertebrate fossils. There are concerns over the possible destruction and loss of these resources. These activities also create new fossil-bearing exposures that would not otherwise be found.	Preliminary issue has been addressed by law, regulation, or policy.	By law, these resources must be protected once they become known or exposed and the mitigation to protect them is the same for all alternatives. Thus, it is not necessary to consider them in more detail in this analysis.
Issue 17: Wildland Fire and Fuels Management Historical fire records for the Sioux Ranger District indicate lightning as the primary ignition source for wildfires. There are other ignition sources but these occur infrequently. Oil and gas development may increase the chance of a wildfire ignition and possible loss of public and private property as well as result in some environmental damage. The potential for increased access may provide the opportunity for greater suppression capability.	Beyond the scope of this decision and analysis.	The FS is not making a decision on fire and fuels management or on providing greater access to the land units within the analysis area.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 18: Jurisdiction		
Tribal governments desire the United States government to return jurisdiction of the lands within the project area to the Native Americans.	Beyond the scope of this decision and analysis and will not be considered further in this analysis.	This issue is beyond the scope of the decision to be made for the proposed action. The Forest Service has thanked tribal representatives for their comments and has indicated that they should express their concerns to their elected federal legislative representatives.
Issue 19: County Roads		
Oil and gas activities require a road system designed to withstand heavy commercial payloads. Any existing or newly constructed roads on National Forest System lands used for these activities would be designed or upgraded to withstand these payloads. Should oil and gas resources be made available for leasing, the increase in heavy truck traffic on roads may likely accelerate the deterioration of County roads.	Beyond the scope of this decision and analysis and will not be considered further in this analysis.	Addressing effects to county roads is beyond the scope of this analysis because the responsible officials have no authority over county roads. The Forest Service has no jurisdiction on county roads so this issue is outside the scope of this analysis.
Issue 20: Geologic Type Sections		
Geologic type sections are the outcrop areas for a particular rock formation for which the formation was originally described and named. There is concern that if type sections occur in the project area, oil and gas activities could damage or destroy them. No such type sections exist in the project area. Therefore, this issue is not relevant to the decision to be made and will not be addressed further in this analysis.		No geologic type sections are known to exist within the project area. Even if there were type sections within the project area, standard lease terms would allow moving a proposed drill location by up to 200 meters if unacceptable adverse effects were likely. Thus, this preliminary issue is dismissed without being considered in detail.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 21: Cretaceous/Tertiary		
In some places, the K/T boundary marks a major distinction event in geologic time. The formations representing this event are exposed in the project areas. Some such outcrops have world/class characteristics, literally occurring only in a few places in the worlds. If such outcrops exist in the project area, oil and gas activities could contribute to destruction of the outcrops, thereby precluding scientific study of possibly unique features.		The K/T boundary does exist within certain locations within the project area. However, standard lease terms would allow moving a proposed drill location by up to 200 meters if unacceptable adverse effects were likely. However, this issue is not relevant to the decision to be made and will not be addressed in detail.
Issue 22: Wait Until Forest Plan Revision		
Concern was expressed that the results of this analysis would drive the long-term land management of the area. It was suggested that the Forest Plan revision process was the appropriate place for such a decision.	Beyond the scope of this decision and analysis.	One of the purposes of this analysis is to address the outstanding requests for leases, which makes the purpose of the proposal ripe for a decision. There is no need to wait and make this decision in the next Forest Plan revision. Until a Forest Plan revision is completed, management of the forest continues under the current Forest Plan. The next Forest Plan revision is not scheduled to begin until 2004. This oil and gas leasing analysis was started in 1996 and it may or may not result in a Forest Plan amendment.
Issue 23: Alternative Energy Sources		
It was suggested that a hydrogen-based energy alternative be considered.	Beyond the scope of this decision and analysis.	The Forest Service is not making decisions on what type of energy source is best. This decision deals with determining which lands are available for leasing, and of those, which lands to specifically authorize BLM to consider for leasing. The BLM will determine which of those specific lands to lease.

Table 2-1. Issues in Sioux Oil & Gas Leasing EIS (Cont'd)

Issue Description	Type	Measure and/or Monitor
Issue 24: Coal Bed Methane		
Concern was expressed that coalbed methane extraction could include the need to remove and dispose of large quantities of water that could adversely alter the quality and quantity of ground and surface water sources.	Beyond the scope of this decision and analysis.	The oil and gas reasonably foreseeable development scenario projected coalbed methane as having a low potential in the project area. The extraction of coalbed methane is not considered reasonably foreseeable. Consequently, potential impacts of exploration, development, and operations for coalbed methane extraction involving the removal and surface discharge of large quantities of water are not analyzed and disclosed in this document. Additional environmental analysis under NEPA would be required beyond this document if at a future date lessees discoveries result in the need to remove large quantities of water to produce hydrocarbons and surface discharge is a viable disposal option for such water. However, coal bed methane is addressed by this document if the impacts for such activities are consistent with those analyzed in this document for conventional oil and gas development.

2.4 ALTERNATIVES DEFINE THE ISSUES

NEPA requires an analysis of a no-action alternative and reasonable alternatives that meet the purpose and need and address significant issues. This section is the heart of the environmental impact statement. It defines the issues and, based on the information and analysis presented in Chapter 3, summarizes the environmental consequences of the alternatives, relative to the significant issues, in a comparative format. This provides the decision maker and the public a basis for choice among the alternatives.

2.4.1 INITIAL LIST OF PRELIMINARY ALTERNATIVES

The FS identified the following initial list of potential alternatives that were presented in the scoping efforts:

- Alternative 1 – No Action, No New Leases
- Alternative 2 – Lease with Forest Plan Stipulations
- Alternative 3 – Lease With Only BLM Standard Lease Terms

2.4.2 ADDITIONAL ALTERNATIVES IDENTIFIED IN SCOPING

The scoping responses suggested the following two additional alternative leasing concepts:

- Alternative Energy Sources
- No New Lease and Buy-back of Existing Leases

2.4.3 ALTERNATIVES NOT CONSIDERED IN DETAIL

The following alternatives are not considered in detail for the reasons stated.

2.4.3.1 Leases Issued with only BLM Standard Lease Terms (SLTs)

Standard Lease Terms provide for measures to minimize adverse impacts to surface resources, such as modifications to the siting or design of facilities, timing of operations, and specifications

of interim and final reclamation measures. However, it was determined that issuance of oil and gas leases with only these SLTs would have the following detrimental effects:

- Risk the environmental consequences that the stipulations were created to mitigate; and
- Would not be consistent with the Leasing Reform Act regulations that require a finding that the lease terms are consistent with the Forest Plan; and
- Preliminary review indicated that leasing with only Standard Lease Terms may violate Forest Service regulations or policies in certain cases.

In fact, the CNF Forest Plan, based on environmental analysis documented in the Forest Plan EIS, specifically identifies and directs the use of specific lease terms in addition to BLM SLTs to mitigate potentially significant impacts. As a result, this alternative was not considered reasonable and is not considered further.

2.4.3.2 Utilize Alternative Energy Sources

The use of alternative energy sources implies that no additional oil and gas leases would be made available. The option of not going forward with new oil and gas leasing activities is considered in detail in this DEIS as Alternative 1 (the No Action alternative). Further, the purpose and need of this proposal is to determine which, if any, lands are to be authorized for oil and gas leasing and under what conditions; the use of alternative energy sources does not fall within the stated purpose and need.

