Chapter 4.0
Environmental Consequences

4.1 INTRODUCTION

This chapter describes the probable consequences of each alternative on the human and natural environmental resources that could be affected and presents comparative analyses of the direct and indirect effects on the environment. Environmental impact analysis is based upon available data and literature from state and federal agencies, peer-reviewed scientific literature, and resource studies conducted in the Project Area.

Within each resource, evaluation of impacts is intended to provide an impartial assessment to help inform the decision-maker and the public. Actions resulting in adverse impacts to one resource may impart a beneficial impact to other resources. In general, adverse impacts described in this section are considered important if they result from, or relate to, the implementation of any of the alternatives. These impacts are defined as follows:

- **Direct impacts** – Impacts that are caused by the action and that occur at the same time and in the same general location as the action.
- **Indirect impacts** – Impacts that occur at a different time or in a different location than the action to which the impacts are related.
- **Short or long-term impacts** – When applicable, the short-term or long-term aspects of impacts are described. For the purposes of this EIS, short-term impacts occur during or after the activity or action and may continue for up to 2 years. Long-term impacts occur beyond the first 2 years.

Each resource section includes a discussion of the issues raised during public scoping, internal scoping, and/or during the public comment period on the Draft EIS, followed by the direct and indirect impacts of each alternative. The impact analysis for the Proposed Action is split into two separate analyses, on-site processing and off-site processing, because these two scenarios under the Proposed Action are unique in their associated impacts and require a separate analysis. Analysis of the on-site processing option includes the analysis of impacts associated with the Mine and the On-Site Ore Processing Facility. Analysis of the off-site processing option assumes that the impacts would be similar to the on-site processing option in general except where noted. This analysis is considered conservative because Energy Fuels would develop the Mine under either processing scenario, but could choose either on-site processing or off-site processing (not both). The cumulative impacts associated with each alternative, when added to past, present, and reasonably foreseeable future activities, are discussed in Chapter 5.0.

The Plan of Operations as submitted by Energy Fuels (Energy Fuels, 2015a) meets BLM's completeness requirements at 43 CFR § 3809.401. Therefore, the analysis presented herein describes the impacts of the implementation of the complete Plan of Operations in order to determine whether or not the Plan of Operations would result in unnecessary or undue degradation of public lands in accordance with 43 CFR § 3809.5. If additional information becomes available prior to the ROD for this EIS, it will be incorporated into the analysis to the best extent possible. The BLM AO for this Project will determine whether additional scoping or public comment is necessary as a result of these changes. If additional information becomes available after the ROD that requires a modification to the Plan of Operations, the appropriate level of NEPA will be completed as determined by the AO.

As a note: the NRC has jurisdiction over the processing of uranium ore into yellowcake and will prepare a separate NEPA document analyzing the On-Site Ore Processing Facility (i.e., Heap Leach Pad; Treatment Ponds; and Extraction and Precipitation and Packaging plants). While

the information presented in the Plan of Operations meets BLM's requirements, the detailed schematics and engineered designs for the On-Site Ore Processing Facility will be better described in the license application to the NRC for that NEPA analysis. The BLM's authority is limited to determining whether the approach to uranium mining, processing, and reclamation selected by Energy Fuels would result in undue or unnecessary degradation of public surface. Therefore, the analysis conducted in this EIS considers both the on-site and off-site processing facilities as described in the Plan of Operations and assumes that all applicable NRC regulations will be adhered to and followed by Energy Fuels, but the analysis is specific to BLM's resource management expertise. It is the NRC's responsibility to ensure that the processing facilities meet the applicable laws and regulations governing radiological impacts. Therefore, the analysis presented herein utilizes the most up to date information available such as the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and Energy Fuels' Plan of Operations (Energy Fuels, 2015a) summarized in Chapter 2 as a basis for analysis of the Proposed Action. Additionally, the analysis assumes that all permits currently held by Energy Fuels are adhered to including the WDEQ-LQD Mine Permit 318C, WDEQ-WQD WYPDES Permit WY0095702, and SWPPP. Therefore, it would be inappropriate for BLM to assume in the impact analysis that the measures in these permits fail or are not adhered to resulting in adverse impacts.

4.2 PHYSICAL RESOURCES

4.2.1 Climate and Air Quality

4.2.1.1 Proposed Action

An air quality modeling analysis was performed to assess the impacts on ambient air quality and AQRVs from potential air emissions due to the Proposed Action. Both near-field and far-field air quality analyses were performed for each analyzed scenario: Construction, Operations with on-site processing, and Operations with off-site processing. Potential ambient air quality impacts for each scenario were quantified and compared to applicable state and federal ambient air quality standards and PSD increments. AQRV impacts (impacts on visibility, atmospheric deposition and potential increases in acidification to acid-sensitive lakes) were determined and compared to applicable thresholds. The Sheep Mountain Uranium Project Air Quality Technical Support Document (AQTSD – Appendix 4-A) provides a complete summary of the Project emissions inventories and modeling analyses.

Near-Field Modeling

A near-field ambient air quality impact assessment evaluates maximum pollutant impacts within and near the Project Area resulting from Construction and Operations. EPA's Guideline (EPA, 2005) model, AERMOD (version 13350), was used to assess these near-field impacts. The near-field modeling used two years of meteorological data collected on-site during 2011 and 2012.

The near-field criteria pollutant assessment was performed to estimate maximum potential impacts of CO, NO_2, SO_2, PM_{10} and $PM_{2.5}$. Impacts were assessed from three scenarios: mine and processing plant construction, mine operations with the On-Site Ore Processing Facility, and mine operations with ore processed off-site at the Sweetwater Mill. Hazardous Air Pollutant (HAPs) emissions of benzene, toluene, ethyl benzene, xylene, n-hexane, and formaldehyde would be emitted primarily through mobile source fuel combustion, and due to the quantity of these pollutants emitted, ambient impacts were not analyzed.

Mine construction modeling analyzed impacts from underground blasting and construction, mine intake air heaters, surface dozing, overburden removal and overburden unloading (similar to surface mining activity occurring during Operations), facilities construction, unpaved road travel,

wind erosion of open acres and stockpiles, and mobile source fuel combustion. Operations modeling (both on-site processing and off-site processing) included underground blasting, mine intake air heaters, primary crushers, conveyor transfers, surface dozing, product removal, overburden removal, and unloading of product and overburden, radial stacker transferring material to the leach pad, the yellowcake production facility (on- or off-site), unpaved road travel, wind erosion of open acres and stockpiles, mobile source fuel combustion, and shop, plant, and office heating. The Operations case for off-site ore processing at the Sweetwater Mill also includes the hauling of ore by truck to the mill and an additional stockpile at the mill.

The three cases analyzed utilized pollutant emission rates calculated based on maximum throughput and activity rates. The modeled cases assumed a mine configuration representative of Year 3, which had the second highest amount of material excavated (2 percent less than the maximum) as well as mining activities in close proximity to the northern and eastern boundaries. Short-term emission rates were used to quantify concentrations for short-term averaging periods. Model receptors were placed at and beyond the ambient boundary following accepted guidance, with terrain elevations for each receptor developed using the AERMAP processor along with available digital elevation model data.

Far-Field Modeling

A far-field ambient air quality impact assessment quantified potential air quality impacts to both ambient air concentrations and AQRVs from air pollutant emissions of NO_X, SO_2, PM_{10} and $PM_{2.5}$ expected to result from the Proposed Action. Ambient air quality impacts of NO_2, SO_2, PM_{10}, and $PM_{2.5}$ and AQRVs were analyzed at far-field federal Class I and sensitive Class II areas located within 200 km of the Project Area. The Class I areas located within 200 km of the Project Area include the Bridger Wilderness Area, Fitzpatrick Wilderness Area, and Mount Zirkel Wilderness Area. Class II areas within 200 km of the Project Area that are considered sensitive areas include the Popo Agie Wilderness Area, Savage Run Wilderness Area, and Wind River Roadless Area. Ten lakes that are designated as acid sensitive including Black Joe, Deep, Hobbs, Lazy Boy, and Upper Frozen lakes in the Bridger Wilderness; Ross Lake in the Fitzpatrick Wilderness; Lake Elbert, Seven Lakes, and Summit Lake in the Mount Zirkel Wilderness; and Lower Saddlebag Lake in the Popo Agie Wilderness Area were assessed for potential lake acidification from atmospheric deposition impacts.

The far-field analyses used the EPA-approved version of the CALPUFF modeling system (Version 5.8.4) along with a windfield developed for year 2008 using the Mesoscale Model Interface Program (MMIF) Version 3 (ENVIRON, 2013) and the 2008 Weather Research and Forecasting (WRF) meteorological model output that was produced as part of the Western Regional Air Partnership's (WRAP) West-wide Jump Start Air Quality Modeling Study (WestJumpAQMS) (ENVIRON et al., 2012).

The far-field analysis assessed impacts from Construction, Operations with on-site processing, and Operations with off-site processing, utilizing maximum emission rates.

Impact Significance Criteria. Air quality impacts from pollutant emissions are limited by regulations, standards, and implementation plans established under the Federal Clean Air Act, as administered by the WDEQ-AQD under authorization of the EPA. Under FLPMA and the Clean Air Act, the BLM cannot conduct or authorize any activity which does not conform to all applicable local, state, tribal, or federal air quality laws, statutes, regulations, standards or implementation plans. As such, significant impacts to air quality from Project-related activities would result if it is demonstrated that:

- NAAQS or WAAQS would be exceeded; or
- AQRVs would be impacted beyond acceptable levels.

All NEPA analysis comparisons to the PSD Class I and II increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD Increment Consumption Analysis. The determination of PSD increment consumption is an air quality regulatory agency responsibility. Such an analysis would be conducted to determine minor source increment consumption or, for major sources, as part of the New Source Review process. The New Source Review process would also include an evaluation of potential impacts to AQRVs such as visibility, aquatic ecosystems, flora, fauna, etc. performed under the direction of federal land managers.

Emission Inventory Development. Air pollutant emissions would result from Construction and Operations. The primary pollutants emitted during Construction would be PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, volatile organic compounds (VOCs), and HAPs including benzene, toluene, ethyl benzene, n-hexane and formaldehyde. These activities would temporarily elevate pollutant levels, but impacts would be localized and would occur only for the short-term during Construction. Mechanically-generated fugitive dust emissions (PM_{10} and $PM_{2.5}$) would result from material movement and travel on unpaved roads. Wind-blown fugitive dust emissions would also occur from open and disturbed land during Construction.

Emissions from Construction were quantified using accepted methodologies, including manufacturer's emission factors, EPA emission factors and standards, and engineering estimates. Maximum annual mine-wide criteria pollutant and HAPs emissions resulting from mine and processing plant construction are shown in Table 4.2-1. The total HAPs emissions include benzene, toluene, ethyl benzene, n-hexane, and formaldehyde emissions of 0.4807, 0.2845, 0.0588, 0.1005, and 6.14 tons per year (tpy), respectively.

Table 4.2-1
Construction Emissions

	Tons Per Year						
Activity	**PM_{10}**	**$PM_{2.5}$**	**NO_x**	**CO**	**SO_2**	**VOC**	**HAPs**
Underground Activity	2.64	2.57	48.52	67.04	0.60	5.14	0.98
Surface Activity	13.19	5.03	--	--	--	--	--
Unpaved Roads	12.78	1.28	--	--	--	--	--
Wind Erosion	12.71	1.91	--	--	--	--	--
Surface Mobile Sources	1.99	1.99	199.03	119.63	0.27	14.02	6.08
Maximum Annual Emissions	**43.31**	**12.78**	**247.55**	**186.67**	**0.87**	**19.16**	**7.06**

During mining, the primary pollutants emitted would be PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, VOCs, and HAPs including benzene, toluene, ethyl benzene, n-hexane and formaldehyde. Operations on the surface, underground, and at the processing facility would result in increased pollutant emissions over the life of the Project. Mechanically-generated fugitive dust emissions (PM_{10} and $PM_{2.5}$) would result from overburden and ore removal, material transfers, crushing, overburden and ore haulage on unpaved roads and support and delivery vehicles on unpaved roads. Wind-blown fugitive dust emissions would also occur from open and disturbed land, including topsoil stockpile areas, the ore stockpile, the Hanks Draw and South spoils piles, and other open, disturbed areas.

Emissions from Operations were quantified using accepted methodologies, including manufacturer's emission factors, EPA emission factors and standards, and engineering estimates. Maximum annual mine-wide criteria pollutant and HAPs emissions resulting from mining with an on-site processing facility are shown in Table 4.2-2. Table 4.2-3 shows annual criteria pollutant and HAPs emissions from mining with ore processing occurring off-site at the Sweetwater Mill. The total HAPs emissions for Operations with on-site processing include benzene, toluene, ethyl benzene, n-hexane, and formaldehyde emissions of 0.335, 0.218, 0.042, 0.069, and 4.48 tpy, respectively.

Table 4.2-2
Annual Emissions - Operations with On-Site Processing

Activity	Tons/Year						
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Underground Activity	2.81	2.59	48.52	67.04	0.60	5.14	0.98
Surface Activity	77.83	16.92	0.89	0.65	0.02	41.77	0.0037
Unpaved Roads	88.42	8.84	--	--	--	--	--
Wind Erosion	58.55	8.78	--	--	--	--	--
Surface Mobile Sources	1.24	1.24	136.65	80.41	0.18	9.48	4.16
Total Emissions	**228.85**	**38.37**	**186.06**	**148.10**	**0.80**	**56.39**	**5.14**

Table 4.2-3
Annual Emissions - Operations with Off-Site Processing

Activity	Tons/Year						
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Underground Activity	2.81	2.59	48.52	67.04	0.69	5.14	0.98
Surface Activity	77.83	16.92	0.89	0.65	0.02	41.77	0.0037
Unpaved Roads	114.07	11.40	--	--	--	--	--
Wind Erosion	59.45	8.92	--	--	--	--	--
Surface Mobile Sources	1.29	1.29	151.66	89.09	0.20	10.48	4.23
Total Emissions	**255.45**	**41.12**	**201.07**	**156.78**	**0.91**	**57.39**	**5.21**

Greenhouse Gases

As part of the development of the Proposed Action emission inventory, emissions of the greenhouse gases CO_2, CH_4, and N_2O from Project sources were quantified for Construction and Operations, expressed as CO_2e. Calculating emissions as CO_2e allows for the comparison of emissions from different greenhouse gases based on their Global Warming Potential (GWP). GWP is defined as the cumulative radiative forcing of a gas over a specified time horizon relative to a reference gas resulting from the emission of a unit mass of gas. The reference gas is taken to be CO_2. The CO_2e emissions for a greenhouse gas are derived by multiplying the emissions of the gas by the associated GWP. The GWPs for the inventoried greenhouse gases are CO_2:1, CH_4:21, N_2O:310 (EPA, 2011b). Calculated CO_2e emissions for Construction and Operations with on-site and off-site processing are shown in Table 4.2-4.

Table 4.2-4
GHG Emissions (metric tons per year)

Pollutant	Construction	Operations (with on-site processing)	Operations (with off-site processing)
CO_2e	11,089	11,304	12,437

4.2.1.1.1 Impacts with On-Site Processing

Near-Field Modeling

Air pollutant dispersion modeling quantifies maximum potential PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2 impacts from Construction and Operations with on-site processing. AERMOD was used to model the maximum potential emissions of PM_{10}, $PM_{2.5}$, NO_x, CO and SO_2 that could occur from each of these scenarios, with maximum short-term emission rates utilized in all short-term modeling. Table 4.2-5 presents the modeled air pollutant concentrations that could occur for Construction and Table 4.2-6 presents the modeled air pollutant concentration that would occur for Operations with on-site processing. Because Construction is a temporary activity, in Table 4.2-5 the modeled concentrations are only compared to the ambient air quality standards and are not compared to the Class II increments. In Table 4.2-6, the modeled concentrations are compared to both the ambient air quality standards and the Class II increment because the Operations sources include more permanent stationary point sources; however, the increment demonstration is for informational purposes only and does not constitute a regulatory PSD increment consumption analysis.

When the concentrations from the modeled scenarios are added to representative background concentrations, it is demonstrated that total ambient air concentrations are less than the applicable NAAQS and WAAQS. The direct modeled concentrations are below all applicable PSD Class II increments except 24-hour PM_{10} and $PM_{2.5}$. The 24-hour PM_{10} and $PM_{2.5}$ impacts are controlled by fugitive sources like the mining pit and roads associated with Operations.

Potential ozone impacts resulting from this Project and other regional emissions have been predicted as part of the Continental Divide-Creston (CD-C) EIS (BLM, 2016b) and are discussed further in Chapter 5.

Table 4.2-5
Modeled Pollutant Concentration Impacts for Construction (µg/m^3)

Pollutant	Averaging Period	Direct Modeled	Background	Total Predicted	NAAQS	WAAQS
CO	1-hour	1,048.1[1]	904.0	1,952.1	40,000	40,000
	8-hour	266.7[1]	572.0	838.7	10,000	10,000
NO_2	1-hour	163.0[2]	9.4	172.4	188	188
	Annual	10.5[3]	1.9	12.4	100	100
SO_2	1-hour	6.3[4]	18.3	24.6	196	196
	3-hour	5.0[1]	18.3	23.3	1,300	1,300
PM_{10}	24-hour	47.5[1]	49.0	96.5	150	150
	Annual	2.1[3]	11.0	13.1	--	50
$PM_{2.5}$	24-hour	5.3[5]	27.0	24.6	35	35
	Annual	0.4[3]	7.0	7.4	12	15

[1] Highest-second-high concentration.
[2] 3-year average of the 98th percentile daily maximum concentration based on 2 years of Construction impacts and 1 year of Operations impacts with off-site-processing.
[3] Maximum concentration.
[4] Maximum 99th percentile daily maximum concentration.
[5] Maximum 98th percentile concentration.

Table 4.2-6
Maximum Modeled Pollutant Concentration Impacts
for Operations with On-Site Processing (µg/m^3)

Pollutant	Averaging Period	Direct Modeled	PSD Class II Increment [1]	Background	Total Predicted	NAAQS	WAAQS
CO	1-hour	1,048.1[2]	--	904.0	1,952.1	40,000	40,000
	8-hour	159.4[2]	--	572.0	731.4	10,000	10,000
NO_2	1-hour	137.9[3]	--	9.4	147.3	188	188
	Annual	8.0[4]	25	1.9	9.9	100	100
SO_2	1-hour	6.3[5]	--	18.3	24.6	196	196
	3-hour	3.3[2]	512	18.3	21.6	1,300	1,300
	24-hour	1.1[2]	91	--	--	--	--
	Annual	0.03[2]	20	--	--	--	--
PM_{10}	24-hour	33.4[2]	30	49.0	82.4	150	150
	Annual	4.9[4]	17	11.0	15.9	--	50
$PM_{2.5}$	24-hour	14.5[2]	9	--	--	--	--
	Annual	0.7[2]	4	--	--	--	--
$PM_{2.5}$	24-hour	4.3[6]	----	27.0	31.3	35	35
	Annual	0.7[4]		7.0	7.7	12	15

[1] The PSD demonstration serves informational purposes only and do not constitute a regulatory PSD increment consumption analysis.
[2] Highest-second-high concentration.
[3] 2-year average of the 98th percentile daily maximum concentration.
[4] Maximum concentration.
[5] Maximum 99th percentile daily maximum concentration.
[6] Maximum 98th percentile concentration.

Far-Field Modeling

Far-field modeling at Class I and sensitive Class II areas within 200 km of the Project Area was performed using the CALPUFF model to quantify potential air quality impacts to both ambient air concentrations and AQRVs from air pollutant emissions of NO_x, SO_2, PM_{10} and $PM_{2.5}$ expected to result from Construction and from Operations with on-site processing.

The Class I and sensitive Class II areas analyzed include the Bridger Wilderness Area, Fitzpatrick Wilderness Area, Mount Zirkel Wilderness Area, and Washakie Wilderness Area, all PSD Class I Areas, and the Popo Agie Wilderness Area, Savage Run Wilderness Area, and Wind River Roadless Area, all sensitive Class II areas.

The far-field assessment used the same maximum emissions scenarios and Year 3 modeling configuration as described in the Emissions Inventory Development section for Construction and Operations with on-site processing. The source locations, emissions, and parameters from the AERMOD files for each scenario were converted directly into CALPUFF format and coordinates to ensure consistency between the near-field and far-field analyses.

Class I and Sensitive Class II Areas

PSD Increment Comparison. The maximum direct modeled concentrations of NO_2, SO_2, PM_{10}, and $PM_{2.5}$ at Class I and sensitive Class II areas resulting from either Construction or Operations is provided in Table 4.2-7 for comparison to PSD Class I and Class II increments. Note that although Construction sources are temporary and would not consume increment, for informational purposes, modeled construction impacts to PSD increments were included in the comparison.

As shown in Table 4.2-7, the maximum concentrations are well below the PSD Class I and Class II increments. The impacts from Construction and Operations are similar, with slightly higher impacts occurring at each sensitive area as a result of the emissions from Operations, with the exception of the SO_2 impacts at the Savage Run Wilderness Area which had maximum impacts associated with emissions from Construction. The PSD demonstrations are for information only and are not regulatory PSD Increment consumption analyses, which would be completed as necessary by the WDEQ-AQD.

Table 4.2-7
Maximum Modeled Pollutant Concentrations at PSD Class I and Sensitive Class II Areas (µg/m^3) for Operations with On-Site Processing

Location	Pollutant	Averaging Time	Direct Modeled	PSD Increment
Bridger Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0074	25
		24-hour	0.0009	5
		Annual	0.00001	2
	PM_{10}	24-hour	0.0237	8
		Annual	0.0004	4
	$PM_{2.5}$	24-hour	0.0080	2
		Annual	0.0002	1
Fitzpatrick Wilderness Area	NO_2	Annual	0.00001	2.5
	SO_2	3-hour	0.0002	25
		24-hour	0.00004	5
		Annual	0.000001	2
	PM_{10}	24-hour	0.0115	8
		Annual	0.0002	4
	$PM_{2.5}$	24-hour	0.0065	2
		Annual	0.0001	1
Mount Zirkel Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0019	25
		24-hour	0.0002	5
		Annual	0.000004	2
	PM_{10}	24-hour	0.0154	8
		Annual	0.0005	4
	$PM_{2.5}$	24-hour	0.0088	2
		Annual	0.0003	1
Washakie Wilderness Area	NO_2	Annual	0.00001	2.5
	SO_2	3-hour	0.0001	25
		24-hour	0.0001	5
		Annual	0.000001	2
	PM_{10}	24-hour	0.0249	8
		Annual	0.0002	4
	$PM_{2.5}$	24-hour	0.0133	2
		Annual	0.0001	1
Popo Agie Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0116	25
		24-hour	0.0015	5
		Annual	0.0001	2
	PM_{10}	24-hour	0.0381	8
		Annual	0.0006	4
	$PM_{2.5}$	24-hour	0.0114	2
		Annual	0.0002	1
Savage Run Wilderness Area	NO_2	Annual	0.0002	25
	SO_2	3-hour	0.0068	512
		24-hour	0.0009	91
		Annual	0.00001	20
	PM_{10}	24-hour	0.0336	30
		Annual	0.0007	17
	$PM_{2.5}$	24-hour	0.0274	9
		Annual	0.0004	4
Wind River Roadless Area	NO_2	Annual	0.00004	25
	SO_2	3-hour	0.0003	512
		24-hour	0.0001	91
		Annual	0.000002	20
	PM_{10}	24-hour	0.0125	30
		Annual	0.0003	17
	$PM_{2.5}$	24-hour	0.0072	9
		Annual	0.0001	4

AQRV Impacts

Visibility Impacts. Visibility impacts were calculated following the FLAG 2010 (FLAG, 2010) methodology and background data for the 20 percent cleanest days. The maximum impacts from either Construction or Operations with on-site processing are presented in Table 4.2-8 and indicate that there are zero days predicted above the 0.5 delta-deciviews (Δdv) threshold at any of the Class I and sensitive Class II areas. A maximum predicted visibility impact was 0.076 Δdv, occurring at Washakie Wilderness Area. The maximum impacts presented in Table 4.2-8, were the result of the Operations scenario.

Table 4.2-8
Maximum Visibility Impacts at Class I and Sensitive Class II Areas for Operations with On-Site Processing

Location	Maximum Impact (Δdv)
Bridger Wilderness Area	0.037
Fitzpatrick Wilderness Area	0.039
Mount Zirkel Wilderness Area	0.052
Washakie Wilderness Area	0.076
Popo Agie Wilderness Area	0.051
Savage Run Wilderness Area	0.052
Wind River Roadless Area	0.043

Deposition Impacts. Potential direct atmospheric deposition impacts within Class I and sensitive Class II areas were also calculated. At all Class I and sensitive Class II areas, the maximum direct total (wet and dry) N and S deposition are predicted to be well below the DAT of 0.005 kg/ha-yr. The maximum predicted N deposition impacts occurred at Savage Run Wilderness Area and are 0.0004 kg/ha-yr N and the maximum S deposition impacts occurred at Popo Agie and are 0.000006 kg/ha-yr. The maximum impacts are similar between the Construction and Operations scenarios.

In addition, estimated changes in acid neutralizing capacity - ANC (ΔANC) resulting from potential N and S deposition from Project emissions were calculated for ten sensitive lakes within the Bridger, Fitzpatrick, Mount Zirkel and Popo Agie wilderness areas. For all lakes, the estimated changes in ANC are all predicted to be less than the significance thresholds (10 percent ΔANC for lakes with background ANC values of 25 µeq/l or greater, and ΔANC<1 µeq/l for lakes with background ANC values less than or equal to 25 µeq/l). For the lakes with background ANC values above 25 µeq/l the estimated change in ANC was: 0.002 percent at Black Joe Lake, 0.002 percent at Deep Lake, 0.001 percent at Hobbs Lake, 0.002 percent at Ross Lake, 0.002 percent at Lake Elbert, 0.005 percent at Seven Lakes, 0.003 percent at Summit Lake, and 0.004 at Lower Saddlebag Lake. For the extremely sensitive lakes, the predicted change in ANC was 0.001 µeq/l at Lazy Boy Lake and 0.002 µeq/l at Upper Frozen Lake. The maximum impacts are similar for both the Construction and Operations scenarios.

Greenhouse Gas Emissions and Climate Change

The U.S. Supreme Court ruled in 2007 that the EPA has the authority to regulate greenhouse gases (GHGs) such as CH_4 and carbon dioxide CO_2 as air pollutants under the Clean Air Act; however, there are currently no ambient air quality standards for GHGs, nor are there currently any emissions limits on GHGs that would apply to sources developed under the Proposed Action and alternatives. There are, however, applicable reporting requirements under the EPA's Greenhouse Gas Reporting Program. These GHG emission reporting requirements, finalized in 2010 under 40 CFR Part 98, require industrial sources that emit 25,000 metric tons or more of CO_2e per year to report GHG emissions annually. The maximum Sheep Mountain Uranium

Project annual CO_{2e} emissions, from either the Construction or Operations phases, are 11,304 metric tons per year (Operations phase), which is less than the reporting threshold. At present, there are no rules related to GHG emissions or impacts that could affect development of the Proposed Action, besides these GHG reporting requirements.

The CEQ recently released draft guidance for federal agencies on consideration of GHGs and the effects of climate change in NEPA documents (CEQ, 2014). While the guidance provides federal agencies with significant discretion on how to consider the effects of GHG emissions and climate change in their evaluation of proposals for federal actions, it also provides an expectation of what should be considered and disclosed. Agencies are directed to consider two separate issues when addressing climate change: (1) the effects of a proposed action on climate change as indicated by its GHG emissions; and (2) the implications of climate change for the environmental effect of a proposed action. Agencies should consider the climate change effects of a proposal by comparing the GHG emissions of the proposed action and the reasonable alternatives. The effects of climate change on the proposed action and alternatives should be considered during the analysis of the affected environment. Land managers should consult the CEQ guidance for information on direct, indirect, and cumulative impact analyses, among other topics.

Renewable and nonrenewable resource management actions have the potential to impact climate change due to GHG emissions and other anthropogenic effects. However, the assessment of GHG emissions and climate change is extremely complex because of the inherent interrelationships among its sources, causation, mechanisms of action, and impacts. Emitted GHGs become well-mixed throughout the atmosphere and contribute to the global atmospheric burden of GHGs. Given the global and complex nature of climate change, it is not possible to attribute a particular climate impact in any given region to GHG emissions from a particular source. The uncertainty in applying results from Global Climate Models to the regional or local scale (a process known as downscaling) limits the ability to quantify potential future impacts from GHGs emissions at this scale. When further information on the impacts of local emissions to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

Sheep Mountain Uranium Project GHG emissions were not modeled in either the near-field or far-field impact analyses, but the total GHG inventory is presented here for informational purposes and is compared to other U.S. GHG emissions in order to provide context for the project GHG emissions.

The maximum annual GHG emissions resulting from the Proposed Action Operations scenario with on-site processing are estimated as 11,304 metric tons per year of CO_2e, which are approximately 0.01 teragrams per year (tg/yr). To place the Project GHG emissions in context, the Dave Johnston coal-fired power plant located east of Casper, Wyoming emits 5.1 tg/yr CO_2e (EPA, 2014a). In addition, 0.01 tg/yr is approximately equivalent to 0.0002 percent of total 2012 U.S. CO_2e emissions of 6,526 tg (EPA, 2014b).

4.2.1.1.2 Impacts with Off-Site Processing

Near-Field Modeling

The AERMOD model was used to estimate the maximum potential PM_{10}, $PM_{2.5}$, NO_x, CO, and SO_2 impacts for Operations with off-site processing. Table 4.2-9 presents the modeled air pollutant concentrations that could occur for this scenario. Construction impacts under this scenario would be identical to the impacts presented above for the Operations with on-site processing case.

Table 4.2-9
Maximum Modeled Pollutant Concentration Impacts
for Operations with Off-Site Processing (µg/m^3)

Pollutant	Averaging Period	Direct Modeled	PSD Class II Increment [1]	Background	Total Predicted	NAAQS	WAAQS
CO	1-hour	1,069.0[2]	--	904.0	1,973.0	40,000	40,000
	8-hour	185.5[2]	--	572.0	757.5	10,000	10,000
NO_2	1-hour	145.2[3]	--	9.4	154.6	188	188
	Annual	8.6[4]	25	1.9	10.5	100	100
SO_2	1-hour	9.3[5]	--	18.3	27.6	196	196
	3-hour	7.6[2]	512	18.3	25.9	1,300	1,300
	24-hour	3.1[2]	91	--	3.1	--	--
	Annual	0.03[2]	20	--	0.03	--	--
PM_{10}	24-hour	53.0[2]	30	49.0	102.0	150	150
	Annual	12.3[4]	17	11.0	23.3	--	50
$PM_{2.5}$	24-hour	12.1[2]	9	--	--	--	--
	Annual	1.3[2]	4	--	--	--	--
	24-hour	5.7[6]	--	27.0	32.7	35	35
	Annual	1.3[4]	--	7.0	8.3	12	15

[1] The PSD demonstration serves informational purposes only and do not constitute a regulatory PSD increment consumption analysis.
[2] Highest-second-high concentration.
[3] 2-year average of the 98th percentile daily maximum concentration.
[4] Maximum concentration.
[5] Maximum 99th percentile daily maximum concentration.
[6] Maximum 98th percentile concentration.

When the concentrations are added to representative background concentrations, it is demonstrated that total ambient air concentrations are less than the applicable NAAQS and WAAQS. The direct modeled concentrations are below all applicable PSD Class II increments except 24-hour PM_{10} and $PM_{2.5}$. The 24-hour PM_{10} and $PM_{2.5}$ impacts are controlled by fugitive sources like the mining pit and roads associated with Operations.

Potential ozone impacts resulting from this Project and other regional emissions have been predicted as part of the CD-C EIS (BLM, 2016b) and are discussed further in Chapter 5.

Far-Field Modeling

Far-field modeling at Class I and sensitive Class II areas within 200 km of the Project Area was performed using the CALPUFF model to quantify potential air quality impacts to both ambient air concentrations and AQRVs from air pollutant emissions of NO_x, SO_2, PM_{10} and $PM_{2.5}$ expected to result from Operations with off-site processing.

PSD Increment Comparison. The maximum direct modeled concentrations of NO_2, SO_2, PM_{10}, and $PM_{2.5}$ at Class I and sensitive Class II areas, resulting from either Construction or Operations, is provided in Table 4.2-10 for comparison to PSD Class I and Class II increments. As shown in Table 4.2-10, the maximum concentrations are well below the PSD Class I and Class II increments. The maximum impacts are associated with emissions from both Construction and Operations sources. The PSD demonstrations are for information only and are not regulatory PSD Increment consumption analyses, which would be completed as necessary by the WDEQ.

Table 4.2-10
Maximum Modeled Pollutant Concentrations at PSD Class I and Sensitive Class II Areas (µg/m^3) for Operations with Off-Site Processing

Location	Pollutant	Averaging Time	Direct Modeled	PSD Increment
Bridger Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0074	25
		24-hour	0.0009	5
		Annual	0.00001	2
	PM_{10}	24-hour	0.0219	8
		Annual	0.0004	4
	$PM_{2.5}$	24-hour	0.0078	2
		Annual	0.0001	1
Fitzpatrick Wilderness Area	NO_2	Annual	0.00001	2.5
	SO_2	3-hour	0.0002	25
		24-hour	0.00004	5
		Annual	0.000001	2
	PM_{10}	24-hour	0.0095	8
		Annual	0.0001	4
	$PM_{2.5}$	24-hour	0.0060	2
		Annual	0.0001	1
Mount Zirkel Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0019	25
		24-hour	0.0002	5
		Annual	0.000004	2
	PM_{10}	24-hour	0.0129	8
		Annual	0.0005	4
	$PM_{2.5}$	24-hour	0.0083	2
		Annual	0.0002	1
Washakie Wilderness Area	NO_2	Annual	0.00001	2.5
	SO_2	3-hour	0.0001	25
		24-hour	0.0001	5
		Annual	0.000001	2
	PM_{10}	24-hour	0.0208	8
		Annual	0.0002	4
	$PM_{2.5}$	24-hour	0.0121	2
		Annual	0.0001	1
Popo Agie Wilderness Area	NO_2	Annual	0.0002	2.5
	SO_2	3-hour	0.0116	25
		24-hour	0.0015	5
		Annual	0.00001	2
	PM_{10}	24-hour	0.0364	8
		Annual	0.0005	4
	$PM_{2.5}$	24-hour	0.0085	2
		Annual	0.0002	1
Savage Run Wilderness Area	NO_2	Annual	0.0002	25
	SO_2	3-hour	0.0068	512
		24-hour	0.0009	91
		Annual	0.00001	20
	PM_{10}	24-hour	0.0304	30
		Annual	0.0006	17
	$PM_{2.5}$	24-hour	0.0267	9
		Annual	0.0003	4
Wind River Roadless Area	NO_2	Annual	0.00004	25
	SO_2	3-hour	0.0003	512
		24-hour	0.0001	91
		Annual	0.000002	20
	PM_{10}	24-hour	0.0103	30
		Annual	0.0003	17
	$PM_{2.5}$	24-hour	0.0066	9
		Annual	0.0001	4

AQRV Impacts

Visibility Impacts. Visibility impacts were calculated following the FLAG 2010 methodology and background data for the 20 percent cleanest days. The maximum impacts from either Construction or Operations with off-site processing are presented in Table 4.2-11 and indicate that there are zero days predicted above the 0.5 Δdv threshold at any of the Class I and sensitive Class II areas. A maximum predicted visibility impact was 0.071 Δdv, occurring at Washakie Wilderness Area. With the exception of the impacts at the Popo Agie Wilderness Area, the maximum impacts presented in Table 4.2-11, were the result of the emissions from construction.

