Specialist Report 2.0
Roadless and Eligible Wild and Scenic Rivers

Oil and Gas Leasing EIS
on Lands Administered by the
Dixie National Forest

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Table of Contents

2.1 Introduction 1
2.1.1 Roadless Area Conservation Rule 1
2.1.2 Wild and Scenic River Suitability Study for National Forest System Lands in Utah 3
2.2 Consideration of Available Science 3
2.3 Use of GIS 3
2.4 Description of Affected Environment 4
2.4.1 Inventoried Roadless Areas 4
2.4.2 Eligible Wild and Scenic Rivers 7
2.4.3 Pine Valley Ranger District 9
2.4.3.1 Inventoried Roadless Areas 9
2.4.3.2 Eligible Wild and Scenic Rivers 9
2.4.4 Cedar City Ranger District 11
2.4.4.1 Inventoried Roadless Areas 11
2.4.4.2 Eligible Wild and Scenic Rivers 11
2.4.5 Powell Ranger District 12
2.4.5.1 Inventoried Roadless Areas 12
2.4.5.2 Eligible Wild and Scenic Rivers 12
2.4.6 Escalante Ranger District 12
2.4.6.1 Inventoried Roadless Areas 12
2.4.6.2 Eligible Wild and Scenic Rivers 12
2.5 Impact Analysis 13
2.5.1 Connected Actions 14
2.5.2 Issue Statement 14
2.5.2.1 Inventoried Roadless Areas 14
2.5.2.2 Eligible Wild and Scenic Rivers 14
2.5.3 Indicators 15
2.5.3.1 Inventoried Roadless Areas 15
2.5.3.2 Eligible Wild and Scenic Rivers 15
2.5.4 Direct and Indirect Effects 15
2.5.4.1 Impacts of Connected Actions by Leasing Option 16
2.5.4.2 Impacts of connected actions under SLT 21
2.5.4.3 Impacts by Alternative 28
2.5.5 Cumulative Effects 32
2.5.5.1 Description of Cumulative Effects Area 32
2.5.5.2 Past, Present, and Reasonably Foreseeable Actions 33
2.5.5.3 Cumulative Effects by Alternative 37
2.5.6 Summary 40
2.6 Compliance with Other Laws and Regulations 40
2.7 Forest Plan Consistency Determination 40
2.8 Literature Cited 42

List of Tables

Table 2.4-1 Inventoried Roadless Areas on the Dixie National Forest, by Ranger District 5
Table 2.4-2 Eligible Wild and Scenic Rivers on the Dixie National Forest 8
Table 2.5-1 Summary of Terms used to describe Effects in the Specialist Report..... 13
Table 2.5-2 Leasing Options assigned under each Alternative 16
Table 2.5-3 Projected Road Construction and Total Disturbance that could occur within an IRAs, by Ranger District 23
Table 2.5-4 Acreage of Resource Components under each Leasing Stipulation by Alternative 28
Table 2.5-5 Land Ownership Within the Watershed Cumulative Effects Area 33
Table 2.5-6 Reasonably Foreseeable Future Actions in the Dixie National Forest 36
Table 2.5-7 Summary of Cumulative Effects 41

List of Figures

Figure 2.4-1 IRAs and Eligible Wild and Scenic Rivers on the Dixie National Forest..... 10
Figure 2.5-1 Cumulative Effects Area for Watershed Resources 34

Appendices

Appendix 2A Stipulation Forms
Appendix 2B Dixie National Forest Oil and Gas Construction and Operating Standards and Well Site Design Requirements

List of Acronyms & Abbreviations

BLM	Bureau of Land Management
BMP	Best Management Practices
CEA	Cumulative Effects Area
CSU	Controlled Surface Use
EIS	Environmental Impact Statement
GIS	Geographic Information System
IRA	Inventoried Roadless Area
NA	Not Available for Leasing
NL	No Leasing
NSO	No Surface Occupancy
OHV	Off Highway Vehicle
RACR	Roadless Area Conservation Rule
RFDS	Reasonably Foreseeable Development Scenario
SLT	Standard Lease Terms
TL	Timing Limitation

2.0 ROADLESS AND ELIGIBLE WILD AND SCENIC RIVERS

2.1 Introduction

This Specialist Report has been prepared in support of the Oil and Gas Leasing EIS on lands administered by the Dixie National Forest, which is an environmental analysis to identify those lands with Federal mineral rights that should or should not be made available for oil and gas leasing. A more detailed description of the Purpose and Need is provided in Chapter 1 of the EIS and a description of the Proposed Action, Alternatives, and leasing options is available in Chapter 2.

The analysis area includes all National Forest System lands within the Dixie National Forest, with the exception of Brian Head Ski Resort, wilderness areas, areas surrounding the Box-Death Hollow Wilderness Area that were withdrawn from leasing by the Utah Wilderness Act of 1984, and lands with a non-federal mineral estate. The analysis area covers 1,546,640 acres, of which approximately 570,436 acres (37 percent) is within Inventoried Roadless Areas (IRAs). The IRAs are spread across the four Ranger Districts administered by the Dixie National Forest and contain some of the largest and most extensive tracts of undeveloped land on the Dixie National Forest. These areas are protected from further road construction and timber harvesting by the 2001 Roadless Area Conservation Rule (36 CFR 294).

In addition to IRAs, there are six streams on the Dixie National Forest that are considered eligible for inclusion in the National Wild and Scenic Rivers System as wild or scenic rivers. Like IRAs, these streams are, for the most part, relatively unaltered by human activity. Further, they represent "outstandingly remarkable" characteristics of the region and the Dixie National Forest.

2.1.1 Roadless Area Conservation Rule

The US Forest Service (Forest Service) identified IRAs nationwide as part of its 1972-1985 Roadless Area Review and Evaluation process. The purpose of the process was to identify all lands exhibiting wilderness characteristics, which could be considered for inclusion in the National Wilderness Preservation System. All the IRAs in the nation were reviewed again by the Forest Service in 1999 under the Roadless Area Conservation Initiative. The Roadless Area Conservation Initiative recognized the value of large tracts of land not yet fragmented by roads and sought to protect these areas from increasing development pressure. In November 2000, the Forest Service issued the Final EIS for the proposed Roadless Area Conservation Rule, which was published in the Federal Register on January 21, 2001 (66 FR 3244).

The Forest Service Roadless Area Conservation Rule currently applies to Forest Service actions in all IRAs. The Roadless Area Conservation Rule prohibits a Forest Service responsible official from approving road construction and reconstruction and the cutting, sale, or removal of timber in IRAs except when the responsible official determines certain circumstances apply. Among the circumstances when the rule does not apply are:

(1) A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event that, without intervention, would cause the loss of life or property.

(2) A road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act or to conduct a natural resource restoration action under the Act, Section 311 of the Clean Water Act, or the Oil Pollution Act.

(3) A road is needed pursuant to reserved or outstanding rights, or as provided for by statute or treaty.

(4) Road realignment is needed to prevent irreparable resource damage that arises from the design, location, use, or deterioration of a classified road and that cannot be mitigated by road maintenance. Road realignment may occur under this paragraph only if the road is deemed essential for public or private access, natural resource management, or public health and safety.

(5) Road reconstruction is needed to implement a road safety improvement project on a classified road determined to be hazardous on the basis of accident experience or accident potential on that road.

(6) The Secretary of Agriculture determines that a Federal Aid Highway project, authorized pursuant to Title 23 of the United States Code, is in the public interest or is consistent with the purposes for which the land was reserved or acquired and no other reasonable and prudent alternative exists.

(7) A road is needed in conjunction with the continuation, extension, or renewal of a mineral lease on lands that are under lease by the Secretary of the Interior as of January 12, 2001 or for a new lease issued immediately upon expiration of an existing lease. Such road construction or reconstruction must be conducted in a manner that minimizes effects on surface resources, prevents unnecessary or unreasonable surface disturbance, and complies with all applicable lease requirements, land and resource management plan direction, regulations, and laws. Roads constructed or reconstructed pursuant to this paragraph must be obliterated when no longer needed for the purposes of the lease or upon termination or expiration of the lease, whichever is sooner.

Several groups and states filed lawsuits challenging the 2001 Roadless Area Conservation Rule. The Idaho Federal District Court issued a preliminary injunction on May 10, 2001 prohibiting the Forest Service from implementing the rule. On December 12, 2002, the Ninth Circuit Court of Appeals reversed and remanded the Idaho District Court's injunction. The Ninth Circuit Court issued its mandate to the Idaho District Court to remove its preliminary injunction on April 4, 2003, thereby putting the Roadless Area Conservation Rule back into effect. However, on July 14, 2003, the US District Court for the District of Wyoming found the Roadless Area Conservation Rule to be unlawful and ordered the rule be permanently enjoined.

On July 12, 2004, Ann M. Veneman, former Secretary of Agriculture, announced a proposal to establish a state petitioning process for IRA management. The proposed rule was published on July 16, 2004. On May 13, 2005, the Forest Service issued a Final State Petition Rule, which replaced the enjoined 2001 Roadless Area Conservation Rule. This 2005 rule established a process for governors with National Forest System IRAs in their states to petition the Secretary of Agriculture to establish or adjust management requirements for these areas. Unless governors chose to initiate a change through the petition process, existing IRA management requirements contained in individual land and resource management plans would remain unchanged.

On September 20, 2006, the US District Court for the Northern District of California set aside the 2005 State Petitions Rule and reinstated the 2001 Roadless Area Conservation Rule nationwide, except in the Tongass National Forest. In addition, on November 29, 2006, the Court issued an injunction halting all activities inconsistent with the 2001 Roadless Area Conservation Rule. In the

injunction, the Court stated that the 2001 rule had been repealed illegally and therefore all projects in IRAs inconsistent with that rule were also illegal and must be halted. On February 6, 2007, the Court issued a final injunction, clarifying that the injunction extended to oil and gas drilling permits (as well as leases) issued since May 2005. As a result of this ruling, the 2001 Roadless Area Conservation Rule currently governs the management of IRAs on National Forest System lands.

2.1.2 Wild and Scenic River Suitability Study for National Forest System Lands in Utah

In November 2007, the Forest Service issued a Draft EIS for the Wild and Scenic River Suitability Study for National Forest System Lands in Utah. The EIS evaluates the suitability of 86 eligible river segments on National Forests in Utah for recommendation for inclusion in the National Wild and Scenic Rivers System, including the six eligible segments on the Dixie National Forest. The final EIS and a decision as to which segments will be found suitable is likely to occur prior to the completion of the final EIS for oil and gas leasing on the Dixie National Forest. As a result, some of the eligible segments discussed in this Specialist Report may be determined unsuitable prior to completion of this EIS. For example, the preferred alternative in the Draft EIS for the Wild and Scenic River Suitability Study does not recommend one of the eligible segments on the Dixie National Forest (the East Fork of Boulder Creek) for inclusion. Any segments discussed in this Specialist Report that are not determined to be suitable in the Final EIS for the Wild and Scenic River Suitability Study would no longer be considered eligible and therefore would not be subject to special management consideration in the Final EIS for oil and gas leasing on the Dixie National Forest.

2.2 Consideration of Available Science

The techniques and methodologies used in this analysis consider the best available science. The analysis includes a summary of the credible scientific evidence that is relevant to evaluating reasonably foreseeable impacts. In addition, the analysis also identifies the methods used and references the scientific sources relied on. When appropriate, the conclusions are based on a scientific analysis that shows a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgment of incomplete or unavailable information, scientific uncertainty, and risk.

2.3 Use of GIS

Alternatives were developed by assigning the leasing options described in Chapter 2 of the EIS, and summarized for this Specialist Report in Section 2.5.4.1, to site-specific resource components using geospatial data. Using a geographic information system (GIS), the spatial distribution of each resource component and associated leasing option were overlaid. The most restrictive leasing option (i.e., NL or NSO) assigned to a particular resource component supersedes any less restrictive options (i.e., CSU or SLT) assigned to other resource components that occur in the same area or site-specific location. For example, where NSO was assigned to an area of high erosion potential that coincides with the habitat of a sensitive wildlife species assigned CSU, the NSO option would be applied to the area common to both of these resources. As a result, multiple stipulations may apply to a resource component, depending upon its location, even if only a single stipulation was specified for that resource component under an alternative. A full range of leasing options was incorporated into the development of alternatives so that the different alternatives would insure that differing levels of protection were addressed for each specific resource component.

Leasing options were applied to geographical areas that represent the spatial distribution of a

resource component. However, it is important to note that leasing options are applied to the resource component and not simply to specific geographic areas and if unmapped resource components were identified in the future they would be protected by the same leasing option. Furthermore, the geospatial data used in this analysis is the best GIS data available; however, it comes from multiple sources and was created at varying scales. As a result, it is not assumed that these data are 100 percent complete or that they meet the US National Mapping Accuracy Standard of the Office of Management and Budget. Unless otherwise stated, GIS data was provided by the Dixie National Forest.

2.4 Description of Affected Environment

2.4.1 Inventoried Roadless Areas

In an increasingly developed and fragmented landscape, IRAs represent some of the largest and most extensive tracts of undeveloped land. To be classified as an IRA, areas must not contain constructed roads and generally are at least 5,000 acres. Areas containing less than 5,000 acres can also be classified as IRAs if they do not contain constructed roads and meet one of the following criteria: (1) areas can be preserved due to physical terrain and natural conditions, (2) they are self-contained ecosystems, such as islands, that can be managed as an individual unit of wilderness, and; (3) they are contiguous to existing wilderness, primitive areas, recommended wilderness, or potential wilderness in other Federal ownership. The definition for a constructed road is a road where there has been mechanical surface grading and cut and fill slopes are present along with drainage structures. Two-track roads are permissible within an IRA if there is no evidence of mechanical construction.

There are 38 IRAs covering a total of approximately 570,436 acres, which represents approximately 37 percent of the analysis area for this EIS. Seven of the IRAs are smaller than 5,000 acres, but were included in the initial Roadless Area Review and Evaluation process and later received designation under the 2001 Roadless Area Conservation Rule. Some of these IRAs are adjacent to larger tracts of wilderness, other IRAs, or adjacent to potential wilderness on land administered by the Bureau of Land Management (BLM). Table 2.4-1 lists the IRAs on the Dixie National Forest by Ranger District and the total acreage associated with each. Figure 2.4-1 shows the IRAs on each Ranger District

In addition to the absence of constructed roads, IRAs contain other important environmental values that warrant protection. These values include nine values or features identified in the Roadless Area Conservation Rule that characterize IRAs, as well as seven attributes that characterize wilderness potential. Given the large number of IRAs on the Dixie National Forest and the inability to predict where potential oil and gas activity may occur, detailed information on the characteristics and attributes of each individual IRA will not be presented in this Specialist Report. Rather, the characteristics and attributes are described in general in this section and any unique characteristics known to be present within a specific IRA are discussed within the individual Ranger District sections. Further, since IRAs cover such a large percentage of the land available for leasing, it is assumed that they contain a full range of the physical and biological characteristics found on each Ranger District.

Table 2.4-1 Inventoried Roadless Areas on the Dixie National Forest, by Ranger District

Ranger District	IRA Name	Acres
Pine Valley	Atchinson	17,663
	Bull Valley	10,907
	Cave Canyon	5,661
	Cedar Bench	8,917
	Cottonwood	6,752
	Cove Mountain	16,633
	Dixie	109
	Gum Hill	3,181
	Headwaters/Pine Park Bench/Pine Park	10,949
	Kane Mountain	8,016
	Lost Peak	4,144
	Mogotsu	16,771
	Moody Wash	31,853
	North Hills	24,485
	Pine Valley Mountains	57,621
	Rock Canyon	16,463
	Stoddard Mountain	13,155
Total		253,280
Cedar City	Bear Valley Peak	7,418
	Bunker Creek	7,286
	Hancock	9,806
	Lava Beds	14,940
	Mineral Canyon	8,392
Total		47,842
Powell	Casto Bluff	87,416
	Deer Creek	39,783
	Fishhook	12,921
	Horse Valley	13,603
	Red Canyon North	9,964
	Red Canyon South	3,730
Total		167,417
Escalante	Boulder Mtn/Boulder Top/Deer Lake	14,881
	Box-Death Hollow	3,120
	Hog Ranch	17,114
	Jake Hollow	15,135
	Long Neck Mesa/Steep Creek/Oak Creek – Steep Creek/Oak Creek	11,136
	McGath Lake – Auger Hole	8,328
	New Home Bench	10,505

Ranger District	IRA Name	Acres
	Shakespeare Point	750
	South Rim	1,367
	Table Cliffs – Henderson Canyon	19,561
Total		101,897
Forest Total		570,436

ROADLESS CHARACTERISTICS

High quality or undisturbed soil, water, and air: These three resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; maintain fish and wildlife populations; and provide recreational opportunities.

Sources of public drinking water: National Forest System lands contain watersheds that are important sources of public drinking water. Maintaining these areas in a relatively undisturbed condition is crucial to maintain the flow and affordability of clean water to a growing population.

Diversity of plant and animal communities: IRAs are more likely than roaded areas to support greater ecosystem health, including the diversity of native and desired nonnative plant and animal communities. These areas serve as a bulwark against the spread of nonnative invasive species.

Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land: IRAs function as biological strongholds and refuges for many species including 25% and 13% of federally listed animal and plant species, respectively. In addition, 65% of all Forest Service sensitive species are directly or indirectly supported by IRAs (36 CFR 294).

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation: IRAs often provide outstanding dispersed recreation opportunities in areas with wilderness-like attributes. These areas reduce recreation pressure on designated Wilderness and unlike Wilderness; the use of mountain bikes and other mechanized means of travel is permitted.

Reference landscapes: Reference landscapes of relatively undisturbed areas serve as a barometer to measure the effect of development on other parts of the landscape.

Natural appearing landscapes with high scenic quality: High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. In addition, quality scenery contributes directly to real estate values in nearby communities and residential areas.

Traditional cultural properties and sacred sties: Traditional cultural properties are places, sites, structures, art, or objects that have played an important role in the cultural history of a group. Sacred sites are places that have special religious significance to a group. Many of these sites may be eligible for protection under the National Historic Preservation Act; however, many of these areas have not been inventoried.

Other locally identified unique characteristics: IRAs may offer other locally identified unique characteristics and values such as, uncommon geological formations, unique wetland complexes, or social, cultural, or historical characteristics.

WILDERNESS ATTRIBUTES

Natural Integrity: Natural integrity is the extent to which long-term ecological processes are intact and operating. It describes the extent to which human influences have altered natural processes.

Apparent Naturalness: Apparent naturalness means that the environment looks natural to most people using the area.

Solitude and Primitive Recreation: Solitude is defined as isolation from the sights, sounds, and presence of others as well as human development. Opportunities for primitive recreation is a measure of the experiences available to be isolated from the evidence of man, to feel a part of nature, to have a vastness of scale, and a high degree of challenge and risk while using outdoor skills. Physical factors that can create primitive recreation opportunities include topography, vegetative screening, distance form human impacts such as roads and logging operations, presence of motorized vehicles, and difficulty of travel.

Challenging Experience: A challenging experience is one that requires self-reliance through application of outdoor skills.

Special Features/Special Places/Special Values: These consist of unique geological, biological, ecological, cultural, or scenic features.

Wilderness Manageability and Boundaries: To be evaluated for wilderness an area generally must comprise a minimum of 5,000 acres. The boundaries of these areas should be manageable without conflicts to existing developments and uses. The shape of an area and changes of the shape influence how it can be managed.

2.4.2 Eligible Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 established a National Wild and Scenic Rivers System to preserve free-flowing rivers that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. Section 5(d) of the act requires the Forest Service to evaluate rivers within its jurisdiction for their potential for inclusion in the National Wild and Scenic Rivers System. The Forest Service does not have the authority to designate Wild and Scenic Rivers. Rather, the Forest Service can only evaluate potential river segments and determine suitability, the US Congress then has the ability to designate suitable segments. The Forest Service evaluation of potential Wild and Scenic Rivers consists of a 3-step process.

1. Determination of eligibility (inventory)
2. Potential classification as wild, scenic, or recreational (inventory)
3. Determination of suitability (decision)

To be eligible for Wild and Scenic River status, a river, or segment of a river, must be free flowing and possess at least one or more river-related “outstandingly remarkable” values. Eligible segments are tentatively classified as wild, scenic, or recreational depending upon the degree of development and access along the river. Rivers or river segments tentatively classified as wild are generally inaccessible, except by trail, with unpolluted water and watersheds or shorelines that are essentially primitive. A scenic tentative classification indicates that watersheds or shorelines are generally still primitive and undeveloped; however, the river may be accessible in some places by roads. Rivers that are readily accessible by road or railroad and have development along their shorelines are classified as recreational.

The Forest Service has evaluated all rivers and streams on the Dixie National Forest to determine which river segments meet eligibility criteria for inclusion in the National Wild and Scenic Rivers System. Segments of six different streams on the Dixie National Forest have been determined to be eligible for inclusion, with five eligible to be classified as wild and one as scenic (Table 2.4-2). As discussed in Section 2.1.2, any river segments that are found unsuitable in the Wild and Scenic River Suitability Study for National Forest System Lands in Utah will not be managed to protect outstandingly remarkable values or free flow. A summary of the characteristics of each stream is presented below in the corresponding Ranger District sections. The location of the streams is shown in Figure 2.4-1.