2.4.3.3 No New Leases and Buy-back of Existing Leases

The option of not going forward with new oil and gas leasing activities is considered in detail in this DEIS as Alternative 1 (the No Action alternative). Although the federal government could buy-back existing oil and gas leases if special legislation is enacted to authorize it, there is no compelling reason to do so since (1) the experience with the existing leases on the Sioux Ranger District has been a positive one and (2) the existing lease stipulations are serving to prevent or mitigate potential adverse environmental consequences. Thus, consideration of this alternative would not be responsive to federal Law, Regulation, and Policy and would not address the stated purpose and need.

2.4.3.4 Additional Alternatives Considered by Forest Service ID Team

The following alternatives were suggested and considered by the Forest Service Interdisciplinary Team, but were dismissed without consideration in further detail.

1. An alternative was proposed that would constrain well pads to within 200 meters of existing state, county, and National Forest System Roads (NFSRs) within the project area. While this alternative would have allowed the use of existing roads, no new road construction would have been permitted. Everything outside the 200 meter "road corridor" would have been designated No Surface Occupancy (NSO). Controlled Surface Use and Timing Limitations would be utilized as much as possible. This alternative was dismissed from detailed analysis because this issue could be addressed by mitigation in another alternative.

2. An alternative was proposed that would maintain and enhance the cultural landscape and human dimension. Consideration would be given to sense of place; access; visuals; recreation; Research Natural Areas; The Castles National Natural Landmark; traditional cultural uses; and traditional lifestyles including ranching, farming, oil and gas; and research such as for cultural resources or raptors. This alternative was dismissed from detailed analysis because the current Alternative 3 (Leasing with Additional Stipulations to Protect Forest Resources) addresses the issues for which this alternative was developed.

3. An alternative was proposed that would maximize the efficient recovery of the oil and gas resource, and would result in staggered leasing and production. Under this alternative, a land unit would have been opened leasing, production, and development for thorough recovery of the oil and gas resource, and then it would be rehabilitated and closed before opening the next unit. Land units would be offered based on industry interest, and each spacing unit would be occupied. However, implementation in some units would delay the ripeness of the decision for others. This alternative was dismissed from detailed analysis because market conditions and industry practices would have made this alternative infeasible.

4. An alternative was proposed that would end drainage of federal minerals by ensuring that federal land adjacent to private lands was made available for lease. Consideration would have been given to placing wells around the bottoms of the buttes to minimize effects to resources. Consideration of wells placed wells on the tops of the buttes would only be given on a case-by-case basis. However, the Forest Service and the Bureau of Land Management could not guarantee that federal land would be leased, pending production on the adjacent lease. Thus, this alternative would not meet the stated purpose and need and was dismissed from detailed analysis.

5. An alternative was proposed to emphasize surface resource protection through the use of performance-based stipulations, which dictate the desired end result of an action rather than the manner in which the action is accomplished. This would imply occupation of the lease at some location as long as the surface resource protection objectives were being met, though it would not preclude a No Surface Occupancy stipulation. Mitigation would not actually occur until the Application for Permit to Drill (APD) stage. The APD would not be considered complete unless the lessee demonstrated that it could meet the stipulation criterion. This alternative would have resulted in uncertainty as to the effects of oil and gas leasing since it would have been necessary to defer a determination of effects, for the most part, to the APD stage. This alternative was dismissed from detailed study because it would not meet the NEPA requirement for ascertaining, site specifically, the effects of the proposal on the human environment.

2.4.4 ALTERNATIVES CONSIDERED IN DETAIL

Oil and gas exploration and development has been occurring on the Sioux Ranger District for over 20 years. There are five existing oil and gas leases currently active on the District. As a result, CNF professional staff has considerable knowledge and experience regarding oil and gas operations and effects. The Custer National Forest Plan and EIS analyzed the environmental consequences of further oil and gas leasing on the Forest and developed specific stipulations to be used in future leases to mitigate potentially significant effects (Forest Plan p. 169-173). This oil and gas leasing analysis and EIS is tiered under the CNF Forest Plan and the Forest Plan EIS.

In that regard, it should be viewed as a focused continuum of the analysis and direction contained in those documents. As a result, additional alternatives other than the No Action - No New Leasing alternative are only needed to address adverse environmental consequences not mitigated by the stipulations that are a part of Alternative 2 – Lease with Forest Plan Stipulations.

Three alternatives are considered in detail. Each is described below.

2.4.4.1 Alternative 1 – No Action, No New Leasing

This alternative represents the National Environmental Policy Act (NEPA) requirement to consider a "no action" alternative, which in this situation is considered to be continuing the current management situation. No new leasing is allowed under this alternative. Existing leases have an entitlement to continue as long as they are producing. Any lease not producing at the end of its lease term would be terminated.

There are five existing leases in the project area, as listed in Table 2-2, totaling 4,440 acres. Three leases are located in the South Cave Hills land unit and the other two are in the North Cave Hills land unit.

Table 2-2. Existing Leases in the Project Area

Lease	Location	Lease Acres	Year Leased	Has Existing Lease Stipulations?
SDM 59567	South Cave Hills	1200	1983	Yes
SDM 54525	South Cave Hills	320	1982	Yes
SDM 51491-A	South Cave Hills	80	1983	No
SDM 43521	North Cave Hills	2440	1979	Yes
SDM 54158	North Cave Hills	400	1982	Yes

There are currently three existing wells in North Cave Hills leases and one existing well in the South Cave Hills leases. The RFD projects two additional wells in the North Cave Hills existing leases and three additional wells in the South Cave Hills existing leases. Table 2-3 summarizes the existing and RFD-projected wells in the existing lease areas.

Table 2-3. Existing and RFD Projected Wells in the Existing Lease Areas

Wells	North Cave Hills	South Cave Hills	Total
Existing Lease Areas			
Existing Oil	2	1	3
Existing Injection	1		1
Sub-Total Existing Wells in Existing Lease Areas	3	1	4
RFD Projected Oil	1	2	3
RFD Projected Injection	1	1	2
Sub-Total RFD Wells in Existing Lease Areas	2	3	5

Table 2-3. Existing and RFD Projected Wells in the Existing Lease Areas (Cont'd)

Wells	North Cave Hills	South Cave Hills	Total
Sub-Total Wells in Existing Lease Areas	5	4	9
Off Forest			
Existing Oil		1	1
RFD Projected Oil			
RFD Projected Injection			
Sub-Total Off Forest		1	1
Total	5	5	10

Each of the existing leases has been in existence a little over 20 years. Some of these leases have additional lease stipulations to protect the surface resources. Geographically locatable existing lease stipulations are shown in Table 2-4. Maps showing the location of the existing leases and the applicable geographically locatable existing lease stipulations are shown in Figures 2-1 through 2-6 located in the accompanying map packet. The existing and RFD-projected locations for wells and roads on existing leases are also shown on these maps. One existing well is located adjacent to the boundary of the South Cave Hills unit and drains federal minerals.

