Summary: Draft Uranium Leasing Program Programmatic Environmental Impact Statement

DOE/EIS 0472-D
March 2013

U.S. DEPARTMENT OF ENERGY | Legacy Management

COVER SHEET

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Title: Draft Uranium Leasing Program Programmatic Environmental Impact Statement (DOE/EIS-0472D)

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Abstract: The U.S. Department of Energy (DOE) has prepared this Draft *Uranium Leasing Program Programmatic Environmental Impact Statement* (Draft ULP PEIS) pursuant to the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's (CEQ's) NEPA regulations (40 CFR Parts 1500–1508), and DOE's NEPA implementing procedures (10 CFR Part 1021) to analyze the reasonably foreseeable environmental impacts, including the site-specific impacts, of the range of reasonable alternatives for the management of the ULP. DOE's ULP administers 31 tracts of land covering an aggregate of approximately 25,000 acres (10,000 ha) in Mesa, Montrose, and San Miguel Counties in western Colorado for exploration, mine development and operations, and reclamation of uranium mines. There are currently 29 existing leases; two of the lease tracts are not leased. Site-specific information available on the 31 lease tracts (including current lessee information and status, size of each lease tract, previous mining operations that occurred, location of existing permitted mines and associated structures, and other environmental information) has been utilized as the basis for the evaluation contained in this Draft ULP PEIS.

DOE has evaluated five alternatives that address the range of reasonable alternatives for the management of the ULP. These alternatives are as follows:

- *Alternative 1:* DOE would terminate all leases, and all operations would be reclaimed by lessees. DOE would continue to manage the withdrawn lands, without leasing, in accordance with applicable requirements.

- *Alternative 2:* Same as Alternative 1, except once reclamation was completed by lessees, DOE would relinquish the lands in accordance with 43 CFR Part 2370. If DOI/BLM determines, in accordance with that same Part of the CFR, the lands were suitable to be managed as public domain lands, they would be managed by BLM under its multiple use policies. DOE's uranium leasing program would end.

- *Alternative 3:* DOE would continue the ULP as it existed before July 2007 with the 13 then-active leases, for the next 10-year period or for another reasonable period, and DOE would terminate the remaining leases.[1]

- *Alternative 4:* DOE would continue the ULP with the 31 lease tracts for the next 10-year period or for another reasonable period.

- *Alternative 5:* This is the No Action Alternative, under which DOE would continue the ULP with the 31 lease tracts for the remainder of the 10-year period, as the leases were when they were issued in 2008.

Preferred Alternative: DOE's preferred alternative is Alternative 4.

Public Comments: DOE issued a Notice of Intent (NOI) to prepare the ULP PEIS in the *Federal Register* on June 21, 2011, and a supplemental notice was issued on July 21, 2011, to announce the four public scoping meetings and their locations and to announce the extension of the public scoping period to September 9, 2011. Meetings were held in Montrose, Naturita, and Telluride in Colorado and in Monticello, Utah. DOE has considered all input received during the scoping process to prepare this Draft ULP PEIS.

A 60-day public comment period on this Draft ULP PEIS begins with the publication of the EPA Notice of Availability in the *Federal Register.* This Draft ULP PEIS is available on the ULP web site at http://ulpeis.anl.gov and on the DOE NEPA web site at http://energy.gov/nepa. DOE will consider all comments postmarked or received during the comment period in preparing the Final ULP PEIS. DOE will consider any comments postmarked after the comment period to the extent practicable. The locations and times of the public hearings on the Draft ULP PEIS will be identified in a DOE *Federal Register* notice and through other media, such as local press notices. In addition to the public hearings, comments may also be submitted by mail or electronically via the web site or e-mail at the addresses listed below.

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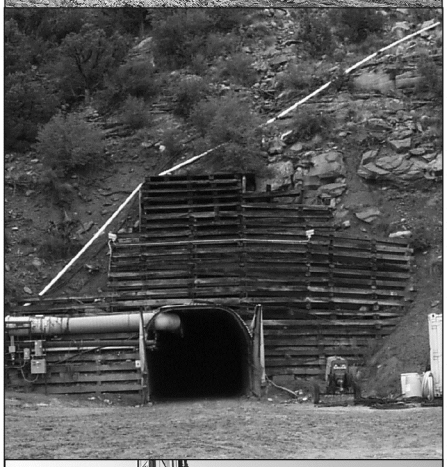
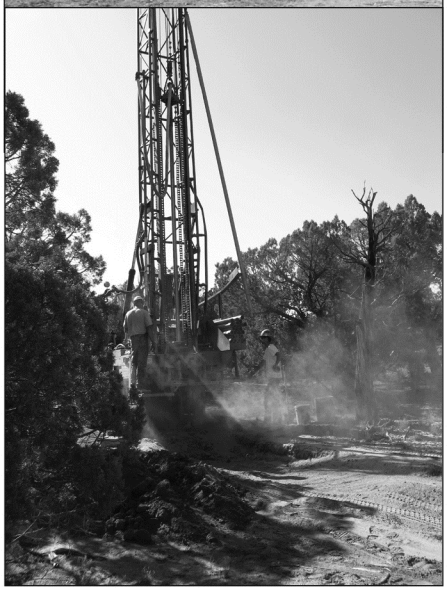
[1] In July 2007, DOE issued a programmatic environmental assessment and finding of no significant impact for the ULP, which a U.S. District Court invalidated on October 18, 2011.





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NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in the Summary.

ACRONYMS AND ABBREVIATIONS

AEA	Atomic Energy Act
AEC	Atomic Energy Commission
BA	biological assessment
BLM	Bureau of Land Management
BMP	best management practice
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDRMS	Colorado Division of Reclamation, Mining, and Safety
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CPW	Colorado Parks and Wildlife
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	*Federal Register*
ISL	in situ leaching
LCF	latent cancer fatality
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NRC	U.S. Nuclear Regulatory Commission

PEA	programmatic environmental assessment
PEIS	programmatic environmental impact statement
P.L.	Public Law
PLO	Public Land Order
PM	particulate matter
$PM_{2.5}$	particulate matter with a mean diameter of 2.5 µm or less
PM_{10}	particulate matter with a mean diameter of 10 µm or less
ROD	Record of Decision
ROI	region of influence
ROW	right-of-way
ULP	Uranium Leasing Program
USC	*United States Code*
USFWS	U.S. Fish and Wildlife Service
WL	working level

UNITS OF MEASURE

ac-ft	acre-foot (feet)
cm	centimeter(s)
dBA	a-weighted decibel(s)
ft	foot (feet)
gal	gallon(s)
h	hour(s)
ha	hectare(s)
in.	inch(es)
kg	kilogram(s)
km	kilometer(s)
lb	pound(s)
m	meter(s)
mi	mile(s)
mrem	millirem

ppm	part(s) per million
rem	roentgen equivalent man
s	second(s)
yr	year(s)

CONVERSION TABLE
ENGLISH/METRIC AND METRIC/ENGLISH EQUIVALENTS

Multiply	By	To Obtain
English/Metric Equivalents		
Acres	0.004047	square kilometers (km^2)
acre-feet (ac-ft)	1,234	cubic meters (m^3)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
degrees Fahrenheit (ºF) –32	0.5555	degrees Celsius (ºC)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
miles per hour (mph)	1.609	kilometers per hour (kph)
pounds (lb)	0.4536	kilograms (kg)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)
Metric/English Equivalents		
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	0.00081	acre-feet (ac-ft)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (ºC) +17.78	1.8	degrees Fahrenheit (ºF)
hectares (ha)	2.471	Acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
kilometers per hour (kph)	0.6214	miles per hour (mph)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
square kilometers (km^2)	247.1	Acres
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

S.1 INTRODUCTION

The U.S. Department of Energy (DOE) has prepared the Uranium Leasing Program (ULP) Programmatic Environmental Impact Statement (PEIS) pursuant to the National Environmental Policy Act of 1969 (NEPA) (Title 42, Section 4321 and following sections of the *United States Code* [42 USC 4321 *et seq.*]), the Council on Environmental Quality's (CEQ's) NEPA regulations found in Title 40 of the *Code of Federal Regulations* (40 CFR Parts 1500–1508), and DOE's NEPA implementing procedures (10 CFR Part 1021) in order to analyze the reasonably foreseeable environmental impacts, including the site-specific impacts, of alternatives for the management of the ULP. DOE's ULP administers tracts of land located in Mesa, Montrose, and San Miguel Counties in western Colorado for the exploration, mine development and operations, and extraction of uranium and vanadium ores.

S.1.1 Background

Congress authorized DOE's predecessor agency, the U.S. Atomic Energy Commission (AEC), to develop a supply of domestic uranium. In 1948, the Bureau of Land Management (BLM) issued Public Land Order (PLO) 459, which stated, "Subject to valid existing rights and existing withdrawals, the public lands and the minerals reserved to the United States in the patented lands in the following areas in Colorado are hereby withdrawn from all forms of appropriation under the public-land laws, including the mining laws but not the mineral-leasing laws, and reserved for the use of the United States Atomic Energy Commission." Subsequently, other PLOs increased or decreased the total acreage of the withdrawn lands. In addition, the Federal Government, through the Union Mines Development Corporation, acquired a substantial number of patented and unpatented mining claims, mill and tunnel site claims, and agricultural patents, until the aggregated acreage managed by AEC totaled approximately 25,000 acres (10,000 ha). The areas under consideration are located in western Colorado in Mesa, Montrose, and San Miguel Counties.

Beginning in 1949, the AEC and its successor agencies, the U.S. Energy Research and Development Administration and DOE, administered three separate and distinct leasing programs during the ensuing 60 years, as summarized in Table S.1-1. To put the production numbers in Table S.1-1 in perspective, domestic annual uranium production peaked in 1980 at about 44 million lb (20 million kg), of which lease production that year represented about 2.5% of the total. In addition, today's world market produces approximately 100 million lb (45 million kg) of uranium annually.

In preparing for the 1974 leasing period, the AEC evaluated the potential environmental and economic impacts related to the leasing program. This evaluation was documented in *Environmental Statement, Leasing of AEC Controlled Uranium Bearing Lands* (AEC 1972). In 1995, DOE again evaluated the potential environmental and economic impacts related to the leasing program and documented its findings in the *Finding of No Significant Impact for the Uranium Lease Management Program* (DOE 1995).

TABLE S.1-1 Summary of Three Leasing Programs Administered between 1949 and 2008

Years of Operation	No. of Leases	Lease Production (million lb)[a]		Royalties Generated ($ million)
		U_3O_8	V_2O_5	
1949–1962	48	1.2	6.8	5.9
1974–1994[b]	43	6.5	33.0	53.0
1996–2008	15	0.3	1.4	4.0
Total		8.0	41.2	62.9

[a] Uranium ore is generated as uranium oxide (U_3O_8) and vanadium ore is generated as vanadium oxide (V_2O_5).

[b] Mining operations peaked in 1980.

When the first leasing program ended in 1962, the AEC directed the lessees to close the mines (to prohibit unauthorized entry), but little was done to reclaim the mine sites. These mine sites became DOE's "legacy sites," discussed later in this section.

In 1974, the AEC initiated reclamation bonding requirements in its new lease agreements that ensured that all mine sites would be adequately reclaimed when lease operations ended. During this period, a new lessee could elect to incorporate an existing mine (from the previous leasing program) into its current operation. By so doing, the new lessee accepted the responsibility and liability associated with the ultimate reclamation of that mine site.

In October 1994, DOE initiated a mine-site reconnaissance and reclamation project on the lease tracts. Each lease tract was thoroughly inspected to identify all the abandoned mine sites that resulted from pre-1974 leasing activities. After this identification process, all the mining-related features associated with each site were quantified and assessed for their historic importance. In 1995, in the absence of specific guidance pursuant to the reclamation of abandoned uranium mine sites, DOE initiated discussions with BLM officials (state and local) that culminated in the establishment of a guidance document, *Uranium Closure/Reclamation Guidelines* (BLM 1995) for such sites. DOE's objective in establishing this guidance document was to ensure that DOE's lease tracts were reclaimed in a manner that was acceptable to BLM, so that the lands could be restored to the public domain and managed by BLM. Subsequently, DOE's "legacy" mine sites were prioritized and systematically reclaimed. Reclamation at the final legacy mine site was completed in May 2001. DOE reclaimed a total of 161 separate mine sites on 22 lease tracts at a total cost of $1.25 million.

In July 2007, DOE issued a programmatic environmental assessment (PEA) for the ULP, in which it examined three alternatives for the management of the ULP for the next 10 years (DOE 2007). In that same month, DOE issued a Finding of No Significant Impact (FONSI), in which DOE announced its decision to proceed with the Expanded Program Alternative and also determined that preparation of an environmental impact statement (EIS) was not required (DOE 2007). Under the Expanded Program Alternative, DOE would extend the 13 existing leases for a 10-year period and would also expand the ULP to include the competitive offering of up to 25 additional lease tracts to the domestic uranium industry.

In 2008, DOE implemented the Expanded Program Alternative and executed new lease agreements with the existing lessees for their 13 respective lease tracts, effective April 30, 2008. In addition, DOE offered the remaining, inactive lease tracts to industry for lease through a competitive solicitation process. That process culminated in the execution of 18 new lease agreements for the inactive lease tracts, effective June 27, 2008. Since that time, two lease tracts were combined into one and another lease was relinquished back to DOE. Accordingly, there are 29 lease tracts that are actively held under lease and 2 lease tracts that are currently inactive.

Between 2009 and 2011, DOE approved seven exploration plans (one each for Lease Tracts 13A, 15A, 17, 21, 24, 25, and 26). These exploration plans primarily involved the drilling of at least one exploratory hole. To date, the approved exploration plans for Lease Tracts 15A and 17 have not been implemented. Exploration activities typically resulted in surface disturbance of less than 1 acre (0.4 ha). Disturbed lands were reclaimed by using polyurethane plugs, surface soils, and established seed mixtures. There was also one mine re-entry plan that was approved and implemented for Lease Tract 26. This plan included mine re-entry activities whereby information was collected within an existing mine and the mine re-secured. DOE also approved 19 reclamation plans to reclaim disturbed areas located on Lease Tracts 5, 6, 7, 10, 11, 11A, 12, 13, 16, 16A, 17, 19A, 20, 21, 22, 22A, 23, 26, and 27. All approved reclamation plans have been implemented. Reclamation activities addressed open drill holes and vents, land subsidences, and abandoned mine portals and adits. These exploration and reclamation activities are further discussed and evaluated in the cumulative impacts section (Section S.6).

S.1.2 Current Status of the ULP

Colorado Environmental Coalition and three other plaintiffs filed a complaint against DOE in the U.S. District Court for the District of Colorado on July 31, 2008, in which the plaintiffs alleged, among other things, that DOE's July 2007 PEA and FONSI violated NEPA by failing to consider adequately the environmental impacts of expansion of the ULP, and violated the Endangered Species Act (ESA) by jeopardizing endangered species. On October 18, 2011, the Court issued an Order in which it held, among other things, that DOE had violated NEPA by issuing its July 2007 PEA and FONSI instead of preparing an EIS. In that Order, the Court invalidated the July 2007 PEA and FONSI; stayed the 29 leases in existence under the ULP; enjoined DOE from issuing any new leases on lands governed by the ULP; enjoined DOE from approving any activities on lands governed by the ULP; and ordered that after DOE conducts an environmental analysis that complies with NEPA, the ESA, all other governing statutes and

regulations, and the Court's Order, DOE could then move the Court to dissolve its injunction (*Colorado Environmental Coalition v. DOE*, No. 08-cv-1624 [D. Colo. Oct. 18, 2011]).

The Court later granted in part DOE's motion for reconsideration of that Order and amended its injunction to allow DOE; other Federal, state, or local governmental agencies; and/or the ULP lessees to conduct only those activities on ULP lands that are absolutely necessary: (1) to conduct DOE's environmental analysis regarding the ULP; (2) to comply with orders from Federal, state, or local government regulatory agencies; (3) to remediate certain dangers to public health, safety, and the environment on ULP lands; and (4) to conduct certain activities to maintain the ULP lease tracts and their existing facilities (*Colorado Environmental Coalition v. DOE,* No. 08-cv-1624 [D. Colo. Feb. 27, 2012]).

On June 21, 2011, DOE published the Notice of Intent (NOI) to prepare the PEIS (see Volume 76, page 36097 of the *Federal Register* [76 FR 36097]). In the NOI, DOE stated that it had determined, in light of the site-specific information that it had gathered as a result of the site-specific agency actions proposed and approved pursuant to the July 2007 PEA, that it was appropriate for DOE to prepare a PEIS in order to analyze the reasonably foreseeable environmental impacts, including the site-specific impacts, of a range of alternatives for the management of the ULP for the remainder of the 10-year period that was covered by the July 2007 PEA. After DOE published the NOI, it notified the ULP lessees that until the PEIS process was completed, DOE would not approve any new exploration and mining plans and would not require any lessees to pay royalties.

Currently, of the 31 ULP lease tracts, 29 have active leases. Two do not—Lease Tracts 8A and 14 (Parcels 14-1, 14-2, and 14-3) are currently not leased. Lease Tract 8A is a small tract that is isolated and may be located entirely below (or outside) the uranium-bearing formation, which could indicate a lack of ore. Lease Tract 14 comprises three parcels (14-1, 14-2, and 14-3). There was some interest in Parcels 14-1 and 14-2 by potential lessees in the past; however, the third parcel (14-3, which lies east of Parcel 14-1) is located almost entirely within the Dolores River corridor and was never leased. Table S.1-2 lists the 31 lease tracts with applicable acreage, current lessee, and status of each. Figure S.1-1 shows the locations of the 31 ULP lease tracts.

S.1.2.1 DOE ULP Administrative Process

DOE's administration of the ULP includes the actions needed to manage the activities conducted at the 31 lease tracts. Table S.1-2 lists the 31 lease tracts with applicable acreage, current lessee, and the status of each. Figure S.1-1 shows the locations of the 31 ULP lease tracts. These actions are undertaken to assure that the program's technical and administrative objectives are accomplished, as listed below:

- Offer the lease tracts to the domestic uranium industry through a competitive royalty-bid process that culminates in the award of each lease to the highest qualified bidder.

TABLE S.1-2 Summary of the 31 DOE ULP Lease Tracts in 2011

	Lease Tract No.	Acreage	Current Lessee	County	Status[a]
1	10	638	Golden Eagle Uranium, LLC	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
2	11	1,303	Cotter Corporation	San Miguel	One new underground mine permitted and developed; reclamation of previously disturbed areas needed.
3	11A	1,297	Golden Eagle Uranium, LLC	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
4	12	641	Colorado Plateau Partners	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
5	13	1,077	Gold Eagle Mining, Inc.	San Miguel	Three existing, permitted underground mines; reclamation of previously disturbed areas is needed.
6	13A	420	Cotter Corporation	San Miguel	Exploration plan (one hole) approved; drilling and reclamation of the explored area are completed.
7[b]	14 (1, 2, 3)	971	Not applicable	San Miguel	Lease tract not currently leased.
8	15	350	Gold Eagle Mining, Inc.	San Miguel	One existing underground mine; reclamation of previously disturbed areas is needed.
9	15A	172	Golden Eagle Uranium, LLC	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
10	16	1,790	Golden Eagle Uranium, LLC	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
11	16A	585	Energy Fuels Resources Corp.	San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
12	5	151	Gold Eagle Mining, Inc.	Montrose	One existing, permitted underground mine; reclamation of previously disturbed areas is needed.

TABLE S.1-2 (Cont.)

	Lease Tract No.	Acreage	Current Lessee	County	Status[a]
13	5A (1, 2)	25	Golden Eagle Uranium, LLC	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
14	6	530	Cotter Corporation	Montrose	One existing permitted underground mine; reclamation of previously disturbed areas is needed.
15	7	493	Cotter Corporation	Montrose	Two existing permitted mines—one underground mine and one large open-pit mine; reclamation of previously disturbed areas is needed.
16	8	955	Cotter Corporation	Montrose	One existing permitted underground mine; reclamation of previously disturbed areas is needed.
17	8A	78	Not applicable	Montrose	Lease tract has not been leased.
18	9	1,037	Cotter Corporation	Montrose	One existing permitted underground mine; reclamation of previously disturbed areas is needed.
19	17 (1, 2)	475	Golden Eagle Uranium, LLC	Montrose and San Miguel	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
20	18	1,181	Cotter Corporation	Montrose	One existing permitted underground mine; reclamation of previously disturbed areas is needed.
21	19	662	Energy Fuels Resources Corp.	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
22	19A	1,204	Energy Fuels Resources Corp.	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
23	20	627	Energy Fuels Resources Corp.	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
24	21	651	Cotter Corporation	Montrose	Exploration plan (two holes) approved; drilling and reclamation of the explored area are completed; no area needs to be reclaimed under current conditions.

TABLE S.1-2 (Cont.)

	Lease Tract No.	Acreage	Current Lessee	County	Status[a]
25	22	224	Golden Eagle Uranium, LLC	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
26	22A	409	Golden Eagle Uranium, LLC	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
27	23 (1, 2, 3)	596	Golden Eagle Uranium, LLC	Montrose	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
28	24	201	Energy Fuels Resources Corp.	Montrose	Exploration plan (eight holes) approved; drilling and reclamation of explored area are completed; no area needs to be reclaimed under current conditions.
29	25	639	Cotter Corporation	Montrose	Exploration plan (one hole) approved; drilling and reclamation of explored area are completed; no area needs to be reclaimed under current conditions.
30	26	3,989	Energy Fuels Resources Corp.	Mesa	Exploration plan (six holes) approved; drilling and reclamation of the explored area are completed; mine re-entry plan is approved, bulkhead partially removed, and assessment completed; portal is resecured; reclamation of previously disturbed areas is needed.
31	27	1,766	Energy Fuels Resources Corp.	Mesa	No recent (post-1995) activity conducted; no area needs to be reclaimed under current conditions.
Total		25,137			

[a] On October 18, 2011, a Federal district court stayed the 31 leases, and enjoined DOE from approving any activities on ULP lands. On February 27, 2012, the court amended its injunction to allow DOE, other Federal, state, or local governmental agencies, and the ULP lessees to conduct only those activities on ULP lands that are absolutely necessary, as described in the court's Order. See *Colorado Environmental Coalition v. Office of Legacy Management*, No. 08-cv-01624, 2012 U.S. DIST. LEXIS 24126 (D. Colo. Feb. 27, 2012).

[b] Lease Tracts 7 and 7A were combined (February 2011 time frame) into Lease Tract 7.

