Uranium Leasing Program Programmatic Environmental Impact Statement

Welcome

The U.S. Department of Energy (DOE) issued the Draft Uranium Leasing Program Programmatic Environmental Impact Statement (ULP PEIS) on March 15, 2013.

You are invited to submit comments on the Draft ULP PEIS. Four public hearings are being held. The 77-day public comment period started on March 15, 2013 and will close on May 31, 2013.

ULP Public Hearings Schedule		
Date	Place	Time
April 22	Grand Junction, CO	6:30-9:00 p.m.
April 23	Montrose, CO	6:30-9:00 p.m.
April 24	Telluride, CO	6:30-9:00 p.m.
April 25	Naturita, CO	6:30-9:00 p.m.

Written comments on the scope of the Draft PEIS may be submitted by U.S. mail to the following address:

Ray Plieness
DOE ULP PEIS Document Manager
Office of Legacy Management
U.S. Department of Energy
11025 Dover Street, Suite 1000
Westminster, CO 80021

Comments may be submitted electronically via the ULP PEIS website at http://ULPEIS.anl.gov or by email at ulpeis@anl.gov.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Uranium Leasing Program Programmatic Environmental Impact Statement

National Environmental Policy Act Process for the ULP PEIS

National Environmental Policy Act (NEPA) Process for PEISs. Under NEPA, the term "environment" encompasses both the physical environment (e.g., air, surface water, groundwater, geology) and the human environment (e.g., health and safety, jobs, transportation, cultural resources, land use).

The Council on Environmental Quality (CEQ) established NEPA requirements for all federal agencies, including procedures for preparing PEISs. In turn, individual agencies such as DOE have established their own implementing regulations to meet or exceed these requirements. Related information is available on the DOE NEPA website at **http://energy.gov/nepa**.

DOE is preparing the ULP PEIS in order to analyze the reasonably foreseeable environmental impacts, including site-specific impacts, of the range of reasonable alternatives for the management of the ULP.

Notice of Intent (NOI)
June 21, 2011

Public Scoping Process
June 21, 2011 to September 9, 2011

Draft PEIS
March 15, 2013

We Are Here

Public Comment on Draft PEIS

Final PEIS

ROD

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Purpose and Need for Agency Action

- 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.
- 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).
- 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.

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.