Table 2-4. Geographically Locatable Existing Lease Stipulations (from existing lease documents)

Lease(s)/Resource Concern	Related Issue	Stipulation
Lease M 43521 (SD)		
Steep slopes	8 (soils)	NSO
Hardwood draws	1 (biodiversity)	NSO
Rimrocks and breaks	1 (biodiversity)	NSO
Leases M 54525 (SD), M 59567 (SD), M 43521 (SD) and M 54158 (SD)		
Steep slopes	8 (soils)	NSO
Hardwood draws	1 (biodiversity)	NSO
Rimrocks and breaks	1 (biodiversity)	NSO
Active raptor nests: Seismic work and well drilling within ¼ mile of active nests will be allowed only during August 1 – March 1. This does not apply to maintenance and operation of producing wells and facilities.	1 (biodiversity)	TL
100 feet of skylines or ridges in tabletop grassland ecosystem	4 Scenic	CSU
100 feet from the edge of the rights-of-way from highways, designated county roads and appropriate federally-owned or controlled roads and recreation trails	15 Public Access	CSU
500 feet, or when necessary, within the 25-year flood plain from reservoirs, lakes, and ponds and intermittent, ephemeral or small perennial streams	9 Hydraulic Resources	CSU

Table 2-4. Geographically Locatable Existing Lease Stipulations (Cont'd)

Lease(s)/Resource Concern	Related Issue	Stipulation
300 feet from occupied buildings, developed recreational areas, undeveloped recreational areas receiving concentrated public use and sites eligible for or designated as National Register sites	7 Recreation 2 Cultural	CSU
300-foot buffer around developed recreation sites	7 Recreation	CSU
On slopes over 30 percent, or 20 percent on extremely erodable or slumping soils	8 Soils	CSU

Source: BLM Standard Lease Forms, Existing Leases on the Project Area.
NSO = No Surface Occupancy; TL = Timing Limitation; CSU = Controlled Surface Use

2.4.4.2 Alternative 2 – Lease with Forest Plan Stipulations

This alternative would permit oil and gas leasing on all portions of the project area, subject to the stipulations contained within the Custer National Forest Land and Resource Management Plan as amended. These lease stipulations, as they apply to the project area, are summarized in Table 2-5 below and shown on maps in Figures 2-7 through 2-24 in the accompanying map packet.

The geographical locations where these stipulations apply were compared with the projected well and road site locations from the RFD (Appendix D). Well sites that fell within areas where the no surface occupancy (NSO) stipulation applies were analyzed to see if they could be relocated or had to be eliminated. For this analysis, it was assumed a well site could be moved up to one-half mile from the RFD location by slant or horizontal drilling. If the well could not be relocated out of NSO within one-half mile, it was eliminated.

Table 2-5. Custer Forest Plan Oil & Gas Leasing Stipulations Applicable to the Sioux Ranger District within South Dakota

Stipulations	Related Issue(s)	Mgmt Area	Stip.
Biological Diversity Stipulations			
Within 200 feet of **grouse dancing grounds**	1 Biodiversity	B Range C Rimrock D Wildlife F Dev Rec L RNAs O Nat'l LMs	NSO
¼ mile from **Eagle, Falcon or Merlin nests**	1 Biodiversity	C Rimrock F Dev Rec L RNAs O Nat'l LMs	NSO
¼ mile from **Eagle, Falcon or Merlin nests**	1 Biodiversity	B Range D Wildlife N Woody Draws	CSU
½ mile from **Eagle nests** from 2/15 to 7/15	1 Biodiversity	All	TL

Table 2-5. Custer Forest Plan Oil & Gas Leasing Stipulations (Cont'd)

Stipulations	Related Issue(s)	Mgmt Area	Stip.
Biological Diversity Stipulations			
¼ mile from **Falcon nests** from 3/15 to 7/20	1 Biodiversity	All	TL
¼ mile from **Merlin nests** from 3/15 to 7/15	1 Biodiversity	All	TL
¼ mile from **Prairie Grouse** dancing grounds from 3/1 to 4/30	1 Biodiversity	All	TL
Forested Areas including mature ponderosa pine, aspen, and cottonwood	1 Biodiversity	B Range D Wildlife E Minerals	CSU
Protection of **Woody Draws** (Forest Plan Amendment 13)	1 Biodiversity	N Woody Draws	CSU
Rimrock Ecosystem - When existing leases expire or terminate, the new lease will contain a No Surface Occupancy Stipulation. For areas not accessible by directional drilling, mineral withdrawal will be considered.	1 Biodiversity	C Rimrock	NSO
Physical Resources Stipulations			
Slopes exceeding 40 percent, fragile soils, and/or mass failure hazard.	8 Soils	B Range D Wildlife E Minerals	NSO
Minimize surface disturbance in **riparian areas**. Drill pads will not be located within the **riparian ecosystem** and will be located to avoid disturbance to the distinctive vegetative communities within the riparian ecosystems unless after analysis the Authorizing Officer determines that locating in alternate sites may be more damaging than occupying this management area. Access and other associated development and production facilities will be routed to cross riparian areas at right angles to minimize road lengths, maintain stream gradients, and prevent sedimentation in the streams.	9 Hydraulic Resources	M Riparian	LN
Recreation and Special Management Area Stipulations			
Developed recreation sites	7b Developed Recreation	F Dev. Rec.	NSO
Protection of Research Natural Area values	14 Research Natural Area	L RNA's	NSO
Prohibit occupancy within 1/4 mile of developed sites from May 15 to September 15.	7b Developed Recreation	F Dev. Rec.	TL
Protection of National Natural Landmarks	13 Landmarks	O Nat'l landmarks	NSO
Protect Administrative Site at **Camp Crook**	N/A	P Ad. Site	NSO

TL = Timing Limitation; NSO = No Surface Occupancy; CSU = Controlled Surface Use; LN = Lease Notice

Table 2-6. Existing and Projected Wells under Alternative 2

Wells	North Cave Hills	South Cave Hills	Slim Buttes	East Short Pines	West Short Pines	Total
Existing Lease Areas						
Existing Oil	2	1				3
Existing Injection	1					1
Sub-Total Existing Wells in Existing Lease Areas	3	1				4
RFD Projected Oil		1				1
RFD Projected Injection						
Sub-Total RFD Wells in Existing Lease Areas		1				1
Sub-Total Wells in Existing Lease Areas	3	2				5
New Lease Areas						
RFD Projected Oil	6	5				11
RFD Projected Injection	6	2				8
RFD Projected Dry			3	1	1	5
RFD Projected Gas					1	1
Sub-Total New Lease Wells	12	7	3	1	2	25
Off Forest						
Existing Oil		1				1
RFD Projected Oil		1				
RFD Projected Injection		1				1
Sub-Total Off Forest		3				3
Total	15	12	3	1	2	33

2.4.4.3 Alternative 3 – Lease with Additional Stipulations to Protect Forest Resources (Preferred Alternative)

Alternative 3 consists of the Alternative 2 Forest Plan stipulations plus additional stipulations to address the residual adverse effects that would remain if Alternative 2 were implemented. These additional stipulations were identified as a result of the analysis of the environmental consequences of Alternative 2. These additional stipulations are, in essence, mitigation measures for Alternative 2 and would require a Forest Plan amendment to implement. Alternative 3 is the preferred alternative.

Alternative 3 applies all of the stipulations of Alternative 2. Alternative 3 applies certain of the Alternative 2 biological and physical stipulations to the entire lease area rather than limiting them to just certain management areas as in Alternative 2. In addition, Alternative 3 adds stipulations to protect cultural resources and avoid health hazards associated with abandoned uranium mines.

It should be noted that there are conditions under which a waiver, exception, or modification of a stipulation would be allowed. These conditions for each stipulation are listed in Appendix B. In the Slim Buttes, cultural resources NSO could be exempted based on survey showing no historical properties at proposed development location(s). NSO waivers would also require broad-scale analysis for the identification of Traditional Cultural Properties and Sacred Areas which could be adversely affected by the undertaking.

Table 2-7 shows the geographically locatable Alternative 3 stipulations. Figures 2-25 through 2-42 in the accompanying map packet illustrate where the stipulations would be applied and the location of the existing and projected wells and roads.