Table 4.2-11
Maximum Visibility Impacts at Class I and Sensitive Class II Areas for Operations with Off-Site Processing

Location	Maximum Impact (Δdv)
Bridger Wilderness Area	0.032
Fitzpatrick Wilderness Area	0.036
Mount Zirkel Wilderness Area	0.049
Washakie Wilderness Area	0.071
Popo Agie Wilderness Area	0.032
Savage Run Wilderness Area	0.048
Wind River Roadless Area	0.030

Deposition Impacts. Potential direct atmospheric deposition impacts within Class I and sensitive Class II areas were also calculated. At all Class I and sensitive Class II areas, the maximum direct total (wet and dry) N and S deposition are predicted to be well below the DAT of 0.005 kg/ha-yr. The maximum predicted nitrogen deposition impacts occurred at Savage Run and are 0.0004 kg/ha-yr N and the maximum S deposition impacts occurred at Popo Agie 0.000006 kg/ha-yr. The maximum impacts are from Construction.

In addition, estimated changes in ANC resulting from potential N and S deposition from Project emissions were calculated for ten sensitive lakes within the Bridger, Fitzpatrick, Mount Zirkel and Popo Agie Wilderness Areas. For all lakes the estimated changes in ANC are all predicted to be less than the significance thresholds. For the lakes with background ANC values above 25 µeq/l the estimated change in ANC was; 0.002 percent at Black Joe Lake, 0.002 percent at Deep Lake, 0.001 percent at Hobbs Lake, 0.002 percent at Ross Lake, 0.002 percent at Lake Elbert, 0.005 percent at Seven Lakes, 0.003 percent at Summit Lake, and 0.004 at Lower Saddlebag Lake. For the extremely sensitive lakes, the predicted change in ANC was 0.001 µeq/l at Lazy Boy Lake, and 0.002 µeq/l at Upper Frozen Lake. The maximum impacts are from the Construction scenario.

Greenhouse Gases

The maximum annual GHG emissions from the off-site Operations scenario are estimated to be approximately 10 percent greater than the on-site Operations scenario. Potential impacts for off-site processing would be similar to the on-site processing case described above.

4.2.1.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.1.2 BLM Mitigation Alternative

4.2.1.2.1 Impacts

Impacts to air quality under the BLM Mitigation Alternative would be similar to those described above for the Proposed Action.

4.2.1.2.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.2.1.3 No Action Alternative

Under the No Action Alternative, Construction and Operations of the Project would not occur, and therefore, no impacts to air quality would occur from any of the action alternatives described above.

4.2.2 Geologic Resources

Potential issues associated with geologic resources were identified by the BLM through internal scoping. Issues include:

- Changes to physiography and topography of the area;
- Potential for changes to geologic structure; and
- Potential for geologic hazards including slope stability, subsidence, seismic hazards, and chemical hazards related to overburden and spoil quality.

4.2.2.1 Proposed Action

4.2.2.1.1 Impacts with On-Site Processing

Much of the Project Area was impacted by historic mining (Section 2.2.2). Therefore, this evaluation takes into account the extent of additional disturbance due to the Project as proposed and the extent to which the historic and new disturbance would be reclaimed during the Project as proposed. All of the identified impacts would be direct impacts.

Physiography and Topography

The existing physiography and topography of the Project Area, some of which was influenced by historic mining, would be modified by the proposed mining and ore processing facilities resulting in direct, long-term impacts. The physiography and topography would change in the Project Area during Construction and would continue to change through Operations as the mine expands, spoils piles grow, and the On-Site Ore Processing Facility expands. In all, about 929 acres of the 3,611 acres in the Project Area would be disturbed or re-disturbed. The most extensive surface features during Operations would be: the Congo Pit, which would cover about 216 acres and have highwalls up to 600 feet high; the Hanks Draw and South Spoil facilities, which would cover about 124 acres and be up to 300 feet high; and the On-Site Ore Processing Facility, which would cover about 205 acres, with a 40-acre Heap Leach Pad about 60 feet high, depending on the quantity of ore processed at the facility.

During Reclamation, the physiography and topography of the Project Area, with the exception of the Heap Leach Pad in the NRC License Area, would be reclaimed to approximate original contours where possible or geomorphically regraded to create stable topography within the Project Area that would be monitored until determined successfully reclaimed. The Heap Leach Pad would be reclaimed in accordance with NRC requirements to ensure stability during long-term care, and the proportions of the facility would be similar to those during Construction.

Backfill and regrading are two of the more expensive aspects of mine reclamation costs, and the requirement that the operator post a bond for site reclamation in accordance with an approved

plan provides assurance that reclamation can be conducted by the permitting and licensing agencies should the operator not fulfill its obligations.

Geology

No impacts to the geologic structure are anticipated due to the Proposed Action. The stratigraphy of the Project Area has been impacted by previous mining, both on the surface and underground, due to the removal of sedimentary layers overlying the ore horizon and removal of ore, leaving open surface pits and underground voids. During Construction and Operations, the Proposed Action would have a similar direct impact as the historic activities, although many of the historic mining impacts were not reclaimed. During Reclamation of the Project, backfilling of the pit and underground mine would result in the homogenization of the backfill material, which would be unconsolidated compared to surrounding, undisturbed strata. Voids may remain in some areas underground.

Geologic Hazards

The geologic hazards include both physical and chemical hazards. The potential physical hazards include: slope stability (primarily a concern related to surface mining); subsidence (primarily a concern related to underground mining); and seismic hazards. The chemical hazards include impacts related to overburden and spoil quality.

Slope Stability. During Construction and Operations, potential physical hazards related to slope stability would be present at the Hanks Draw and South Spoil facilities and in the Congo Pit walls, which could slump if inadequately designed or drained. Results from direct shear testing of on-site materials were used for the designs of the Hanks Draw and South Spoil facilities, and the designs addressed factors such as vertical lift height, angles of repose, overall slopes, setbacks, and safety berms. Pit design was based on experience at other open pit mines in the Sheep Mountain and Gas Hills region and includes progressive backfilling. During Reclamation, the potential for slope failure would be removed because the spoil piles and pit would be backfilled and geomorphically regraded to create a stable topography within the Project Area that would be monitored until a regulatory determination that the area was successfully reclaimed.

Similar physical hazards would be present at the On-Site Ore Processing Facility, specifically the Heap Leach Pad, during Construction and Operations; however, through BLM monitoring/inspection activities these hazards would be minimized. Additionally, the rules and regulations promulgated by the NRC as well as the NRC License would likely minimize these hazards. During Reclamation, the focus of the license requirements would be on capping the facility to ensure stability during long-term care by the State of Wyoming or the DOE.

Subsidence. Potential physical hazards related to subsidence are present due to historic and proposed underground mining. Some subsidence has occurred due to historic underground mining (WDEQ, 2015a). Continued subsidence of those areas or new subsidence due to the proposed mining could occur, and procedures are in place to address encounters with known and potential subsidence areas that may occur during mining both the Congo Pit and the Sheep Underground Mine.

During Construction of the Congo Pit, ground control to locate and prevent accidental subsidence during surface mining is necessary. Ground control in the floor of the Congo Pit is discussed in Section 2.3.4.2. Similarly, prior to underground mining, rehabilitation of the existing underground workings is necessary. During rehabilitation (Construction) of the underground workings, rebolting of some areas may be necessary (Section 3.3 of the Plan of Operations). During Operations, mitigation of subsidence hazards includes ground control, progressive backfill, and collapse of underground workings during retreat mining (Section 4.2.1 of the Plan of Operations). During Reclamation, installation of bulkheads at specified depths would also

mitigate long-term subsidence hazards (Section 5.2 of the Plan of Operations – Energy Fuels, 2015a).

Seismic Hazards. If an earthquake of sufficient magnitude were to occur, it could impact structural integrity of mine and associated facilities; however, given the relatively low probability of this magnitude of earthquake occurring within the Project Area, this is an unlikely scenario.

During Construction and Operations, seismic hazards could adversely affect slope stability at the Hanks Draw and South Spoil facilities and in the Congo Pit, as well as increase subsidence risks, if not taken into account in facility design. However, seismic loading conditions were taken into account in the design of the Hanks Draw Spoils Facility, and the NRC and WDEQ-LQD have stringent requirements that plans and procedures be in place to address accidental releases that could result from catastrophic events, such as an earthquake. During Reclamation, potential impacts of seismic hazards would be significantly reduced by the work to backfill and regrade site disturbances. Due to the nature of this Project and relatively low risk for earthquakes in this area (Section 3.2.2.3), the potential for Project activities (such as blasting) to induce an earthquake or seismic event is considered low.

Chemical Hazards. The primary concern related to chemical hazards is whether the overburden or spoil material contains material with deleterious properties, including elevated: acid-forming potential, Sodium Adsorption Ratio, levels of potentially toxic elements (e.g., boron) and/or radiological or metal concentrations. During Operations, elevated levels could require special handling (separate storage) of overburden or spoil materials to prevent contaminated drainage from spoil piles and to ensure such materials would be identified for proper placement during Reclamation. Direct adverse impacts to revegetation success and post-mine water quality could be anticipated if unsuitable overburden or spoil material were placed in the near-surface reclamation or below the water table and groundwater sampling would confirm the post-mine water quality (see Sections 4.2.4.1.1 and 4.2.5.4.1).

Based on sampling of the Quaternary Alluvial deposits and weathered Battle Spring Formation, no impacts from chemical hazards are anticipated (Section 3.2.2.3). Overburden sampling has been conducted, and material with elevated radiological concentrations represents the primary chemical hazard. This material is generally associated with the mineralized zones that would be removed during mining and transported to the Heap Leach Pad. Field measurements would be used to identify material for selective handling during Operations, so the material could be placed in the backfill with the least risk to revegetation success and post-mine water quality. In addition, the regraded spoil would be sampled prior to placement of topsoil to confirm the suitability of the material in and adjacent to the root zone, and groundwater sampling would confirm the post-mine water quality (Section 4.2.5.4.1).

The Heap Leach Pad and On-Site Ore Processing Facility would be designed to minimize any release of deleterious or toxic chemicals during Construction, Operation, and Reclamation as required through the NRC licensing process and BLM Performance Standards (43 CFR § 3809.429).

4.2.2.1.2 Impacts with Off-Site Processing

The impacts associated with off-site processing would be similar to those described above for on-site processing, and no new impacts to geologic resources (hazards) are anticipated to occur as a result of the Proposed Action at the off-site processing facility considering the facility is already constructed. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analyses as necessary.

4.2.2.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.2.2 BLM Mitigation Alternative

4.2.2.2.1 Impacts

The geologic impacts of the BLM Mitigation Alternative, which includes revisions to the Reclamation Plan, are not anticipated to differ significantly from those of the Proposed Action. If on-site processing occurs, approximately 90 acres of additional revegetation and road reclamation may occur on previously un-reclaimed or poorly reclaimed lands disturbed by historic mining activities in the Project Area. As a result of the additional revegetation and/or road reclamation, there could be minor differences in the post-mine physiography and topography, but the differences would not be substantial.

4.2.2.2.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.2.2.3 No Action Alternative

The No Action Alternative would not generate any additional impacts to the existing geologic resources except those already anticipated as a result of activities that would be conducted under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O (BLM, 2014b) for reclamation of McIntosh Pit.

4.2.3 Mineral Resources

Potential issues associated with mineral resources were identified by the BLM through internal scoping. Issues include:

- Temporary or permanent restriction of resource development; and
- Increased ease or difficulty of resource development, such as increased infrastructure or personnel needs.

4.2.3.1 Proposed Action

4.2.3.1.1 Impacts with On-Site Processing

It is anticipated that future development of mineral resources in the Project Area, other than uranium, would either be delayed for the duration of the Project or intermixed within the overall Project Area. However, as noted in Section 3.2.3, mineral resources are relatively limited in and near the Project Area, and there are no known proposals for development of mineral resources within the Project Area. Thus, the direct impacts of the Project to mineral resource development are negligible. If potential projects were to arise within the Project Area, it is expected that coexistence and conflicts would be negotiated and agreed upon between the different mineral rights owners, surface owners, and land management agencies. Impacts to mineral resources would be similar throughout the Construction, Operations, and Reclamation phases of the Project. Indirect impacts to mineral resource development near the Project Area such as existing and proposed oil and gas operations could occur through an increase in demand for fuel, equipment, labor, and other products and resources as a result of this Project. These indirect impacts could decrease productivity and increase costs of other mineral resource users which would impact the development of mineral resources; however, analysis of these impacts to other mineral users is inherently analyzed as an impact to various other resources such as socioeconomic resources and is described in detail in Section 4.4.4.

Locatable Minerals

No direct and indirect impacts to locatable mineral resources other than uranium are anticipated. As discussed in Section 2.3.5.13, Energy Fuels plans to continue uranium exploration within the Project Area. No other uranium exploration is currently on-going in the vicinity of the Project Area. In the Project Area, the currently known uranium resources would be mined. The subsequent reclamation and transfer of all or a portion of the 205-acre NRC License Area to the State of Wyoming or the DOE (Section 2.3.5.12 and Map 2.3-2) might make access to undiscovered or unexploited uranium deposits more difficult in the southwestern portion of the Project Area, but the existence of undiscovered resources is speculative, and unexploited uranium deposits in this area are either mined out, inaccessible, or accessible via underground mining without interference from the License Area.

Jade resources which may have occurred in the Project Area have probably been disturbed by prior mining-related activities. Access for jade prospecting during the Project would be restricted; however, after reclamation, access to the Project Area, except for the property transferred to the State of Wyoming or the DOE, would be reestablished.

The potential bentonite-bearing strata in the northern portion of the Project Area has never been prospected or explored. No known plans exist for the development of this potential, un-verified bentonite in the northern portion of the Project Area. Access for bentonite mining during the Project would be restricted; however, after reclamation, access to the Project Area except for the property transferred to the State of Wyoming or the DOE, would be returned.

Leasable Minerals

Existing oil and gas development is established outside the Project Area (Section 3.2.3.2), and the Project is not anticipated to impact that development directly. A previous exploration well in the Project Area is reported as dry and abandoned; and no exploration or development within the Project Area is anticipated in the foreseeable future.

Mineral Material Deposits

Mineral materials, such as sand and gravel, needed for the Project facilities would be generated during mining on-site, so these materials would be directly impacted through their removal and there are no anticipated impacts to off-site mineral material resources. The operator would need a permit to develop any mineral materials on BLM mineral lands where a reservation is held. Because the On-Site Ore Processing Facility would be regulated and permitted by the NRC and Energy Fuels has not submitted their NRC application, it is unknown whether additional off-site specialty materials (such as clay or limestone) would be needed for Construction or Reclamation of the On-Site Ore Processing Facility and impacts to off-site mineral materials cannot be speculated at this time. Appropriate permits would have to be acquired prior to extracting mineral material off-site from public lands which may or may not include additional NEPA analysis.

4.2.3.1.2 Impacts with Off-Site Processing

The impacts with off-site processing are not expected to differ from those with on-site processing because the infrastructure at the proposed off-site processing location and the transportation route to that location already exist. Impacts to locatable, leasable, and salable minerals are expected to be negligible as a result of processing uranium ore from the Project Area at the off-site facility. In addition, the scale of the Project as proposed would not substantially increase the need for mineral resources; additional sand and gravel may be needed for road maintenance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analyses as necessary.

4.2.3.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.3.2 BLM Mitigation Alternative

4.2.3.2.1 Impacts

The mineral resources impacts of the BLM Mitigation Alternative, which includes revisions to the Reclamation Plan, would be similar to those described above for the Proposed Action. If other areas outside of those identified for Reclamation under the Proposed Action are determined to be reclaimed as described in the BLM Mitigation Alternative, additional mineral materials may be required resulting in more direct impacts to mineral resources than identified in the Proposed Action.

4.2.3.2.2 Monitoring and/or Compliance

Monitoring and compliance under the BLM Mitigation Alternative would be similar to the Proposed Action.

4.2.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in current mineral resource development and trends except those already anticipated as a result of activities that would be conducted under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2016a) and the WDEQ-AML Project 16-O (BLM, 2014b) for reclamation of McIntosh Pit.

4.2.4 Soils

Potential issues associated with soils were identified through public scoping, BLM internal scoping, and public comment on the Draft EIS. Issues include:

- Potential effects to soil resources and soil productivity from the loss of topsoil through increased erosion; and
- Deleterious effects to soil chemical and physical characteristics from soil mixing, rutting, compaction, and potential spills.

4.2.4.1 Proposed Action

4.2.4.1.1 Impacts with On-Site Processing

Potential direct impacts to soils include physical removal, mixing or burying of surface soils, damage or destruction of soil properties in place, elimination or destruction of organic matter in soil stockpiles, spills and leaks onto soils, and the potential mixing of mineral soil, waste rock, and ore into the topsoil. Indirect impacts to soils could occur from wind and water erosion resulting in a loss of surface soils, thereby reducing soil and vegetation productivity.

Biological soil crusts (BSCs), if present, could also be impacted by the Proposed Action, including topsoil salvage. BSCs are composed of multiple organisms, including cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria (Belnap et al., 2001). Full recovery of BSCs from extensive disturbance is a slow process, particularly for mosses and lichens. Recovery of pre-disturbance crust thickness can take up to 50 years, and mosses and lichens can take up to 250 years to recover (BLM, 2012a). As noted in the vegetation survey (Appendix D-8 of the WDEQ-LQD Permit to Mine 381C – WDEQ, 2015a), cryptograms, including moss, lichen, algae, and fungi, were essentially absent within the proposed disturbance.

Available Topsoil and Coversoil

The Proposed Action would affect a total of 929 acres across five soil mapping units. Approximately 572.5 acres (62 percent) of the Proposed Action would be located within previously disturbed soils and 356.5 acres (38 percent) would be new disturbance.

Some of the 572.5 acres of previously disturbed areas have been or are being reclaimed. Soil productivity in reclaimed areas is expected to be less than the native undisturbed soils in the Project Area due to previous soil alterations that affect the physical and chemical properties of the soil through soil mixing, compaction, and loss of structure, organic matter, and nutrients.

Existing sources of suitable plant growth material for reclamation include in-place topsoil, in-place coversoil, and topsoil stockpiles from previous mining operations. Prior to surface disturbance, all available topsoil and coversoil would be salvaged and stockpiled. This would minimize the loss of topsoil and increase the likelihood of successful revegetation and reclamation. In addition, the use of coversoil would allow for reclamation of re-disturbed areas from which topsoil was not stripped prior to the original disturbance.

Salvage thicknesses of topsoil suitable as a plant growth medium ranged from less than 0.5 to 1.79 feet (see Table 3.2-9), exclusive of previously disturbed areas. According to the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a), approximately 580,000 cubic yards of topsoil would be salvaged during mining.

In addition to topsoil, Energy Fuels has identified up to 2,000,000 cubic yards of potential salvageable plant growth medium (coversoil) that would be salvaged and stockpiled, depending on accessibility and percentage of large rocks and boulders in the material. Coversoil thicknesses depths range from about 1.54 to 2.86 feet. In addition to the in-place topsoil and coversoil, approximately 220,000 cubic yards of topsoil salvaged during previous mining operations, is currently stockpiled within the Project Area. WDEQ-AML plans to use about 72,000 cubic yards of the stockpiled topsoil during reclamation of McIntosh Pit (WDEQ, 2015a), so the remaining 150,000 cubic yards would be used for reclamation related to the Proposed Action.

Salvage and Protection

During vegetation clearing and topsoil salvaging, all clearing work would be conducted when soils are not saturated. Topsoil and coversoil salvage would be directed by ground control personnel experienced with the identification of topsoil and/or other suitable plant growth material which may be encountered during excavation. Without vegetation, topsoil is vulnerable to erosion from storm events. Soil compaction could result in decreased infiltration rates and increased surface runoff, which can increase peak flows and further increase surface erosion. However, soil would be stripped from specific areas, such as roads, facilities, and the Congo Pit and stockpiled for replacement during Reclamation, reducing the potential for loss of topsoil.

Salvaged topsoil and coversoil would be placed in designated stockpile areas. Improperly protected stockpiles could also erode, resulting in loss of topsoil; however, topsoil and coversoil stockpiles would be stabilized by surface roughening, seeding, and mulching to minimize the loss of topsoil due to wind and water erosion over the life of the mine. An interim seed mixture approved by the WDEQ and the BLM would be used to establish a suitable vegetative cover on the piles for stabilization and to promote beneficial soil biological activity, aid in maintaining long-term soil productivity, and minimize weeds. The topsoil and coversoil piles would be clearly identified by signage in compliance with WDEQ regulations. These measures would also help to maintain the viability of soils with limiting characteristics. Temporary and permanent erosion

controls would be installed as necessary to minimize erosion and capture sediment. In addition, a perimeter ditch/berm would be constructed around the stockpile for sediment control.

According to BKS (2014a), the hazard for wind and water erosion on the undisturbed soil mapping units within the survey area varies from negligible to moderate. However, the potential for wind and water erosion would increase with implementation of the Proposed Action due to the loss of vegetation cover, soil structure, and increased compaction compared to undisturbed soils. To minimize the potential for accelerated erosion and capture sediments, Energy Fuels would install and maintain temporary and permanent erosion controls, including silt fence, sediment control wattles, berms, ditches, culverts, and sediment ponds, as necessary, throughout the disturbed areas during Operations and Reclamation.

The spill contingency plans outlined in the Plan of Operations (Energy Fuels, 2015a) would minimize the potential for soil contamination during all phases of the Project. These measures include using designated fuel and lubricant storage areas that are appropriately contained by berms, and surrounding ore pads by berms constructed of compacted clay-amended soils. Mine shops and warehouses would be equipped with drain and waste containment sumps to contain spills. Spills of used oil, lubricants, and other liquid wastes from maintenance operations would be appropriately recycled and/or disposed off-site at a licensed facility.

Reclamation

Section 4.4.5 of the Reclamation Plan in WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) outlines reclamation practices that would minimize the loss of soil productivity and return disturbed areas to their pre-mining land use according to the reclamation success standards. These practices include regrading disturbed areas to their approximate pre-mine contours, redistributing topsoil and coversoil, and revegetating with native plant species approved by the BLM and WDEQ-LQD.

Subsequent to final grading, ripping would be completed prior to topsoil placement in areas of compacted substrate, including topsoil that has been compacted by haulage vehicles. Ripping would be done to a depth of 12 inches parallel to the contour at intervals sufficient to "shatter" compacted materials between rip lines.

Prior to topsoil placement, available topsoil would be inspected and/or sampled as necessary to determine the need for amendments to ensure fertility of the soil. Soil amendments might become necessary depending upon reclamation success. Examples of soil amendments consist of: grass hay, wood chips, or other weed free cellulosic materials, gypsum, elemental sulfur, and fertilizer.

After WDEQ-LQD approval of grading and sampling, topsoil would be placed in an incremental manner designed to limit haulage over previously placed topsoil. Replacement depths for suitable coversoil would be about 1 foot, with topsoil placement of at least 0.5 feet. With implementation of the reclamation practices outlined in the Permit to Mine 381C (WDEQ, 2015a), the final topsoil replacement depth is expected to be adequate to meet final reclamation success standards.

Revegetation would be completed as soon as appropriate after topsoil placement. Pitting and broadcast seeding is proposed for revegetating steeper areas, and contour ripping and drill seeding is proposed for less steep areas. Pitting creates a roughened micro surface that minimizes the development of rilling prior to the establishment of vegetation. In addition, the pits capture snow and enhance moisture availability.

4.2.4.1.2 Impacts with Off-Site Processing

The impacts associated with off-site processing would be similar to those described above for on-site processing. Soil impacts such as runoff from the road onto the adjacent topsoil, could be greater due to increased traffic on Crooks Gap/Wamsutter Road. However, the measures used to reduce road damage such as water bars and catchments (Section 4.4.6) would reduce the impacts. Additional impacts to soils at the Sweetwater Mill are not anticipated considering that the mill currently exists without requiring new disturbance. If any changes or updates to the existing permits became necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as required.

4.2.4.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.4.2 BLM Mitigation Alternative

4.2.4.2.1 Impacts

Direct and indirect impacts to soils under the BLM Mitigation Alternative would be similar to those described above for the Proposed Action, but would be reduced and reclamation success would be accelerated with implementation of a revised Reclamation Plan that would be required to comply with the BLM Wyoming Reclamation Policy (BLM, 2014d) and a Weed Management Plan. If on-site processing occurs, the Reclamation Plan revisions would also address previously unreclaimed lands, specifically about 90 acres of previously disturbed areas to offset BLM-managed land that would be permanently taken out of the public domain. Soil amendment plans would be submitted to the BLM for approval prior to the application of any soil amendment (S-1 in Table 2.4-1). With implementation of these measures, impacts to soils would be less under this alternative than under the Proposed Action.

4.2.4.2.2 Monitoring and/or Compliance

Monitoring and compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.2.4.3 No Action Alternative

No additional direct or indirect impacts to soils described above for the Proposed Action and the BLM Mitigation Alternative would occur under the No Action Alternative. Activities that would be conducted under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O reclamation plans (BLM, 2014b) would be implemented to restore previously disturbed areas that have not been reclaimed which would utilize available stockpiled topsoil for reclamation and would require monitoring to achieve success standards defined in the WDEQ-LQD Permit to Mine 381C and the WDEQ-AML Project 16-O reclamation plans (see Chapter 5 for additional details).

4.2.5 Water (Surface, Groundwater, and Water Rights and Water Use)

For the impact evaluations, it has been assumed that in addition to the permits and licenses already acquired, Energy Fuels would acquire any additional necessary federal, state, and local permits/licenses and approvals for the Project, and the requirements of those permits would be met. It has also been assumed that Energy Fuels' applicant-committed measures, including those described in Chapter 2, and the agency-required measures and monitoring measures described in this section are fully and properly implemented.

4.2.5.1 Surface Water – Proposed Action Alternative

Potential issues associated with surface water were identified by the BLM through public scoping, internal scoping, and through public comment on the Draft EIS. Issues include:

- Alteration of stream channel geometry or gradient by accelerated runoff and erosion (e.g., undesirable aggradation, degradation, or side cutting) beyond what would be expected by natural processes;
- Alteration of streamflow characteristics of perennial streams such that established uses by the public and by federal, state, and local agencies for fisheries and wildlife and for livestock, recreational, municipal, and industrial uses are affected; and
- Degradation of water quality beyond the designated use of the receiving waterbody, or other violations of federal or state water quality standards, or negatively impacting a waterbody listed on the State 303d list of Impaired or Threatened Waterbodies.

4.2.5.1.1 Impacts with On-Site Processing

The existing surface water system that makes up the affected environment as described in Chapter 3 includes areas disturbed by historic mining; areas currently permitted by WDEQ-LQD (WDEQ, 2015a) for mining and reclamation in the Project Area; areas being reclaimed by WDEQ-AML (BLM, 2014b); and undisturbed areas part of which would remain undisturbed (Section 2.2.2.2 and Map 2.2-1). The Proposed Action would result in re-disturbance of some previously impacted areas as well as new disturbance within this surface water system.

The potential direct and indirect impacts to the surface water in and near the Project Area are identified first, along with associated protection measures. Surface water flow is then discussed, with an overview of general concerns followed by information on specific surface water features, such as Crooks Creek. Surface water quality is then discussed by the potential quality impact of concern, such as sediment transport. The existing surface water features of concern in and near the Project Area are described in more detail below and include:

- perennial streams (Crooks Creek and to a much lesser degree Sheep Creek);
- mine pit lake and impoundment (McIntosh Pit and Western Nuclear Pond); and
- ephemeral drainages which flow into either of the creeks, the pit lakes, or altered channels or closed depressions associated with subsidence or historic mine pits (e.g., the Paydirt Pit).

Applicant-committed measures to control sediment and limit erosion are described in Section 2.3.4.2 and listed in Table 2.4-1. Surface water monitoring is described in Section 2.3.12.3. Without the applicant-committed measures and monitoring to ensure the effectiveness of those measures, the disturbances and diversions could result in adverse direct impacts due to decreased streamflows, increased erosion potential from surface water runoff, and/or transport of sediment. Measures to protect surface water in and downgradient of the Project Area relate to protection of surface water flows and quality and to ensure the appropriate response if unanticipated conditions are encountered. In addition to applicant-committed measures, the NRC would require stringent plans and procedures to address surface water flows and quality in the NRC License Area, if the On-Site Ore Processing Facility were constructed.

Perennial Streams. For one of the perennial streams, Sheep Creek, the anticipated impacts to the quantity and quality of the water in the creek are indirect in that a small portion of the ephemeral drainages to this creek may be directly impacted, but not the actual creek. Indirect

impacts to Sheep Creek could be anticipated due to the proposed activities which would affect the configuration of some of the ephemeral tributaries that flow into Sheep Creek.

For the other perennial stream, Crooks Creek, the anticipated impacts to the quantity and quality of the water in the creek are indirect, with one exception. Indirect impacts to Crooks Creek could be anticipated due to the proposed activities which would affect: the configuration of the ephemeral drainages that flow into Crooks Creek; the configuration of the existing mine pits and spoil piles, including reestablishment of through drainage where appropriate; and changes in groundwater exchange with surface flows. The one direct impact would be the discharge of treated water from the dewatering of the Congo Pit and the Sheep Underground Mine (Section 2.3.11).

McIntosh Pit and Western Nuclear Pond. As discussed in Section 2.5, the reclamation work on McIntosh Pit, including Energy Fuels' previous reclamation responsibility for the part of the pit, and related improvements to Western Nuclear Pond have been consolidated under the WDEQ-AML Project 16-O (BLM, 2014b). As a result, no direct impacts to either McIntosh Pit or Western Nuclear Pond are anticipated due to Project activities. The anticipated impacts to Western Nuclear Pond are also indirect or non-existent as part of the Proposed Action because no new disturbance is proposed within the drainage that feeds this pond.

If the On-Site Ore Processing Facility were built, there could be indirect impacts to McIntosh Pit due to the need to ensure the surface reclamation of the Facility was appropriately tied into reclamation of McIntosh Pit, specifically a smooth topographic transition and control of drainage from the Facility. Energy Fuels has considered this in the design of their facility, and these impacts would be minimized through the design. Additionally, Energy Fuels' reclamation of the On-Site Ore Processing Facility would be in compliance with applicable rules and regulations promulgated by the NRC and with the License.

Ephemeral Drainages. The anticipated impacts to the ephemeral drainages are primarily direct because of rerouting of drainages during the Project and during subsequent reclamation. The rerouting would change the flow patterns which could result in different areas of infiltration, erosion, and sedimentation than are currently present. In addition, one ephemeral drainage would receive the discharge of treated water from the dewatering of the Congo Pit and the Sheep Underground Mine (Section 2.3.11).

The proposed Construction and Operations activities that could impact surface water flow and quality include: road and facility construction; open pit mining; creation of mine spoil stockpiles; and mine dewatering. The road and facility construction disturbances generally involve relatively small areas, and surface water drainage can be addressed by local diversion of stormwater runoff and installation of culverts under some roads. The larger areas of surface disturbance, such as the Congo Pit, spoil facilities, and On-Site Ore Processing Facility require more extensive diversion of stormwater, including rerouting of drainages and filling of drainages. The mine dewatering could reduce groundwater discharge to Crooks Creek; however, the mine dewatering and subsequent discharge of the treated water to an ephemeral drainage would increase direct surface water flow to Crooks Creek.

Surface Water Flow

The potentially adverse disruption of surface water flows which would occur during Construction and Operations would be eliminated during Reclamation.

Because of the extent of the Project surface disturbance in the proposed surface mining areas, such as the Congo Pit and spoils facilities (Section 2.3), the most extensive direct impact would be diversion of stormwater, including rerouting of drainages and filling of drainages. During

Construction and Operations, design of diversion channels and sediment ponds to handle anticipated surface water flows is essential to ensuring the flows are diverted and contained as necessary. Design considerations are summarized in Section 2.3.4.2.

The sediment ponds are designed to capture runoff from the disturbed areas, such as the spoils, to prevent sediment dispersal into drainages or onto topsoil; and from the undisturbed area, to prevent surface water flow into the pit. The sediment ponds would be sized to contain the 100-year, 24-hour storm plus ensure that the estimated sediment storage volume for one year is always available. Therefore, the sediment ponds are not intended to allow release of any water; however, the emergency sediment pond spillways would pass a minimum of the 25-year storm, in accordance with WDEQ regulations (Section C-31(c) of the WDEQ Water Quality Rules and Regulations (WDEQ, 1984)). The WDEQ regulations only require sediment ponds to impound the 10-year, 24-hour storm (WDEQ, 1984), and the intent is to impound water long enough for the sediment to settle prior to discharge. However, due to concerns about the potential for radium in the discharge water, the sediment ponds in the Project Area were sized to substantially reduce the possibility of discharge. The sediment ponds designed under the Proposed Action would not discharge water and would only release water through loss by evaporation and infiltration.

It is recognized that the use of design storm events may not cover all the storm events encountered during the life of a project, particularly given the variability of precipitation and snow melt in high desert environments. The WDEQ-LQD statutes and regulations provide for measures to address the possibility of unexpected events, including: inspections to ensure the surface water control features were properly constructed and are functioning (e.g., Sections VI and VII of WDEQ-LQD Guideline 15); annual reports with evaluation of the extent to which "expectations and predictions" have been met (Wyoming Statute § 35-11-411); and designation of operator duties, including protection of soil and water (Wyoming Statute § 35-11-415). Because the sediment ponds are constructed to not allow overflow and meet/or exceed WDEQ statutes and regulations that instruct management of surface water within the Project Area, the impacts associated with re-routing of drainages around the Congo Pit and water management on site are due and necessary.

Other hydrologic mitigation features would consist of culverts with inlet and outlet protection installed during the road development and erosion control features such as the sediment control fence (Section 2.3.3.3).

During Reclamation, all of the drainage reestablishment would be based on geomorphic principles to enhance long-term stability and create a diverse and erosionally-stable landscape (Section 2.3.12.4). It may be necessary to armor drainage channels which cross areas of backfill to prevent infiltration of the drainage so the channel does not flow as planned.

During Construction and Operations, the underground mining could potentially cause subsidence of subsurface geologic layers, which could extend to the surface and disrupt drainage patterns. As discussed in Section 2.3.4.3, spoils from the mine would be replaced within the mined out workings where possible, and as mining progresses, collapse would only be allowed in areas without mineralization in the overlying rock. Limiting the extent of collapse would reduce the potential for subsidence. In addition, as discussed in Section 2.3.5.4, bulkheads would also be installed during Reclamation, which would further minimize the potential for mine subsidence to reach the surface.

If the ore were processed on-site, the NRC License Area would encompass the On-Site Ore Processing Facility in the southern portion of the site (Section 2.3.3.7 and Map 2.3-2). Much of this area was disturbed during historic mining. NRC reviews both technical and environmental aspects of the Proposed Action, including concerns related to radiation safety, as well as

drainage designs within the NRC License Area. However, based on the design of the On-site Ore Processing Facility presented in the Plan of Operations, the impacts to surface water flow would be minimal because the facility is designed to not allow any off-site discharge. Furthermore, by designing and controlling the surface water flow in and around the NRC License Area, erosion of existing spoils and sedimentation down-slope at this location would likely decrease. At least a portion of this area, though perhaps not all, would be turned over to the State of Wyoming or the DOE for long-term care (Section 2.3.5.12). The NRC reviews reclamation plans and as-built topography for stability, including the ability to resist stormwater flows resulting from a PMP event (NRC, 2002). Such an area would include both the surface and subsurface, and existing property rights, such as water rights, and mineral resource development opportunities, such as oil and gas leases, and would be addressed at time of transfer.

Sheep Creek Drainage. Sheep Creek receives surface water runoff from several ephemeral drainages and the upper reaches of five of these drainages are partially within the Project Area (subbasins SC1 through SC5 shown on Map 3.2-10). These five drainages comprise less than 20 percent of the Sheep Creek drainage. There are existing and planned Project activities in the upper reaches of three of those drainages, such as placement of a topsoil stockpile at the upper end of the Congo Pit and the Sheep I Shaft (see Map 2.3-1). However, during Project Construction and Operations, any surface water flows near those activities would be diverted to sediment ponds within the Project Area. Therefore, no runoff from the Proposed Action would contribute directly to Sheep Creek or the ephemeral drainages tributary to it. During Reclamation, which would take about 10 more years, the diversions and sediment ponds would be removed and through-drainage reestablished. Because the existing and proposed disturbance areas comprise less than 5 percent of the Sheep Creek drainage, the diversion of water from these areas is not anticipated to cause adverse or beneficial direct or indirect impacts to Sheep Creek flows during the life of the Project.