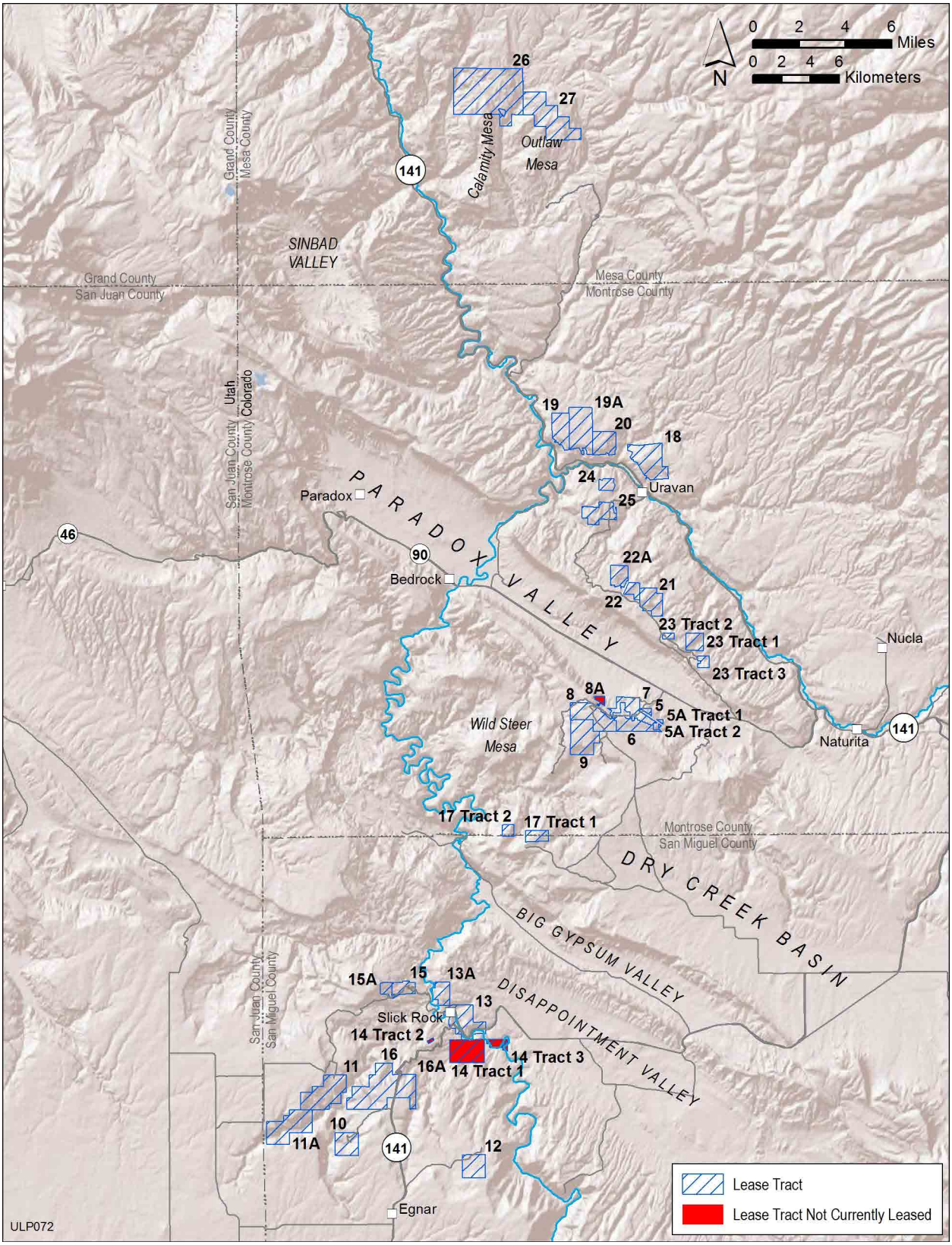

FIGURE S.1-1 Locations of the 31 ULP Lease Tracts in Colorado

- Inspect and maintain lease tract boundary markers and monuments on the lease tracts. Establish and maintain records of survey control points for said markers and monuments.

- Review lessees' exploration and mining plans, in coordination with BLM and the Colorado Division of Reclamation, Mining and Safety (CDRMS), to ensure that they are consistent with Federal, state, and local rules and regulations; existing environmental regulations; lease stipulations; and standard industry practices. Approve or deny each plan as warranted.

- Coordinate with other Federal agencies (e.g., BLM, U.S. Fish and Wildlife Service [USFWS], U.S Environmental Protection Agency [EPA]), state agencies (e.g., CDRMS, Colorado Division of Parks and Wildlife [CPW], Colorado Department of Public Health and the Environment [CDPHE]), local and tribal officials, and private entities as appropriate to address concerns that they may have. Routinely review each Memorandum of Understanding established with BLM and CDRMS to ensure that the agreements remain up to date and reflect actual work practices.

- Establish the amount of reclamation performance bonding appropriate for the amount of environmental disturbance anticipated based on an evaluation of the lessees' proposed activities, including site-specific access routes, exploration drill-hole locations, mine-site support facility locations, and proposed methods of reclamation.

- Monitor lessees' exploration, mine-development, and ore-production activities to ensure compliance with Federal, state, and local environmental regulations and lease stipulations. Identify adverse conditions that need to be addressed and advise the lessees accordingly.

- Review exploration drill-hole logs, drill-hole maps, mine maps, and quarterly reports submitted by the lessees to assess the lessees' progress and verify conditions witnessed during field inspections.

- Review Federal and state mine safety inspection records and reports to identify significant violations or adverse trends and determine whether actions are warranted.

- Monitor and track market prices (spot and long term) for uranium oxide (U_3O_8) and vanadium oxide (V_2O_5) (uranium ore is generated as uranium oxide and vanadium ore is generated as vanadium oxide) and keep abreast of activities occurring within the world uranium and vanadium industries.

- Develop and maintain procedures to process and maintain records of ores produced from the DOE lease tracts and delivered to a mill or other receiving

station for processing. Calculate the resulting royalties due and payable to DOE. Ensure that royalty payments are submitted in accordance with the lease agreements. Maintain records associated with the number of miles traveled by ore trucks on Federal, state, and county roadways. Ensure that lessees' pulp ore samples are analyzed in accordance with lease agreement requirements.

- Maintain a record of and provide for the routine surveillance of concurrent surface activities (e.g., activities associated with oil and gas leases and special use permits) that are authorized by other agencies with surface-management jurisdiction.

- Evaluate sample plants to verify that they or other facilities receiving lease tract ores have adequate procedures for weighing, sampling, and assaying said ores and for reporting the results to DOE.

- Monitor lessees' reclamation activities to ensure that they comply with Federal, state, and local environmental regulations and lease stipulations. Ensure that these activities are consistent with existing exploration and mining plans and standard industry practices. Monitor post-reclamation sites for 3 to 5 years to assure that adequate vegetation is successfully re-established at the site.

- Oversee the relinquishment of lease agreements when requested by a lessee or the termination of lease agreements for cause when directed by DOE.

Determine the eligibility of inactive, reclaimed lease tracts for restoration to the public domain under BLM's management . Prepare a Request to Relinquish Lands and submit it to the BLM Colorado State Office for processing. Help BLM officials review the Request, and monitor its status until the restoration process is complete.

S.1.2.2 Lease Requirements

Two generic leases are currently utilized for the DOE ULP and could be modified in the future as a result of this ULP PEIS process. Both generic leases are the same except for how the royalty payment is determined. Before conducting any exploratory or mining activity, the lessee is required to file a "Notice of Intent to Conduct Prospecting Operations" or "Reclamation Permit Application" with the Colorado Mined Land Reclamation Board for the review and approval of CDRMS. The lessee is then required to submit three copies of a detailed Exploration Plan or Mining Plan to DOE. This plan must include a site-specific environmental analysis and a description of measures to be taken to ensure compliance with all Federal, state, and local laws. In addition, the lessee must consult with all pertinent Federal, state, and local agencies—including, but not limited to, the BLM, USFWS, U.S. Army Corps of Engineers (USACE), EPA, CPW, State Historic Preservation Officer (SHPO), and Indian tribal governments—to determine the presence and/or location of all endangered, threatened, and sensitive plant and wildlife

species; known cultural resources; and floodplain and wetland areas. Plans are reviewed by DOE, and upon DOE's approval, the actions described in the plan can commence. DOE and other appropriate agencies must be notified in writing if the lessee wishes to change part of the plan, and no change can take place until approval is given. After the plan is approved, but before any ground-disturbing activity can commence, the lessee must file a performance bond (the amount is established by DOE) in coordination with CDRMS. This coordination is reflected in the Memorandum of Understanding (MOU) between DOE and CDRMS (DOE and CDRMS 2012).

S.1.2.3 Site-Specific Information for the ULP Lease Tracts

In addition to information about the 31 lease tracts presented in Table S.1-2 (and Figure S.1-1), site-specific information on 8 of the 31 lease tracts where existing permitted mines are located is summarized in this section. This information, in addition to other site-specific information and assumptions discussed in Section S.3.1, is used as the basis of the evaluation for potential impacts discussed in Section S.4. The information for Lease Tracts 5, 6, 7, 8, 9, 11, 13, and 18 discussed in the sections that follow includes the location of the existing permitted mine(s), activities conducted to date, amount of ore generated, and royalty realized. Finally, Table S.1-3 lists the estimated ore reserve that remains at each of the 31 lease tracts.

S.1.2.3.1 ULP Lease Tract 5. On Lease Tract 5, the C–JD–5 mine is located in Sections 21 and 22, T 46 N, R 17 W, NMPM, in Montrose County, Colorado (see Figure S.1-2). The original lease was executed effective June 12, 1974. A royalty bid of 12.00%, payable on ores containing 700,000 lb (318,000 kg) of U_3O_8 secured the lease.

A mining plan was submitted on June 10, 1976, proposing entry by a 16-ft (4.9-m) diameter, 320 ft (98 m) deep, shaft located in the northwest corner of the property. The leasee began sinking the shaft shortly after the plan was approved, and the shaft was bottomed in early April 1977. The ore zone was encountered almost immediately and the initial shipment of ore was made on May 26, 1977. As mining continued, a second level was developed that ultimately yielded the bulk of the mine's production. The mine was extended to the west and south and connected with the old Paradox D and Mineral Joe No. 4 mines, respectively; during this time, the mine maintained consistent ore production at approximately 3,000 tons (2,700 metric tons) per month. The mine was shut down in early 1980 due to a lack of economical ore reserves.

Mining resumed briefly in 1989 (as the mine's economics improved) and production continued through June 1990. In March 1998, Gold Eagle Mining, Inc. (GEMI), notified DOE of its intensions to resume operations at the mine. Subsequent to DOE's approval, GEMI upgraded the mine's entire infrastructure to current standards and code. Unfortunately, GEMI could not secure a milling agreement and no ore production occurred. At that time, the mine was placed on standby status.

TABLE S.1-3 Estimated Remaining Ore Reserve at the ULP Lease Tracts

ULP Lease Tract	Remaining Ore Reserves[a] (lb U_3O_8)
5	230,000
5A	30,000
6	850,000
7	2,800,000
8	330,000
8A	30,000
9	630,000
10[b]	0
11	740,000
11A	300,000
12	160,000
13	330,000
13A	220,000
14	85,000
15	84,000
15A	250,000
16	44,000
16A	18,000
17	75,000
18	1,200,010
19[b]	0
19A	1,500,000
20	800,000
21	1,000,000
22	140,000
22A[b]	0
23	550,000
24	90,000
25	540,000
26	68,000
27	87,000
Total remaining ore reserves	13,000,000

[a] Amount shown equals the lease "bid quantity" minus the total production to date. Values have been rounded to two significant figures.

[b] The lease "bid quantity" has been produced from this tract; any additional reserves that may exist have not been quantified.

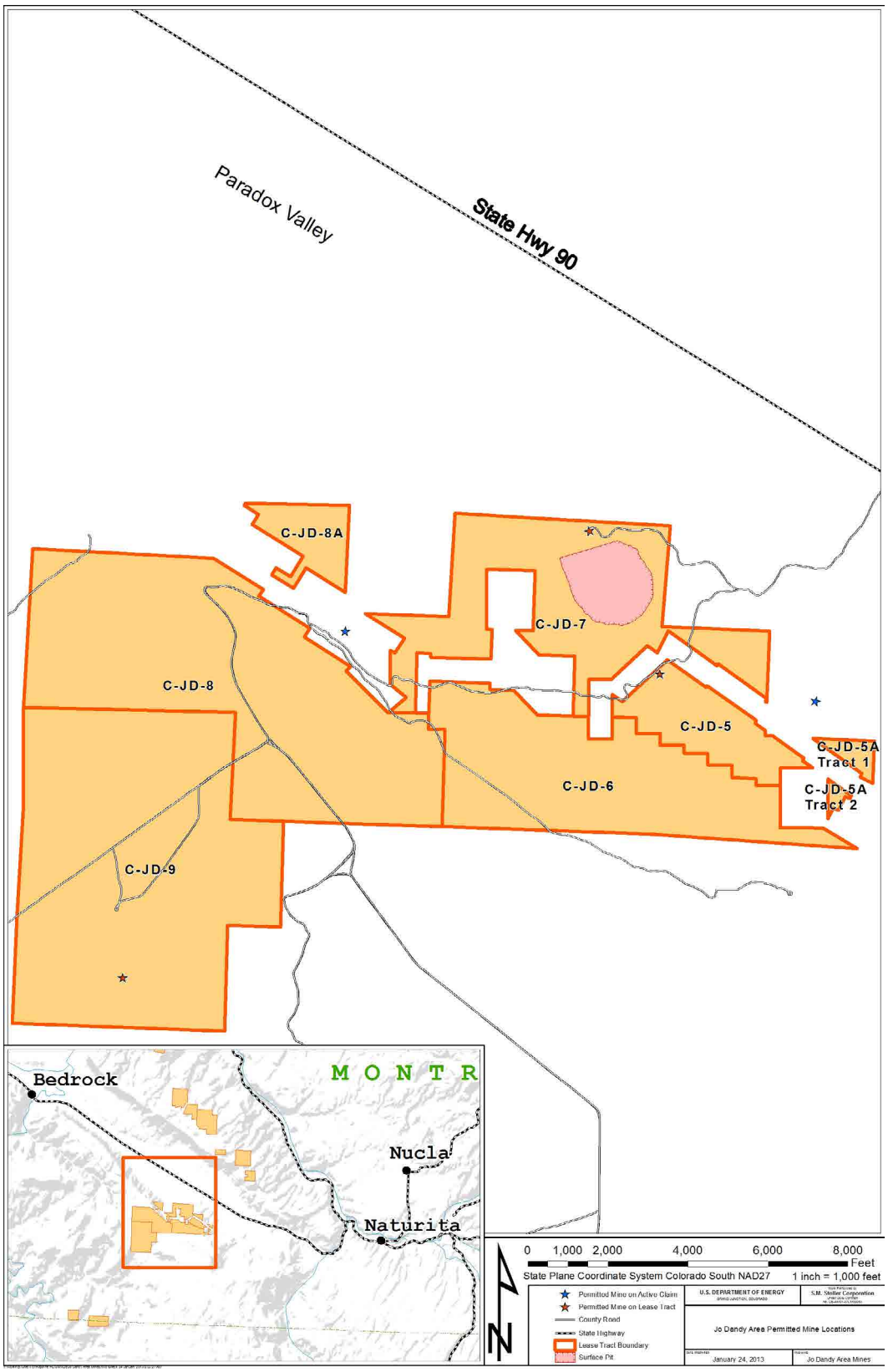

FIGURE S.1-2 Location of Lease Tracts 5, 5A, 6, 7, 8, 8A, and 9

A total of 136,000 tons (123,000 metric tons) of ore, containing 466,000 lb (211,000 kg) of U_3O_8 and 1,812,000 lb (822,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $2,154,000.

S.1.2.3.2 ULP Lease Tract 6. On Lease Tract 6, the C-JD-6 mine is located in Sections 21 and 22, T 46 N, R 17 W, NMPM, in Montrose County, Colorado (see Figure S.1-2). The original lease was executed effective April 18, 1974. A royalty bid of 14.20% payable on ores containing 1,200,000 lb (544,000 kg) of U3O8 secured the lease.

A mining plan was submitted in September of 1975 proposing access through the Duggan Adit, which is located on adjacent, privately held unpatented claims. The plan was approved and development work began the following April. The first ore shipment from the mine was made on May 12, 1976; however, the true production cycle did not begin until August 1977. Mining continued much the same until May 1980, at which time Cotter Corporation announced a temporary shutdown of operations effective August 8, 1980.

In May 2004, the lessee, Cotter, notified DOE of its intensions to resume operations at the mine. Subsequent to DOE's approval and following several weeks of site preparation, Cotter resumed mining activities on August 2, 2004. Production continued through November 2005, at which time mining was suspended and the mine was placed on standby status. In 2008, Cotter installed a lysimeter downgradient of the mine site to determine whether near-surface soils or rock formations contain moisture that could affect (or be affected by) the mine site. The lysimeter is monitored monthly.

A total of 107,000 tons (97,000 metric tons) of ore, containing 350,000 lb (159,000 kg) of U_3O_8 and 2,248,000 lb (1,020,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $2,946,000.

S.1.2.3.3 ULP Lease Tract 7. On Lease Tract 7, the C-JD-7 mine is located in Sections 16, 20, 21, and 22, T 46 N, R 17 W, NMPM, in Montrose County, Colorado (see Figure S.1-2). The original lease was executed effective April 18, 1974. A royalty bid of 27.30% payable on ores containing 2,800,000 lb (1,270,000 kg) of U3O8 secured the lease.

An underground mining plan was submitted in November 1976 proposing entry through a 1600-ft (490-m) decline in the northern portion of the tract. The plan was approved and development work was initiated the following May. Following numerous delays, including the encountering of sugar sands, which require continuous support, the incline was finally bottomed in December 1978. Water was then encountered in the drift and two evaporation ponds were constructed to support dewatering activities. The first ore was shipped in July 1979 and production continued through May 1980, at which time Cotter Corporation announced a temporary shutdown of operations effective May 22, 1980. In June 1980, the water treatment system was redesigned (another pond was built) to bring the mine-water treatment system into compliance with the existing NPDES permit. In June 2005, Cotter notified DOE of its intensions

to resume operations at the mine. Subsequent to DOE's approval, Cotter began rehabilitating the underground mine workings to support future production activities. This work continued through November 2005, at which time development activities were suspended and the mine was placed on standby status.

During May 1979, Cotter submitted an open pit mining plan for the property that would require the removal of 13 million tons (12 million metric tons) of overburden and affect some 650 acres (260 ha). The plan was approved in November and Cotter entertained bids on two separate contracts. The first contract was for the removal of the vegetation; that work was initiated in January 1980. The second contract was for Phase 1 of stripping the overburden, which began in April 1980. Phase 1 activities included utilizing the northern portion of Lease Tract 7A (also a Cotter lease tract) for the spoils pile. Stripping activities continued at a rate of 1,000,000 yd^3 (765,000 m^3) per month for 13 months, until March 31, 1981, at which time the mine was placed on standby status due to declining market conditions. Once in production, the operation was expected to produce 500 tons (450 metric tons) of ore per day, averaging 0.30% U_3O_8.

On February 16, 2011, DOE executed a modification to the lease that incorporated Lease Tract 7A into 7, recognizing that the two lease tracts were inseparable due to the open-pit mining operation.

A total of 12,000 tons (11,000 metric tons) of ore, containing 46,000 lb (21,000 kg) of U_3O_8 and 125,000 lb (57,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $1,442,000.

S.1.2.3.4 ULP Lease Tract 8. On Lease Tract 8, the C-JD-8 mine is located in Sections 17, 18, 19, and 20, T 46 N, R 17 W, NMPM, in Montrose County, Colorado (see Figure S.1-2). The original lease was executed effective April 18, 1974. A royalty bid of 36.20% payable on ores containing 375,000 lb (170,000 kg) of U3O8 secured the lease.

In January 1984, a mining plan was submitted proposing access through the Opera Box Adit, which is located on an adjacent, privately held patented claim. This plan was approved on November 18, 1985; however, it was never acted upon. A revised mining plan, updated to meet current requirements, was submitted in December 2004 and was approved January 21, 2005. Cotter Corporation enlarged the existing Opera Box portal and the main haulage drift to accommodate larger, more modern equipment. The first ore shipment from the mine was made in June 2005 and production continued through November 2005, at which time mining was suspended and the mine was placed on standby status. In 2008, Cotter installed a lysimeter downgradient of the mine site to determine whether near-surface soils or rock formations contain moisture that could affect (or be affected by) the mine site. The lysimeter is monitored monthly.

A total of 9,000 tons (8,000 metric tons) of ore, containing 46,000 lb (21,000 kg) of U_3O_8 and 178,000 lb (81,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $1,264,000.

S.1.2.3.5 ULP Lease Tract 9. On Lease Tract 9, the C-JD-9 mine is located in Sections 19, 29, and 30, T 46 N, R 17 W, NMPM, in Montrose County, Colorado (see Figure S.1-2). The original lease was executed effective April 18, 1974. A royalty bid of 24.30% payable on ores containing 850,000 lb (386,000 kg) of U3O8 secured the lease.

A mining plan was submitted in February 1977 proposing entry through a 1700-ft (520-m) incline of –17.5% in the south-central portion of the tract. The plan was approved and development work began in May. Numerous delays were encountered while sinking the decline; however, it was finally bottomed in March 1978 and development drift work continued toward different ore bodies. Water was soon encountered and two evaporation ponds were constructed to support dewatering activities. Some ore was encountered in August 1978 and the initial ore shipment was made. The ore production rate soon increased and ore shipments were made on a regular basis until May 1980 when Cotter Corporation announced a temporary shutdown of operations effective August 8, 1980.

On April 28, 1998, Cotter submitted a plan to construct two new mine-water treatment ponds and decommission the existing pond system on top of Monogram Mesa. Construction of the ponds was completed, but the ponds were never lined or put into service and the existing pond system was never decommissioned.

In March 2003, Cotter advised DOE of its plans to resume mining operations at the site. Following several weeks of site preparation, Cotter resumed production activities at the mine. Mine production activities continued through November 2005, at which time mining was suspended and the mine was placed on standby status. In 2008, Cotter installed a lysimeter downgradient of the mine site to determine whether near-surface soils or rock formations contain moisture that could affect (or be affected by) the mine site. In addition, in December 2006 DOE approved the installation of a groundwater monitoring well downgradient of the mine site. The lysimeter and monitoring well are monitored and sampled monthly. In October 2008, Cotter notified DOE of a rockfall that had recently occurred at the mine, approximately 100 ft (30 m) down the main haulage drift from the portal. In discussions between DOE and Cotter, Cotter concluded that it would assess the situation and options.

A total of 55,000 tons (50,000 metric tons) of ore, containing 223,000 lb (101,000 kg) of U_3O_8 and 1,112,000 lb (504,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $2,586,000.

S.1.2.3.6 ULP Lease Tract 11. On Lease Tract 11, the C-SR-11 mine is located in Sections 8, 17, and 18, T 43 N, R 19 W, NMPM, in San Miguel County, Colorado (see Figure S.1-3). The original lease was executed effective June 12, 1974. A royalty bid of 11.67% payable on ores containing 900,000 lb (408,000 kg) of U_3O_8 secured the lease.