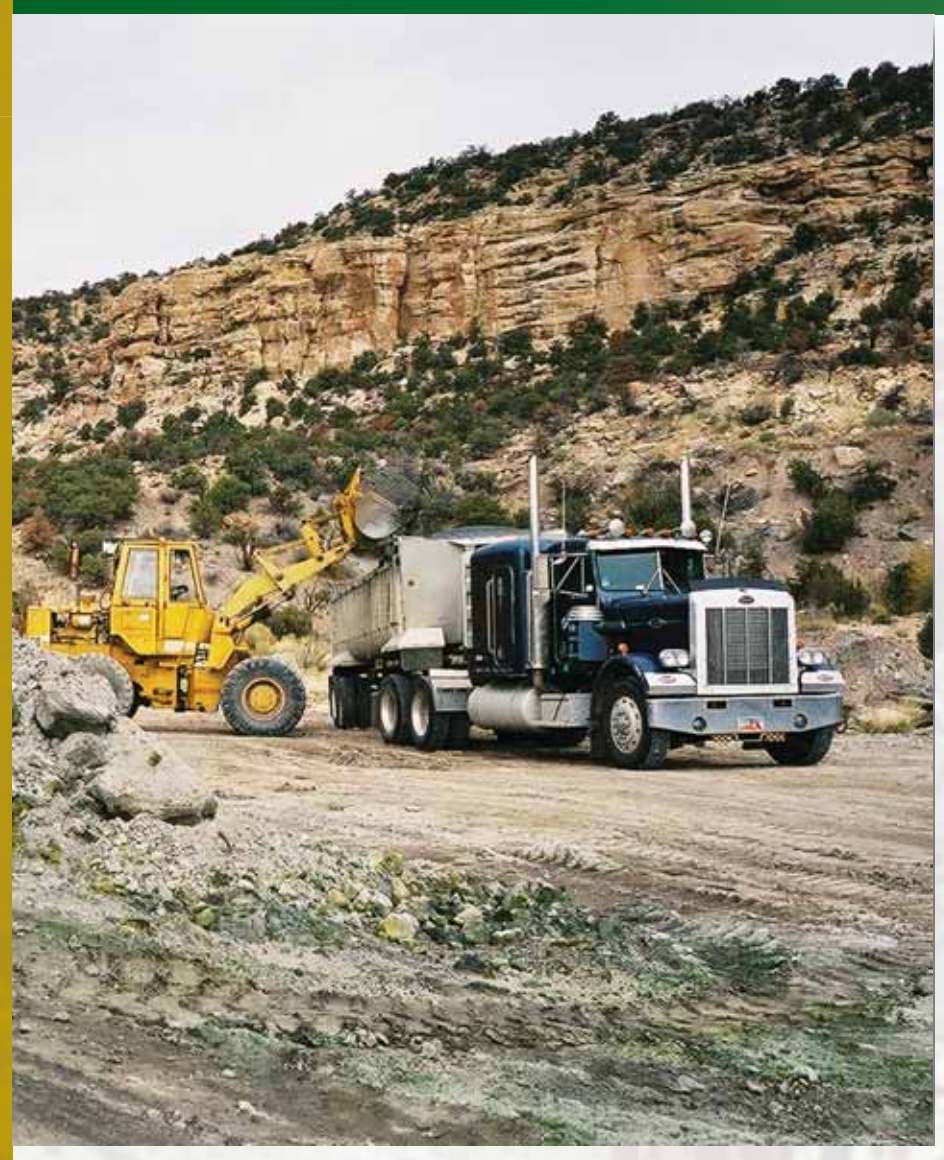
For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

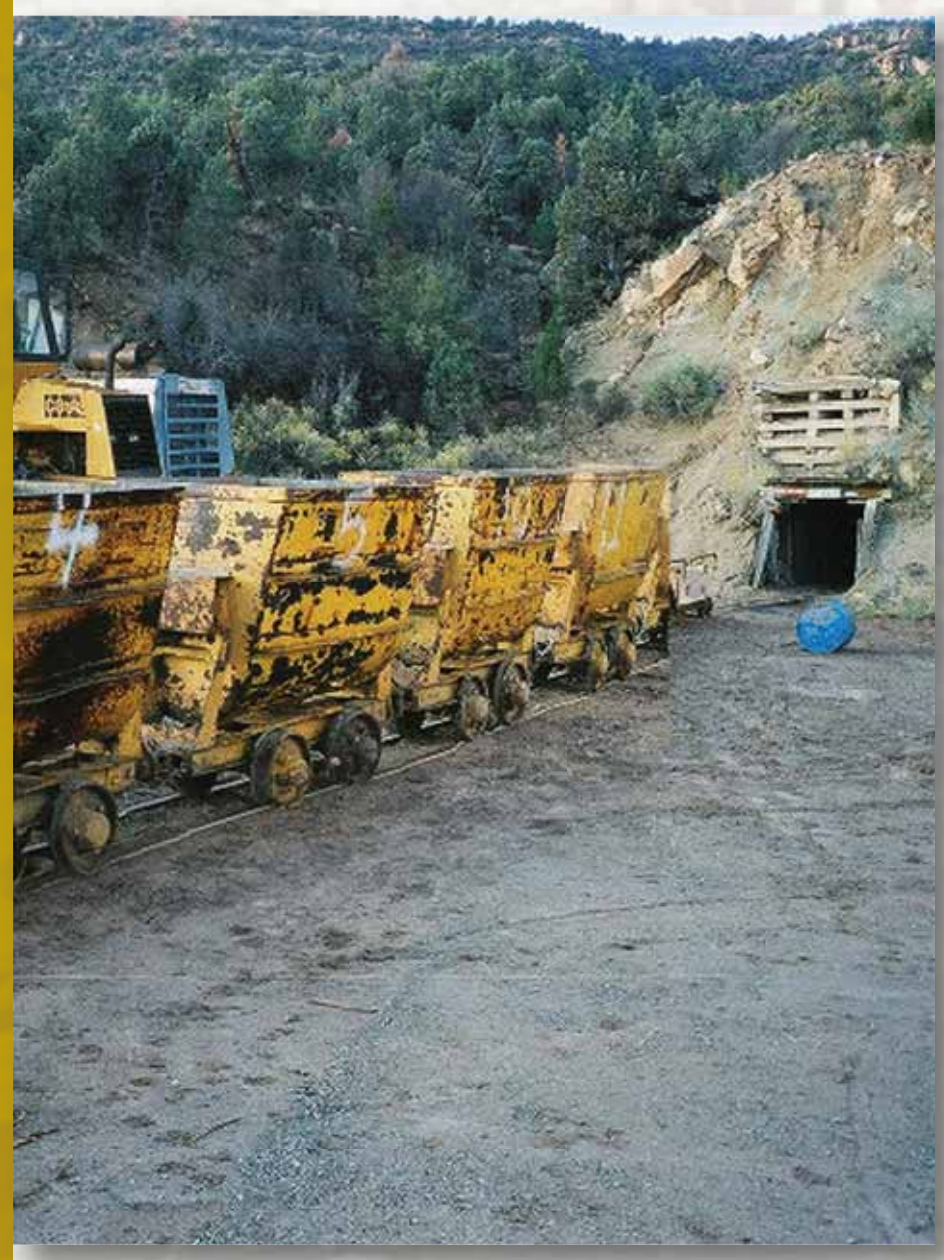
U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Uranium Leasing Program Programmatic Environmental Impact Statement