Table 2-8 lists non-mapped stipulations, lease notices (LN), and conditions of approval (COAs) that may be required for approval of an Application for Permit to Drill (APD) or Sundry Notice.

The geographical locations where these stipulations apply were compared with the projected well and road site locations from the RFD (Appendix D). Well sites that fell within areas where the no surface occupancy stipulation applies were analyzed to see if they could be relocated or had to be eliminated. For this analysis, it was assumed a well site could be moved up to one-half mile from the RFD location by slant or horizontal drilling. If the well could not be relocated out of NSO within one-half mile, it was eliminated.

Table 2-7. Alternative 3 Leasing Stipulations

Stipulation Type	Related Issue(s)	Mgmt Area	Stipulation
Biological Diversity Stipulations			
Within 200 feet of **grouse dancing grounds**	1 Biodiversity	All	NSO
1/2 mile from **Eagle and Falcon** nests	1 Biodiversity	All	NSO
1/4 mile from **Merlin** nests	1 Biodiversity	All	NSO
Rimrock Ecosystem - When existing leases expire or terminate, the new lease will contain a No Surface Occupancy Stipulation. For areas not accessible by directional drilling, mineral withdrawal will be considered.	1 Biodiversity	C Rimrock	NSO
Protection of **Woody Draws**	1 Biodiversity	N Woody Draws	NSO
Within ¼ mile of **grouse dancing grounds**	1 Biodiversity	All	NSO
1/2 mile from **Eagle and Falcon** nests	1 Biodiversity	All	NSO
1/4 mile from **Merlin** nests	1 Biodiversity	All	NSO
Rimrock Ecosystem - When existing leases expire or terminate, the new lease will contain a No Surface Occupancy Stipulation. For areas not accessible by directional drilling, mineral withdrawal will be considered.	1 Biodiversity	C Rimrock	NSO
Protection of **Woody Draws**	1 Biodiversity	N Woody Draws	NSO
Forested areas (including ponderosa pine, juniper, aspen, cottonwood, and areas offering valuable vegetative diversity and seclusion for **big game**)	1 Biodiversity	All	CSU
FS sensitive/Watchlist plants	1 Biodiversity	All	CSU

Table 2-7. Alternative 3 Leasing Stipulations (Cont'd)

Stipulation Type	Related Issue(s)	Mgmt Area	Stipulation
Biological Diversity Stipulations			
1/2 mile from **Eagle nests from 2/1 to 7/31**	1 Biodiversity	All	TL
1/2 mile from **Falcon nests from 3/1 to 7/31**	1 Biodiversity	All	TL
1/4 mile from **Merlin nests from 3/15 to 7/15**	1 Biodiversity	All	TL
2.0 mile from **Sage Grouse active leks 3/1 to 5/15**	1 Biodiversity	All	TL
1.0 mile from **Sharp-tailed Grouse active leks 3/1 to 5/15**	1 Biodiversity	All	TL
Goshawk: 3/1 to 9/30 in potential nest stands and post-fledging family area (PFA) in mature forest habitat	1 Biodiversity	All	TL
Physical Resources Stipulations			
Existing mine spoil piles and abandoned mines	12 Health & Safety	All	NSO
Slopes exceeding 40 percent, fragile soils, and/or mass failure hazard.	8 Soils	All	NSO
Minimize surface disturbance in **riparian areas**. Drill pads will not be located within the riparian ecosystem and will be located to avoid disturbance to the distinctive vegetative communities within the riparian ecosystems unless after analysis the Authorizing Officer determines that locating in alternate sites may be more damaging than occupying this management area. Access and other associated development and production facilities will be routed to cross riparian areas at right angles to minimize road lengths, to maintain stream gradients, and to prevent sedimentation in the streams.	1 Biodiversity 9 Hydrologic Resources	M Riparian	CSU
Developed **recreation sites**	7b Developed Recreation	F Dev. Rec.	NSO
Protection of **Research Natural Area** values	14 Research Natural Area	L RNA's	NSO
Prohibit occupancy within 1/4 mile of **developed sites** from May 15 to September 15.	7b Developed Recreation	F Dev. Rec.	TL
Protection of **National Natural Landmarks**	13	O Nat'l landmarks	NSO
Proposed **Ludlow Cave Archaeological District**	2, 3 Cultural Resources & Properties	N/A	NSO
North Cave Hills and Slim Buttes Land Units	2, 3 Cultural Resources & Properties	All	NSO
Sensitive **Cultural Resources Sites** (confidential locations not displayed on maps) plus a ¼-mile buffer around each site	2, 3 Cultural Resources & Properties	All	NSO
Protect Administrative Site at **Camp Crook**	N/A	P Ad. Site	NSO

CSU = Controlled Surface Use; NSO = No Surface Occupancy; TL = Timing Limitation; LN = Lease Notice

Table 2-8. Non-Mapped Stipulations, Lease Notices, and Conditions of Approval

Lease Term or Condition	Alternative	Related Issue(s)	Mgmt Area	Type
Stipulations				
To restrict the number and/or location of concurrent drilling activities where intensive development or **cumulative impacts** may significantly affect other key resources	2 & 3	1 Biodiversity	All	CSU
When the project-specific scenic analysis is conducted, if the VQO is determined to be Retention, the scenic condition must be "unnoticed alterations," and the proposed offending structure must be relocated or abandoned unless a Forest Plan Amendment is implemented.	3	4 Visual	All	NSO
When the project-specific scenic analysis is conducted, if the VQO is determined to be Partial Retention or Modification, lessee must submit visual simulations with plans for Forest Service approval demonstrating that all structures will be visually subordinate to the surrounding landscape.	3	4 Visual	All	CSU
Lease Notices				
The stipulations developed for this lease were based on available data. Before any ground disturbing activities occur, lessee shall have surveys of the types described below conducted at lessees expense for areas designated by Forest Service as potentially affected. These surveys will be conducted by professional natural resource management specialist with qualifications and experience in the particular resource they are addressing. Lessee must consult with Forest Service to develop the scope of work for the surveys and obtain approval of the scope of work as well as the firm or individual to conduct each survey before the survey is performed. The types of surveys to perform include, but are not limited to **Biological; Cultural; Soils and Hydrological; and Scenic.** The results of the surveys are to be utilized in lessees planning and to further refine the application of the stipulations.	2 & 3	1 Biodiversity 2, 3 Cultural Resources & Properties 8. Soils 9 Hydrologic Resources 4. Visual	All	LN
Personnel of the Lessee or Operator organization will be required to undergo cultural resources sensitivity training by reading a brochure about cultural resource importance and protection before beginning work on National Forest lands. This education will be conducted at lessee expense.	3	2, 3 Cultural Resources & Properties	All	LN
The lessee will be required, at its own expense, to post signage and/or maintain existing signage at each primary entrance into Forest Service land by which it gains access to its leases. Said signage will remind visitors to respect cultural resources and obey the Archaeological Resources Protection Act.	3	2, 3 Cultural Resources & Properties	All	LN
Mitigation, as defined in standard BLM lease terms, will be required, whenever practicable, where NRHP-eligible cultural resources are to be adversely affected. Impacts such as the effects of vibration on rock art sites and rock alignments are not predictable in advance and mitigation of such effects is not considered practicable.	2 & 3	2, 3 Cultural Resources & Properties	All	LN
Land disturbing activities will be defined to include seismic exploration as well as any activities that require excavation, which include but are not limited to well pad, access road, and pipeline construction.	2 & 3	2, 3 Cultural Resources & Properties	All	LN

Table 2-8. Non-Mapped Stipulations, Lease Notices, and Conditions of Approval (Cont'd)