Table 2.4-2 Eligible Wild and Scenic Rivers on the Dixie National Forest

River	Classification	Segment Length (miles)	Acres within Buffer (at least ½-mile wide)
Pine Valley RD			
Moody Wash River	Wild	5.1	1,433
Cedar City RD			
North Fork of the Virgin River	Scenic	0.7	279
Escalante RD			
Death Hollow Creek	Wild	9.6	2,801
East Fork of Boulder Creek	Wild	2.8	896
Mamie Creek	Wild	2.0	697
Pine Creek	Wild	7.8	2,234

Management guidelines in Section 10 (a) of the Wild and Scenic Rivers Act dictates that designated Wild and Scenic Rivers should be administered in a manner that will protect and enhance the values that caused them to be designated. Specific direction for oil and gas development in Section 9 of the Act prohibits mining claims and mineral leases within ¼-mile of a designated Wild and Scenic River (¼-mile measured from each bank, for a total width of at least ½-mile around each stream). However, these management guidelines only apply to designated Wild and Scenic Rivers, or to legislatively mandated study rivers (defined in Section 5(a) of the Wild and Scenic Rivers Act). These guidelines do not apply directly to rivers segments determined to be eligible or suitable by the Forest Service under Section 5(d) of the Act. Further, a decision on the Draft EIS for the Wild and Scenic River Suitability Study for National Forest System Lands in Utah would not provide any protection for identified river segments, as they would not be designated until action by Congress. Rather, management guidelines for Forest Service identified 5(d) rivers are outlined in Chapter 80 of Forest Service Handbook 1909.12 (USFS 2006a). The guidelines state that protection of Forest Service identified rivers is derived from existing authorities such as the Clean Water Act, the Endangered Species Act, the Archeological Resources Protection Act, etc. Furthermore, the guidelines state that projects and activities on National Forest System Lands within the river corridor (within ¼-mile) of an eligible or suitable river must be consistent with the following guidelines:

- The free-flowing character of the identified river is not modified
- Outstandingly remarkable values of the identified river area are protected
- Classification is maintained as inventoried unless a suitability study (a decision) is completed that recommends management at a less restrictive classification (such as from wild to scenic or scenic to recreational).

Regarding oil and gas development, Section 82.51 of USFS (2006a) states, "Leases, licenses, and permits under mineral leasing laws would be subject to conditions necessary to protect the values in the event it (an eligible Wild and Scenic River) is subsequently included in the National System." USFS (2006a) also states that the construction of new roads within the river corridor is not considered compatible with eligible rivers tentatively classified as wild. A few roads up to the river corridor may be acceptable and any trails within the river corridor should generally be for non-motorized use only. For rivers tentatively classified as scenic, new road construction, including bridges is allowed if construction fully protects river values (including the river's free-flowing character). For both all eligible rivers, the guidelines in USFS (2006a) are that construction of transmission lines (i.e., oil, gas, and water) is discouraged). In accordance with this direction and to protect the eligibility of these streams, a ¼-mile buffer measured out from either streambank will be applied to eligible streams in this EIS. The area encompassed by the buffer around eligible streams is specified in Table 2.4-2.

2.4.3 Pine Valley Ranger District

2.4.3.1 Inventoried Roadless Areas

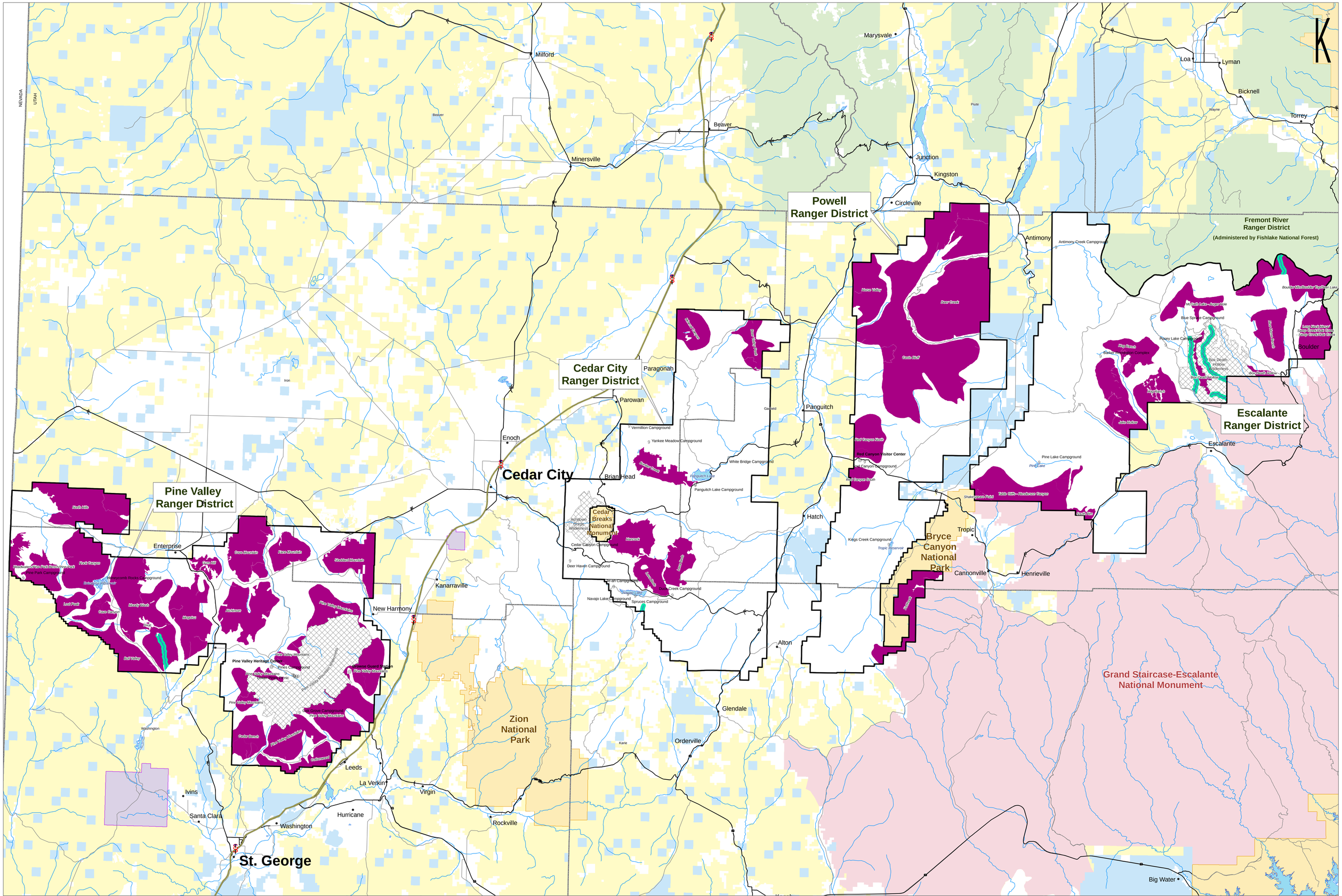
There are 17 IRAs on the Pine Valley Ranger District covering a total of 253,280 acres. The IRAs are identified in Table 2.4-1 and are Atchison (17,663 acres), Bull Valley (10,907 acres), Cave Canyon (5,661 acres), Cedar Bench (8,917 acres), Cottonwood (6,752 acres), Cove Mountain (16,633 acres), Dixie (109), Gum Hill (3,181), Headwaters/Pine Park Bench/Pine Park (10,949 acres), Kane Mountain (8,016 acres), Lost Peak (4,144), Mogotsu (16,771 acres), Moody Wash (31,853 acres), North Hills (24,485 acres), Pine Valley Mountains (57,621 acres), Rock Canyon (16,463 acres), and Stoddard Mountain (13,155 acres).

The Pine Valley Ranger District contains the largest amount of biological crusts and gypsiferous soils and these resources would be expected to occur on IRAs. Eight municipal watersheds covering 14,669 acres are at least partially located on the Pine Valley Mountains IRA. The watersheds are Central, Enterprise, Leeds, New Harmony, Pine Valley, Pintura, Sawyer Spring, and St. George. In addition, IRAs include 19,999 acres of known or suitable habitat for threatened and endangered species including California condor (*Gymnogyps californianus*), Mexican spotted owl (*Strix occidentalis*), and Mohave desert tortoise (*Gopherus agassizii*). The IRAs also include 23,340 acres of suitable habitat for sensitive species including bald eagle (*Haliaeetus leucocephalus*), Bonneville cutthroat trout (*Oncorhynchus clarki utah*), flammulated owl (*Otus flammeolus*), peregrine falcon (*Falco peregrinus*), northern goshawk (*Accipiter gentilis*), pygmy rabbit (*Brachylagus idahoensis*), and sensitive bats.

2.4.3.2 Eligible Wild and Scenic Rivers

MOODY WASH

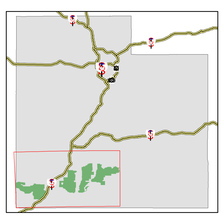
There are approximately 5.1 miles of Moody Wash that are considered eligible for inclusion in the National Wild and Scenic River System. The eligible section extends upstream 5.08 miles from a major utility corridor located near the Dixie National Forest boundary. Moody Wash is a semi-arid desert stream system that is very closely connected to a shallow alluvial aquifer. Summer low flows become intermittent, with areas of downwelling and upwelling that support and maintain a cottonwood and willow riparian plant community. Peak flows typically occur December through May, but can also occur from localized late summer thunderstorms (USFS 2007a).



Oil & Gas Leasing EIS on Lands Administered by the Dixie National Forest

FIGURE 2.4-1
Inventoried Roadless Areas & Wild & Scenic Rivers

Horizontal Datum = NAD 83 Coordinate System = Zone 12N	1:220,000	22 February 2008



Legend

- Cities

Forest Sites

- Campgrounds
- Visitor Centers
- Interstates
- Highways
- Minor Roads*
- Major Streams & Rivers
- Water Bodies
- County Boundaries
- State Boundaries

National Forest System Lands

- Dixie National Forest
- Wilderness Areas
- Fishlake National Forest

Other Land Administration

- Bureau of Land Management
- GSENM**
- National Park Service
- Private (off-forest)
- State of Utah
- Tribal
- Inventoried Roadless Areas
- Wild & Scenic Rivers
- Wild & Scenic River Corridors (0.5-mi wide)

Miles: 0, 2.5, 5, 7.5, 10

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. For specific dates and/or additional digital information, contact the Forest Supervisor, Dixie National Forest, Cedar City, Utah. This map has no warranties to its contents or accuracy.

*Not all roads are shown. Only some roads are depicted for orientation purposes.
**Grand Staircase-Escalanted National Monument. Managed by the Bureau of Land Management.

Moody Wash does not have any water developments and is considered free flowing. Further, a non-motorized trail is the only access upstream of the utility corridor and the section is eligible to be classified as wild. It is has ecological, geological/hydrological, and native fish outstandingly remarkable values. It is considered a fully functioning semi-arid desert stream system that has not been impacted by development, groundwater pumping, channel modification, and invasive species to the degree of similar systems in the southwestern US. Moody Wash supports healthy, self-sustaining populations of native wildlife including Arizona toad (*Bufo microscaphus*), canyon treefrog (*Hyla arenicolor*), desert sucker (*Catostomus clarki*), speckled dace (*Rinichthys osculus yarrowi*), and Virgin spinedace (*Lepidomeda mollispinus*). The Virgin spinedace population in Moody Wash is a self-sustaining, breeding population and Moody Wash is the only tributary to the Santa Clara River in which Virgin spinedace occupies its historic range. Moody Wash is different from other streams in that it is dominated by volcanic geology versus the more typical sedimentary limestone and sandstone well known to the area (USFS 2007a).

2.4.4 Cedar City Ranger District

2.4.4.1 Inventoried Roadless Areas

There are five IRAs on the Cedar City Ranger District covering a total of 47,842 acres. The IRAs are identified in Table 2.4-1 and are Bear Valley Peak (7,418 acres), Bunker Creek (7,286 acres), Hancock (9,806 acres), Lava Beds (14,940 acres), and Mineral Canyon (8,392 acres). The Bunker Creek IRA includes 1,190 acres of the Parowan municipal watershed. IRAs on the Cedar City Ranger District include 1,799 acres of known or suitable habitat for threatened and endangered species including California condor, Mexican spotted owl, and Utah prairie dog (*Cynomys parvidens*). IRAs on the Ranger District also include 18,118 acres of suitable habitat for sensitive species including flammulated owl, greater sage grouse (*Centrocercus urophasianus*), peregrine falcon, northern goshawk, pygmy rabbit, and sensitive bats.

2.4.4.2 Eligible Wild and Scenic Rivers

NORTH FORK OF THE VIRGIN RIVER

Approximately 0.7 miles of the North Fork of the Virgin River is considered eligible, beginning at the headwaters and extending downstream to the Dixie National Forest boundary. The North Fork of the Virgin River begins at Cascade Falls, a perennial spring that is fed by Navajo Lake through underground lava tubes and a limestone solution channel. Cascade Falls is located in the Pink Cliffs on the south edge of the Markagunt Plateau. From here, the river flows as a boulder dominated, cascading to step-pool stream system through the Grey Cliffs before cutting down through the Kolob Terrace into Zion National Park (USFS 2007b).

There are no water developments on the North Fork of the Virgin River; however, the segment would be classified as scenic due to signs of human activity and a four-wheel-drive road that provides access to private property that are within a half mile of the river corridor. Outstandingly remarkable values for this reach are scenic, geological, and recreational. The river begins at Cascade Falls and flows through the pink cliffs of the Virgin River rim and other high elevation landscapes of Jurassic and Cretaceous sediment deposits, with extensive viewsheds and examples of stream erosion. The stream corridor also supports a diverse riparian plant community, and near Cascade Falls the watershed supports an abundance of bristlecone pine (*Pinus longaeva*) trees. The North Fork of the Virgin River provides a unique recreational opportunity for hiking, sightseeing, and studying the ecology of Southern Utah. The Cascade Falls National Recreation Trail (#32055) is one of the most popular and heavily used trails on the Dixie National Forest. The trail terminates

at a viewpoint looking directly into the limestone cavern from which water exits and forms Cascade Falls. The Virgin River Rim Trail (#32011) also provides visitors a view of the river segment (USFS 2007b).

2.4.5 Powell Ranger District

2.4.5.1 Inventoried Roadless Areas

There are six IRAs on the Powell Ranger District covering a total of 167,417 acres. The IRAs are identified in Table 2.4-1 and are Casto Bluff (87,416 acres), Deer Creek (39,783), Fishhook (12,921 acres), Horse Valley (13,603 acres), Red Canyon North (9,964 acres), and Red Canyon South (3,730 acres). The Deer Creek IRA overlaps 5,303 acres of the Antimony municipal watershed. In addition, IRAs on the Ranger District include 42,180 acres of known or suitable habitat for threatened and endangered species including California condor, Mexican spotted owl, and Utah prairie dog. IRAs also include 59,154 acres of suitable habitat for sensitive species including Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*), flammulated owl, greater sage grouse, peregrine falcon, northern goshawk, pygmy rabbit, and sensitive bats.

2.4.5.2 Eligible Wild and Scenic Rivers

There are no streams on the Powell Ranger District that are considered eligible for inclusion in the National Wild and Scenic River System.

2.4.6 Escalante Ranger District

2.4.6.1 Inventoried Roadless Areas

There are 10 IRAs on the Escalante Ranger District covering a total of 101,897 acres. The IRAs are listed in Table 2.4-1 and are Boulder Mtn/Boulder Top/Deer Lake (14,881 acres), Box-Death Hollow (3,120 acres), Hog Ranch (17,114 acres), Jake Hollow (15,135 acres), Long Neck Mesa/Steep Creek/Oak Creek –Steep Creek/Oak Creek (11,136 acres), McGath Lake–Auger Hole (8,328 acres), New Home Bench (10,505 acres), Shakespeare Point (750 acres), South Rim (1,367 acres), and Table Cliffs –Henderson Canyon (19,561 acres). The Hog Ranch and McGath Lake – Auger Hole IRAs overlap with 1,006 acres of the Escalante municipal watershed and the New Home Bench IRA overlaps with 426 acres of the Boulder Town municipal watershed. The Side Hollow Ponderosa Pine Provenance Study Area covers 4.5 acres within the New Home Bench IRA. The Study Area contains ponderosa pine (*Pinus ponderosa*) from various origins that are being used for genetic studies (USDS 2006b). In addition, IRAs on the Ranger District include 71,494 acres of known or suitable habitat for threatened and endangered species including California condor, Mexican spotted owl, and Utah prairie dog. IRAs also include 80,791 acres of suitable habitat for sensitive species including Colorado River cutthroat trout, flammulated owl, peregrine falcon, northern goshawk, pygmy rabbit, and sensitive bats.

2.4.6.2 Eligible Wild and Scenic Rivers

There are four eligible Wild and Scenic Rivers on the Escalante Ranger District, Death Hollow Creek, East Fork Boulder Creek, Mamie Creek, and Pine Creek. However, Death Hollow Creek, Mamie Creek, and Pine Creek are entirely within the Box-Death Hollow Wilderness Area. As a result, these streams would not be impacted by oil and gas leasing and will not be described in detail below. In addition, there are two streams, Cottonwood Canyon and Slickrock Canyon, located on the Dixie portion of the Fremont River Ranger District, which is administered by the Fishlake National Forest. Extremely small portions of the ¼-mile buffer placed on these streams

(2.43 and 5.32 acres, respectively) extend onto the Escalante Ranger District. However, these streams were not included in Table 2.1-2 as the actual streams are located entirely on the portion of the Fremont River Ranger District administered by the Fishlake National Forest. Further, these streams will not be described in detail in this Specialist Report due to the extremely small portion of the ¼-mile buffers that overlap onto the Escalante Ranger District. However, the same stipulations would be applied to the portion of the buffer occurring on the Dixie National Forest, as with the other eligible Wild and Scenic Rivers described.

EAST FORK BOULDER CREEK

There are 2.8 miles of the East Fork of Boulder Creek that are considered eligible to be classified as wild. The creek originates along the southern rim of the Aquarius Plateau known as the Boulder Top. The East Fork of Boulder Creek is accessed only by a non-motorized trail. It is considered because of its outstandingly remarkable scenic, recreational, and fishery values. The stream passes through wet meadows, aspen (*Populus tremuloides*), and mixed conifer forest that contains large Engelmann Spruce (*Picea engelmannii*), Douglas fir (*Pseudotsuga menziesii*), and a diverse riparian plant community. The scenic qualities of the stream corridor are frequently enhanced by the presence of mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), and large herds of Rocky Mountain elk (*Cervus elaphus*). The scenic qualities are visible from the East Boulder Creek Trail (#34019) that provides a backcountry hiking experience and creek access as it loops the river corridor. The trail receives low to moderate amounts of use during the summer and fall months. The East Fork of Boulder Creek also supports self-sustaining populations of Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) and brook trout (*Salvelinus fontinalis*). Natural cascades prevent brook trout from invading the upper half-mile of the creek, which is inhabited by a genetically pure remnant population of Colorado River cutthroat trout (USFS 2007c).

2.5 Impact Analysis

This section describes the changes to the human environment that could occur as a result of implementing the Alternatives outlined in Chapter 2. Changes to the human environment are described using the terms “effect” and “impact,” which are synonymous under NEPA. Effects may be direct, indirect, or cumulative in nature.

- Direct effects occur at the same time and place as the action.
- Indirect effects are reasonably foreseeable effects that occur later in time or are removed in distance from the action.
- Cumulative effects are those impacts to the environment that result from the incremental impacts of an alternative when added to other past, present, and reasonably foreseeable future actions.

In this Specialist Report, the direct and indirect effects of an action are discussed in combination for the affected resource components in Section 2.5.4. Cumulative effects are described by alternative in Section 2.5.5.

NEPA requires that effects in an EIS be discussed in terms of context and intensity. In this Specialist Report, context refers to the location, type, or size of the area to be affected relative to each resource component. Intensity refers to the severity or level of magnitude of impact. In this Specialist Report, the intensity of effects is defined as Major, Moderate, Minor, or Negligible. In addition, the duration of effects can be temporary, short term, or long term. These terms are described more specifically in Table 2.5-1.

Table 2.5-1 Summary of Terms used to describe Effects in the Specialist Report.

Attribute of Effect		Description
Quality	Beneficial	An improvement of current conditions.
	Adverse	A degradation of current conditions.
Magnitude (Intensity)	Negligible	No measurable change in current conditions.
	Minor	A small, but measurable change in current conditions.
	Moderate	A moderate, measurable change in current conditions.
	Major	A big, easily measurable change in current conditions.
Duration	Temporary	Short-lived (i.e., during construction).
	Short-term	10 years or less.
	Long-term	More than 10 years.