A number of different mining plans were submitted and approved for the lease tract, proposing re-entry into existing mines and resumption of mining activities through existing mine workings. However, only two operations bear any significant recognition: the Brighton and Ike

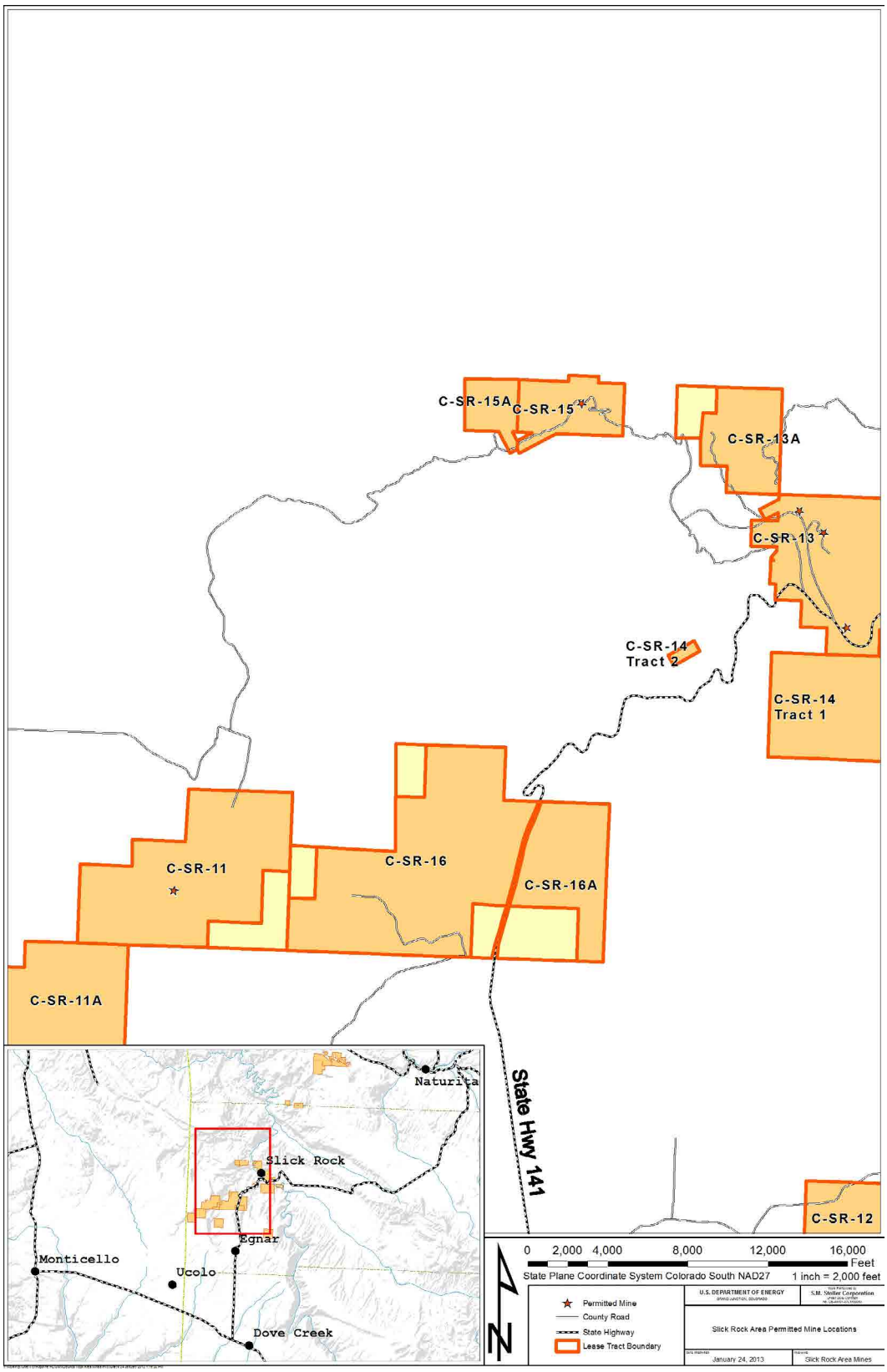

FIGURE S.1-3 Location Lease Tracts 11, 11A, 12, 13, 13A, 14, 15, and 15A

mines. The Brighton mine, located along the rim of Summit Canyon, was in production from December 1975 through April 1977. The Ike mine complex, mined through the Dawson Incline, was in production from August 1975 through mid-December 1980. This operation included some initial work in the existing Ike No. 2 mine, in addition to development of and production from a nearby incline on the Radium No. 8 claim adjacent to the lease tract along the northeast corner. In December 1980, mining activities on the lease tract were suspended and the mines were placed on standby status. In 1999, Cotter Corporation initiated reclamation activities at the Brighton and Ike mines, as well as on legacy mine sites located on the lease tract. The mine portals and ventilation shafts were permanently sealed and closed; the mine waste-rock dumps were recontoured to blend in with the surrounding natural topography, and the disturbed areas were reseeded. These activities were completed in the fall of 2000.

In February 2005, Cotter proposed a new mine for the lease tract located in the south-central portion of the property. Entry was to be gained from a 1,300-ft (400-m) decline, and DOE approved the plan in June 2005. Mine development work began almost immediately and continued through November 2005, at which time mining activities were suspended and the mine was placed on standby status. At that time, the decline had been advanced approximately 250 ft (76 m).

A total of 47,000 tons (43,000 metric tons) of ore, containing 162,000 lb (73,000 kg) of U_3O_8 and 925,000 lb (420,000 kg) of V_2O_5 have been produced and sold from the lease tract mines. Royalties paid for this lease tract (production royalties plus annual royalties) total $1,200,000.

S.1.2.3.7 ULP Lease Tract 13. On Lease Tract 13, the C-SR-13 mine is located in Sections 29, 30, 31, 32, and 33, T 44 N, R 18 W, NMPM, in San Miguel County, Colorado (see Figure S.1-3). The original lease was executed effective May 24, 1974. A royalty bid of 20.60% payable on ores containing 700,000 lb (318,000 kg) of U_3O_8 secured the lease.

The initial mining plan submitted in January 1975 proposed entry through the Burro Tunnel Mine. The mine portal and a portion of the main haulage drift are located on the lease tract but provide access to the Burro Mine complex, which is located immediately north of the lease tract on the privately held unpatented Burro claims. The plan was approved and production began from an area along the northern boundary of the lease tract in an area of the Burro Mine complex where ore was showing in the heading. Production continued from there and extended southward toward the Ellison Mine. The initial shipment of ore was made in June 1975 and production continued through 1981, at which time the mine was placed on standby status. A second mining plan (the New Ellison Mine) was submitted in November 1978 proposing entry through a new decline into the area northeast of the existing Ellison mine, with which it would connect for ventilation. The plan was approved and development began in May 1979. The incline was bottomed in August 1980 and development continued through December of that year. Although ore is showing in several headings, the operation was limited to development and no ore was produced. In March 1981, the mine was expanded to connect with the existing Ellison mine, establishing a ventilation pathway and a secondary escapeway. Shortly afterward,

operations ceased and this mine was also placed on standby status. Other operations were conducted sporadically during this time and include mines such as Hawkeye and Herbert. However, ore shipments from these operations were small and relatively insignificant when compared to the operation at the Burro Mine complex. These smaller mine sites have since been reclaimed. The mine portals were gated to conserve bat habitat, or were permanently sealed and closed; the mine-waste-rock dumps were recontoured to blend in with the surrounding, natural topography; and the disturbed areas were reseeded.

A total of 86,000 tons (78,000 metric tons) of ore, containing 323,000 lb (147,000 kg) of U_3O_8 and 2,766,000 lb (1,255,000 kg) of V_2O_5, have been produced and sold from the lease tract. Royalties paid for this lease tract (production royalties plus annual royalties) total $4,047,000.

S.1.2.3.8 ULP Lease Tract 18. On Lease Tract 18, the C-SM-18 mine is located in Sections 21, 22, 26, 27, and 28, T 48 N, R 17 W, NMPM, Montrose County, Colorado (see Figure S.1-4). The original lease was executed effective April 18, 1974. A royalty bid of 15.60% payable on ores containing 1,300,000 lb (590,000 kg) U_3O_8 secured the lease.

A mining plan was submitted in March 1978 proposing entry through a 1540-ft (470-m) decline in the northwestern portion of the lease. The plan was approved and development began in late May. After numerous delays, the incline was bottomed in September 1979 and production began in December of that year. The initial shipment of ore was made in February 1980. Production continued until May when Cotter Corporation announced a temporary shutdown of operations effective May 22, 1980. The mine was placed on standby status and remained so until October 2000. At that time, Cotter submitted a reclamation plan for a portion of its mining operations on Lease Tract 18. The plan was approved by DOE in January 2001 and reclamation activities were completed in February. The mine portal and ventilation shaft were permanently sealed and closed; the mine-waste-rock dump was recontoured to blend in with the surrounding, natural topography; and the disturbed areas were reseeded. The maintenance shop building was left intact to support Cotter's continuing operations on the lease tract.

In September 2004, Cotter submitted a new mining plan, proposing entry into the southern portion of the lease tract through the Wright Mine located on an adjacent, privately held patented claim. DOE approved the plan in October 2004 and site preparation activities began almost immediately. Mining was initiated in the first quarter of 2005 and shipments of lease tract ore began in March. Mining was suspended in November 2005 and the mine was placed on standby status. In 2008, Cotter installed a lysimeter downgradient of the mine site to determine whether near-surface soils or rock formations contain moisture that could affect (or be affected by) the mine site. The lysimeter is monitored monthly.

A total of 27,000 tons (24,000 metric tons) of ore, containing 136,000 lb (62,000 kg) of U_3O_8 and 1,163,000 lb (528,000 kg) of V_2O_5, have been produced and sold from the mine. Royalties paid for this lease tract (production royalties plus annual royalties) total $1,950,000.

FIGURE S.1-4 Location of Lease Tract 18

S.1.3 Purpose and Need for Agency Action

The underlying purpose and need for agency action is to support the implementation of the Atomic Energy Act (AEA)(42 U.S.C. §§ 2096-2097), which authorized and directed DOE to develop a supply of domestic uranium and to issue leases for the mining of uranium and other source materials to effectuate the provisions of the AEA, and the implementation of the Energy Policy Act of 2005 (Public Law [P.L.]109-58), which emphasized the reestablishment of nuclear power (Sections 601 through 657). In support of these statutes, DOE needs to determine the future course of the ULP, including whether to continue leasing some or all of the withdrawn lands and Government-owned patented claims (referred to as "DOE-managed lands") for the exploration and production of uranium and vanadium ores.

S.1.4 Proposed Action

DOE's proposed action is to decide whether to continue the ULP and, if it decides to continue the ULP, to determine which alternative to adopt in order to manage the ULP. DOE developed the range of reasonable alternatives by carefully considering DOE's underlying need for action and comments received during the public scoping period for this Draft ULP PEIS.

S.1.5 Cooperating and Commenting Agencies

DOE invited various Federal, state, and county agencies and tribal nations to participate either as a cooperating agency or commenting agency in the preparation of the Draft ULP PEIS. Since January 2012, monthly telephone conferences have been held between DOE and the cooperating agencies to develop the Draft ULP PEIS. The following government agencies and tribal groups are participating as cooperating agencies by providing their expertise and knowledge about various areas required during the preparation of the Draft ULP PEIS:

1. *BLM:* Jurisdictional responsibilities in land use planning, designations, or restrictions on and surrounding DOE-withdrawn lands; and an understanding of the potential impacts from increased mining and oil and gas exploration and development. An MOU between the BLM and DOE (BLM and DOE 2010) is currently in place that identifies the individual and shared roles and responsibilities of DOE and the BLM with respect to the DOE ULP.

2. *EPA:* Expertise in addressing the protection of human health and the environment (e.g., water quality, air quality, and radiation protection).

3. *CDOT:* Knowledge of local and regional transportation systems including primary and secondary highways.

4. *CDRMS:* Expertise in mining and reclamation and the safety requirements attendant to these activities. An MOU between DOE and CDRMS (DOE and

CDRMS 2012) is currently in place for the purpose of promoting coordination between DOE and CDRMS to result in efficient and effective oversight of uranium and vanadium mining on the DOE ULP lease tracts.

5. *CPW:* Expertise in addressing the protection of wildlife.

6. *Mesa County Commission:* Expertise in identifying and assessing the potential impacts that energy development activities, such as uranium mining, would have on the county's economy, residents, and the environment, including its primary and secondary roadways.

7. *Montrose County Commissioners:* Expertise in socioeconomic, transportation, and water quality issues related to the county.

8. *San Juan County Commission:* Expertise in identifying and assessing the potential impacts that energy development activities, such as uranium mining, would have on the county's economy, residents, and the environment, including its primary and secondary roadways.

9. *San Miguel County Board of Commissioners:* Expertise in identifying and assessing the potential impacts that energy development activities, such as uranium mining, would have on the county's economy, residents, and the environment, including its primary and secondary roadways and land use and planning.

10. *Navajo Nation:* Knowledge of cultural resources in the area.

11. *Pueblo of Acoma Tribe*: Knowledge of cultural resources in the area.

12. *Pueblo de Cochiti Tribe*: Knowledge of cultural resources in the area.

13. *Pueblo de Isleta Tribe*: Knowledge of cultural resources in the area.

14. *Southern Ute Indian Tribe:* Knowledge of cultural resources in the area.

The following agencies and tribal groups chose to participate as commenting agencies and are included in the project distribution list to receive the Draft ULP PEIS for review and comment:

1. USFWS;

2. U.S. Nuclear Regulatory Commission (NRC);

3. CDPHE;

4. Utah Department of Transportation;

5. Hopi Nation;

6. Ute Indian Tribe;

7. Ute Mountain Ute Tribe; and

8. White Mesa Ute Tribe.

S.1.6 Consultation

In the NOI (76 FR 36097) to prepare the ULP PEIS, DOE stated that it is preparing to enter into consultation with the USFWS, in compliance with Section 7 of the ESA, concerning DOE's management of the ULP. Section 7 of the ESA requires Federal agencies to consider the effect of their undertakings on species listed under the ESA and to consult with the USFWS to ensure that the action or actions that they fund, authorize, or permit are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the critical habitat of such species. DOE and the USFWS have initiated the informal consultation, and DOE is currently preparing a biological assessment (BA). DOE has also provided the USFWS with updates on the ULP PEIS project schedule.

The Government-to-government relationship with Indian tribes was formally recognized by the Federal Government with Executive Order (E.O.) 13175 on November 6, 2000, and DOE is coordinating and consulting with Indian tribal governments, Indian tribal communities, and tribal individuals whose interests might be directly affected by activities on the ULP lands. As part of this consultation, DOE has contacted 25 Indian tribal governments to provide them with opportunities for Government-to-government consultation by participating in the planning and resource management decision-making throughout the ULP PEIS process. Five are participating as cooperating agencies, and four are participating as commenting agencies (see Section S.1.5).

S.2 NEPA PROCESS FOR THE ULP PEIS

After the ULP PEIS is completed and at least 30 days after the EPA issues a notice of availability of the Final ULP PEIS, DOE may issue a Record of Decision (ROD) announcing DOE's selection of an alternative for the continued management of the ULP. Section S.2.2 of this Summary identifies DOE's preferred alternative (i.e., Alternative 4, to continue with exploration, mine development and operations, and reclamation on the 31 DOE ULP lease tracts for the next 10 years or another reasonable time period). After the ROD is issued, as plans (exploration, mining, and reclamation) are submitted by the lessees to DOE for approval, further NEPA review for a given action would be conducted. The level of follow-on NEPA review for a

given lease tract (e.g., categorical exclusion determination, environmental assessment, or EIS) would depend on the action being proposed by the lessees, as indicated in the plans submitted.

This NEPA review would be conducted to inform DOE's decision on approval of the plans, including the conditions DOE would require to mitigate potential environmental impacts. No activity can be undertaken by the lessees until DOE has approved the plans submitted. DOE's review would be conducted in consultation with Federal, state, and local agencies. Tribal consultation would also be undertaken for site-specific actions, as appropriate. Public participation on the follow-on NEPA review would occur in a manner consistent with the level of review conducted and with DOE and CEQ guidelines. Section S.2.1 discusses the public participation process for the ULP PEIS.

FIGURE S.2-1 NEPA Process for the ULP PEIS

During the preparation of the ULP PEIS, opportunities for public participation have been and are being provided (see Figure S.2-1). Consistent with CEQ requirements (40 CFR 1501.7) and DOE NEPA implementation procedures (10 CFR 1021.311), an early and open scoping process was carried out to determine the scope of the ULP PEIS and identify significant issues related to the proposed action. An NOI was issued for public review, and a public scoping process was conducted. Public participation is also being solicited for the review of the Draft ULP PEIS during the public comment period. NEPA requires that comments on the Draft ULP PEIS be evaluated and considered during the preparation of the Final ULP PEIS and that a response to comments be provided.

S.2.1 Public Involvement

The NOI (76 FR 36097) to prepare the ULP PEIS was issued on June 21, 2011, and a supplemental notice (76 FR 43678) was issued on July 21, 2011, to announce the four public scoping meetings and their locations and to announce the extension of the public scoping period to September 9, 2011. Public scoping meetings were held in Montrose, Telluride, and Naturita in Colorado and in Monticello, Utah.

In addition to presenting comments at the scoping meetings, stakeholders could also mail comments directly to DOE or submit comments through the project web site (http://ulpeis.anl.gov/) by completing and submitting a scoping comment form. A total of 287 unique "comment documents" were submitted by individuals, organizations, and government agencies to provide comments on the scope of the ULP PEIS. A comment document

is a written document, an e-mail submission, or an oral presentation given during a scoping meeting that provides comments on the scope of the PEIS. A single comment document may contain multiple comments on one or more issues. There were 61 comment documents provided at the scoping meetings; 164 were mailed to DOE (counting both e-mails and regular mail), and 62 were submitted electronically through the project web site. Of these comment documents, 8 were received from Federal, state, or local government agencies, with the remainder being from individuals or other organizations. Of the 262 comments for which a state of origin was identified, approximately 88% were from Colorado within the potentially affected area. However, comments were received from 12 other states as well.

Comments received during the public scoping period focused on whether or not the ULP or uranium mining at the lease tracts should be continued. Summarized comments and DOE responses are provided as follows. The first set of comments (Section S.2.1.1) consists of those comments determined to be within the scope of the ULP PEIS, and the second set (Section S.2.1.2) consists of those determined to be outside the scope of the ULP PEIS.

S.2.1.1 Comments Considered within ULP PEIS Scope

- *The current leases should be terminated and reclamation conducted, after which uranium mining should not be conducted on the lands. The lands could be restored to the public domain under BLM oversight and the DOE ULP terminated.*

  Alternatives 1 and 2 evaluated in the Draft ULP PEIS address this comment. Under Alternative 1, all leases on the 31 lease tracts would be terminated, and reclamation would be conducted where needed. The lands would then be maintained per DOE oversight without leasing for uranium mining. Alternative 2 evaluated in the Draft ULP PEIS is similar to Alternative 1, except once reclamation was completed by lessees, DOE's jurisdiction would return to BLM, if approved by DOI/BLM (in accordance with 43 CFR § 2372.3). If approved, the land would be managed by BLM under its multiple use policies. DOE's uranium leasing program would end.

- *DOE should continue with the ULP and continue to make the 31 lease tracts available for exploration, mine development and operations, and reclamation, as was the case before the preparation of the PEIS was initiated.*

  Alternatives 4 and 5 evaluated in the Draft ULP PEIS address this comment. Under Alternative 4, DOE would continue the ULP with the 31 lease tracts for the next 10-year period or for another reasonable period. Alternative 5 is similar to Alternative 4, except that the lease period is limited to the remainder of the current 10-year lease period and the leases would continue exactly the same as when they were issued in 2008.

- *DOE should prohibit any further mining or exploration until reclamation has been completed on existing or old leases.*

  As mentioned above, reclamation would be conducted where needed as part of the alternatives evaluated in the Draft ULP PEIS. In addition, all legacy mine sites located on the DOE lease tracts have already been reclaimed.

- *DOE should stipulate protection of the Dolores and San Miguel River watersheds.*

  The preferred alternative includes a requirement for future mines to be at least 0.25 mi (0.40 km) from the Dolores River. The San Miguel River is about 0.3 mi (0.54 km) from the closest lease tracts. The evaluation for water quality discussed in the Draft ULP PEIS considers both the Dolores and San Miguel Rivers.

- *Potential impacts from uranium mining at the DOE ULP lease tracts on air quality, water quality, human health, socioeconomics, transportation, views from sensitive areas, and cultural resources should be evaluated.*

  Chapter 4 of the Draft ULP PEIS (as summarized in Section S.4) analyzes the potential impacts associated with the human health and environmental resource areas listed. Potential impacts on noise, soil resources, land use, ecology, environmental justice, and waste management are also analyzed.

- *DOE should undertake its duties under Section 7 of the ESA.*

  DOE is engaged in consultation with the USFWS pursuant to Section 7 of the ESA. A BA is also being prepared as part of this consultation. Chapter 6 of the Draft ULP PEIS presents a summary of this consultation.

- *DOE should collaborate with other agencies, including the CDRMS, BLM, and EPA.*

  DOE is collaborating with various agencies, including the CDRMS, BLM, and EPA, on the ULP PEIS process. Section S.1.5 presents a list of the cooperating agencies and the commenting agencies.

- *The review and approval process must include a site-specific NEPA review for each proposed mining operation.*

  This PEIS utilizes site-specific data that are available and contains a discussion of the NEPA process that would be conducted once site-specific and project-specific mine plans were submitted by the lessees to DOE for review and approval.

S.2.1.2 Comments Considered outside PEIS Scope

- *Because of unstable uranium markets and the uncertainty of future commercial development of nuclear power facilities, uranium should be preserved for the future use by the American people until it becomes critical for national strategic energy purposes.*

  The issue presented is not within the scope of the purpose and need for DOE's action (described in Section S.1.3 of this Summary).

- *Analyze a No Action Alternative that would allow the leases to lapse with no reclamation conducted.*

  The option of not performing reclamation when leases lapse or are terminated is not consistent with the requirements of the leases, the ULP, and applicable laws and is therefore not considered a reasonable alternative to evaluate in the Draft ULP PEIS.

- *Analyze the economic benefit of fully reclaiming and rehabilitating all Federal and state lands in the Uravan Mineral Belt and compare that to the economic benefit of maintaining the existing uranium leases over the next 5 years.*

  The economic study suggested is not relevant and is considered outside the scope of the Draft ULP PEIS. It does not meet the purpose and need for DOE's action (described in Section S.1.3 of this Summary).

S.3 SCOPE OF THE DRAFT ULP PEIS

The Draft ULP PEIS evaluates five alternatives for managing the ULP for which there are 31 lease tracts located in Mesa, Montrose, and San Miguel Counties in western Colorado. These alternatives address the range of reasonable options, which involve (1) terminating the leases and conducting reclamation where needed, with DOE continuing to maintain oversight of the lands without uranium leasing; (2) terminating the leases and conducting reclamation where needed, relinquishing the lands for potential management by BLM as public domain lands; (3) terminating the DOE ULP; and (4) continuing the ULP with associated exploration, mine development and operations, and reclamation at some or all of the 31 lease tracts. At the time that the Draft ULP PEIS was being prepared, 29 of the 31 lease tracts were actively held under lease, and the remaining 2 tracts had not been leased.

Of the 31 lease tracts, 11 are located in San Miguel County, 17 are located in Montrose County, 2 are located in Mesa County, and 1 is located in both San Miguel and Montrose Counties. The lease tracts vary in size from as small as 25 acres (10 ha) to as large as about 4,000 acres (1,600 ha).