Lease Term or Condition	Alternative	Related Issue(s)	Mgmt Area	Type
Lease Notices				
Lessees will follow Forest Service Best Management Practices for noxious weed detection, prevention, and treatment per policy (FSM 2080, Supplement R1 2000-2001-1).	2 & 3	10 Noxious Weeds	All	LN
Lessees will train all employees with respect to noxious weed identification.	2 & 3	10 Noxious Weeds	All	LN
Lessees will make arrangements for weed control upon positive identification of noxious weeds.	2 & 3	10 Noxious Weeds	All	LN
Lessee will include weed prevention measures in operation and/or reclamation plans.	2 & 3	10 Noxious Weeds	All	LN
Should noxious weeds be introduced in areas disturbed by the lessee, the lessee will be responsible for developing a noxious weed eradication plan for FS approval. Lessee will be responsible for implementing the plan. Only those chemicals that are labeled under state and federal laws for target species, and which experience and research have proven effective for weed control, will be used. Chemical treatment will be avoided in areas where such treatment will have a significant impact on water resources, key wildlife habitat, or unique vegetation. Isolated new noxious weed starts will be controlled to prevent further expansion into other areas. Where chemicals are used, techniques will be utilized to reduce the amount applied per acre. All pesticide applicators on National Forest System lands will be commercially certified under the applicable federal or state law. The use of chemicals will be in agreement with NEPA requirements.	2 & 3	10 Noxious Weeds	All	LN
Biological control techniques that become available and are proven safe and effective will be favored over chemical methods. Research efforts by universities and research stations will be encouraged and new feasible technology resulting from this research will be applied.	2 & 3	10 Noxious Weeds	All	LN
Pre-construction planning must identify the areas to be disturbed and what measure will be implemented to minimize the disturbance areas.	3	11 Air Quality	All	LN
Prior to project startup, the Forest Service will require substantiation that the developer has consulted with the State DENR Air Division on issues related to air quality permits, compliance, monitoring, and record keeping requirements.	3	11 Air Quality	All	LN
Periodic site inspections will identify worn or leaking valves and flanges, and repairs must commence on such items as soon as possible.	3	11 Air Quality	All	LN
Whenever possible, site access roads must be "use" restricted or secured to prevent non-essential vehicle travel.	3	11 Air Quality	All	LN
Vehicle speeds on access roads and on-site will be limited to 15 mph or less.	2 & 3	15 Public Access	All	LN

Table 2-8. Non-Mapped Stipulations, Lease Notices, and Conditions of Approval (Cont'd)

Lease Term or Condition	Alternative	Related Issue(s)	Mgmt Area	Type
Conditions of Approval				
Topsoil shall be stockpiled and reused in rehabilitation of disturbed sites to maintain soil productivity.	2 & 3	8 Soil Resources	All	COA
Lessees will require employees and contractors to clean equipment and vehicles, especially vehicle undercarriages, before bringing it onto National Forest System lands and into the project vicinity so as to prevent introduction and spread of noxious weeds.	2 & 3	10 Noxious Weeds	All	COA
After construction, fugitive dust from active disturbed areas must be minimized by watering on a periodic basis, but at least twice daily.	3	11 Air Quality	All	COA
After construction, fugitive dust from inactive disturbed areas must be minimized by seeding and watering the area to promote ground cover growth.	3	11 Air Quality	All	COA
Equipment engines must be maintained in good working condition and properly tuned per the manufacturer's specifications.	3	11 Air Quality	All	COA
All material excavated or graded must be sufficiently watered to prevent excessive amounts of fugitive dust. Watering must occur at least twice daily with complete coverage. Timing must be consistent with DENR Air Division recommendations.	3	11 Air Quality	All	COA
All material transported off-site must be covered or sufficiently watered to prevent fugitive dust emissions during transport.	3	11 Air Quality	All	COA
If on-site electricity is available, electric drill rigs will be used.	3	11 Air Quality	All	COA
During clearing, grading, earth moving, or excavation operations, excessive fugitive dust emissions must be controlled by one or more of the following techniques: (1) regular watering, (2) speed control, (3) use of dust palliative or soil stabilization agents, or (4) paving.	3	11 Air Quality	All	COA
Electric power must be brought to the site as soon as possible after well production begins.	3	11 Air Quality	All	COA
Electric pumps must be used whenever possible.	3	11 Air Quality	All	COA

CSU = Controlled Surface Use; NSO = No Surface Occupancy; TL = Timing Limitation; LN = Lease Notice; COA = Conditions of Approval (see Appendix B for definition of terms)

Table 2-9 lists the existing wells and wells projected in the RFD for each of the land units that would occur given the Alternative 3 stipulations. Ten of the RFD-projected wells are eliminated due to NSO stipulations, and 12 of the remaining 24 wells would be located off-Forest.

Table 2-9. Existing and Projected Wells under Alternative 3

Wells	North Cave Hills	South Cave Hills	Slim Buttes	East Short Pines	West Short Pines	Total
Existing Lease Areas						
Existing Oil	2	1				3
Existing Injection	1					1
Sub-total Existing Wells in Existing Lease Areas	3	1				4
RFD Projected Oil		1				1
RFD Projected Injection						
Sub-total RFD Wells in Existing Lease Areas		1				1
Sub-total Wells in Existing Lease Areas	3	2				5
New Lease Area						
RFD Projected Oil		4				4
RFD Projected Injection						
RFD Projected Dry				1	1	2
RFD Projected Gas					1	1
Sub-total New Lease Wells		4		1	2	7
Off Forest						
Existing Oil		1				1
RFD Projected Oil	3	2				5
RFD Projected Injection	2	2				4
RFD Projected Gas (Dry)			2			2
Sub-total Off Forest	5	5	2			12
Total	8	11	2	1	2	24

2.4.5 COMPARISON OF ALTERNATIVES

Table 2-10 provides a summary of the environmental consequences regarding each of the significant issues areas for each of the three alternatives being considered in detail. Chapter 3 provides more detail on the analyses summarized in this table.

Table 2-10. Summary of Environmental Consequences

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 1: Biological Diversity	Based on the RFD and the existing lease terms and stipulations, the only projected additional direct habitat impact is 31 acres of grassland, which represents less than 0.1 percent of the grasslands in the five land units. Only grassland-associated species would be potentially affected, none of which would be substantially affected by the low level of disturbance. Should development occur in locations other than projected in the RFD, the existing lease terms and stipulations should steer development away from sensitive habitats. As a result, impacts to biodiversity are expected to be on a low level.	Based on the RFD and the oil and gas stipulations in the Forest Plan, the only projected additional direct habitat impact is 98 acres of grassland, which represents less than 0.24 percent of the grasslands in the five land units. Only grassland-associated species would be affected, none of which would be substantially affected by the low level of disturbance. Should development occur in locations other than projected in the RFD, the Forest Plan terms and stipulations should steer development away from sensitive habitats. However, certain Forest Plan stipulations are Management Area specific leaving the areas with the most development projected, North and South Cave Hills, with the least biological protection. However, the most sensitive areas—riparian, rimrock, and woody draws—are still protected. As a result, impacts to biodiversity are expected to be on a low level but greater than in alternative 1.	Based on the RFD and the Alternative 3 stipulations, the only projected additional direct habitat impact on-Forest is 41 acres of grassland, which represents less than 0.10 percent of the grasslands in the five land units. Only grassland-associated species would be affected, none of which would be substantially affected by the low level of disturbance. Certain Alternative 2 biological stipulations apply only to one Management Area. These are changed to apply to the entire lease area. In addition, the buffer areas and TL for grouse and several raptors are increased to reduce the risk associated with the lack of consensus on adequate buffer distances. As a result, biodiversity impacts are projected to be less than expected for Alternative 2 but more than alternative 1.
Issue 2: Cultural Resources	Archaeological sites are nonrenewable resources, and development, trampling by stock, and vandalism are steadily eroding the cultural resource base of the Northwestern Plains. The projected increase in oil and gas leasing under the existing leases, although minor, still brings more people and access to the area and contributes to a cumulative effect that is already substantial.	Impacts to archaeological resources are expected to be greater than Alternative 1 under this alternative, with or without cumulative effects. However, cumulative considerations compound the magnitude of the impact of oil and gas leasing, especially in the Cave Hills area.	The North Cave Hills and Slim Buttes land units as well as the proposed Ludlow Cave Archaeological District are protected by a no surface occupancy stipulation in this alternative. This would reduce the cultural resources impacts on-Forest. However, some of the wells are projected to be located off-Forest as a result and, if so, could result in cultural resource impacts there. Cumulative impacts will increase under this alternative, but land use restrictions and additional lease requirements should reduce this below the level expected for Alternative 2 but still greater than Alternative 1. By enhancing understanding of cultural resources laws and values through signage, this alternative might produce a slight decline in cumulative loss of the resource from collecting and vandalism by altering people's behavior toward cultural resources elsewhere in the region.