2.5.1 Connected Actions

The Alternatives described in Chapter 2 do not authorize surface disturbance. Therefore, environmental impacts in this Specialist Report are analyzed as connected actions. Connected actions are defined by the Council on Environmental Quality (CEQ 1508.25) as actions that: 1) automatically trigger other actions which may require environmental impact statements; 2) cannot or will not proceed unless other actions are taken previously or simultaneously, and; 3) are interdependent parts of a larger action and depend on the larger action for their justification. Forest Service regulations (36 CFR 228.102(c)(4)) require the Forest Service to consider the subsequent actions that would be authorized by a lease as connected actions. Connected actions are the basis of the environmental analysis from which leasing decisions would be made. In this Specialist Report, connected actions are the predicted disturbance from oil and gas leasing activity, which is discussed in the Reasonably Foreseeable Development Scenario (BLM 2007) and Chapter 2 of the EIS.

2.5.2 Issue Statement

2.5.2.1 Inventoried Roadless Areas

Issue: Post-leasing activities could impact the characteristics and attributes of IRAs.

IRAs represent some of the largest and most extensive tracts of undeveloped land on the Dixie National Forest and are valued for their roadless nature and associated environmental characteristics and attributes. Any construction and reconstruction of roads, currently prohibited by the 2001 Roadless Area Conservation Rule, associated with oil and gas facilities would fragment or reduce the size of IRAs and the operation of oil and gas facilities such as power lines, drill pads, drill rigs, roads, and production facilities would impact the roadless characteristics and wilderness attributes of IRAs.

2.5.2.2 Eligible Wild and Scenic Rivers

Issue: Post-leasing activities could degrade the values of eligible Wild and Scenic Rivers and could make these areas ineligible for future inclusion in the National Wild and Scenic River System.

The construction and operation of oil and gas facilities such as power lines, drill pads, drill rigs, roads, and production facilities would alter the outstandingly remarkable values identified for the six different rivers and streams on the Dixie National Forest that are eligible to be classified as wild

under the requirements of the Wild and Scenic Rivers Act. Any action that substantially alters the outstandingly remarkable values or inhibits free flow would eliminate the future potential for these areas to be added to the National Wild and Scenic Rivers System. Further, the construction of roads associated with oil and gas activity within the corridor of eligible streams would make them unable to be classified as wild.

2.5.3 Indicators

In this Specialist Report, effects will be described using indicators developed for each resource. Using the environmental conditions described in Section 2.4 as a baseline, indicators are used to predict or measure change in a resource related to effects of the Alternatives. Some indicators are quantitative and measure effects based on numerical thresholds, while other indicators involve a narrative to qualitatively describe any changes relevant to baseline conditions.

2.5.3.1 Inventoried Roadless Areas

Measurement Indicators

- *NARRATIVE DISCUSSION OF IMPACTS TO ROADLESS CHARACTERISTICS AND WILDERNESS ATTRIBUTES*
- *MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE IN IRAS*

2.5.3.2 Eligible Wild and Scenic Rivers

Measurement Indicators

- *NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES*
- *MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE DISTANCE FROM EITHER BANK OF ELIGIBLE STREAM SEGMENTS*

2.5.4 Direct and Indirect Effects

Under Alternatives B, C, D, E it is assumed that activities described under the RFDS would occur on some portion of the Dixie National Forest. However, depending on the Alternative, activities described under the RFDS would be restricted in some locations. These activities include 60 to 120 acres (depending upon Ranger District) of surface disturbance associated with seismic surveys, 83 to 332 acres (per Ranger District) of land clearing surface disturbance associated with road and pad building for exploration wells, and 254 acres of land clearing surface disturbance for a production field. The locations of activities are not yet known. Given that the roadless and wilderness characteristics of IRAs and the outstandingly remarkable values of eligible Wild and Scenic Rivers relate to a broad array of resources, nearly every aspect of oil and gas activity has the potential to impact these resources. In general, the impacts of seismic exploration would be negligible to minor and temporary to short term due to the small amount of disturbance expected.

Exploratory wells and access roads would have a much larger impact on both these resources, ranging from minor to major depending upon the location of the disturbance relative to the IRA and/or eligible Wild and Scenic River. For both of these resources, roads present the greatest potential for impacts due to the extent of ground covered and the fact that IRAs and streams eligible to be classified as "wild" are valued for their lack of roads. However, temporary roads used to access exploratory wells (as well as the well pads themselves) would still have a short-term impact, as these areas would be reclaimed following exploration. Well pads, production facilities, power lines, pipelines, and access roads associated with a production field would have long-term impacts

due to the direct loss of roadless acres for the life of the development and the elimination of the eligibility of river segments for inclusion in the National Wild and Scenic River System. These impacts could range from minor to major depending upon the location of the facilities relative to the resource.

Table 2.5-2 lists the leasing options assigned to IRAs and eligible Wild and Scenic Rivers under each alternative. Descriptions of leasing options (and associated impacts on these resources) are described in Section 2.5.4.1. Each assigned leasing option would either allow or restrict certain oil and gas activities (described under the RFDS) whenever the applicable resource component occurs on the Dixie National Forest.

Table 2.5-2 Leasing Options assigned under each Alternative

Resource Component	Alternative				
	A	B	C	D	E
Inventoried Roadless Areas	NL	NL	NSO[2]/NSO[1]	NSO[2]/CSU[1]	NSO[2]/SLT[1]
Eligible Wild and Scenic Rivers	NL	NL	CSU	CSU	SLT

[1]Alternatives C, D, and E will undergo a dual analysis as described in Section 2.3.2.
[2] Actual leasing option is CSU, but the CSU would effectively prohibit most surface use or occupancy and is analyzed as NSO. This CSU is more restrictive than the CSU applied under the dual analysis scenario with the 2001 Roadless Area Conservation Rule not in effect.

Regarding leasing options and the 2001 Roadless Area Conservation Rule, the rule does not explicitly prevent issuing new oil and gas leases (NL) nor does it strictly require a NSO stipulation be connected with mineral leases in IRAs. It does prohibit the road construction and timber removal that would be practically necessary for efficient oil and gas exploration through drilling, as well as road building and timber removal necessary for building oil and gas production facilities. It is possible that certain resource mapping and exploration activities could occur on new oil and gas leases in IRAs as long as these activities are not prohibited by the 2001 Roadless Area Conservation Rule. In actuality, an agency-wide CSU stipulation would be applied to new leases within an IRA but the fact that compliance with the 2001 Roadless Area Conservation Rule (no roads or timber cutting) would effectively prevent use of the lease surface for efficient exploration and development of oil and gas has been reflected in this impact analysis by assuming new leases in IRAs would essentially include a NSO stipulation.

2.5.4.1 Impacts of Connected Actions by Leasing Option

This section summarizes the lease options described in Chapter 1 of the EIS and describes how they would apply to IRAs and eligible Wild and Scenic Rivers. Leasing options would dictate the conditions under which impacts from connected actions (as described in the RFDS) may occur. Impacts from connected actions under each leasing option are discussed in this section; impacts under SLT are described more extensively in Section 2.5.4.2. Impacts to IRAs and eligible Wild and Scenic Rivers considering leasing option overlaps (i.e., overlaps with more restrictive leasing options assigned to other resources) are discussed in Section 2.5.4.3 (Impacts by Alternative). Under all leasing options and Alternatives, oil and gas activity would be subject to the Best Management Practices (BMPs) listed in the Dixie National Forest Oil and Gas Construction and Operating Standards and Well Site Design Requirements contained in Appendix 2B and the BLM and USFS Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – the Gold Book (USFS and BLM 2007).

NOT AVAILABLE (NA)

NA applies to lands that are not administratively available for leasing and includes Brian Head Ski Resort, wilderness areas, and areas surrounding the Box-Death Hollow Wilderness Area that were withdrawn from leasing by the Utah Wilderness Act of 1984. No oil and gas leasing would occur in

these areas. There would be no effects to eligible Wild and Scenic Rivers located within these areas including Death Hollow Creek, Mamie Creek, and Pine Creek. No IRAs are located within wilderness or Brian Head Ski Resort; however, there would be no effect to the small portion of IRAs within the areas withdrawn by the Utah Wilderness Act of 1984.

NO LEASE (NL)

NL applies to lands where no new leases would be authorized. No direct disturbance to IRAs or eligible Wild and Scenic Rivers would occur under NL. Under Alternative A, NL would apply to all areas on the Forest and there would be no direct or indirect effects to IRAs or eligible Wild and Scenic Rivers. Under Alternative B, NL would also apply specifically to IRAs and eligible Wild and Scenic Rivers and no direct impacts would occur in these areas. Adverse indirect effects to these resources could occur as a result of oil and gas activity on lands available for leasing adjacent to these areas. Indirect effects are not likely to affect the ability of these areas to be managed as IRAs or Wild and Scenic Rivers; however, they could degrade various roadless or wilderness characteristics and outstandingly remarkable values. The types of indirect effects under NL would be the same as those described in Section 2.5.4.3. For seismic exploration and exploratory wells, adverse indirect effects would generally range from negligible to minor and be temporary or short term. A production field would have moderate to major, adverse, long-term indirect effects.

NO SURFACE OCCUPANCY (NSO)

NSO would prohibit occupancy or use of the land for oil and gas related activities (i.e., construction of well pads, central tank batteries, access roads, pipelines, power lines, and other linear structures). Seismic exploration could occur under NSO. NSO does not apply to eligible Wild and Scenic Rivers under any alternative. Under the dual analysis scenario for Alternatives C, D, and E, the 2001 Roadless Area Conservation Rule applies a CSU stipulation to IRAs. However, due to the level of restrictions predicated by the CSU stipulation, it will be analyzed as NSO (explained in further detail under CSU).

Under NSO, the only direct impacts to IRAs would occur as a result of seismic exploration and would range from negligible to moderate, and adverse as summarized below in the measurement indicators.

Indirect impacts to IRAs would be the same as described in Section 2.5.4.2 and in most cases would be adverse, ranging from negligible to minor and temporary or short term.

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ROADLESS CHARACTERISTICS AND WILDERNESS ATTRIBUTES – The impacts of seismic exploration in IRAs would generally be the same as described in Section 2.5.4.2 and the Specialist Reports referenced in Section 2.5.4.2. The impacts will be summarized in this section and the reader is referred to Section 2.5.4.2 and the other Specialist Reports for more detailed information.

Roadless Characteristics

High quality or undisturbed soil, water, and air: The transportation of seismic equipment using buggies would produce surface ruts, particularly in areas of soft soil. The creation of ruts could promote small-scale soil erosion. Other direct impacts include possible chemical/fuel spills, vehicle emissions, and the creation of fugitive dust. Prompt reclamation of disturbed areas would limit the duration of these impacts. These impacts would be adverse, negligible to minor, and short term.

Sources of public drinking water: Seismic exploration would have only short-term negligible to minor adverse effects as discussed for water in the previous roadless characteristic.

Diversity of plant and animal communities: Adverse effects of seismic exploration would be short term and minor resulting from the temporary disturbance of mobile wildlife due to noise and human presence, mortality to less mobile animals, and the potential to introduce noxious weeds.

Habitat for threatened, endangered, proposed, candidate, and sensitive species dependent on large undisturbed areas of land: Impacts to threatened, endangered, proposed, and candidate species would be avoided/mitigated through compliance with the Endangered Species Act. Impacts to sensitive species would be adverse, short term, and minor as described in the previous roadless characteristic.

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive: Seismic activity would lead to minor short-term increases in noise levels that would detract from the recreation experience.

Reference landscapes: Seismic exploration would have negligible to minor, short-term adverse impacts to an IRA's potential to serve as a reference landscape, due primarily to the possibility of noxious weed introductions.

Natural appearing landscapes with high scenic quality: Seismic exploration would not result in substantial alteration of the scenic quality of the landscape and impacts would be negligible and short term.

Traditional cultural properties and sacred sties: Cultural surveys would be required prior to any seismic exploration and areas identified would be protected by Section 106 of the National Historic Preservation Act and impacts would be negligible.

Other locally identified unique characteristics: Specific, comprehensive information on unique characteristics is not available for each IRA. Any unique characteristics present would likely be adversely impacted by seismic exploration with short-term effects ranging from negligible to moderate.

Wilderness Attributes

Natural Integrity: Seismic exploration would have negligible, adverse, short-term effects on long-term ecological processes, primarily due to the potential for noxious weed introductions.

Apparent Naturalness: Short-term impacts from seismic exploration would include the appearance of ruts and drill holes. These impacts would be adverse and minor.

Solitude and Primitive Recreation: Seismic activity would disturb the solitude of IRAs and opportunities for primitive recreation during the exploration, due primarily to helicopter and/or buggy traffic/noise and explosions. These adverse impacts would be minor and limited to the length of the exploration.

Challenging Experience: Seismic exploration would have no effect on the ability of IRAs to provide a challenging experience.

Special Features/Special Places/Special Values: Adverse, negligible to moderate short-term impacts could occur similar to what is described for locally identified unique characteristics.

Wilderness Manageability and Boundaries: Seismic activity would have no effect on the ability of an IRA to be managed as wilderness.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE IN IRAS – The only disturbance that could occur within IRAs under NSO would be seismic exploration. If the full amount of seismic exploration predicted by the RFDS were to occur within IRAs, disturbance could be up to 60 acres on the Pine Valley Ranger District and 120 acres on the Cedar City, Powell, and Escalante Ranger Districts. No new or reconstructed roads would occur in IRAs.

TIMING LIMITATION (TL)

TL prohibits surface activities during specified time periods. While no TL stipulations were developed for IRAs or eligible Wild and Scenic Rivers, these areas overlap with other resources that have been assigned a TL stipulation. A TL stipulation would not prevent any of the disturbance predicted, and for IRAs and eligible Wild and Scenic Rivers the impacts would generally be the same as described for SLT.

CONTROLLED SURFACE USE (CSU)

CSU provides for controlled but generally allowed surface use on all or portions of a lease. Operations would be held to special constraints that may exceed the mitigation provided by SLT, Forest Service regulations, and operating orders. An agency-wide CSU stipulation for new leases is applied to IRAs under the 2001 Roadless Area Conservation Rule that prohibits new temporary roads, permanent roads, road construction or reconstruction. Timber cutting associated with oil and gas exploration and development activities for new leases would also be prohibited by the CSU stipulation. As exploratory wells and production fields would all require roads and timber cutting, it is unlikely that these activities would occur within IRAs under the CSU stipulation. As a result, it was determined that for the purpose of analyzing impacts the CSU stipulation would be analyzed as being practically equivalent to NSO.

A second CSU leasing option was also developed for IRAs for Alternative D with leasing allowed in IRAs. This CSU was designed to allow for exploration within IRAs while still preserving the ability of these areas to be managed for the undeveloped, unroaded charateristics of the area. The CSU would not allow mechanical road construction or reconstruction; as a result no new temporary or permanent roads would be constructed. Travel may occur along any existing roads located within IRAs (as described in Section 2.4.1, roads without evidence of mechanical construction, such as two-track roads, may exist in IRAs). In addition, this CSU would allow timber harvest. As a result, exploration, including seismic and exploratory wells, could occur within IRAs. It is unlikely that a production field would occur within an IRA under this CSU, as a production field would require permanent roads to service the wells and transport the oil to market. Seismic exploration and the construction and operation of well pads and associated facilities would have adverse effects to the roadless characteristics and wilderness attributes of IRAs. The general type of impacts would be the same as described for SLT in Section 2.5.4.2. However, the amount of disturbance and the duration of impacts would be reduced relative to SLT due to the lack of road construction and the fact that a production field would not be developed. As a result, impacts would be short term. Impacts associated with seismic activity would be adverse, negligible to minor. Impacts associated with exploratory wells would be minor to moderate.

Measurement Indicators

- *Measurement Indicator #1* NARRATIVE DISCUSSION OF IMPACTS TO ROADLESS CHARACTERISTICS AND WILDERNESS ATTRIBUTES

The impacts of seismic exploration within IRAs would generally be the same as described in Section 2.5.4.2 and summarized above for NSO. The impacts of exploratory wells would also generally be the same as described in Section 2.5.4.2 and the other Specialist Reports referenced in Section 2.5.4.2. While access roads would not be constructed under CSU, the types of impacts associated with roads in Section 2.5.4.2 would still occur under CSU due to the fact that travel would still be allowed on existing roads. However, under CSU there would be less disturbance of habitat as roads would not be mechanically constructed or widened to their full width.

- *Measurement Indicator #2* MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE IN IRAS

There would be no construction or reconstruction of roads. Disturbance would consist of seismic exploration, the construction of well pads, and the clearing on vegetation within or along existing roads. If the full amount of seismic exploration predicted by the RFDS were to occur within IRAs, which is unlikely, disturbance could effect up to 60 acres on the Pine Valley Ranger District and 120 acres on each of the Cedar City, Powell, and Escalante Ranger Districts. Without the disturbance associated with access roads, exploratory wells would disturb up to 5.9 acres per well, for a total of up to 29.5 acres on the Pine Valley Ranger District, 88.5 acres on the Cedar City Ranger District, and 118 acres each on the Powell and Escalante Ranger Districts. The amount of vegetation that would need to be cleared in order to use existing roads is unclear, but it is assumed that it would be much less than the full disturbance estimated for access road construction (6.6 acres per well) for a total of 33 acres on the Pine Valley Ranger District, 99 acres on the Cedar City Ranger District, and 132 acres on each of the Powell and Escalante Ranger Districts.

An additional CSU stipulation is applied to Wild and Scenic Rivers under Alternatives C and D. This CSU stipulation would not allow the construction of new roads within ¼-mile of either bank of an eligible stream to preserve its ability to be classified as wild. Further, in accordance with Section 9 of the Wild and Scenic Rivers Act and USFS (2006), pipelines and power lines would not be allowed within ¼-mile of either bank of an eligible stream. Portions of other facilities, such as well pads and central tank batteries, could be located within ¼-mile of an eligible stream if the location of these facilities would not degrade the outstandingly remarkable values or make the stream ineligible for future inclusion in the National Wild and Scenic River System. Seismic exploration would be permitted under the CSU stipulation. Impacts to eligible Wild and Scenic Rivers under CSU are described in the measurement indicators below.

NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES – Seismic exploration using buggies could produce surface ruts, particularly in areas of soft soil near streams, which could promote small-scale soil erosion. Some of the eroded material has the potential to enter streams, which could negatively impact native fish habitat and ecological conditions in Moody Wash and the East Fork of Boulder Creek. Chemical or fuel spills in or adjacent to streams could also negatively impact fish habitat and aquatic ecology; however, these impacts should be mostly negligible due to the BMPs in BLM and USFS (2007), Appendix 2B, and the ability to move operations by up to 200 meters (656 feet) under SLT. Seismic surveys also have the potential to disturb recreation due to noise from drilling, blasting, and vehicular and/or helicopter traffic. The presence of buggies, helicopters, and mobile drill rigs would temporarily degrade the scenic qualities of these areas, with scenic integrity returning to baseline levels once these activities are completed. Well pads and associated facilities (excluding pipelines and power lines) could also be located within ¼-mile of either streambank if they do not jeopardize the eligibility of the stream for inclusion in the National Wild and Scenic River System. Constructing these facilities in a way that would not jeopardize eligibility likely involves locating them at a

sufficient distance that they do not impact ecological conditions, scenic integrity, or recreational values. In all practicality, the inability to construct roads, pipelines, or power lines within ¼-mile of an eligible segment would preclude locating more than a portion of a well pad or other similar facility within the buffer. Considering this, impacts should be negligible to minor, and would not be expected to jeopardize a stream's eligibility for inclusion in the National Wild and Scenic River System. Impacts may be long or short term.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE OF ELIGIBLE STREAM SEGMENTS – Under CSU, no road construction, or reconstruction would occur. Up to 60 acres could be disturbed by seismic exploration on Moody Wash (Pine Valley Ranger District) and 120 acres North Fork of the Virgin River and East Fork Boulder Creek (Cedar City and Escalante Ranger Districts, respectively). This disturbance estimate represents the maximum amount that may occur if all the seismic exploration predicted to occur by the RFDS were to occur within the ¼-mile buffer around eligible streams. Similarly, if it is assumed that an entire pad for an exploratory well could be constructed within the ¼-mile buffer around an eligible stream, then 5.0 acres could be disturbed per well, with a total possible disturbance of 29.5 acres on Moody Wash (5 wells), 88.5 on the North Fork of the Virgin River (15 wells), and 118 acres on the East Fork of Boulder Creek (20 wells). However, it is extremely unlikely that more than 1 well pad would be located with ¼-mile of an eligible stream due the ability of one exploration well to adequately explore the small area surrounding these streams, the CSU stipulation that would prevent any disturbance affecting stream eligibility, and the ability under SLT to move facilities by up to 200 meters (656 feet). As a result, the expected disturbance would be much less, likely no more than 1 well (5.9 acres). For a production field, the inability to construct any roads would also preclude constructing an entire production field within the buffer around an eligible Wild and Scenic River. Further, it is highly unlikely that a production field would be located in direct proximity to an eligible stream. However, for purpose of this analysis, the disturbance associated with the elements of a production field that could be located within ¼-mile of an eligible stream under CSU would be 137.6 acres (20 wells, topsoil storage areas, 1 water injection well, and production facilities).