Crooks Creek Drainage. The potential indirect and direct impacts to the surface water flows in the Crooks Creek Drainage could result from two different actions: ephemeral drainage diversion and subsequent reestablishment; and dewatering. The potential indirect impacts relate to diversion of ephemeral drainages during Construction and Operations and subsequent reestablishment of the drainages during Reclamation. Another potential indirect impact would be changes in the exchange of groundwater and surface water during mine dewatering. A direct impact would be increased flow in one of the ephemeral drainages during Operations when discharge of treated water from the surface and underground mine dewatering is necessary. As discussed below, the net, long-term impact to the surface water hydrology from the Proposed Action is essentially slight alterations of runoff patterns in the ephemeral drainages. The final reclamation contours are illustrated on Map 4-1 of the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a).

Ephemeral Drainage Diversion and Subsequent Reestablishment. Crooks Creek drains approximately 90 square miles above the Project's furthest downstream surface water sampling location on Crooks Creek (XSCCDS on Map 3.2-10).

Crooks Creek receives occasional surface water runoff from ephemeral drainages which flow through the Project Area. Historically, there were more drainages which flowed through the Project Area to Crooks Creek; however, as a result of previous mining-related activities, through flow was blocked in some drainages (e.g., the drainage which currently ends at impoundment SW-1). The ephemeral drainages which cross the Project Area to Crooks Creek, including those which have been blocked, comprise only about 10 percent of the Crooks Creek Drainage. Map 3.2-10 shows the extent of the Crooks Creek Drainage, and Map 3.2-11 shows the locations of the ephemeral drainage subbasins within the Project Area.

Subbasins CC1 through CC9 and SM1 through SM3 cover an area of approximately 9 square miles or 10 percent of the Crooks Creek Drainage. Within these subbasins in the Project Area, the watershed contributing flows to the drainages would be reduced by about 20 percent during Construction and Operations, which would take place over about 11 years. Surface water flows in some of these subbasins would be diverted to sediment ponds within the Project Area; therefore, no runoff from the Proposed Action would contribute directly to Crooks Creek without sediment control to reduce the potential for adverse indirect impacts to surface water flow in Crooks Creek. During Reclamation, the diversions and ponds would be removed and the ephemeral channels reestablished, including several which were previously blocked. All of the drainage reestablishment would be based on geomorphic principles to enhance long-term stability and create a diverse and erosionally-stable landscape (Section 2.3.12.4), eliminating any adverse impacts that may have occurred during Construction and Operations and improving drainage characteristics and flow to Crooks Creek in those drainages that are currently blocked.

Dewatering. The groundwater impacts related to dewatering of the Congo Pit and Sheep Underground mine are discussed in Section 4.2.5.4. The potential indirect and direct impacts to surface water related to dewatering are discussed in this section. Water discharged from the dewatering system could be entirely consumed on-site if the On-Site Ore Processing Facility were constructed. The water would be piped to the Facility and introduced into the leaching cycle in which it would be recycled in the Heap Leach, used in the Extraction Plant, lost to evaporation, or disposed of as part of the liquid waste (Section 2.3.3.7). The quantity of water needed for processing could vary over time; therefore, discharge of the some of the water from the dewatering system could be necessary.

Potential dewatering impacts to the surface water system could result from changes to the exchange of surface water and groundwater; and the amount of surface water flowing from the site to Crooks Creek. As discussed in Section 3.2.5.1, the exchange of surface water and groundwater along that portion of Crooks Creek adjacent to the site is limited. Therefore, no adverse impact to the surface water flows, e.g., diminution of the groundwater contribution to Crooks Creek or increased seepage from Crooks Creek, is anticipated if all the water from the dewatering system were consumed on-site. Because the maximum dewatering discharge, i.e., the most surface water flowing from the site to Crooks Creek, would occur if the ore were processed off-site, the impacts of the dewatering discharge are discussed in Section 4.2.5.1.2 (Impacts with Off-Site Processing).

Surface Water Quality

Potential impacts to the surface water quality in the ephemeral drainages and existing pit lakes in the Project Area relate to increased sediment transport, to spills and leaks, and to dewatering discharge.

Sediment Transport. The potential adverse water quality impacts from sediment transport include degradation due to increases in suspended solid concentrations in runoff from disturbed lands and increased sedimentation in surface water features resulting from construction on adjacent upland areas. Road and facility construction reduce vegetation cover and compact soils from heavy machinery and frequent traffic. Without vegetation, topsoil is vulnerable to erosion from storm events. Soil compaction could result in decreased infiltration rates and increased surface runoff, which can increase peak flows and further increase surface erosion. However, soil would be stripped from specific areas, such as roads, facilities, and the Congo Pit and stockpiled for replacement during Reclamation, reducing the potential for adverse impacts from sediment transport. Improperly protected stockpiles could also erode, increasing sediment loads in surface water runoff; however, measures such as seeding and inspection would ensure that erosion from the stockpiles does not contribute to sediment transport, reducing the potential

for adverse impacts. During Operations, improper storage of ore and spoils could result in increased sediment transport, which could be contaminated due to potential mobilization of metals from the ore and spoils due to oxidation of the material. During Reclamation, activities such as discing to loosen compacted soil could result in increased sedimentation to surface water runoff if erosion increased.

Energy Fuels would implement the following measures to address surface water quality impacts related to sediment transport:

- limit soil compaction and removal and protect excavated topsoil and subsurface material from erosion in accordance with Standard Operating Procedures (SOPs) and the SWPPP.
- ensure that runoff from disturbed areas meets WYPDES permit guidelines for stormwater management and sediment reduction.
- complete appropriate reclamation practices in a timely manner. After short-term disturbances during Construction, such as pipeline installation, the disturbed areas would be revegetated with either a temporary seed mix (Table 4-5 of the WDEQ-LQD Permit to Mine 381C – WDEQ, 2015a) or with the permanent seed mix (Tables 2.3-5 and 2.3-6 in Chapter 2).
- Comply with the 43 CFR § 3809.420 Performance Standards, any requirements of WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a), and any requirements developed through the NRC licensing process.

Sediment transport impacts related to the dewatering discharge are discussed below.

During Project Construction and Operations, which would take place over about 11 years, surface water flows in some of the ephemeral drainages which flow through the Project Area would be diverted to sediment ponds, within the Project Area, which were conservatively designed as discussed under Surface Water Flow. Therefore, no runoff from the Proposed Action would contribute directly to Crooks Creek without sediment control to reduce the potential for adverse indirect impacts to surface water flow quality in Crooks Creek. During Reclamation, which would take about 10 more years, the diversions and ponds would be removed and the ephemeral channels reestablished, including several which were previously blocked. All of the drainage reestablishment would be based on geomorphic principles to enhance long-term stability and create a diverse and erosionally-stable landscape (Section 2.3.12.4).

Spills and Leaks. Surface water runoff to the ephemeral drainages and pit lakes in the Project Area could be impacted due to a spill or leak from machinery, pipelines, or tanks in use during Construction, Operations, or Reclamation. In addition to the use of measures to comply with SOPs, the SWPPP, and WYPDES requirements, the environmental protection measures to prevent and mitigate spills and leaks include selection of appropriate materials for pipelines and tanks, proper installation and testing of those materials prior to use; and inspection and maintenance. Piping and associated fittings would only be constructed of materials that are chemically compatible, able to withstand the expected operating pressures, and compatible with ambient conditions. Pipelines would be checked before being placed into operation and after significant repairs. Berms would be in place in and around the Plant to control the movement of spills. Storage tanks for fuels and other liquids would comply with Chapter 17 of WDEQ-WQD's rules and regulations on storage tanks (WDEQ, 2012b). Inspections would be regularly scheduled. Should a spill or leak occur, remediation and reporting procedures would be conducted in accordance with the spill contingency plans described in Section 2.3.10.

If the ore were processed on-site, the NRC License would include requirements for control of runoff from the entire processing facility including the Heap Leach Pad during a PMP significant precipitation event as defined by the NRC. Overflow drainage channels, with double-lined leak detection systems, would be constructed around the Collection Pond and Raffinate Pond to direct any overflow to the Holding Pond (Section 2.3.3.7.2). Based on the design of the ore processing facility presented in the Plan of Operations, the impacts to surface water quality would be minimal because the Facility is designed to not allow any surface water discharge. Both the NRC and the DOE review the reclamation plans and as-built topography for stability, including the ability to resist stormwater flows resulting from a PMP event (NRC, 2014). Should a spill or leak occur, remediation and reporting procedures would be conducted in accordance with the applicable rules and regulations promulgated by the NRC or required by the License.

As discussed in Section 3.2.5.1, a portion of Crooks Creek has a WDEQ-WQD 303d listing (Category 5 impaired stream) for oil and grease contamination in the SWNE ¼ of Section 18 T28N R92W (WDEQ, 2012a). However, the condition appears to be temporary or aberrant, e.g., the result of a spill, based on subsequent water quality sampling, although additional sampling is required (Hyatt, 2014). No direct or indirect adverse impacts to Crooks Creek are anticipated from any on-site spills and leaks.

Dewatering Discharge. Water discharged from the dewatering system could be entirely consumed on-site if the On-Site Ore Processing Facility were constructed. The water would be piped to the Facility and introduced into the leaching cycle in which it would be recycled in the Heap Leach, used in the Extraction Plant, lost to evaporation, or disposed of as part of the liquid waste (Section 2.3.3.7). However, the quantity of water needed for processing could vary over time, therefore, discharge of some of the water from the dewatering system could be necessary. Because the maximum dewatering discharge would occur if the ore were processed off-site, the impacts of the dewatering discharge are discussed in the next section.

As noted in Section 2.3.3.4 (Utilities), non-potable water for ore processing, dust suppression on the site roads, fire suppression systems, and washing equipment would be supplied by dewatering of the Congo Pit and Sheep shafts. Use of this untreated water would be limited to areas where drainage is controlled (in and around the Congo Pit) to avoid the potential for off-site drainage. The site stormwater controls including use of untreated water for dust suppression have been approved by the WDEQ through various permits such as the WDEQ-LQD Mine Permit 381C, WYPDES, and SWPPP; therefore, the impacts associated with using untreated water for dust suppression and water management on site are due and necessary.

4.2.5.1.2 Impacts with Off-Site Processing

The impacts associated with off-site processing would generally be similar to those described above for on-site processing, with the exception of impacts associated with dewatering discharge, which could be more extensive as discussed in the section below. The magnitude of adverse impacts caused by erosion could be increased due to the increased traffic on Crooks Gap/Wamsutter Road and Minerals Exploration Road; however, the measures used to reduce road damage, water bars and catchments (Section 4.4.6) would mitigate the increased impact. Any additional impact to surface water at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new surface disturbance. If any change or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

Dewatering Discharge. Energy Fuels anticipates that, during the first year of mining, the dewatering rate is anticipated to exceed the consumption rate, based on the site-wide water balance (WDEQ, 2015a). The amount of excess water would depend on whether or not the On-Site Ore Processing Facility is constructed. Energy Fuels has an approved WDEQ-WQD

WYPDES Permit (WY0095702) for the treatment and discharge of mine water in accordance with the provisions of the WYPDES program (WDEQ, 2015b). Treatment of the mine water for removal of radium is necessary, and treatment for removal of uranium or other parameters may be necessary in compliance with the approved WYPDES Permit (WDEQ, 2015b). Water from the dewatering system would be stored in a lined pond on the Ore Pad, and the treatment system would also be located on the Ore Pad. The pretreatment temporary storage and settling ponds are lined, no additional surface disturbance is necessary, and runoff from the Ore Pad would be controlled; therefore, no impacts to surface water are anticipated from the water treatment facility. See Section 2.3.11 (Water Management Plans) for more details.

Surface Water Flow. The treated water would be discharged to an ephemeral drainage on the northwest side of the Ore Pad. This drainage was constructed by WDEQ-AML as part of their reclamation of the Paydirt Pit several years ago. Energy Fuels would install riprap at the discharge location to prevent erosion at the outfall. Similar discharge permitted by WDEQ-LQD and WDEQ-WQD occurred during the 1970s and 1980s through Hanks Draw and no adverse impacts to Crooks Creek were reported or were evident. Based on the calculated extent of groundwater drawdown during Operations (Appendix D-6 of the WDEQ-LQD Permit to Mine 381C – WDEQ, 2015a), the dewatering of the Congo Pit would not indirectly impact surface water and groundwater exchange which may be occurring along Crooks Creek. The more extensive drawdown during the dewatering of the Sheep Underground Mine could impact surface water and groundwater exchange along Crooks Creek by possibly reducing groundwater contribution to the creek and possibly inducing recharge from the creek. During Operations, any adverse impact to the exchange of surface water and groundwater, e.g., diminution of the groundwater discharge to surface water, would be offset by discharge of the treated water from dewatering of the Congo Pit and the Sheep Underground Mine (Section 2.3.11). During Reclamation, any impact to the surface and groundwater exchange would be eliminated by the recovery of the groundwater levels. Based on historical data, the previous dewatering of the Congo Pit and Sheep Underground Mine did not adversely impact the flow in Crooks Creek. During dewatering of the Congo Pit in the mid-1970s, the treated water was discharged to Hanks Draw (National Pollutant Discharge Elimination System - NPDES Permit 0024490). However, during dewatering of the Sheep Underground Mine for a 10-year period at rates on the order of 200 to 250 gpm, the water was discharged to McIntosh Pit rather than the creek. Even so, as noted above, no adverse impact to the creek flow was reported or evident.

The direct impact of the dewatering discharge to an ephemeral drainage during Operations would be beneficial because of the importance of water in this climate; however, the benefit would be temporary because during Reclamation, the discharge would cease. Ephemeral drainages in this semi-arid climate pass elevated flow rates during snowmelt and after thunderstorms. The ephemeral drainage to which the water from the Project would be discharged was constructed by WDEQ-AML during reclamation of the Paydirt Pit several years ago, and consists of rip-rap sediment control structures every 100 feet. The outfall would be less than 1 mile from Crooks Creek. Based on the characteristics of this drainage (Lidstone, 2013), substantial changes to the channel for erosion protection are not anticipated to be necessary. However, energy-absorbing rip rap would be used at the outfall to help prevent erosion of the drainage. Further, the authority on water discharge in Wyoming is the WDEQ-WQD under the WYPDES program. Energy Fuels' WYPDES Permit clearly states as measure A.1 of Part 1 under Permit WY0095702 that "all waters shall be discharged in a manner to prevent erosion scouring, or damage to stream banks, stream beds, ditches, or other waters of the state at the point of discharge."

With respect to Crooks Creek, the dewatering discharge would not contribute more water to the creek than it generally carries, although there would be fewer low flows in the creek. This assessment assumes all of the dewatering discharge reaches the creek from the ephemeral drainage. This assumption is highly unlikely considering the discharge would flow to a drainage designed to minimize erosion by slowing water and decreases in gradient significantly where the drainage spreads out into two shallowly sloping drainages in sand before reaching Crooks Creek. The lowest and highest recorded flows in the creek adjacent to the Project were 2.3 cfs and 7.6 cfs, respectively (Table 1 in Appendix 3-B), which converts to about 1,000 to 3,400 gpm. Based on the flow measurements on the West Fork of Crooks Creek (Table 2 in Appendix 3-B), higher flows could be anticipated in Crooks Creek. The anticipated range of discharge flow rates during most of the Project is 0.6 to 0.9 cfs (250 to 400 gpm). If all the discharge flowed to the creek, the anticipated range of the discharge rates would increase the low flow rate in the creek by 25 to 40 percent of the lowest recorded creek flow rate. However, that increased rate would be less than the highest recorded flow adjacent to the Project. If the highest discharge rate occurred simultaneously with the highest recorded flows adjacent to the Project, the increase would equal 10.6 cfs, or an increase of approximately 40 percent. The highest anticipated discharge rate of about 3 cfs (1,375 gpm), which could occur for 9 months to 1 year, would more than double the lowest recorded flow rate in the creek, however, the increased flow rate (5.3 cfs) would be less than the highest recorded flow (7.6 cfs) adjacent to the Project. At the average flow rate measured downstream of the Project (4.8 cfs), the increase from the dewatering discharge would result in a flow rate near the highest recorded flow. Based on the measurement of significantly higher flows in the West Fork of Crooks Creek (Table 2 in Appendix 3-B), the combination of the discharge rate and highest recorded flow adjacent to the Project is not anticipated to exceed historic flow rates in Crooks Creek (255 cfs in 1975, 46 cfs average historic flow rates), nor do these changes in flow rates represent large quantities of water even for the Crooks Creek drainage with the highest anticipated possible flow of 10.6 cfs (from 7.6) as a result of discharge for up to 1 year or average flow of 5.3 cfs (from 4.8) for up to 8 years. These flows are certainly not sufficient to change the characteristics of Crooks Creek to the point that water would reach the Sweetwater River. Therefore, substantial changes and adverse impacts to the flow in Crooks Creek, or to its extent across the Sweetwater River Valley, are not anticipated.

S*urface Water Quality.* In October 2015, WDEQ-WQD approved a permit for discharge of treated mine water to the surface under the WYPDES Program (WDEQ, 2015b). Treatment of the mine water for removal of radium is necessary, and treatment for removal of uranium or other parameters may be necessary in the future. The treatment method(s) required under the provisions of the WYPDES Permit specify the parameter(s) of concern for discharge to Crooks Creek, and the BLM must assume that the conditions of the WYPDES Permit are adhered to; therefore, no adverse impacts to overall water quality are anticipated. The discharge limitations per the approved WYPDES Permit WY0095702 are characterized below in Table 4.2-5. Effluent limits consider federal and state regulations and standards and incorporates the most stringent requirements. See Section 2.3.12.3 and Appendix 2B for more information on effluent limits. If determined necessary to meet limits during operations, a processing step for uranium removal would be added to the treatment system (e.g., ion exchange, IX, treatment). See the permit (WY0095702) for more information.

Table 4.2-5
WYPDES Permit WY0095702 Effluent Limitations

Effluent Characteristic	Discharge limitations	
	Monthly Average	Daily Maximum
Chemical Oxygen Demand, ,mg/l	100	200
Dissolved Radium 226, pCi/l	3	10
Oil and Grease, mg/l	N/a	10
Total Radium 226+228, pCi/l	N/A	5
Total Recoverable Selenium, µg/l	N/A	1
Total Suspended Solids, mg/l	20	30
Total Uranium (as U), mg/l	2.0	4.0
Total Zinc, mg/l	0.5	1.0
Dissolved Zinc, µg/l	N/A	23
pH	N/A	6.5-9.0

4.2.5.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.5.2 Surface Water – BLM Mitigation Alternative

4.2.5.2.1 Impacts

The direct and indirect water resources impacts of the BLM Mitigation Alternative, which includes revisions to the Reclamation Plan, would not be anticipated to differ noticeably from those of the Proposed Action. If on-site processing occurs, the Reclamation Plan revisions would address previously unreclaimed lands, specifically about 90 acres of previously disturbed areas to offset BLM-managed land that would be permanently taken out of the public domain. The reclamation might provide for more stable soils and, as a result, less potential for erosion and sedimentation which could benefit surface water quality.

4.2.5.2.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.2.5.3 Surface Water – No Action Alternative

The No Action Alternative would not generate any additional direct or indirect impacts to the existing surface water resources or change any of the existing uses except those already anticipated as a result of Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O reclamation plans (BLM, 2014b) for reclamation of McIntosh Pit. For those areas for which Energy Fuels does not have reclamation responsibility, the WDEQ-AML Project 16-O plans address the existing disturbance which poses the greatest safety concern, which is currently McIntosh Pit (Chapter 5). The plans would reduce the potential for erosion, through regrading and revegetation, and would re-establish some through-drainages.

4.2.5.4 Groundwater – Proposed Action Alternative

Potential issues associated with groundwater were identified by the BLM through public scoping, internal scoping, and through public comment on the Draft EIS. Issues include:

- Interruption or reduction of the natural flow or level of groundwater to existing local springs, seeps, wells, or permitted water supply wells to the point that existing hydrologic function and beneficial uses cannot be maintained; and
- Degradation of groundwater quality in any aquifer such that it would conflict with any applicable rules or regulations such as the WDEQ-WQD criteria for evaluating potential water uses based on water quality (WDEQ-WQD Rules, Chapter 8, Table I – WDEQ, 2015d) which would result in unnecessary or undue degradation of public lands.

4.2.5.4.1 Impacts with On-Site Processing

The existing groundwater system that could be affected by the Proposed Action includes portions of the undifferentiated Battle Spring and Fort Union formations (referred to as the Project Area Aquifer). As discussed in Section 3.2.5.2, the Battle Spring and Fort Union formations are the water-bearing formations in the vicinity of the Project Area. Because of the heterogeneity of the geologic materials in these formations, the formations are difficult to distinguish and the term Project Area Aquifer is used to collectively refer to the water-bearing strata in the Battle Spring and Fort Union formations. There is also variability in the hydrogeologic properties within the formations due to lithologic variations, e.g., lenses and layers of material rather than homogenous material. The synclinal structure of the Cody Shale aquitard provides a significant control on the movement of water out of these formations. The system also includes shallow groundwater in alluvial deposits along Crooks Creek to the west of the Project Area.

In the Project Area, the groundwater system in the Project Area Aquifer was affected by historic underground mining and currently permitted activities in the Project Area (Section 2.2.2 and Map 2.2-1). The hydrologic data collected during historic mining, including surface and underground mine dewatering, offers unique insight into the drawdown resulting from pumping for mine dewatering and subsequent recovery after pumping ceases. The historic information has been supplemented with more recent information, including data from installation, testing, and sampling of new wells and results from groundwater modeling.

The Proposed Action would result in additional changes in the subsurface conditions that could directly impact groundwater quantity, flow, and quality. The impacts to groundwater quantity and flow are discussed first, followed by discussion of the impacts to groundwater quality.

Groundwater Quantity and Flow

Impacts to the groundwater quantity and flow in and near the Project Area are described in more detail below and could result from:

- groundwater withdrawals for Project water supply;
- groundwater withdrawals to dewater the Congo Pit and the Sheep Underground Mine;
- backfilling of the Congo Pit and the Sheep Underground Mine; and
- increased interconnection within the aquifer due to tunnels and subsidence.

Project Water Supply. It is anticipated that all non-potable water supply needs can be generated from water produced during dewatering that would be treated on-site with barium chloride to reduce radium concentrations as necessary.

As discussed in Sections 2.3.3.4 and 2.3.11.3, potable water would be obtained from the Jeffrey City Water and Sewer District via water trucks. This water consumption would equal approximately 2,000 gpd, which is within the current capacity of the District system. If necessary when the Project is fully operational and if the On-Site Ore Processing Facility were built, the on-site treatment system could be upgraded to produce potable water.

Congo Pit. Based on the depth of the phreatic surface and the mining rate, the Congo Pit would require dewatering, using in-pit sumps, during Operations. The dewatering rates would range from about 156 gpm in the first year, increase to about 377 gpm in the fourth year, and then decline to about 199 gpm in the eighth (final) year of mining the pit.

Sheep Underground Mine. Dewatering from the Sheep I and/or II shafts is scheduled to begin from 1 to 5 years after mining begins in the Congo Pit, and the initial dewatering of the Sheep Underground Mine is anticipated to require continuous pumping at a rate of 750 to 1,000 gpm for a period of approximately 9 months to 1 year (WDEQ, 2015a). After initial dewatering of the Sheep Underground Mine and during Operations, a steady-state dewatering rate of 250 to 400 gpm is expected during the 11 years of mining, based on historical information (WDEQ, 2015a).

Groundwater Withdrawal Impacts. No groundwater data was collected before mining of the Sheep Mountain area began in the late 1950s. However, beginning in the 1970s, groundwater data was collected during periods when mining was active (and dewatering was occurring) and when it was not. Both open pit and underground mining have been active at the site since the late 1950s; however, no actual mining activity has taken place in the Project Area since 1982, though pumping of underground workings was conducted from 1990 through 2000 and minor site reclamation activities were conducted in the 1990s and 2000s. One of the original mine owners, Western Nuclear, initially dewatered the Sheep Underground Mine in the mid-1970s (1974-1976), and discharged treated water to Hanks Draw to the north. Dewatering of the Sheep Underground Mine workings resumed in 1990 and continued until October 2000 (WDEQ, 2015a). During this timeframe, the water was discharged into McIntosh Pit.

The baseline information collected to date and the assessments of historic operations and impacts (Lidstone and Wright, 2013), provide an understanding of the groundwater system so the open pit and underground mine dewatering programs can be designed and conducted as efficiently as possible. An efficient dewatering system would reduce the possibility of pumping more water than necessary. In addition, the information and assessments provide an understanding of drawdown extent and duration due to the Proposed Action. The historical data record, in particular comparison of the historic and current groundwater levels in the Sheep I and II shafts and evaluation of water level changes outside the immediate vicinity of dewatering activities, provides a basis for assessing the impacts associated with the Proposed Action.

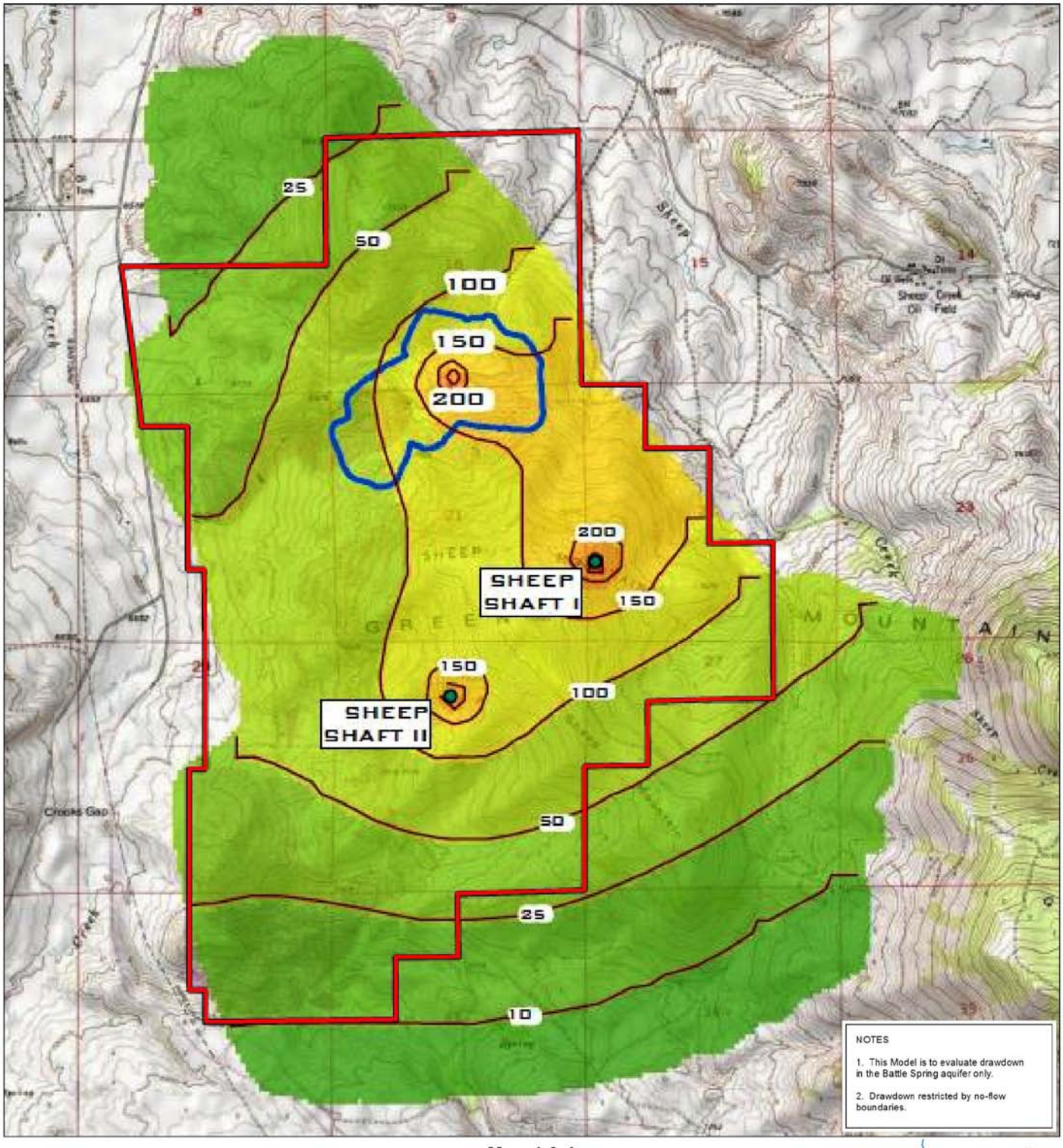
During the dewatering in the 1990s, the dewatering rate was on the order of 250 gpm, and the water level declines in the Sheep I and II shafts were on the order of 1,000 feet, based on available data. Current groundwater levels (Section 3.2.5.2) indicate the water levels have recovered to within 90 percent (or more) of the premining water levels in the 13 years since the dewatering ceased. Because the portions of the extended underground mine would extend about 400 feet deeper into the Project Area Aquifer, groundwater levels would be drawn down to corresponding deeper levels than during the previous underground mining. Pumping rates could be somewhat greater, although duration would be similar to the dewatering during the 1990s. Recovery rates of the groundwater levels after dewatering could be expected to be similar to the historic recovery rates. In addition to the relatively rapid recharge rate, the areal extent of the drawdown from the historic dewatering activities was relatively limited, based on data to the southeast of the Sheep Underground Mine.

Although historic data shows limited extent of influence from drawdown, there is potential for dewatering to create a groundwater sink directly impacting existing groundwater flow within the Project Area during Operations at the Congo Pit and Sheep Underground Mine. The most extensive drawdown would be while the pit and underground mine are being dewatered at the same time. Drawdown and recovery analyses were completed by Energy Fuels in support of the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a). The results for concurrent dewatering of the Congo Pit and Sheep Underground Mine, which would impose the most stress on the groundwater system, indicates the drawdown would be within the Project Area, except to the south-southeast where up to 50 feet of drawdown could occur at the Project Area boundary, and to the north, where less than 25 feet of drawdown could occur within 1 mile of the Project Area - see Map 4.2-1 (WDEQ, 2015a). The results of the analyses indicate water levels at the Congo Pit would recover completely within about 13.5 years after cessation of mining, assuming the Sheep Underground Mine was not developed. Conservative analysis of the recovery after cessation of mining in the Sheep Underground Mine indicated complete recovery of the water levels would require about 55 years. However, recovery is anticipated to be more rapid because of the increased interconnection in the aquifer due to the underground workings. In addition, initial water level recovery in an aquifer is generally rapid, with last 10 percent to 20 percent requiring the most time (Driscoll, 1986).

Groundwater in the Project Area Aquifer beneath the site is unconfined. Depth to water depends on location within the Project Area and is generally deeper to the east and north, where the ground elevations are higher. Groundwater flow directions identified during studies completed in 1979/1980 and in 2013 were similar, and the flow direction is generally to the west in the Project Area. Groundwater flow directions could be expected to be similar when groundwater levels recover after mining and reclamation.

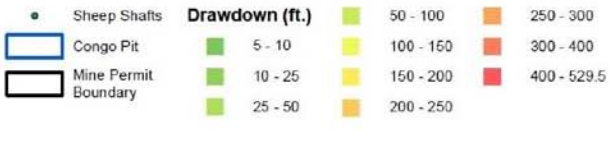
Drawdown from utilization of water from wells could occur during operations when 10,000 gallons of potable per day are needed. This water is anticipated to come from multiple sources including from the water treatment plant (after amendments), existing wells on-site, and possibly also from Jeffrey City. Potable water would be required to meet EPA regulations, and a permit would be needed from the EPA in order to use a new source for potable water on-site. Water from most existing wells on-site do not currently meet EPA regulations, so treatment would be necessary. Drawdown in existing wells on site would occur as water is pumped at a rate to meet the 10,000 gpd operating requirement. However, per the discussion above, drawdown in these wells will not likely influence the hydrogeologic characteristics of the Project Area aquifer.

Additionally, drawdown in Jeffrey City municipal water wells to supply potable water needs during Construction and possibly Operations could impact the local Jeffrey City water supply and local aquifer (these wells are likely screened in White River Formation referred to as the Arikaree aquifer). However, this aquifer in the Sweetwater River Basin is largely unconfined, and contains potentially large supplies of groundwater indicating drawdown from the Jeffrey City wells would not cause adverse long term impacts.



Map 4.2-1
Projected Extent of Groundwater Drawdown Due to Mine Dewatering

No warranty is made by the Bureau of Land Management (BLM) for use of the data for purposes not intended by the BLM



Based on creek flow measurements, the elevation of the groundwater table and the flow direction, exchange of some water from the Project Area Aquifer to the alluvial deposits along Crooks Creek is likely. There is no indication in the historic record that historic dewatering activities reduced the groundwater contribution to, or induced recharge from, the alluvial deposits in sufficient quantities to interfere with the flow in the creek. This includes the time period when the water produced by dewatering was pumped to McIntosh Pit, not the Creek.

There is also a spring, Sheehan Spring, to the southeast of the Project Area. The spring is located along the drainage which flows into Western Nuclear Pond and McIntosh Pit. Because the spring is about 2 miles south of the Congo Pit and 1 mile south of the Sheep Underground Mine, dewatering associated with the Project is not likely to interfere with the spring flow. The spring is at an elevation of about 7,050 feet amsl, compared to the regional groundwater elevations of about 6,900 feet in the vicinity of the proposed mining.

Backfill of the Congo Pit and the Sheep Underground Mine. Backfilling the Congo Pit and the Sheep Underground Mine during Reclamation would create areas of less consolidated material within the undisturbed, consolidated Project Area Aquifer. The characteristics and flow regime of the groundwater would be altered because this less consolidated material would generally have a higher permeability than the surrounding rock, allowing for faster recharge and flow through the backfill material. Therefore, the backfill areas could provide faster recharge to the groundwater system. However, the extent of the backfill is small compared to the extent of the formation, so the impact would be minimal. In addition, the historic mining of the Congo Pit and Sheep Underground Mine (Sections 2.3.4.2 and 2.3.4.3) created areas of less consolidated material, and the proposed backfill areas would coincide, in part, with the historic backfill locations. For example, mine voids remaining in the historic underground mine workings beneath the Congo Pit would be replaced with backfilled materials.

Interconnection. The natural heterogeneity of the geologic materials in the Battle Spring and Fort Union formations is augmented by the presence of historic mining-related activities, such as underground workings. Localized, small-scale faults within the Project Area Aquifer also contribute to the heterogeneity within the aquifer. However, the heterogeneity does not restrict groundwater movement throughout the Project Area Aquifer, as evidenced by the consistency of the potentiometric surface before and after intervals of dewatering (e.g., Maps D-6-4 and D-6-10 in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a). Historic surface and underground mining within the Project Area have created more permeable pathways (e.g., tunnels, backfilled pits, and slumped layers) within the Project Area Aquifer. Impacts of increased permeability could be beneficial, allowing for more rapid recharge, and/or detrimental, allowing for more rapid movement of contaminants. Because of the areal and vertical extent of the Project Area Aquifer in and near the Project Area compared to the more limited extent of the historic underground disturbance, the additional impact of the increased interconnection within the Project Area Aquifer from the Project would be minimal. In addition, the proposed surface mining (the Congo Pit) would remove many of the underground workings in the vicinity of the pit, and much of the proposed underground mining (Sheep Underground Mine) coincides with historic mining from the Sheep shafts. Therefore, the extent of interconnection within the Project Area Aquifer is not expected to increase substantially.