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 3: Traditional Cultural Properties	North Cave Hills: Development of the two wells that are projected for this unit will result in auditory and visual intrusions in their immediate vicinity, but should not affect the feeling and association for voyagers to the southern portion of the unit, where Ludlow Cave is situated. Any sound from these developments will be dissipated before it reaches the ears of a voyagers to this site and will be subdued by noise from the nearby ranch. Neither projected well is within sight of the cave or visible from the cliff above. South Cave Hills: Development of wells along the west side of the Cave Hills will result in some visual and auditory intrusions to people wishing to use the area for meditative purposes. Since specific portions of the unit that might be important to religious practitioners are unknown at this time, it is not possible to ascertain the severity of this intrusion.	As our national population grows and the west becomes increasingly developed for minerals, residences, and recreational sites, it is becoming increasingly difficult for practitioners of Native religions (or any other for that matter) to find places for meditative observances. Buffalo home caves and rock art sites are rarer than isolated locations once were and become more rare, or harder to utilize for religious purposes, as development progresses. Some buffalo home sites are on federal land and accessible still, but others may not be. Therefore, reduction in the utility of one more area for solitude or one more buffalo home cave takes on greater importance. Projected development in and around the project area includes development of many additional wells and support facilities for fossil fuels extraction and transport. These activities will increase noise levels, potentially bring new people into the area, and thus provide visual and auditory intrusion to places of meditation. The impact of this alternative on traditional cultural uses of the Cave Hills would be substantial, and is magnified by the parallel loss to religious practitioners of other sites of the same kind in the Northwestern Plains.	The North Cave Hills and Slim Buttes land units as well as the proposed Ludlow Cave Archaeological District are protected by a no surface occupancy stipulation (NSO) in this alternative. Given this NSO stipulation and because of efforts to educate the workers and the public about the importance of this area, impacts will be reduced and education of both groups might result in reduced impacts to other areas of similar importance. The result will still be a cumulative loss since some wells will be located off-Forest. However, when all influences are taken into consideration, that loss might be of only moderate severity.
Issue 4: Scenic or Visual Resources	A low level of impacts is expected. The Government can specify relocation of facilities up to 200 meters under standard lease terms. This will allow facilities to be pulled back from the edge of buttes so they will not be skylighted when viewed from below the buttes. The facilities would be located on the buttes away from the edges within the grasslands. The grasslands offer no screening potential. However, painting the facilities to blend in and installing underground pipeline and powerlines, coupled with the low density of facilities, will minimize the visual impact so facilities are not dominant in the landscape.	Impacts similar to but increased from those in Alternative 1 are expected. Although the density of facilities will be greater than Alternative 1, it is still relatively low. With the same mitigation measures, the impact is not expected to be dominant in the landscape.	Impacts greater than Alternative 1 but slightly less than Alternative 2 are expected. The NSO stipulations for North Cave Hills and Slim Buttes will eliminate any visual impact on the Forest in those land units. Stipulations will assure VQOs are met on Forest. However, visual impacts may occur at the off-Forest well sites that are visible from both on and off Forest.

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 5: Economic Resources	Production Phase Impacts ($0.828 million/year Production Phase)	Production Phase Impacts ($3.659 million/year Production Phase)	Production Phase Impacts ($2.831 million/year Production Phase)
	Total Output $1,226,207	Total Output $5,418,708	Total Output $4,192,404
	Total Intermediate Inputs $420,361	Total Intermediate Inputs $1,857,608	Total Intermediate Inputs $1,437,214
	Total Value Added $805,846	Total Value Added $3,561,100	Total Value Added $2,755,189
	Total Labor Income $367,793	Total Labor Income $1,625,306	Total Labor Income $1,257,481
	Total Other Prop. Income $367,837	Total Other Prop. Income $1,625,503	Total Other Prop. Income $1,257,638
	Total Ind. Business Taxes $70,217	Total Ind. Business Taxes $310,294	Total Ind. Business Taxes $240,071
	Total Jobs (Full- & Part-time) 19.8	Total Jobs (Full- & Part-time) 87.5	Total Jobs (Full- & Part-time) 67.7

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 6: Social Resources	During oil and gas leasing activities for nine wells (five new wells) under the No Action Alternative, some short-term effects (from 2 to 15 months) would occur to traffic and local housing such as a potential increase in visitors (workers) at the hotel in Buffalo. Transportation to favorite spots for hunting or other activities could be affected during the construction period. Once construction of new wells and roads was completed, these temporary effects would end. Long-term direct impacts due to new oil and gas leasing activities could occur to the visual environment and thus impact the perception of local residents that they live in a remote, pristine area. The arrival of new permanent workers to Harding County could also contribute directly to a sense of change in the community.	Similar impacts as Alternative 1 would occur but to a slightly larger extent. An increase in workers to the area would bring an influx of money to the local economy both in the short-term and long-term. The 87 jobs expected under Alternative 2 would be long-term but would not represent a substantial negative effect on the existing social structure. The jobs created in Harding County would most likely be held by workers who live within the county and those from nearby counties, who would either commute or relocate. If these workers do relocate, they would be expected to share similar values with existing Harding County residents and would have a small positive impact to the economy. Even if 87 new people moved to the area to fill all of the expected new jobs, the population would not rise above its current level of 0.5 persons per square mile. The arrival of new permanent workers to Harding County could also contribute directly to a sense of change in the community. However, sense of place and community is not expected to be substantially changed by a small number of newcomers to the area.	The social consequences of alternative 3 are similar but slightly less than alternative 2 (68 jobs in alternative 3 versus 87 in alternative 2) and greater than alternative 1.
Issue 7a: Dispersed Recreation	If implemented, the Alternative 1 leasing scenario could result in impacts to the recreation values of the forest. Three areas of potential effects include: Effects to recreational travel during construction of drilling sites due to increased vehicle traffic. Effects to the visual quality of the forest once the oil wells are constructed, which could affect recreational scenic viewing. Recreational hunting could be affected due to herd dispersal caused by increased traffic along with noise levels at the drill site. Potential for low level impact if exploration or development occurred during hunting season. However, only two wells in South Cave Hills and three wells in North Cave hills are projected so these impacts are not expected to be substantial.	Under Alternative 2, 28 new wells are projected to be constructed. Access to portions of the forest could be affected if a forest visitor attempts travel on a NFS Road at the same time as oil and gas-related trucks or commuting workers. Additionally, forest visitors who expect an isolated experience, such as hunters, could have a diminished experience due to additional traffic on NFS Roads resulting from oil and gas leasing activities as well as from other forest activities. Visitor perception of access could affect their experience. The temporary effects during construction represent a short-term (10 to 28 months), direct irretrievable interruption to public access and therefore dispersed recreation. Potential for low-level impact could exist if exploration or development occurred during hunting season. FS has authority under SLTs to delay activities up to 60 days in any year, which could be used to mitigate impact.	Under the Alternative 3, 19 new wells would be constructed. Impacts in South Cave Hills, West and East Short Pines Units would be similar to those in Alternative 2. Impacts in North Cave Hills and Slim Buttes would be substantially less than in Alternative 2 since these land units are entirely NSO in this Alternative.