STANDARD LEASE TERMS (SLT)

Standard lease terms (SLTs) are contained in BLM Lease Form 3100-11, Offer to Lease and Lease for Oil and Gas. Under SLT, the lessee has the right to use as much of the leased lands as is necessary, as well as the right to build and maintain necessary improvements thereon. Section 6 of the standard lease form requires the operator to conduct operations in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, visual, and other resources and land uses or users. In addition, if threatened or endangered species; objects of historic, cultural, or scientific value; or substantial unanticipated environmental effects are encountered during operations, all work affecting the resource must cease, and the land management agency contacted. SLT operations cannot violate any other federal environmental protection laws (i.e., Clean Air Act, Clean Water Act, Endangered Species Act, etc.). SLT would allow operations to be moved up to 200 meters (656 feet) and be delayed for up to 60 days if the authorizing officer deems it necessary to protect a resource. These allowances provide a level of protection to eligible Wild and Scenic Rivers; however, some impacts could still occur, as the allowable distance is less than the full width (at least ½-mile) of the buffer. SLT does not provide consideration for roadless characteristics and wilderness attributes and impacts to IRAs would occur under SLT. SLT would apply to IRAs and eligible Wild and Scenic Rivers under Alternative E (with leasing allowed in IRAs under a less restrictive stipulation than NSO). The impacts of SLT on both these resources are discussed in Section 2.5.4.2.

2.5.4.2 Impacts of connected actions under SLT

Impacts in this section are discussed assuming no restrictions or stipulations other than those listed on BLM Lease Form 3100-11 (SLT) and the environmental protection measures that would be implemented by other laws and regulations (i.e., Clean Water Act, Endangered Species Act, etc.). As a minimum, all leases are governed by SLT and the impacts described in this section represent the maximum amount that could occur as a result of oil and gas activities.

INVENTORIED ROADLESS AREAS

Assuming IRAs are open to oil and gas leasing activity under SLT (2001 Roadless Area Conservation Rule is not in effect), disturbance could consist of seismic exploration, construction and reconstruction of roads, exploratory well pads and associated facilities, and production wells with their associated facilities. Table 2.5-3 shows the projected road construction that could occur within IRAs in each Ranger District, assuming the 2001 Roadless Area Conservation Rule was not in effect. These activities/facilities would have adverse effects to the roadless characteristics and wilderness attributes of IRAs. In general, seismic exploration has the least potential for impacts, followed by well pads, production facilities, power lines, pipelines, and access roads. Roads would tend to have the greatest impacts due to the extent of ground covered and the fact that IRAs are valued for their lack of roads. Disturbance associated with seismic activity would be adverse, negligible to minor and short term as discussed in the measurement indicators. Impacts from exploratory wells would also be primarily short term, and minor to moderate. For both these activities, once activities and reclamation were completed, the conditions should return to baseline conditions. However, given the arid nature of many areas on the Dixie National Forest, reclamation could involve longer periods of time and some evidence of these activities may be present long term (>10 years). If oil or gas was discovered and a production field developed, there would be a direct loss of roadless acres for the life of the development, which is expected to be longer than 10 years. The direct loss of roadless acres would be an adverse affect and could range from minor to major depending upon the size of the IRA and the roadless characteristic or wilderness attribute being impacted, as discussed in the measurement indicators.

Indirectly, drill rigs, power lines, roads, seismic exploration, vehicular traffic, and other facilities and noise associated with oil and gas activity may be visible and audible from various locations within IRAs (USFS 1995). These impacts would be both long and short term depending upon the nature of the development. Similar to direct impacts discussed above, indirect effects would be adverse and range from negligible to moderate depending upon the roadless characteristic or wilderness attribute. These effects are discussed in the measurement indicators.

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ROADLESS CHARACTERISTICS AND WILDERNESS ATTRIBUTES – Many of the roadless characteristics are also resources that are described in other Specialist Reports for this EIS. The impacts described in those reports are summarized for each roadless characteristics and the reader is referred to the other Specialist Reports for further information.

Table 2.5-3 Projected Road Construction and Total Disturbance that could occur within an IRAs, by Ranger District

Ranger District	Activity	[1]Roads (miles)		[1]Total Disturbance (Acres)
		New Roads	Reconstructed Roads	
Pine Valley	Seismic Exploration (100 miles)			60.0
	Exploratory Wells (5 wells)	3.3	19.6	83.0
	Production Wells (19 wells)	10.0		253.9
Cedar City	Seismic Exploration (200 miles)			120.0
	Exploratory Wells (15 wells)	9.9	58.8	249.0
	Production Wells (19 wells)	10.0		253.9
Powell	Seismic Exploration (200 miles)			120.0
	Exploratory Wells (20 wells)	13.2	78.4	332.0
	Production Wells (19 wells)	10.0		253.9
Escalante	Seismic Exploration (200 miles)			120.0
	Exploratory Wells (20 wells)	13.2	78.4	332.0
	Production Wells (19 wells)	10.0		253.9
[2]Forest Total	Seismic Exploration			420.0
	Exploratory Wells	39.6	235.2	996.0
	Production Wells	40.0		253.9

[1] Miles and acres of roads are a part of the estimated total disturbance, which also includes well pads, production facilities, power lines, pipelines, and truck loading areas (BLM 2007).
[2] For the purpose of this analysis it is assumed that a single production field could be located on any of the Ranger Districts; however, only a single production field is predicted for the entire forest. As a result the total disturbance for production wells is the same for each Ranger District

Roadless Characteristics

High quality or undisturbed soil, water, and air: Impacts to soil, water, and air are described in Specialist Report 9.0 (soils), 7.0 (water resources), and 13.0 (air resources). Seismic exploration in IRAs would be conducted primarily using the explosion method due to the lack of roads. Seismic drill rigs would be transported using off-road buggies or helicopter. The use of buggies would produce surface ruts, particularly in areas of soft soil, which could promote small-scale soil erosion. Other direct impacts include possible coolant/oil/fuel spills from equipment, vehicle emissions, and the creation of fugitive dust. Prompt reclamation of disturbed areas would limit the duration of these impacts. The construction of exploration and production drilling well pads and access roads would present a greater risk of soil erosion due to runoff events, wind, and traffic. Sediment could be transported to wetlands, streams, lakes, and other waterbodies, which would degrade aquatic ecosystem function. Further, impacts to soils and water could result from the spill of hydrocarbons, drilling mud, or other chemicals. Impacts to air would occur primarily from vehicle emissions and fugitive dust from road traffic. The ability to move operations up to 200 meters (656 feet) to avoid sensitive resources, compliance with the BMPs listed in BLM and USFS (2007) and Appendix 2B, and prompt reclamation of disturbances following short-term exploration activities would reduce impacts. Disturbances related to development and production activities would be minimally reclaimed following construction and full reclamation of these disturbances would be delayed for the duration of the production. Direct impacts from exploration to production would be expected to be adverse, negligible to moderate, and both short term to long term. There would be no indirect impacts to soil, water, and air within IRAs

Sources of public drinking water: The potential effects to sources of public drinking water are described in Specialist Report 7.0. Impacts to municipal watersheds would largely be avoided under SLT by moving facilities up to 200 meters (656 feet) where required to protect sensitive areas

and by complying with the BMPs listed in BLM and USFS (2007) and Appendix 2B. If contamination did occur, adverse effects would range from negligible to major depending upon the location and amount of contamination. Effects would be primarily short term, as conditions would return to normal following the spill and proper cleanup and reclamation. Indirect impacts to portions of municipal watersheds located outside of IRAs would be the same as described in Specialist Report 7.0.

Diversity of plant and animal communities: Impacts to plant and animal communities are described in Specialist Reports 4.0 and 10.0. Impacts of seismic exploration include temporary disturbance of mobile wildlife due to noise and human presence and potential mortality to less mobile animals. Seismic exploration also has the potential to introduce noxious weeds, which could impact both plant and animal communities. Exploratory wells and access roads would remove vegetation/habitat for the life of the well and the time necessary for effective reclamation. Production wells and associated facilities would have similar impacts, but they would be more long term due to the delay in full reclamation until production ceases. Oil and gas activity could also disturb biological crusts, which would physically destabilize the soil, reduce soil fertility, decrease the ability of the soil to retain water, and increase the potential for noxious weed invasion (NSTC 2001). Impacts to biological crusts would be most likely on the Pine Valley Ranger District, where they are more prevalent. Recovery of biological crusts may take decades to hundreds of years. Further, oil and gas activity within the Side Hollow Ponderosa Pine Provenance Study Area could remove trees or disturb soil and vegetation communities, which would disrupt the long-term study underway. However, given the small size of the study area (4.5 acres), impacts would be avoidable under SLT by the ability to move operations by up to 200 meters (656 feet). Impacts to other unique habitats not identified in this Specialist Report would vary depending upon the habitat and the location of disturbance. Overall, exploration activities would have the least amount of impacts on the diversity of plant and animal communities due to the relatively small amount of disturbance and direct adverse impacts would most likely range from negligible to moderate and would be short term. A production field could have more intense adverse impacts due to the greater amount of disturbance expected and impacts could range from minor to major and would be long term. Oil and gas activity on land adjacent to IRAs would have no impacts on the diversity of plant communities within IRAs. Activity on adjacent land could intersect wildlife migration corridors and further isolate wildlife communities. However, given the large size of IRAs and the high quality habitat present in these areas, adverse indirect effects would be negligible and short term to long term.

Habitat for threatened, endangered, proposed, candidate, and sensitive species dependent on large undisturbed areas of land: Threatened, endangered, proposed, candidate, and sensitive species are discussed in Specialist Reports 5.0 and 6.0. SLT requires lessees to comply with all applicable laws, including the Endangered Species Act. Compliance with the Endangered Species Act would avoid and/or mitigate most impacts to habitat for threatened, endangered, proposed, and candidate species. Habitat for sensitive species, and species dependent on large areas of land, would not be protected by the Endangered Species Act and could be impacted by oil and gas activity. The type of impacts would generally be the same as described above for the diversity of plant and animal communities. The intensity of impacts would vary depending upon the amount of habitat affected and could range from negligible to moderate and short term for exploration activities. Adverse impacts of a production field would be long term and would likely range from minor to major. Indirect impacts would be the same as described for the diversity of plant and animal communities.

Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized: Impacts to recreation are discussed in Specialist Report 3.0. Exploration and development activities would lead to temporary increases in noise levels that would detract from the nearby recreation experience. Exploratory wells and access roads could remove portions of trails or established routes, block access to some

areas, and increase noise levels. In addition, the visual presence of facilities would detract from the recreation experience. These impacts would be adverse and negligible to minor in larger IRAs and moderate to major in the smaller IRAs such as Dixie, Gum Hill, Red Canyon South, Shakespeare Point, and South Rim. Impacts would primarily be short term, limited to the length of exploration and time needed for full reclamation. Production wells and facilities would have similar, but long-term effects until production ceased and the disturbances were fully reclaimed. Indirectly, the ability to see and hear oil and gas facilities and/or activities on adjacent land would degrade the recreation experience. These effects would be adverse, long term, and negligible to minor depending upon the topography and placement of the facilities relative to the IRAs.

Reference landscapes: Seismic exploration, exploratory wells, access roads, and production wells, would introduce human disturbance into IRAs and would potentially eliminate the ability to use parts of these areas as reference landscapes. The intensity of these adverse effects would be minor for seismic exploration to major for a production field, depending also upon the size of the IRA and the placement of facilities. Effects would be long term since once a landscape is disturbed it loses its value as a reference landscape. There would be no indirect impacts to the ability of an IRA to be used as a reference landscape.

Natural appearing landscapes with high scenic quality: Scenic integrity is discussed in detail in Specialist Report 1.0. Seismic exploration would not result in substantial alteration of the scenic quality of the landscape. Well pads, access roads, and other facilities would alter its natural appearance and degrade the scenic qualities of landscapes. These impacts would be adverse and negligible to moderate depending upon the placement of facilities and would be short term, limited to the length of exploration for exploratory wells and associated access roads. They would be long term for production facilities until production ceased and disturbances were fully reclaimed. Indirectly, oil and gas facilities on adjacent land would also reduce the natural appearance of areas visible from IRAs, but not of IRAs themselves.

Traditional cultural properties and sacred sties: Cultural properties have not been identified in the majority of IRAs. However, cultural surveys would be required prior to any lease activity and areas identified would be protected by Section 106 of the National Historic Preservation Act. There would also be no indirect effects to cultural properties within IRAs.

Other locally identified unique characteristics: All the unique characteristics that may be present within IRAs on the Dixie National Forest were not identified in this Specialist Report. Any unique characteristics that may be present within IRAs on the Dixie National Forest are likely considered under the specific resource for which it is unique and therefore considered elsewhere in the document. Impacts may be direct or indirect and intensity would vary depending upon the specific characteristics and both the level and location of oil and gas activity. In general, seismic exploration would have the least amount of impacts, followed by exploratory wells and production wells. Impacts could, therefore, range from negligible to major and may be short term or long term.

Wilderness Attributes

Natural Integrity: Seismic exploration would have little effect on long-term ecological processes. Well pads and access roads can disrupt ecological processes by increasing soil erosion and sediment delivery to aquatic ecosystems, removing vegetation, and removing or altering wildlife habitat. These impacts are discussed in further detail in Specialist Reports 4.0 (fish and wildlife), 5.0 (threatened, endangered, and candidate species), 6.0 (sensitive and management indicator species), 7.0 (water resources), 8.0 (watershed resources), 9.0 (soils), and 10.0 (Vegetation). Without knowing the location of any future disturbance relevant to specific resources it is difficult to

predict the magnitude of the impacts on long-term ecological processes. However, the protection measures included in SLT, BMPs, and other environmental laws are designed to prevent major impacts to long-term ecological processes and adverse impacts would likely range from minor to moderate. Impacts could be both long and short term. The relative intensity of impacts to any one IRA would also depend upon the size of the IRA affected. There would be no indirect impacts to natural integrity.

Apparent Naturalness: Impacts from this disturbance would include the appearance of roads, well pads, and power lines. These impacts would be minor to moderate for large IRAs and moderate to major for smaller IRAs. Effects would be short term for seismic exploration and exploratory wells and long term for a production field. There would be no indirect impacts to apparent naturalness.

Solitude and Primitive Recreation: Seismic exploration would disturb the solitude of IRAs and opportunities for primitive recreation, due primarily to noise from helicopters, buggies, and explosions. These impacts would be minor and temporary, with the duration limited to the length of the exploration. Exploratory wells and access roads would eliminate opportunities for solitude near the activity due to vehicular traffic, noise, and visual disruption of the landscape. The presence of these facilities would also reduce the primitive recreation experience. These impacts would be adverse and minor for most IRAs due to their large size relative to the area disturbed and the ability for the visitor to avoid these facilities; however, impacts would be more intense in the smaller IRAs. Impacts would be short term for exploratory wells and long term for a production field. Indirect impacts to solitude would be the same as described for Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive recreation.

Challenging Experience: The opportunity for a challenging experience would primarily be impacted by the presence of roads. Roads would increase the ability of the public to access areas that otherwise would be accessible only through a challenging experience. This impact would be adverse and range from minor to moderate for most IRAs due to their large size relative to the roaded area. However, as with other resources, the impacts would be more intense for the smaller IRAs. Impacts would be both short term for exploration activities and long term for production facilities. There would be no indirect impacts to a challenging experience.

Special Features/Special Places/Special Values: As described for locally identified unique characteristics, the special features/places/values in the 38 individual IRAs are not described in this Specialist Report. Any unique characteristics that may be present within IRAs on the Dixie National Forest are likely considered under the specific resource for which it is unique and therefore considered elsewhere in the document. Adverse impacts may be direct or indirect with the intensity ranging from negligible to major depending upon the resource and interaction with the oil and gas activities. In general, seismic exploration would have the least amount of impacts, followed by exploratory wells and productions wells. Duration may be short term for exploration activities and long term for production facilities.

Wilderness Manageability and Boundaries: Seismic exploration would have no effect on the ability of an IRA to be managed as wilderness. Disturbance associated with well pads and access roads could change the shape of an IRA's boundary or could dissect an IRA into fragments that would be too small to be managed as wilderness (<5000 acres). For example, an access road that bisects an IRA could fragment it into two sections that, by themselves, would be too small to be managed as wilderness areas. Alternatively, an access road could be built near the boundary of an IRA and although this may reduce the size of the IRA, it would not reduce it sufficiently to affect its wilderness potential. As a result, the intensity of effects would be dependent on the road placement and the amount of disturbance and could range from negligible to major. The effects would be most

pronounced in some of the smaller IRAs. Impacts from exploratory wells and access roads would be short term and once disturbance is reclaimed the boundary would return to prior conditions. A production field would substantially alter boundaries in the long term. There would be no indirect effects to wilderness manageability and boundaries.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE IN IRAS – New roads would be constructed to a width of 39 feet and existing National Forest System roads would need to be widened to 39 feet to accommodate traffic. There would be approximately 3.3 miles of new roads that could occur within IRAs on the Pine Valley Ranger District, 9.9 miles on the Cedar City Ranger District, and 13.2 miles on the Powell and Escalante Ranger Districts. In addition, approximately 19.6 miles of existing National Forest System roads on the Pine Valley Ranger District, 58.8 miles on Cedar City, and 78.4 on Powell and Escalante would need to be widened. A production field would require an additional 10 miles of permanent roads.

Table 2.5-3 lists the amount of projected road disturbance that could occur in an IRA. For this analysis, it is assumed that the activity projected for any Ranger District could occur entirely within an individual IRA located on that Ranger District. The total amount of disturbance that could occur in an individual IRA would be 396.9 acres for IRAs on the Pine Valley Ranger District, 622.9 acres for IRAs on the Cedar City Ranger District, and 705.9 acres for IRAs on the Powell and Escalante Ranger Districts. These estimates represent 7, 12, and 14 percent, respectively, of a 5,000-acre IRA.

ELIGIBLE WILD AND SCENIC RIVERS

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES – Death Hollow Creek, Mamie Creek, and Pine Creek are located within the Box-Death Hollow Wilderness Area and there would be no direct impacts to these streams from oil and gas activities. Under SLT, seismic surveys, roads, exploratory wells, and production wells and associate facilities could occur within ¼-mile of Moody Wash, North Fork of the Virgin River, and the East Fork of Boulder Creek. These activities would involve some degree of surface disturbance that could include vegetation removal, soil compaction, earthwork, and natural drainage pattern alteration, resulting in increased erosion. Some of the eroded material has the potential to enter streams, which would negatively impact native fish habitat and ecological conditions in Moody Wash and the East Fork of Boulder Creek. Having roads and wells near the stream corridor also increases the risk for contamination from spills of hydrocarbons, water produced by the drilling process, fuel, or chemical spills. Potential erosion and the effects of sediment on streams and fish habitat are discussed further in Specialist Reports 4.0 (fish and wildlife), 7.0 (water resources), and 8.0 (watershed resources). Roads and well pads would also adversely affect the scenic and recreational values identified for the North Fork Virgin River and East Fork of Boulder Creek. The appearance of these features would interfere with the natural look of these streams and would decrease the desire to recreate in these areas.

SLT allows the Forest Service to require a lessee to move operations by up to 200 meters (656 feet) for resource management reasons. This would reduce the potential for impacts to the streams themselves and to the ecological values of Moody Wash, as well as the fishery values of Moody Wash and East Fork of Boulder Creek. Movement by up to 200 meters (656 feet) would not, however, eliminate impacts to the scenic and recreational values of the North Fork of the Virgin River and the East Fork of Boulder Creek. Furthermore, any road construction within ¼-mile of these streams would make them ineligible for inclusion in the National Wild and Scenic River

System as Wild, which would be a major, adverse impact. As a result, adverse impacts would range from minor to major if roads are built within ¼-mile of these streams. The impacts would be short term for disturbance from seismic exploration and exploratory wells and long term for a production field.

Concerning indirect effects, oil and gas activity on land beyond the ¼-mile buffer on either side of eligible streams would not make the streams ineligible for inclusion as wild (in the case of Moody Wash and East Fork of Boulder Creek). However, it could degrade the scenic and recreational values of the North Fork of the Virgin River and East Fork of Boulder Creek. These impacts would be negligible for seismic activity and mostly minor and temporary for exploratory wells and roads. However, the significant development associated with a production field could lead to moderate to major impacts.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE OF ELIGIBLE STREAM SEGMENTS – No road reconstruction would occur due to the lack of existing roads in the stream corridor. A total of up to 3.3 miles of new, temporary roads would be required for exploratory wells on the Pine Valley Ranger District, 9.9 miles on the Cedar City Ranger District, and 13.2 miles on the Escalante Ranger District. However, it is unlikely that more than one exploratory well would occur within ¼-mile of an individual stream and actual road construction would likely be much less. This is particularly true for the North Fork Virgin River, which only has 0.7 miles eligible for inclusion in the National Wild and Scenic River System. A production field would require up to 10 miles of permanent roads; however, it is unlikely that a production field would occur within ¼-mile of an eligible stream.

Total disturbance associated with oil and gas activity could be up to 396.9 acres on Pine Valley Ranger District, 622.9 acres on Cedar City Ranger District, and 705.9 acres on the Escalante Ranger District. It is highly unlikely that this disturbance would incur entirely within ¼-mile of an eligible river, and in the case of the North Fork of the Virgin River it would be impossible given that the total buffered area only comprises 279 acres. Therefore, for the purpose of this analysis, total disturbance for the North Fork of the Virgin River is estimated to be the total acres available (279 acres), although it is highly unlikely this would occur.