The 29 active leases are held by five companies: (1) Golden Eagle Uranium, LLC; (2) Cotter Corporation; (3) Gold Eagle Mining, Inc.; (4) Colorado Plateau Partners; and (5) Energy Fuels Resources Corporation, Inc.

The Draft ULP PEIS evaluates the three mining phases associated with the underground and surface open-pit mining methods. These phases are the exploration phase, mine development and operations phase, and reclamation phase. The resource areas listed below are evaluated; cumulative impacts that consider the potential impacts from the five alternatives in combination with impacts from past, present, and reasonably foreseeable future actions are also evaluated.

- Air quality,
- Acoustic environment (noise),
- Geology and soils,
- Water resources,
- Human health,
- Ecological resources,
- Land use,
- Socioeconomics,
- Environmental justice,
- Transportation,
- Cultural resources,
- Visual resources, and
- Waste management.

The analyses in this Draft ULP PEIS incorporates site-specific information available regarding the ULP lease tracts (e.g., including current lessee information and status, size of each lease tract, previous mining operations that occurred, location of existing permitted mines and associated structures, and other environmental information) . In addition, since, as of the preparation of the Draft ULP PEIS, no new mine plans have been submitted to DOE by the lessees, the locations where new, future, potential mining would take place and other associated details are not currently known. Hence, the evaluation conducted in the Draft ULP PEIS also incorporates assumptions for developing a reasonable scenario that could represent an upper-bound level for possible future mining activity under each of the alternatives, as appropriate.

S.3.1 Alternatives Evaluated in the Draft ULP PEIS

DOE developed the range of alternatives for determining how the ULP should be managed by carefully considering the following: (1) the need for uranium reserves to support energy development (consistent with the Energy Policy Act of 2005); (2) other mining issues; and (3) comments received during the public scoping period for the NOI (76 FR 36097) to prepare the ULP PEIS. The five alternatives are as follows:

1. *Alternative 1:* DOE would terminate all leases, and all operations would be reclaimed by lessees. DOE would continue to manage the withdrawn lands, without uranium leasing, in accordance with applicable requirements.

2. *Alternative 2:* Same as Alternative 1, except once reclamation was completed by lessees, DOE would relinquish the lands in accordance with 43 CFR Part 2370. If DOI/BLM determines, in accordance with that same Part of the CFR, the lands were suitable to be managed as public domain lands, they would be managed by BLM under its multiple use policies. DOE's uranium leasing program would end.

3. *Alternative 3:* DOE would continue the ULP as it existed before July 2007, with the 13 active leases, for the next 10-year period or for another reasonable period, and DOE would terminate the remaining leases.[4]

4. *Alternative 4:* This is the preferred alternative under which DOE would continue the ULP with the 31 lease tracts for the next 10-year period or for another reasonable period.

5. *Alternative 5:* This is the No Action Alternative, under which DOE would continue the ULP with the 31 lease tracts for the remainder of the 10-year period, and the leases would continue exactly as they were issued in 2008.

S.3.1.1 Alternative 1

Alternative 1 would involve terminating the existing leases and conducting reclamation as needed. Two of the 31 lease tracts are not leased. There are currently no ongoing operations on any of the lease tracts, so no ongoing operations would need to be terminated. Reclamation would need to be conducted at 10 of the 31 lease tracts. These 10 lease tracts (11, 13, 15, 5, 6, 7, 8, 9, 18, and 26) shown on Figure S.3-1 have areas that were disturbed in the past either for exploration or from operations. Table S.3-1 presents a list of these lease tracts, the lessees, and the approximate acreage that would have to be reclaimed at each lease tract. Existing structures that would have to be removed during reclamation are also listed. Reclamation plans submitted to DOE for review and approval would have to be consistent with CDRMS requirements. CDRMS requires that reclamation plans take into account existing and planned structures before a permit is issued. The reclamation of these structures is approved prior to the issuance of the permit. Any changes not consistent with the approved plans would require a revision to the CDRMS permit.

After the leases were terminated and reclamation was completed, DOE would continue to manage the withdrawn lands and not lease these lands for uranium mining purposes. Under

[4] In July 2007, DOE issued a programmatic environmental assessment and finding of no significant impact for the ULP, which a U.S. District Court invalidated on October 18, 2011.

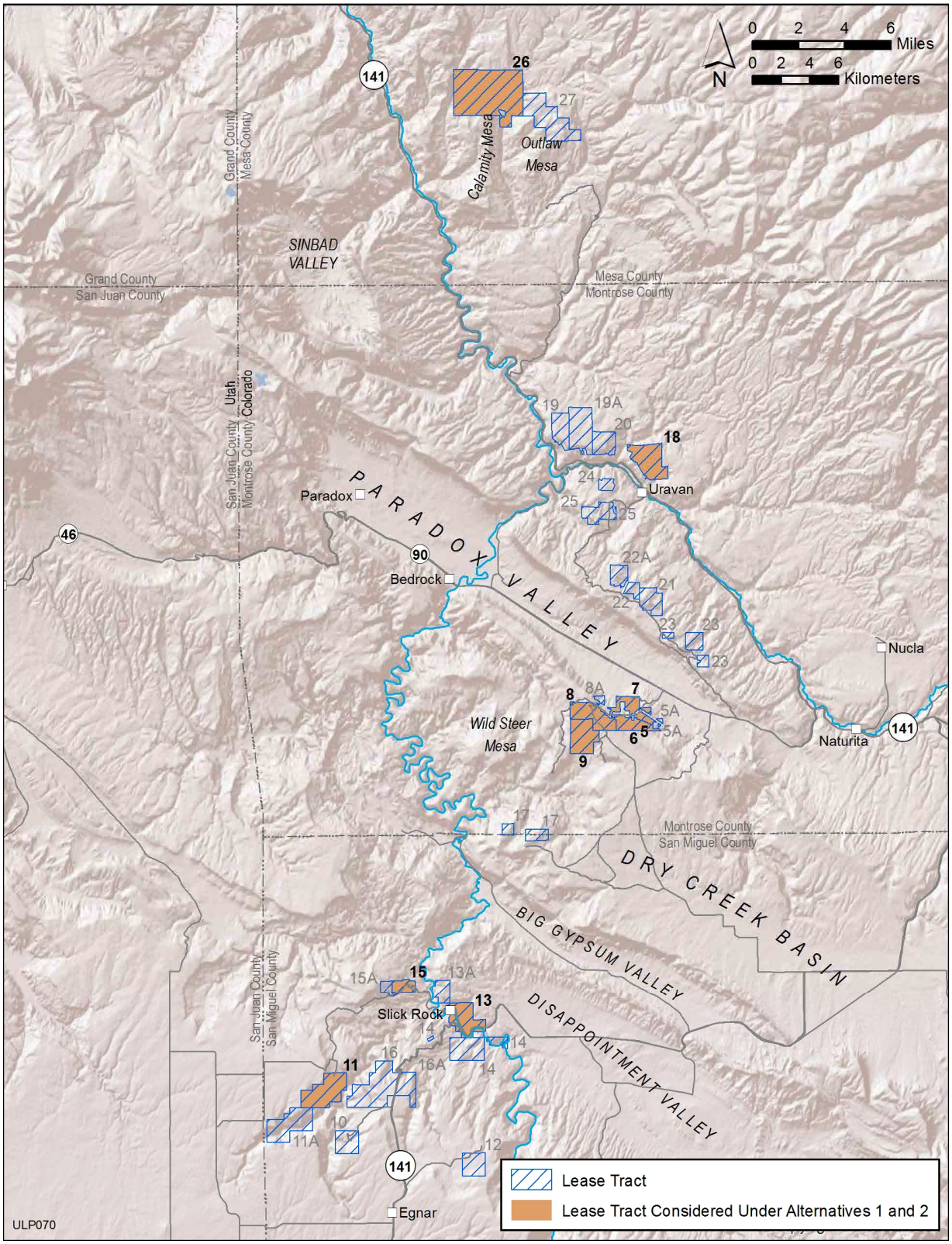

FIGURE S.3-1 Locations of Lease Tracts Evaluated under Alternatives 1 and 2

TABLE S.3-1 Lease Tracts Evaluated under Alternatives 1 and 2

Lease Tract	Lease Tract Acreage[a]	Approximate Acreage of Mine Site Surface To Be Reclaimed	Structures That Need To Be Removed or Reclaimed	Lease Holder
5	151	7	Head frame, hoist house, vent fan, timbered ore bins	Gold Eagle Mining, Inc.
6	530	8	Two vent fans	Cotter Corporation
7	493	210	Small and large shop buildings, three water treatment ponds, 6,000-gal water tank, vent fan, substation	Cotter Corporation
8	955	5	None	Cotter Corporation
9	1,037	8	Shop building, four water treatment ponds, three vents, hoist house, pump house, substation	Cotter Corporation
11	1,303	5[b]	Office trailer, 6,000-gal water tank	Cotter Corporation
13	1,077	8	Grated vent	Gold Eagle Mining, Inc.
15	350	1	None	Gold Eagle Mining, Inc.
18	1,181	4	Shop building, vent fan	Cotter Corporation
26	3,989	1	None	Energy Fuels
Total		257		

[a] Indicates total acreage for the lease tract; only disturbed areas need to be reclaimed as listed in the next column.

[b] In early November 2005, when the mine on Lease Tract 11 was shut down, Cotter Corporation had disturbed just less than 5 acres (2 ha) and had advanced the decline approximately 330 ft (100 m). The development of the decline created a small mine waste-rock dump at the site, which is how conditions remain to date.

Alternative 1, after reclamation was complete, essentially no activity would occur on the lease tracts aside from continued maintenance to ensure conditions would remain consistent with Federal, state, and local requirements. Surface rights would continue to be held by the BLM, and current activities approved or permitted by the BLM would continue under BLM oversight.

S.3.1.2 Alternative 2

Under this alternative, the same 29 leases addressed in Alternative 1 would be terminated. The primary difference between Alternative 1 and 2 is that under Alternative 2, after reclamation was completed by the lessees on the 10 lease tracts listed in Table S.3-1 and shown on Figure S.3-1, DOE would relinquish all the withdrawn lands for potential management by BLM in accordance with 43 CFR § 2372.3. DOE's uranium leasing program would end.

Under BLM management, private parties could establish new mining claims under the 1872 mining law. The potential impacts from any future potential uranium mining under BLM management would likely be similar to those discussed in the Draft ULP PEIS (e.g., those discussed for Alternatives 3 through 5, depending on the level of mining activity). If BLM determines that the relinquished lands cannot be managed as public domain lands, the General Services Administration (GSA) would evaluate potential management and disposition options.

S.3.1.3 Alternative 3

Under Alternative 3, DOE would continue with exploration, mine development and operations, and reclamation at the 13 lease tracts for which leases existed prior to July 2007. The leases on the remainder of the lease tracts would be terminated. The 13 leases before July 2007 were on Lease Tracts 5, 6, 7, 7A, 8, 9, 11, 13, 13A, 15, 18, 21, and 25. Lease Tracts 7 and 7A (separate tracts at that time) were since combined (February 2011) into Lease Tract 7 (held by Cotter Corporation). The lease tracts, which now number 12 (as shown in Figure S.3-2), either have approved exploration drill holes and/or have existing inactive mines or permits for new underground mines. Of the 12 lease tracts, 9 are leased to Cotter Corporation, and the remaining 3 are leased to Gold Eagle Mining, Inc. Table S.3-2 presents a list of the lease tracts evaluated under Alternative 3. Other relevant information about these lease tracts is also presented.

This alternative assumes future mine development and operations would occur on the 12 lease tracts for the next 10 years or for another reasonable period of time, with subsequent reclamation to be conducted after the operations were considered complete. Leases could be extended after the 10-year period was met. Under this alternative, it is expected that all mines to be developed at the 12 lease tracts would be underground mines, with the exception of Lease Tract 7, where an open-pit mine currently exists and would likely be operated. This expectation is consistent with the current status of the 12 leases summarized in Table S.3-2. Notwithstanding the existing, permitted mines located on the lease tracts (that would be expected to resume operations), no new project-specific plans have been submitted to DOE by the lessees. Accordingly, for the purposes of the analyses for the Draft ULP PEIS, additional assumptions have been developed to form the basis of the impacts analyses for Alternative 3.

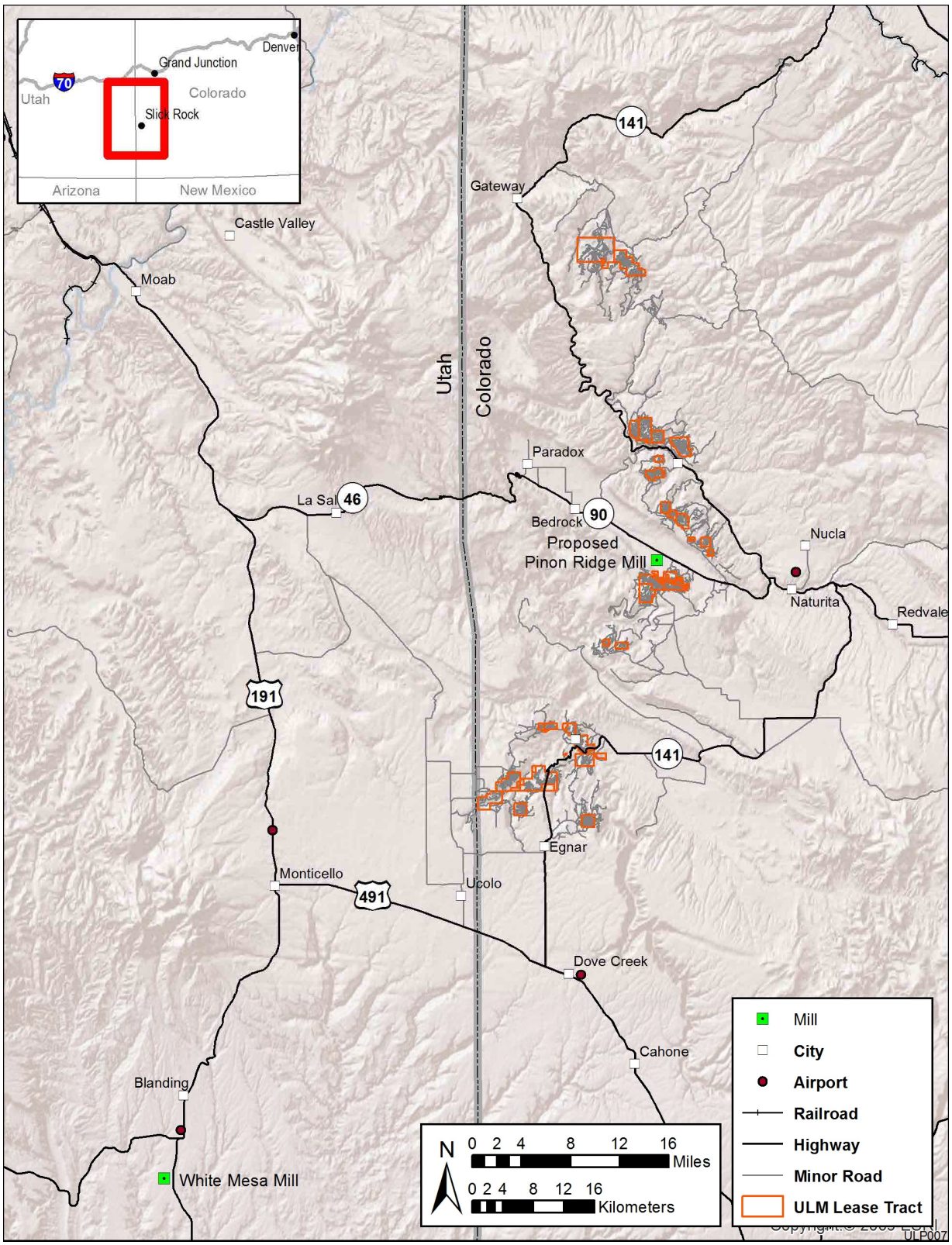

FIGURE S.3-2 Locations of Lease Tracts Evaluated under Alternative 3

TABLE S.3-2 Lease Tracts Evaluated under Alternative 3

Lease Tract	Acreage	Location (County)	Lessee	Current Status
5	151	Montrose	Gold Eagle Mining, Inc.	One existing permitted underground mine
6	530	Montrose	Cotter Corporation	One existing permitted underground mine
7	493	Montrose	Cotter Corporation	Two existing permitted mines: one underground and one very large open pit mine
7A[a]	–	–	–	–
8	955	Montrose	Cotter Corporation	One existing permitted underground mine
9	1,037	Montrose	Cotter Corporation	One existing permitted underground mine
11	1,303	San Miguel	Cotter Corporation	New permit for one underground mine yet to be developed
13	1,077	San Miguel	Gold Eagle Mining, Inc.	Three existing permitted underground mines
13A	420	San Miguel	Cotter Corporation	Exploration of one hole approved; drilling and reclamation of the explored area completed
15	350	San Miguel	Gold Eagle Mining, Inc.	One existing permitted underground mine
18	1,181	Montrose	Cotter Corporation	One existing underground mine
21	651	Montrose	Cotter Corporation	Exploration of two holes approved; drilling and reclamation of the explored area completed
25	639	Montrose	Cotter Corporation	Exploration of one hole approved; drilling and reclamation of the explored area completed

[a] Lease Tract 7A, which existed in 2007, was combined with Lease Tract 7 in February 2011.

It is assumed that activities associated with the exploration phase would be minor, given that at all 12 lease tracts involved under Alternative 3 contain existing permitted mines or have been the subject of exploration activities. However, assumptions for potential new exploration activities were developed to provide the basis for the evaluation in the Draft ULP PEIS. It is assumed that the total disturbed surface area for the exploration of the assumed new two small mines, four medium mines, and one large mine would be about 0.11 acre (0.04 ha), 0.44 acre (0.17 ha), and 0.17 acre (0.06 ha), respectively. The disturbed area for the existing very large open-pit mine (the JD-7 mine) is about 210 acres (80 ha). It is further assumed that the total number of workers for the exploration phase for Alternative 3 is eight workers.

In addition, a "peak year" of activity representing a reasonable upper-bound level of activity was analyzed in order to provide conservative yet reasonable estimates for Alternative 3, addressing impacts that could result from the largest number of mines that could be operated at the same time. The peak year could occur more than once; that is, there could be multiple years with the same number of mines operating at similar ore production rates. It is also reasonable to expect that there would be a smaller number of mines in operation or that ore production could be less in the years other than the peak year(s). Uranium ore from some of the mines could be exhausted before the 10-year lease period, and operations at these mines could end sooner than the 10-year lease period. The potential impacts for years other than the peak year(s) would fall within the range of impacts discussed in the Draft ULP PEIS and summarized in Section S.4. For Alternative 3, the potential impacts for the entire 10-year lease period would be expected to be no more than 10 times those for the peak year, if it is conservatively assumed that all 10 years of mining operations are consistent with the assumptions for the peak year discussed here.

Given that State of Colorado permits have already been obtained for most of the lease tracts and given that these permits hold, the peak year of operations for Alternative 3 could occur as early as year 5 or 6 after the first mine development commenced. The lessees would have to submit a plan to DOE for review and approval. For existing mines on some of the lease tracts, however, operations could resume sooner and simultaneously; this could result in a peak year that would occur sooner. There could be several peak years, depending on how much ore was available on the lease tracts. It is also expected that some of the mines would be terminated before others, depending on the availability of ore deposits. A 10-year lease period would allow for, on average, about 6 years of operations for each of the mines, and that amount of time might or might not be enough to exhaust the ore that would be available, depending on the lease tracts. However, under Alternative 3, the lease period for a given lease could be extended beyond the 10-year period for another reasonable period, which would then allow additional time for mining operations.

Other assumptions made to estimate potential impacts from this alternative include the tonnage that would be generated by each mine, the size of the surface area that would be disturbed by each mine, the number of workers needed, and the amount of water needed for each mine. (It is assumed that this water would be trucked into the work site and used as potable water, for showers, and for other activities such as dust control.) For Alternative 3, it is assumed that in addition to the two retention pond systems that currently exist at ULP mine sites (located at medium-size mines at Lease Tracts 7 and 9), an additional two new retention pond systems

could be utilized for the new mines. Potential future mining operations at lease tracts 8 and 13 could encounter water that might need to employ retention pond systems. These ponds are primarily intended to capture surface water and prevent sediment from entering nearby streams and drainages. The pond volumes are between 330,000 gal (about 1 acre-ft) and 470,000 gal (about 1.5 acre-ft) with discharge rates of between 160,000 gal/mo (0.5 acre-ft/mo) to 280,000 gal/mo (0.86 acre-ft/mo). These assumptions are generally based on past uranium mining experiences in the area.

While the existence of one stockpiles during active mining operations is expected, the duration is not expected to affect human health and the environment. The Colorado State regulations prohibit the stockpiling of ore at the mine sites for more than 180 days.

For the reclamation phase, a workforce of 29 workers would be employed for a 1-year period to perform the reclamation field work for a given peak year. It is assumed that a team of five workers would be employed for about 3 to 4 months (adjusting for seasonal considerations) to conduct the reclamation needed per lease tract. Hence, three teams of five workers each are assumed for the reclamation of the nine lease tracts, excluding the JD-7 mine. It is assumed that an additional 14 workers would work on the reclamation of the JD-7 mine for 1 year. The peak year of reclamation has been analyzed to address a reasonable upper-bound scenario to provide a conservative estimate of potential impacts; however, it is expected that reclamation would be conducted for a given lease tract when mining operations were considered complete. Similar to Alternatives 1 and 2, it is assumed that field work associated with reclamation would be conducted during daytime work hours. Reclamation undertaken for Alternative 3 would require the same types of equipment as those discussed for Alternatives 1 and 2.

S.3.1.4 Alternative 4

All 31 lease tracts (see Table S.1-2) are assumed to be available for potential exploration and mining of uranium ores under Alternative 4. Leases on the ULP lease tracts would be continued for the next 10 years or for another reasonable period, as appropriate. As discussed previously in Section S.1.2, Lease Tract 8A and Lease Tract 14 (i.e., Parcels 14-1, 14-2, and 14-3) are currently not leased. Lease Tract 8A is a small tract that is isolated and may be located entirely below or outside the uranium-bearing formation, which could indicate a lack of ore. Lease Tract 14 is composed of three parcels (14-1, 14-2, and 14-3). There was some interest in Parcels 14-1 and 14-2 by potential lessees in the past; however, the third parcel (14-3, which lies east of 14-1) is located almost entirely within the Dolores River corridor and was never leased. The leases stipulate that no new mining activity could be conducted within 0.25 mi (0.4 km) of the Dolores River.

As is the case for Alternative 3, no new project-specific plans have been submitted to DOE by the lessees with regard to where and how many mines might be developed and operated in the near future. For the purposes of the analyses for the Draft ULP PEIS, various assumptions have been developed to form the basis of the impact analyses for Alternative 4.