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 7b: Developed Recreation	No impact. Within land units with existing leases, only North Cave Hills has a developed recreation site (Picnic Springs), which is partially within existing lease SD 53421. However, the RFD projects no further wells in this lease and the lease terms allow relocation of proposed drilling or other exploratory or developmental operations.	No impact. Lease stipulations would require developed recreation sites to be under a NSO stipulation and a ¼-mile conditional surface use stipulation around developed sites.	No impact. Lease stipulations would require developed recreation sites to be under a NSO stipulation and a ¼-mile conditional surface use stipulation around developed sites.
Issue 8: Soil Resources	Under this Alternative, a projection of the current management situation, approximately 11 acres of additional land disturbance could occur from future oil and gas operations in the North Cave Hills, and 17 acres in South Cave Hills. This would result in a total land disturbance of approximately 0.5 percent for North Cave Hills and 0.6 percent in South Cave Hills. The new wells can be sited so that they would not be located on fragile soils and landscapes. Best Management Practices (USFS 1988) and Soil Quality Standards (USFS 1999) are being applied and monitored and the small amount of additional disturbance is not expected to cause substantial loss to soil productivity of the land units. The Custer National Forest has a Contingency Plan for use and direction in the event of a serious oil or gas spill. This alternative is not expected to have an adverse impact on soil resources.	All of the projected RFD sites can be located to avoid impacting fragile soils and landscapes. The current Forest Service Manual restricts soil-disturbing activities to less than 20 percent of a project area including roads, in order to protect soil productivity. The projected activities are well below that level, ranging from approximately 0.4 to 1.5 percent. Best Management Practices (USFS 1988) and Soil Quality Standards (USFS 1999) are being applied and monitored and the small amount of additional disturbance is not expected to cause substantial loss to soil productivity of the land units. The Custer National Forest has a Contingency Plan for use and direction in the event of a serious oil or gas spill. This alternative is not expected to have an adverse impact on soil resources. However, due to greater development the risk of adverse impacts is greater than in Alternative 1.	None of the RFD sites would be located on fragile soils and landscapes. The current Forest Service Manual restricts soil-disturbing activities to less than 20 percent of a project area including roads in order to protect soil productivity. The projected activities are well below that level, ranging from approximately 0.4 to 1.5 percent, well below the Forest Manual direction. Effects on soils will be minimized by following Best Management Practices (BMPs) (USFS 1988) and Soil Quality Standards (USFS 1999), and where reclamation, revegetation, and erosion control measures are implemented and are successful. The Custer National Forest has a Contingency Plan for use and direction in the event of a serious oil or gas spill. This alternative is not expected to have an adverse impact on soil resources. The risk of adverse impacts is greater than in Alternative 1 but less than in Alternative 2.

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 9: Hydrologic Resources	The No Action alternative has a small increase in land-disturbing activities, so there is unlikely to be an increase in potential for nonpoint source water pollution. The Forest's application of Best Management Practices (BMPs), Appendix E, has been effective in reducing effects below that which would affect the beneficial uses of water. With adherence to Forest Plan standards and guidelines, no substantial adverse effects to riparian areas, wetlands, or floodplains are anticipated from this alternative.	The Lease Notice for riparian areas would reduce direct effects to this resource. Well sites and other facilities could be moved up to 200 meters without the need for additional lease stipulations. This adjustment opportunity would allow for the avoidance of sensitive resources (i.e., riparian and wetland areas) in the event that such sites are identified after lease areas have been designated. The discretional authority to relocate any projected activity by 200 meters effectively provides for a 400-meter-wide corridor centered on riparian areas and streams. The small increases in short- and long-term disturbance are not likely to have substantial impacts on water resources.	The CSU stipulation for riparian areas would reduce direct effects to this resource. In addition, well sites and other facilities could be moved up to 200 meters without the need for additional lease stipulations. This adjustment opportunity would allow for the avoidance of sensitive resources (i.e., riparian and wetland areas) in the event that such sites are identified after lease areas have been designated. The discretional authority to relocate any projected activity by 200 meters effectively provides for a 400-meter-wide corridor centered on riparian strips and streams. The small increases in short- and long-term disturbance are not likely to have substantial impacts on water resources.
Issue 10: Noxious Weeds	The existing lease terms have no noxious weed prevention or control terms. It is assumed that noxious weed control would be considered where substantial infestations occur on lease sites; however, the responsibility would likely fall on the government. As a preventative measure, Forest Service personnel can request that lessees clean the surface and undercarriage of vehicles before entering portions of a lease where the surface is being disturbed.	The Custer National Forest Plan has no specific lease stipulations for noxious weed prevention and control for oil and gas exploration and development activities (USFS 1987). However, FS/BLM could issue a Lease Notice (LN) to lessee under the general authority of the BLM standard lease terms section 6 requiring that has the same terms as the noxious weeds CSU stipulation for Alternative 3 listed in Table 2-8.	Under Alternative 3, the Alternative 2 LN would be changed to a Controlled Surface Use (CSU) lease stipulation and, as such, would be more enforceable.
Issue 11: Air Quality	Based on the ozone analysis thresholds and the level of long-term operational VOC emissions for the additional well sites (<0.3 tons/yr), it is highly unlikely that emissions from the predicted additional wells on current leases, if developed, would have a cumulative effect on existing or future air quality, or would jeopardize the attainment or maintenance of any state or federal ambient air quality standard.	The cumulative effects of localized pollutants would depend on the locations of potential future projects in the near vicinity of the existing well sites. Emissions from the existing wells, both direct and indirect, are insignificant, and it is highly unlikely that such emissions would have a cumulative effect when addressed in any cumulative analysis for potential future projects. Anticipated site emissions for projected wells (direct long-term effects) are insignificant. Vehicular emissions associated with the well sites are also insignificant.	Short-term impacts for Alternative 3 would be essentially the same as Alternative 2. Long-term impacts of Alternative 3 would be slightly less than Alternative 2, due to fewer projected wells.