Groundwater Quality

Potential impacts to the groundwater quality beneath the Project Area relate to mineral oxidation and to spills and leaks. Similar to the discussion of the impacts of the Proposed Action on groundwater quantity and flow, the groundwater quality impacts are evaluated relative to the conditions resulting from the historic mining of the site.

Mineral Oxidation. The potential groundwater quality impacts associated with the Proposed Action include impacts to water quality resulting from potential oxidation of minerals in the aquifer matrix materials of the Project Area Aquifer adjacent to the open pit and the underground mine workings. Oxidation may result in changes in the groundwater pH and in the concentrations of TDS and concentrations of metals and radionuclides. Based on the current groundwater quality, which is influenced by naturally occurring mineralization and by historic mine development and reclamation (see discussion of Groundwater Quality in Section 3.2.5.2), the Proposed Action is not likely to result in a change in the groundwater quality in the Project Area Aquifer sufficient to change the current WDEQ-WQD Class of Use for which the water is suitable. Current groundwater quality and Class of Use are discussed in Section 3.2.5.2. Additional details on the historic mining impacts on groundwater quality and the current groundwater conditions are provided in Appendix D-6 of the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a).

The reclamation requirements for the Project would reduce the potential for mineral oxidation. No post-mine pit lake is proposed. The relatively rapid flooding of the backfilled pit and the underground mine after mining, and the selective handling of overburden would reduce the potential for mineral oxidation. In addition, monitoring required per WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) would provide confirmation that excessive mineral oxidation is not occurring. In addition, the WDEQ-AML reclamation of McIntosh Pit (BLM, 2014b) should also reduce the potential for mineral oxidation, which would benefit the Project.

Spills and Leaks. Potential groundwater quality impacts resulting from the Proposed Action include impacts related to a spill or leak from machinery, pipelines, or tanks in use on the surface during Construction, Operations, or Reclamation. Because of the depth to groundwater, direct leakage of a surface spill or leak to the groundwater is considered unlikely and would be the result of a slow leak or catastrophic failure. Within the open pit or underground mine, the potential for a spill or leak to contact groundwater is greater, although dewatering would be designed to keep the groundwater out of the pit and underground mine. Within the On-Site Ore Processing Facility, spills or leaks are also unlikely to contact the groundwater because of the depth to water.

The environmental protection measures to prevent and mitigate spills and leaks include selection of appropriate materials for pipelines and tanks, proper installation and testing of those materials prior to use, and inspection and maintenance. Berms would be placed in and around facilities to control the movement of spills. Storage tanks for fuels and other liquids would comply with Chapter 17 of WDEQ-WQD's rules and regulations on storage tanks (WDEQ, 2012b). Inspections would occur regularly, and should a spill or leak occur, remediation and reporting procedures would be conducted in accordance with the spill contingency plans described in Section 2.3.10.

If the ore were processed on-site, the Heap Leach Pad and other structures, such as the Holding Pond would be lined with leak detection as described in Section 2.3.3.7.1 and meet applicable NRC requirements. Sumps and other drainage systems would also require lining or routing to prevent groundwater discharge from the facility. Leak detection systems would have provisions for monitoring and contingencies for unanticipated conditions. Reclamation requirements would also include provisions for removing liquids, constructing impermeable caps where necessary, and other measures for long-term stability of the site, as well as groundwater monitoring.

4.2.5.4.2 Impacts with Off-Site Processing

The impacts associated with off-site processing would be similar to those described above for on-site processing. However, as mentioned in Section 4.2.5.1.2, water discharged to Crooks Creek under the WYPDES Permit from the Project Area during dewatering would likely dissipate into the soils and sand before reaching the Sweetwater River becoming part of a local alluvial aquifer or leaking into the unconfined Arikaree Aquifer. If this occurs, this water could contribute beneficially to the local groundwater system during discharge activities. The treatment method(s) required under the provisions of the WYPDES Permit specify the parameter(s) of concern for discharge to Crooks Creek, and the BLM must assume that the conditions of the WYPDES Permit are adhered to; therefore, no adverse impacts to overall groundwater quality are anticipated as a result of surface discharge through infiltration into the groundwater system. Any additional impact to groundwater at the Sweetwater Mill is not anticipated considering the project currently exists. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis, as necessary, and applicable rules and regulations would be complied with.

4.2.5.4.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.5.5 Groundwater – BLM Mitigation Alternative

4.2.5.5.1 Impacts

The groundwater resources impacts of the BLM Mitigation Alternative, which includes Reclamation Plan revisions, would not be anticipated to differ significantly from those of the Proposed Action.

4.2.5.5.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.2.5.6 Groundwater – No Action Alternative

The No Action Alternative would not generate any additional impacts to the existing groundwater resources except those already anticipated as a result of Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b) for partial reclamation of McIntosh Pit. The WDEQ-AML reclamation plans, in collaboration with Energy Fuels and the landowner, would include backfilling McIntosh Pit above the groundwater table. This reclamation would eliminate evaporative loss of groundwater at the pit and reestablish the groundwater flow direction to the west rather than to the pit.

4.2.5.7 Water Rights and Water Use – Proposed Action Alternative

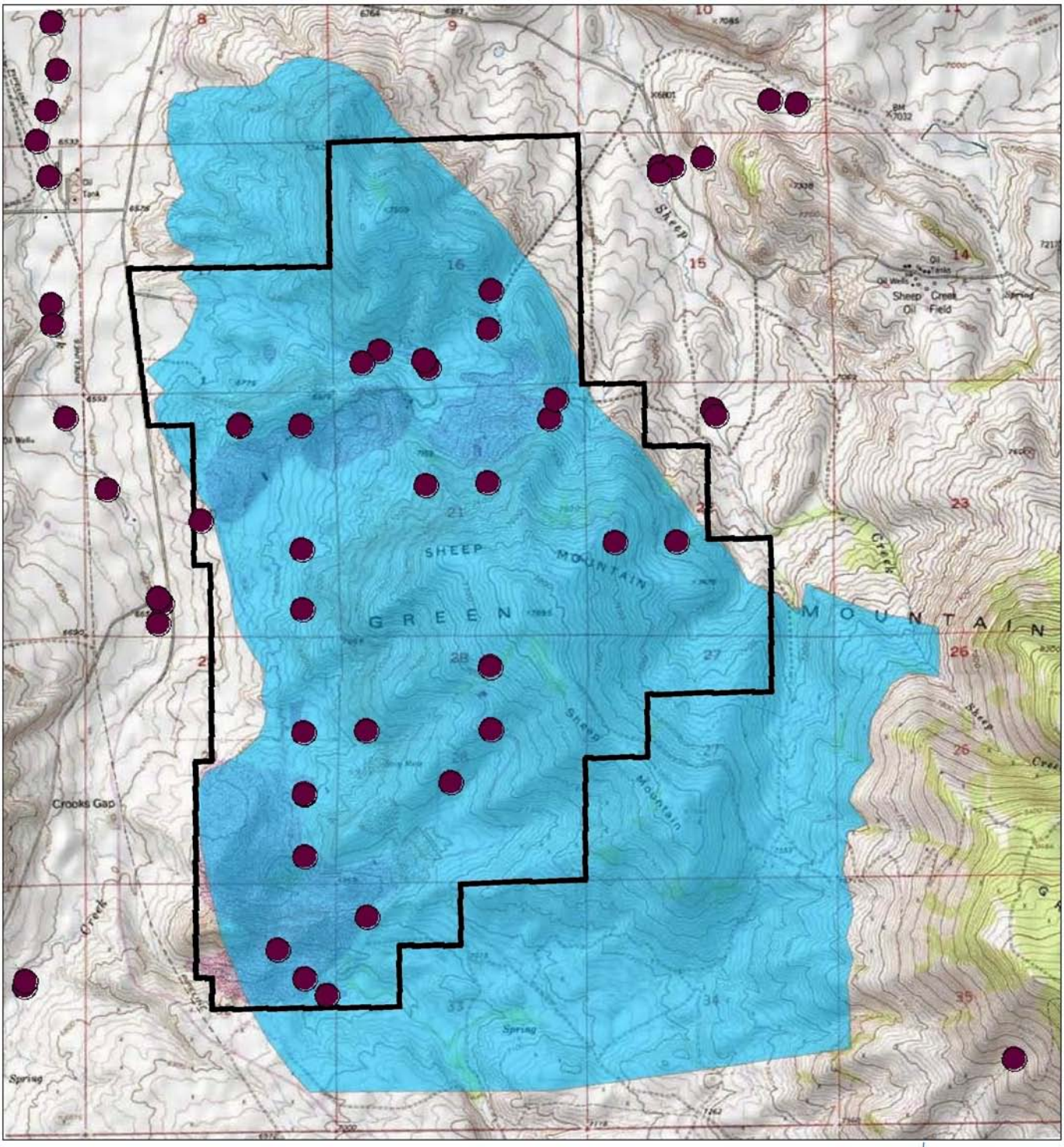
Potential issues associated with water rights and water use are similar to those identified by the BLM through public scoping, internal scoping, and through public comment on the Draft EIS. Issues include:

- Alteration of streamflow characteristics of perennial streams such that established uses by the public and by federal, state, and local agencies for fisheries and wildlife and for livestock, recreational, municipal, and industrial uses are affected;
- Interruption or reduction of the natural flow or level of groundwater to existing local springs, seeps, flowing artesian wells, or permitted water supply wells to the extent beneficial uses cannot be maintained;
- Degradation of water quality to the extent the designated use of the receiving surface or groundwater cannot be maintained.

No impacts to surface water uses would be anticipated. As discussed in Section 4.2.5.1.1, only indirect impacts to surface water flows and quality would be anticipated in the ephemeral drainages, except for those related to dewatering. The indirect impacts would not extend to either Crooks Creek or Sheep Creek. Therefore, existing uses would continue. During Operations, specifically the first two years of dewatering, all of the water from the dewatering operations would be used on-site. After the first two years of dewatering, some of the water from the dewatering operations would be treated and discharged (Section 2.3.10.2). As discussed in Section 4.2.5.1.1, no diminution in flow (or surface water use impacts) are anticipated due to dewatering, and after the first two years of dewatering, temporary additional uses could be possible because of the increased streamflow as a result of the discharge of treated water from dewatering operations. Additional long-term uses could also be possible after Reclamation because historic disturbances in some drainages would be reclaimed, allowing for reestablishment of flow-through drainage and reduced sediment loads to those drainages.

No direct or indirect impacts to groundwater uses are anticipated. No groundwater uses unrelated to mining are known to occur within the Project Area as identified in Chapter 3. Some of the uses identified in Chapter 3 were for previous mining projects, and some are for reclamation activities. The uses for the Proposed Action would be similar to the historic uses, and Energy Fuels has and continues to ensure the appropriate water rights and permits are obtained for these uses. Use of approximately 2,000 gallons of water per day during Construction from Jeffrey City would need to be permitted and allocated through the appropriate agencies and/or organizations; however, this water consumption is not anticipated to cause adverse impacts to the city water supply because Energy Fuels anticipates buying this water from Jeffrey City. Jeffrey City indicates the municipal water supply could handle these drawdowns, and the city's water management would be responsible for allocating this use. Therefore, any potential impacts from this activity would be acceptable. Any identified issues with consumptive use of water would be resolved through Wyoming Statute § 41 (WSEO) policies and procedures.

The calculated zone of influence of the proposed dewatering relative to existing water rights near the Project Area is shown on Map 4.2-2. Based on the assessment of the zone of influence, no existing wells outside of the Project Area would experience drawdown due to dewatering for the Project. All the water rights within the Project Area were acquired by Energy Fuels and the water would be put to the uses specified in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a).



Map 4.2-2
Water Right Locations in Relation to Projected Groundwater Drawdown

Area Water Rights
Mine Permit Boundary
Area of Drawdown From Pumping

N

0 4,000 Feet

No warranty is made by the Bureau of Land Management (BLM) for use of the data for purposes not intended by the BLM

The wells which are related to public drinking water supply, i.e., near the A&M Reservoir and near Jeffrey City, are several miles outside the area of influence of the Project. As discussed in Chapter 3, the distances and geologic setting indicate that groundwater from the vicinity of the Project Area is not likely to be within the capture zone of any public water supply, and the occurrence of natural uranium mineralization throughout the region impacts water quality. Therefore, no direct adverse impacts are anticipated in regards to these public drinking water supplies as a result of the Proposed Action other than those impacts discussed above regarding removal of water from the Jeffrey City water supply during construction and possibly operations.

The Project is located within the North Platte River Basin and potential depletions of surface water or groundwater flowing to the river require evaluation in accordance with the 2001 decision by the U.S. Supreme Court, which established a new legal distribution of the North Platte River among Nebraska, Wyoming, and Colorado. An analysis of the potential depletion due to the Project underground mine dewatering was submitted to the WSEO in 2013. The analysis demonstrated that the dewatering does not increase depletion of North Platte River. This study is provided in Appendix D-6 of the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a).

4.2.5.7.1 Impacts with Off-Site Processing

The impacts associated with off-site processing would be similar to those described above for on-site processing. Temporary additional surface water uses could be possible because of the increased streamflow due to the discharge of treated water from dewatering operations (Section 4.2.5.1.2). Any additional impact to water use at the Sweetwater Mill is not anticipated considering the project currently exists. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.2.5.7.2 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.2.5.8 Water Rights and Water Use – BLM Mitigation Alternative

4.2.5.8.1 Impacts

The water use impacts of the BLM Mitigation Alternative, which includes revisions to the Reclamation Plan, would not be anticipated to differ significantly from those of the Proposed Action.

4.2.5.8.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as that described above for the Proposed Action.

4.2.5.9 Water Rights and Water Use – No Action Alternative

The No Action Alternative would not generate any additional impacts to the existing water uses or change any of the existing uses except those already anticipated as a result of Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (BLM, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b).

4.3 BIOLOGICAL RESOURCES

4.3.1 Invasive, Non-Native Species and Noxious Weeds

Potential issues associated with invasive, non-native species and noxious weeds were identified by the BLM through public scoping, internal scoping, and public comment on the Draft EIS. Issues include:

- Establishment and growth of weed species due to clearing native vegetation and exposing bare ground surfaces;
- Transporting weeds from established infestations by vehicles and construction equipment; and
- Invasion of weeds and increase in weeds due to dust deposition and other factors.

4.3.1.1 Proposed Action Alternative

4.3.1.1.1 Impacts with On-Site Processing

Surface disturbance (including vegetation removal, topsoil and coversoil removal, spoil storage, and development of the Congo Pit), increased vehicle traffic, equipment placement and operation, foot traffic, and other activities associated with the Proposed Action could increase the distributions of established weed species (see Table 3.3-1) and/or could introduce new invasive species and noxious weeds into areas that are not currently infested. Clearing native vegetation and exposing bare ground surfaces, especially within closed canopy big sagebrush shrub communities, allows invasive species, particularly annuals, to become established at the expense of perennial bunchgrasses (West, 1988). Vehicles could transport weed seeds embedded in dried mud or soils attached to bumpers, undercarriages, and wheel wells. Transport of seeds for more than 100 miles has been documented for vehicles traveling on paved and unpaved roads, and under wet and dry conditions (Taylor et al., 2012).

Weedy annuals such as cheatgrass, halogeton, Russian thistle, and the biennial black henbane, are quick to invade disturbed soils in the Project Area, and can hinder rehabilitation efforts. Invasive plant infestations in the Project Area are expected to increase, which can alter soil health, leading to accelerated erosion and loss of soil fertility, although this depends on other factors such as soil disturbance and climatic conditions. Invasive plant infestations can force out native vegetation and replace it with weedy plants that provide inferior protection to the soil surface (BLM, 2013a). Cheatgrass is present in the Project Area and could provide a fuel load contributing to wildland fires. Fire frequency is increased with cheatgrass invasion; the establishment of cheatgrass causes substantial competition for resources used by native shrubsteppe species (Whisenant, 1990; Knick and Rotenberry, 1997).

Existing infestations of invasive non-native species and noxious weeds within the previously disturbed sites and those that may have become established since the baseline surveys could become established on newly disturbed or re-disturbed surfaces. Of those previously disturbed sites, 572.5 acres would be re-disturbed by the Proposed Action. The re-disturbed sites would be likely sources of noxious weed plants, seeds, and propagules for initiating additional infestations on-site and off-site. This would occur through redistribution of soils by earth moving and increased vehicle travel.

To control invasive, non-native, and weed species, Energy Fuels would implement control measures during all phases of the Project, including seeding and revegetating areas of disturbance as soon as practical with certified weed-free seed; minimizing soil disturbance to the extent possible; using weed-free mulch/straw for erosion control; and selecting and spraying herbicides based on weed species and desired results. In addition, topsoil would be stockpiled,

and temporary seeding would be used for soil stabilization on topsoil stockpiles and steep slopes, which would serve as a weed control measure. During Reclamation, the evaluation of reclamation success would take the extent of invasive, non-native, and noxious weeds into account in determining if vegetation cover, productivity, and diversity met the reclamation requirements.

4.3.1.1.2 Impacts with Off-Site Processing

The potential effects associated with invasive non-native species and noxious weeds for off-site processing would be similar to those described for on-site processing. Because off-site processing would include travel from the Project Area to the Sweetwater Mill, there is a greater opportunity for the spread of noxious weeds along Crooks Gap/Wamsutter Road and Minerals Exploration Road. Dust deposition can adversely impact native vegetation by making it more difficult for native vegetation to compete against invasive species. This is much less likely to cause an increase in invasive species than the removal of vegetation and the increase in traffic. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.1.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.1.2 BLM Mitigation Alternative

4.3.1.2.1 Impacts

Direct and indirect impacts resulting from the occurrence and spread of invasive non-native species and noxious weeds under the BLM Mitigation Alternative would be similar to those described above for the Proposed Action, but likely to be meaningfully less in severity as a result of the requirements added as mitigation and the obligation to reclaim additional areas.

Implementation of Energy Fuels' site-specific Reclamation Plan, as discussed in Section 2.4, would accelerate establishment of the native plant community. Stable healthy plant communities have the ability to keep invasive species from becoming established.

Energy Fuels would be responsible for submitting and implementing a Weed Management Plan that would address all invasive and non-native species and noxious weeds within the mine permit area including specific emphasis on the reclaimed areas, including cheatgrass, until re-vegetation has been determined to be successful. The plan would identify the frequency of inspection for noxious weed and herbicide spraying by a certified applicator. If noxious or invasive weeds are encountered, the BLM would be consulted for suppression and control methods. A Pesticide Use Proposal (PUP) and written approval from the BLM AO would be obtained prior to usage of herbicides. Pesticide Application Records (PAR) would also be submitted to the BLM AO on a regular basis. An annual Pesticide Use Report (PUR) would be required at the end of each season (INNS-1 in Table 2.4-1). This would further reduce the potential for the occurrence and spread of invasive non-native species and noxious weeds.

Prior to surface disturbance, an invasive plant survey would be conducted by a qualified vegetation specialist. This assessment would show the location and species of invasive or noxious plants and the findings would be presented to the BLM (INNS-2 in Table 2.4-1).

Mobile equipment being transported from an off-site location to the Project Area would be cleaned prior to arrival using water, steam, or air pressurized cleaning methods to remove any invasive or noxious weed seed and plant parts or materials that could contain seeds. When appropriate, sites off public lands where equipment could be cleaned would be identified. Seeds and plant parts would be collected and disposed of appropriately (INNS-3 in Table 2.4-1).

Energy Fuels would be responsible for suppression and/or control of any invasive or noxious plant species within the Project Area. If chemical herbicide control methods are used on public lands, only BLM-approved chemicals and application rates and methods would be allowed (INNS-4 in Table 2.4-1).

All mulch, seed, and other vegetative reclamation materials would be certified weed-free. All sand, gravel, and fill materials would be certified weed-free (INNS-5 in Table 2.4-1).

Annual weed surveys would be conducted during each growing season for the life of the Project. Reconnaissance surveys would be conducted within areas that were recently disturbed by project-related actions during the previous year(s). Survey areas would include 50-foot buffers extending from surface disturbances to adjacent, undisturbed surfaces. Complete surveys of an area plus buffer would be preferred but sampling surveys of an area plus buffer might be required if the disturbed area is large. Weed species, number of plants, and/or area occupied by each weed infestation observed would be reported immediately so that infested areas would be cleared in a manner to minimize transport of weed seed, roots, and rhizomes or other vegetative materials and soil from the site to adjacent weed-free areas (INNS-6 in Table 2.4-1).

4.3.1.2.2 Monitoring and/or Compliance

Monitoring under this alternative would include that described above for the Proposed Action but would also include additional monitoring for invasive non-native species and noxious weeds that would be included in Energy Fuels' Weed Management Plan.

4.3.1.3 No Action Alternative

Under the No Action Alternative, Energy Fuels would be responsible for weed management within the areas bonded for reclamation in the Project Area. Activities that would be conducted under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O reclamation plans (BLM, 2014b) could potentially reduce invasive non-native species and noxious weeds within the Project Area beyond those that are already occurring.

4.3.2 Vegetation

Potential issues associated with vegetation identified by the BLM through the scoping process and through public comment on the Draft EIS. Issues include:

- Direct removal of vegetation during site clearing;
- Long-term conversion of tree-shrub vegetation (woody vegetation) to less diverse herbaceous vegetation;
- Damage or mortality of plants by dust deposited on photosynthetic surfaces during construction and operation;
- Damage/mortality to plants by dust suppressants (e.g. magnesium chloride solution) and/or road surface de-icers;
- Damage to BSCs;
- Effects on plant pollinators due to habitat alteration, dust, diesel exhaust, and noxious weeds;
- Indirect effects to vegetation by fragmenting patches and along edges created during clearing and grading;
- Uptake of radionuclides in plant roots and leaves from soil and/or water;
- Changes in herbivory by domestic and/or native herbivores caused by displacement from affected areas or attraction to newly re-vegetated sites;

- Introduction or an increase in noxious weeds could alter vegetation cover and species composition, potentially out-competing native plant species; and
- Use of herbicides to control noxious weeds with effects to non-targeted species.

4.3.2.1 Proposed Action Alternative

4.3.2.1.1 Impacts with On-Site Processing

Direct effects to vegetation could occur through removal of vegetation during Construction and Operations. New disturbance is estimated to be 356.5 acres and re-use of previously disturbed areas is estimated to be 572.5 acres for a total of 929.0 acres (see Table 2.3-1 in Chapter 2). The estimated 356.5 acres of new disturbance would include approximately 120 acres of Limber Pine-Big Sagebrush type vegetation and approximately 237 acres of Sagebrush-Grass type vegetation and would be reclaimed. Included in the 572.5 acres proposed for re-disturbance is 314.2 acres that are not classified as reclaimed and 258.3 acres of land that are classified as reclaimed. In summary, 314.2 acres of existing disturbance would be re-used under the Proposed Action and would be reclaimed. About 258.3 acres of reclaimed or currently vegetated areas would be re-disturbed and reclaimed again. Effects to herbaceous vegetation is expected to be short-term (assuming vegetation becomes re-established within 5 years of disturbance), whereas effects to shrub-dominated and forest-dominated vegetation would persist for more than 10 years due to the length of time required for those species to recover. Fall seeding would be done between September 15 and the time that frost prevents preparation of a proper seed bed. Spring seeding would be done after the frost leaves the ground and until May 15th.

Surface disturbance in Sagebrush-Grass and Limber Pine-Big Sagebrush would alter shrub-dominated and tree-dominated vegetation for the long-term. For example, sagebrush can take up to 10 to 15 years to become reestablished (West, 1988). Mature pine-juniper woodlands may be more than 140 years old, originating in pre-settlement times (Miller et al., 2008). Greasewood, bitterbrush, and rabbitbrush re-sprout following fire or mechanical treatments (Church, 2009; Bunting, et al., 1987), including crushing by overland vehicle travel. Big sagebrush does not sprout back from similar effects but will regenerate from seed (West, 1988). Cover is reduced considerably by mechanical treatment of sagebrush (such as crushing); big sagebrush may eventually re-grow from seed and/or survival of damaged plants, depending on precipitation (Yeo, 2009; Summers, 2005).

Damage or mortality to individual plants as a result of decreased light transmission due to dust deposited directly on leaves or other photosynthetic surfaces could occur due to clearing vegetation, operation of earth-moving equipment, and increased traffic along roads during Construction and Operations. Dust from construction and related traffic could impair photosynthesis, gas exchange, transpiration, leaf morphology, and stomata function (Farmer, 1993; Sharifi et al., 1997; Rai et al., 2009). Dust from construction and related traffic could also interfere with plant reproduction by disrupting pollinator activities and plants' physiology (Lewis, 2013).

Baseline conditions revealed radium-226 and other radionuclides in near-surface soils (see Section 3.2.4.4) with highest background radiation levels (gamma exposure rates) measured at historic mine operations (including mine spoils, low grade ore stockpiles, and surface mines, see Map 3.2-9). Uranium and other radionuclides can be transported through the environment and contribute to exposure of biological receptors via atmospheric deposition, dust, runoff, erosion and deposition, groundwater and surface water, and the food chain (Hinck et al., 2010). Radium and other radionuclides can be transferred to plants through uptake from the soil by plant roots and by foliar uptake of radionuclides by plants' external surfaces (Fesenko et al., 2014). Concerns about plant uptake of radionuclides on impacts to human health stem from

direct ingestion of plants and/or indirect transfers of radionuclides through food chains (Robertson et al., 2003) that involve domestic livestock and wildlife.

Soil-to-plant concentration ratios, or C_r (concentration ratios are calculated as the concentration of radionuclide in plant tissue divided by the concentration in the soil) reflect numerous chemical and biotic factors that determine effects to plants (Robertson et al., 2003). For example, in a controlled study of three plant species growing on uranium mill tailings, higher concentrations of uranium and radium-226 were observed in the plants growing on the tailings than on control sites (Rumble and Bjugstad, 1986). However, radionuclide concentrations in mill tailing soils were higher, indicating that the plants were not concentrating the radionuclides because C_r were approximately 0.03 (Rumble and Bjugstad, 1986). Field studies of plants growing on natural uranium-containing soils reveal uranium C_r ranging from 0.07 to 4.1 (Robertson et al., 2003). C_r values for radium-226 in native forage plants ranged from 0.78 for shrubs, to 0.1 for native browse, forage and tree species, and 0.3 for lichens and mosses; C_r values for sagebrush, grasses and herbs ranged from 0.05 to 0.7 in high background radium areas (Carvalho et al., 2014), indicating that the plants do not concentrate the radionuclide.

Traffic on Crooks Gap/Wamsutter Road would likely generate dust for some distance from roads and affect existing vegetation, most likely on the west sides of north-south roads, opposite prevailing south-southeasterly winds (Section 3.2.1.1). Project-related traffic is expected to increase fugitive dust which could directly impact roadside vegetation.

As discussed in Section 3.3.5.1, Big Game and Trophy Game, the Project Area provides seasonal ranges for native herbivores (pronghorn, mule deer, elk, and moose) and coincides with two livestock grazing allotments (see Section 3.5.2, Livestock Grazing). Indirect effects to vegetation could occur if the Proposed Action displaced or shifted native and/or domestic herbivores from disturbed sites, leading to excessive browsing and/or grazing on vegetation resources that otherwise would not occur. Alternatively, herbivores could be attracted to unaffected vegetation adjacent to newly revegetated locations, causing excessive browsing and/or grazing following reclamation.

Indirect effects to native vegetation could also occur if invasive, non-native species became established in cleared, disturbed areas and resulted in infestations that might limit or prohibit growth of native and/or desirable species. Weed seeds or plant parts (propagules) of some species could be transported naturally (wind and water) or accidentally (vehicles or other equipment) to disturbed areas. Weed seeds may be present in the native soil materials and the removal of vegetative cover and soil disturbance might promote weed establishment at the expense of desirable species. Vehicles moving on- and off-site could increase distribution of invasive non-native species and noxious weed plants, seeds, and propagules for initiating additional infestations on-site and off-site through redistribution of soils by earth moving activities and increased vehicle travel.

The Proposed Action would disturb vegetation within eight different ecological sites. The most surface disturbance would be to previously disturbed sites identified by the NRCS (see Section 3.3.2) as “Dumps, Mines.” Under this alternative, ecological site characteristics would not be considered for reclamation.

4.3.2.1.2 Impacts with Off-Site Processing

Direct and indirect impacts to vegetation with off-site processing would be similar to those described above for on-site processing. The truck traffic associated with delivery of ore from the Sheep Mountain Project Area to the Sweetwater Mill is expected to generate fugitive dust which could directly impact roadside vegetation on both sides of Crooks Gap/Wamsutter Road. The increased traffic could also contribute to additional infestations of noxious weeds along the road

which would indirectly affect native vegetation. Any additional impact to vegetation at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.2.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.2.2 BLM Mitigation Alternative

4.3.2.2.1 Impacts

Direct impacts under the BLM Mitigation Alternative would be similar to those described above for the Proposed Action but long-term effects to vegetation could be reduced through implementation of a revised Reclamation Plan dependent upon ecological sites and/or reference areas, reclamation potential, and area resource objectives. In general, previously disturbed surfaces from past mining actions are harder to reclaim and revegetate because they may be devoid of vegetation and contain waste rock derived from former mining activities, consistent with the NRCS “Dumps, Mines” ecological sites (see Section 3.2.4.2).

Sites that had previously been disturbed, with or without reclamation, would be subject to the revised Reclamation Plan, potentially improving affected vegetation communities by requiring additional reclamation and revegetation of more diverse species. The end result is expected to accelerate reclamation processes and lead to more diverse plant communities, concomitant with the pre-disturbance conditions reflected in the Ecological Site Descriptions (see Section 2.4). If on-site processing occurs, the Reclamation Plan revisions would also address previously unreclaimed lands, specifically about 90 acres of previously disturbed areas to offset BLM-managed land that would be permanently taken out of the public domain.

On June 20, 2014, President Barack Obama issued a Presidential Memorandum – Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators as a directive to take new steps to reverse pollinator losses. Compliance with this memorandum would help to reverse pollinator losses.

Implementation of the following measures under the Mitigation Alternative would further reduce impacts to vegetation:

1. At the time of reclamation, Energy Fuels would be required to obtain a BLM-approved seed mix, and a permanent site-wide seed mix would likely not be acceptable (VEG-1 in Table 2.4-1).
2. Genetically appropriate and locally adapted native plant materials (e.g., locally sourced or cultivars recommended for seed zone) would be selected based on the site characteristics, ecological setting, and pre-disturbance plant community (VEG-2 in Table 2.4-1).
3. Locally sourced and/or collected seeds would be used to the extent possible (local collection and logistics should be included in the Reclamation Plan) (VEG-3 in Table 2.4-1).
4. Non-native plants would only be used as an approved short-term and non-persistent (i.e., sterile) alternative to native plant materials (VEG-4 in Table 2.4-1).
5. Energy Fuels would provide data to the BLM on all source material used for reclamation (e.g., where seeds were obtained, where seed originated, year collected, results of

germination and viability tests - these data should accompany seed purchase) (VEG-5 in Table 2.4-1).

6. Energy Fuels would provide the BLM with small samples of all seed used in reclamation, preferably before different species are mixed together (VEG-6 in Table 2.4-1).
7. Seeding would take into account differential handling methods to match germination characteristics of species in the seed mix and consider timing of planting to maximize germination and establishment of all reclamation species (VEG-7 in Table 2.4-1).
8. The Presidential Memorandum-Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators (June 20, 2014) would be complied with (VEG-8 in Table 2.4-1).

Under this alternative, Energy Fuels would be required to comply with a Weed Management Plan that identifies the frequency of inspection for noxious weeds and herbicide spraying by a certified applicator. Implementation of the Weed Management Plan would reduce direct effects to vegetation that would not occur under the Proposed Action.

4.3.2.2.2 Monitoring and/or Compliance

Environmental monitoring during reclamation of the mined portion of the Project Area would focus on the reestablishment of a stable system (see Section 2.3.5, Chapter 2). With respect to surface disturbance, Permit to Mine 381C (WDEQ, 2015a) includes requirements for post-mine topography, drainage reestablishment, and evaluation of revegetation success. As noted in Section 2.3.5.11, when the reclamation is considered complete by WDEQ-LQD, the reclamation bond is released and jurisdiction terminated. There may be additional monitoring with implementation of a revised Reclamation Plan and Weed Management Plan (see Section 4.3.1, Invasive, Non-Native Species and Noxious Weeds).

4.3.2.3 No Action Alternative

The direct and indirect effects to vegetation described above for the Proposed Action and the BLM Mitigation Alternative would not occur under the No Action Alternative. Additional areas that would be reclaimed to offset BLM-managed land permanently taken out of the public domain under the BLM Mitigation Alternative (approximately 90 acres) if ore is processed on-site would also not occur. Activities that would be conducted under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O (BLM, 2014b) would positively benefit vegetation through the reclamation of currently disturbed areas. The bonded disturbance (144 acres) would be reclaimed by Energy Fuels under the No Action Alternative; and about 302 acres would be reclaimed by WDEQ-AML under Project 16-O. About 190 acres of existing disturbance that are within the proposed disturbance limits would not be reclaimed.

4.3.3 Wetlands and Riparian Zones

Potential issues associated with wetlands and riparian zones were identified by the BLM through the scoping process and public comment on the Draft EIS. Issues include:

- Effects to riparian areas along Crooks Creek resulting from Project-related in-stream flow variations;
- Effects to wetland and riparian vegetation along perennial waterbodies by ore spills, vehicular accidents, accidental release of hazardous materials (e.g., diesel fuel spill, other petroleum compounds); and
- Effects to Western Nuclear Pond.

4.3.3.1 Proposed Action Alternative

4.3.3.1.1 Impacts with On-Site Processing

Jurisdictional wetlands would not be affected by the Proposed Action (see Section 3.3.3).

Direct or indirect impacts to riparian vegetation associated with Sheep Creek are not anticipated because of the overall limited indirect impacts to the Sheep Creek drainage (see Section 4.2.5.1.1). Direct impacts to riparian vegetation associated with Crooks Creek would be negligible because it is likely that any discharge would be to one of the ephemeral drainages tributary to Crooks Creek. Assuming all the discharge reached Crooks Creek (i.e., no evaporation or infiltration) the discharge would not exceed historic creek flow levels (see Section 4.2.5.1.1). Therefore adverse impact to the riparian vegetation is not anticipated (e.g., increased erosion), and the increased streamflow could benefit the riparian vegetation.

Riparian areas associated with Crooks Creek could be potentially impacted, indirectly, due to inadvertent spills or leaks from machinery, pipelines, or tanks into an ephemeral drainage tributary to the creek. This potential is unlikely because measures to control stormwater runoff included in the SWPPP would be implemented.

There would be no direct or indirect effects to Western Nuclear Pond under the Proposed Action Alternative. As discussed in Section 2.5.2, improvements to Western Nuclear Pond are being conducted under the WDEQ-AML Project 16-O (BLM, 2014b). The pond and its associated drainages are south of the Project Area (see Map 2.3-1), and no disturbance of the pond or drainages are planned as part of the Proposed Action.

4.3.3.1.2 Impacts with Off-Site Processing

Potential direct and indirect effects to wetlands and riparian zones associated with off-site processing would be similar to those described for on-site processing. Wetland impacts such as runoff from the road onto any adjacent wetlands (if present), could be greater due to increased traffic on Crooks Gap/Wamsutter Road. However, the measures used to reduce road damage such as water bars and catchments (Section 4.4.6) would reduce the impacts. Impacts to riparian areas associated with Crooks Creek through surface discharge under the approved WYPDES Permit are anticipated to only be minor or non-existent. As described in Section 4.2.5.1.2, based on the highest potential discharge rate (3 cfs for up to 1 year) to Crooks Creek, assuming no evaporation or infiltration, the flow rate would increase 40 percent from the highest recorded flow in the creek (7.6 cfs). This increase in flow in the creek is not likely to change the characteristics of the riparian areas in the creek. Considering average discharge rates (0.6 to 0.9 cfs) and average flow rates in the creek (4.8 cfs downstream of the Project Area), the increase in flow rate (13 to 19 percent) is so miniscule as to be inconsequential to the vegetation and health regimes in these riparian areas. Any additional impact to wetlands at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.3.1.3 Monitoring and/or Compliance

No monitoring is proposed for potential impacts to wetlands.