It is assumed that there would be a total of 19 mines operating at various production rates at the same time during what would be considered the peak year of operations. That is, the 19 mines would comprise 6 small, 10 medium, 2 large, and 1 very large (open-pit JD-7 mine). Similar to Alternative 3, it is further assumed for Alternative 4 that there would be a smaller number of mines in operation in the years other than the peak year, and that this peak year could occur more than once (i.e., there could be multiple years with the same number of mines operating at similar ore production rates). It is expected that the potential impacts for years other than the peak year(s) would fall within the range of impacts discussed in the Draft ULP PEIS as summarized in Section S.4. Similar to Alternative 3, the potential impacts for the entire 10-year lease period would be expected to be no more than 10 times those for the peak year, if the assumptions for all 10 years of the operations would be the same as those for the for the peak year discussed here.

The peak year could occur as early as the seventh year after operations began, for each of the five companies holding the leases. It is assumed that each company would begin mine development and operations at one mine at a time, with the second mine being developed about 8 months after the first one, and so on, until the entire number of mines planned to operate at the same time would be in operation. It is also likely that the ore for some of the mines would be exhausted after several years (e.g., the resources for the mines that were placed into operation first could be exhausted after 6 years, so the potential impacts for the years before and after the peak year[s] would be less). This assumption allows for 2 to 3 years to obtain permits and approvals for plans submitted.

For the exploration phase for Alternative 4, it is assumed that a total of 0.33 acre (0.13 ha), 1.1 acre (0.44 ha), and 0.33 acre (0.13 ha) of surface would be disturbed for the new 6 small, 10 medium, and 2 large mines assumed, respectively. For the very large mine, 210 acres (92 ha) has already been disturbed at the JD-7 surface open-pit mine. A total of 20 workers would be required to conduct the exploration phase for the number of mines assumed for Alternative 4 (not including the very large open-pit mine at JD-7, for which exploration is assumed to have been completed).

The total area disturbed for Alternative 4 is 460 acres (190 ha). This acreage should remain the same through the life of Alternative 4. Total tonnage of ore generated for the peak year of operation would be about 480, 000 tons. The number of workers needed for mine development and operations would depend on the size of the mine and could vary from 7 to 51 workers. It is assumed that 7, 11, 17, and 51 workers would be needed for each small, medium, large, and very large mine, respectively. These workers would consist mostly of mine workers.

Equipment needed for mine development and operations would include both underground and surface equipment. The equipment includes diesel skid-steer loaders, diesel trucks or buggies, development drills, production drills, exploration drills, backhoes, highway haul trucks, scrapers, and power generators. The items of equipment needed for mine development and operations at the one very large mine evaluated (the JD-7 surface open-pit mine on Lease Tract 7) would be different than those needed for the underground mines assumed under this

alternative; primarily surface equipment (e.g., front-end loaders, bulldozers, dump trucks, and backhoes) would be needed at Lease Tract 7. Water would also be needed and would be trucked in. The annual amount of water needed for the 19 mines assumed for Alternative 4 would be about 6,300,000 gal (19 ac-ft). Similar to the discussion in Section 2.2.3.1 for Alternative 3, retention ponds would be used to capture surface water and prevent sediment from entering nearby streams and drainages. For Alternative 4, as many as four retention ponds are assumed for the peak ULP mining activities with similar pond volumes and discharge rates discussed in Section 2.2.3.1.

Reclamation of the mine operations for Alternative 4 would involve 39 workers over the course of a peak year. It is also assumed that there would be a waiting period of about 1 or 2 years to account for following up on the revegetation and obtaining the necessary release and approval from the state.

Current expectations indicate that most, if not all, of the mines would be underground, with the exception of the JD-7 mine on Lease Tract 7, which is a surface open-pit mine.

S.3.1.5 Alternative 5

The primary difference between Alternatives 4 and 5 is that the leases for Alternative 5 would be for the remainder of the 10-year period and would continue exactly as they were in 2008. This is the No Action Alternative and reflects the current status for the management of the ULP. The ULP is administering the 29 leases that existed in 2008. So far, the 10-year period for these leases has been extended for a time period equivalent to the time taken to prepare and complete this Draft ULP PEIS. It is currently projected that the leases would be extended by about 3 years, which means that instead of expiring in 2018, as originally stipulated, the leases would now be expiring in 2021. The lease tracts are listed in Table S.1-1.

It is assumed that because the lease period for Alternative 5 is shorter than that for Alternative 4, a similar number of mines could be operated in a peak year, but to increase ore production, individual mines would be larger (e.g., there would be more medium mines and no small mines). This would enable the production of as much uranium ore as reasonable within the shorter time frame of Alternative 5. That is, 16 medium, 2 large, and 1 very large (the open-pit JD-7 mine) constitute the 19 mines assumed for Alternative 5. The total amount of ore generated for Alternative 5 for the peak-year operations would be about 552,000 tons. The total area disturbed for Alternative 5 is 490 acres (200 ha). This acreage should remain the same through the life of Alternative 5. Annual water usage would be about 8,000,000 gal (25 ac-ft). Assumptions associated with the exploration and reclamation phases are generally the same as those for Alternative 4.

S.3.2 Preferred Alternative

DOE's preferred alternative for the management of the ULP is Alternative 4. DOE would continue to allow, after appropriate NEPA analysis, the exploration, mine development and operations, and reclamation of uranium mines on the 31 lease tracts that are being managed under the DOE ULP. As stated in previous sections, the primary difference between Alternative 4 (the preferred alternative) and Alternative 5 (the No Action Alternative for the Draft ULP PEIS) is the lease period associated with these alternatives. Under Alternative 4, the lease period would be for the next 10 years or for another reasonable period; under Alternative 5, the lease period would be for the 10-year period stipulated in the leases executed in 2008. Hence, the number of years available for ore generation would be shorter under Alternative 5 and might not give the lessees enough flexibility to time their mining activities to coincide with periods when the economic market for uranium ore was favorable. The shorter period of time associated with Alternative 5 could also mean that the ore in some of the mines might not be exhausted by the time the lease(s) expired, resulting in the premature shutdown of activities, termination, and reclamation.

The comparison and summary of potential impacts in Section S.3 indicates that in general, the impacts from Alternative 4 would be similar to those from Alternative 5. The exception is that it is assumed that a slightly greater quantity of ore would be generated each year under Alternative 5. This assumption was made to simulate conditions in which the lessees would expedite ore production by operating medium-sized to large mines (and not any small mines, which are considered under Alternative 4). The slightly higher amount of ore generated under Alternative 5 would result in potential impacts slightly greater than those under Alternative 4.

Potential impacts from reclamation activities would be similar under all the alternatives, 1 through 5. Potential impacts under Alternatives 1 and 2 would result only from reclamation. Potential impacts from mine operations would be slightly less under Alternative 3 than under Alternative 4 because it is assumed that fewer mines (with fewer leases—12 versus 31) would be operated under Alternative 3. The assumptions developed for Alternative 4 are considered more realistic based on historical experience and on the outlook for future uranium mining in the area.

S.3.3 Alternatives Considered but Not Evaluated in Detail

DOE identified the range of reasonable alternatives for detailed analysis based on the purpose and need for agency action described in Section S.1.3 and comments received during the scoping period. Some comments identified other alternatives, which were considered to be outside the scope of the ULP PEIS.

DOE has focused this Draft ULP PEIS on its AEA authority to manage the leasing of land with known uranium resources withdrawn under PLO 459. The extracted ore would later be converted, enriched, and fabricated into nuclear fuel; used in commercial reactors; possibly reprocessed; and ultimately result in the generation of various radioactive wastes requiring

specialized disposal. This Draft ULP PEIS does not discuss the impacts of these actions. The quantity of uranium available on the DOE ULP lease tracts (estimated to be 13.5 million lb [6.1 million kg]) represents approximately only 1.5% of the available domestic uranium reserves (nearly 900 million lb [410 million kg]). These domestic reserves represent approximately 7% of the world's known uranium reserves. Uranium mining on the DOE ULP lease tracts would have little to no impact on the nuclear fuel cycle, because this small percentage would not dictate whether or not uranium ore processing would continue. All components of the nuclear fuel cycle will continue to be the subject of proposal-specific and site-specific environmental analyses by the appropriate governmental entity.

There is no need to evaluate the in situ leaching (ISL) method for mining uranium in this Draft ULP PEIS, because it is not considered to be a viable option due to the location of the ore in "dry" sedimentary strata. The ISL method is not suitable considering the geology of the DOE ULP area and the manner in which the uranium ore is located on the lease tracts. The uranium ore at the DOE ULP lease tracts is expected to be deposited along roll fronts following stream bends. The ISL method requires that ore be located within areas where groundwater is present in relative abundance, which is not the case at the DOE ULP lease tracts. In addition, past mining operations on the lease tracts have been primarily underground (and current permits have been primarily for underground mining).

S.4 SUMMARY AND COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS

Table S.4-1 provides definitions of the terms used to describe the levels of potential impact for the various resources evaluated in the Draft ULP PEIS. Tables S.4-2 through S.4-7 describe the potential impacts from the five alternatives evaluated for each of the environmental resource areas and human health. Measures identified to minimize the potential impacts summarized in this section are identified in Section S.5. Potential impacts from the five alternatives are considered in combination with impacts of past, present, and reasonably foreseeable future actions in the cumulative impacts evaluation summarized in Section S.6.

The potential impacts from the five alternatives for the various resource areas indicate that the potential impacts are generally negligible to moderate and that Alternative 5 could result in the highest potential impacts of all the alternatives, primarily because the assumptions used as basis for the analysis require the most activities, area of disturbance, ore tonnage generated, and water utilized.

1 **TABLE S.4-1 Definition of Impact Levels**

	Impact Level			
Resource/System	Negligible	Minor	Moderate	Major
Air quality	No measurable impacts.	Most impacts on affected resource could be avoided with proper mitigation. If impacts occur, the affected resource would recover completely without mitigation once the impacting stressor is eliminated.	Impacts on the affected resource are unavoidable; the viability of the affected resource is not threatened, and would recover completely if proper mitigation is applied or proper remedial action is taken once the impacting stressor is eliminated.	Impacts on the affected resource are unavoidable; the viability of the affected resource may be threatened, and the affected resource would not fully recover even if proper mitigation is applied or remedial action is implemented once the impacting stressor is eliminated.
Acoustic environment	Same as for air quality.	Same as for air quality.	Same as for air quality.	Same as for air quality.
Soil resources	Same as for air quality.	Same as for air quality.	Same as for air quality.	Same as for air quality.
Water resources	Same as for air quality.	Same as for air quality.	Same as for air quality.	Same as for air quality.
Human health[a]	Not applicable	Not applicable	Not applicable	Not applicable
Ecological resources[b]	Same as for air quality.	Same as for air quality.	Same as for air quality.	Same as for air quality.
Land use	No measurable impacts.	Adverse impacts on the affected activity, community, or resource could be avoided with proper mitigation. Impacts would not disrupt the normal or routine functions of the affected activity, community, or resource. The affected activity, community, or	Impacts on the affected activity, community, or resource are unavoidable. Proper mitigation would reduce impacts substantially during the life of the project. A portion of the affected activity, community, or resource would have to adjust somewhat	Impacts on the affected activity, community, or resource are unavoidable. Proper mitigation would reduce impacts substantially during the life of the project. Resources could incur long-term effects or unavoidable disruptions to a

TABLE S.4-1 (Cont.)

Resource/System	Impact Level			
	Negligible	Minor	Moderate	Major
Land use (Cont.)		resource would return to a condition of no measurable effects once the impacting stressor is eliminated.	to account for disruptions due to impacts of the project. The affected activity, community, or resource would return to a condition of no measurable effects once the impacting stressor is eliminated.	degree beyond what is normally acceptable. The affected activity, community, or resource would return to a condition of no measurable effects once the impacting stressor is eliminated.
Socioeconomics	Same as for land use.	Same as for land use.	Same as for land use.	Same as for land use.
Environmental justice	Same as for land use.	Same as for land use.	Same as for land use.	Same as for land use.
Transportation[c]	Not applicable	Not applicable	Not applicable	Not applicable
Cultural resources	Same as for land use.	Same as for land use.	Same as for land use.	Same as for land use. All of the affected resource would be permanently damaged or destroyed.
Visual resources[d]	*No contrast:* The contrast is technically visible but unlikely to be seen by the casual observer and unlikely to create discernible contrast.	*Weak contrast:* The contrast is unlikely to be seen by the casual observer but is noticeable to those who look closely at the affected area.	*Minimal contrast:* The contrast is likely to be seen by anyone but does not strongly attract and hold visual attention.	*Dominant contrast:* The contrast is strong enough to attract and hold visual attention and may dominate the view.

[a] Human health potential impacts are discussed relative to regulatory limits.

[b] Ecological resources include vegetation, wildlife, aquatic biota, and threatened, endangered, and rare species. For most biota, these levels are based on population-level impacts rather than impacts on individuals. For species listed under the ESA, the impact levels consider impacts on individuals, when appropriate, as well as on populations. Impacts on species listed under the ESA are discussed using impact levels consistent with determinations made in ESA Section 7 consultation with the USFWS.

Footnotes continued on next page.

TABLE S.4-1 (Cont.)

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[c] Radiological transportation impacts are quantified based on the latest scientific knowledge regarding radiation and human health, to aid in understanding the general level of potential risks, but the assignment of cutoff or significance levels is not appropriate. The same is true for potential injuries and fatalities as a result of potential traffic accidents.

[d] Because project-specific information is not yet available, the analysis for visual resources focuses only on the potential level of visual contrast (i.e., changes in form, line, color, and texture as compared to the existing or baseline condition) that would occur as a result of mining-related activities on the lease tracts. For this analysis, contrast is characterized as either nonexistent (i.e., no contrast), minimal, weak, or dominant—terms that roughly approximate the four-level classification scheme presented in the table.

TABLE S.4-2 Comparison of the Potential Impacts on Air Quality, the Acoustic Environment, and Soil Resources from Alternatives 1 through 5

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Air Quality	Potential impacts on ambient air quality anticipated to be minor and temporary in nature. It is estimated that PM_{10} emissions would be about 0.92% of emission totals for the three counties and NO_x emissions would be about 0.09% of the three-county totals.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts from the exploration phase would be minimal and temporary in nature. Peak-year emission rate estimates would be small during mine development and operations compared with the emission totals for the three counties. PM_{10} and $PM_{2.5}$ emissions could contribute about 1.5% and 0.66 % of the three county total, respectively. NO_x emissions could be highest during operations, contributing about 1% of the three-county total emissions. During reclamation, PM_{10} emissions could be highest, at about 0.98% of the three-county total emissions.	Similar to Alternative 3 in that potential impacts from the exploration phase would be minimal and temporary in nature. Peak-year emission rates would be small during mine development and operations compared with the emission totals for the three counties. PM_{10} and $PM_{2.5}$ emissions could contribute about 3.0% and 1.3% of the three-county total, respectively. Estimates indicate NO_x emissions would contribute about 2% of the three-county total emissions. During reclamation, PM_{10} emission estimates could be highest at about 1.1% of the three-county total emissions.	Peak-year mine development and operations emission rates are estimated to be higher than those under Alternative 4. PM_{10} and $PM_{2.5}$ emissions could contribute about 3.2% and 1.4% of the three-county total, respectively. NO_x emissions would contribute about 2.3% of the three-county total. During reclamation, PM_{10} emission estimates could be highest at about 1.1% of the three-county total emissions.

TABLE S.4-2 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acoustic Environment	Noise levels would attenuate to about 55 dBA (the Colorado daytime maximum permissible limit) at a distance of 1,650 ft (500 m) from the reclamation sites. Most area residences are located beyond this distance. However, if reclamation activities were conducted near the boundary of Lease Tract 13, noise levels at nearby residences could exceed the Colorado limit.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Noise impacts during the exploration phase on neighboring residences or communities would be minimal and intermittent in nature. During mine development and operations, noise levels at about 55 dBA and 50 dBA (Colorado nighttime limit) would be limited to distances of 1,650 ft (500 m) from the mine sites and 230 ft (70 m) from the haul routes, respectively. Most area residences are located beyond these distances. If activities were conducted near the boundary of Lease Tract 13, noise levels at nearby residences could exceed the Colorado limit. For reclamation, some unavoidable but localized short-term and minor noise impacts on neighboring residences or communities could occur.	Noise impacts for the three phases would be similar to those from Alternative 3. Activities conducted near Lease Tracts 13, 13A, 16, and 16A could exceed the Colorado daytime limit of 55 dBA. In addition, noise from haul trucks could exceed the Colorado nighttime limit of 50 dBA within 350 ft (107 m) from the haul route, and possibly any residences within this distance could be affected.	Similar to Alternative 4, except Colorado nighttime limit exceedance from haul trucks within 380 ft (120 m) from the haul route.

TABLE S.4-2 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Soil Resources	Ground disturbances from reclamation activities could result in minor impacts due to soil compaction, soil horizon mixing, soil contamination (from oil and fuel releases related to use of trucks and other equipment), and soil erosion.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Ground disturbances from mining-related activities could result in minor impacts due to soil compaction, soil horizon mixing, soil contamination (from oil and fuel releases related to use of trucks and other equipment), and soil erosion. Potential impacts from Alternative 3 would likely be greater than those from Alternative 1 since there would be impacts from mine development and operations, which would also be conducted.	Potential impact could be greater than that from Alternative 3 since more mines would be developed and operated.	Potential impact could be slightly greater than from Alternative 4 since larger sized mines would be developed requiring a slightly larger surface footprint.

TABLE S.4-3 Comparison of the Potential Impacts on Water Resources, Land Use, and Waste Management from Alternatives 1 through 5

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Water Resources	Of the 10 lease tracts evaluated for Alternative 1, reclamation activities on Lease Tract 13 has the greatest potential to affect surface water resources due to the proximity to the Dolores River. The potential impacts due to the backfill materials and poor sealing of drill holes would be minor in Lease Tracts 7, 9, and 13 and avoided by implementation of reclamation performance standards set by the CDWR.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts (e.g., runoff generation and erosion) associated with exploration would be minor due to the small amount of land involved. Potential impacts of groundwater mixing and leaching via exploratory drill holes are expected to be minor in a few lease tracts (i.e., Lease Tracts 7, 9, and 13). For mine development and operations, activities on lease tracts closest to the Dolores River and San Miguel River (e.g., Lease Tracts 13 and 18) pose the greatest potential to affect water quality because of erosion. Potential groundwater contamination impacts and dewatering effects would be minor in a few lease tracts (i.e., Lease Tracts 7, 9, and 13). However, a limited number of existing domestic water wells, associated with Lease Tracts 7, 9, and 13, would be potentially affected if local groundwater is contaminated or aquifers are dewatered. Impacts from reclamation activities would be greater than those for Alternative 1. Water use under Alternative 3 during development and operation would be 3,200,000 gal/yr (9.8 ac-ft/yr).	Similar to the type of potential impacts under Alternative 3, potential impacts associated with exploration (e.g., runoff generation and erosion) would be minor due to the small spatial extent involved. Potential impacts of groundwater mixing and leaching via exploratory drill holes are expected to be minor in a few lease tracts (i.e., Lease Tracts 7, 9, and 13). Also, mine development and operations on the lease tracts closest to the Dolores River and San Miguel River (i.e., Lease Tracts 13 and 18) would have the greatest potential to affect water quality because of erosion. Potential groundwater contamination impacts and dewatering effects would be minor in a few-lease tracts (i.e., Lease Tracts 7, 9, 13, and possibly 8A). The number of domestic wells that might be affected is similar to Alternative 3, and they are associated more with Lease Tracts 5, 6, 8, 13, 16, and 18. Impacts from reclamation activities would be greater than those under Alternative 1. Water use under Alternative 4 during development and operation would be two times higher than that under Alternative 3.	Similar to Alternative 4, except water that would be used during development and operation is 8,000,000 gal/yr (25 ac-ft/yr).

TABLE S.4-3 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Land Use	Potential impacts due to land use conflicts are expected to be small under Alternative 1; the lands would continue to be closed to mineral entry, and all other activities, like recreation within the lease tracts, would continue.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts due to land use conflicts are expected to be minor under Alternative 3; the lands would be closed to mineral entry, and all other activities, like recreation within the lease tracts, would continue.	Potential impacts due to land use conflicts are expected to be small under Alternative 4; the lands would continue to be closed to mineral entry, and all other activities, like recreation within the lease tracts, would continue.	Potential impacts due to land use conflicts are expected to be small like Alternative 4 but would affect a slightly larger amount of land due to larger sized mines that would be developed.
Waste Management	Amounts of waste or trash generated would be small and would be taken to a mill for recovery, or taken to a permitted landfill near Nucla or Naturita.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Amounts of waste that would be generated during exploration, mine development and operations, and reclamation would be small and managed in a manner similar to that described for Alternative 1. Any waste-rock piles that would remain at the mine surface would be graded to be consistent with the surrounding area, provided with a top cover of soil or other material from the mine site, and seeded.	Amounts of waste or trash generated during the three phases would be small but more than those generated under Alternative 3. They would be managed in a manner similar to that described for Alternatives 1 and 3.	Amount of waste or trash generated during the three phases would be small but slightly more than that generated under Alternative 4.

TABLE S.4-4 Comparison of the Potential Impacts on Human Health from Alternatives 1 through 5

Phase of Activities	Receptor	Assessment Endpoint[a]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Mine development and operations	Uranium miner	Individual rad dose (mrem/yr)	NA[b]	NA	433[c]	Same as Alt. 3	Same as Alt. 3
		Individual LCF risk (1/yr)	NA	NA	4×10^{-4} [c]	Same as Alt. 3	Same as Alt. 3
		Chemical risk (hazard index or HI)	NA	NA	1.1[d]	Same as Alt. 3	Same as Alt. 3
	General public – resident	Individual rad dose (mrem/yr)	NA	NA	16–1.9[e] (WL: 0.0013 to 0.00016)	Same as Alt. 3	Same as Alt. 3
		Individual LCF risk (1/yr)	NA	NA	2×10^{-5} to 3×10^{-6} [e]	Same as Alt. 3	Same as Alt. 3
		Collective rad dose (person-rem/yr)	NA	NA	7.5 to 39[f]	17–94[f]	20–110[f]
		Collective LCF (1/yr)	NA	NA	0.01 to 0.05[f]	0.02–0.1[f]	0.03–0.1[f]
		Chemical risk (HI)	NA	NA	<< 1.0[e]	Same as Alt. 3	Same as Alt. 3
Reclamation	Reclamation worker	Individual rad dose (mrem/yr)	4.8 (WL: $<5 \times 10^{-5}$)	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Individual LCF risk (1/yr)	4×10^{-6}	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Chemical risk (HI)	0.043	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
	General public – resident	Individual rad dose (mrem/yr)	3.0–0.03[g] (WL: $<2 \times 10^{-4}$)	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Individual LCF risk (1/yr)	3×10^{-6} to 3×10^{-8} [g]	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Chemical risk (HI)	< 0.010	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1

TABLE S.4-4 (Cont.)

Phase of Activities	Receptor	Assessment Endpoint[a]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Post-reclamation	General public – recreationist	Individual rad dose (mrem/yr)	0.38 to 11[h] (WL: $<2 \times 10^{-4}$)	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Individual LCF risk (1/yr)	7×10^{-7} to 9×10^{-6}	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Chemical risk (HI)	< 0.13	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
	General public – individual entering an inactive underground mine	Individual rad dose (mrem/h)	7.4 to 87[i] (WL: 3 to 39)	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Individual LCF risk (1/h)	9×10^{-6} to 3×10^{-4}[i]	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
		Chemical risk (HI)	0	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1

[a] Radiation dose and chemical risk (HI) estimates are rounded to two significant figures; latent cancer facility (LCF) risk is rounded to one significant figure. For some radiation doses, the corresponding radon levels in terms of working level (WL) are also listed in parentheses.