Table 2-10. Summary of Environmental Consequences (Cont'd)

Issue	Alternative 1	Alternative 2	Alternative 3
Issue 12: Human Health and Safety/ Abandoned Uranium Mines	Conditions at the Riley Pass Mine present an imminent and substantial endangerment to human health and the environment, mainly due to exposure and erosion of contaminated soils associated with uranium mining. These conditions meet the criteria for initiating a removal action under 40 CFR Section 300.415 (b)(2) of the National Contingency Plan (NCP). One of the projected well sites is located within the existing lease SDM 54158 0.5 miles northwest of Riley Pass. The well site is on the butte above the mine spoils.	Conditions at the Riley Pass Mine present an imminent and substantial endangerment to human health and the environment, mainly due to exposure and erosion of contaminated soils associated with uranium mining. These conditions meet the criteria for initiating a removal action under 40 CFR Section 300.415 (b)(2) of the National Contingency Plan (NCP). One of the projected well sites is located within the existing lease SDM 54158 0.5 miles northwest of Riley Pass. The well site is on the butte above the mine spoils.	The entire North Cave Hills land unit, where the abandoned Riley Pass uranium mines are located, is NSO under Alternative 3. Furthermore, the mine sites themselves are not administratively available for lease in this alternative. Other abandoned mines are under an NSO stipulation.
Issue 13: National Natural Landmarks	No impact. Only North & South Cave Hills land units have existing leases. The only National Natural Landmark is in the Slim Buttes land unit.	No impact. The Forest Plan stipulations require NNL to be under a NSO stipulation if within a lease area.	No impact. The Forest Plan stipulations require NNL to be under a NSO stipulation if within a lease area.
Issue 14: Research Natural Area (RNA)	No impact. The proposed Deer Draw RNA is located in the Slim Buttes land unit. There are no existing leases within the Slim Buttes.	No impact. The Forest Plan stipulations require the proposed RNA be under a NSO stipulation if within a lease area.	No impact. The Forest Plan stipulations require the proposed RNA be under a NSO stipulation if within a lease area.
Issue 15: Public Access	A low level of impacts is expected. Under the No Action Alternative, five new wells would be constructed. Access to portions of the forest could be inhibited in those five locations if a forest visitor attempts travel on a NFS Road at the same time as oil and gas-related trucks or commuting workers. Additionally, forest visitors who expect an isolated experience, such as hunters, could have a diminished experience due to additional traffic on NFS roads resulting from oil and gas leasing activities as well as from other forest activities. Visitor perception of access could affect their experience. The temporary effects during construction represent a short-term (two to six months), direct irretrievable interruption to public access.	Impacts greater than Alternative 1, but still at a low level, are expected. Under Alternative 2, 28 new wells are projected to be constructed. Access to portions of the forest could be inhibited in those 28 locations if a forest visitor attempts travel on a NFS road at the same time as oil and gas-related trucks or commuting workers. Additionally, forest visitors who expect an isolated experience, such as hunters, could have a diminished experience due to additional traffic on NFS roads resulting from oil and gas leasing activities as well as from other forest activities. Visitor perception of access could affect their experience. The temporary effects during construction represent a short-term (ten to twenty-eight months), direct irretrievable interruption to public access.	Impacts greater than Alternative 1 but less than Alternative 2 are expected. Under Alternative 3, 19 new wells are projected to be constructed. Access to portions of the forest could be inhibited if a forest visitor attempts travel on roads at the same time as oil and gas-related truck trips or commuting workers. Additionally, forest visitors who expect an isolated experience, such as hunters, could have a diminished experience due to additional traffic on NFS roads resulting from oil and gas leasing activities as well as from other forest activities. Visitor perception of access could affect their experience. The temporary effects during construction represent a short-term (8 to 23 months), direct irretrievable interruption to public access.

Tables 2-11, 2-12, and 2-13 below list the number of acres within each stipulation by land unit for each of the three Alternatives.

Table 2-11. Alternative 1 - Acres Under Each Stipulation for Each Land Unit

Land Unit	Stipulation					
	NL	NSO	TL	CSU	SLT	Total
North Cave Hills	11,580	1,190	102	172	1,477	14,420
South Cave Hills	6,764	527	709	587	486	8,364
Slim Buttes	43,574					43,574
East Short Pines	1,065					1,065
West Short Pines	6,074					6,074
Total	69,057	1,717	811	759	1,964	73,497

Table 2-12. Alternative 2 - Acres Under Each Stipulation for Each Land Unit

Land Unit	Stipulation					
	NL	NSO	TL	CSU	SLT	Total
North Cave Hills		10,222	9,561	1,048	3,150	14,420
South Cave Hills		6,276	4,145	374	1,714	8,364
Slim Buttes		29,781	12,614	5,919	7,874	43,574
East Short Pines		336	276	491	239	1,065
West Short Pines		3,162	633	1,267	1,646	6,074
Total		49,776	27,228	9,099	14,622	73,497

Table 2-13. Alternative 3 - Acres Under Each Stipulation for Each Land Unit

Land Unit	Stipulation					
	NL	NSO	TL	CSU	SLT	Total
North Cave Hills	252	14,168	10,916			14,420
South Cave Hills		7,605	4,764	69	689	8,364
Slim Buttes*		43,574	19,861			43,574
East Short Pines		538	771	371	156	1,065
West Short Pines		4,378	1,632	667	1,029	6,074
Total	252	70,262	37,945	1,107	1,874	73,497

NL = No Lease; NSO = No Surface Occupancy; TL = Timing Limitation; CSU = Controlled Surface Use; SLT = Standard Lease Terms

Note: TL stipulations overlay other stipulations and thus acres of TL are not included in totals for each land unit.

**Cultural resources NSO could be exempted based on survey showing no historical propertiesat proposed development location(s). NSO waivers would also require broad-scale analysis for the identification of TCPs and Sacred Areas which could be adversely affected by the undertaking.*

Table 2-14 below lists the type and number of wells that are projected as reasonably foreseeable, given the lease terms associated with each alternative/leasing scenario. The table also has estimates of the number of acres that would be disturbed and the energy produced based on the wells projected. Note that existing and projected wells off-Forest that drain Forest minerals are included.

Table 2.14. Estimated Wells, Acres Disturbed, and Energy Production by Alternative

ALTERNATIVE 1

Land Unit	Existing Lease Existing Wells			Reasonably Foreseeable Development Scenario (RFD) Wells						Acres Disturbed		Production	
	Producing Oil Wells	*Injection Wells*	*Total Existing Wells*	*Dry Holes*	*Producing Gas Wells*	*Producing Oil Wells*	*Injection Wells*	*Total RFD Wells*	*Total Wells*	*Short Term*	*Long Term*	*Gas (cubic feet)*	*Oil (barrels)*
North Cave Hills	2	1	3			1	1	2	5	26	25		600,000
South Cave Hills	2		2			2	1	3	5	27	25		800,000
Slim Buttes													
West Short Pines													
East Short Pines													
Totals	4	1	5	0	0	3	2	5	10	54	50		1,400,000

ALTERNATIVE 2

North Cave Hills	2	1	3			6	6	12	15	83	75		1,600,000
South Cave Hills	2		2			7	3	10	12	67	60		1,800,000
Slim Buttes				3				3	3	17			
West Short Pines				1	1			2	2	11	5	400,000	
East Short Pines				1				1	1	6			
Totals	4	1	5	5	1	13	9	28	33	185	140	400,000	3,400,000

ALTERNATIVE 3

North Cave Hills	2	1	3			3	2	5	8	44	40		1,000,000
South Cave Hills	2		2			7	2	9	11	61	55		1,800,000
Slim Buttes				2				2	2	11			
West Short Pines				1	1			2	2	11	5	400,000	
East Short Pines				1				1	1	6			
Totals	4	1	5	4	1	10	4	19	24	133	100	400,000	2,800,000

Short-term (5.7 acres per well for two years for RFD dry, producing, and injection wells. 5.0 acres per well for existing wells)
Long-term (5.0 acres producing and injection wells. 5.0 acres per well for existing wells)
400,000 mcf per producing gas well
200,000 barrels per producing oil well