2.5.4.3 Impacts by Alternative

The degree to which the impacts of connected actions (Sections 2.5.4.1 and 2.5.4.2) would differ by alternative is discussed in this section. Alternatives involve leasing options, which would restrict the locations and the nature of oil and gas impacts that are allowed.

Table 2.5-4 shows the acres and percentage of each resource component under each leasing option by alternative. It is important to note that the past history of the 2001 Roadless Area Conservation Rule has been full of changes in applicability due to judicial actions. Due to the uncertainty in the future status of the rule, this Specialist Report intends to evaluate the effects to IRAs under a broad range of protective stipulations ranging from NSO to SLT. This occurs for Alternatives C through E in which the impact evaluation is conducted under the NSO stipulation, consistent with the 2001 Roadless Area Conservation Rule and another stipulation that would allow new disturbances for oil and gas exploration and development. In Alternative C, both end members of the stipulation range are assumed to be NSO and so this is evaluated only as NSO. There are two columns under Alternatives D, and E. The first column under these alternatives represents the acres available with NSO in all IRAs. The second column represents the acres with leasing allowed in IRAs under a less restrictive lease option. In Alternative D this leasing would occur with a CSU stipulation. Under Alternative E, it would be under a SLT condition.

Table 2.5-4 Acreage of Resource Components under each Leasing Stipulation by Alternative

Resource Component	Stipulation	[1]Alternative						
		A	B	C	D		E	
Inventoried Roadless Areas	NA	2,142.2	2,142.2	2,142.2	2,142.2	2,142.2	2,142.2	2,142.2
	NL	568,407.5	568,407.5	16,449.1	7.21	7.21		
	NSO			551,958.4	568,402.5	42,237.9	568,409.7	
	TL					303,688.3		
	CSU					222,476.4		
	SLT							568,409.7
Eligible Wild and Scenic Rivers	NA	5,732.4	5,732.4	5,732.4	5,732.4	5,732.4	5,732.4	5,732.4
	NL	2,548.4	2,548.4					
	NSO			2,472.5	2,086.2	6.9	2,086.2	
	TL				297.3	1,104.0		
	CSU			75.8	162.9	1,437.5		
	SLT						460.2	2,708.9

[1]There are some small discrepancies in the total acreage given for each resource component for each alternative. This is due to the fact that limitations with the GIS database applied over an extremely large area result in an inability to accurately calculate acreages that match exactly between alternatives.

A more detailed table that separates the acreage by resource component and Ranger District will be available in Appendix B of the EIS. In this section, impacts are discussed at the Forest-wide level and not by Ranger District. This is done to avoid repetition and facilitate the comparison of impacts across alternatives. However, any pronounced differences in the impacts to a resource component between Ranger Districts will be highlighted and discussed.

ALTERNATIVE A

No new oil and gas leases would be authorized under Alternative A and there would be no direct or indirect impacts to IRAs or eligible Wild and Scenic Rivers as a result of oil and gas leasing activity. Unrelated actions could occur or continue to occur; however, they would not be considered connected actions related to oil and gas leasing and are not discussed in this section.

ALTERNATIVE B

Alternative B would apply a NL stipulation to 100 percent of IRAs and eligible Wild and Scenic Rivers and there would be no direct impacts to IRAs or eligible Wild and Scenic Rivers. In addition, approximately 2,142 acres of IRAs (less than 1 percent) and 69 percent (5,732 acres) of eligible Wild and Scenic Rivers (Death Hollow Creek, Mamie Creek, and Pine Creek) are within areas that are not available for leasing. Indirect impacts to both IRAs and eligible Wild and Scenic Rivers would be the same as described for SLT.

ALTERNATIVE C

Under Alternative C, NSO would apply to all IRAs not within areas unavailable to leasing (2,142 acres, less than 1 percent) and disturbance would be limited to possible activities that are not prohibited by the 2001 Roadless Area Conservation Rule such as seismic exploration not requiring road building or timber cutting. Exploratory drilling and oil and gas production activities would practically be eliminated by the prohibition on road construction or timber cutting. Impacts from seismic exploration would result in short-term adverse effects that would range from negligible to moderate, as described for seismic exploration under NSO (Section 2.5.4.1).

Approximately 69 percent (5,732 acres) of eligible Wild and Scenic Rivers (Death Hollow Creek, Mamie Creek, and Pine Creek) are within wilderness and not available for leasing. In addition, approximately 97 percent (2,473 acres) of the eligible Wild and Scenic Rivers located outside

wilderness would be under NSO. The remaining 3 percent (76 acres) has a CSU stipulation applied. The 76 acres are located around Moody Wash on the Pine Valley Ranger District. Impacts are discussed in the measurement indicators below.

Indirect impacts to both IRAs and eligible Wild and Scenic Rivers would be the same as described in Section 2.5.4.2.

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES – The impacts of seismic exploration are described for this measurement indicator under NSO. On Moody Wash, well pads and associated facilities (excluding pipelines and power lines) could be located on 76 acres of the area within ¼-mile of either streambank if they do not jeopardize the eligibility of the stream for inclusion in the National Wild and Scenic River System. Given the small area available (5 percent of the area within ¼-mile of either streambank) and the CSU stipulation that prohibits constructing these facilities in a way that would jeopardize eligibility, only minor adverse impacts would be expected. Impacts could be short and long term. Overall, given the level of protection (NSO for 97 percent and CSU for 3 percent), adverse impacts to eligible Wild and Scenic Rivers would be negligible to minor, and would not be expected to jeopardize their eligibility for inclusion in the National Wild and Scenic River System.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE OF ELIGIBLE STREAM SEGMENTS – No road construction or reconstruction would occur. Disturbance from seismic activity could be up to 60 acres on Moody Wash (Pine Valley Ranger District) and 120 acres North Fork of the Virgin River and East Fork Boulder Creek. Other facilities such as well pads could disturb 75.9 acres on Moody Wash

ALTERNATIVE D WITH NSO IN IRAS

Under Alternative D with NSO in IRAs, the vast majority of IRAs would be under NSO (over 99 percent) with approximately 2,142 acres (less than 1 percent) within areas not available for leasing (NA), and 7 acres (less than 1 percent) under NL. Given that most of the available acres are under NSO, the impacts to IRAs would generally be the same as described for Alternative C.

For eligible Wild and Scenic Rivers, there would be approximately 69 percent (5,732 acres) that would be within wilderness and not available for leasing. Of the areas outside wilderness (Moody Wash, North Fork of the Virgin River, and the East Fork of Boulder Creek) approximately 82 percent (2,086 acres) would be under NSO and 18 percent (460 acres) would be under CSU. Of the 460 acres under CSU, 297 acres would also have an overlapping TL stipulation.

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES – The majority of the eligible Wild and Scenic Rivers located outside wilderness would be under NSO (82 percent) with impacts limited to seismic exploration as described under NSO. The TL stipulation would not provide further protection to eligible Wild and Scenic Rivers than is already provided by the CSU stipulation. The areas of CSU would apply to approximately 24 acres around the East Fork of Boulder Creek, approximately 273 acres on the North Fork of the Virgin River, and 163 acres around Moody Wash.

The impacts of seismic exploration on eligibility and outstandingly remarkable values are described under NSO (Section 2.5.4.1). The impacts under CSU are also described in Section 2.5.4.1. Under CSU, the outstandingly remarkable values would not be degraded and the tentative classification of the eligible segments would not be affected. Under this alternative, only a small portion of the East

Fork of Boulder Creek (24 acres), the North Fork of the Virgin River (273 acres), and Moody Wash would be under CSU. The impacts under CSU would be adverse and minor as described for Moody Wash under Alternative C. As a result, the overall impacts to eligible Wild and Scenic Rivers would be negligible to minor, and would not be expected to jeopardize their eligibility for inclusion in the National Wild and Scenic River System.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE OF ELIGIBLE STREAM SEGMENTS – Up to 60 acres could be disturbed by seismic exploration on Moody Wash (Pine Valley Ranger District) and 120 acres North Fork of the Virgin River and East Fork Boulder Creek (Cedar City and Escalante Ranger Districts, respectively). This disturbance estimate represents the maximum amount that may occur if all the seismic exploration predicted to occur by the RFDS were to occur within the ¼-mile buffer around eligible streams. Also, up to 24 acres on the East Fork of Boulder Creek, 273 acres on the North Fork of the Virgin River, and up to 163 acres on Moody Wash could be disturbed by facilities such as well pads (under CSU).

ALTERNATIVE D WITH CSU IN IRAS

Under this Alternative, less than 1 percent (2,149 acres) of IRAs would be within areas not available to leasing or would have a NL stipulation applied (7 acres). Approximately 7 percent (42,238 acres) would be under NSO and 92 percent (526,164 acres) would be under NSO. Of the 526,164 acres under CUS, 303,688 acres would also be overlapped by various TL stipulations, and 39 percent (222,476) under CSU. Only seismic exploration would occur on the 7 percent of IRAs under NSO. The TL stipulations would not provide further protection to IRAs than is already provided by the CSU stipulation. The majority of IRAs would be available under CSU. The impacts under CSU are described in Section 2.5.4.1 and would include seismic exploration, exploratory wells, and the clearing of vegetation. Impacts as a result of these activities would range from negligible to moderate.

NSO would apply to less than 1 percent (7 acres) of eligible Wild and Scenic Rivers, CSU to 31 percent (2,542 acres), and the remaining 69 percent (5,732 acres) are within wilderness and not available for leasing. Various TL stipulations would overlap 1,104 acres, but would not provide further protection to eligible Wild and Scenic Rivers than is already provided by the CSU stipulation., The impacts of oil and gas activity to eligible Wild and Scenic Rivers under CSU are discussed in Section 2.5.4.1 and would be negligible to minor and short to long term.

ALTERNATIVE E WITH NSO IN IRAS

The acres of IRAs available for leasing under NSO would be the same as for Alternative C. Impacts would also be the same.

Approximately 69% (5,732 acres) of eligible Wild and Scenic Rivers (Death Hollow Creek, Mamie Creek, and Pine Creek) are within wilderness and not available for leasing. Of areas not within wilderness, approximately 82 percent (2,086 acres) would be under NSO and the remaining 18 percent (460 acres) would be available under SLT. This would include 24 acres on the East Fork of Boulder Creek, 273 acres on the North Fork of the Virgin River, and 163 acres on Moody Wash. Impacts are described for the measurement indicators below.

Measurement Indicators

NARRATIVE DISCUSSION OF IMPACTS TO ELIGIBILITY AND "OUTSTANDINGLY REMARKABLE" VALUES – The majority of the eligible Wild and Scenic Rivers located outside wilderness would be under NSO (82 percent) with impacts limited to seismic exploration as described under NSO. The impacts that could occur under SLT are described in Section 2.5.4.2

and include the degradation of outstandingly remarkable values and the possible loss of eligibility for inclusion in the National Wild and Scenic River System due to the construction of roads. Under this Alternative, only a small portion of each stream would be subject to these impacts and a large impact to the outstandingly remarkable values is unlikely. However, the construction of roads and other facilities could make all, or portions, of these streams ineligible for inclusion as "wild" or "scenic". As a result, the adverse impacts under this Alternative would be moderate to major depending upon the location of the facilities and the amount of each stream that could lose eligibility. Impacts may be either long or short term depending upon whether the disturbance was from an exploratory well or a production field.

MILES OF ROADS (RECONSTRUCTION AND NEW CONSTRUCTION) AND ACRES OF DISTURBANCE WITHIN ¼-MILE OF ELIGIBLE STREAM SEGMENTS –Disturbance from seismic activity could be up to 60 acres on Moody Wash (Pine Valley Ranger District) and 120 acres North Fork of the Virgin River and East Fork Boulder Creek. Also, up to 24 acres on the East Fork of Boulder Creek, 273 acres on the North Fork of the Virgin River, and 163 acres on Moody Wash could be disturbed by any of the activities predicted to occur by the RFDS, including roads power lines, and pipelines.

ALTERNATIVE E WITH SLT IN IRAS

All acres of IRAs would be available under SLT and impacts would be as described for SLT in Section 2.5.4.2.

Approximately 69 percent (5,732 acres) of eligible Wild and Scenic Rivers (Death Hollow Creek, Mamie Creek, and Pine Creek) would remain unavailable for leasing due to their inclusion in wilderness. The remainder of the streams would be available under SLT and would be impacted as described for SLT in Section 2.5.4.2.

2.5.5 Cumulative Effects

Cumulative effects are the total effect, including direct and indirect effects, on a given resource resulting from the incremental impact of past, present, and reasonably foreseeable future actions. They can result from individually minor, but collectively significant actions taken over a period of time. Cumulative effects may arise from single or multiple actions and the effects may be additive or interactive. The net adverse effect of interactive actions may be less than the sum of the individual effects (countervailing) or the actions may interact to create a net adverse cumulative effect that is greater than the sum of the individual effects (synergistic). The magnitude and extent of the effect on a resource depends on whether the cumulative effects exceed the ability of a resource to function at a desired level (CEQ 1997).

2.5.5.1 Description of Cumulative Effects Area

The Cumulative Effects Area (CEA) for IRAs and eligible Wild and Scenic Rivers is the Dixie National Forest boundary plus the outermost boundary of the Boulder Mtn/Boulder Top/Deer Lake and the Long Neck Mesa/Steep Creek/Oak Creek-Steep Creek/Oak Creek IRAs on the Dixie portion of the Fremont River Ranger District administered by the Fishlake National Forest (Figure 2.5-1). The outermost boundary incorporates all existing roads and other areas that were cherry stemmed out or excluded from either IRA. The CEA is approximately 1,850,392 acres (Table 2.5-5).

RATIONALE

IRAs are designated on National Forest System land only and would generally only be affected by actions occurring within the Dixie National Forest. However, the Boulder Mtn/Boulder Top/Deer

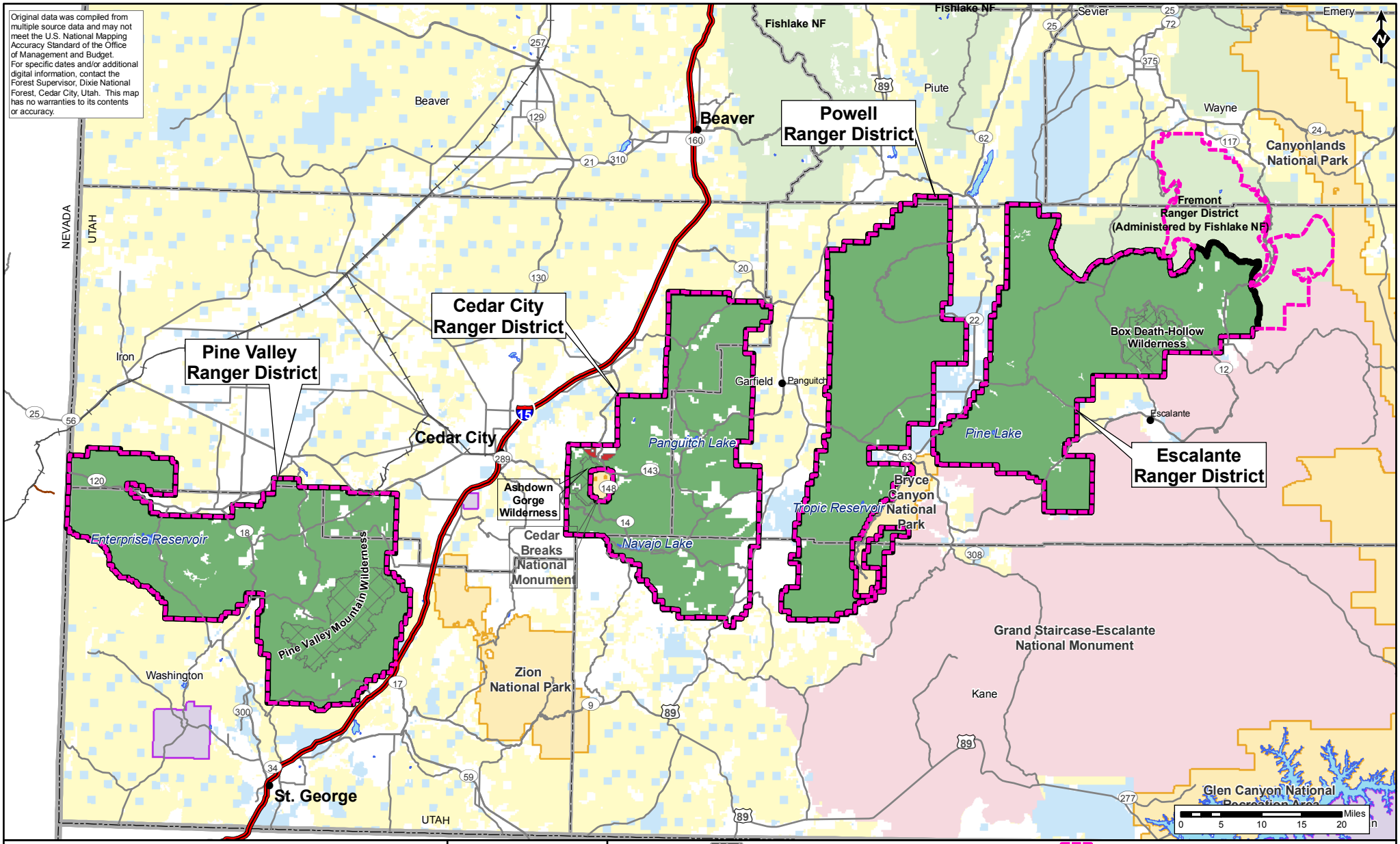
Lake and the Long Neck Mesa/Steep Creek/Oak Creek-Steep Creek/Oak Creek IRAs overlap the Forest boundaries, with large portions of both IRAs occurring on both Forests. The portions of these IRAs on the Dixie portion of the Fremont River Ranger District are included in the CEA as actions on the Dixie portion of the Fremont River Ranger District could affect the ability of these areas to be managed as IRAs. Smaller areas that are not part of the IRAs, but are within the overall boundary were included both for simplicity as well as to incorporate any changes in these areas that could affect the ability of these areas to be managed as IRAs. In addition, some roadless characteristics such as the diversity of plant and animal communities and opportunities for solitude and primitive recreation could be affected by activities on land adjacent to the Dixie National Forest. However, these impacts would be discussed in the cumulative effects sections of other Specialist Reports, such as 4.0 (Fish and Wildlife) and 1.0 (Visual). In addition, all segments of streams eligible for inclusion in the National Wild and Scenic River System, including all upstream areas, are located entirely within the Dixie National Forest boundary and would not be affected by outside activities.

Table 2.5-5 Land Ownership Within the Watershed Cumulative Effects Area

Land Ownership	Area (acres)	Percent of Total CEA
Bureau of Land Management (BLM)	398	<1
National Park Service (NPS)	75	<1
Private	78,107	4
US Forest Service (USFS)	1,687,298	91
USFS Wilderness Areas	82,573	4
Water	1,942	<1
Total	**1,850,392**	**100**

2.5.5.2 Past, Present, and Reasonably Foreseeable Actions

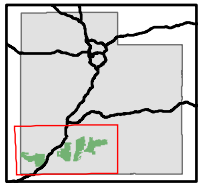
As shown in Table 2.5-5, approximately 95 percent of the CEA is land managed by the Dixie or Fishlake National Forests. Only four percent is private land and most of that is located near developed areas (such as Duck Creek). Within IRAs, there are only 341 acres of private land and all eligible Wild and Scenic Rivers, with the exception of Moody Wash, are located entirely on the Dixie National Forest. On Moody Wash, there is private land along approximately 0.2 miles of the river corridor. As a result, most of the discussion concerning past, present, and reasonably foreseeable actions will be focused on activities occurring on National Forest System land. The only discussion of private will be with regards to Moody Wash. Furthermore, the discussion will focus primarily on the following activities: timber harvest, road construction, and grazing. The discussion of timber harvest and road construction will apply to both IRAs and eligible Wild and Scenic Rivers as the ability of these areas to be managed as designated or proposed would be impacted primarily by these activities. In addition, of the three eligible Wild and Scenic Rivers located outside wilderness areas, two of them (Moody Wash and the East Fork of Boulder Creek) are located primarily within IRAs. The discussion of grazing applies primarily to eligible Wild and Scenic Rivers as this is the activity (outside of timber harvest and road construction) that is most likely to affect the outstandingly remarkable values of these areas. The majority of other resource uses are not likely to occur in these areas due to steep topography and limited access (USFS 2007 a, b, and c). In limiting the discussion to these activities, it is acknowledged that other types of activities may affect the broad array of roadless characteristics and wilderness attributes that help define IRAs. However, these activities will primarily be discussed in other Specialist Reports.