[b] NA = not applicable; continued uranium mining would not occur under Alternatives 1 and 2.

[c] The listed values are based on historical data on the average exposures of underground uranium miners.

[d] The impact associated with exposure to particulates containing uranium and vanadium compounds during this phase was estimated based on the radiation dose associated with inhalation of particulates containing uranium isotopes and their decay products.

[e] Potential individual radiation dose and LCF risk for the general public – resident scenario would depend on the location of the residence. The dose and risk are functions of the distance and direction from the residence to the radon emission source. The listed range is associated with a residence located in the dominant wind direction that gives the highest exposures at a distance of 1,630 to 16,400 ft (500 to 5,000 m) to the emission source, which is a medium-underground mine. Potential dose and LCF risk associated with a small underground mine would be about half of the listed values; those associated with a large underground mine would be about twice the listed values. Potential dose and LCF risk associated with a very large open-pit mine would be greater than those associated with a small underground mine but less than those associated with a medium-sized underground mine for a distance of 3,300 ft (1,000 m) or greater. Potential hazard index associated with the exposures of residents is expected to be much smaller than that associated with the exposures of uranium miners (i.e., much smaller than the threshold value of 1).

Footnotes continued on next page.

TABLE S.4-4 (Cont.)

[f] The collective dose and LCF risk were estimated for the entire population living at a distance of 3.1 to 50 mi (5 to 80 km) from the center of each lease tract group. The collective dose and LCF risk correspond to the peak year of operations. In any other year, the collective dose/LCF risk is expected to be lower than the listed value.

[g] Potential individual radiation dose and LCF risk for the general public – resident scenario would depend on the location of the residence. The dose and risk are functions of the distance and direction from the residence to the source of radon and particulate emissions. The listed range is associated with a residence located in the most dominant wind direction at a distance of 1,600 to 16,000 ft (500 to 5,000 m) to the emission source, which is a waste-rock pile at a scale ranging from small to very large. The waste-rock pile is assumed to be generated by the development and operations of an underground mine for 10 years.

[h] The recreationist dose and LCF risk results were obtained based on the assumption that the emission source (i.e., a waste-rock pile) would be covered by 0–1 ft (0–0.3 m) of soil materials.

[i] Potential individual radiation dose and LCF risk for the general public – individual entering an inactive underground mine were calculated on the basis of radon levels that were measured in three abandoned mines in the United Kingdom (Denman et al. 2003).

3 **TABLE S.4-5 Comparison of the Potential Impacts on Ecological Resources from Alternatives 1 through 5**

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Vegetation	It is expected that impacts under Alternative 1 would generally be minor and short term. Areas affected by Alternative 1 activities would generally consist of previously disturbed areas, and reclamation would generally include relatively small surface areas (approximately 1 to 8 acres [0.4 to 3.2 ha] per mine, other than the JD-7 mine). Reclamation would establish plant communities on disturbed areas, including waste rock; however, resulting plant communities might be considerably different from those of adjacent areas. The successful reestablishment of some plant communities, such as sagebrush shrubland or piñon-juniper woodland, would likely require decades. Indirect impacts associated with reclamation activities could include the deposition of fugitive dust, erosion, sedimentation, and the introduction of non-native species, including noxious weeds. However, because of the small areas involved and short duration of reclamation activities, these would generally constitute a short-term impact. The establishment of invasive species, including the potential alteration of fire regimes, could result in long-term impacts, although monitoring and vegetation management programs would likely control invasive species.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Impacts under Alternative 3 would range from minor to moderate and short term to long term. Impacts from exploration would result from disturbance of vegetation and soils, the removal of trees or shrubs, compaction of soils, destruction of plants, burial of vegetation under waste material, or erosion and sedimentation. Exploration activities are expected to affect relatively small areas, and impacts would generally be short term. The localized destruction of biological soil crusts, where present, would be considered a longer-term impact, particularly where soil erosion has occurred. Ground disturbance from mine development and operations would range from 10 to 20 acres (4 to 8 ha) per mine, except for the 210-acre (85-ha) JD-7 open-pit mine. Impacts would include the destruction of habitats during site clearing and excavation, as well as the loss of habitat in additional use areas. Affected areas might include high-quality mature habitats or previously degraded areas. Wetlands present on project sites could be directly or indirectly affected. Indirect impacts from mining would be associated with fugitive dust, invasive species, erosion, sedimentation, and impacts due to changes in surface water or groundwater hydrology or water quality. The deposition of fugitive dust and the establishment of invasive species, including the potential alteration of fire regimes, could result in long-term impacts.	Impacts would be similar to those for Alternative 3, except a larger area (460 acres, or 190 ha) would be disturbed.	Similar to Alternative 4 with respect to the amount of area disturbed, but disturbance would be for a shorter period of time (i.e., 10 years versus potentially more than 10 years for Alternative 4).

TABLE S.4-5 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Wildlife	Reclamation activities would cause a short-term, localized disturbance of wildlife in the area of the 13 mine sites on 10 lease tracts. Reclamation of 267 acres (108 ha) would result in long-term, localized improvement of wildlife habitats within the 10 lease tracts. Negligible impacts on wildlife would occur during DOE's long-term management of the withdrawn lands.	Similar to Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	There could be impacts on a total of 310 acres (125 ha) of wildlife habitat at 8 mine sites within 1 or more of the 12 formerly active lease tracts during the peak year of operations. Additional habitats could be affected by any access roads or utility lines required for the mines. Impacts on wildlife could occur from habitat disturbance, wildlife disturbance, and wildlife injury or mortality and habitat loss. Overall, localized impacts on wildlife would range from negligible to moderate during mine development and operations, while wildlife impacts would last for decades but would not affect the viability of wildlife populations.	Impacts would be similar to those from Alternative 3, except that a total of 460 acres (190 ha) of wildlife habitat at 19 mine sites could be disturbed within any of the 31 lease tracts during the peak year of operations. Overall, localized impacts on wildlife would range from negligible to moderate and would not affect the viability of wildlife populations.	Impacts on a total of 490 acres (198 ha) of wildlife habitat at 19 mine sites within any of the 31 lease tracts during the peak year of operations. Impacts on wildlife would be similar to, but for a shorter time period than, those for Alternative 4. Overall, localized impacts on wildlife would range from negligible to moderate and would not affect the viability of wildlife populations.
Aquatic Biota	Reclamation activities could cause sediment deposition in intermittent and ephemeral streams and possibly the Dolores River. The potential for sediments to enter the perennial streams is negligible to minor due to the limited amount of land undergoing reclamation in any given area. Reclaimed areas would be less prone to erosion as vegetation becomes established.	Similar to Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Impacts on aquatic resources could result from increases in sedimentation and turbidity from soil erosion and runoff during mine development and operations. There would be a very low likelihood of an accidental ore spill into a perennial stream or river. Overall, localized impacts on aquatic biota would range from negligible to moderate and would not affect the viability of any aquatic species.	Impacts on aquatic resources would be similar to those under Alternative 3, except that 19 mines could be in operation on any of the 31 lease tracts during the peak year of operations. Overall, localized impacts on aquatic biota would range from negligible to moderate and would not affect the viability of any aquatic species	Impacts on aquatic resources would be similar to those under Alternative 4, except that the mines would be in operation for a shorter length of time. Overall, localized impacts on aquatic biota would range from negligible to moderate and would not affect the viability of any aquatic species.

TABLE S.4-5 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Threatened, Endangered, and Sensitive Species	Reclamation activities would generally cause minor, short-term impacts on threatened, endangered, and sensitive species. The small scale of reclamation activities on previously disturbed areas would generally have minor direct impacts on sensitive terrestrial species. Indirect impacts associated with water withdrawal, erosion, and sedimentation might have minor, short-term impacts on sensitive aquatic species (including Colorado River endangered fish species).	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts on threatened, endangered, and sensitive species could range from small to moderate and short term to long term, depending on the location of the mines and amount of surface disturbance. Direct impacts could result from the destruction of habitats during site clearing, excavation, and operations. Indirect impacts could result from fugitive dust, erosion, sedimentation, and impacts related to altered surface water and groundwater hydrology. Water withdrawals from the Upper Colorado River Basin to support mining activities may result in potentially unavoidable impacts on aquatic biota (particularly the Colorado River endangered fish species). For this reason, ULP activities under Alternative 3 may affect, but are not likely to adversely affect, the Colorado River endangered fish species and their critical habitat.	Similar to Alternative 3. However, there would be more lease tracts available for mining under this alternative, thereby increasing the area that could be disturbed or developed and the potential for impacts on threatened, endangered, and sensitive species.	Similar to Alternative 4, but the total disturbed surface area is somewhat larger than that under Alternative 4.

TABLE S.4-6 Comparison of the Potential Impacts on Socioeconomics, Environmental Justice, and Transportation from Alternatives 1 through 5

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Socioeconomics	Potential impact is expected to be minor. Reclamation activities would require 29 direct jobs and generate 16 indirect jobs. Reclamation would produce $1.7 million in income. There would likely be a small positive impact on recreation and tourism because of the reclamation that would be completed.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impact is expected to be minor. Mine development and operations would create 123 direct jobs, 98 indirect jobs, $4.7 million in direct income, and $4.0 million in indirect income. In-migration could include up to 63 people moving into the ROI. Reclamation activities would require 29 direct jobs and generate 17 indirect jobs. Reclamation would produce $1.8 million in income.	Potential impact is expected to be minor. Mine development and operations would create 229 direct jobs, 152 indirect jobs, and $14.8 million in income. In-migration could include up to 115 people moving into the ROI. Reclamation activities would require 39 direct jobs and generate 21 indirect jobs. Reclamation would produce $2.4 million in income.	Potential impact is expected to be minor. Mine development and operations would create 253 direct jobs, 152 indirect jobs, and $15.6 million in income. In-migration could include up to 122 people moving into the ROI. Reclamation activities would require 39 direct jobs and generate 25 indirect jobs. Reclamation would produce $2.5 million in income.
Environmental Justice	Potential impacts on the general population could result from uranium mining activities. For the majority of resources evaluated, impacts would be likely to be minor and would be unlikely to disproportionately affect low-income and minority populations.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts are likely to be minor and are unlikely to disproportionately affect low-income and minority populations. Specific impacts on low-income and minority populations as a result of participation in subsistence or cultural and religious activities would also be minor and unlikely to be disproportionate.	The types of impacts related to mine development and operations under Alternative 4 would be similar to those described under Alternative 3, but the increase in the disturbed area under Alternative 4 could potentially increase the impacts. Impacts on low-income and minority populations associated with the reclamation activities would be the same as those under Alternative 1.	The types of impacts related to exploration under Alternative 5 would be similar to those under Alternative 3. The types of impacts related to mine development and operations under Alternative 5 would be similar to those under Alternative 4. Under Alternative 5, for the majority of resources evaluated, the impacts would likely be minor and would be unlikely to have disproportionate impacts on low-income or minority populations.

TABLE S.4-6 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Transportation	No transportation of uranium ore would occur. There would be no radiological transportation impacts. No changes in current traffic trends near the DOE ULP lease tracts would be anticipated because no significant supporting truck traffic or equipment moves would occur, and only about five reclamation workers would be commuting to each site on a regular basis during reclamation activities.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	There would be an average of approximately 40 round-trip uranium ore truck shipments per weekday under Alternative 3. For the sample case considered, the total annual distance travelled in the peak year by the haul trucks would be about 1.10 million mi (1.77 million km), primarily on CO 90 and CO 141 and on US 491 and US 191. The estimated attendant traffic accident injuries and fatalities would be about 0.33 and 0.029, respectively. The resultant collective radiological population dose to those individuals living and working near the haul routes was estimated to be approximately 0.14 person-rem, a dose that could potentially result in an LCF risk of 8×10^{-5}. The potential annual collective dose estimated for the truck drivers is 0.71 person-rem, with an associated LCF risk of 0.0004. Dependent on which lease tracts have mining operations and which mill was used in each case, the total annual distance in the peak year could range from about 0.47 million to 2.22 million mi (751,000 to 3.58 million km), with impacts roughly proportional to the distance travelled.	There would be an average of approximately 80 round-trip uranium ore truck shipments per weekday under Alternative 4. For the sample case considered, the total annual distance travelled in the peak year by the haul trucks would be about 2.22 million mi (3.57 million km), primarily on CO 90 and CO 141 and on US 491 and US 191. The estimated attendant traffic accident injuries and fatalities would be about 0.63 and 0.057, respectively. The resultant collective radiological population dose to those individuals living and working near the haul routes was estimated to be approximately 0.28 person-rem, a dose that could potentially result in an LCF risk of 0.0002 in the population. The potential annual collective dose estimated for the truck drivers is 1.4 person-rem, with an associated LCF risk of 0.0009. Dependent on which lease tracts have mining operations and which mill was used in each case, the total annual distance in the peak year could range from about 1.14 million to 4.26 million mi (1.84 million to 6.86 million km), with impacts roughly proportional to the distance travelled.	There would be an average of approximately 92 round-trip uranium ore truck shipments per weekday under Alternative 5. For the sample case considered, the total annual distance travelled in the peak year by the haul trucks would be about 2.72 million mi (4.38 million km), primarily on CO 90 and CO 141 and on US 491 and US 191. The estimated attendant traffic accident injuries and fatalities would be about 0.81 and 0.073, respectively. The resultant collective radiological population dose to those individuals living and working near the haul routes is estimated to be approximately 0.34 person-rem, a dose that could potentially result in an LCF risk of 0.0002 in the population. The potential annual collective dose estimated for the truck drivers was 1.8 person-rem, with an associated LCF risk of 0.001. Depending on which lease tracts have mining operations and which mill was used in each case, the total annual distance in the peak year could range from about 1.45 million to 4.90 million mi (2.34 million to 7.88 million km), with impacts roughly proportional to the distance travelled.

3 **TABLE S.4-7 Comparison of the Potential Impacts on Cultural Resources and Visual Resources from Alternatives 1 through 5**

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Cultural Resources	Under Alternative 1, indirect impacts could occur on all known cultural resources located within the 10 lease tracts. It is estimated that there are 111 resources within the 10 lease tracts. Direct impacts are not expected because areas to be reclaimed have already been disturbed, and no new land disturbance is expected. Indirect impacts under Alternative 1 would include the increased potential for vandalism related to road or footpath expansion and for the disturbance of a cultural resource from fugitive dust. Significant cultural properties that could be adversely affected by the proposed action would be identified before any ground-disturbing activities occurred, and plans would be modified to avoid or mitigate impacts on cultural resources. There is potential for buried cultural deposits to be uncovered even if sites were not identified on the surface prior to ground disturbance activities.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Under Alternative 3, indirect impacts could occur on all known cultural resource sites located within the 12 lease tracts. It is estimated that there are 128 resources within the 12 lease tracts. Direct impacts could occur on eight of these resources. Potential direct impacts would include the disturbance of buried cultural resources or surface deposits as a result of excavation, vibration from equipment, and fugitive dust. Indirect impacts would include visual disturbance to resources; the introduction of noise to traditional sacred areas; and an increased potential for vandalism, erosion, trampling, and nonauthorized collecting related to road or footpath expansion. Significant cultural properties that would be adversely affected by the proposed actions would be identified before any ground-disturbing activities occurred, and plans would be modified to avoid or mitigate impacts on cultural resources.	Under Alternative 4, indirect impacts on all known cultural resources located within the 31 lease tract could occur. Direct impacts could occur on 21 of these resources. Types of potential impacts would be the same as those discussed for Alternative 3. Significant cultural properties that would be adversely affected by the proposed action would be identified before ground-disturbing activities occurred, and plans could be modified to avoid or mitigate impacts on cultural resources.	Similar to Alternative 4, except that direct impacts could occur on 23 of the known cultural resources on the 31 lease tracts.

TABLE S.4-7 (Cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Visual Resources[a]	Potential visual impacts that could occur under Alternative 1 would include vegetation clearing, landform alteration, removal of structures and materials, changes to existing roadways, vehicular and worker activity, and light pollution. Under Alternative 1, one or more of the 10 lease tracts would be visible from portions of the Sewemup WSA, Palisade ONA ACEC, Palisade WSA, Unaweep/ Tabeguache Scenic and Historic Byway, Tabeguache Area, Dolores River Canyon WSA, Dolores River SRMA, McKenna Peak WSA, San Miguel ACEC, San Miguel SMRA, and Trail of the Ancient Byways, which are located within 0–25 mi (0–40 km) of the lease tracts. Visual contrast of visible activities occurring within the lease tracts would range from none to strong, depending on the viewer's location with respect to the SVRA.	Similar to Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential visual impacts that could occur under Alternative 3 include vegetation clearing, exploratory drilling, road construction, support facility construction, worker and equipment presence, and lighting in the form of skyglow, light trespass, or glare. Under Alternative 3, one or more of the 12 lease tracts would be visible from portions of the Sewemup WSA, Unaweep/Tabeguache Scenic and Historic Byway, Tabeguache Area, Dolores River Canyon WSA, Dolores River SRMA, McKenna Peak WSA, San Miguel ACEC, San Miguel SMRA, and Trail of the Ancient Byways, which are located within 0–25 mi (0–40 km) of the lease tracts. Visual contrast of visible activities occurring within the lease tracts would range from none to strong, depending on the viewer's location with respect to the SVRA.	Potential visual impacts under Alternative 4 would be the same as those under Alternative 3. Under Alternative 4, 1 or more of the 31 lease tracts would be visible from portions of the Sewemup, Palisade, Squaw/Papoose Canyon, McKenna Peak, Dolores River Canyon, and Cahone Canyon WSAs; the Palisade ONA, San Miguel SMRA, and San Miguel ACECs; the Unaweep/ Tabeguache Scenic and Historic Byway; the Tabeguache Area; the Dolores River SRMA; Canyon of the Ancients National Monument; and Trail of the Ancient Byways, which are located within 0–25 mi (0–40 km) of the lease tracts. Visual contrast of visible activities occurring within the 31 lease tracts would range from none to strong, depending on the viewer's location with respect to the SVRA.	Similar to Alternative 4.

[a] ONA = Outstanding Natural Area, SRMA = Special Recreation Management Area, SVRA = special visual resource area, WA = Wilderness Area, WSA = Wilderness Study Area.

S.5 MEASURES TO MINIMIZE POTENTIAL IMPACTS FROM ULP MINING ACTIVITIES

The potential impacts discussed in Tables S.4-2 through S.4-7 are expected to be minimized or reduced by implementing the measures listed in Table S.5-1. These measures apply to the three phases of the proposed action (exploration, mine development and operations, and reclamation), as applicable. The measures have been grouped by the 12 objectives included in Table S.5-1 and further categorized into the following three categories:

1. *Compliance measures:* Measures that are required by applicable regulations.

2. *Mitigation measures:* Measures that are required by DOE as identified in current leases or that could be added to the leases when modified. DOE may also identify additional mitigation measures.

3. *Best management practices (BMPs):* Best industry practices and activities that should be considered during implementation, as practicable.

Reclamation activities would be conducted to ensure that post-reclamation mine conditions are protective of the environment and human health. Mitigation measures such as those listed in Table S.5-1 would be implemented so that potential exposure to a reasonable end-state scenario (i.e., a recreational visitor scenario at the mine site footprint and within the lease tracts, and a resident scenario for outside the lease tracts) would be at acceptable risk levels (e.g., meet applicable dose requirements or the EPA's acceptable risk range) for the appropriate end-state land use.

Specifics associated with the measures (compliance, mitigation measures, or BMPs) that involve monitoring, sample collection, and the installation of protective elements (e.g., depth of soil cover on waste-rock piles, the necessity for and/or type of liners for water evaporation ponds, other elements) during operations and reclamation would be identified in the mine plans submitted to DOE for review and approval.

TABLE S.5-1 Measures Identified to Minimize Potential Impacts from Uranium Mining at the ULP Lease Tracts

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
M-1	**Reduce dust emissions; reduce air emissions**			
	• Apply water or chemical suppressants on unpaved haul roads, disturbed surfaces, and temporary stockpiles.	X		
	• Limit soil-disturbing activities and travel on unpaved roads.		X[d]	
	• Design and construct new access roads to meet appropriate standards; roads should be no larger than necessary to accommodate their intended function.		X[d]	
	• Cover unpaved access roads, frequently used on-site roads, and parking lots with aggregate.	X		
	• Assure all heavy equipment meets emission standards as required.	X		
	• Limit idle time of vehicles and motorized equipment.			X
	• Fuel all diesel engines used with ultra-low sulfur diesel (sulfur content of ≤15 parts per million [ppm]).			X[e]
	• Avoid construction traffic and reduce speeds on unpaved surfaces.	X		
	• Ensure that all vehicles transporting loose materials are covered (e.g., with tarpaulins), both when travelling with a load of ore and when returning empty; loads should be sufficiently wet and kept below the freeboard.	X		
M-2	**Identify and protect paleontological resources**			
	• Consult with affected BLM Field Offices to determine whether areas of moderate to high fossil-yield potential (i.e., PFYC 3, 4, or 5) or known significant localities occur within proposed areas of disturbance. All PFYC 4 and 5 areas should be field surveyed; PFYC 3 areas should be field surveyed and sampled. Surveys should be conducted along rock outcrops devoid of thick soils and well-developed vegetation to identify exposed fossils. Areas identified as PFYC 3, 4, or 5 may require monitoring by a qualified paleontologist during all excavation and earthmoving activities.	X		
	• For areas of high fossil-yield potential (PFYC 4 or 5), develop a paleontological resources management plan to define mitigation measures (i.e., avoidance, removal, monitoring, or special stipulations) and the analysis, reporting, and curation of any collected fossils.	X		
	• Immediately notify the BLM authorized officer of any paleontological resources discovered as a result of mining activities so that appropriate measures to mitigate adverse effects to significant paleontological resources can be determined and implemented. Operations may continue if activities can avoid further impacts on the fossil discovery or can be continued elsewhere.	X		

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
M-3	**Reduce noise-related impacts**			
	• Maintain equipment in good working order in accordance with manufacturer's specifications.			X
	• Limit noisy activities to the least noise-sensitive times of the day (daytime between 7 a.m. and 7 p.m.) and weekdays and limit idle time for vehicles and motorized equipment.			X
	• Notify area residents of high-noise and/or high-vibration-generating activities (e.g., aboveground and belowground blasting) in advance.			X
	• Employ noise-reduction devices (e.g., mufflers) as appropriate.			X
	• Provide a noise complaint process for surrounding communities.			X
	• Site noise sources to take advantage of topography and distance; construct engineered sound barriers and/or berms as necessary.			X
	• Limit operational noise to 49 dBA or less within 2 mi (3 km) from an occupied/active Gunnison sage-grouse lek.			X
M-4	**Protect soils from erosion; protect local surface water bodies from contamination and sedimentation; protect local aquifers from contamination**			
	• Identify local factors that cause slope instability (e.g., slope angles, precipitation) and avoid areas with unstable slopes.			X
	• Avoid creating excessive slopes during excavation; use special construction techniques, where applicable, in areas of steep slopes, erodible soil, and stream channel crossings.		X[f]	
	• Apply all dust palliatives in accordance with appropriate laws and regulations; ensure that dust suppression chemicals are not sprayed on (released to) soils or streams.		X[g]	
	• Control and direct runoff from slope tops to settling or rapid infiltration basins until disturbed slopes are stabilized; stabilize slopes as quickly as possible.	X[h]		
	• Assure operators comply with CDRMS requirements regarding groundwater and groundwater contamination.	X		
	• Obtain borrow materials from authorized or permitted sites.		X[i]	
	• Retain sediment-laden waters from disturbed areas with the lease tract through the use of barriers and sedimentation devices (e.g., berms, straw bales, sandbags, jute netting, or silt fences) as necessary.	X[h]		
	• Place barriers and sedimentation devices around drainages and wetlands.		X[g]	
	• Require developers using on-site groundwater supplies to conduct a hydrologic study consistent with that required by the state's environmental protection plan.	X		

TABLE S.5-1 (Cont.)

Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
• Conduct routine inspections to assess effectiveness and maintenance requirements for erosion and sediment control systems.			X
• Maintain, repair, or replace barriers and sedimentation devices as necessary to ensure optimum control.	X[h]		
• Inspect and clean tires of all vehicles to ensure they are free of dirt before they enter paved public roadways to the extent practicable.			X
• Locate a diversion ditch upstream of the mine site to intercept surface water flow or shallow groundwater and channel it around the site; tailor the location and length of the ditch to site-specific conditions, taking into account the location of mine waste piles, the site topography, and surface flow patterns.	X[h]		
• Place drill holes at a distance from existing water rights to the extent possible.			X
• Plug open drill holes and areas around vent shafts to reduce the volume of groundwater entering an underground mine during operations to the extent possible; use underground sumps to contain water flow, as needed; pump water from groundwater seepage to control water flow, if necessary, into surface mine-water treatment pond.		X[j]	
• Divert water pumped from mines (or drill sites) to a lined sedimentation pond for treatment. Locate settling pond(s) in topographically low areas (but not any that are along drainages or near naturally flowing water). The purpose of treatment is to promote the precipitation of heavy metals through oxidation processes like aeration. (Employ this option at sites at which the mine drainage is high in total suspended solids).	X[h]		
• As sedimentation ponds are cleaned, test sediments and precipitates for proper disposal.	X[h]		
• Locate mine ore storage and waste-rock or tailings piles on topographically high ground so they do not come into direct contact with flowing or ponded water; grade the ore storage area and construct an earthen berm around it. Divert any runoff from the area to a sedimentation pond for testing and treatment.		X	
• Contain any runoff from mine waste-rock piles (e.g., divert it to a sedimentation pond) and treat it, as needed.	X[h]		
• Provide off-site (downgradient) groundwater monitoring consistent with Colorado requirements for groundwater protection permits.	X[i]		
• Site and design mine entrances and activities so that they avoid direct and indirect impacts on important, sensitive, or unique habitats, including, but not limited to, wetlands (both jurisdictional and nonjurisdictional), springs, seeps, streams (ephemeral, intermittent, and perennial), 100-year floodplains, ponds and other aquatic habitats, riparian habitats, remnant vegetation associations, rare or unique biological communities, crucial wildlife habitats, and habitats supporting sensitive species populations.		X[k]	

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
	• Restrict activities at previously mined sites so they do not further encroach toward perennial streams (e.g., the Dolores River); new mining activities should not be allowed within 0.25 mi (0.40 km) of perennial streams; avoid the placement of facilities or roads in drainages, and make necessary accommodations for the disruption of runoff.		X[l]	
	• Identify surface water runoff patterns at the mine site and develop mitigation that prevents soil deposition and erosion throughout and downhill from the site; potential adverse impacts could be minimized by incorporating erosion-control techniques such as water bars, weed-free hay bales and silt fences, vegetation, erosion-control fabric, temporary detention basins, and land contours in the construction design.	X[h]		
	• Assure that herbicides used meet the specifications and standards of BLM and county weed control staff.	X[m]		
	• Seed soil stockpiles to minimize erosion and growth of weeds.			X
	• Apply methods such as chisel plowing[n] or subsoiling[o] (tilling), as necessary, to abandoned roads and areas no longer needed to alleviate soil compaction.			X
	• Limit herbicide use to nonpersistent, immobile substances. Do not use herbicides near or in U.S. waters, including ponds, lakes, streams (intermittent or perennial), and wetlands, unless the herbicide is labeled for such uses. If herbicides are used in or near U.S. waters, the applicator shall ensure that the applications meet the requirements of the EPA's "Pesticide General Permit for Discharges from the Application of Pesticides." Determine setback distances in coordination with Federal and state resource management agencies. Before beginning any herbicide treatments, ensure that a qualified biologist has conducted surveys of bird nests and of sensitive species to identify the special measures or BMPs that are necessary to avoid and minimize impacts on migratory birds and sensitive species. The herbicides to be used would be approved by BLM through submission of "Pesticide Use Proposal" forms. The state-, county-, and BLM-listed plant species scheduled for eradication that are found in the project area would be eradicated and reported to BLM through submission of "Pesticide Application Records."	X[m]		
M-5	**Minimize the extent of ground disturbance and the duration of ground-disturbing activities**			
	• Reduce the surface footprint of disturbed areas (buildings, service areas, storage areas, stockpile areas, and loading areas) within the lease tracts to the extent possible.			X
	• Minimize the duration of ground-disturbing activities, especially during periods of heavy rainfall.			X
	• Expand disturbed areas (e.g., waste-rock pile storage areas) incrementally to the extent practicable.			X
	• Use existing roads and disturbed areas (and transportation ROWs) to the extent possible (before constructing new roads or disturbing new areas).		X	

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
	• If ground-disturbing activities require an extended schedule, employ measures to limit exposure to wind and water during the activity.			X
	• Avoid clearing and disturbing sensitive areas (e.g., steep slopes and natural drainages) and minimize the potential for erosion.		X	
	• Limit access to disturbed areas and staging areas to authorized vehicles traveling only on designated (dust-stabilized) roads.			X
	• Minimize disturbance to vegetation, soils, drainage channels, and stream banks.		X[p]	
M-6	**Restore original grade and reclaim soil and vegetation**			
	• Salvage topsoil and vegetation prior to site disturbance and place in stockpiles (to be used in final reclamation).			X
	• Use DOE-developed seed mixture (see Table 4.1-9).	X[m]		
	• Reestablish the original grade and drainage pattern of all disturbed areas before final reclamation to the extent practicable.		X[p]	
	• Test for agronomic nutrient profile to determine whether amendments are needed to establish vegetation before final reclamation.			X
	• Place topsoil over the top of disturbed areas and seed (e.g., by broadcast or drill seeder).		X	
	• Monitor seeded areas for some period following seeding to ensure vegetation is reestablished.	X[h]		
	• Grade mine waste-rock or tailings piles to create a gently sloping (more stable) surface.		X[f]	
	• Recontour soil borrow areas and cut and fill slopes, berms, waterbars, and other disturbed areas to approximate naturally occurring slopes.		X[f]	
M-7	**Protect wildlife and wildlife habitats (and grazing animals, if present) from ground disturbance and general site activities**			
	• Use wattles or other appropriate materials to reduce potential for sediment transport offsite.			X
	• Avoid unnecessary disturbance or feeding of wildlife. The collection, harassment, or disturbance of wildlife and their habitats should be reduced through employee and contractor education about applicable state and Federal laws.			X

TABLE S.5-1 (Cont.)

Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
• Minimize the number of areas where wildlife could hide or be trapped (e.g., open sheds, pits, uncovered basins, and laydown areas). For example, cap uncovered pipes at the end of each workday to prevent animals from entering the pipes. If a sensitive species is discovered inside a component, do not move that component, or, if it must be moved, move it only to remove the animal from the path of activity, until the animal has escaped.			X
• Establish buffer zones around sensitive habitats and either exclude project facilities and activities from those areas or modify them within those areas, to the extent practicable.			X
• If any Federally listed threatened and endangered species are found during any phase of the project, consult with the USFWS as required by Section 7 of the ESA and determine an appropriate course of action to avoid or mitigate impacts.	X		
• Schedule activities to avoid critical winter ranges for big game (mule deer and elk) when they are heavily used (December 1 through April 15), or utilize compensatory mitigation (e.g., habitat enhancement or replacement) to offset long-term displacement of big game from critical winter ranges. Compensatory mitigation projects may be developed in coordination with CPW.		X	
• Conduct pre-disturbance surveys for threatened, endangered, and sensitive species within all areas that would be disturbed by mining activities. These surveys would be used to determine the presence of sensitive species on the lease tracts and develop the appropriate measures to avoid, minimize, or mitigate impacts on these species. If sensitive species are located in the developable area, coordination with the USFWS and CPW would be necessary to determine the appropriate species-specific measures.		X	
• Minimize increases in the number of nuisance animals and pests in the project area, particularly any individuals or species that could affect human health and safety or that could adversely affect native plants and animals to the extent practicable.			X
• Monitor to the extent practicable the potential for an increase in the predation of sensitive species (particularly Gunnison sage-grouse) from ravens and other species that are attracted to developed areas and that use tall structures opportunistically to spot vulnerable prey.			X
• Locate soil borings, mine entrances, and travel routes to avoid important, sensitive, or unique habitats, including, but not limited to, wetlands, springs, seeps, ephemeral streams, intermittent streams, ponds and other aquatic habitats, riparian habitat, remnant vegetation associations, rare natural communities, and habitats supporting sensitive species populations as identified in applicable land use plans or best available information and science.		X[g]	
• Conduct pre-construction raptor nest surveys to ensure compliance with the Migratory Bird Treaty Act; follow the recommended buffer zones and seasonal restrictions for Colorado's raptors (CPW 2008).	X[q]		

TABLE S.5-1 (Cont.)

Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
• Schedule activities to avoid, minimize, or mitigate impacts on wildlife. For example, avoid crucial winter ranges, especially during the periods when they are used. If there are plans to conduct activities during bird breeding seasons, a nesting bird survey should be conducted first. If active nests are detected, the nest area should be flagged, and no activity should take place near the nest (at a distance determined in coordination with the USFWS) until nesting is completed (i.e., until nestlings have fledged or the nest has failed) or until appropriate agencies agree that construction can proceed with the incorporation of agreed-upon monitoring measures. Coordinate the timing of activities with BLM, USFWS, and CPW. Prior to authorization of ground disturbing activities a habitat suitability analysis would be done and for habitats found suitable, a protocol survey would be done. If nesting birds are found, seasonal and year-round buffers would be established with USFWS coordination.		X	
• Avoid and minimize impacts to bats during mine renewal activities (as well as during mine closure and reclamation) as follows: – Reentry of existing mines that contain winter roosting bats should be avoided during the winter season (October 1 through April 15). For existing mines expected to be reused, exclusion devices could be used to prevent bats from using the mines during winter. This would involve screening out bats by placing chicken wire with ≤1-in. (2.5-cm) mesh across the bat gate or open-access point at mine complexes that are ungated. Exclusions should be installed by September 1, if possible, but no later than September 30. – Existing mines utilized as summer roosting sites (other than maternity roost sites) can be handled similarly. The summer season is considered April 15 through September 1. – Any mine to be reworked that is used as a maternity roost should undergo an exclusion effort by April 15 and should be maintained from at least April 15 through June 15. Also, the portal(s) should be covered during night to prevent the potential reuse as maternity sites. In the event that a maternity roost will be permanently impacted, consideration should be given to preserving nearby mine features, if possible, to serve as mitigation and as a possible alternate habitat for bats. This is also recommended to mitigate impacts for a large winter roost site that will be permanently impacted. The creation of artificial bat habitat could also serve as an important alternative to mitigate impacts on maternity roosts or large winter roost sites. – For mine sites used year round, mining renewal activities should be spring (April through May) or fall (September through October). – The development and enactment of bat mitigation should be coordinated with the Colorado Bat Working Group and CPW.		X	

TABLE S.5-1 (Cont.)

Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
• Avoid vegetation clearing, grading, and other construction activities during the bird breeding season; if activities are planned during the breeding season, a survey of nesting birds should be conducted first. If active nests are detected, the nest area should be flagged, and no activity should take place near the nest (at a distance determined in coordination with the USFWS) until nesting is completed (i.e., until nestlings have fledged or the nest has failed) or until appropriate agencies agree that construction can proceed with the incorporation of agreed-upon monitoring measures. Coordinate the timing of initial development activities with the BLM, USFWS, and CPW.	X[q]		
• Relocate wildlife found in harm's way away from the area of the activity when safe to do so.			X
• Design stream crossings to provide in-stream conditions that would allow for and maintain uninterrupted movement of water and safe passage of fish; minimize removal of any deadfall and overhanging vegetation that provides shelter and shading to aquatic organisms.			X
• Exclude new mining and other surface-disturbing activities within 0.25 mi (0.4 km) of the Dolores River to avoid impacts on a desert bighorn sheep movement corridor (and other wildlife).		X[l]	
• Limit vegetation maintenance for transmission lines located near aquatic habitats or riparian areas (e.g., use minimum buffers identified in the applicable land use plan or best available science and information) and perform maintenance mechanically rather than with herbicides. Cutting in wetlands or stream and wetland buffers should be done by hand or by feller-bunchers. Tree cutting in stream buffers should only target trees able to grow into a transmission line conductor clearance zone within 3 to 4 years. Cutting in such areas for construction or vegetation management should be minimized, and the disturbance of soil and remaining vegetation should be minimized.			X
• The leaseholder should consult with the USFWS to address concerns regarding mine-water treatment ponds. Water pumped from mines should be diverted to a lined sedimentation pond for treatment. Settling ponds should be located in topographically low areas but not in any areas that are along drainages or near naturally flowing water. The treatment ponds should be constructed in accordance with applicable regulations. As applicable, the ponds should be fenced and netted to prevent use by wildlife (or livestock), including birds and bats. The lower 18 in. (46 cm) of the fencing should be a solid barrier that would exclude entrance by amphibians and other small animals.		X[q]	
• Before mine entrances are closed during reclamation, conduct a summer and winter bat survey, if required, to determine the number and species of bats that could potentially occupy a site. Depending on the results of the surveys, undertake actions that could include the installation of bat gates. If bat surveys indicate no presence of bats, promptly close off all mine openings when finished with mining activities before bats have an opportunity to establish roosts or hibernacula.		X[q]	

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
	• Use herbicides that have a low toxicity to wildlife and untargeted native plant species, as determined in consultation with the USFWS. Do not use herbicides near or in U.S. waters, including ponds, lakes, streams (intermittent or perennial), and wetlands, unless the herbicide is labeled for such uses. If herbicides are used in or near U.S. waters, the applicator shall ensure that the applications meet the requirements of the EPA's "Pesticide General Permit for Discharges from the Application of Pesticides." Determine setback distances in coordination with Federal and state resource management agencies. Before beginning any herbicide treatments, ensure that a qualified biologist has conducted surveys of bird nests and of sensitive species to identify the special measures or BMPs that are necessary to avoid and minimize impacts on migratory birds and sensitive species. The herbicides to be used would be approved by BLM through submission of "Pesticide Use Proposal" forms. The state-, county-, and BLM-listed plant species scheduled for eradication that are found in the project area would be eradicated and reported to BLM through submission of "Pesticide Application Records."	X[m]		
	• If a transmission line is required, it should be designed and constructed in conformance with *Avian Protection Plan Guidelines* (APLIC and USFWS 2005), in conjunction with *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006), to reduce the operational and avian risks that result from avian interactions with electric utility facilities. For example, transmission line support structures and other facility structures shall be designed to discourage their use by raptors for perching or nesting (e.g., by use of anti-perching devices). This would also minimize potential increased presence of ravens and raptors that may prey upon Gunnison sage-grouse. Shield wires should be marked with devices that have been scientifically tested and found to significantly reduce the potential for bird collisions.		X[q]	
M-8	**Minimize the establishment and spread of invasive (vegetative) species**			
	• Monitor the area regularly and eradicate invasive species immediately.	X[m]		
	• Use DOE-developed seed mixture (see Table 4.1-9) and weed-free mulch.	X[m]		
	• Clean vehicles to avoid introducing invasive weeds.			X
M-9	**Identify and protect cultural and historic resources**			
	• Assure that all activities comply with Section 106 of the NHPA.	X		
	• Assure that all individuals performing cultural resources management tasks and services meet the Secretary of the Interior Standards for Archaeology and Historic Preservation.	X		

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
	• Identify through searches of records, field surveys, and consultation with tribes, as necessary, all cultural resources in the area of potential effects and evaluate them for eligibility for inclusion on the NRHP.	X		
M-10[r]	**Minimize lighting to off-site areas; minimize contrast with surrounding areas**			
	• Design lighting to provide the minimum illumination needed to achieve safety and security objectives. Minimize or eliminate lighting of off-site areas or the sky. All unnecessary lighting should be turned off at night to limit attracting migratory birds, bats, or other wildlife.			X
	• Minimize the number of structures required.			X
	• Construct low-profile structures whenever possible to reduce the structures' visibility.			X
	• Repeat and/or blend materials and surface treatments (e.g., paint buildings) to correspond with the existing form, line, color, and texture of the landscape.			X
	• Select appropriately colored materials for structures, or apply appropriate stains as coatings, so they blend with the backdrop of the lease tract.			X
	• Use materials, coatings, or paints having little or no reflectivity whenever possible.			X
	• Avoid installing gravel and pavement wherever possible to reduce contrasts in color and texture with the existing landscape to the extent practicable.			X
	• Avoid downslope wasting of excess fill material.			X
	• Control litter and noxious weeds by removing them regularly during mine development and operations.			X
	• When accurate color rendition is not required (e.g., roadway, basic security), lighting should be amber in color, using either low-pressure sodium lamps or yellow LED lighting, or an equivalent.		X	
	• Undertake interim restoration during the operating life of the mine, as soon as possible after disturbances have occurred.		X[p]	
	• Ensure that lighting for structures on the mining sites does not exceed the minimum number of lights and brightness required for safety and security and does not cause excessive reflected glare.		X	
	• Use full cut-off luminaires recommended or approved by the International Dark Sky Association to minimize uplighting; direct lights downward or toward the area to be illuminated.			X
	• Ensure that light fixtures do not spill light beyond the lease tract boundaries to the extent practicable.			X

TABLE S.5-1 (Cont.)

	Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
M-11	**Protect human health from radiological exposures**			
	• Monitor radon emissions and related operational conditions to obtain data for the estimation of more precise radon doses with respect to the potential exposures of nearby residents, including (1) monitoring the radon discharge concentration continuously whenever the mine ventilation system is operational, (2) measuring each mine vent exhaust flow rate, and (3) calculating and recording a weekly radon-222 emission rate for the mine. Model the dose to the nearest member of the public by using COMPLY-R, as required by 40 CFR Part 61, Subpart B.	X		
	• In cases where radon doses to nearby residents exceed the NESHAP (40 CFR Part 61 Subpart B) dose limit of 10 mrem/yr, implement one or more of the following measures to reduce the potential radon exposures: (1) increase the ventilation flow rate; (2) reroute ventilation flow; (3) reroute ventilation to a new vent; (4) modify the vent stack; (5) decrease the vent stack diameter; (6) increase the vent stack release height; or (7) construct additional bulkheads.	X		
	• Promptly close off all mine openings and install warning signs of potentially high levels of radiation exposures when finishing the mining activities to prevent any inadvertent intrusion to the mine or getting too close to the mine openings.		X	
	• Assure an adequate thickness for the surface soil material covering waste-rock piles before seeding. The thickness should be adequate to prevent the underlying waste rocks from exposure to the ground surface over time. Through modeling and/or monitoring, evaluate measured uranium and decay product concentrations in waste rocks to determine whether the thickness is sufficient to mitigate potential radiation exposures.		X	
M-12	**Assure safe and proper transportation**			
	• Maintain the haul trucks for exclusive use only. Avoid using trucks for cartage of material other than uranium ore unless they have been properly cleaned for unrestricted use.	X		
	• Use a gravel track pad or similar method to minimize tracking of mud and dirt from any mine site onto the local public and county roads that provide site access.			X
	• Assure that uranium ore shipments proceed directly to the mill from the mine location. Identify locations for potential "safe havens" for temporary wayside parking or storage in the event there are unforeseen delays or scheduling issues associated with the mill.		X[s]	
	• Assure that mine and mill operators are aware of the routes used for shipments of uranium ore.		X[s]	

TABLE S.5-1 (Cont.)

Measure Description	Compliance Measure[a]	Mitigation Measure[b]	BMP[c]
• The State of Colorado Highway Access Code recognizes the right of reasonable access, by development, to the state highway system, providing the development mitigates traffic impacts on the highway at the point of access to the state highway. This would also apply to the traffic generation/impacts from the lease tracts considered in the Draft ULP EIS. As a measure to minimize potential traffic impacts due to the ULP proposed action, the following steps would be taken by each lease operator prior to opening a mining operation on a lease tract:			
1. The lessee should contact CDOT to meet for an access pre-application meeting to determine the size and scope of traffic impacts to be considered before submitting an access application.			X
2. The lessee shall submit a complete Access Permit Application to CDOT (Region 5 Access Permit Office) for its review. This application should include a traffic impact study (TIS) that identifies the directional distribution and daily and peak-hour volumes of traffic generated to identify if intersection improvements are warranted. Depending upon the size and impacts of a facility, the requirements for a TIS maybe waived for smaller operations, depending upon the outcome of the pre-application meeting. Typically the lessee would receive a response from CDOT within 20 days if additional documentation was needed before the permit would be completed. If CDOT accepted the application with no revisions, a permit would be issued or denied within 45 days of receipt of the application. If revisions were necessary, the application review period (20-day review) would restart upon receipt of the revised information by CDOT.	X		
3. The mine development constructs intersection improvements per the requirements of the access permit issued prior to commencement of the activity.	X		

[a] Compliance measures are those measures needed to fulfill regulatory requirements. Note that Appendix C of the lease agreement requires lessees to comply with all applicable statutes and regulations. Generic leases for the ULP are presented in Appendix A of this Draft ULP PEIS.

[b] Mitigation measures identified in the table include measures that are required by DOE as identified in current leases or that could be added to the leases when modified. DOE may also identify additional mitigation measures.

[c] BMPs are those practices and activities generally implemented within the industry to conserve resources. These BMPs are not necessarily required by DOE but may be implemented to further reduce impacts.

[d] See Appendix C, Section I of the lease agreement.

Footnotes continued on next page.

TABLE S.5-1 (Cont.)

[e] Except for older diesel equipment meeting emissions requirements that need higher sulfur content for proper functioning.

[f] See Appendix C, Section L of the lease agreement.

[g] See Appendix C, Section J of the lease agreement.

[h] The CDRMS requires lessees to obtain permits for their mining operations and to submit and follow an EPP. Runoff and run-on are specifically addressed on a site-by-site basis, as are issues concerning hydrology and reestablishment of vegetation.