Uranium Leasing Program Background





The Uranium Leasing Program (ULP) began in the late 1940s, when the U.S. Atomic Energy Commission (AEC) was authorized to withdraw lands from public use to ensure an adequate reserve of uranium and vanadium ores and associated minerals for the nation's defense program.

The ULP has administered the program through three previous leasing periods: 1948 – 1962, 1974 – 1994 and 1996 – 2008. These leasing periods collectively produced 8.1 million pounds of uranium as U_3O_8; 41.7 million pounds of vanadium as V_2O_5; and generated $65 million in royalties to the federal government.

DOE currently manages 31 lease tracts (approximately 25,000 acres), all located within the Uravan Mineral Belt in southwestern Colorado. There are 29 lease tracts actively held under lease. Eight of these lease tracts have existing mines on them; these mines are currently maintained in standby status. Two additional lease tracts are currently inactive and will remain so indefinitely.

The DOE lessees are required to comply with all applicable Federal, State and local statutes, rules, and regulations. The U.S. Bureau of Land Management (BLM) is the surface managing agency for all lands included within the DOE lease tracts, especially for non-lessee activities. DOE has developed a Memorandum of Understanding (MOU) with BLM identifying each agency's roles and responsibilities.

The Colorado Division of Reclamation, Mining, and Safety (CDRMS) is the state agency that regulates exploration, development, and mining (extraction) activities within the state of Colorado. DOE has developed a MOU with CDRMS identifying each agency's roles and responsibilities.

DOE coordinates its review of all lessee-proposed activities with these two agencies to ensure that lessee activities are conducted in the most environmentally sound manner and duplicative agency efforts are minimized.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