Oil and Gas Leasing EIS on Lands Administered by the Dixie National Forest

FIGURE 2.5-1
Cumulative Effects Area
Wild & Scenic Rivers and Inventoried Roadless Areas

28 February 2008	1:1,000,000	Horizontal Datum = NAD 83 Coordinate System = Zone 12N



- Cities
- Railroad
- Minor Roads*
- Freeways
- Water Bodies
- County Boundaries
- State Lines

National Forest System Lands
- Dixie National Forest
- Wilderness Areas
- Fishlake National Forest
- Brian Head Ski Resort

Other Land Administration
- Bureau of Land Management
- GSENM**
- National Park Service
- Private
- State of Utah
- Tribal
- Cumulative Effects Area***

*Not all roads are shown. Only some roads are depicted for orientation purposes.
**Grand Staircase-Escalante National Monument. Managed by the Bureau of Land Management.
***Includes Dixie National Forest boundary and Inventoried Roadless Areas that intersect Fishlake National Forest.

ROADS

As discussed in Section 2.1.1, IRAs were set aside due to the fact that they were unfragmented by roads. Also, Moody Wash and the East Fork of Boulder Creek are eligible to be classified as wild rivers due to the fact that they are accessed only by non-motorized trails. In contrast, the North Fork of the Virgin River is eligible to be classified as scenic due to its close proximity to roads. There are 3,078 miles of authorized Forest Service Roads on the Dixie National Forest (see Specialist Report 11.0, Transportation), including approximately 145 miles within IRAs. There are also approximately 1,379 miles of unauthorized roads that exist on the Forest, but are not part to the Forest road system or the designated trail system. According to Dixie National Forest GIS data, there are approximately seven miles of unauthorized roads present in IRAs. These include old timber sale roads, old mining roads, and user-created roads (i.e., illegal off highway vehicle (OHV) trails). In general, very few new roads are expected to be constructed in the future and the overall mileage of the entire system is expected to decrease with many projects designed to decommission unused roads (USFS 2006c). Furthermore, the Dixie Motorized Travel Planning Project should reduce the amount of cross-country travel by OHVs and reduce the amount of unauthorized routes. Future projects on the Dixie and Fishlake National Forest that would include road construction are listed in Table 2.5-6. There are currently not any projects known on the Dixie portion of the Fremont River Ranger District that would involve new road construction. The only project known to involve any road construction or reconstruction within IRAs is the Mt Dutton Vegetation management project on the Powell Ranger District. This project would not involve any new road construction, but would involve maintenance and reconstruction of existing roads. The project would include a 274-acre portion of the Deer Creek IRA. Approximately 40 acres of this same area was previously harvested in 1990 and there is evidence of stumps, slash, skid trails and landings, as well as three miles of Forest Road # 30358 (USFS 2006d). If the status of the 2001 Roadless Area Conservation Rule were changed due to judicial action, a small amount of road construction could occur in IRAs at a rate similar to what is described above for the rest of the Dixie and Fishlake National Forests.

Concerning eligible Wild and Scenic Rivers, Forest Service Road #30860 provides access to the lower two miles of Moody Wash (below the eligible segment). This road forks 0.5 miles up from the Dixie National Forest boundary and follows an existing utility corridor. Another Forest Service Road (#303354) ends approximately 0.25 miles from the upper end of the eligible segment. A non-system (i.e., unauthorized) non-motorized trail following the stream connects these two roads. No new road construction is planed for this area; however, road construction could occur on the private land located along the river. The private land is located about mid-way through the eligible section (USFS 2007a). On the North Fork of the Virgin River, a four-wheel-drive road provides access to private property below the Dixie National Forest Boundary. The only other road access is Forest Service Road #054, which ends 0.8 miles from the river corridor and is the starting point for the Cascade Falls Trail that provides access to a viewpoint at Cascade Falls. No other roads are planned on Forest Service land in the immediate vicinity; however, addition road construction could occur on private land below the Dixie National Forest Boundary.

TIMBER HARVESTING

Historical logging, even-aged management, and historical fire suppression have created relatively dense, mid-succession, mixed conifer forests with relatively large accumulations of woody debris and fuel (UDNR 2003). In recent years, the number of acres harvested per year has generally decreased relative to historic levels as the emphasis of timber harvests has shifted from promoting wood growth (for production) to ecosystem health. Harvests such as clearcuts are rare; more frequent are commercial thinning treatments, salvage cuts, sanitation cuts, and thinning for stand improvement and to reduce susceptibility to bark beetle outbreaks. The levels of recent timber

harvest have been variable and almost entirely in response to spruce beetle outbreaks. Timber harvests (mainly commercial thinning operations) were relatively high in 1998 (31,252 acres; 53 percent commercial thinning) and 1999 (20,280 acres; 94 percent commercial thinning). Annual harvest totals between 2000 and 2007 were only 2,657 acres on average and consisted mainly of sanitation cuts (61 percent), salvage cuts (19 percent), and improvement cuts (11 percent) in an attempt to create conditions favorable to tree regeneration and increased diversity in order to reduce the risk of severe outbreaks. The continued strategy of the Dixie National Forest's timber program is to reduce susceptibility to bark beetle attacks (USFS 2006c). Future timber harvest projects planned for the Dixie and Fishlake National Forests are shown in Table 2.5-6. No timber harvests are planned within the portion of the CEA on the Dixie portion of the Fremont River Ranger District. None of the timber projects listed would impact eligible Wild and Scenic Rivers and only one, the Mt. Dutton Vegetation Management Project described in the roads section would occur within an IRA. If the status of the 2001 Roadless Area Conservation Rule were changed due to judicial action, timber harvest could occur in IRAs at similar levels to the rest of the Dixie and Fishlake National Forest.

LIVESTOCK GRAZING

Much of the CEA experienced intense overgrazing in the late 1800s and early 1900s prior to active management. Although impacts continue to occur, grazing practices have improved considerably in recent years. Two of the eligible streams are within active grazing allotments. Moody Wash is located within two different allotments with a capacity of 1,089 head of cattle from 1 June to 30 September (USFS 2007a). The East Fork of Boulder Creek is located within one active grazing allotment with a capacity of 1,043 head of cattle from 16 June to 15 October (USFS 2007c). Degraded conditions from grazing are not noted for either of these streams in the Suitability Evaluation Reports (USFS 2007a, c). The North Fork of the Virgin River is within an inactive grazing allotment that was last grazed in 1994 by 16 head of cattle (USFS 2007b).

Table 2.5-6 Reasonably Foreseeable Future Actions in the Dixie National Forest

Project	Location	Description
Motorized Travel Planning	Forest-wide	Would designate identified routes open to motorized use. With designation of a motorized travel system, motorized cross-country travel would generally be prohibited.
Bumblebee Fuels Treatment	Pine Valley RD	
Upper Santa Clara River Vegetation and Fuels Project	Pine Valley RD	This project entails vegetation treatments on approximately 1,662 acres of a 1,817 acres project area. Approximately 714 acres were treated in 2007, 352 acres will be treated in 2008, and 596 acres will be treated in 2009. There would be approximately 3.3 miles of temporary road construction, with 1.2 miles becoming part of system roads used to access existing campgrounds after Project completion. No activities will occur in any IRAs or within the Pine Valley Wilderness Area.
Pine Valley Fuels Treatments	Pine Valley RD	Project involves the construction of fuel breaks around the communities of Pine Valley and Central. Approximately 516 acres were treated in 2003 and 2004. Future treatments include 217 acres in 2011.
Duck Creek Fuels Treatment	Cedar City RD	The Project would treat approximately 13,700 acres on the Cedar City RD to reduce fuels, enhance fire-tolerant vegetation, and provide fuel breaks. The purpose of the fuels treatments is to reduce the risk of a large-scale high intensity wildfire from spreading to or from NFS lands, which may threaten or burn into public and private property and facilities within the Duck Creek area. In order to reduce this risk, surface, ladder, and crown fuels will be treated.

Project	Location	Description
		Phase 1 of the Project treated 2,800 acres in 2007. Phase II will treat 600 acres in 2008 and Phase III 2,800 acres in 2008, 10,000+ acres in 2009, 5,000 acres 2010, and 1,500+ acres in 2011.
Edward Spring Vegetation Treatment	Cedar City RD	
Midway-Deer Valley Scenery Enhancement & Veg Treatment	Cedar City RD	The Project would remove dead vegetation and decadent aspen, including the salvage logging of dead spruce. The project would also include the construction of 3.8 miles of temporary roads and the prescribed burning of riparian meadows. Approximately 1,400 acres would be treated over the next three years: 600 acres in 2008, 400 acres in 2009, and 200 acres in 2010. The revenues generated from treatments will be used to accomplish ancillary activities associated with stewardship projects in recreation, vegetation, and wildlife habitat
Webster Flat Road Reconstruction & Easement	Cedar City RD	Would involve reconstruction of 4 miles of arterial gravel road, including road relocation, widening, improved drainage, additional surfacing, approximately 0.41 miles of new construction, and approximately 0.71 miles of road obliteration. An easement would be issued to Iron County. Road is located south of Highway 14.
King Creek Campground Non-Commercial Thinning	Powell RD	Thin heavily stocked ponderosa pine to improve health and vigor in order to make these stands less susceptible to bark beetle attacks.
Marshall Canyon Pinyon-Juniper Removal	Powell RD	The proposed action is to treat up to 900 acres within an existing chained area to improve wildlife habitat on the western portion of the Sevier Plateau (Mt. Dutton). The proposed action consists of the following actions; Remove pinyon pine and juniper mechanically on approximately 900 acres using a skid steer (bobcat) or other tractor type device, or through hand thinning with chainsaws.
Robinson/Meadow Timber Stand Improvement	Powell RD	Thinning for timber stand improvement.
Mt. Dutton Vegetation Management Project	Powell RD	The project would include timber harvest, prescribed burns, reforestation, road reconstruction, and road decommissioning on 5,490 acres in the upper drainages of Hoodle Creek, Willow Spring Creek, Forest Creek, Pine Creek, and North Fork Deep Creek. Timber harvest would occur on approximately 870 acres, including approximately 620 acres in 2009, 200 acres in 2010, and 50 acres in 2011. Approximately 145 acres would occur in the Deer Creek IRA.
Canaan Mountain Reroute	Escalante RD	The Canaan Mountain Loop Trail approximately 14.5 miles southwest of Escalante would be rerouted to move it off a waterline, reduce its slope, and provide for improved maintenance. Expected implementation is 6/2008
Clayton Salvage	Escalante RD	Timber salvage of 248 acres of dead and dying spruce on the Griffin Top Plateau.
Pockets Vegetation Management	Escalante RD	The Project covers an area of 8,564 acres and would include commercial timber harvest on 4,721 acres of conifers and 2,647 acres of aspen, including 82 acres along the Antimony Creek drainage. Smaller areas would receive additional treatments. In addition, 9 miles of new roads would be required, 7.0 miles of unauthorized roads would be designated NFS roads, and 13.4 miles of existing NFS roads would be improved. Expected implementation is 06/2008.
Toad Salvage	Escalante RD	Salvage of dead and dying ponderosa pine. Expected implementation is 09/2008.
Bug Lake Salvage Project	Escalante RD	

2.5.5.3 Cumulative Effects by Alternative

ALTERNATIVE A

Under Alternative A, no new oil and gas activity would occur and there would be no cumulative effects.

ALTERNATIVE B

Under Alternative B, a NL option would be applied to IRAs and eligible Wild and Scenic Rivers. As a result, oil and gas activity would have no direct effect on these resources. Indirect effects could occur as a result of oil and gas activity on adjacent land. However, these effects would negligible to minor and when combined with the past, present, and reasonable foreseeable actions in the CEA would not be of a sufficient magnitude to result in cumulative effects.

ALTERNATIVE C

Under Alternative C, direct effects to IRAs would be limited to seismic exploration by the application of an NSO stipulation to this resource. It is not expected that seismic exploration would produce disturbance of a magnitude sufficient to result in cumulative effects. For IRAs, the only portion of the CEA that is expected to be affected by other past, present, or reasonably foreseeable future actions is a small portion of the Deer Creek IRA on the Powell Ranger District. This area has been previously disturbed by a prior timber sale and may be disturbed by another (Mt Dutton Vegetation Treatment Project, see Table 2.5-6). If seismic exploration were to occur in the same area of the Deer Creek IRA, the disturbance would likely be undetectable relevant to the disturbance that has occurred and will occur in the future from timber harvest. As a result, there would be no cumulative effects to IRAs under this Alternative.

Under this Alternative, approximately 75.8 acres of Moody Wash would be under a CSU stipulation and could be disturbed by the construction of well pads and other facilities other than access roads, pipelines, and power lines. Under CSU, these facilities are to be constructed in a manner that would not jeopardize the eligibility of this stream for inclusion in the National Wild and Scenic River System. As a result, it is not likely that any other activities on Moody Wash, which would be limited to the small section (0.2) miles of private land, would interact with the 75.8 acres of disturbance possible under this Alternative to create a cumulative effect beyond what has already been described.

ALTERNATIVE D WITH NSO IN IRAS

Under Alternative D with NSO in IRAs, oil and gas activity in IRAs would be limited to seismic exploration by the NSO stipulation and there would be no cumulative effects as described for Alternative C.

For eligible Wild and Scenic Rivers, up to 24 acres on the East Fork of Boulder Creek and 273 acres on the North Fork of the Virgin River could be disturbed by any of the activities predicted to occur by the RFDS, including roads, power lines, and pipelines. Up to 163 acres on Moody Wash could be disturbed by facilities such as well pads (limited by CSU). There would be no cumulative effect on Moody Wash as described for Alternative C. When combined with existing and future livestock grazing, the small amount of disturbance possible on the East Fork of Boulder Creek is not likely to be of a sufficient magnitude to cause cumulative effects. However, for the North Fork of the Virgin River, its current eligibility status as scenic is a result of existing development in close proximity to the river. If this were combined with oil and gas activity of any type, it is possible that the stream would no longer be eligible as scenic or may lose eligibility all together. This would be a major and long-term cumulative impact, as it would not likely be considered again in the near future.

ALTERNATIVE D WITH CSU IN IRAS

Under this Alternative, the majority of IRAs would be available under CSU and oil and gas activity within IRAs could include pipelines, power lines, well pads, etc. However, the construction or reconstruction or roads would be prohibited and the development of a production field would be precluded by the inability to construct roads. This alternative assumes that timber harvest and road construction could occur at rates similar to the rest of the National Forest System land within the CEA (due to changes in the 2001 Roadless Area Conservation Rule). Under this scenario, any areas of timber harvest would represent a direct loss of roadless acres for the life of the development. If oil and gas activity were to occur on the same IRA as other road construction or timber harvest, the direct loss of roadless acres would be larger than with either activity alone. This could result in increased fragmentation of these areas with subsequent impacts to the resources described in the roadless characteristics and wilderness attributes (see Section 2.4.1). As the amount of an IRA that may potentially be impacted by well pads is small and would not bisect an IRA into smaller segments, the cumulative impacts would be minor. The effects would be short term as the only likely development would be exploratory wells.,

For eligible Wild and Scenic Rivers, the CSU leasing option applied under this alternative would prevent degradation of the outstandingly remarkable values and would not affect free flow or the tentative classification of eligible segments. As described for Alternative D with NSO in IRAs, disturbance under CSU is not expected to be of a magnitude sufficient to result in cumulative effects. However, major and long-term cumulative impacts may result to the North Fork of the Virgin River.

ALTERNATIVE E WITH NSO IN IRAS

NSO would limit oil and gas activity in IRAs to seismic exploration and there would be no cumulative effects as described for Alternative C.

For eligible Wild and Scenic Rivers, up to 24 acres on the East Fork of Boulder Creek, 273 acres on the North Fork of the Virgin River, and 163 acres on Moody Wash could be disturbed by any of the activities predicted to occur by the RFDS, including roads, power lines, and pipelines. The impacts could include the degradation of outstandingly remarkable values and the possible loss of eligibility for inclusion in the National Wild and Scenic River System due to the construction of roads. On Moody Wash and the East Fork of Boulder Creek, degradation of the riparian area and introduction of sediment by oil and gas development could be exacerbated by livestock grazing. An increase in sediment could negatively affect fish and ecological values on these creeks. However, due to the Best Management Practices (BMPs) included in Appendix C and BLM and USFS (2007), and the fact that grazing in these areas is not currently noted to be causing adverse effects, cumulative effect to these values would be minor. They could, however, be short or long term. More adverse cumulative effects would occur if oil and gas activity, combined with other activities, resulted in a loss of eligibility for inclusion in the National Wild and Scenic River System. This would be most likely to occur on the North Fork of the Virgin River as already described in Alternative D with NSO in IRAs. It could also occur on Moody Wash if development such as roads were to occur on the existing private land. Were this to occur on either of these streams, it would be a major, long-term impact, as it is unlikely these streams would be considered for inclusion again in the near future.

ALTERNATIVE E WITH SLT IN IRAS

Under this alternative, the majority of IRAs would be available under SLT and oil and gas activity within IRAs could include all activities predicted by the RFDS. This includes roads, pipelines, power lines, well pads, etc. Further, this alternative assumes that timber harvest and road construction could occur at rates similar to the rest of the National Forest System land within the CEA. Under this scenario, any road construction or timber harvest would represent a direct loss of roadless

acres for the life of the development. If oil and gas activity were to occur on the same IRA as other road construction or timber harvest, the direct loss of roadless acres would be larger than with either activity alone. This could result in increased fragmentation of these areas with subsequent impacts to the resources described in the roadless characteristics and wilderness attributes (see Section 2.4.1). Also, in some cases, particularly with the smaller IRAs, the fragmentation and loss of roadless acres may be enough that the area could no longer be managed as an IRA, wilderness, or simply as a large area of contiguous habitat. These impacts would be minor to moderate if they were to affect only a small portion of a larger IRA; however, the impacts would range as high as major if a large proportion of IRAs and the unfragmented areas they cover were fragmented by roads and other development. The effects would be short term for exploratory wells and roads and long term for a production field with its associated roads.

For eligible Wild and Scenic Rivers, all of the streams located outside wilderness areas (Moody Wash, the North Fork of the Virgin River, and the East Fork of Boulder Creek) would be available for lease under SLT and the impacts would be the same as described for Alternative E with NSO in IRAs. However, under this alternative more acres on eligible Wild and Scenic Rivers would be available under SLT and the potential for the impacts described in Alternative E with NSO in IRAs to occur is increased.

A summary of the cumulative effects from the different alternatives is shown in Table 2.5-7.

2.5.6 Summary

Most direct impacts to IRAs would be avoided by applying NSO in accordance with the limits set by the 2001 Roadless Area Conservation Rule and most indirect impacts would be negligible to minor. When a less restrictive lease option than NSO is applied to IRAs, direct impacts can occur, which can result in the fragmentation of these areas and a loss of roadless acres. These impacts can be short or long term depending upon whether the disturbance is due to exploration or production activities. Half of all eligible Wild and Scenic Rivers are within the Box-Death Hollow Wilderness Area and would not be impacted by oil and gas activity. Those streams not within wilderness receive adequate protection to prevent most adverse impacts by the NSO stipulation applied to IRAs and other resources under most alternatives. When NSO is not applied to IRAs the impacts to these streams can be more severe.

2.6 Compliance with Other Laws and Regulations

Alternative A, B, C, and Alternative D and E with NSO applied under the dual analysis would be in compliance with the 2001 Roadless Area Conservation Rule. Alternative D and E without NSO applied to IRAs would allow road building and timber harvest in IRAs, assuming the Roadless Area Conservation Rule would not be in effect. Similarly, all alternative with the exception of Alternative E would be in compliance with the regulations outlined for the management of eligible Wild and Scenic Rivers in USFS (2006a).

2.7 Forest Plan Consistency Determination

The Land and Resource Management Plan was developed prior to the 2001 Roadless Area Conservation Rule and no specific management directions exists for IRAs. Similarly, there were no rivers or streams classified as Wild and Scenic during the preparation of the Land and Resource Management Plan and, as a result, management direction for eligible Wild and Scenic Rivers does not exist.