4.3.3.2 BLM Mitigation Alternative

4.3.3.2.1 Impacts

Impacts to wetlands and riparian zones under the BLM Mitigation Alternative would be similar to those under the Proposed Action. Additional reclamation under the BLM Mitigation Alternative

might provide for less potential for erosion and sedimentation, which could benefit surface water quality and riparian vegetation along Crooks Creek downstream from the Project Area.

4.3.3.2.2 Monitoring and/or Compliance

Monitoring and Compliance under the BLM Mitigation Alternative would be the same as for the Proposed Action.

4.3.3.3 No Action Alternative

The No Action Alternative would not generate any additional impacts to wetlands and riparian zones except those already anticipated as a result of Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b).

4.3.4 Special Status Species

4.3.4.1 ESA-Listed, Proposed, and Candidate Species – Proposed Action

Potential issues associated with ESA-listed, proposed, and candidate species were identified by the FWS through the Official Species List for the Sheep Mountain Project Area (FWS, 2016) and by the BLM through the public scoping process and through public comment on the Draft EIS. Issues include:

- Potential for water depletions from the Platte River System and effects to ESA-listed species (downstream whooping crane, interior least tern, piping plover, pallid sturgeon, western prairie fringed orchid).

4.3.4.1.1 Impacts with On-Site Processing

The Proposed Action would not directly or indirectly affect ESA-listed species.

An analysis of the potential depletion due to the Project underground mine dewatering was submitted to the WSEO in 2013. The analysis demonstrated that the dewatering does not increase depletion of North Platte River. This study is provided in Appendix D-6 of the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a). No habitat is present within the Project Area that would be suitable to support Ute ladies'-tresses orchid and the Project would have no effect on the species. The possibility of a wolf pack becoming established in the Project Area and vicinity is extremely remote (insignificant and discountable). As such, the Proposed Action would not jeopardize the continued existence of the gray wolf.

4.3.4.1.2 Impacts with Off-Site Processing

Any additional impact to ESA-listed species at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.4.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.4.2 ESA-Listed, Proposed, and Candidate Species – BLM Mitigation Alternative

4.3.4.2.1 Impacts

Effects to ESA-listed species under the BLM Mitigation Alternative would be the same as that for the Proposed Action.

4.3.4.2.2 Monitoring and/or Compliance

Monitoring under the BLM Mitigation Alternative would be the same as that for the Proposed Action.

4.3.4.3 ESA-Listed, Proposed, and Candidate Species – No Action Alternative

The No Action Alternative would not generate any additional impacts to ESA-listed species except those already anticipated as a result of Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (BLM, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b).

4.3.4.4 Migratory Birds – Proposed Action Alternative

Potential issues associated with Migratory Birds were identified by the BLM through the scoping process and through public comment on the Draft EIS and include:

- direct mortality ("take") of eggs, juveniles, adults by project construction and operations;
- project-related noise above ambient causing interference with mating displays, juvenile rearing and/or feeding vocalizations;
- decreased nesting success due to edge effects (predation, competition);
- increased edges with smaller habitat patch areas;
- decreased nesting habitat suitability due to effects of dust, suppressants, deicers, etc. to shrub/tree vegetation;
- risk of migratory bird mortality in tailings ponds;
- reducing or preventing the exposure of heavy metals, arsenic, and selenium to migratory birds and other wildlife;
- risk to migratory birds via exposure to hazardous substances such as heavy metals and sulfuric acid;
- potential exposure to radiation during operation and post-reclamation;
- any radioactive zones or open water pits should be outfitted with bird deterrent devices to preclude impacts to avian species;
- direct loss of nesting habitats, conversion of woody vegetation to herbaceous vegetation;
- increased presence of corvids, raptors, and other human-tolerant predators with potential for nest and juvenile depredations;
- potential vehicle-related mortality of scavengers feeding on roadside carrion; and
- potential for raptor electrocutions on new and/or existing power lines: conductor configurations, perching deterrents on poles/cross arms.

4.3.4.4.1 Impacts with On-Site Processing

Most disturbance to previously undisturbed areas would be within sagebrush-grass vegetation and limber pine-big sagebrush vegetation. These vegetation types provide nesting habitats for numerous migratory birds including BCC and BLM-sensitive species: Brewer's sparrow, ferruginous hawk, sage thrasher, loggerhead shrike, and sage sparrow.

In the 2010 MOU pursuant to EO 13186, the BLM committed to identify where take under the MBTA could be reasonably attributable to agency actions that could have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. Avoiding surface disturbance during nesting seasons is one approach to lessening take. The BLM suggested that impacts to nesting migratory birds could be minimized or avoided by imposing a timing limitation on use authorizations to mitigate vegetative disturbing activities during the primary portion of the nesting season (BLM, 2007). Surface disturbances that have potential to result in "take" is prohibited in the LFO during the period May 1 to July 15 (or longer if deemed necessary) unless a survey is conducted to

determine the presence or absence of nesting migratory birds. For birds observed within the Project Area, the median date that migratory species arrive in Wyoming during spring is April 15. Fall migration for most species is underway by August 15 (Faulkner, 2010).

Ground-disturbing actions during the peak nesting period from May 15 to July 15 and probably into early August for some species could result in nest abandonment, displacement of birds, and possible mortality of nestlings, most likely early in the nesting season (egg laying, incubation) rather than late in the season (Romin and Muck, 2002). Most species will re-nest following a nesting failure, although the number of nesting attempts or re-nesting intensity varies among species (Marten and Geupel, 1993). However, it should be noted that "taking" an individual, nest, or eggs of a migratory bird is unlawful under the MBTA, whether or not the species will re-nest. Risk of mortality of nestlings and dependent fledglings is greater if adults abandon nests late in the season or nests are destroyed prior to fledging young, and could increase if predators are attracted to areas occupied by humans (Andren, 1994; Chalfoun et al., 2002). Displacement of nesting migratory birds from adjacent nesting habitats due to noise, human activity, and dust associated with mining could also occur (Ingelfinger and Anderson, 2004; Knick and Rotenberry, 2002) within a "zone of effect" surrounding Project components. Displacement/avoidance may be short-term if related to noise and human presence, or long-term if related to habitat removal, alteration, and/or fragmentation (Gilbert and Chalfoun, 2011). Disturbances (noise, human activities) to nesting raptors can lead to nest abandonment and nestling mortality (Romin and Muck, 2002; Whittington and Allen, 2008).

Three raptor species have been observed nesting in the Project Area: red-tailed hawk, prairie falcon, and great horned owl. The great horned owl nest currently occupied by red-tailed hawks and a second nest last occupied by red-tailed hawks in 2011 would not be affected by the Proposed Action because they are farther than 0.75 mile from any proposed surface-disturbing activity. Approximately 304 acres would be disturbed within 0.75 mile of the newly discovered red-tailed hawk nest that was active in 2014 (Real West, 2014).

Sagebrush habitats within the Project Area have been fragmented by past mining and would be reduced and isolated further through removal of sagebrush grassland and limber pine-big sagebrush habitats (see Section 4.3.2, Vegetation) that potentially provide nesting habitat for sagebrush-obligate and other migratory birds. Fragmentation of sagebrush shrub-steppe habitats affects breeding densities, nesting success, and nest predation of nesting species (Knick and Rotenberry, 2002). Fragmentation of nesting habitat allows predator access to breeding sites used by birds along newly created corridors and through edges of habitats that were previously continuous. Levels of fragmentation would decline over time with successful revegetation of shrub habitat.

Corvids, including common ravens and American crows, are opportunistic predators and prey on other species' nests as noted above. Corvids and other opportunistic predators could be attracted to the Project Area as discussed in Section 4.3.4.1.1. Prohibiting on-site trash within the Project Area could reduce attractions for corvids and other potential predators of migratory birds.

Corvids and raptors could use existing power poles and cross arms for perching. Some power pole cross arms within the Project Area have been fitted with anti-perching deterrents (see Avian Power Line Interaction Committee - APLIC, 1994) but deterrents are not present on other power pole cross arms. If the existing power lines are energized, raptors could be electrocuted if birds with adequate wing-span connect between phase conductors (APLIC, 2006 and 2014). Perching deterrents fixed to all power poles in the Project Area would reduce potential predation of migratory birds, similar to the discussion on greater sage-grouse, below.

According to the Plan of Operations (Energy Fuels, 2015a), access to the NRC Restricted Area, which may contain toxic and/or radioactive constituents, would be controlled by fencing (8 foot chain link) to exclude access to the public, wildlife, or livestock. In addition, the ponds would be covered with bird balls to deter waterfowl. Bird balls have been used to hinder birds from using standing water near airports (Harris and Davis, 1998; Transport Canada, 2010) and used to exclude wildlife and prevent mortality at various industrial wastewater impoundments including cyanide ponds, coal-fired power plant evaporation ponds, and acidic water impoundments (FWS, 2009b). Bird balls were reported to eliminate mortality of birds at an oil waste pit but high winds at the site required constant replacement of balls and chronic maintenance to maintain total surface cover (Ramirez, 2010). Bird ball cover adjusts to fluctuating water levels and snow levels but may be affected by winds greater than 50 mph (Harris and Davis, 1998). Project personnel would inspect the ponds on a daily basis to verify adequate coverage by bird balls; identify, record, and report any wildlife mortalities; and where possible, implement measures to reduce or eliminate future occurrences. Any migratory bird mortality would be reported to the FWS Office of Law Enforcement.

Migratory birds could be exposed to radiation during Operations and post-reclamation. As discussed for greater sage-grouse, below, birds appear at higher risk of radiation exposure than other vertebrates because they ingest grit during foraging which could increase radiation dose (Driver, 1994; Hinck et al., 2010). There are no chemical and radiation toxicity data for effects of uranium and radium on birds in general (Hinck et al., 2010). Accumulation of radionuclides in bird tissues will depend on radiation dose which varies based on food source, behavior, and habitat (Hinck et al., 2010). For birds inhabiting aquatic habitats, shorebirds and grebe that fed on insect larvae and herbivorous diving ducks, had higher concentration factors for beta radiation than piscivorous mergansers, river ducks, and omnivorous gulls near the Hanford Site on the Columbia River (Driver, 1994).

In their scoping response, the FWS expressed concern that migratory birds would be exposed to environmental contaminants during the heap leach extraction practice. Exposure to elevated metal concentrations and/or sulfuric acid has led to bird deaths. In one case, birds ingested grit, insects, or impoundment sediments at lead, cadmium and zinc mining, milling, and smelting sites which lead to high tissue concentrations of lead and zinc (Beyer et al., 2004). In another, ponded water on tailings impoundment and stormwater retention impoundments were found to have sufficiently high concentrations of heavy metals to cause injury and death to birds (Stratus Consulting, 2003). Birds ingest acid mine water, especially in semi-arid areas and/or during migrations. A study of relatively low levels of metal contamination in mine waters concluded that “acid metalliferous water bodies pose a significant hazard to wildlife that come in contact with them” (Hooper et al., 2007). Although the Heap Leach Pad would be capped each night with a 4-inch thick, ¾-inch gravel layer, heap leach materials would be exposed during the day when most bird species are active. Energy Fuels does not anticipate that ponding of heap leach solution on the exposed facility would occur.

4.3.4.4.2 Impacts with Off-Site Processing

Potential direct and indirect impacts to migratory birds with off-site processing would be similar to those described above for on-site processing. In addition, effects to migratory bird nesting habitats adjacent to Crooks Gap/Wamsutter Road and Minerals Exploration Road caused by truck traffic to the Sweetwater Mill would be similar to effects described below for greater sage-grouse (see Section 4.3.4.7.1). Any additional impact to migratory birds at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.4.4.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.4.5 Migratory Birds – BLM Mitigation Alternative

4.3.4.5.1 Impacts

Direct and indirect effects to migratory birds under the BLM Mitigation Alternative would be similar to those under the Proposed Action. There could be some differences in the post-mine vegetation due to additional measures required by the revised Reclamation Plan and implementation of a Weed Management Plan.

Under this alternative, the following measures are included to reduce effects to migratory birds:

- Surface disturbance in previously undisturbed areas and/or disruptive activities that have the potential to cause destruction of nests, eggs, or young of migratory birds would be prohibited during the period of May 1st to July 15th. A survey of the proposed disturbance areas would be conducted by the proponent to determine the presence/absence of nesting migratory birds. Nest surveys would be conducted no more than 7 days prior to surface disturbing and/or disruptive activities. If no nests, eggs, or young are identified in these areas by this survey, this measure would be waived (MB-1 in Table 2.4-1).
- All open pipes would be screened, capped, or filled to prevent birds from becoming trapped; all exhaust stacks would be screened to prevent bird entry and discourage perching, roosting, and nesting. Caps would be checked regularly (MB-2 in Table 2.4-1).
- In consultation with the BLM, the WGFD, and the FWS, approaches to minimize bird presence on the Heap Leach Pad and exposure to sulfuric acid and sodium chlorate would be explored. If an approach is identified during the required consultation and is implemented, bird death impacts would be minimized (MB-3 in Table 2.4-1).
- New power lines would be constructed to meet or exceed the 2006 and 2014 APLIC Standards and bird deterrents would be installed on existing power lines (MB-4 in Table 2.4-1).
- Sides of all water/fluid impoundments, including sediment ponds, would be sloped enough to allow animals to escape (MB-5 in Table 2.4-1).

4.3.4.5.2 Monitoring and/or Compliance

Monitoring under the BLM Mitigation Alternative would be similar to that for the Proposed Action. Monitoring for mosquito larvae at all water/fluid impoundments capable of providing a medium for mosquito reproduction would be conducted. Fence lines would be monitored for any wildlife mortality. Monitoring for nesting raptors prior to initiating new surface disturbing actions would avoid adverse effects. Daily monitoring for adequacy of bird ball cover and bird mortality would be appropriate for all standing water (Raffinate Pond, Collection Pond, and Holding Pond) with toxic solutions. Any migratory bird mortality would be reported to the FWS Office of Law Enforcement.

4.3.4.6 Migratory Birds – No Action Alternative

The No Action Alternative would not generate any additional impacts to migratory birds except those already anticipated in Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (BLM, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b).

4.3.4.7 BLM and Wyoming Special Status Species – Proposed Action

Potential issues associated with BLM and Wyoming Special Status Species were identified by the BLM through the scoping process and through public comment on the Draft EIS. Issues include:

- Sensitive Animals: Bats
    - Direct mortality – ingestion of fluids in Holding Pond, Collection Pond and/or Raffinate Pond.
    - Potential exposure to radiation during Operations and post-reclamation.
    - Removal of roosts and hibernacula (trees, rock outcrops, abandoned mine adits, and tunnels).
    - Interference with feeding behavior from night-lighting (e.g., mercury vapor lamps) or as barriers to movements
- Sensitive Animals: Prairie dogs and Pygmy rabbits.
    - Direct mortality by vehicle access to site.
- Sensitive Animals: Waterfowl, shore birds, raptors, passerines.
    - See Migratory Birds, above.
- Sensitive Animals: Greater Sage-Grouse
    - Potential effects to seasonal habitats (nesting, brood-rearing, winter habitats) used by greater sage-grouse;
    - Greater sage-grouse mortality due to collision with project-related fencing/structures;
    - Increased presence of corvids and other human-tolerant predators with potential for nest and juvenile depredations;
    - Potential exposure of greater sage-grouse to radiation during Operations and post-reclamation;
    - Potential increase of disease (West Nile Virus - WNV) due to an increase in ponds and surface water; and
    - Project-related noise effects on greater sage-grouse; expected levels above ambient.
- Sensitive Plants: Rocky Mountain Twinpod
    - Direct mortality – removal if present in affected suitable habitats.
    - Effects to plants by dust deposited on photosynthetic surfaces during Construction and Operation.
    - Damage/mortality to plants by dust suppressants (e.g., magnesium chloride solution) and/or road surface deicers.
    - Damage to BSCs.
    - Effects on plan pollinators due to habitat alteration, dust diesel exhaust, and noxious weeds.
    - Introduction or an increase in noxious weeds could alter vegetation cover and species composition, potentially out-competing native plant species.
- Sensitive Plants: Limber Pine
    - Direct mortality – removal of limber pine.
    - Effects to limber pine due to damage or mortality of plants by dust deposited on photosynthetic surfaces during Construction and Operation.
    - Damage/mortality to plants by dust suppressants (e.g., magnesium chloride solution) and/or road surface deicers.
    - Changes in characteristics (shade, temperature, soil moisture, species composition, etc.) that alter suitable habitat.
    - Accidental release of toxic compounds during Construction and/or Operation.

  - Potential for increased susceptibility to insects (mountain pine beetle) and disease (white pine blister rust) if alternate host plants (e.g., *Ribes*) increase due to the Project along with microclimatological changes over the altered landscape.
- Sensitive Animals: Northern leopard frog
  - See Wetlands and Riparian Zones (Section 4.3.3).

4.3.4.7.1 Impacts with On-Site Processing

BLM and Wyoming special status species would be directly affected by removal during surface disturbing activities.

Mammals

Increased Project-related traffic is expected to increase vehicle-related mortality of wildlife, including white-tailed prairie dogs and pygmy rabbits, although no estimate of mortality rates is possible.

Activities associated with excavation of the Congo Pit are likely to directly impact bats, causing death and/or abandonment of roosts and hibernacula. Bat day roosts may also be present in conifers and natural rock outcrops that could be removed by the Proposed Action.

Bat species are likely to forage in the Project Area and vicinity. The Proposed Action could directly impact bats by adversely affecting foraging habitats, contaminating surface water, generating noise that could interfere with echolocation, and through night lighting that may alter their behavior. Night lighting would likely occur at construction sites and could act as barriers to bat movements (Kuijper et al., 2008), reduce bat activity in the immediate vicinity (Stone et al., 2009), or have an opposite effect (mercury vapor lamps) by attracting nocturnal insects (Svensson and Rydell, 1998; Rydell and Racey, 1993). Noise from traffic and other sources is believed to interfere with bats' echolocation of insect prey (Jones, 2008). Effects due to noise and night-lighting would be direct impacts to bats. Loss or reduction of foraging habitat can adversely affect bats (Adams, 2003) as an indirect impact.

Bats using the Project Area have likely been exposed to prolonged radiation and chemical hazards associated with past uranium mining. In particular, bats roosting in uranium mines are exposed to radon gas were exposed to higher radon concentrations in winter than during summer. However, bats' respiration rates are lower during winter hibernation and overall adsorbed doses of radon were likely lower in winter than in summer (Schmidt, 2014). Exposure risks through ingestion of insects have not been found.

Bats may also be directly impacted through exposure to sulfuric acid and sodium chlorate if they feed or seek prey in the vicinity of the heap Heap Lleach Ppad, similar to potential effects described for migratory birds, above. Bats drink in flight over open water and observations have suggested that bat mortality has coincided with cyanide-extraction gold mines at several locations in the United States (Clark and Hothem, 1991). However, evidence of ingestion or direct exposure to cyanide and/or heavy metals by bats was not provided. Exposure of bats to sulfuric acid and possibly sodium chlorate used in the heap leach process could occur and potentially cause tissue damage and death.

Birds

Impacts to BLM-sensitive bird species (including aquatic species, raptors, and passerine species included in Table 3.3-4) by on-site processing would be the same as discussed above in Section 4.3.4.4.1, Migratory Birds.

In Wyoming, study results indicate that 95 percent of female greater sage-grouse nested within 6.2 miles from the nest where they were captured (Fedy et al., 2012). Holloran and Anderson

(2005) reported the most distant nest was 17 miles away from the lek of capture. Because there are 13 leks within an approximate 10-mile radius, greater sage-grouse could nest within suitable habitats within the Project Area, but nesting was not reported (Real West, 2011). Noise generated within the Project Area would extend into suitable nesting habitats that are present within the Greater South Pass Core Area, 0.5 mile from the north and 0.4 mile from the south Project Area boundaries.

Machinery used during Construction (backhoes, dozers, graders, mounted impact hammers) produce noise ranging from 80 to 90 dBA 50 feet away (Federal Highway Administration - FHWA, 2011). Sound levels decrease by 6 dBA for each doubling of distance from point sources with an additional decrease of 1.5 dBA if noise is propagated across “soft” ground such as plowed farmland, grass, crops and other vegetation (FHWA, 1995). Ambient sound levels at greater sage-grouse leks in Wyoming range from 16 to 20 dBA with greater sage-grouse present (Patricelli et al., 2012) and noise levels above ambient could interfere with greater sage-grouse acoustic reproductive displays. The closest greater sage-grouse lek is 5.33 miles from the Project Area. Using standard noise attenuation rates, maximum noise (90 dBA at 50 feet) from machinery would be less than BLM’s noise allowance (10 dBa above ambient) at the perimeter of the closest active lek. Project-related noise (80-90 dBA) would exceed ambient levels (16-20 dBA) in nesting and early brood-rearing habitats within 2 to 9 miles from construction sites and could adversely affect the suitability of these habitats.

Mortality of birds, chicks, or eggs due to the Proposed Action could directly affect greater sage-grouse. The Proposed Action would not affect breeding activities on leks. However, greater sage-grouse nests could be destroyed, and birds, chicks, or eggs killed if present in areas subject to surface disturbing activities during the breeding, nesting, and early brood-rearing periods, generally from March 15 through June 30 (WGFD, 2010).

Loss of potential nesting habitat and early brood-rearing habitat due to the Proposed Action would indirectly affect greater sage-grouse populations. The Proposed Action would remove sagebrush-grass vegetation (237 acres) and Limber Pine-Big Sagebrush vegetation (120 acres). The sagebrush-grass vegetation and the Big Sagebrush component of the Limber Pine-Big Sagebrush vegetation type could provide nesting/early brood-rearing habitat for greater sage-grouse. No surveys for greater greater sage-grouse nests were conducted during any of the wildlife surveys. As noted in Chapter 3, most female greater sage-grouse nest within 2.1 to 4.8 miles from leks although distances are highly variable. There are two known active leks (active in 2015) within 6 miles of the Project Area. Greater sage-grouse nesting is possible given the vegetation present, the proximity of multiple leks and core area habitat. Once the Project begins, earth-moving and mining machinery, noise, and dust could affect the suitability of seasonal habitats in the Project Area and female greater sage-grouse may avoid nesting proximate to the disturbances, similar to effects due to noise and activities associated with natural gas development (Lyon and Anderson, 2003).

New fencing would be limited to those areas where it is needed to preclude public access for safety, at all defined points of ingress and egress. Greater sage-grouse have been killed by colliding with barbed-wire fences, typically those that 1) are constructed with steel t-posts, 2) are constructed near leks, 3) bisect winter concentration areas, and 4) border riparian areas (Christiansen, 2009). Markers placed on new barbed wire fence would increase visibility (Christiansen, 2009). Chain link fencing topped with barbed wire is proposed to surround the NRC Restricted Area. Chain-link fence is more visible than 3-strand barbed wire fence, and would be unlikely to be a risk to greater sage-grouse. No Project-related fencing is proposed near any greater sage-grouse leks.

Greater sage-grouse may be at higher risk of radiation exposure than other vertebrates because they ingest grit during foraging which could increase radiation dose (Hinck et al., 2010). Greater sage-grouse feed on sagebrush and herbaceous range plants, all of which can contain radionuclides, including radium-226 (see Section 4.3.2.1.1, above). However, there are no chemical and radiation toxicity data for effects of uranium and radium on birds in general (Hinck et al., 2010), and greater sage-grouse in particular. In general, plant accumulations of uranium are low as reflected by C_r values in Section 4.3.2.1.1 and biomagnification of uranium through food chain transfers does not occur with transfer coefficients less than 1 from plants to foraging terrestrial herbivores (Driver, 1994; Hinck et al., 2010). While bioaccumulation through herbivory may be low, accumulation through other exposure routes including ingestion, inhalation, and dermal contact may increase concentrations in tissues of exposed animals (Hinck et al., 2010). Birds as a group appear at greater risk of exposure from radiation, mostly through ingestion of grit (Driver, 1994), as noted above. LD50/30s (lethal dose to 50 percent of organisms exposed for 30 days) for wild bird species exposed to ionizing radiation ranged from 485 to 2,500 rad (Driver, 1994). There are no data to suggest that greater sage-grouse use of the Project Area during Operations and post-reclamation would be at risk of uranium toxicity or lethal radiation.

Increased predation on greater sage-grouse would be an indirect impact from the Proposed Action. The Proposed Action could attract predators of greater sage-grouse in the Project Area and vicinity and facilitate predation by providing nesting and perching substrates. Corvids are effective nest predators of greater sage-grouse, taking eggs and possibly recently hatched chicks, and their abundance has been related to higher nest predation rates of greater sage-grouse (Hagen, 2009). A recent study observed that greater sage-grouse nested in areas with lower densities of corvid predators (common ravens and black-billed magpies) and raptors (golden eagles and buteo hawks) when compared to higher predator densities at random locations across the landscape (Dinkins et al., 2012). Corvids are often attracted to areas of human development (Marzluff and Neatherlin, 2006). If the Proposed Action caused increased populations of corvids, greater sage-grouse nesting within the vicinity of the Project Area could be affected.

Increased incidence of WNV and potential adverse effects to greater sage-grouse would be an indirect impact from the Proposed Action. Elevated populations of corvids (crows, ravens, jays) have been implicated in local incidence of WNV and increased infection rates by the disease (Reisen et al., 2006). WNV can infect greater sage-grouse; they are highly susceptible to the disease which culminates in death in most infected birds (Clark et al., 2006). Infection of greater sage-grouse likely depends on the presence of standing water, high ambient temperatures, and populations of mosquitos (Walker et al., 2007). In 2013, Fremont County had the most reports of mosquitos testing positive (29) and most cases of humans testing positive (17) for WNV of any county within Wyoming (USGS, 2014). During 2014 and 2015, there were no human cases and only one case involving mosquitos in Fremont County. There is the potential for presence of WNV in the Project Area, possibly less than at lower elevations within Fremont County.
Attraction of corvids to the Project Area would also increase the risk for WNV, as discussed above. Presence of standing water (Raffinate Pond, Collection Pond, Holding Pond) may also contribute to increased local populations of mosquitos although potential toxicities of Raffinate Pond and Holding Pond contents (solutions of sodium chlorate, sulfuric acid, heavy metals, liquid waste) could preclude the presence of mosquitos at those sites. Sediment and collection ponds that would store surface runoff within the Project Area would be more likely to provide growth media for mosquitos.

Amphibians and Fish

Project-related effects to leopard frogs in Crooks Creek, Western Nuclear Pond, and its tributary are not expected. Increases or decreases in instream flows in Crooks Creek would not be likely to cause measureable effects to leopard frogs inhabiting Crooks Creek. No direct or indirect effects to Western Nuclear Pond are anticipated because no new disturbance is proposed within the drainage that feeds Western Nuclear Pond. For reasons provided in Chapter 3, Section 3.3.4.3, there would be no effects to Yellowstone Cutthroat Trout.

Plants

The Proposed Action would affect approximately 4 acres of mapped Rocky Mountain twinpod potential habitat. The affected area of potential habitat, as mapped by BKS (2011b), is within the footprint of an existing road that is used to access the Sheep II pad. There appears to be no chance that Rocky Mountain twinpod plants or potentially suitable habitats would be affected by the Proposed Action.

The Proposed Action would affect 120 acres occupied by limber pine. Based on the average density of 17.9 trees per acre, the Proposed Action would remove an estimated 2,140 limber pine trees from the Project Area including an estimated 214 healthy trees and 1,926 trees infected with white pine blister rust (WPBR).

Mountain pine beetle (MPB) outbreaks and the introduced WPBR fungus increase the potential for high severity fires that ultimately kill pines that survived infections (Burns et al., 2011; Campbell et al., 2010). Wyoming BLM management guidelines (see IM No. WY-2011-041 – BLM, 2011a) recommend seed collection from limber pines that are resistant to WPBR testing protection for use in re-establishing populations. The testing process takes approximately 5 years to determine WPBR resistance, and BLM recommends that unaffected trees be protected from natural and human disturbance until the determination is made. Project-related effects to healthy limber pines could directly affect future conservation of the species. Warming conditions, possibly caused by removing trees and other vegetation which would expose ground surfaces to increased solar radiation, could accelerate the reproduction of MPB and the spread of WPBR (Campbell et al., 2010).

Fugitive dust generated by machinery could directly impact limber pines by coating needles and impeding photosynthesis as described above, under Vegetation. Application of dust suppressants could affect limber pine similar to effects described for Engelmann spruce, lodgepole pine, and ponderosa pine due to uptake of magnesium and chloride from magnesium chloride applied to road surfaces (Goodrich et al., 2008). Energy Fuels would routinely spray site roads with water to control fugitive dust.

Other BLM-Sensitive Species

Project-related effects to leopard frogs in Crooks Creek are not expected.

4.3.4.7.2 Impacts with Off-Site Processing

With off-site processing, there may be effects to sensitive bird species such as greater sage-grouse, burrowing owl, loggerhead shrike, sage thrasher, Brewer's sparrow, and sage sparrow. Effects to birds species would be similar to those described below for greater sage-grouse. Any additional impact to BLM and Wyoming special status species at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

Decreased nesting habitat suitability could occur near Crooks Gap/Wamsutter Road and Minerals Exploration Road with off-site processing. Project-related traffic on the Crooks

Gap/Wamsutter Road and Minerals Exploration Road would pass through the Greater South Pass Core Area for 23.3 miles, from the Project Area to the Sweetwater Mill. Increased animal-vehicle collisions may also occur due to the increased traffic on Crooks Gap/Wamsutter Road and Minerals Exploration Road.

In 2015, there were nine active leks within 5 miles of Crooks Gap/Wamsutter Road. The closest active lek is 1.0 mile from the road. Noise from diesel dump trucks measured 50 feet away averages 76 dBA (FHWA, 2011). Average noise from dump trucks using the road during pre-dawn from March through May (period of greater sage-grouse lek attendance) would attenuate to 26 dBA at the closest lek. Noise from the loudest dump trucks (84 dBA, FHWA, 2011) would attenuate to 34 dBA. In general, noise that is 4 dBA above ambient levels would be detected by greater sage-grouse and other birds (Dooling and Hulse, 1989). Project-related truck noise would be above ambient levels and would likely be audible to displaying greater sage-grouse at the closest lek 1 mile away from the road and would be above estimated audible detection at three active leks. Additional vehicle-related noise due to the Project may adversely affect greater sage-grouse attendance at three active leks that are <2 miles from the road.

If Project-related traffic occurred during periods of greater sage-grouse attendance at leks, the noise generated by truck traffic could lead to lek abandonment such as described by Blickley et al. (2012a) for natural gas drilling rig noise. The study found that intermittent noise from roads had more of a negative effect on greater sage-grouse lek attendance than continuous noise such as that produced by drill rigs. Chronic noise from natural gas drilling and roads was found to be related to elevated fecal glucocorticoid levels in exposed greater sage-grouse, an indication of endocrine response and increased physiological stress (Blickley et al., 2012b). Chronic stress could lead to long-term decreased fecundity and survivorship, including reduced immune response, and a possible increased susceptibility to WNV (Blickley et al., 2012b).

The presence of nine active leks within 5 miles of Crooks Gap/Wamsutter Road indicates that greater sage-grouse are likely to nest in suitable sagebrush habitats near the road. Dust from Project-related traffic could adversely affect roadside vegetation (see Section 4.3.2.1.1) and potential greater sage-grouse nesting habitat. Light traffic disturbances (ranging from 1 to 12 vehicles per day) during the breeding season were related to reduced nest-initiation rates and increased distances of nest sites away from disturbed leks (Lyon and Anderson, 2003).

Impacts to water sources for greater sage-grouse associated with Crooks Creek through surface discharge under the approved WYPDES Permit are anticipated to only be minor. As described in Section 4.2.5.1.2 and 4.3.3.1.2, the average increase in flow rate (from 4.8 cfs to 5.7 cfs) is so miniscule as to be inconsequential to the vegetation and health regimes of riparian areas along Crooks Creek, and the increase in flow from the lowest recorded flows in Crooks Creek (from 2.3 cfs to 3.2 cfs) may provide more consistent, year-round flow in the creek making greater sage-grouse utilize Crooks Creek more frequently during operations (short term, indirect, beneficial impact). However, once discharge ceases, these birds could be negatively impacted as the water in the creek would decrease, but not disappear, leading to only minor, long term impacts.

4.3.4.7.3 Monitoring and/or Compliance

Monitoring would be similar to that described above for migratory birds under the Proposed Action.

4.3.4.8 BLM and Wyoming Special Status Species – BLM Mitigation Alternative

4.3.4.8.1 Impacts

Direct and indirect effects to BLM and Wyoming sensitive species under the BLM Mitigation Alternative would be similar to those under the Proposed Action. There could be some differences in the post-mine vegetation due to additional measures required by the revised Reclamation Plan and implementation of a Weed Management Plan which could reduce residual impacts to BLM and Wyoming Special Status Species.

Direct and indirect effects to greater sage-grouse by the BLM Mitigation Alternative would be similar to those under the Proposed Action; however, the effects would be reduced with implementation of the mitigation measures described below. There could be some differences in the post-mine vegetation due to additional measures required by the revised Reclamation Plan and implementation of a Weed Management Plan; however, differences in potentially suitable greater sage-grouse habitats are not expected.

All garbage would be collected and managed on-site appropriately then removed from the Project Area at frequent intervals (at least every 2 weeks) to avoid attracting scavengers and avian predators to the area (BWSS-1 in Table 2.4-1). Garbage would attract corvids to the area which could lead to predation of greater sage-grouse nests and juveniles in the surrounding area and could increase the likelihood for transmitting WNV to greater sage-grouse and other birds in the Project Area and vicinity.

Availability of perches can attract corvids and raptors to the Project Area and increase possible predation of greater sage-grouse nests and juveniles in the area surrounding the project. Newly constructed aboveground structures that can serve as perching and nesting sites for corvids and raptors would be equipped with anti-perching devices. Anti-perching devices would also be installed on all existing power line poles and cross-arms on a case by case basis if not already in place (BWSS-2 in Table 2.4-1).

New and existing 3- or 4-strand wire fences would have markers or reflectors to increase visibility for low-flying greater sage-grouse. All new fences would be Type E fences (BWSS-3 in Table 2.4-1).

All water/fluid impoundments capable of providing a medium for mosquito reproduction would be monitored for mosquito larvae. If mosquito larvae in water/fluid impoundments are present, mosquito control would be initiated immediately (BWSS-4 in Table 2.4-1).

If off-site processing occurs, dust control would be applied to the Crooks Gap/Wamsutter road in coordination with the appropriate county transportation department (W-5 in Table 2.4-1). If off-site processing occurs, Energy Fuels would be required to implement procedures to ensure employees adhere to appropriate speed limits within the Project Area and on public roads outside of the Project Area where speed limits are not posted to limit noise and dust produced by trucks traveling on the road during the greater sage-grouse breeding and nesting season (BWSS-5 in Table 2.4-1). If off-site processing occurs, Project-related truck traffic in Core Area during the greater sage-grouse nesting/breeding season would only be allowed between 9 am and 6 pm daily to prevent Project-related noise from detection or exceeding ambient noise at lek perimeters (BWSS-6 in Table 2.4-1). If off-site processing occurs, baseline measurements of ambient noise at lek perimeters facing the Crooks Gap/Wamsutter Road would be made to determine levels of risk to each active lek within 2 miles of the road. If noise levels are anticipated to exceed regulatory thresholds 10dB above ambient at the lek perimeter, the WGFD would need to be consulted to determine appropriate mitigation (BWSS-7 in Table 2.4-1).

Measures described above for greater sage-grouse and migratory birds would be appropriate to minimize effects to BLM and Wyoming Special Status Species. In addition, the BLM may determine if monitoring limber pines that are not infected with WPBR warrant testing to determine WPBR resistance. If so, the BLM would recommend that unaffected trees be protected from natural and human disturbance until the determination is made. If resistant, limber pine cones could be used in re-establishing populations. Alternatively, the BLM may determine that transplanting some of the healthy limber pine trees to previously disturbed areas within the Project Area would be effective reclamation in those sites (BWSS-8 in Table 2.4-1).