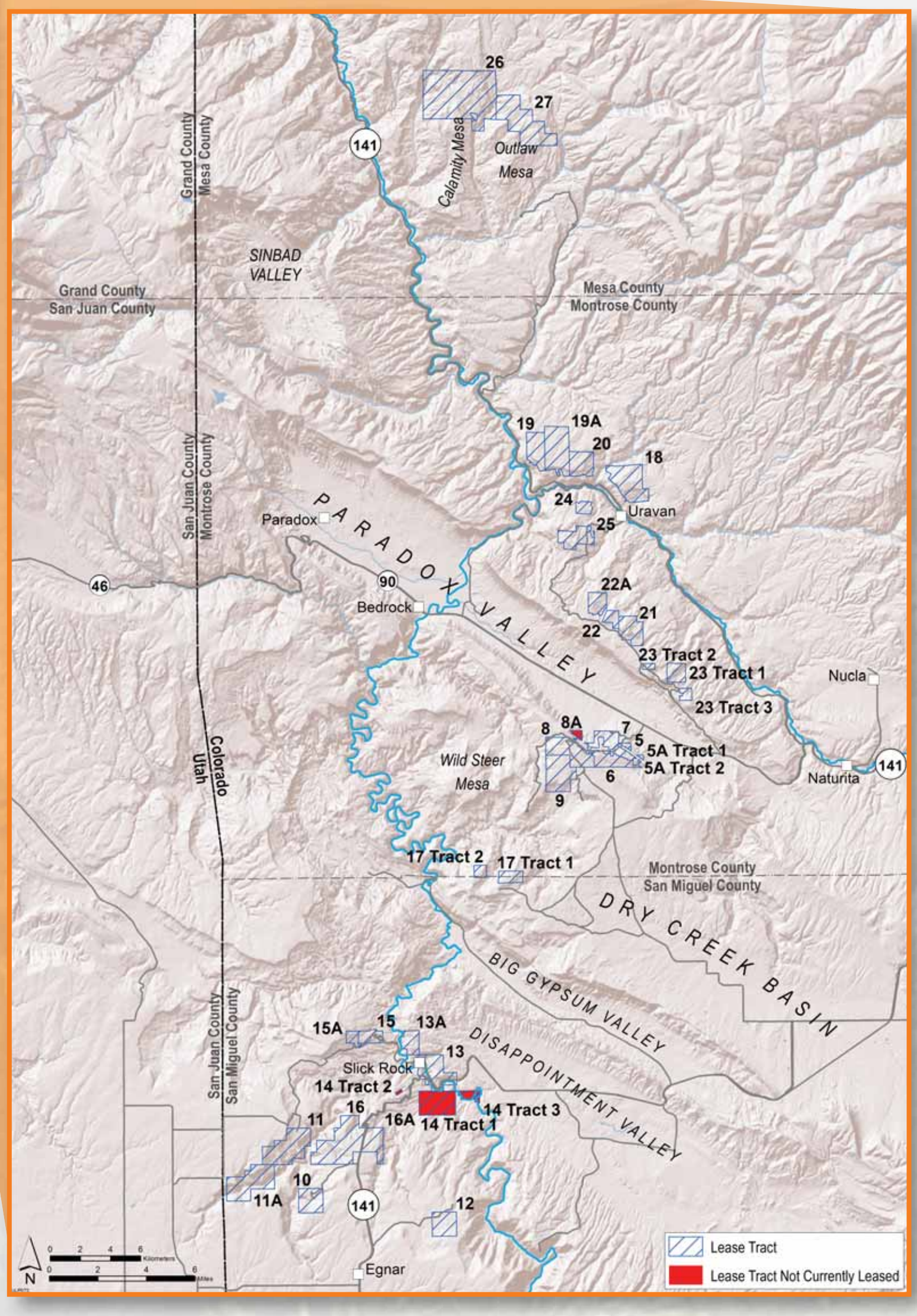
U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Uranium Leasing Program Programmatic Environmental Impact Statement

Lease Tract Maps

Regional Location Map



Lease Tract Location Map

For further information contact:

Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management

U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021

Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Cooperation & Consultation

Fourteen cooperating agencies provided input in the preparation of the Draft ULP PEIS

- **Federal** – U.S. Department of the Interior, Bureau of Land Management; U.S. Environmental Protection Agency
- **State** – Colorado Department of Transportation; Colorado Division of Reclamation, Mining, and Safety; and Colorado Parks and Wildlife
- **County** – Mesa County Commission; Montrose County Commission; San Juan County Commission; and San Miguel County Board of Commissioners
- **American Indian Tribal Government** – the Pueblo of Acoma Tribe; the Pueblo de Cochiti Tribe; the Pueblo de Isleta Tribe; the Navajo Nation; and the Southern Ute Indian Tribe