[i] Article XIII MINING PLAN of the lease agreement addresses the process for reclamation; the ULP will work with the BLM to identify and clear local sources of borrow material.

[j] See Appendix C, Section M of the lease agreement; also required to be submitted under Article XII EXPLORATION PLAN of the lease agreement.

[k] See Appendix C, Sections G and H of the lease agreement, which address the location of mining infrastructure.

[l] See Appendix C, Section T of the lease agreement (for applicable lease tracts).

[m] Requirement of the surface management agency, BLM.

[n] Chisel plowing is a method used to alleviate shallow soil compaction by inserting a narrow tool in soil to depths of at least 14 in. (35 cm).

[o] Subsoiling is a method used to alleviate shallow soil compaction by tillage of soil to depths of at least 14 in. (35 cm).

[p] See Appendix C, Section H of the lease agreement.

[q] Measure per CPW.

[r] Primary source of information is USDA and DOI (2007).

[s] See Appendix C, Section P of the lease agreement.

S.6 CUMULATIVE IMPACTS

Potential impacts from the five alternatives in this Draft ULP PEIS are considered in combination with impacts of past, present, and reasonably foreseeable future actions. For this cumulative impacts analysis, past projects are generally assumed to be reflected in the affected environment discussion. Projects that have been completed, such as the exploration and reclamation activities implemented under the ULP in 2009 and 2011, are generally assumed to be part of the baseline conditions that were analyzed under the five alternatives (see Sections S.3.1.1 through S.3.1.5). As mentioned previously, the region of cumulative effects is conservatively assumed to be a 50-mi (80-km) radius (see Figure S.6-1). For most of the resource areas, a 25-mi (40-km) radius was identified as the ROI. The analyses for potential environmental justice impacts and potential impacts on the human health of the population generally addressed a 50-mi (80-km) radius, which is why the region of cumulative effects was extended to this larger radius (see Appendix D for information on how the radius was identified as the ROI for each resource area).

The major ongoing projects that are related to uranium mining activities proposed under the five alternatives evaluated in this Draft ULP PEIS include (1) the White Mesa Mill; (2) various permitted uranium mining projects in Montrose, Mesa, and San Miguel Counties, none of which are currently actively producing (of the 33 permitted projects, a few of the permits are for mines on the DOE ULP lease tracts); (3) the Daneros Mine; (4) the Energy Queen Mine, which is operational but currently inactive; and (5) the ongoing reclamation of abandoned uranium mines (these mines are not on the DOE ULP lease tracts). There are also several foreseeable projects related to uranium mining, which are currently in the planning phase. These include the Piñon Ridge Mill[5] and the Whirlwind Mine near Gateway.

Projects that are not related to uranium mining include the operating Nucla Station Power Plant; the Lisbon Natural Gas Processing Plant; the New Horizon Coal Mine; other mineral mining projects (for sand, gravel, gold, quartz, and granite); oil and gas exploration, transmission line, and transportation ROW projects; grazing and wildlife and vegetation management projects; and National Monument improvement projects.

The environmental impacts discussion in Section S.4 (and summarized in Tables S.4-5 through S.4-7) concludes that potential impacts on the resource areas evaluated for the five

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[5] Energy Fuels Resources Corporation has planned to construct the Piñon Ridge Mill (a conventional uranium mill) in Paradox Valley, between Naturita and Bedrock in Montrose County, Colorado. In early 2011, the Colorado Department of Public Health and Environment (CDPHE) issued a final radioactive materials license to Energy Fuels Resources Corporation (which is the main asset of Ontario's Energy Fuels Resources, Inc., located in Lakewood, Colorado), following CDPHE's preparations of a decision analysis and environmental impact analysis (CDPHE 2011). A group of plaintiffs then challenged that license by filing a lawsuit against CDPHE in Colorado's District Court for the City and County of Denver. On June 13, 2012, the court issued a decision in which it held that the CDPHE had unlawfully issued the license without conducting the necessary administrative procedures. The court set aside CDPHE's action in issuing the license, remanded the case for further proceedings, and ordered CDPHE to convene an additional hearing. As of the present date, CDPHE has convened that hearing, and further proceedings have been scheduled. Pursuant to CDPHE's tentative schedule, by April 2013 it will take final agency action and make a new decision on whether or not to issue the license.

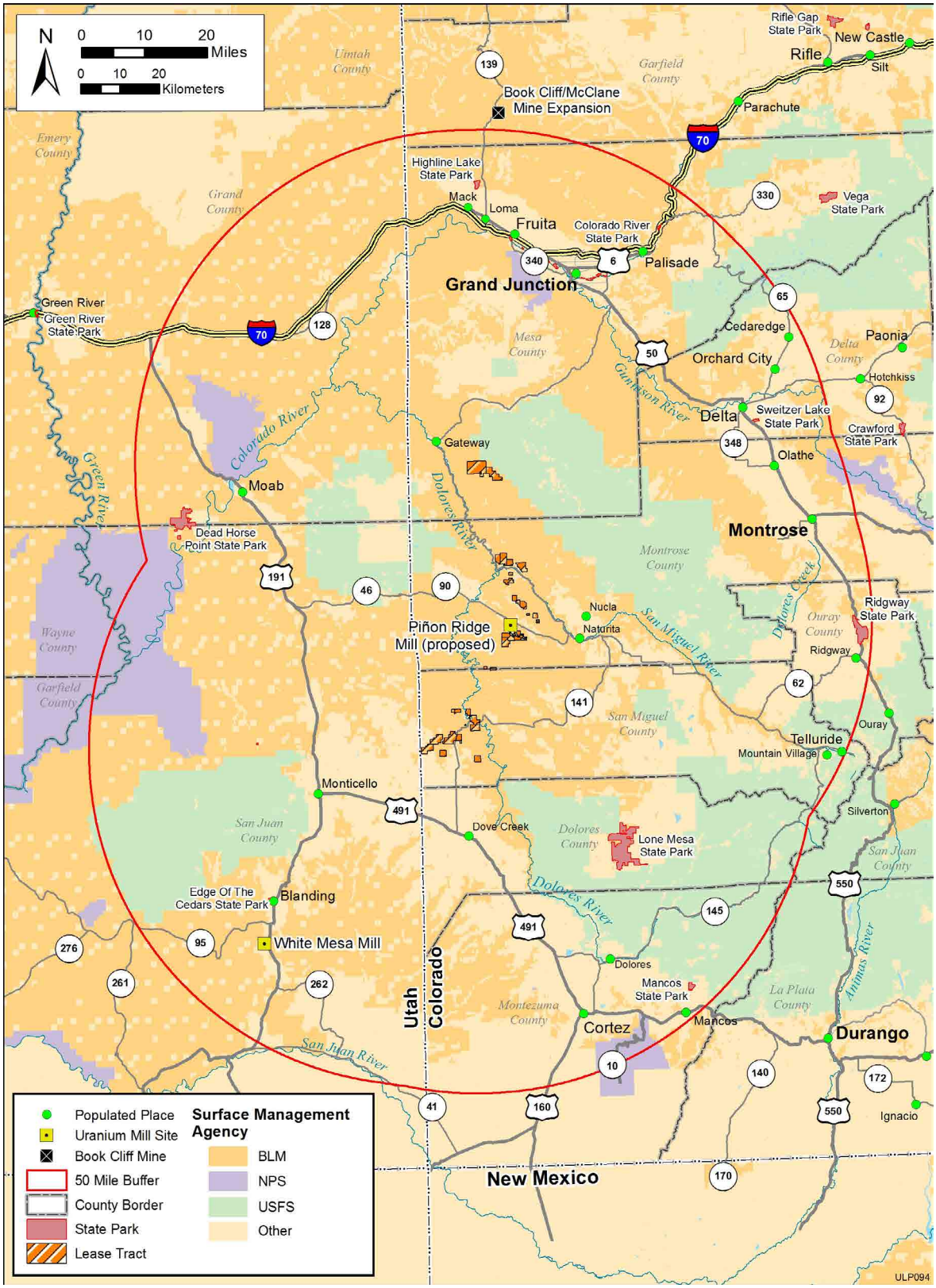

FIGURE S.6-1 Region of Cumulative Effects

alternatives generally would be minor and could be further minimized by implementing the compliance and mitigation measures and/or BMPs as required by project-specific mine plans. Estimates for potential human health impacts indicate that the emission of radon would be the primary source of potential human health radiation exposure. However, requirements for monitoring and ventilating mine operations and for worker safety are expected to mitigate potential impacts on human health. The potential radon dose estimates presented in the Draft PEIS were calculated by using conservation assumptions that the radon emission rate is proportional to the cumulative uranium production and the uranium mines have been in operation for 10 years. Actual radon dose based on measured radon emission data should be used to obtain more realistic radon exposure estimates.

Although the various present, ongoing, and planned projects identified in the region of cumulative effects could contribute to impacts on the various environmental resource areas evaluated, it is expected that uranium-mining-related projects would be most similar with respect to the types of potential environmental impacts that could occur, and most of these are located closer to (within 25 mi or 40 km) the lease tracts. However, information for most of the projects is either not available or qualitative in nature.

Potential impacts from the five alternatives would generally be negligible to moderate. The potential (incremental) impacts from the five alternatives are tabulated in Tables S.4-5 through S.4-7.

For specific resources, the cumulative impacts as well as the incremental contributions to these impacts from implementation of the ULP under any of the five alternatives are summarized below:

- *Air quality.* Because of the relatively low population density, low level of industrial activities, and relatively low traffic volume in the ULP region, the quantity of anthropogenic emissions is small and the ambient air quality is relatively good. Particulate emissions associated with ongoing actions in the region, such as White Mesa Mill and uranium mining, and planned actions, such as Piñon Ridge Mill, are not expected to exceed ambient air quality standards. Cumulative impacts on air quality in the ULP region are therefore considered to be minor. Under Alternatives 1 and 2, PM_{10} and NO_x emissions during reclamation are estimated to be less than 1% and 0.1% of the emission totals, respectively, for the Colorado counties (Mesa, Montrose, and San Miguel) encompassing the ULP lease tracts. Under Alternatives 3 through 5, PM_{10} and NO_x emissions are estimated to be highest during the development and operations phase, ranging from 1.5 to 3.2% (PM_{10}) and 1.0 to 2.3% (NO_x) of emission totals. The contribution of any alternative to cumulative impacts in the region is expected to be negligible to minor. None of the ULP alternatives would cause measurable impacts on regional ozone or AQRVs at nearby Class 1 areas.

- *Acoustic environment.* There are no sensitive receptors (such as hospitals or schools) within 3 mi (5 km) of the ULP lease tracts, and only 17 residences lie within 1 mi (1.6 km) of the lease tracts (7 of which are adjacent to a lease tract). Although there are no noise surveys of the immediate vicinity, it is likely that the highest human-caused noise levels (in the range of 50 to 60 dBA) in the ULP region are intermittent and associated with state highways and agricultural/industrial activities. Planned and ongoing actions, such as the Piñon Ridge Mill and uranium mining, are not expected to exceed the maximum permissible noise levels. Noise-related cumulative impacts are therefore considered minor. Noise levels associated with reclamation activities under Alternatives 1 and 2 would be about 55 dBA at a distance of about 1,650 ft (500 m) from the reclamation site; this is the Colorado daytime maximum permissible limit in a residential zone. Under all alternatives, noise-related impacts are expected to be local and intermittent and, therefore, minor. Noise levels could exceed the Colorado limit at Lease Tract 13 under Alternatives 1 through 3 and at Lease Tracts 13, 13A, 16, and 16A under Alternatives 4 and 5, if any activities occurred near the boundary. The contribution of any of the five ULP alternatives to cumulative noise-related impacts in the region is expected to be minor.

- *Paleontological resources.* Significant paleontological resources within the ULP lease tracts (the region of cumulative effects) are associated with stratigraphic units of Jurassic and Cretaceous age. The PFYC ranking of the Jurassic-age Morrison Formation, the main source of uranium in the lease tracts and the geologic unit most likely to be affected by future mining, is 5 (very high), indicating that it is highly fossiliferous and most at risk for human-caused adverse impacts or natural degradation. Other uranium mines in the region have acknowledged the potential for discovering or damaging vertebrate fossils within in the Morrison Formation. Because there are compliance-driven measures governing the management of paleontological resources on Federal lands, the cumulative impacts on these resources are considered to be minor. Lessees would follow requirements set forth in project-specific paleontological management plans prepared in consultation with the BLM. Therefore, the contribution of any of the five ULP alternatives to cumulative impacts on paleontological resources is expected to be minor.

- *Soil resources.* Cumulative impacts on soil resources within and adjacent to the ULP lease tracts (the region of cumulative effects) would result mainly from ground-disturbing activities associated with mining activities under any of the five alternatives. These impacts are expected to be minor to moderate, but they would be short in duration and generally controlled through mitigation measures and BMPs.

- *Water resources.* Water resources in the region of cumulative effects include surface water in the Upper Dolores, San Miguel, and Lower Dolores

watersheds; groundwater in the bedrock aquifers within Paradox Basin; and alluvial aquifers within the various canyons along the Dolores and San Miguel Rivers. Cumulative impacts on stream flow in the Dolores River are considered moderate due mainly to the effects of regulated flow by the McPhee Dam located upstream of the ULP lease tracts. Changes in the water cycle due to seasonal shifts in precipitation (and a decline in snowpack) are projected to cause up to a 20% decrease in runoff in the Upper Colorado River Basin (of which the Dolores and San Miguel Rivers are a part) in the foreseeable future; the decrease in runoff will also affect recharge rates in aquifers throughout the region. Water consumption, especially in terms of irrigation from surface water sources, is already on the decline because of regional drought conditions, and this trend is likely to continue into the foreseeable future. In terms of water quality, the cumulative impacts on groundwater and surface water in the Paradox Basin are considered to be moderate, due mainly to the naturally high saline groundwater that discharges to the Dolores River in Paradox Valley. Activities associated with ongoing actions in the region, such as the White Mesa Mill and uranium mining, and planned actions such as the Piñon Ridge Mill, could reduce runoff to the Dolores River; however, water quality impacts are not expected. Under all five alternatives, minor impacts on water quality could occur as a result of land disturbance and underground mining activities associated with mine development, operations, and reclamation; these impacts would be minimized by the implementation of compliance and mitigation measures and/or BMPs (Table 4.6-1). Minor (local and temporary) impacts on stream flow are also expected.

- *Human health.* Exposures from background radiation sources within a 50-mi (80-km) radius of the ULP lease tracts were estimated on the basis of two hypothetical scenarios: (1) considering an individual who lives near the lease tracts; and (2) considering an individual pumping out groundwater from a well for drinking. Potential dose estimates show that an individual could receive a dose of about 120 mrem/yr from ambient gamma radiation, 290 mrem/yr from inhalation of radon, 0.47 mrem/yr from breathing airborne radionuclides in resuspended dust particles, and 25 mrem/yr from drinking untreated well water. The probability that such a person would incur an LCF is estimated to be about 5×10^{-4} (i.e., 1 in 2,000 [2×10^{3}]). Dose estimates associated with White Mesa and Piñon Ridge Mills (to the nearest receptor at the site boundary) range from 5.8 to 8.2 mrem/yr. The contribution of any of the five ULP alternatives to cumulative impacts due to radiation exposure in the region is expected to be negligible, ranging only from 1 to 10 mrem/yr for a resident living more than 1.5 mi (2,500 m) from the lease tract. The potential dose could be higher if the distance is less than 1.5 mi (2,500 m), but the dose would still be less than 31 mrem/yr, which corresponds to a probability of 4×10^{-5} to develop a latent fatal cancer (i.e., 1 in 2,500 [2.5×10^{4}]).

- *Ecological resources (vegetation).* The region of cumulative effects (Montrose, Mesa, and San Miguel Counties) supports a wide variety of vegetation types, primarily woodlands and shrublands. Incremental impacts on vegetation result mainly from ground disturbance (which can destroy vegetation and introduce non-native species); indirect impacts include deposition of fugitive dust, soil erosion, sedimentation, and changes in water quantity or quality. Impacts are expected to be minor to moderate; establishment of native plant communities during reclamation would reduce impacts over the long term.

- *Ecological resources (wildlife).* Incremental impacts on wildlife in the region of cumulative effects (Montrose, Mesa, and San Miguel Counties) result mainly from habitat disturbance. Such impacts could be minor to moderate in the short term but would be localized and would not affect the viability of wildlife populations.

- *Ecological resources (aquatic biota).* The region of cumulative effects (Montrose, Mesa, and San Miguel Counties) contains a variety of freshwater aquatic habitats that support a wide diversity of aquatic biota. Incremental impacts result from the disturbance of these habitats, sedimentation (due to soil erosion from mine sites), or changes in water quantity or quality due to alterations in drainages or releases of contaminants into aquatic systems. Overall, these impacts are expected to be negligible to minor for all project phases under each of the five ULP alternatives; moderate impacts would be expected only if mines were located near perennial water bodies.

- *Ecological resources (threatened, endangered, and sensitive species).* Incremental impacts on threatened, endangered, and sensitive species would be similar to those described for vegetation, wildlife, and aquatic biota.

- *Land use.* Most of the lands surrounding the ULP lease tracts are managed by the BLM under its "multiple use" management framework. These lands are currently managed for uses that include conservation, recreation, agriculture (including grazing), rangeland, and minerals (via mining, leasing, and free use). Because these lands are managed under the authority of the BLM and USFS, the cumulative impacts within the 25-mi (40-km) radius (the region of cumulative effects) are considered to be minor. Lands within the Uravan Mineral Belt, including those on which the ULP lease tracts are located, were withdrawn from mineral entry in 1948 in order to reserve them for the exploration and development of uranium and vanadium resources. Under Alternatives 1 and 2, all mining activities on these lands would cease, and other activities within the lease tracts would continue. The contributions of the ULP to cumulative impacts in the region would be minor since there would be no conflict between mining and other uses. Under Alternatives 3 through 5, mining activities within the lease tracts may preclude certain other uses (such as recreation and grazing), but their contributions to cumulative impacts

would also be considered minor since the surrounding lands offer ample opportunity for these other uses.

- *Socioeconomics.* Cumulative socioeconomic impacts result from changes in employment opportunities and income, expenditures for goods and services, and tax revenues associated with various types of commercial, industrial, and recreational activities that are taking place within the region of cumulative effects (Montrose, Mesa, and San Miguel Counties). These impacts are generally considered beneficial to local communities, counties, and states. Unemployment in the three-county region is currently 9.6% (2011). Under Alternatives 1 and 2, socioeconomic impacts are expected to be minor, increasing the total employment by about 0.1% in the region. Under Alternatives 3 through 5, impacts would also be minor, increasing the total employment by less than 1% in the region.

- *Environmental justice.* Cumulative environmental justice impacts would encompass any (and all) human health and environmental impacts that could be disproportionately high and adverse on minority or low-income populations; however, there are no minority or low-income populations, as defined by CEQ guidelines, within the region of cumulative effects. As a result, there would be no anticipated cumulative impacts on these populations, and no contribution to these impacts from any of the five ULP alternatives.

- *Transportation.* Most roads in the region of cumulative effects pass through uninhabited public lands; however, routes used to haul uranium ore over the past 10 to 30 years pass 13 of 15 residences along the ULP lease tracts. Traffic volume along these routes is expected to increase with the continued operation of White Mesa Mill, the construction of Piñon Ridge Mill, and future uranium mining in the region. Under Alternatives 1 and 2, there would be no transport of uranium ore and therefore no change in current traffic trends. Ore shipments under Alternatives 3 through 5 would increase truck traffic along affected routes and would contribute to cumulative impacts, such as human exposure to low levels of radiation, increased traffic, and potential accidents. It is estimated that the number of shipments from mines to mills could be as high as 92 per day under Alternative 5. The average external dose rate is about 0.1 mrem/h at 6.6 ft (2 m), two orders of magnitude lower than the regulatory maximum. Estimated potential impacts include no LCFs to the collective population, no traffic fatalities, and possibly one traffic injury under Alternatives 4 and 5.

- *Cultural resources.* Incremental impacts from the five ULP alternatives could result from vandalism, theft, and damage or destruction of cultural artifacts within the lease tracts or in adjacent areas affected by mining activities. Adverse impacts on traditional cultural properties are also counted among the direct impacts on cultural resources. Direct impacts on these resources are not

expected under Alternatives 1 and 2; however, vandalism and theft are possible impacts because of greater site accessibility. Ground disturbance under Alternatives 3 through 5 could damage or destroy artifacts and traditional cultural properties, and artifacts could be lost through vandalism or theft as a result of improved site access. Such impacts would be minimized or avoided, since all activities would comply with Section 106 of the NHPA.

- *Visual resources.* Incremental impacts from the five ULP alternatives relate mainly to alterations to vegetation and landforms, removal of structures and materials, changes to roadways, and changes in vehicular and work activities. Although impacts associated with exploration are generally expected to be minor, potential long-term impacts could result from mine development and operations, as would occur under Alternatives 3 through 5, because activities during these phases could increase contrasts in form, line, color, and texture. The magnitude of these impacts would need to be determined at the project level.

- *Waste management.* Incremental impacts on waste management within the lease tracts (the region of cumulative effects for waste management) are associated with the generation of waste from the various mining phases. These impacts are expected to minor under all five of the ULP alternatives.

Potential cumulative impacts on the various environmental resources (e.g., air quality, water quality, soils, ecological resources, socioeconomics, transportation) and human health from various past, present, and reasonably foreseeable projects and activities within the 50-mi (80-km) ROI, which include the impact of these activities when added to activities related to the ULP, would vary by resource but would generally range from negligible to moderate (see Table S.4-1). The overall contribution of the ULP to these impacts is considered to be minor.[6]

S.7 HOW THE PUBLIC CAN PARTICIPATE

DOE is soliciting comments on the Draft ULP PEIS during a 60-day public comment period, during which public hearings will be held to provide interested members of the public with opportunities to learn more about the content of the ULP PEIS, hear DOE representatives present a summary of the results of the Draft ULP PEIS analyses, ask clarifying questions, and

[6] Because of the qualitative nature of information presented for most projects or activities in the region of cumulative effects, it is not possible to determine an overall cumulative impact in a quantitative sense. Even for projects where quantitative results are calculated or estimated, (e.g., for air emissions, human health doses, transportation, and socioeconomics), the methodology and associated assumptions used for the calculations vary, making definitive comparisons among projects difficult. For this Draft ULP PEIS, the potential incremental impacts of the five alternatives are based on conservative assumptions and mostly do not take credit for measures (compliance measures, mitigation measures, and BMPs) that would minimize the potential impacts. Hence, it is expected that the potential incremental impacts of the ULP would be less than those summarized in S.4-5 through S.4-7, since such measures would be implemented as required by project-specific mine plans and permits.

provide oral and written comments. The ULP PEIS web site (http://www.ulpeis.anl.gov) provides detailed information about the Draft ULP EIS, public hearings, comment submission, and other pertinent information.

S.8 LOCATIONS AND DATES OF THE PUBLIC HEARINGS

Public hearing dates, times, and locations will be announced in the *Federal Register*, in local newspapers, on the ULP PEIS web site (http://www.ulpeis.anl.gov), and on the DOE NEPA web site (http://energy.gov/nepa).

S.9 REFERENCES

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