To protect breeding raptor species, Energy Fuels would avoid all existing raptor nest sites and surface-disturbing activities during the breeding season (April 1 to September 15 for burrowing owls, and February 1 to July 31 for all other raptors) within applicable nest protection buffers (i.e., 1 mile for ferruginous hawk or 0.75 mile for all other raptors, unless site-specific, species-specific distances are determined and approved by the BLM). Because a number of variables (e.g., nest location, species' sensitivity, breeding, phenology, topographical shielding) determine the level of impact to a breeding pair, appropriate protection measures, such as seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis, in coordination with the BLM. This measure would only apply to operations beginning within these sensitive time frames and within the sensitive buffer areas. It would not apply to ongoing operations continuing through the active breeding season (BWSS-9 in Table 2.4-1).

4.3.4.8.2 Monitoring and/or Compliance

The monitoring and compliance measures that were disclosed for the Proposed Action would apply to the BLM Mitigation Alternative but would also include monitoring for mosquito larvae at all water/fluid impoundments capable of providing a medium for mosquito reproduction. Fence lines would be monitored for any wildlife mortality, including greater sage-grouse.

4.3.4.9 BLM and Wyoming Special Status Species – No Action Alternative

The No Action Alternative would not generate any additional impacts to BLM and Wyoming special status species except those included in Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and WDEQ-AML Project 16-O reclamation plans (BLM, 2014b).

4.3.5 Wildlife

Potential issues associated with terrestrial wildlife species were identified by the BLM through the scoping process and through public comment on the Draft EIS. Issues include:

- Direct mortality by vehicles during all phases of the Project, and poaching coincidental with increased human use;
- Decreased habitat use proximate to the Project components (within a zone of effect) caused by displacement of animals to alternative habitats;
- Removal and alteration of vegetation composition and structure of existing habitats, making them less functional for wildlife;
- Fragmentation of habitats;
- Barriers to animal movements, fencing, and overland ore conveyors;
- Potential exposure to radiation during operation and post-reclamation;
- Effects to habitat from invasive non-native species and noxious weeds; and
- Direct mortality of burrowing species – ingestion of fluids in the Raffinate Pond, Collection Pond, or Holding Pond.

4.3.5.1 Proposed Action

4.3.5.1.1 Impacts with On-Site Processing

Big Game and Trophy Game

Increased vehicle-related mortality due to increased Project-related traffic would directly impact big game. Mule deer in the Sweetwater Herd Unit and pronghorn in the Beaver Rim Herd Unit migrate north and south parallel to Crooks Gap/Wamsutter Road. Mule deer are likely to cross US Highway 287 in the vicinity of Jeffrey City to and from crucial winter ranges. Elk in the Green Mountain Herd Unit also migrate north and south and cross US Highway 287 east of Jeffrey City. Vehicular collisions with big game are most likely to occur where roads with high volume traffic are crossed by migrating big game. A WYDOT map of highway sections with high numbers of reported wildlife collisions include a small portion of US Highway 287 near the Fremont-Natrona border (WYDOT, 2012b). Mule deer-vehicle collisions are expected to increase with increased vehicle presence, particularly on US Highway 287 during winter and spring migrations. Vehicles would likely travel on Crooks Gap/Wamsutter Road at lower speeds than on US Highway 287 during winter. However, Crooks Gap/Wamsutter Road passes through pronghorn crucial yearlong range between Jeffrey City and the Sheep Mountain Project Area which makes wintering pronghorn vulnerable to vehicular collisions.

Traffic could indirectly affect pronghorn, mule deer, and elk distributions in occupied habitats. Big game species tend to move away from areas of human activity and roads, reducing habitat utilization. Displacement of big game is greatest for heavily traveled secondary and dirt roads. Deer displacement distances can reach over 0.5 mile. Deer and pronghorn have been observed to habituate to vehicles as long as traffic is predictable, moving at constant speeds, and not associated with out-of-vehicle activities. Increased vehicular access could induce glucocorticoid stress in animals (Creel et al., 2002; Sheriff et al., 2011) in the vicinity of the Project Area and roads during winter. Mortality would likely be increased if animals, especially juveniles, increased their energy expense, especially travelling through snow during winter (Parker et al., 1984) while escaping from vehicles (Hobbs, 1989).

Public access to the Project Area and vicinity would not change as a result of the Proposed Action; however, human presence would increase in the area. Poaching wildlife is a possible consequence of additional human access within wildlife habitats (Comer, 1982).

Comparative estimates of densities on seasonal ranges that are used by different big game during non-winter seasons (includes spring-summer-fall ranges combined with yearlong ranges) and winter seasons (includes winter ranges combined with yearlong ranges) are provided in Table 4.3-1 for herd units coinciding with the Project Area. The highest expected densities are for pronghorn non-winter ranges in the Red Desert herd unit followed by pronghorn winter ranges in the Beaver Rim herd unit. Potential for indirect impact through Project-related losses of seasonal ranges would depend on the relative densities of animals on those ranges and the area of each range that would be affected (see Tables 4.3-1 and 4.3-2). The Sheep Mountain Project Area is an existing mine site and much of the seasonal ranges in the Project Area are already disturbed or in some state of reclamation.

Table 4.3-1
Estimates of Average Animal Densities Expected on Seasonal Ranges for Big Game Populations in the Project Area

Species and Herd Unit	Post-Harvest Population[1]	Spring-Summer-Fall and Yearlong Range		Winter and Yearlong Range	
		Area (mi^2)	Average Density (animals per mi^2)	Area (mi^2)	Average Density (animals per mi^2)
Pronghorn					
Beaver Rim Herd Unit	13,999	2,025	9.4	873	21.8
Red Desert Herd Unit	11,080	70	158.3	2,889	3.8
Mule Deer					
Sweetwater Herd Unit	3,400	535	6.4	601	5.7
Elk					
Green Mountain Herd Unit	1,400	188	7.4	334	4.2
Moose					
Lander Herd Unit	323	629	0.5	292	1.1

[1] Population estimates from 2014 for pronghorn and mule deer; from 2005 for elk; from 2011 for moose.

Construction would directly remove habitats used by big game within the Project Area. Table 4.3-2 provides the number of areas (acres) in big game seasonal ranges that would be affected by the Proposed Action; however, much of the habitat within these ranges is already disturbed or is previously reclaimed. Specific habitats used by trophy game (mountain lions and black bears) have not been identified but would be expected to mostly coincide with big game wintering habitats within the Project Area and vicinity.

Table 4.3-2
Areas of Big Game Seasonal Ranges that would be Affected by the Proposed Action

Big Game	Herd Unit	Seasonal Range	Seasonal Range Area Affected (acres)	Total Seasonal Range Area in Herd Unit (mi^2)	Percent of Total Seasonal Range Affected
Pronghorn	Beaver Rim	Spring-Summer-Fall	**587.8**	**1,152**	**0.08**
		Winter – Yearlong	**74.9**	**975**	**0.01**
	Red Desert	Winter – Yearlong	**266.2**	**2,889**	**0.01**
Mule Deer	Sweetwater	Yearlong	**351.2**	**383**	**0.14**
		Winter – Yearlong	**577.8**	**218**	**0.41**
Elk	Green Mountain	Winter	**45.0**	**70**	**0.10**
Moose	Lander	Spring-Summer-Fall	**312.7**	**608**	**0.08**

Compared to the amount of seasonal ranges available to each herd unit, the areas affected by the Proposed Action represent a very small proportion of each seasonal range (see Table 4.3-2). An alternative interpretation of effects utilizes the density estimates provided in Table 4.3-1 with the areas affected in Table 4.3-2 to estimate how many animals in each herd unit could be supported by the seasonal ranges affected. For example, the 587.8 acres of Spring-Summer-Fall range removed within the Beaver Rim herd unit would support approximately 8 to 9 pronghorns and 74.9 acres of Winter-Yearlong range removed would support from 2 to 3 pronghorns. In the Red Desert Herd Unit, loss of 266.2 acres of Winter-Yearlong range would support from 1 to 2 animals. While the areas affected contribute to seasonal carrying capacities, the proportion of seasonal ranges available to each population that would be affected by the Proposed Action is small.

Big game animals using seasonal habitats within the Project Area could potentially be exposed to radiation during operation and post-reclamation. Pronghorn and mule deer feed on sagebrush and other browse and elk feed on grasses and herbaceous range plants, all of which can contain radionuclides, including radium-226 (see Section 4.3.2.1.1, above). Ingestion of radium is partitioned into fecal material (80 percent) and the gastrointestinal tract (20 percent); radium adsorbed into the blood stream eventually is eliminated through feces and urine but a portion accumulates in bone tissue (Hinck et al., 2010). Naturally occurring radioactive materials that are characteristic of decay chains of uranium-238 and other sources produce groups of other radionuclides with wide variety of half-lives.

Transfer coefficients are often used to predict transfer of radionuclides to animal food products and depend on adsorption of radionuclides across animals' gastrointestinal tracts (Robertson et al., 2003). However, there are few data related to transfer coefficients for animal products that might be useful to evaluate effects on big game species. Given the relatively low transport of uranium and radium from soil to plants (see Section 4.3.2.1.1, above), the seasonal use of various portions of the Project Area by big game, and the estimates for numbers of animals based on densities in seasonal ranges described earlier, exposures of big game to uranium and radium toxicities and ionizing radiation during operation and post-reclamation are expected to be very limited.

Loss of seasonally used habitat would indirectly impact big game populations through decreased habitat carrying capacities for each of the affected populations (big game herd units). Loss of habitat by the Proposed Action would lead to increased animal densities on unaffected seasonal ranges within each herd unit and may increase demographic population effects by increasing mortality (e.g., through stress, predation, disease, or intraspecific competition), decreasing fecundity (e.g., through nutrition deficits during pregnancy and lactation, fetal resorption, fetal abortion), or by increasing emigration.

Barriers to wildlife movement such as fencing and the conveyor could cause a direct impact to wildlife causing them to alter their movement patterns. This effect is expected to be minimal because the animals may already be avoiding the area due to it being an existing mine site. According to WGFD (2011) most mule deer observations made during early winter classification flights are on the eastern slope of Sheep Mountain, thus the Proposed Action should have minimal effect, if any, on this slope.

Indirect effects to big game could occur from invasive non-native species and noxious weeds interfering with reestablishment of native vegetation species. Many weeds are unpalatable to wildlife (Whitson, et al., 1996). Successful reclamation of vegetated seasonal ranges would provide more suitable habitat, especially on previously disturbed lands. Full restoration of shrub-dominated habitats would occur over the long-term. Noxious weeds often out-compete native vegetation. They displace native species by spreading rapidly and utilizing resources (nutrients, water, sunlight) that can eventually lead to a weed-dominated monoculture. Such transformed habitat can be unsuitable to former wildlife inhabitants. Often, as habitat quality degenerates, wildlife diversity declines.

Upland Game Birds, Small Game, and Furbearers

Direct impacts could occur to small game and furbearers through mortalities from Project-related traffic. Species most susceptible to vehicle-related mortality include those that are inconspicuous, those with limited mobility (skunks), burrowing species (badgers and weasels), have behavioral activity patterns (i.e., nocturnal activity) making them vulnerable (cottontails and furbearers), and wildlife that may scavenge roadside carrion (Leedy, 1975; Bennett, 1991; Forman and Alexander, 1998). Maintaining speed limits would minimize the potential for vehicle collisions with terrestrial wildlife.

Habitats used by wildlife, including upland game birds, small game, and furbearers would be removed. Loss of shrub cover would reduce forage for some herbivores (cottontails), reduce hiding cover and thermal shelter (cottontails), and reduce nesting cover and substrate for birds. Game wildlife species would potentially be displaced by an increase in human activities and from habitats that are cleared of vegetation. Displacement due to habitat removal would extend for the long-term. However, the Sheep Mountain Project Area is an existing mine site and wildlife has most likely acclimated to the area, some of which is already disturbed or is in some state of reclamation.

Upland game birds, small game, and furbearers using habitats within the Project Area could potentially be exposed to radiation during Operations and post-reclamation. Risks of exposures to uranium and radium toxicity and radiation to game birds are expected to be similar to that described for greater sage-grouse in Section 4.3.4.7.1, above. Likewise, risks to small game mammals and furbearers are likely to be low, as described above for big game (Section 4.3.5.1.1).

Badgers dig burrows to hunt burrowing rodents, for shelter and for use as natal dens. Badger burrows can be up to 30 feet long and 10 feet deep and are generally marked by large mounds of soil at burrow entrances (Sullivan, 1996). Badgers could possibly burrow beneath the chain-link fence surrounding the NRC Restricted Area and access toxic compounds at the Heap Leach Pad, Raffinate Pond, Collection Pond, or Holding Pond, all of which would contain toxic and caustic compounds.

Migratory Game Birds

Waterfowl could be directly affected by the Proposed Action if they utilize sediment and collection ponds that would store surface runoff. Similar to effects described for migratory birds, above, waterfowl might attempt to access the Heap Leach Pad. Inhalation of sulfuric acid likely poses the greatest risk along with ingestion and dermal exposure, causing tissue damage and death. Sodium chlorate is an inorganic salt herbicide that may present a risk to migratory game birds if they are exposed to high concentrations of the compound (EPA, 2008). Migratory game birds could be directly impacted by exposure to sulfuric acid and possibly sodium chlorate used in the heap leach process. Use of bird balls would deter waterfowl from accessing the Raffinate Pond, Collection Pond, or Holding Pond containing toxic and caustic compounds.

Non-Game Wildlife

Impacts to non-game wildlife would be similar to those described above for upland game birds, small game, and furbearers.

Fisheries

Project-related effects to native fish and amphibians (including Northern leopard frog) in Crooks Creek are not expected. There would be no direct or indirect effects to fish and amphibians in Western Nuclear Pond under the Proposed Action. Increases or decreases in instream flows in Crooks Creek would not cause measurable effects to fish or amphibians inhabiting Crooks Creek. No direct or indirect effects to Western Nuclear Pond are anticipated because no new disturbance is proposed within the ddrainage that feeds Western Nuclear Pond. As discussed in Section 2.5, improvements to Western Nuclear Pond are being conducted under the WDEQ-AML Project 16-O (BLM, 2014b).

4.3.5.1.2 Impacts with Off-Site Processing

Potential direct and indirect impacts to wildlife associated with off-site processing are similar to those described above for on-site processing but would also include:

- Increased animal-vehicle collisions on the Crooks Gap/Wamsutter Road and Minerals Exploration Road, and
- Decreased habitat suitability near heavily traveled roads.

Truck traffic from the Sheep Mountain Project Area to the Sweetwater Mill would increase the potential for pronghorn-vehicle collisions which would directly impact the population.

Increased traffic on the Crooks Gap/Wamsutter Road and Minerals Exploration Road could decrease habitat suitability for wildlife within some distance on either side of the road. Increased dust from vehicles on the road could affect roadside vegetation and could lead to increased weed infestations along the roadside. Impacts to water sources and vegetation for forage for wildlife associated with Crooks Creek through surface discharge under the approved WYPDES Permit are anticipated to only be minor. As described in Section 4.2.5.1.2 and 4.3.3.1.2, the average increase in flow rate (from 4.8 cfs to 5.7 cfs) is so miniscule as to be inconsequential to the vegetation and health regimes of riparian areas along Crooks Creek, and the increase in flow from the lowest recorded flows in Crooks Creek (from 2.3 cfs to 3.2 cfs) may provide more consistent, year-round flow in the creek making wildlife utilize Crooks Creek more frequently during operations (short term, indirect, beneficial impact). However, once discharge ceases, these wildlife could be negatively impacted as the water in the creek would decrease, but not disappear, leading to only minor, long term impacts. Both effects would indirectly impact wildlife by decreasing suitable habitat. Any additional impact to wildlife at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.5.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.5.2 BLM Mitigation Alternative

4.3.5.2.1 Impacts

Potential direct and indirect impacts to wildlife under the BLM Mitigation Alternative would be similar to those described above for the Proposed Action. Additional revegetation and road reclamation that would occur on previously unreclaimed or poorly reclaimed lands disturbed by historic mining in the Project Area could result in differences in post-mine vegetation, but differences in potentially suitable wildlife habitats are not expected between the two alternatives.

Sites that had previously been disturbed, with or without reclamation, would be subject to the revised Reclamation Plan, potentially improving affected vegetation within wildlife seasonal habitats by requiring additional reclamation and revegetation of more diverse species. The end result is expected to be more diverse plant communities, concomitant with the pre-disturbance conditions reflected in the Ecological Site Descriptions. In addition, Energy Fuels would be required to develop and comply with a Weed Management Plan that identifies the frequency of inspection for noxious weeds and herbicide spraying by a certified applicator. Reclamation success of previously disturbed areas would be evaluated and additional reclamation would occur if the areas have not achieved adequate revegetation. If on-site processing occurs, the Reclamation Plan revisions would also address previously unreclaimed lands, specifically about 90 acres of previously disturbed areas to offset BLM-managed land that would be permanently taken out of the public domain.

Also under this alternative, the BLM would require the following measures to minimize potential effects to wildlife:

- Energy Fuels would be required to implement procedures to ensure employees adhere to appropriate speed limits within the Project Area and on public roads outside of the Project Area where speed limits are not posted to minimize big game-vehicle collisions (W-1 in Table 2.4-1).
- human activity on the east slope of Sheep Mountain, at the Sheep I Shaft would be minimized to the extent practicable as to not compromise the safety of the mine from November 15 to April 30 to reduce impacts to wintering mule deer (W-2 in Table 2.4-1).
- fences would be monitored for any wildlife mortalities, including big game (W-3 in Table 2.4-1).
- Wildlife-friendly fencing would be placed around reclaimed areas to facilitate reclamation success. Fences installed for reclamation purposes would conform to BLM's standard fence type (3-wire, 2 barbed, bottom smooth) to facilitate animal migration. Unnecessary existing fencing would be removed to reduce wildlife hazards (W-4 in Table 2.4-1).
- dust control would be applied along Crooks Gap/Wamsutter Road in consultation with the appropriate county transportation department to reduce effects to roadside vegetation/habitat (W-5 in Table 2.4-1).
- through consultation between the NRC and the BLM, the perimeter of the chain-link fence surrounding the NRC Restricted Area would be checked frequently, depending on initial observations, for any signs of mammal or reptile presence (W-6 in Table 2.4-1).
- through consultation between the NRC and the BLM, if signs of small mammal and reptile presence are detected within the NRC Restricted Area (animal presence, carcasses, feces, burrows), a fine mesh wire fence or hardware cloth apron extending 2 feet below the ground surface would be buried around the outside perimeter of the chain-link fence to minimize or eliminate burrowing animals from entering the area. Fine mesh fencing extending to 3 feet above ground around the inside perimeter of the chain-link fence would be placed to prevent smaller, ground-dwelling wildlife (i.e., ground squirrels, chipmunks, and other rodents, lizards, and snakes) from entering tailings cells and evaporation ponds (W-7 in Table 2.4-1).

Implementation of these measures would reduce the potential for impacts to wildlife under the BLM Mitigation Alternative that would not be reduced under the Proposed Action.

4.3.5.2.2 Monitoring and/or Compliance

The monitoring and compliance measures that were disclosed for the Proposed Action would apply to the BLM Mitigation Alternative.

4.3.5.3 No Action Alternative

The No Action Alternative would not generate any additional direct or indirect impacts to the existing wildlife resources or change any of the existing uses except those already anticipated as a result of Energy Fuels' Reclamation Plans in the WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and the WDEQ-AML Project 16-O reclamation plans (BLM, 2014b). Implementation of existing reclamation plans would increase wildlife habitat in the Project Area and may restore some natural drainages which would positively benefit wildlife.

4.3.6 Wild Horse and Burros

Issues associated with wild horses and the Green Mountain HMA were identified by the BLM through internal scoping and public comment on the Draft EIS. They include:

- Reduced forage due to vegetation removal, fencing, and introduction of invasive species and noxious weeds;
- Potential effects to water quantity and quality; and

- Impairment of the wild and free roaming characteristics of wild horse behavior within HMAs.

4.3.6.1 Proposed Action

4.3.6.1.1 Impacts with On-Site Processing

The Green Mountain HMA and wild horses would be directly impacted by the Proposed Action through forage removal by surface disturbance and additional fencing through all phases of the Project. Approximately 302 acres of new disturbance and 208 acres of disturbance on reclaimed areas would be within the Green Mountain HMA. This direct impact would not be expected to significantly alter the AUM ratio for the designated 170 to 300-horse Appropriate Management Level on the Green Mountain HMA. Additional fencing would be erected within the Project Area (NRC Restricted Area), which partially coincides with the Green Mountain HMA. Due to wild horses' known aversion toward fences, they are likely to avoid newly fenced areas. Alternatively, fencing would prevent horses from entering potentially hazardous areas in the Project Area. The Project Area generally would not be fenced, and existing fences would be maintained. Direct effects could also occur from introduction of noxious weeds and invasive species and removing native vegetation during all phases of the Project.

Diminished surface water quality in water supplies utilized by wild horses (Crooks Creek) could also be a direct impact to wild horses through all phases of the Project. Project design features are in place to ensure that impacts to surface water quality would be minimal, if any (Section 4.2.5, Water Resources).

Indirect effects could also occur during Construction, Operations, and Reclamation, and include increased noise, dust, vehicular traffic, and human activity; both where the Green Mountain HMA overlaps with the Project Area, and outlying access roads. Wild horse-vehicle collisions are rare, and increased traffic is not likely to result horse injuries or death (Section 3.3.6).

These direct and indirect impacts are not expected to alter the HMA objectives, or change the wild, free-roaming nature of the horses in the area. However, it is likely that due to increased human activities, horses would not frequent the area and/or would move to other locations in and off the Green Mountain HMA.

4.3.6.1.2 Impacts with Off-Site Processing

If off-site processing occurs, truck traffic between the Sheep Mountain Project Area and the Sweetwater Mill would increase the opportunity for horse-vehicle collisions. Impacts to water sources and vegetation for forage for wild horses associated with Crooks Creek through surface discharge under the approved WYPDES Permit are anticipated to only be minor. As described in Section 4.2.5.1.2 and 4.3.3.1.2, the average increase in flow rate (from 4.3 to 5.7 cfs) is so miniscule as to be inconsequential to the vegetation and health regimes of riparian areas along Crooks Creek, but the increase in flow from the lowest recorded flows in Crooks Creek (2.3 to 3.2 cfs) may provide more consistent, year-round flow in the creek making wild horses utilize Crooks Creek more frequently during operations (short term, indirect, beneficial impact). However, once discharge ceases, these horses could be negatively impacted as the water in the creek would decrease, but not disappear, leading to only minor, long-term impacts. Any additional impact to wild horses and burros at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.3.6.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.3.6.2 BLM Mitigation Alternative

4.3.6.2.1 Impacts

The direct and indirect impacts for the BLM Mitigation Alternative would be similar to those described above for the Proposed Action. Under this alternative, reclamation could be more successful and might progress faster with the revisions to Energy Fuels' Reclamation Plan. The potential for noxious weed and invasive species would be reduced with implementation of a Weed Management Plan. Fencing of the Congo Pit highwalls would more effectively decrease potential falls, entrapments, or other impacts to wild horses under the BLM Mitigation Alternative than the berms described under the Proposed Action (WHB-1 in Table 2.4-1).

4.3.6.2.2 Monitoring and/or Compliance

No additional monitoring specific to wild horse management would be required.

4.3.6.3 No Action Alternative

Under the No Action Alternative, no uranium mining or ore processing would take place in the Sheep Mountain Project Area and no ore processing would occur at the Sweetwater Mill. Land use activities would continue at levels comparable to that of recent years. Energy Fuel's obligation for previously committed reclamation under WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) would continue under this alternative with the expectation that some forage would be returned. WDEQ-AML Project 16-O (BLM, 2014b) for reclamation of McIntosh Pit would also continue.

4.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

4.4.1 Cultural Resources

Potential impacts to cultural resources were identified based on review of existing literature and site records, as well as the results of past and recent Class III pedestrian inventories conducted within the Project Area and through Native American consultation efforts. The impact analysis of cultural resources is based on the following assumptions.

- Number of sites that would be impacted by the Project is directly correlated with the degree, nature, and quantity of surface disturbance within the APE;
- Protection of historic properties would occur in accordance with SHPO consultation requirements and other state and federal regulations; and
- Values that render a cultural resource eligible for the NRHP would dictate what type and kind of impacts are of concern.

For cultural resources, the analysis area is called the area of potential effect (APE). Under Section 106 of the NHPA, the APE is defined as "those areas in which impacts are planned or are likely to occur." Specifically, the APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. Additionally, the APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR § 800.16(d)). Under this regulation, the APE should include:

- all alternative locations for all elements of the Project;
- all locations where the Project may result in disturbance of the ground;
- all locations from which elements of the Project may be visible or audible;
- all locations where the Project may result in changes in traffic patterns, land use, public access, etc.; and
- all areas where there may be indirect as well as direct effects.

For purposes of this analysis, the APE for direct and indirect effects includes the lands within the Project Area and associated access roads. The APE also includes the Rawlins to Fort Washakie Road and Crooks Gap Stage Station, from which the Project Area is visible. Primary issues related to cultural resources were potential impacts to Native American properties of traditional religious and cultural importance, prehistoric sites and artifacts, and historic sites.

General ground disturbance associated with mining and ore processing could result in direct effects to cultural properties. These include construction of surface infrastructure (Congo Pit, spoils facilities, Ore Pad, On-Site Ore Processing Facility, Conveyor, topsoil stockpiles, building and parking, power lines, and roads), as well as subsurface infrastructure (Sheep I and II shafts, pipelines, and electrical and communication lines). These physical impacts could result in the vertical and horizontal displacement of soil containing cultural materials and the resulting loss of integrity and information, and the alteration of a site's setting.

Potential indirect effects could include the introduction of visual or auditory elements that diminish the integrity of the area's historic features, including setting. Potential indirect effects could include vandalism, inadvertent damage, and illegal artifact collection due to increased numbers of people in and increased access to the Project Area.

4.4.1.1 Proposed Action Alternative

4.4.1.1.1 Impacts with On-Site Processing

Based on information gathered in file searches, LTA cultural reports (as described in Section 3.4.1), and BLM and SHPO consultations, the Proposed Action would not directly affect cultural or historic sites.

As presented in Section 3.4.1, the BLM has determined the setting and viewsheds of the two NRHP-eligible wagon road sections and the Stage Station are weakened by past modern intrusions. SHPO has concurred that setting is no longer an aspect of integrity for these sites. As a result, the Project would have no adverse effect upon historic properties. The Hanks Draw Spoils Facility, located within Hanks Draw, would be greatly shielded from both the wagon road and from visitors traveling by vehicle on Crooks Gap/Wamsutter Road. The majority of the Project components would not be visible from the NHT segments located 7 miles north of the Project Area and the small portions that would be visible consist of existing disturbance. As such, the Project would have no visual impact on NHTs, resulting in No Effect to this historic property.

There is a potential for the unanticipated discovery of archaeological resources during construction and surface disturbing activities and could result in direct effects. Unanticipated discoveries could result in displacement or loss (either complete or partial) of the located resource. Areas of high potential for buried cultural features are immediately adjacent to Crooks Creek, which would not be disturbed. The rest of the Project Area has low potential for buried cultural features. An Unanticipated Discovery Plan for Cultural Resources for the Project would not be necessary.

Site 48FR7357 (the former Continental Materials Corp. mine camp and office area) is within the proposed surface disturbance footprint of the On-Site Ore Processing Facility, near the west border of the Project Area. Recently, SHPO determined that the site is not eligible for listing in the NRHP and found that the Proposed Action would have no effect on the site; however, the BLM and SHPO are requesting physical avoidance of the site. Energy Fuels has offered to install signage along Big Eagle Road or Crooks Gap/Wamsutter Road adjacent to the Project Area during construction of the On-Site Ore Processing Facility that provides a historical overview of uranium mining in the Crooks Gap area.

4.4.1.1.2 Impacts with Off-Site Processing

Direct and indirect impacts to cultural resources within the Project Area with off-site processing would be similar to those described above for on-site processing. The increase in heavy truck traffic on existing county roads is not anticipated to affect cultural resources. Any additional impact to cultural resources at the Sweetwater Mill is not anticipated considering the Project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.4.1.1.3 Monitoring and/or Compliance

No additional monitoring specific to cultural resources would occur under this alternative, unless actions are triggered by unanticipated discoveries.

4.4.1.2 BLM Mitigation Alternative

4.4.1.2.1 Impacts

In addition to the construction and mining elements in the Proposed Action, the BLM Mitigation Alternative provides specific measures that would protect cultural resources from potential impacts. This could result in more successful and expedient reclamation, which in turn, could allow for impacts to the visual setting for cultural resources to be remediated sooner. No additional impacts are expected under this alternative. However, impacts associated with the visual setting for cultural resources could occur for a shorter time due to more successful and expedient reclamation under this alternative.

The BLM, in consultation with SHPO, developed three formal measures to avoid, minimize, or mitigate potential impacts to cultural resources under the BLM Mitigation Alternative. The three measures are described in full detail in Table 2.4-1 in Chapter 2. Mitigation Measure CR-1 ensures that all personnel on-site at the Project would be familiar with the significance of area cultural resources and relevant laws protecting them. Mitigation Measure CR-2 requires that in accordance with 43 CFR § 3809.420 Performance Standards, all Project-related work cease if cultural resources are found on-site during construction or operations. Energy Fuels would be responsible for the costs of evaluation and any necessary mitigation. These two mitigation measures would decrease potential impacts to unknown or unidentified archaeological sites that may occur within the Project Area. The Proposed Action does not stipulate personnel education on cultural resource protection and significance, nor does it indicate Energy Fuels' responsibilities spurred by potential unanticipated resource discoveries.

As noted in Table 2.4-1, Mitigation Measure CR-3 would prevent impacts to site 48FR7357 by requiring physical avoidance and protection during construction. If physical avoidance is not possible, interpretive signage would be developed and installed along public roads by Energy Fuels in coordination with the BLM. With this Mitigation Alternative, the site would be isolated with temporary construction fencing, under the on-site guidance of a BLM-approved archaeologist.

Collectively, the three measures outlined in this alternative could provide action to avoid impacts to and protection of known and unknown existing cultural resources that go beyond those of the Proposed Action. These actions include: personnel education, protection, and avoidance.

4.4.1.2.2 Monitoring and/or Compliance

Monitoring for cultural resource impacts under the BLM Mitigation Alternative would be the same as that described above for the Proposed Action.

4.4.1.3 No Action Alternative

Under the No Action Alternative, no uranium mining or corresponding activities would take place within the Sheep Mountain Project Area. As a result, none of the potential direct or indirect impacts to cultural resources as identified for the Proposed Action would occur. Thus, there would be no residual impacts or need for mitigation and monitoring. Under this alternative, approximately 144 acres under current mine reclamation commitments would be reclaimed. Reclamation would occur within previously disturbed areas; therefore, the potential for identifying new cultural resources at these locations would be minimized. Indirect impacts such as illegal collecting of artifacts and vandalism would be expected to continue at current levels.

4.4.2 Paleontological Resources

The analysis area for paleontological resources is the Sheep Mountain Project Area, including upgraded and maintained access roads. Issues identified during the scoping process for paleontological resources include the potential for loss of important fossil resources due to the following proposed activities or conditions:

- Surface disturbance such as clearing, grading, and excavation in previously unaffected areas; and
- Increased access resulting in vandalism or unauthorized collection.

4.4.2.1 Proposed Action

4.4.2.1.1 Impacts with On-Site Processing

Within the Project Area, direct impacts (destruction or loss of fossils) could occur from construction conducted on formations with potential for important scientific fossil resources (PFYC Class 3, as noted in Chapter 3 Section 3.4.2). Indirect impacts during construction can include damage or loss of fossil resources due to the unauthorized collection of fossils by the public due to increased access to localities near construction areas. Adverse impacts to important fossil resources would be long-term because fossils removed or destroyed are lost to science.

As a result of the recent literature review, pedestrian survey and BLM resource management's knowledge of the area, the probability of fossil resource discovery and impact is considered to be low (Connely, 2011). There are no known existing fossil resources in the vicinity of the Proposed Action.

4.4.2.1.2 Impacts with Off-Site Processing

Off-site processing would occur at an existing processing facility several miles from the Sheep Mountain Project Area. Heavy truck traffic would increase on existing county roads, but impact to paleontological resources would not be expected. Any additional impact to paleontological resources at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.4.2.1.3 Monitoring and/or Compliance

No monitoring for paleontological resources would be required.

4.4.2.2 BLM Mitigation Alternative

4.4.2.2.1 Impacts

Direct and indirect impacts for the BLM Mitigation Alternative would be similar to those described above for the Proposed Action. In accordance with 43 CFR § 3809.420 Performance Standards, if suspected paleontological resources are uncovered during construction, Energy Fuels would suspend all activities in the vicinity of such a discovery and notify the BLM AO as soon as possible. Work in this area would not continue until notified to proceed by the BLM AO. The BLM AO would evaluate, or would have evaluated, such discoveries not later than 5 working days after being notified, and would determine what action would be taken with respect to such discoveries. The decision as to the appropriate measures to mitigate adverse effects to significant paleontological resources would be made by the BLM AO after consulting with Energy Fuels. Energy Fuels would be responsible for the cost of any investigations necessary for the evaluation, and for any mitigative measures (P-1 in Table 2.4-1).

4.4.2.2.2 Monitoring and/or Compliance

No monitoring for paleontological resources would be required.

4.4.2.3 No Action Alternative

Under the No Action Alternative, no uranium mining or ore processing would take place in the Sheep Mountain Project Area and no ore processing would occur at the Sweetwater Mill. As a result, none of the potential direct impacts or unanticipated discoveries on paleontological resources as a result of the Proposed Action or BLM Mitigation Alternative would occur. Reclamation under WDEQ-LQD Permit to Mine 381C (WDEQ, 2015a) and WDEQ-AML Project 16-O (BLM, 2014a) would occur and the probability for fossil discovery would be low given that reclamation would occur on previously disturbed soils.

4.4.3 Tribal and Native American Religious Concerns

As with cultural resources, the area of analysis for properties of traditional religious and cultural significance to Indian tribes is the APE. Under Section 106 of the NHPA, the APE is defined as those areas in which impacts are planned or are likely to occur. Specifically, the APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause § changes in the character or use of historic properties, if any such properties exist (36 CFR § 800.16(d)).

For purposes of this EIS analysis, the APE for direct and indirect effects to properties of traditional religious and cultural significance to Indian tribes includes the Project Area, the associated access roads outside the Project Area, and historic properties from which the Project Area is visible, including the Rawlins to Fort Washakie Road and Crooks Gap Stage Station. Primary issues related to properties of traditional religious and cultural significance to Indian tribes were potential impacts to Native American properties of traditional religious and cultural importance including traditional cultural properties, sacred sites, or other sites that may be of tribal concern.

Potential impacts to properties of traditional religious and cultural significance to Indian tribes were identified based on review of the existing literature and site records, past surveying, tribal consultations, and a tour of the Project Area with tribal representatives. This review and consultative process identified no areas or sites with properties of traditional religious and cultural significance to Indian tribes within the Project Area. The Eastern Shoshone were

concerned about impacts to the Rawlins to Fort Washakie Road because it was used to bring government commodities (according to treaty rights) to the tribe from Rawlins. During tribal consultation they agreed that the visual impacts of the Project would be No Adverse Effect.

4.4.3.1 Proposed Action

4.4.3.1.1 Impacts with On-Site Processing

Ground disturbance, including the installation of surface and subsurface infrastructure, could potentially result in direct effects to properties of traditional religious and cultural significance to Indian tribes. However, because no areas or sites with properties of traditional religious and cultural significance to Indian tribes have been identified within or near the Project Area, no direct or indirect impacts are expected during Construction, Operations, or Reclamation.