Consultation with U.S. Fish and Wildlife Service

Section 7 of the Endangered Species Act (ESA) requires Federal agencies to consider the effect of their undertakings on species listed under the ESA and to consult with the U.S. Fish and Wildlife Service (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 been in informal consultation, and DOE has submitted a biological assessment (BA).
- The BA finds that ULP activities would have no effect on 8 species and on the designated critical habitat for 5 species. ULP activities may affect, but are not likely to adversely affect 9 species or the critical habitat for the 4 Colorado River endangered fish species (Note that the determination for the endangered fish species has been reassessed recently and will be revised to "may affect, and are likely to adversely affect").

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Five Alternatives Evaluated

DOE has evaluated five alternatives that address the range of reasonable alternatives for the management of the ULP.

- **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.
- **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 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. Under Alternative 4, the lease period would be for the next 10 years or for another reasonable period.

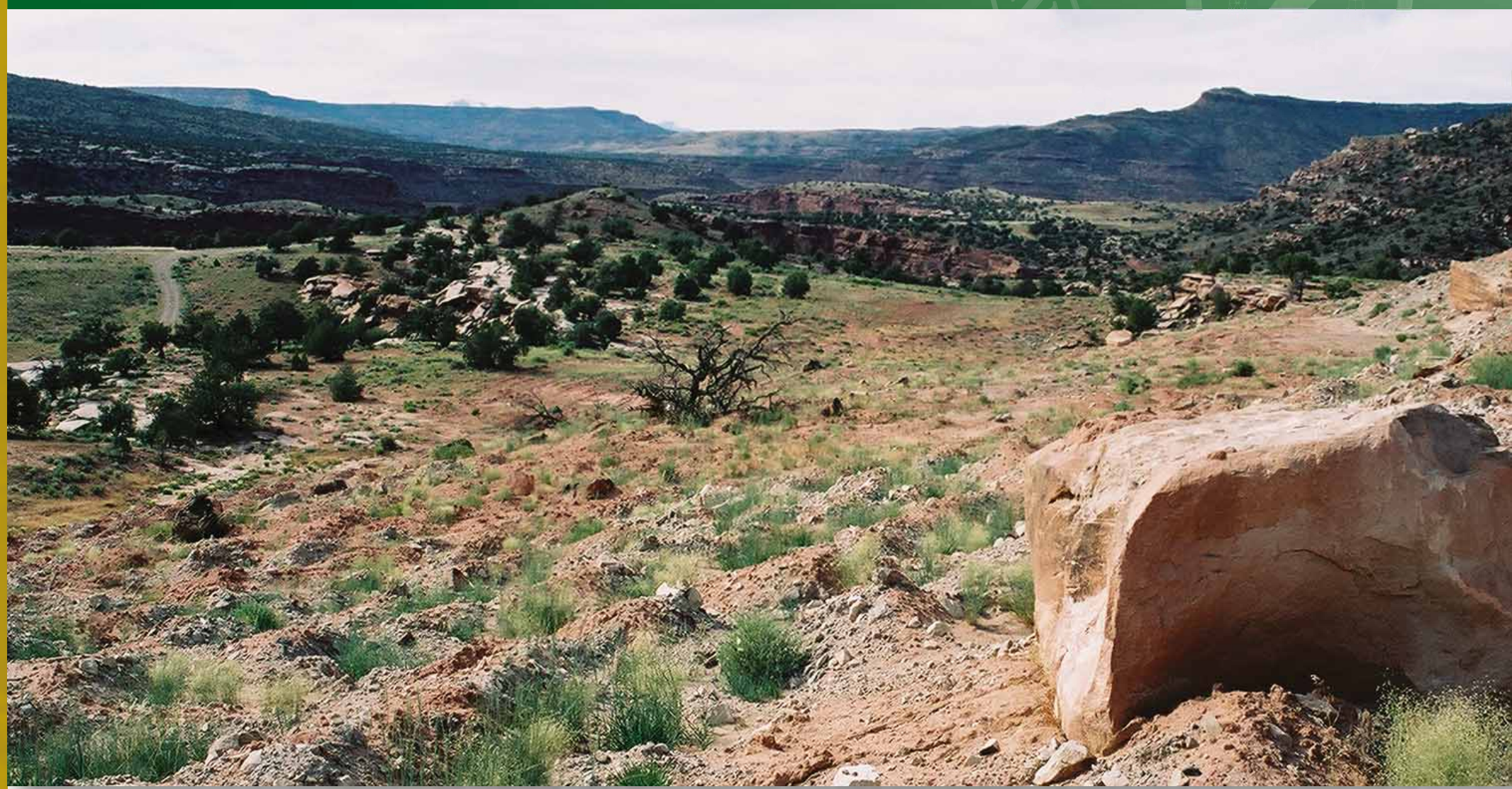
For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Uranium Leasing Program Programmatic Environmental Impact Statement