Table 2.5-7 Summary of Cumulative Effects

Past Actions	Present Actions	Future Actions	Alternative	Cumulative Effect
Roads There are some existing roads within IRAs; however, these roads do not jeopardize the status of these areas. Timber Harvest Timber harvest was widespread throughout much of the CEA in the past. Livestock Grazing Much of the CEA was heavily grazed in the past before management improved.	Roads Most projects within the CEA focus on improving the management of roads and include road closures and decommissioning. A small amount of new roads are planned, mostly associated with timber harvest and salvage. Timber Harvest Timber harvest in the CEA has been greatly reduced relative to past levels and current harvest is primarily in response to spruce beetle outbreaks. Some portions of the Deer Creek IRA still show signs of past timber harvest. Livestock Grazing Moody Wash and the East Fork of Boulder Creek are in active grazing allotments. No adverse impacts are noted in these areas.	Roads The amount of roads is not expected to increase. The Mt Dutton Vegetation Management Project would reconstruct roads in the Deer Creek IRA. If the 2001 Roadless Area Conservation Rule were not in affect, some road construction could occur in IRAs. Timber Harvest The Mt Dutton Vegetation Management Project would affect 247 acres of the Deer Creek IRA. If the 2001 Roadless Area Conservation Rule were not in affect, additional timber harvest could occur in IRAs. Livestock Grazing Grazing would be expected to continue at current levels	**Alternative A** No new leases would be authorized and there would no direct or indirect impacts.	There would be no cumulative effects of oil and gas activity due to the lack of direct and indirect effects.
			Alternative B NL and leasing options would prevent direct disturbance to IRAs and eligible Wild and Scenic Rivers.	There would be no cumulative effects of oil and gas activity due to the lack of direct affects and the minimal nature of indirect effects.
			Alternative C NSO would limit direct disturbance in IRAs and most eligible Wild and Scenic Rivers to seismic exploration. A CSU stipulation would allow some activity on Moody Wash but would prevent roads, power lines, and pipelines.	There would be no cumulative effects of oil and gas activity due to the minimal nature of both direct and indirect effects combined with the small amount of disturbance from past, present, and future actions.
			Alternative D with NSO in IRAs NSO would limit direct disturbance in IRAs and most eligible Wild and Scenic Rivers to seismic exploration. Some development could occur on eligible streams under a CSU stipulation.	There would be no cumulative effects to IRAs due to the minimal nature of direct disturbance. If oil and gas activity were to occur near the North Fork of the Virgin River, the existing level of disturbance when combined with oil and gas activity could affect the stream eligibility for inclusion in the National Wild and Scenic River System. This would be a major, long-term impact.
			Alternative D with CSU in IRAs Direct disturbance (not including roads or production fields) could occur to both IRAs and eligible Wild and Scenic Rivers located outside wilderness or other areas not available for leasing.	Minor short- -term impacts to IRAs could occur if timber harvest and well pads were to occur in IRAs. Cumulative effects to eligible Wild and Scenic Rivers would be the same as described for Alternative D1.
			Alternative E with NSO in IRAs NSO would limit direct disturbance in IRAs and most eligible Wild and Scenic Rivers to seismic exploration. Some development could occur on eligible streams under SLT. .	Cumulative effects for IRAs would be the same as described for Alternative C. Cumulative effects for eligible Wild and Scenic Rivers would major and long-term if oil and gas development affected stream eligibility for inclusion in the National Wild and Scenic River System.

			Alternative E with SLT in IRAs Direct disturbance could occur to both IRAs and eligible Wild and Scenic Rivers.	Cumulative effects for IRAs would be major if oil and gas development, combined with other road development, led to a loss of IRA status. Cumulative effect to eligible Wild and Scenic Rivers would be the same as described for Alternative E1.

2.8 Literature Cited

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Appendix 2A - Stipulation Forms

NO SURFACE OCCUPANCY STIPULATION
NSO[1]
Inventoried Roadless Areas (IRAs)
Alternative C

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description).

All Inventoried Roadless Areas as shown in Figure 2.4-1. This prohibition includes all surface disturbing activities including, but not limited to, drill pads, roads, powerlines, pipelines, and other facilities.

For the purpose of:
Preserving the roadless and wilderness characteristics of the Inventoried Roadless Areas.
.

A request for a waiver, exception, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104).
Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820).
R4-FS-2820-14 (8/92)

CONTROLLED SURFACE USE STIPULATION
Protection of Inventoried Roadless Areas
Alternatives C, D, and E

Surface occupancy or use is subject to the following special operating constraints.

No new temporary roads, permanent roads, road construction or reconstruction (as defined in 36 CFR 294.11) may occur within the lands described below. In addition no timber harvest may occur on the lands described below.

On the lands described below:

All Inventoried Roadless Areas on the Dixie National Forest as shown in Figure 2.4-1.

For the purpose of:

Compliance with the Roadless Area Conservation Rule of 2001. Compliance with the Order(s) of the District Court for the Northern District of California issued in *People of the State of California ex rel. Bill Lockyer, v. United States Department of Agriculture*, No. C05-03508 EDL consolidated with *The Wilderness Society v. United States Forest Service,* No. C05-04038 EDL (reinstating 36 CFR 294, Subpart B (2001) (Protection of Inventoried Roadless Areas) (hereinafter the "2001 Rule")).

To comply with any legal protections for Inventoried Roadless Areas as determined by the courts.

This stipulation may be changed in accordance with 43 CFR 3101.1-4 and any other applicable provisions. This stipulation will cease to apply in the event the District Court's Order reinstating the 2001 Rule is reversed, the 2001 Rule is set aside, or if the Forest Service determines that other events have caused the 2001 Rule to no longer be in effect or applicable to the lands within the leasehold.

CONTROLLED SURFACE USE STIPULATION
Protection of Inventoried Roadless Areas
Alternative D

Surface occupancy or use is subject to the following special operating constraints.

No new temporary or permanent roads, mechanical road construction or reconstruction (as defined in 36 CFR 294.11) may occur within the lands described below. Travel may occur along existing roads, which may be cleared of vegetation to allow passage of trucks. Timber harvest would also be allowed.

On the lands described below:

All Inventoried Roadless Areas on the Dixie National Forest as mapped and shown in Figure 2.4-1.

For the purpose of:

Protecting the undevleoped, unroaded charateristics and wilderness attributes of the areas classified as Inventoried Roadless Areas.

This stipulation may be changed in accordance with 43 CFR 3101.1-4 and any other applicable provisions. This stipulation will apply in the event the District Court's Order reinstating the 2001 Rule is reversed, the 2001 Rule is set aside, or if the Forest Service determines that other events have caused the 2001 Rule to no longer be in effect or applicable to the lands within the leasehold.

CONTROLLED SURFACE USE STIPULATION

Protection of Eligible Wild and Scenic Rivers
(Ref. FSM 2820)
Alternatives C and D

Surface occupancy or use is subject to the following special operating constraints (relative to potential Wild and Scenic Rivers classification).

Proposed operations must be located or designed to maintain and protect the free-flowing character and the outstandingly remarkable values of the identified river. No new temporary roads, permanent roads, road construction or reconstruction may occur to protect the elgibility of these streams to be classified as wild. In addition, no power transmission lines or pipelines (i.e., oil, gas, water) may be constructed in accordance with direction in FSH 1909.12 Chapter 80.

For all Forest Service identified study rivers, classification must be maintained as inventoried unless a suitability study (decision) is completed that recommends management at a less restrictive classification (such as from wild to scenic or scenic to recreational).

On the lands described below:

Lands within one quarter mile of either bank of the eligible stream segments of Moody Wash, the North Fork of the Virgin River, the East Fork of Boulder Creek, Mamie Creek, and Pine Creek. The location of these streams is shown in Figure 2.4-1.

For the purpose of:

Protection of streams to allow for future eligiblity for inclusion in the National Wild and Scenic River System as directed in FSH 1909.12 Chapter 80.

If any of the above rivers are determined not to be suitable through Utah Forest Service Statewide Wild and Scenic River suitability process, this stipulation would no longer apply.

A request for a waiver, exemption, or modification (WEM) to the above lease stipulation may be requested along with the submission of a Surface Use Plan of Operations (36 CFR 228.104). The objective and justification for the above stipulation, along with guidance on when a WEM would potentially be considered, are described in Section 1.8.5.9.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Appendix 2B - Dixie National Forest Oil and Gas Construction and Operating Standards and Well Site Design Requirements

Dixie National Forest Oil and Gas Construction and Operating Standards and Well Site Design Requirements

I. INTRODUCTION

The following operating standards and well site design requirements would be required by the Dixie National Forest for oil and gas facilities and operations to assure consistency with management objectives for the Forest. These operating standards should not be confused with stipulations contained in the applicable Federal oil and gas lease(s) which specify requirements regarding surface occupancy and timing within the specific areas in the lease. Operating standards must be consistent with the rights and restrictions established in the applicable lease(s) and are applicable to all drilling and production operations, unless otherwise approved by the responsible officer based on site-specific conditions.

These operating standards supplement the general requirements of the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (Gold Book) and Best Management Practices in place by the responsible agencies at the time of approval, and the Forest Service, Region 4 Oil and Gas Roading Guidelines. Copies will be made available to operators at first notification of proposed operations.

Authority to require such standards is provided by the Mineral Leasing Act of 1920, as amended, Federal Regulations at 36 CFR 228.106-108 (Submission, Review, and Requirements of Surface Use Plans of Operations) and 43 CFR 3162.3 (BLM procedures for approval of post-lease applications for operations).

II. PURPOSE

These operating standards have been developed to help operators meet agency and Forest requirement when planning operations and preparing their Surface Use Plan of Operations and to assure overall consistency with Forest Service management objectives/direction. They have been developed based on experience with oil and gas operations on National Forest System lands as needed to prevent or mitigate effects and conflicts with other uses.

III. PROCESS

Approvals of proposed operations on lease are subject to the application, review, and approval provisions specified in Onshore Oil and Gas Order No. 1, other Onshore Oil and Gas Orders, and all applicable laws and regulations. Surface disturbing proposals must be evaluated under the requirements of the National Environmental Policy Act of 1969 and the Energy Policy Act of 2005. Operators are encouraged to obtain these operating standards from the Forest Service early in the planning and approval process and to incorporate them into their Surface Use Plans of Operations to help streamline the NEPA analysis and approval process. If not incorporated into the initial SUPO, the Forest Service will work with the operator to revise the SUPO to include them or may otherwise require them as Conditions of Approval (COA).

Other standards or mitigations may be required based on site-specific evaluations of proposed activities. They may be modified if needed to address site-specific conditions. Operators are required to comply with all other applicable laws and regulations.

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IV. OPERATING STANDARDS

These standards apply to the lease holder, contractors, and their sub-contractors. The term "operator" as used herein, includes the lease holder and/or company authorized to conduct operations on the lease or their contractors, subcontractors, and all employees or agents thereof.

1. The operator shall submit for review and approval, a detailed construction and maintenance plan for all exploration and production facilities and roads to be constructed or improved (reconstructed) for operations. Unless otherwise approved by the responsible Forest Service officer, pad designs must be consistent with requirements contained in the Dixie National Forest Well Site Requirements (Attachment 1). A road-use permit (or specific approval as part of the Surface Use Plan of Operations) must be obtained from the Forest Service for commercial use, improvement, and maintenance of National Forest System roads under authority of the National Forest Roads and Trails Act. Road designs must be generally consistent with the Forest Service guidelines provided in the Oil and Gas Roading Guidelines, R-4.

2. The designs for roads, pads, and other facilities are subject to approval by the Forest Service. The designs must be approved and signed by a qualified licensed engineer. Any modifications to approved plans are subject to Forest Service review and approval.

3. Existing roads will be used to the extent possible as long as the existing alignment can be used or improved to the required standard. Additional roads or rerouting of existing road segments, if needed, shall be minimized and approved by the Forest Service prior to construction. Roads or road segments replaced and/or abandoned by construction of new roads or rerouting must be reclaimed by the operator. Road locations and designs must be generally consistent with the Forest Service guidelines provided in the Oil and Gas Roading Guidelines, R-4.

4. Locate and design roads and drainage structures to prevent slope failure and minimize impacts on water quality. To the maximum extent feasible, locate facilities, including service and refueling areas, on benches upslope from streams, lakes, ponds, riparian areas, and floodplains.

5. A pre-construction meeting including the responsible company representative(s), contractors, and the Forest Service must be conducted at the project work site prior to commencement of operations. Earthwork must be construction staked prior to this meeting. Approval of the designs and earthwork staking by responsible Forest Service official is required prior to beginning earthwork.

6. A Spill Prevention Control and Countermeasures (SPCC) Plan consistent with the current EPA Region VIII Oil and Hazardous Substances Regional Contingency Plan must be filed with the Forest Service and approved by the authorized officer prior to conducting any construction and operations on National Forest System lands. The plan must address the potential for spills to occur from haulage of materials and supplies to the construction/operations site(s) as well as drilling and production facilities. Material Safety Data Sheets (MSDS) for all potentially hazardous

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substances used for operations used for operations must be available on-site. Operators must be trained in MSDS protocols.

7. All surface disturbing activities, including reclamation, must be supervised by a qualified on-site responsible designated company representative(s) familiar with the approved plans as well as terms and conditions of approval. The designated representative(s) must be available for contact within the vicinity of the project area or by telephone at all times that operations are in progress. The name and contact telephone number of the designated company representative(s) must be filed with the responsible Forest Service official. A copy of all approved permits with specifications relative to operations in the project area must be available for inspection at the project site.

8. Topsoil must be salvaged from the area to be disturbed, stored, and protected from erosion and contamination until redistributed over recontoured areas for reclamation. The depth of topsoil to be salvaged must be determined though testing and approved by the Forest Service. Methods of topsoil handling and storage must be approved in project plans and specifications and/or appropriate project permits.

9. All vegetation removed by operations must be stored, used for reclamation, or disposed of as approved in project permits or as specified by the Forest Service. The operator must reimburse the Forest Service for the fair market value of all merchantable timber removed or damaged during operations. Prior to vegetation disturbance/removal all noxious weeds must be removed from the site and handled by approved methods needed to prevent spread of seeds.

10. Where determined appropriate by the responsible Forest Service officer, the operator may be required to bury pipelines and powerlines in or adjacent to roads to reduce surface disturbance and visibility. Designs must provide sufficient depth of cover and signs to indicate the type of pipeline(s), location, and depth to prevent damage from road maintenance and other surface disturbing activities in conformance with applicable Federal and State regulations.

11. Where feasible and appropriate, the operator will be required to centralize production facilities, use telemetry to monitor wells, and delay non-essential maintenance activities in important wildlife habitat during critical seasons of use to reduce the number of vehicle trips to the sites and activity that could disturb or stress wildlife.

12. Where needed to protect wildlife, the operator will be required to construct fences and/or nets on reserve pits or use other approved methods to prevent wildlife use or entrapment.

13. Stream crossings will be planned and constructed to minimize disturbance of the riparian and aquatic habitats by locating crossings at the most advantageous location and by crossing at or near the perpendicular. Structures must be designed to allow fish passage as needed to maintain habitat. Measures must be taken to minimize disruption of stream substrate. When no longer needed for operations, crossings must be removed and the stream and banks restored to pre-disturbance conditions/stream hydraulics. Sediment control measures must be used to minimize sediment introduction during all operations. Timing restrictions (construction and reclamation) may be needed to protect fisheries as coordinated with the Utah Division

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of Wildlife Resources and through permitting with the Utah Division of Water Rights, Stream Alteration Program.

14. Unless otherwise specified by the responsible Forest Service officer, new oil and gas access roads shall be closed to the public. Operators must construct and maintain gates to Forest Service design standards at intersections of project access roads with National Forest System roads or other highways to prevent unauthorized traffic from entering. A locking system will be required to allow a Forest Service lock in addition to the operator's lock.

15. Off-road vehicle travel is prohibited unless specifically approved in project permits.

16. Roads used for drilling and production operations which remain open to public traffic must be properly signed to warn the public of project traffic and associated hazards. Signs must be consistent with the Manual on Uniform Traffic Control Devises, Federal Highway Administration.

17. Vehicle operators must obey posted speed restrictions. If speed restrictions are not posted, the operator and contractors must observe safe speeds commensurate with weather and road conditions.

18. Watering and/or application of appropriate dust suppressants shall be used if dust becomes a concern for visibility and sediment transport. Suppressants and application procedures are subject to approval by the responsible Forest Service officer.

19. Unless otherwise approved by the responsible Forest Service officer, all production pads will be fenced to prevent entry by the public and livestock. Designs and specifications are subject to Forest Service approval.

20. Sediment control structures will be used to catch sediment at the base of fill slopes on exploration and production pads. If silt fences are used, they must be constructed with adequate support and maintained to assure that they function at all times, including the winter season and spring runoff.

21. Establishment of staging areas or camp areas outside of the area permitted for surface disturbing operations for project personnel (operator or contractors) on National Forest System lands is subject to Forest Service approval.

22. All permanent survey markers within the area to be disturbed, including section corners, benchmarks, geodetic survey monuments, etc. must be located and flagged for protection prior to any surface disturbance activities. Disturbance or relocation of monuments requires the approval of the agency responsible for their use and preservation.

23. Water needed for operations must be obtained in accordance with State water law. The location and design of diversions on National Forest System lands are subject to review and approval of the responsible Forest Service official.

24. The operator and all contractors shall take measures needed for the prevention of fires started as a result of their operations and to suppress fires that are started as a

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result of their operations. Fire suppression equipment must be available to all personnel in the project area consisting of shovels, axes, and other appropriate hand tools. At least one properly rated fire extinguisher must be available in each vehicle and around all machinery such that they are readily assessable for suppression of fires. During times of severe fire danger when fire restrictions are implemented by order of the responsible Forest Service officer, all operations must be conducted in conformance with the order. The operator may be required to submit and implement a Fire Prevention/Suppression Plan for review/approval by the responsible Forest Service official.

25. All vehicles and other gasoline/diesel-powered equipment must be equipped with properly functioning spark arresters and mufflers. Spark arresters must meet Forest Service specifications in accordance with USDA Forest Service Spark Arrester Guide.

26. The operator will be held responsible for damage and suppression costs for fires started as a result of operations. Fires must be immediately suppressed to prevent spreading and must be reported to the responsible Forest Service officer.

27. The operator must maintain structures, facilities, improvements, and equipment in a safe and neat manner and in accordance with approved permits. The operator must take appropriate measures in accordance with applicable Federal and State laws and regulations to protect the public from hazardous or conditions resulting from the operations. Such measures must include, but are not limited to, posting signs, building fences, or otherwise identifying the potentially hazardous site or condition.

28. All accidents or mishaps resulting in resource/property damage and/or serious personal injury must be reported to the responsible Forest Service officer as soon as possible.

29. The operator may be required to locate pads and facilities in areas where they can be effectively screened from view from sensitive areas. Production facilities must be located and designed to minimize visibility from sensitive viewing areas. Painting of facilities with a non-reflective paint in the color that would best blend with the background will be required. The color will be determined by the operator with approval of the responsible Forest Service officer.

30. The operator must comply with all applicable laws and regulations pertaining to the storage, use, and disposal of hazardous substances and solid or liquid waste. All fluids, chemicals, and solid wastes must be properly contained on-site. Reserve pits, catchment ponds, and bermed areas must be constructed to prevent seepage into the ground or adjacent areas. A minimum of 2-feet of freeboard must be maintained in all reserve pits and ponds at all times to prevent overflow and spillage into adjacent areas.

31. Chemical containers should not be stored on bare ground or exposed to the sun or moisture. Containers and labels are subject to degradation and punctured drums could leak contents onto the ground. Chemical containers should be maintained in good condition and placed within secondary containment in case of a spill or puncture. Secondary containment facilities must be of sufficient size to contain all appropriate fluids, including diesel or other fuels.

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32. Sanitary facilities must be available to operators and contractors in the project area and properly used and maintained to prevent pollution. The installation of sanitary facilities, other than self-contained chemical toilets is subject to State and Forest Service approval.

33. Unless other methods are specifically approved, all solid wastes, contaminated soil materials, drill cuttings, petroleum products, and other fluids must be properly contained on-site. Disposal of associated waste materials must be at a facility licensed by the State to accept such materials.

34. Harassment of wildlife is prohibited. Pets must be properly restrained to prevent harassment of wildlife, livestock, government officials, and the public.

35. Move-in and move-out of heavy construction and drilling equipment will not be allowed during the opening weekends of the general big-game hunts or holiday weekends (including the observed holiday) from noon the previous day until midnight on Sunday or the observed holiday. Use and maintenance of National Forest System roads is regulated under authority of the National Forest Roads and Trails Act and the National Forest Management Act.

36. Vegetation seeding methods and seed mixes (species and amounts) used for interim and final reclamation must be approved by the Forest Service. Reclamation and revegetation plans and standards for success must be approved in project plans or permits. All vegetation materials, seeds, soil amendments, and sediment control materials must be certified that no noxious weed seed or noxious weeds are present. The operator is responsible for control and eradication of noxious weeds in project area, and the control and eradication of any invasive plant species not present at the site prior to operations, until such time as reclamation standards are met and the company is relieved of further reclamation responsibilities.

37. Vehicles and equipment shall be free of mud, soil, plant materials, and other debris which could contain noxious weed seeds prior to coming onto the Forest. This is needed to avoid transporting noxious weeds, or invasive species to sites on the Forest.

38. The operator shall follow Forest guidelines designed to prevent the introduction and spread of aquatic nuisance species (Dixie and Dixie National Forest Supplement, Forest Handbook 2509.16, chapter 1.

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Dixie National Forest Well Site Requirements

V. WELL SITE DESIGN REQUIREMENTS

A. General Requirements

The operator should propose locating the well site in cooperation with Forest Service personnel on the most nearly level location obtainable that would accommodate the intended use. However, potential well site locations should not be evaluated on the basis of site conditions alone. Access to the well site for road and possible future pipeline locations must also be considered in determining the most suitable location. What may be gained on a good location could be lost from an adverse access route. Plan the well site from the long-term standpoint, assuming a discovery could be made. Future pipeline locations are to be proposed by the operator as a part of his proposal on each well site.

Adjust the well site layout to conform to the best topographic situation. Avoid disturbance of drainages and locate reserve pits away from water courses. Deep vertical cuts and long fill slopes should be avoided. The cut and fill volumes should be balanced, excluding the topsoil and subsoil needed to backfill the reserve pit.

A contour map shall be developed for all well pad locations as an aid in the design of pad settings to the existing topography. This will allow the operator to plan the construction of facilities and the surface manager to evaluate impacts and calculate the bond more expeditiously and accurately. Maps should be prepared to a scale of 1 inch equals 20 feet horizontally and a contour interval of 2 feet vertically, or as otherwise directed by the responsible Forest Service officer.