The potential exists that unanticipated sites with properties of traditional religious and cultural significance to Indian tribes could be discovered during project construction and mining in the Congo Pit, and could result in direct effects. Unanticipated discoveries could result in displacement or loss (either complete or partial) of the discovered site.

4.4.3.1.2 Impacts with Off-Site Processing

If Sheep Mountain ore is processed off-site, the direct impacts to properties of traditional religious and cultural significance to Indian tribes would be unchanged from those evaluated with on-site processing. Increased truck traffic on Crooks Gap/Wamsutter Road and Minerals Exploration Road, between the Project Area and the Sweetwater Mill, would not be expected to result in indirect impacts to properties of traditional religious and cultural significance to Indian tribes. Any additional impact to Tribal and Native American religious concerns at the Sweetwater Mill is not anticipated considering the project currently exists without requiring new disturbance. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analysis as necessary.

4.4.3.1.3 Monitoring and/or Compliance

No monitoring or compliance procedures are required for the Proposed Action Alternative unless such actions are triggered by unanticipated discoveries.

4.4.3.2 BLM Mitigation Alternative

4.4.3.2.1 Impacts

Potential direct and indirect impacts to properties of traditional religious and cultural significance to Indian tribes under the BLM Mitigation Alternative would be unchanged from those for the Proposed Action. In the event that properties of traditional religious and cultural significance to Indian tribes were discovered during Project activities, Energy Fuels would stop working in that area and notify the BLM AO. Work would continue in that area with approval of the BLM. Energy Fuels would be responsible for the costs of evaluation, tribal consultation, and any necessary mitigation (TNA-1 in Table 2.4-1).

4.4.3.2.2 Monitoring and/or Compliance

No monitoring or compliance procedures are required under the BLM Mitigation Alternative unless actions are triggered by unanticipated discoveries.

4.4.3.3 No Action Alternative

Under the No Action Alternative, no uranium mining or ore processing would occur in the Sheep Mountain Project Area and no ore processing would occur at the Sweetwater Mill. As a result, none of the potential direct or indirect impacts to properties of traditional religious and cultural significance to Indian tribes identified for the Proposed Action would occur, and there would be no residual impacts or need for mitigation and monitoring. Approximately 144 acres under current mine reclamation commitments would be reclaimed by Energy Fuels under the No Action Alternative (see Map 2.5-2). Reclamation would occur within previously disturbed areas; therefore, the potential for identifying new sites with properties of traditional religious and cultural significance to Indian tribes would be minimized.

4.4.4 Socioeconomic

The Proposed Action and BLM Mitigation alternatives have the potential to affect socioeconomic conditions in Fremont and Carbon counties. Potential issues associated with socioeconomic conditions were identified by the BLM through internal scoping, consultation with cooperating agencies, and comments provided through the public scoping process, and include the following:

- Potential impacts to motels and other short-term housing accommodations during Construction;
- Potential demands for housing and public services or infrastructure that would exceed capacities in these systems; and
- Potential that the Proposed Action could contribute to boom-bust development patterns often associated with mineral development.

Direct impacts to socioeconomic conditions would include an increase in employment and income due to the Construction, Operations, and Reclamation jobs created by the Proposed Action, population changes due to relocating Project workers, and changes in local government finances due to uranium production and Project spending. Direct impacts to population were analyzed by comparing estimated Project-driven in-migration with current and projected population levels. Direct impacts to public finances were evaluated by estimating severance, property (ad valorem), and sales tax revenues stemming from the Proposed Action.

Indirect impacts would include changes in employment and income related to jobs supporting the Proposed Action and its employees, changes in the demand for housing and community services, and changes to local government finances through taxable household spending. The IMPLAN model was used to estimate the total employment in Fremont and Carbon counties associated with Construction and Operations. Impacts to housing and community services were evaluated by comparing estimated Project-driven household growth with current and projected household levels and existing service levels for education. Indirect impacts to public finances were evaluated by estimating the sales tax revenue associated with household spending of income derived from the Proposed Action.

Estimated impacts to socioeconomic conditions are based on the following assumptions:

- the Study Area includes Fremont and Carbon counties.
- the local workforce is defined to include workers from Fremont and Carbon counties, and the non-local workforce is defined to include workers who live outside these counties.
- local workers are expected to comprise approximately 50 percent of the Construction workforces for the Congo Pit and Sheep Underground Mine and 30 percent of the Construction workforce for the Heap Leach Pad/ Ore Processing Facility. Remaining portions of the Construction workforce are expected to be non-local workers who would work in the area on a temporary basis while maintaining their permanent residence elsewhere.
- local workers are expected to comprise approximately 50 percent of the Operations workforces at the Congo Pit and Sheep Underground Mine and 35 percent of the Operations workforce at the Heap Leach Pad/Ore Processing Facility. Remaining portions of the Operations workforces are expected to include non-local workers who relocate to the Study Area.
- the increase in indirect and induced jobs associated with the Proposed Action is expected to be filled through the local labor force and would not result in additional population increases in the Study Area.

Construction, Operations, and Reclamation are expected to occur within 20 years.

4.4.4.1 Proposed Action

4.4.4.1.1 Impacts with On-Site Processing

The direct employment associated with the Proposed Action would be a key driver of the Project's socioeconomic impacts. Table 4.4-1 summarizes the proposed workforce levels in the Project Area with on-site processing as discussed in Section 2.3.7. Residents of the Study Area ("local workers") are expected to comprise approximately half of the Construction, Operations, and Reclamation workforces for the Congo Pit and Sheep Underground Mine, and non-local workers are expected to account for the remaining half. Local workers are expected to account for approximately 30 percent of the Construction workforce, 35 percent of the Operational workforce, and 50 percent of the Reclamation workforce at the Heap Leach Pad and On-Site Ore Processing Facility, with non-local workers accounting for the remainder.

Table 4.4-1
Construction, Operations, and Reclamation Workforce Requirements

Project Component	Duration	Number of Workers		
		Local	Non-Local	Total
Construction				
Congo Pit	2 – 4 months	10	10	20
Sheep Underground Mine	18 months	25	25	50
Heap Leach Pad/Ore ProcessingFacility	9 months	33	77	110
Operations				
Congo Pit	8 years	21	20	41
Sheep Underground Mine	11 years	64	64	128
Heap Leach Pad/Ore Processing Facility	12 - 16 years	12	23	35
Reclamation				
Congo Pit	5 years	12	12	24
Sheep Underground Mine[1]	1 – 2 years	3	3	6
Heap Leach Pad/Ore Processing Facility[2]	2 – 3 years	12	12	24

[1] Demolition of buildings and placement of mine seals would occur over an approximate 8 month period (Energy Fuels, 2015a). Additional closure and reclamation tasks at the Sheep Underground Mine would be conducted during the remainder of the Reclamation phase (Morrison, 2014).

[2] Reclamation of the Heap Leach Pad/Ore Processing Facility would require an earthwork crew of 12 workers during construction seasons (6 to 8 months per year), and a six-man demolition crew and six supervisory and health and safety personnel working on a year-round basis (Energy Fuels, 2015a; Morrison, 2014).

Based on the workforce levels shown in Table 4.4-1 and the construction schedule outlined in Section 2.3.6, Figure 4.4-1 shows the estimated Construction, Operations, and Reclamation workforces. The figure illustrates the Proposed Action's staggered development schedule. Construction of the Congo Pit would coincide with the latter half of the Heap Leach Pad and On-Site Ore Processing Facility's Construction phase. The Sheep Underground Mine would be constructed 1 to 5 years after the start of the Congo Pit and processing operations. Based on the Preliminary Feasibility Study for the Sheep Mountain Uranium Project (BRS, 2012), this analysis assumes that the Sheep Underground Mine would be developed during Years 4 and 5 of the Project's life. Much of the Congo Pit's Reclamation would occur concurrently with Operations and Reclamation of the Congo Pit would overlap with Operations of the Sheep Underground Mine and Heap Leach and On-Site Ore Processing Facility.

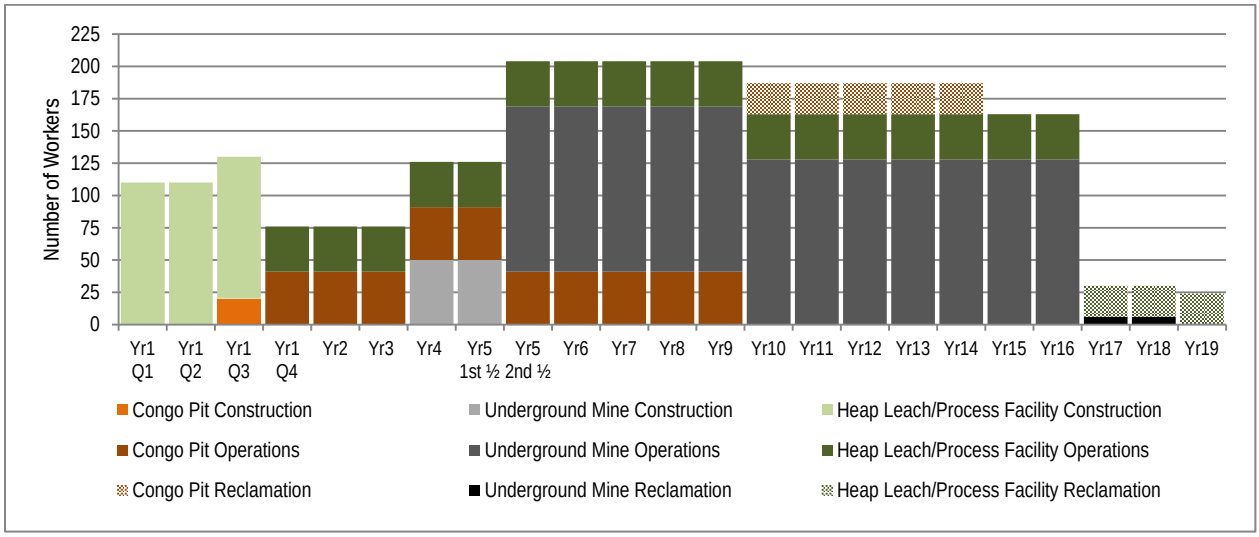


Figure 4.4-1
Proposed Action with On-Site Processing: Estimated Workforce

An analysis of the demographic and economic characteristics of the portions of Fremont and Carbon counties that surround the Project Area suggests that the region, which includes the towns of Lander, Riverton, and Rawlins, could provide approximately 290 workers to the Sheep Mountain Uranium Project (see Table 4.4-2). This estimate is based on several assumptions, including the portion of unemployed workers in Fremont and Carbon counties that would be interested in working at the Project, the portion of Fremont County residents commuting to other counties for work and who would be interested in working at the Project, and the portion of applicants that would qualify for work at the Project. Overall, the analysis indicates that the Study Area has the ability to provide the estimated local workforce.

Table 4.4-2
Estimated Potential Local Workforce

Employment Measure	Jeffrey City CCD	Lander CCD	Wind River CCD	Rawlins CCD	Total
2012 population[1]	92	10,876	26,635	10,940	48,543
Civilian Labor Force[1]	27	5,873	13,570	5,612	25,082
2013 county unemployment rate[2]	5.9%	5.9%	5.9%	4.5%	--
Percent of Fremont County CCD residents working in other counties	NR[3]	6.7%	3.9%	NA[4]	--
Prospective applicants at the mill[5]	1	185	332	63	581
Potential workers from the local area[6]	0.5	92	166	32	290

[1] Source: Census Bureau, 2013a.
[2] Source: BLS, 2014b.
[3] NR = Not Reported.
[4] NA = Not Applicable. The Rawlins CCD is in Carbon County.
[5] Assumes that 25 percent of unemployed labor force participants in Fremont and Carbon counties and 25 percent of Fremont County residents who live in the Jeffrey City, Lander, and Wind River CCDs would be interested in working at the Sheep Mountain Project.
[6] Assumes that 40 percent of applicants possess the relevant job skills and pass drug tests.

Economic Conditions

Direct Project employment and spending would stimulate economic activity in the Study Area by supporting secondary job growth and increasing labor income and regional output. Economists estimate a project's total economic impacts using mathematical analysis that captures the supply and demand linkages between industries and measures the subsequent rounds of spending within the local economy that are associated with an initial expenditure. The current analysis used the IMPLAN regional economic modeling software, calibrated with economic data for Fremont and Carbon counties, to estimate the total employment and income effects associated with the Proposed Action. IMPLAN was originally developed by researchers at the University of Minnesota in cooperation with the Forest Service, the BLM, and the Federal Emergency Management Agency (FEMA) to assist in land and resource management planning. Later commercialized, IMPLAN is now a widely accepted analytical tool to examine local economies across the United States.

The economic impacts estimated by IMPLAN are constrained by the Study Area specified for the analysis, and include:

- **Employment**: The total annual average jobs in the Study Area, including all full-time and part-time jobs for employees and self-employed workers. Because this definition is based on annual average employment, IMPLAN's employment estimates also account for seasonal workers. The 20 workers employed for one quarter in Year 1 constructing the Congo Pit account for 5 annual jobs in the IMPLAN analysis, and the 41 workers who mine (operate) the Congo Pit for one quarter in Year 1 account for 10.3 annual jobs.
- **Labor Income:** The total value paid to workers in the Study Area.
- **Value Added:** The total value of all non-commodity payments associated with production. Value Added indicates the economic growth within the Study Area (gross regional product) attributable to the Project.
- **Output:** The total value of spending within the Study Area, including the value of final output and intermediate purchases (money spent purchasing goods and services used to produce final output).

IMPLAN further distinguishes these impacts into the following effects:

- **Direct Effects** represent Energy Fuels' initial spending on the Sheep Mountain Uranium Project in the Study Area.
- **Indirect Effects** estimate spending in the Study Area by businesses that supply goods and services to the Sheep Mountain Uranium Project.
- **Induced Effects** represent spending in the Study Area by households that earn income from the Sheep Mountain Uranium Project (*Direct Labor Income*) and from businesses that supply goods and services to the Sheep Mountain Uranium Project (*Indirect Labor Income*).

The current analysis used IMPLAN Version 3.1, which is based on 2012 industry spending patterns and levels. All future expenditures associated with the Proposed Action were discounted to 2012 dollars before conducting the analysis, and all expenditures and income estimated by the model and reported below are expressed in 2012 dollars.

Employment and Income Impacts. During the Project's first year, when the Congo Pit, Heap Leach Pad, and On-site Ore Processing Facility would be constructed and Operations begin, direct Project employment would include 106 jobs. Energy Fuels expects to spend approximately $4 million in the Study Area in Year 1, including approximately $3.6 million on labor expenditures. Project and worker spending would support approximately 12 indirect and induced jobs in the Study Area; labor income associated with this employment would approximate $473,757. Output in the Study Area would expand by approximately $1.85 million during Year 1 of the Proposed Action with on-site processing (see Table 4.4-3).

During Project Years 2 and 3, when the Congo Pit, Heap Leach Pad, and Ore Processing Facility would be operating, direct Project employment would include 76 jobs per year. Energy Fuels would spend approximately $7 million in the Study Area each year, including approximately $4.6 million on annual labor expenditures. Project and worker spending would support approximately 21 indirect and induced jobs in the Study Area annually; labor income associated with this employment would average $726,340 per year. Output in the Study Area would expand by approximately $2.2 million annually during Years 2 and 3 of the Proposed Action with on-site processing.

Between Project Years 4 and 5, when the Congo Pit, Heap Leach Pad, and Ore Processing Facility would be operating and the Sheep Underground Mine would be constructed and begin Operations, direct Project employment would average 146 jobs per year. On average, Energy Fuels would spend approximately $9.5 million in the Study Area each year, including $5.3 million on annual labor expenditures. Project and worker spending would support approximately 21 indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $947,685. Output in the Study Area would expand by an average of $3.2 million annually during Years 4 and 5 of the Proposed Action with on-site processing.

During the years of peak production (Project Years 6 through 16), direct Project employment would average 189 jobs per year. Averaged over this period, Energy Fuels would spend approximately $17.1 million in the Study Area each year, including $6.6 million on annual labor expenditures. Project and worker spending would support approximately 28 indirect and induced jobs in the Study Area annually; labor income associated with this employment would average approximately $1 million per year. During this time, output in the Study Area would expand by an average of $5.2 million annually.

Table 4.4-3
Proposed Action with On-Site Processing:
Average Annual Economic Impacts to the Study Area[1]

Impact Measure	Project Year 1	Project Years 2 – 3	Project Years 4 - 5	Project Years 6 – 16	Project Years 17 - 19
Employment[2]					
Direct	106	76	146	189	24
Indirect	5	4	7	7	5
Induced	7	17	19	21	3
Total	118	97	172	217	32
Labor Income					
Direct[3]	$3,633,328	$4,617,400	$5,255,790	$6,605,249	$497,068
Indirect	$230,082	$162,648	$311,107	$320,327	$191,637
Induced	$243,675	$563,692	$636,579	$706,196	$85,426
Total	$4,107,085	$5,343,740	$6,203.476	$7,631,772	$774,131
Value Added					
Direct	$969,103	$625,734	$1,258,344	$3,070,199	$1,112,289
Indirect	$363,301	$336,856	$568,780	$665,434	$344,090
Induced	$521,732	$1,206,946	$1,362,999	$1,512,063	$182,903
Total	$1,854,136	$2,169,536	$3,190,123	$5,247,696	$1,639,282
Output					
Direct[4]	$3,989,568	$6,957,450	$9,534,197	$17,137,414	$2,739,308
Indirect	$670,965	$645,615	$1,068,581	$1,271,845	$627,779
Induced	$824,991	$1,908,511	$2,155,264	$2,390,980	$289,215
Total	$5,485,524	$9,511,576	$12,758,042	$20,800,239	$3,656,302

[1] Source: IMPLAN v.3.1 data for 2012: Fremont and Carbon counties.
[2] Total annual average jobs, including all full-time, part-time and seasonal jobs. Total annual jobs equals the number of workers employed during a year multiplied by the portion of the year they are employed.
[3] Based on annual labor expenditures reported in BRS Engineering, 2012.
[4] Based on annual expenditures reported in BRS Engineering, 2012.

During final Reclamation (Project Years 17 through 19), direct Project employment would average 24 jobs per year. On average, Energy Fuels would spend approximately $2.7 million in the Study Area each year, including $497,068 on annual labor expenditures. Project and worker spending would support approximately eight indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $277,063. During this time, output in the Study Area would expand by approximately $1.6 million annually.

Population

Construction and Operations are expected to attract workers from across Wyoming, as well as workers with specialized skills from neighboring states. Under the Proposed Action with on-site processing, net labor migration into the Study Area would occur periodically over the first 5 years of Project life, as Project facilities are constructed and become operational.

Construction projects typically attract transient non-local workers who work at job sites on a temporary basis while maintaining their permanent residence elsewhere. This tendency would apply to non-local construction workers at the Heap Leach Pad and Ore Processing Facility, where construction would require a variety of general and specialized contractors who typically supply their own crews. Therefore, the non-local workforce associated with constructing the Heap Leach Pad and Ore Processing Facility is not expected to contribute to net labor migration into the Study Area. However, because construction of the Congo Pit would be conducted by mining personnel and construction of the Sheep Underground Mine would span 18 months, with

many of the construction workers transitioning to the mine's operational workforce, migration patterns for the Congo Pit and Sheep Underground Mine construction workforces are expected to be more characteristic of an operational workforce, which includes non-local employees who relocate to their place of employment. The non-local portions of the Construction workforces for the Congo Pit and Sheep Underground Mine and the Operations workforces for all Project components are expected to contribute to net labor migration in the Study Area. The non-local workforce associated with Reclamation would include workers with specialized skills who would work in the Study Area on a short-term basis, and not relocate.

Based on expected non-local workforce levels, net labor migration is estimated to include approximately 107 workers between Project Years 1 and 5 (see Table 4.4-4). Dependents often accompany migrating workers. Based on the 2012 average Wyoming household size of 2.52 and average Wyoming family size of 3.04 (Census Bureau, 2013b), population growth associated with net labor migration due to the Proposed Action is projected to add between 269 and 325 residents to the Study Area during the Project's first 5 years. These estimated population impacts may overstate actual changes in the Study Area's population by the extent to which non-local workers would relocate to surrounding counties (Natrona County, for example) rather than the Study Area, and the extent to which some relocating workers would not be accompanied by dependents.

Table 4.4-4
Proposed Action with On-Site Processing:
Potential Population Change in the Study Area

Population Measure	Project Year 1	Project Year 4	Project Year 5	Total
Net Labor Migration into the Study Area				
Congo Pit	20	--	--	20
Sheep Underground Mine	--	25	39	64
Heap Leach Pad/Ore Processing Facility	23	--	--	23
Total relocating workers	43	25	39	107
Projected Population Growth in the Study Area				
Based on household size (2.52)	108	63	98	269
Based on family size (3.04)	130	76	119	325

Potential population growth resulting from the Proposed Action with on-site processing is not expected to affect long-term population trends in Fremont and Carbon counties because project-driven growth would be within the range of growth that that has occurred in both counties over the past several years. Between 2000 and 2013, Fremont County added an average of 435 new residents per year, and Carbon County added an average of 23 new residents per year. Annual population gains expected from the Proposed Action are less than 1 percent of the 2013 populations in either Fremont or Carbon counties.

The distribution of population growth across the Study Area would be determined by several factors, including distance from the Project Area, the availability (and affordability) of housing, proximity to community facilities and services, and local cultural factors distinct to each surrounding community. Based on these considerations, the historic residency patterns of mining and other industrial workers in Fremont County and informed judgment, this analysis assumed that 60 percent of migrating Project workers would relocate to Riverton, 20 percent would relocate to Lander, and 20 percent would relocate to Rawlins. As shown in Table 4.4-5, the estimated Project-driven growth in each municipality is within the range of recent population gains. This, as well as the scale of the estimated population changes relative to current population levels, indicates that Project-related population growth would not impact long-term population trends in Riverton, Lander, or Rawlins.

Table 4.4-5
Proposed Action with On-Site Processing:
Estimated Project-Related Population Growth in Riverton, Lander and Rawlins

Area	Estimated Project-Related Population Growth			Average Annual Population Growth, 2000 – 2013	2013 Population
	Project Year 1	Project Year 4	Project Year 5		
Fremont County					
Riverton[1]	65 - 78	38 - 46	59 - 71	128	10,969
Lander[2]	22 - 26	13 - 15	20 - 24	67	7,736
Carbon County					
Rawlins[3]	22 - 26	13 - 15	20 - 24	22	9,291

[1] Assumes that 60 percent of migrating Project workers relocate to Riverton.
[2] Assumes that 20 percent of migrating Project workers relocate to Lander.
[3] Assumes that 20 percent of migrating Project workers relocate to Rawlins.

To the extent that some workers may relocate to rural areas and small communities closer to the Project Area, including Jeffrey City and Sweetwater Station, Table 4.4-5 overestimates municipal population growth. Although Project-driven growth would not be likely to impact population trends in Riverton, Lander, or Rawlins, population trends in smaller communities could be affected if sufficient numbers of Project workers chose to relocate there.

Project completion could lead to out-migration in Fremont and Carbon counties in the event that former Project workers would be unable to secure alternative employment in the Study Area. Given the Study Area's extensive mineral resource base and a growing regional economy, it is likely that any population losses due to Project completion would be offset by job creation in other businesses within the Study Area.

Boom and Bust Characteristics
Based on the scale of potential population changes in Riverton, Lander, and Rawlins relative to current population levels, Project-driven population growth is not likely to contribute to boom-bust development patterns in these towns. Jeffrey City and Sweetwater Station could be impacted if sufficient numbers of migrating Project workers relocated to these areas and, upon Project completion, were unable to find suitable work in the local area and out-migrated.

Housing
Short-term Housing. The Construction workforce for the Heap Leach Pad and Ore Processing Facility would rotate due to different trades required at different times of the Construction phase, and non-local construction workers would be likely to stay in short-term housing accommodations in the Study Area. Because mining personnel are expected to develop the Congo Pit and Sheep Underground Mine, construction of the mining facilities is not expected to place additional demands on short-term housing in the Study Area. During construction of the Heap Leach Pad and Ore Processing Facility, as many as 77 non-local construction workers could require short term housing. This demand represents approximately 4 percent of the hotel and motel rooms, and approximately 3 percent of the combined hotel and motel rooms and RV sites in Riverton, Lander, Rawlins, and Jeffrey City. Consequently, the Proposed Action with on-site processing is not expected to have a significant indirect impact on the Study Area's short-term housing markets.

Although the Proposed Action is expected to have minimal impacts on short-term housing markets in Fremont and Carbon counties, localized impacts could occur. To the extent that peak Project-related demand coincided with peaks in summer tourism, there could be upward pricing

pressure on motel room rental rates in some areas. This would be likely to result in workers seeking accommodations in other towns or other facilities, such as RV parks.

Long-term Housing. The demand for housing units by relocating Operations workers (including workers constructing the Congo Pit and Sheep Underground Mine) would begin with the start of mining and ore processing near the end of Project Year 1. The absorption of approximately 107 new households between Project Years 1 and 5 is not expected to have adverse indirect impacts on housing markets in the Study Area. As discussed in Section 3.4.4.4, the WHDP estimates that Fremont County will require housing to accommodate between 654 and 867 new households, and that Carbon County will require housing to accommodate 103 new households, between 2015 and 2020.

Applying the average 2010 home ownership rate of 72 percent in Fremont and Carbon counties to relocating households, during the Project's first 5 years approximately 77 relocating households would purchase homes and approximately 30 new households would rent. Historic vacancy rates in Fremont and Carbon counties and anecdotal evidence suggest that, in the short-term, it may be easier for migrating workers to find rental housing in Rawlins than in Riverton or Lander (see Table 3.4-8 in Chapter 3).

Short-term indirect impacts to housing markets associated with the Proposed Action with on-site processing could include increased housing costs (residential sale prices and rental rates) in some areas. Low income households in Riverton, Lander, and Rawlins may find it more difficult to secure affordable housing. In the long-term, housing markets respond to an increased demand for housing through new construction. Accordingly, long-term indirect impacts to housing associated with on-site processing could include a stimulated residential construction market.

Reclamation could have indirect depressive impacts on local housing markets through the potential out-migration of previously-employed Project workers. However, the potential decrease in the demand for housing associated with such out-migration is expected to be limited given the size of the Project's workforce relative to the size of each community's housing market.

Community Services and Public Infrastructure

Schools. Because construction workers are not typically accompanied by dependents, construction of the Heap Leach Pad and Ore Processing Facility would not be likely to affect school enrollments in the Study Area. Based on household composition and family size in Wyoming, school age children estimated to accompany the Project's 107 migrating workers would include 26 students in Project Year 1, 16 students in Project Year 4, and 24 students in Project Year 5. These estimates overstate Project-related school enrollments to the extent that some migrating workers would not be accompanied by dependents.

Based on expected labor migration patterns, the majority of new enrollments would be in Fremont School District 25, which is the largest school district in the Study Area. New enrollments would be the highest in Project Year 1, when school enrollments would increase by 16 students in Fremont School District 25, five students in Fremont School District 1, and five students in Carbon School District 1 (see Table 4.4-6). The new students would likely be enrolled in different schools and grades in each school district. Current enrollments in these school districts are comparable to or lower than they have been in recent years, indicating the ability to absorb new students that could result from relocating households. Therefore, the Proposed Action with on-site processing is expected to have minimal indirect impacts on local educational facilities and staffing levels.

Table 4.4-6
Proposed Action with On-Site Processing:
Estimated Change in School District Enrollments

School District	Project Year 1	Project Year 4	Project Year 5	Total
Fremont School District 25[1]	16	10	14	40
Fremont School District 1[2]	5	3	5	13
Carbon School District 1[3]	5	3	5	13
Total new enrollments	26	16	24	66

[1] Assumes that 60 percent of migrating workers relocate to Riverton.
[3] Assumes that 20 percent of migrating workers relocate to Lander.
[4] Assumes that 20 percent of migrating workers relocate to Rawlins.

In the event of population out-migration due to Project completion, school enrollments in the Study Area could decrease.

Medical Services. Locally hired construction workers for construction of the Heap Leach Pad and Ore Processing Facility are assumed to be currently using health care services within the Study Area, and would not generate incremental demand for medical services. As non-local construction workers would be in the area temporarily, most of these workers would only seek emergency and urgent health care while working on the Heap Leach Pad and Ore Processing Facility. Non-local construction workers would not have relationships with physicians in the Study Area, and would be likely to use urgent care clinics and emergency rooms at hospitals in Riverton, Lander, or Rawlins for urgent, but non-emergency, medical needs. Because the non-local construction workforce is estimated to peak at 77 workers, non-local construction worker demand for health care services is not expected to result in adverse indirect impacts to health care providers in the Study Area.

Energy Fuels would prepare an Emergency Response Plan outlining procedures for handling on-site accidents and emergencies. Following this, as well as safe mining practices and BMPs, is expected to limit the need for medical services due to on-site accidents. The incremental demand for medical services due to mining and processing in the Project Area is expected to be within the capacity of current health care service providers, as well as service providers who may relocate to the Study Area during the period in which the Project is implemented.

The additional demand for health care services associated with Project-driven population growth is also expected to be within the capacity of current health care service providers, as well as service providers who may relocate to the study over the Project's life. Project closure is not expected to have adverse indirect impacts on health care or medical service providers in the Study Area.

Public Safety and Emergency Services. Construction and Operations have the potential to affect local law enforcement agencies by requiring the Fremont and Carbon county sheriff's offices; the Riverton, Lander, and Rawlins police departments; and the Wyoming Highway Patrol to provide traffic management and accident response services to workers commuting to and from the Project Area, and to vehicles hauling material, equipment and supplies to the site. During the 9 months of Heap Leach Pad and Ore Processing Facility construction, local law-enforcement officials could face an increase in traffic- and alcohol-related offenses committed by construction workers during their off-hours. Thus, construction of the Heap Leach Pad and Ore Processing Facility could have a short-term indirect impact on local law enforcement.

During Construction and Operations, the JCVFD would provide first-call emergency services to the Project Area. The handling of emergencies in the Project Area would follow Energy Fuels' Emergency Response Plan. On-site fire management systems in the Ore Processing Facility would include a firewater loop with hydrants and hose reels, sprinkler systems and fire extinguishers. In the absence of owner-provided on-site emergency equipment and emergency response personnel, Construction and Operations with on-site processing could place additional demands for emergency response services on the JCVFD that would result in indirect adverse impacts to the volunteer fire force.

Project-driven population growth could also increase demands on local law enforcement agencies and fire and emergency service providers. Given the expected level of population growth in any particular area, indirect impacts on local law enforcement agencies and emergency responders due to Project-related population growth are expected to be minimal. Project completion and any associated population losses are not expected to have adverse indirect impacts on public safety and emergency service providers in the Study Area.

Fiscal Conditions

Fiscal impacts associated with the Proposed Action would include mineral severance taxes, property taxes, and sales and use taxes. Severance tax revenues would be based on the assessed value of Project production and would be a direct impact of the Proposed Action. Property tax revenues would be based on the assessed values of Project production and facilities, and would also be a direct impact of the Proposed Action. Sales and use tax revenues from the Project's taxable expenditures would be a direct impact of the Proposed Action, and sales tax revenue from households' spending of income derived from the Project on taxable expenditures would be an indirect impact.

Under the Proposed Action, estimated annual production would range from a low of 388,000 pounds of uranium in the early years of Operations to a high of 1,736,000 pounds during peak production years (BRS Engineering, 2012). The annual average over 16 years of Operations would be 1,148,000 pounds of uranium. The tax revenues that are estimated to be associated with this production and discussed below do not imply that the Project would generate these levels of tax revenue each year.

Mineral Severance Taxes. Based on the Project's anticipated production rates, costs to mine the uranium ore, total production costs, and a final product price of $65 per pound, Energy Fuels estimates that severance tax revenue from the Proposed Action would average $1,153,750 per year over a 16 year production period (BRS Engineering, 2012). Applying severance tax distributions between FY 2005 and FY 2013, annual distributions from the Project would approximate $446,017 to the Permanent Wyoming Mineral Trust Fund; $329,031 to the Budget Reserve Account; $288,571 to the General Fund; and $90,131 to other state entities, including water development agencies, highway and county roads, and cities.

Property Taxes. Under the Proposed Action, Fremont County would receive annual property tax revenues based on the value of uranium production and the assessed value of facilities and equipment in the Project Area. Energy Fuels estimates that property taxes from the Proposed Action would average $2,186,500 per year over 16 years of production (BRS Engineering, 2012). Based on 2013 mill levies for the public entities with ad valorem taxing authority in Tax District 149 (where the Project Area is located), approximately 55 percent of property tax revenues ($1,204,537) would fund public education, 29 percent ($632,510) would fund Fremont County government, 10 percent ($215,048) would fund the Jeffrey City Water and Sewer District, 4 percent ($80,643) would fund the Jeffrey City Fire District, 1 percent ($26,881) would

fund the Popo Agie Conservation District, and 1 percent ($26,881) would fund recreation districts. Direct fiscal impacts to Fremont County due to property tax revenues would vary annually based on the level of production, the price of uranium, Project costs, local taxing rates (mill levies), and the depreciation of facilities and equipment.

Sales and Use Tax. Estimated Project expenditures and household spending were used to estimate sales and use tax revenues associated with the Proposed Action with on-site processing. The analysis applied several assumptions, all of which were intended to produce conservative revenue estimates. Based on industry averages, 40 percent of Energy Fuels' non-labor expenditures were assumed to be subject to sales or use tax. Sales tax revenues from household spending were estimated by adjusting the IMPLAN model's estimated total labor income to exclude benefits and tax liabilities. Nationally, benefits account for 29.7 percent of income (BLS, 2014c). Federal income taxes and social security insurance were estimated to account for 12 percent of income minus benefits (Peter G. Peterson Foundation, 2014). The resulting estimate of disposable income was further adjusted to consider spending on taxable items only. Nationally, 39.7 percent of household income is spent on housing and health care, which are not taxable (BLS, 2014d). Therefore, the sales tax revenues associated with household spending estimated in this analysis applied to 60.3 percent of the IMPLAN model's estimated disposable income.

The analysis assumed that all taxable Project expenditures would either be purchased in Fremont County and subject to Fremont County sales tax, or purchased outside the county and subject to Fremont County use tax at the point of purchase. Regarding household spending, the analysis assumed that 80 percent of taxable household spending would take place in the Study Area, with the remainder being spent in other counties. Based on estimated labor migration patterns, the analysis assumed that 80 percent of household spending within the Study Area would occur in Fremont County and that 20 percent of household spending within the Study Area would occur in Carbon County.

Taxable purchases made in Fremont County are subject to a 4 percent state tax rate and 1 percent General Purpose County Option Tax Rate. Taxable purchases made in Carbon County are subject to a 4 percent state tax rate, 1 percent General Purpose County Option Tax Rate, and 1 percent Specific Purpose County Option Tax Rate (Wyoming Department of Revenue, 2013). Based on the assumptions described above and current tax rates, annual sales tax revenue to the State of Wyoming would average $447,145 per year, sales and use tax revenue to Fremont County would average $102,751 per year, and sales tax revenue to Carbon County would average $8,031 per year over the life of the Project.

4.4.4.1.2 Impacts with Off-Site Processing

Table 4.4-7 summarizes the proposed workforce levels in the Project Area with off-site processing as discussed in Section 2.3.7. Local workers are expected to comprise approximately half of the Construction, Operations and Reclamation workforces for the Congo Pit and Sheep Underground Mine, and all ore haul truck drivers.