Overview of the Potential Impacts of the Five Alternatives



The Draft PEIS evaluations of the five alternatives for the various resource areas indicate that the potential impacts are generally negligible to moderate.

- **Alternatives 1 and 2:** DOE would terminate all existing leases and all activities would be reclaimed by the lessees. Potential impacts could result from reclamation activities only. Potential impacts from future use of the lands could result from Alternative 2.
- **Alternatives 3, 4, and 5:** Potential impacts for Alternative 3 would be less than Alternatives 4 and 5 resulting from exploration, mine development and operations, and reclamation activities on 12 versus 31 lease tracts.
- **Alternative 5** could result in the highest annual 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.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Uranium Leasing Program Programmatic Environmental Impact Statement

What Evaluations Were Performed for the Draft PEIS

DOE evaluated each of the five alternatives for its potential impacts on the following 13 human health and environmental resource areas using available site-specific information:

Uranium Mine Exploration, Mine Development and Operations, Reclamation

Air Quality
Potential impacts on air quality from exploration, mine development/operations, and reclamation

Acoustic Environment
Potential impacts on the acoustic environment from exploration, mine development/operations, and reclamation

Geology and Soils
Potential impacts on geology (including paleontology) and soils resulting from land disturbance activities during exploration, mine development/operations, and reclamation

Water Resources
Potential impacts on surface water and groundwater during exploration, mine development/operations, and reclamation

Human Health
Potential impacts (radiation doses, LCF risks, and industrial accidents) on workers and the general public during exploration, mine development/operations, and reclamation

Ecological Resources
Potential impacts on vegetation, wildlife, and wetlands from exploration, mine development/operations, and reclamation

Socioeconomics
Potential impacts on local employment, income, population, housing, public services, and recreation and tourism from exploration, mine development/operations, and reclamation

Environmental Justice
Potential disproportionately high and adverse impacts on low-income and minority populations from exploration, mine development and operations, and reclamation

Land Use
Potential impacts on the environment from land requirements, potential incompatibilities, and disturbances

Transportation
Potential impacts on workers and the general public associated with transportation of ore to the mills

Cultural Resources
Potential impacts on historically significant properties,if present, from exploration, mine development/operations, and reclamation or from access to traditional use areas

Visual Resources
Potential impacts on visual environment (view) during exploration, mine development/operations, and reclamation

Waste Management
Potential impacts on waste disposal practices from wastes generated during exploration, mine development/operations, and reclamation

- In addition to the thirteen resource areas, DOE evaluated cumulative impacts that could occur when potential impacts from the proposed action are considered with past, present, and reasonably foreseeable future actions in the region of influence (ROI) addressed for the Draft ULP PEIS.
- The five alternatives are also analyzed for the three phases of uranium mining: exploration; mine development and operations; and reclamation, as applicable to the given alternative.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Cumulative Impacts and Measures to Minimize Potential Impacts

Cumulative Impacts Evaluated

Potential impacts from the five alternatives in the Draft ULP PEIS are considered in combination with impacts of past, present, and reasonably foreseeable future actions. Past projects are generally assumed to be reflected in the affected environment discussion. Potential cumulative impacts on the environmental resources from various past, present, and reasonably foreseeable projects and activities within the 50-mi (80-km) region of influence, when added to activities related to the ULP, would vary by resource but would generally range from negligible to moderate. The overall contribution of the ULP to these impacts is considered to be minor.