Once this information is compiled, finished site elevations, cut and fill slopes and their respective catch points, drainage, balanced earth work, adequate storage area locations and other necessary construction features shall be determined and included with the drawings/specifications. Submittals shall include a well site plan (see Drawing No. 1), details of berms, diversion ditches, pits, catchments and other appurtenances and design features. Provide data to support drainage structure design.

B. Clearing

The site must first be cleared of all brush and trees. All merchantable timber must be purchased by the operator prior to cutting, at the appraised price determined by the Forest Service. Grasses and small shrubs need not be removed; however appropriate measure will be required to prevent the spread of noxious weeds and nuisance species prior to starting excavations if they occur on the site. Trees and brush will be disposed of by removal from the Forest, by burning, chipping, or other approved methods needed to prevent the spread of insects. Tree trunks less than 8 inches in diameter and slash can be stockpiled at an approved location to be spread over reclaimed areas. Burning permits will be required and are issued by the Forest Service. Burning would only be permitted if the fire danger is low to moderate.

C. Topsoil Removal and Storage

Surface soil material (topsoil), if present, will be stripped from all areas where surface

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disturbance is necessary and stockpiled. All topsoil will be removed in a separate layer, avoiding mixing with other excavated materials, and stored in a stockpile to prevent loss from erosion or contamination, and from which topsoil may be easily recovered. The depth of surface soil material to be removed and stockpiled will be specified by the Forest Service but will generally include the A Horizon. The topsoil and subsoil stock piles must be located to prevent contamination from the blooie line, flare line, and other operations. Stockpiles shall be contained by silt fencing, ditches and traps or other containment measures to prevent erosion, contamination and loss. If topsoil stockpiles are to remain for more than a single season, seeding with an approved seed mix will be required to minimize loss from erosion and preserve fertility and biological activity.

D. Site Grading

Cut and fill slopes will be such that stability can be maintained for the life of operations. Cut and fill slopes will be constructed as follows (exceptions can be made depending on the type and competency of material encountered):

Height of Slope	Slope
0 – 5 feet	3:1
6 – 10 feet	2:1
over 10 feet	1.5:1

All fills will be free of vegetation and will be compacted in lifts no greater than 12 inches in thickness to a minimum of 90 percent Proctor dry density sufficient to prevent excessive settlement.

The drill site or pad surface will be surfaced with crushed gravel to a depth sufficient to support anticipated loads throughout the life of the well. Usually a depth of 12 inches of gravel is required.

E. Site Drainage

Diversion ditches having the minimum dimensions of 3 feet horizontal to 1 foot vertical (3:1 ditch) will be constructed around the site to divert existing drainages and surface runoff from flowing onto the site. Hydraulic design for ditches is required to determine capacity. The ditch(s) will be located at the top or base of the cut slope (to be determined based on site-specific conditions) and around the toe of the fill slopes (see Drawing No. 1 – Construction Requirements for Typical Well Sites). Straw dykes, catch basins, energy dissipaters or other approved structures will be constructed in the ditch outflow to trap any sediment and dissipate erosive flows. Provide data to support drainage structure designs. A culvert might be necessary where the access road enters the site.

A berm will be constructed around the perimeter of the site to contain all precipitation, spills, and other fluids from leaving the site. The berm will be a minimum of 18 inches high, 12 inches wide at the top, and have 1.5:1 side slopes. Berms will be compacted for stability and to reduce permeability as needed to contain fluids. The site surface will be graded at a minimum of 1 percent to drain to the reserve pit. Use silt fencing, ditches and traps or other containment at toe of fill slopes to prevent erosion and contamination.

The drainage pattern to be constructed will need to be designed for each site, depending on

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site-specific conditions.

F. Construction and Maintenance of Reserve Pits

Reserve pits will be constructed of sufficient size and capacity for the necessary fluids for drilling and to contain any runoff from the drill site. The pad will be graded to empty into the reserve pit or alternative pit or buried tank. Winter operations may require larger pits/tanks due to snow accumulations and runoff. Pits will not be constructed within intermittent or perennial drainage channels. If the operator has concerns that drainage from the pad could contaminate reserve pit muds, the pad can be constructed to drain into alternative lined pits or buried containment tanks.

It is preferred that pits be constructed in undisturbed materials and below the natural ground level to minimize the risk of failure. Where conditions exist that require pits to be constructed of embankment materials, the following criteria are required:

1. The area on which the embankment is to be placed will be cleared of all materials including vegetation, topsoil, and unconsolidated soils and gravels.

2. A foundation keyway will be designed and constructed into native materials to dimensions based on site-specific conditions to provide adequate anchoring and sealing of the embankment.

3. The embankment will be constructed using impermeable materials on slopes of 3:1 into the pit and 2:1 outside the pit. The embankment will have a minimum of 10-foot top width. The materials will be compacted to 95 percent Proctor density.

The following are requirements for construction and maintenance of all reserve pits:

4. Pits must be constructed to contain fluids without leaks throughout the life of operations. If pit liners other than clay coatings are used they must be constructed of sufficiently durable and watertight materials to prevent leakage. Compacted bedding material consisting of sand, clay, or other grout may be required to prevent rocks from puncturing the liner and to seal cracks.

5. A minimum of 2-foot freeboard will be maintained in the pit at all times during the drilling operations or if the pit is left unreclaimed over the winter.

6. If wildlife concerns exist, netting or some other approved method will be used to prevent wildlife use of the pit.

G. Site Reclamation for Nonproductive Wells

Reclamation of the entire site will be required and will commence immediately after drilling, testing, and well plugging/abandonment are complete. The site will be restored to as nearly as practical to its original condition (approximate original contour). Cut and fill slopes will be reduced and graded to conform to the adjacent terrain.

Reserve pits must be allowed to dry before they are backfilled. Fluids that will not dry must be removed from the Forest. All polluting substances or contaminated materials, such as

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oil, oil-saturated soils and gravels will be removed and disposed of at a State licensed facility licensed to receive these materials. Exceptions to allow for reserve pit solidification may be made if the operator can demonstrate to the responsible Forest Service officer that this method would be effective based on site-specific conditions.

Drainages will be reestablished and temporary measures will be required to prevent erosion on the site until all reclamation and revegetation standards established for the site are met.

In general, the well identification standpipe will be set such that it can be buried by at least two feet of soil. A final determination will be made on a case-by-case basis.

After final grading and before replacement of topsoil, the entire surface of the site shall be scarified to eliminate slippage surfaces and promote root penetration. Topsoil will be spread over the site to achieve approximate uniform stable thickness consistent with the established contours.

The site will be seeded and/or planted with a seed mix as approved in the SUPO or as otherwise approved by the responsible Forest Service officer. Nutrients and soil amendments will be applied to the disturbed surface soil needed to meet the revegetation standards.

A temporary fence will be constructed around the site until reclamation standards have been met. The fence design is subject to Forest Service approval will be designed to prevent entry by livestock or wildlife as needed for the specific area. The fence must be maintained such that it is functional at all times as intended to prevent livestock use and unauthorized access by the public. The operator is responsible for damages to the reclaimed condition of the site due to unauthorized access until final reclamation standards are met and the fence is removed. The operator will be responsible for eradicating noxious weeds and nuisance species each season until the final revegetation standards have been met. Once all reclamation standards have been met, the operator is responsible for removal of the fence, gate, and associated structures and materials.

H. Site Reclamation for Producing Wells

Interim and final reclamation for producing wells will be accomplished for portions of the site not required for the continued operation of the associated facilities. All disturbed surfaces will be treated to prevent erosion and to compliment the esthetics of the area. A new site plan will be required encompassing the facilities required for operation and interim reclamation measures. Generally, the following measures will be required:

1. The reserve pit will be reclaimed as previously discussed.
2. All polluting substances and contaminated materials, including contaminated soil and gravels will be disposed of as previously discussed.
3. All cut and fill slopes and other disturbed areas not needed for production operations will be contoured to match the surrounding area, topsoiled, and revegetated as previously discussed.
4. The berm will be reestablished on the production pad where removed to accomplish the reclamation discussed in the previous item.

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5. The pad perimeter and reclaimed area will be fenced. Once reclamation standards have been met for the reclaimed portion of the original pad the fence will be relocated onto the perimeter of the production pad.
6. Measures such as painting facilities an appropriate color, and other practical measures will be used to decrease visibility of the site as viewed from sensitive areas such as roads, highways, and recreation areas. Noise suppression devices and submersible pumps (if feasible) may be required as needed to meet scenic, wildlife, and recreation objectives for the area.

I. Site Maintenance

The site will require periodic maintenance to ensure that drainages remain functional and that surfaces are properly treated to reduce erosion, contamination, fugitive dust, invasion by undesirable plant species, and impacts to the adjacent areas.

All garbage, debris, and foreign materials shall be contained on site in a cage or other enclosure then will be removed to an established/licensed landfill or other recognized facility.

J. Site Reclamation for Production Wells

When production pads and production facilities are no longer needed, the facilities must be removed and final reclamation measures completed as previously prescribed for nonproductive wells. Abandoned or unneeded facilities will be removed/reclaimed within two years. In place abandonment of any facilities such as powerlines, pipelines, etc. will require approval of the Forest Service. If approved, appropriate measures to stabilize and decontaminate them will be required.

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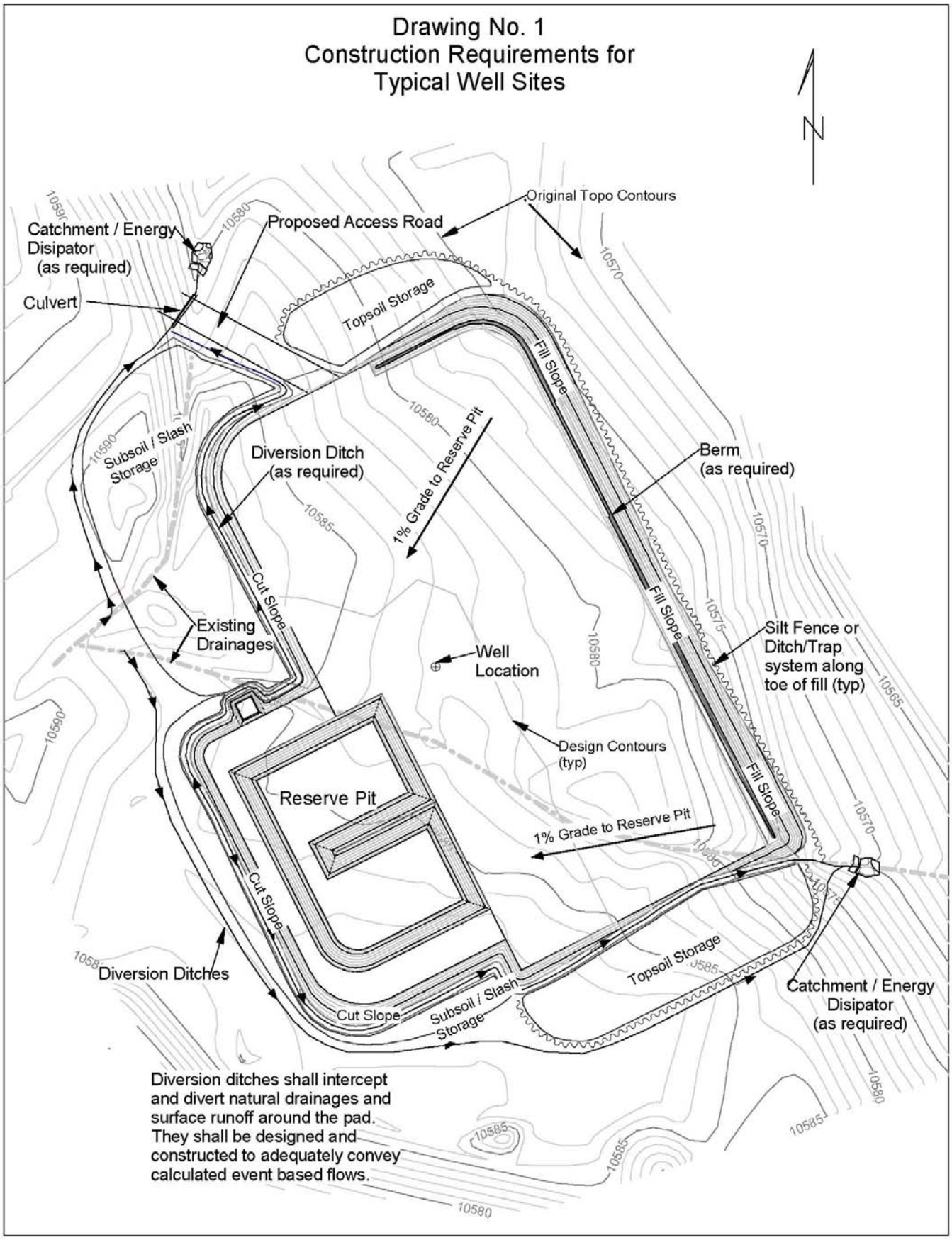
Drawing No. 1
Construction Requirements for
Typical Well Sites
N
Original Topo Contours
Proposed Access Road
Catchment / Energy
Disipator
(as required)
Culvert
Topsoil Storage
Fill Slope
Subsoil / Slash
Storage
Diversion Ditch
(as required)
1% Grade to Reserve Pit
Berm
(as required)
Cut Slope
Existing
Drainages
Well
Location
Silt Fence or
Ditch/Trap
system along
toe of fill (typ)
Design Contours
(typ)
Reserve Pit
1% Grade to Reserve Pit
Diversion Ditches
Cut Slope
Subsoil / Slash
Storage
Topsoil Storage
Catchment / Energy
Disipator
(as required)
Diversion ditches shall intercept
and divert natural drainages and
surface runoff around the pad.
They shall be designed and
constructed to adequately convey
calculated event based flows.
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10580
10585
10590
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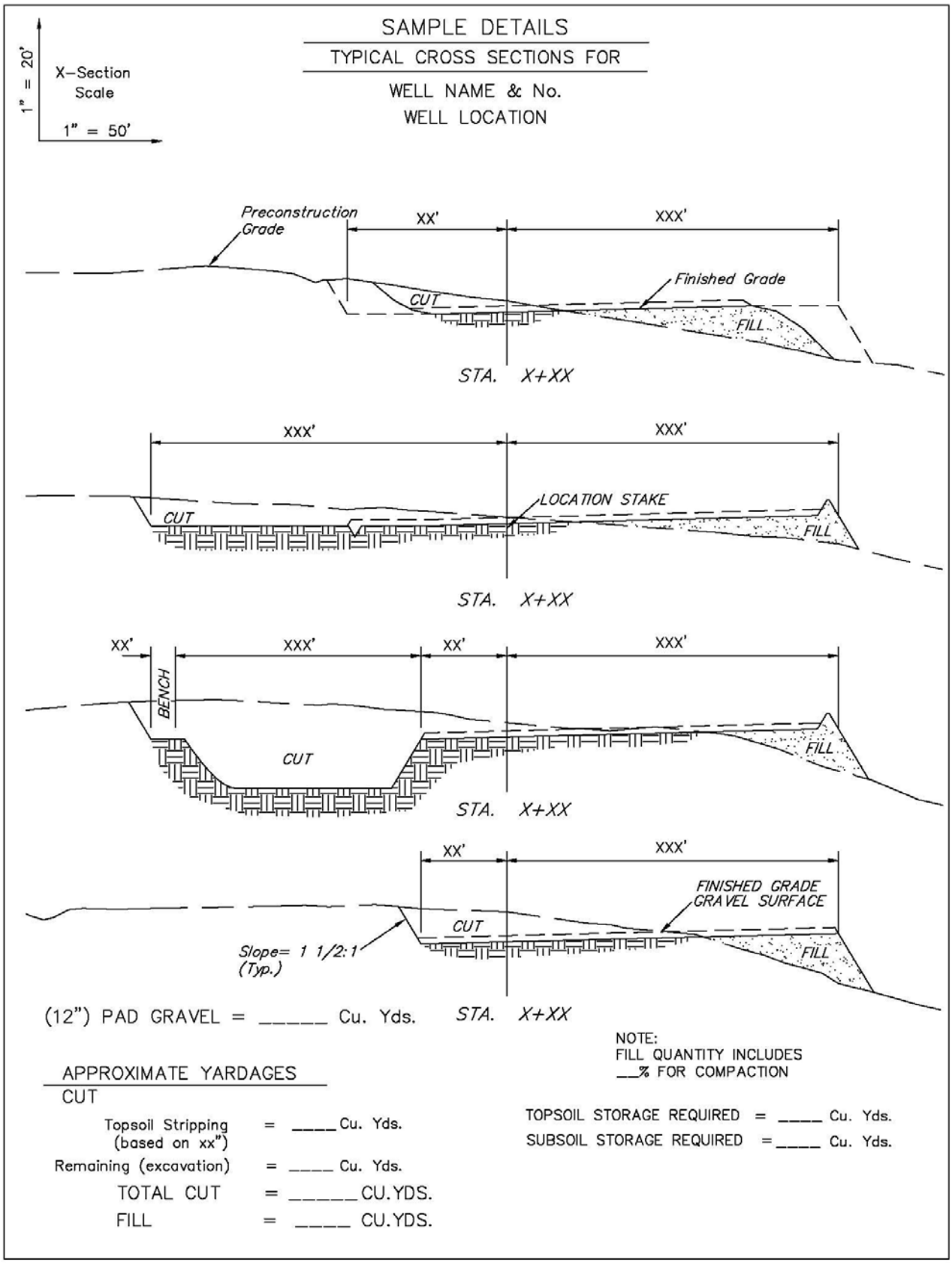


(12") PAD GRAVEL = _____ Cu. Yds.

NOTE:
FILL QUANTITY INCLUDES
__% FOR COMPACTION

APPROXIMATE YARDAGES

CUT

Topsoil Stripping (based on xx") = _____ Cu. Yds.

Remaining (excavation) = _____ Cu. Yds.

TOTAL CUT = _____ CU.YDS.

FILL = _____ CU.YDS.

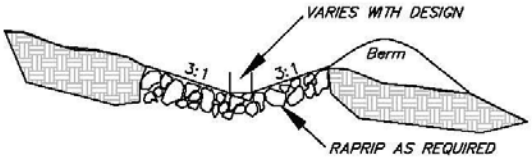
TOPSOIL STORAGE REQUIRED = _____ Cu. Yds.

SUBSOIL STORAGE REQUIRED = _____ Cu. Yds.

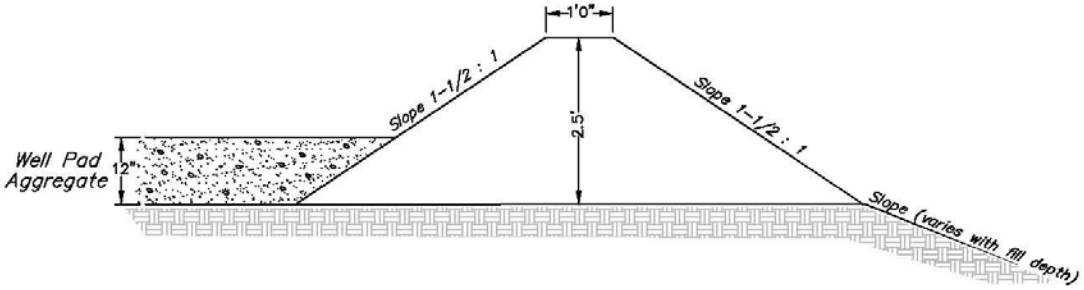
SAMPLE DETAILS

DETAIL SHEET

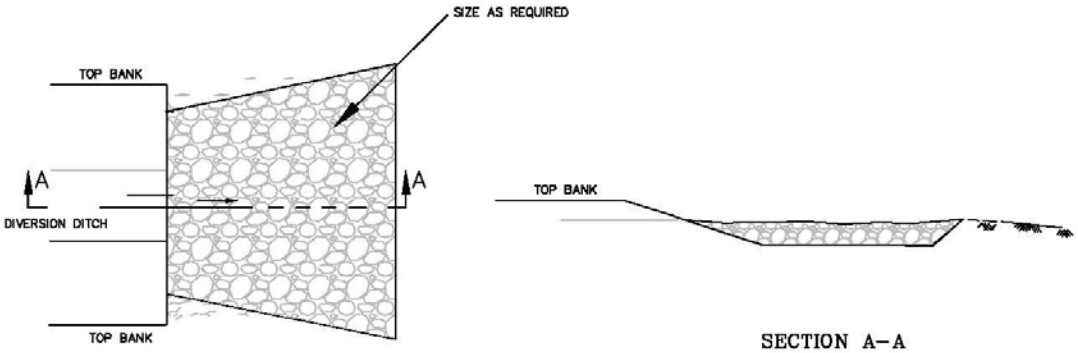
WELL NAME & No.
WELL LOCATION



DIVERSION DITCH (DETAIL)
(Only Where Specified)



BERM (EDGE OF LOCATION)
(NO SCALE)



PLAN VIEW

SECTION A–A

ENERGY DISSIPATER (DETAIL)