Measures to Minimize or Prevent Potential Impacts

The following three categories of measures apply to the exploration, mine development and operations, and reclamation activities:

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 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.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

http://ulpeis.anl.gov

Comparison of Potential Impacts of Alternatives 1-5

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Air Quality PM = Particulate matter NO_x = Nitrogen oxide	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.
Acoustic Environment dBA = decibels	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.
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.
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 Colorado Division of Water Resources.	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).
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.
Human Health LCF = Latent Cancer Fatality	Continued uranium mine development and operations would not occur under Alternative 1.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	During mine development and operations, average radiation dose of individual miners was estimated to be 433 mrem/yr; the corresponding LCF risk is 4×10^{-4}/yr. Potential health risk could result from chemical exposures; the estimated hazard index of 1.1 is slightly over the threshold value of 1. A resident living in the surrounding area was estimated to receive a radiation dose ranging from 16-1.9 mrem/yr at a distance of 500-5,000 m from a medium underground mine. The associated LCF risk ranges from 2×10^{-5}-3×10^{-6}/yr. The collective dose to all residents living within 80 km from the lease tract area would range from 7.5-39 person-rem/yr during the peak year of operations. The collective LCF risk ranges from 0.01-0.05/yr. Potential risk from chemical exposures is not expected for residents.	During mine development and operations, potential impacts to individual miners and residents living in the surrounding area would be similar to those estimated under Alternative 3. The collective dose to all residents living within 80 km from the lease tract area would range from 17-94 person-rem/yr during the peak year of operations. The collective LCF risk ranges from 0.02-0.1. Potential risk from chemical exposures is not expected for residents.	During mine development and operations, potential impacts to individual miners and residents living in the surrounding area would be similar to those estimated under Alternative 3. The collective dose to all residents living within 80 km from the lease tract area would range from 20-110 person-rem/yr during the peak year of operations. The collective LCF risk ranges from 0.03-0.1. Potential risk from chemical exposures is not expected for residents.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management

Comparison of Potential Impacts of Alternatives 1-5 (cont.)

Resource/ System	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Human Health (cont.)	Potential impacts would result from reclamation of lease tracts. Individual dose to reclamation worker was estimated to be 4.8 merm/yr, with a corresponding LCF risk of 4×10^{-6}/yr. For a resident living in the surrounding area, the radiation dose was estimated to range from 3.0-0.038 mrem/yr for a distance of 500-5,000 m from a waste-rock pile in a lease tract. The corresponding LCF risk ranges from 3×10^{-6}-3×10^{-8}/yr. Potential risks from chemical exposures are not expected for both workers and residents.	Same as Alternative 1. However, under BLM's multiple use policies, there could be additional potential impacts.	Potential impacts during the reclamation phase would be similar to those estimated under Alternative 1.	Potential impacts during the reclamation phase would be similar to those estimated under Alternative 1.	Potential impacts during the reclamation phase would be similar to those estimated under Alternative 1.
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).
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.
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 (Note that the determination for the endangered fish species has been reassessed recently and will be revised to "may affect, and are likely to adversely affect").	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.

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

Comparison of Potential Impacts of Alternatives 1-5 (cont.)

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

For further information contact:
Ray Plieness, DOE ULP PEIS Document Manager, Office of Legacy Management
U.S. Department of Energy, 11025 Dover Street, Suite 1000, Westminster, CO 80021
Telephone: (303) 410–4806, or e-mail to ulpeis@anl.gov

U.S. DEPARTMENT OF ENERGY | Legacy Management