Table 4.4-7
Sheep Mountain Construction, Operations and Reclamation
Workforce Requirements in the Project Area

Project Component	Duration	Number of Workers		
		Local	Non-Local	Total
Construction				
Congo Pit	2 – 4 months	10	10	20
Sheep Underground Mine	18 months	25	25	50
Operations				
Congo Pit	8 years	21	20	41
Sheep Underground Mine	11 years	64	64	128
Ore Haul Truck Drivers[1]	Years 1 - 4	7	0	7
Ore Haul Truck Drivers[2]	Years 5 - 16	15	0	15
Reclamation Phase				
Congo Pit	5 years	12	12	24
Sheep Underground Mine	1 – 2 years	3	3	6

[1] Based on ore production from the Congo Pit only.
[2] Based on ore production from the Congo Pit and Sheep Underground Mine.

Figure 4.4-2 shows the estimated workforce levels in the Project Area with off-site processing.

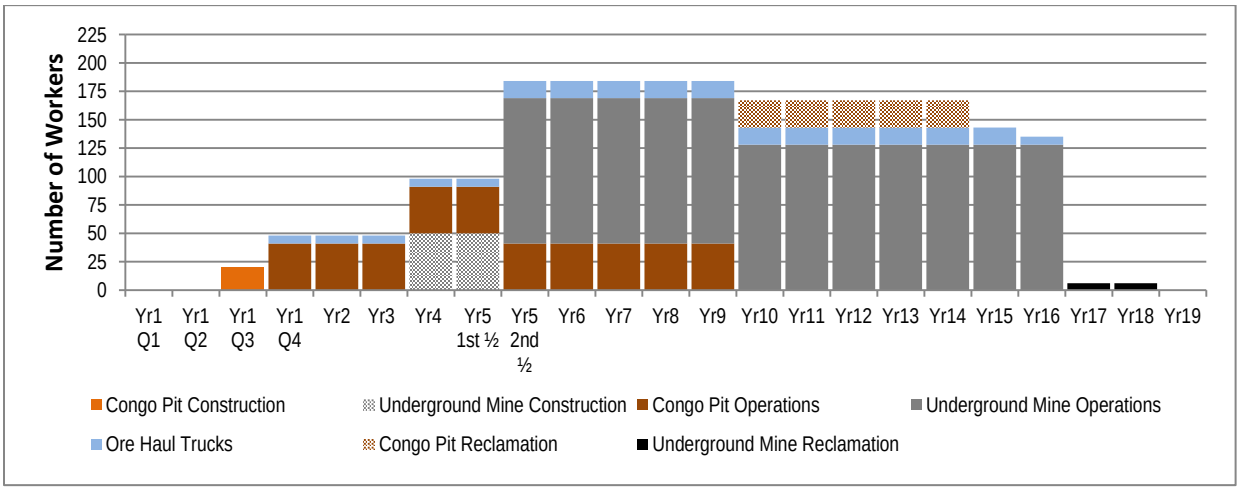


Figure 4.4-2
Proposed Action with Off-Site Processing: Estimated Workforce in the Project Area

In addition to the Project workers employed in the Project Area, Energy Fuels estimates that construction and refurbishment of the Sweetwater Mill would require approximately 55 construction workers over 6 months and that approximately 120 workers would be employed during mill operations. Although this section identifies the potential socioeconomic impacts associated with processing ore off-site, the current analysis focuses on evaluating the potential impacts of employment in the Project Area (mining personnel and ore haul truck drivers) on socioeconomic conditions in the Study Area.

Employment and Income

With off-site processing, direct Project employment and spending associated with mining in the Project Area would be key determinants of the Project's socioeconomic impacts, including secondary employment and income effects and regional economic growth. The methodology for converting workforce estimates to annual jobs is discussed above in Section 4.4.4.1.1.

During Project Year 1, when the Congo Pit would be constructed and Operations begin, direct Project employment would include 17 jobs. Energy Fuels would spend approximately $1.3 million in the Study Area in Year 1, including approximately $1.1 million on labor expenditures. Project and worker spending would support approximately five indirect and induced jobs in the Study Area; labor income associated with this employment would approximate $162,096. Output in the Study Area would expand by approximately $618,370 during Year 1 of the Proposed Action with off-site processing (see Table 4.4-8).

Table 4.4-8
Proposed Action with Off-Site Processing:
Average Annual Economic Impacts to the Study Area[1,2]

Impact Measure	Project Year 1	Project Years 2 – 3	Project Years 4 - 5	Project Years 6 - 16	Project Years 17 - 18
Employment[3]					
Direct	17	48	117	168	6
Indirect	1	2	6	6	2
Induced	4	9	11	16	1
Total	23	59	134	190	9
Labor Income					
Direct[4]	$1,077,984	$2,363,165	$2,984,323	$4,660,840	$269,885
Indirect	$27,548	$107,227	$246,923	$291,515	$97,113
Induced	$134,548	$294,112	$376,466	$528,368	$45,520
Total	$1,240,080	$2,764,504	$3,607,712	$5,480,723	$412,518
Value Added					
Direct	$276,624	$1,811,424	$1,618,573	$3,700,276	$581,652
Indirect	$53,658	$208,792	$424,098	$577,207	$174,370
Induced	$288,088	$629,736	$806,124	$1,131,307	$97,461
Total	$618,370	$2,649,952	$2,848,795	$5,408,790	$853,483
Output					
Direct[5]	$1,264,242	$5,030,098	$7,263,446	$15,073,941	$1,388,163
Indirect	$95,920	$377,061	$768,760	$1,061,774	$318,131
Induced	$455,547	$995,784	$1,274,694	$1,788,902	$154,110
Total	$1,815,709	$6,402,943	$9,306,900	$17,924,617	$1,860,404

[1] Source: IMPLAN v.3.1 data for 2012: Fremont and Carbon counties.
[2] Based on employment, labor income and Project expenditures associated with Construction, Operations, and Reclamation in the Project Area. Does not include employment, labor income and expenditures associated with off-site processing.
[3] Total annual average jobs, including all full-time, part-time and seasonal jobs. Total annual jobs equals the number of workers employed during a year multiplied by the portion of the year they are employed.
[4] Based on annual labor expenditures reported in BRS Engineering, 2012.
[5] Based on annual expenditures reported in BRS Engineering, 2012.

During Project Years 2 and 3, when the Congo Pit would be operating and ore would be hauled to the Sweetwater Mill for processing, direct Project employment would include 48 jobs per year. Energy Fuels would spend approximately $5 million in the Study Area each year, including $2.4 million on annual labor expenditures. Project and worker spending would support approximately 11 indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $401,338. Output in the Study Area would expand by an average of $2.65 million annually during Years 2 and 3 of the Proposed Action with off-site processing.

Between Project Years 4 and 5, when the Congo Pit would be operating, ore would be hauled to the Sweetwater Mill, and the Sheep Mountain Mine would be under construction, direct Project employment would include an average of 117 jobs per year. On average, Energy Fuels would spend approximately $7.3 million in the Study Area each year, including approximately $3 million on annual labor expenditures. Project and worker spending would support approximately 16 indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $623,448. Output in the Study Area would expand by an average of $2.85 million annually during Years 4 and 5 of the Proposed Action with off-site processing.

During Operations in Project Years 6 through 16, direct Project employment would include an average of 168 jobs per year. On average, Energy Fuels would spend approximately $15.1 million in the Study Area each year, including $4.7 million on annual labor expenditures. Project and worker spending would support approximately 22 indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $819,883. During this time, output in the Study Area would expand by an average of $5.4 million annually.

During Reclamation of the Sheep Underground Mine in Project Years 17 and 18, direct Project employment would include six jobs per year. Energy Fuels would spend approximately $1.4 million in the Study Area each year, including approximately $269,885 on annual labor expenditures. Project and worker spending would support approximately three indirect and induced jobs in the Study Area each year; annual labor income associated with this employment would average $142,633 per year. During this time, output in the Study Area would expand by approximately $853,483 annually.

Project employment and spending associated with Construction, Operations, and Reclamation of the Sweetwater Mill would generate additional indirect and induced employment and income impacts. Although estimating the economic impacts of spending at the Sweetwater Mill is beyond the scope of the current analysis, most of these effects would be likely to occur in Sweetwater and Carbon counties.

Population

Mining in the Project Area is expected to attract workers from across Wyoming and neighboring states. Under the Proposed Action with off-site processing, net labor migration into the Study Area would occur periodically between Project Years 1 and 5. Based on average household and family sizes in Wyoming, population growth associated with Project-driven labor migration is projected to add between 211 and 256 residents to the Study Area over 5 years (see Table 4.4-9). These estimated population impacts may overstate actual changes in the Study Area's population by the extent to which dependents would not accompany some relocating workers, and some non-local workers would relocate to surrounding counties rather than the Study Area.

Potential population growth associated with mining in the Project Area would be within the range of growth that has occurred in the Study Area over the past several years and is not expected to impact population trends in Fremont and Carbon counties. Assuming that 60 percent of relocating mining personnel would settle in Riverton, 20 percent would settle in Lander, and 20 percent would settle in Rawlins, the estimated Project-driven growth in each municipality is within the range of recent population gains.

Table 4.4-9
Proposed Action with Off-Site Processing:
Potential Population Change in the Study Area[1]

Population Measure	Project Year 1	Project Year 4	Project Year 5	Total
Net Labor Migration into the Study Area				
Congo Pit	20	--	--	20
Sheep Underground Mine	--	25	39	64
Total relocating workers	20	25	39	84
Projected Population Growth in the Study Area				
Based on household size (2.52)	50	63	98	211
Based on family size (3.04)	61	76	119	256
Project-Related Population Growth in Study Area Towns				
Riverton[2]	30 - 36	38- 46	59 - 71	127 - 153
Lander[3]	10 - 12	13 - 15	20 - 24	42 - 51
Rawlins[4]	10 - 12	13 - 15	20 - 24	42 - 51

[1] Based on Project workers in the Project Area only.
[2] Assumes that 60 percent of migrating Project workers relocate to Riverton.
[3] Assumes that 20 percent of migrating Project workers relocate to Lander.
[4] Assumes that 20 percent of migrating Project workers relocate to Rawlins.

Population change could also result from labor in-migration at the Sweetwater Mill. Energy Fuels' estimation that non-local workers would comprise approximately 70 percent of the Sweetwater Mill's operational workforce would result in the immigration of approximately 84 workers in Project Year 1. Based on average household and family sizes in Wyoming, and the assumption that dependents would accompany all relocating workers, population growth could include between 212 and 255 new residents. Estimating population distribution associated with labor migration at the Sweetwater Mill is beyond the scope of the current analysis. However, most relocating workers would be likely to settle in the communities closest to the mill, including Bairoil, Wamsutter, and Rawlins. Population growth associated with migrating mill workers would not be likely to affect population trends in Rawlins, but could affect the smaller communities of Bairoil and Wamsutter if sufficient numbers of mill workers chose to relocate to those towns.

Reclamation of the Congo Pit and Sheep Underground Mine could lead to out-migration in Fremont and Carbon counties if former Project workers were unable to secure alternative employment in the Study Area. Similarly, closure of the Sweetwater Mill could result in out-migration in Sweetwater and Carbon counties. Regional economic growth would be likely to offset any population losses at the county level, and it is not likely that the populations of Riverton, Lander, or Rawlins would be noticeably impacted by Project closure. In the absence of other local economic activities, noticeable out-migration of population due to Project closure would be expected in Bairoil, Jeffrey City, Sweetwater Station, and Wamsutter.

Boom and Bust Characteristics

Based on the scale of potential population change relative to current population levels, Project-driven population growth is not likely to contribute to boom-bust development patterns in Riverton, Lander, or Rawlins. Small communities close to the Project Area (Jeffrey City and Sweetwater Station) and the Sweetwater Mill (Bairoil and Wamsutter) could be affected if sufficient numbers of migrating workers relocated to these areas over the life of the Proposed Action and out-migrate upon Project completion.

Housing

Short-term Housing. Construction in the Project Area is expected to result in negligible incremental demand for short-term housing in the Study Area. Energy Fuels expects that approximately 70 percent of the temporary workforce required to construct and refurbish the Sweetwater Mill would consist of non-local workers. Accordingly, approximately 39 construction workers at the Sweetwater Mill would require short-term housing. Based on the availability of short-term housing accommodations, most of these workers would be expected to stay in Rawlins. The potential demand for short-term housing by the mill's construction workforce represents approximately 5 percent of the motel rooms in Rawlins and approximately 4 percent of the motel rooms and RV sites in Rawlins. Consequently, the Proposed Action is not expected to have a significant indirect impact on short-term housing markets in the Study Area.

Long-term housing. Labor in-migration due to mining in the Project Area is expected to result in the demand for 85 additional housing units between Project Years 1 and 5. Most workers in the Project Area would be likely to seek long-term housing resources in Riverton, Lander, and Rawlins. Applying the average 2010 homeownership rate of 72 percent in Fremont and Carbon counties to relocating households, during the first 5 years of project implementation, approximately 61 relocating households would purchase homes and 24 new households would rent.

Labor in-migration due to uranium processing at the Sweetwater Mill is expected to result in the demand for 84 additional housing units during the first year of project implementation. Most operational workers at the mill would be likely to seek long-term housing resources in communities closest to the mill. Applying the average 2010 homeownership rate of 72 percent in Sweetwater and Carbon counties to relocating households, approximately 60 relocating households would purchase homes and 24 new households would rent.

The demand for housing by workers in the Project Area and at the Sweetwater Mill could stimulate Rawlins' housing market. Additional short-term indirect impacts to local housing markets may include increased housing costs (residential sale prices and rental rates), which would make it more difficult for low-income households to secure affordable housing. Long-term indirect impacts associated with the Proposed Action could include stimulated residential construction markets in communities near the Project Area and the Sweetwater Mill.

Community Services and Public Infrastructure

Schools. With off-site processing, potential indirect impacts to Fremont school districts #1 and #25 due to Project-driven population growth would be comparable to impacts under the Proposed Action with on-site processing. Indirect impacts to Carbon School District #1 could be more noticeable as Rawlins may attract in-migrating households associated with both the Project Area and the Sweetwater Mill. In addition, Carbon School District #1 would be impacted by new households relocating in eastern Sweetwater County as students from Bairoil and Wamsutter are bussed to Rawlins for junior and high school, and elementary school students in Bairoil are currently bussed to Sinclair Elementary School.

Medical Services. Non-local construction workers at the Sweetwater Mill would be likely to use the Wamsutter Community Health Center or urgent care clinics and Memorial Hospital in Rawlins for urgent, but non-emergency, medical needs. Because the non-local construction workforce at the Sweetwater Mill is estimated to peak at 39 workers, the demand for health care services by non-local construction workers is not expected to adversely affect regional health care providers. During Project operations, emergency response plans would be in place in the Project Area and at the Sweetwater Mill that would limit the need for medical services due to accidents at either location. The incremental demand for medical services likely to be

associated with mining in the Project Area and uranium processing at the Sweetwater Mill is expected to be within the capacity of current health care providers, as well as providers who may relocate to the Study Area during the period in which the Project is implemented.

With off-site processing, potential impacts to medical service providers in Fremont County due to Project-driven population growth would be comparable to impacts under the Proposed Action with on-site processing. Due in large part to the lack of medical services in eastern Sweetwater County, Project-driven population growth associated with mining in the Project Area and processing at the Sweetwater Mill could combine to impact medical service providers in Rawlins. Project closure is not expected to have adverse indirect impacts on health care or medical service providers.

Public Safety and Emergency Services. Construction and Operations in the Project Area and at the Sweetwater Mill could impact local law enforcement agencies by requiring the Fremont, Carbon, and Sweetwater county sheriff's offices; the Riverton, Lander, and Rawlins police departments; and the Wyoming Highway Patrol to provide traffic management and accident response services to workers commuting to and from the Project Area and Sweetwater Mill, and to vehicles hauling material, equipment, and supplies to both sites. Construction and refurbishment of the Sweetwater Mill could place additional demands on local law enforcement officials due to an increase in traffic- and alcohol-related offenses committed by construction workers during their off-hours.

Although emergency response plans would be in place at both locations, mining in the Project Area could place additional demands for emergency response services on the JCVFD and uranium processing at the Sweetwater Mill could place additional demands for emergency response services on the Wamsutter VFD. In the absence of owner-provided on-site emergency equipment and emergency response personnel, construction and operation of the Proposed Action with off-site processing are expected to result in indirect impacts to the Jeffrey City and Wamsutter VFDs.

Project-driven population growth could also increase demands on local law enforcement agencies and fire and emergency services. Indirect impacts on local law enforcement agencies and emergency responders in Fremont County due to incremental population growth are expected to be minimal. Indirect impacts on local law enforcement agencies and emergency responders in Carbon and eastern Sweetwater counties due to incremental population growth could be more substantial, especially in Bairoil, which currently has no local fire department (Urbatsch, 2014). Project closure and any associated population losses are not expected to have adverse indirect impacts on public safety and emergency service providers in the region.

Fiscal Impacts

Severance Taxes. Because severance taxes are not specific to the location of the severed material, the estimated severance tax revenues that would be paid under the Proposed Action with off-site processing would be unchanged from the severance tax revenues that would be paid under the Proposed Action with on-site processing.

Property Taxes. Under the Proposed Action with off-site processing, Fremont County would receive property tax revenue based on uranium production and the assessed value of facilities and equipment in the Project Area, and Sweetwater County would receive property tax revenue based on the assessed value of facilities and equipment at the Sweetwater Mill. Because production would account for the vast majority of property tax revenue, overall, property tax revenue to Fremont County would decrease slightly from the average $2,186,500 per year

estimated by Energy Fuels as production would account for the vast majority of property tax revenue.

Sales taxes. Applying the same assumptions as those used to estimate sales tax revenue under the Proposed Action with on-site processing, annual sales tax revenue to the State of Wyoming would average $353,085 per year, sales and use tax revenue to Fremont County would average $82,182 per year, and sales tax revenue to Carbon County would average $6,766 per year over the life of the Project. Additional sales tax revenue would accrue from Project spending at the Sweetwater Mill and from households' spending of income derived from the mill. Although estimating sales tax revenue associated with the Sweetwater Mill is beyond the scope of the current analysis, much of the mill's spending and the spending of households supported by the mill would be likely to occur in Carbon and Sweetwater counties, thereby providing additional sales tax revenues to these two counties.

4.4.4.1.3 Monitoring and/or Compliance

No monitoring and/or compliance measures are required for Socioeconomics.

4.4.4.2 BLM Mitigation Alternative

4.4.4.2.1 Impacts

Potential direct and indirect impacts to Socioeconomics under the BLM Mitigation Alternative would be unchanged from those for the Proposed Action. To ensure that health, safety, and community service needs are addressed, Energy Fuels would maintain active and open communication with governmental entities throughout the life of the Project (SE-1 in Table 2.4-1).

4.4.4.2.2 Monitoring and/or Compliance

No monitoring and/or compliance for socioeconomics would be required under the BLM Mitigation Alternative.

4.4.4.3 No Action Alternative

Under the No Action Alternative, surface and underground mining and ore processing would not occur in the Project Area or at the Sweetwater Mill, and there would be no change to current socioeconomic conditions and trends in the Study Area. There would be no Project-driven labor migration or population change, and no increased demand for housing and community services by relocating households. There would be no demand for emergency response services at the Project Area or the Sweetwater Mill due to Project activity. There would be no severance tax revenues to the State of Wyoming or property tax revenues to Fremont County from uranium production, and no Project-related sales tax revenues to the state and counties. Energy Fuels would continue to pay approximately $1,079 in annual property taxes for the Sheep Mountain property.

4.4.5 Environmental Justice

EO 12898 requires that every federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority population and low-income populations." The EPA has lead responsibility for implementation of the EO. The EPA recommends a screening process to identify environmental justice concerns that addresses the following issues:

- Potential presence of minority and/or low-income populations in the affected community; and

- Likelihood that the environmental impacts will fall disproportionately on minority and/or low-income members of the community and/or a tribal resource.

If the screening process indicates that there is a potential for environmental justice effects, the EPA recommends that the following factors be considered in the analysis:

- Potential for a disproportionate risk of high and adverse human health or environmental effects;
- Sufficient involvement of potentially affected communities in the decision-making process; and
- Extent to which affected communities currently suffer, or have historically suffered, from environmental and health risks and hazards (EPA, 1998).

The potential for Environmental Justice impacts were evaluated using the CEQ's "meaningfully greater" criterion population analysis in which minority and low-income populations in the Study Area (Fremont and Carbon counties) and communities surrounding the Project Area (the Jeffrey City Census County Division) were compared to state-wide reference populations (CEQ, 1997). Minority and low-income populations equal to or greater than 120 percent of the state-wide relevant population were considered to be "meaningfully greater" populations. This criterion level was selected because it is commonly used for NEPA compliance by federal agencies. Minority and low-income populations identified as "meaningfully greater" were evaluated for potential effects that could disproportionately impact any such populations.

4.4.5.1 Proposed Action Alternative

4.4.5.1.1 Impacts with On-Site Processing

"Meaningfully greater" minority populations in the Study Area include Native American and low-income populations in Fremont County (21.1 percent and 15.2 percent, respectively, of the county's population) and Hispanic populations in Carbon County (16.7 percent of the county's population). Most of Fremont County's Native American population lives on the Wind River Indian Reservation. The nearest reservation boundary is approximately 60 miles northwest of the Project Area. The portion of Fremont County where the Project Area is located (the Jeffrey City Census County Division) is sparsely populated, with a total of 92 residents spread across 1,964 square miles (Census Bureau, 2013a). According to the Census Bureau's 2012 ACS, the Jeffrey City Census County Division contains no minority populations. Statewide, minority populations account for 8.8 percent, and Hispanic populations account for 8.9 percent of the total population. Therefore, the potential direct environmental effects of the Proposed Action would not be expected to disproportionately affect minority or low-income populations.

Indirect effects that could occur at a greater distance from the Project Area, such as air quality, housing, or traffic effects, would affect the study area's population equitably, without regard to race or ethnicity. For example, Project-related traffic would be heaviest on Crooks Gap/Wamsutter Road, between Jeffrey City and the Project Area, where few residents live. Trucks hauling yellowcake for further processing would travel on US Highway 287/WY 789 through eastern Fremont County and western Carbon County to access Interstate-80, but would add only a very small increment to the existing traffic volumes on these highways. Native American populations in Fremont County and Hispanic populations in Carbon County are not expected to be disproportionately affected by Construction or Operation of the Proposed Action with on-site processing. Although the increased demand for housing by Project workers could make it difficult for low-income populations in Fremont County to find affordable housing, the direct, indirect and induced jobs associated with the Proposed Action would create additional job opportunities for some low-income individuals.

Regarding whether communities have been sufficiently involved in the decision-making process, the BLM held three public scoping meetings and distributed public notices about the Sheep Mountain Uranium Project through mailings and notices in area newspapers and formal notice in the Federal Register (see Section 1.4.1). In addition, the BLM toured the Project Area with tribal representatives in order to elicit comments about the Sheep Mountain Project and potential sites of religious or cultural significance (see Section 4.4.3).

4.4.5.1.2 Impacts with Off-Site Processing

If Sheep Mountain ore is processed off-site, the direct impacts to Environmental Justice in the Study Area would be unchanged from those evaluated with on-site processing. Indirect impacts related to increased truck traffic on Crooks Gap/Wamsutter Road and Minerals Exploration Road, between the Project Area and the Sweetwater Mill would affect the Study Area's population equitably, without regard to race or ethnicity. The potential indirect housing impacts on low-income populations in Fremont County are likely to be partially offset by increased job opportunities created by the Proposed Action.

The NRC has jurisdiction over processing uranium into U_3O_8 or yellowcake, and the BLM's authority is limited to determining whether the approach to uranium mining and reclamation selected by Energy Fuels would result in undue or unnecessary degradation of public surface. Therefore, within the current document, the Study Area in which to evaluate potential impacts to Environmental Justice was not expanded to include Sweetwater County.

4.4.5.1.3 Monitoring and/or Compliance

No monitoring and/or compliance measures are required for Environmental Justice.

4.4.5.2 BLM Mitigation Alternative

4.4.5.2.1 Impacts

Potential direct and indirect impacts to Environmental Justice under the BLM Mitigation Alternative would be unchanged from those for the Proposed Action.

4.4.5.2.2 Monitoring and/or Compliance

No monitoring and/or compliance measures are required for Environmental Justice.

4.4.5.3 No Action Alternative

Neither the Proposed Action nor the BLM Mitigation Alternative would occur under the No Action Alternative, and there would be no impacts to Environmental Justice caused by Energy Fuels' on-going reclamation obligations.

4.4.6 Transportation/Access

Potential issues associated with transportation/access were identified by the BLM through the public scoping process, as well as internal scoping. Issues include:

- Increased on- and off-road traffic; and
- Construction of new roads and modifications to existing roads.

Direct impacts to transportation were evaluated by comparing estimates of Project-related traffic with traffic levels on state highways reported by the WYDOT. Existing traffic levels on county roads that would be used to access the Project Area were not available. Due to the lack of comparable data, indirect impacts to road maintenance and vehicle crashes were assessed qualitatively. Indirect impacts to highway fatalities were evaluated by comparing estimated project-related vehicle miles with historic fatality rates reported by the NHTSA.

Assumptions used to analyze impacts to transportation and access include:

- project traffic would use the access routes described in the Sheep Mountain Transportation Plan (Appendix 2-A) and summarized in Section 3.4.6.1;
- the majority of project traffic is expected to originate in Riverton, Lander, and Rawlins. A few vehicles could also travel to the Project Area from Casper;
- heavy vehicles required for Construction, Operations, and Reclamation of the Congo Pit and Sheep Underground Mine would remain on-site;
- over the road vehicles would comply with all applicable USDOT, WYDOT, and MSHA rules and regulations;
- all use of Fremont, Carbon, and Sweetwater county roads would be conducted in accordance with county regulations; and
- all roads in the Project Area would be constructed to design specifications contained in BLM Manual 9113 (BLM, 2011c).

4.4.6.1 Proposed Action Alternative

4.4.6.1.1 Impacts with On-Site Processing

Based on the estimated vehicle round-trips discussed in Section 2.3.8 and the Project's development schedule summarized in Section 2.3.6, Figure 4.4-3 shows the estimated number of vehicle round-trips per day during each year of the Project's life, assuming that ore is processed on-site. During construction of the Heap Leach Pad/Ore Processing Facility and Congo Pit in Year 1, Project traffic would include between 61 and 71 vehicle round-trips per day. Traffic in Years 2 and 3 would include approximately 42 vehicle round-trips per day associated with operation of the Congo Pit and Heap Leach Pad/Ore Processing Facility. Project traffic would increase to approximately 67 vehicle round-trips per day in Year 4, when the Sheep Underground Mine would be under construction. Traffic levels would be highest between Years 5 and 9, when the Congo Pit, Sheep Underground Mine, and Heap Leach Pad/Ore Processing Facility would all be operating. Traffic would begin to decrease with closure of the Congo Pit in Year 10, would decrease further upon completion of Reclamation at the Congo Pit in Year 16, and would decrease again with Reclamation of the Sheep Underground Mine and Heap Leach Pad/Ore Processing Facility in Year 17. Traffic during the final three years of the Project's scheduled life would include approximately 27 vehicle round-trips per day associated with Reclamation of the Sheep Underground Mine and Heap Leach Pad/Ore Processing Facility.

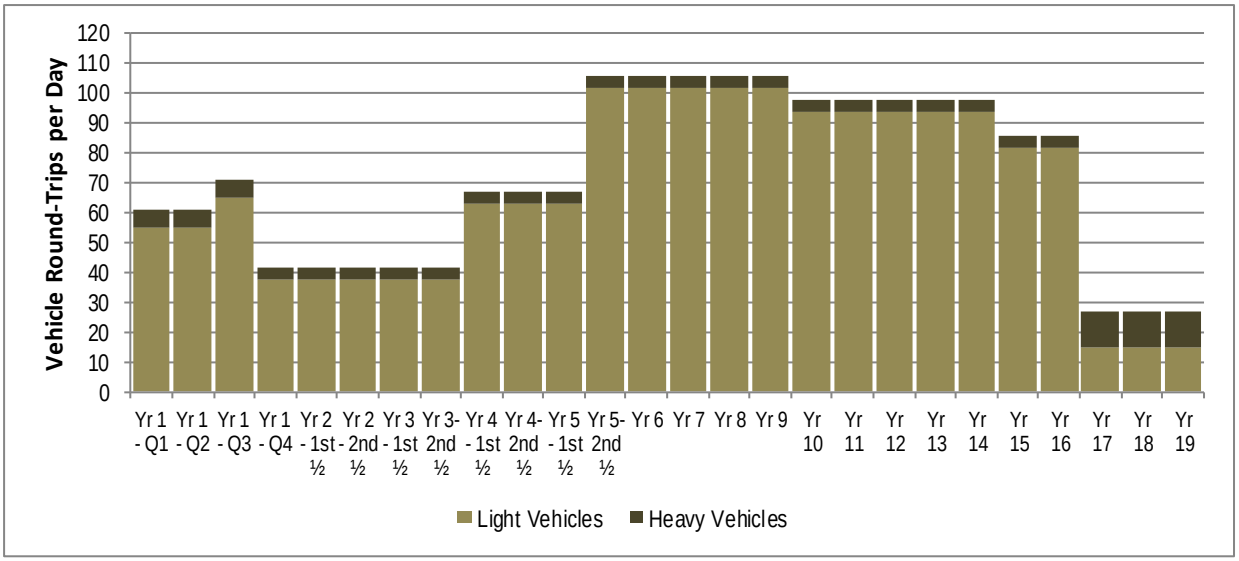


Figure 4.4-3
Peak Vehicle Round-Trips per Day with On-Site Processing

These Project-related vehicle round-trips would result in direct impacts to transportation through additional vehicle trips on affected roadways. Direct impacts would peak between Years 5 and 9. Based on the assumption that 70 percent of Project-related traffic would originate in Lander and Riverton, 25 percent would originate in Rawlins, and 5 percent would originate in Casper, peak Project traffic would result in the following traffic increases on state highways compared to 2011 traffic levels:

- a 2 percent increase in traffic on US Highway 287/WY 789 between Rawlins and Jeffrey City;
- a 6.5 percent increase in traffic on US Highway 287/WY 789 between Lander and Jeffrey City;
- a 15 percent increase in traffic on WY 135 between Sweetwater Station and WY 136;
- a 67 percent increase in traffic on WY 136 between WY 135 and WY 789 south of Riverton;
- a 1 percent increase in traffic on WY 789 between Riverton and WY 136; and
- less than a 1 percent increase in traffic on WY 220 between Muddy Gap and Casper.

Although increased traffic volumes would be noticeable on WY 135 and WY 136, they are not expected to exceed the capacity of any state highway. The 67 percent increase in traffic on WY 136 is high, in part, because current traffic levels are so low; WYDOT reports a 2011 AADT of 222 on WY 136 (WYDOT, 2012a). Traffic impacts between Years 1 and 4 would be 40 to 60 percent of peak impacts. Traffic impacts between Years 10 and 16 would be 80 to 90 percent of peak impacts. Traffic impacts in Years 17 through 19 would be 25 percent of peak impacts.

Project traffic would result in a sizeable increase in traffic on Crooks Gap/Wamsutter Road between Jeffrey City and the Project Area. Traffic counts for Crooks Gap/Wamsutter Road are not available for comparison, but Project-related vehicles would result in a noticeable increase in traffic on Crooks Gap/Wamsutter Road between Jeffrey City and the Project Area throughout Construction, Operations, and Reclamation.

Indirect impacts would include increased road deterioration and a consequent increase in maintenance requirements on roads affected by traffic increases, increased vehicular noise,

increased dust on unpaved roads, and increased opportunities for vehicular crashes. Dust suppression would be implemented by spraying water on unpaved roads on an as-needed basis. Energy Fuels would coordinate the maintenance of county roads with Fremont and Sweetwater counties based on county road use, improvement, and maintenance agreements that would be put into effect prior to the start of mining, and would be responsible for all maintenance actions necessary to provide all weather access to the Project Area. Energy Fuels' county road use, improvement, and maintenance agreements with the counties would include provisions addressing the repair of existing roads due to damages caused by Construction, Operations, and Reclamation traffic. Energy Fuels would maintain on-site roads in accordance with BLM 9113 Manual specifications. Maintenance would include, but not be limited to dust abatement; reconstruction of the crown, slope, and/or water bars; blading or resurfacing; material application; clean-out of ditches, culverts, and catchments; snow plowing; and other BMPs.

Peak traffic would result in an estimated 643,124 Project-related miles traveled on state highways each year. Based on a fatal accident rate of 1.57 fatalities per hundred million vehicle miles traveled on rural roads in Wyoming, this could result in an additional 0.01 highway fatalities each year, or 1 highway fatality every 100 years (NHTSA, 2014). Resource-specific impacts associated with the use of existing roads and the construction of new roads in the Project Area are discussed in others sections of this chapter.

4.4.6.1.2 Impacts with Off-Site Processing

Based on estimated vehicle round-trips for mining personnel and trucks hauling uranium ore to the Sweetwater Mill (see Section 2.3.8), Figure 4.4-4 shows the estimated vehicle round-trips per day during each year of the Project's scheduled life, assuming that ore is processed off-site.

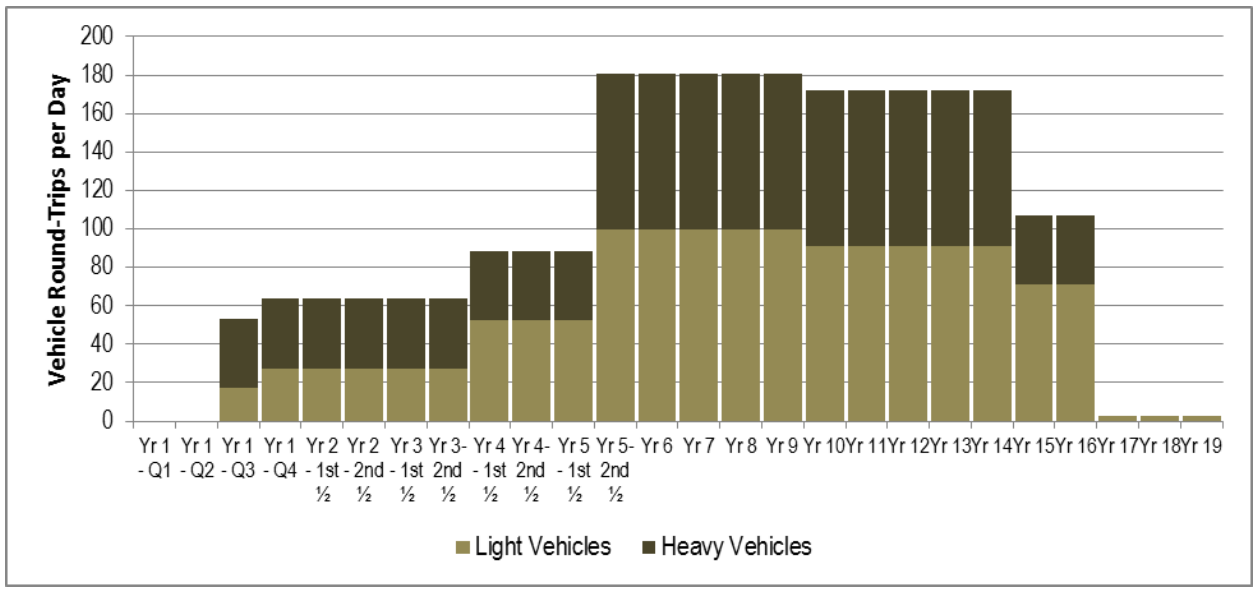


Figure 4.4-4
Peak Vehicle Round-Trips per Day with Off-Site Processing

Between Project years 1 and 3, Project traffic would include Congo Pit worker vehicles and ore haul trucks, and would range from approximately 53 to 64 vehicle round-trips per day. Traffic would increase to approximately 89 vehicle round-trips per day in years 4 and 5, when construction traffic for the Sheep Underground Mine would add to the Congo Pit's operational traffic and ore haul traffic. This analysis assumes that 35 truckloads of ore per day (approximately half of the maximum potential ore haul traffic) would be hauled to the Sweetwater Mill with only the Congo Pit in operation.

With the Sheep Underground Mine in operation, Project traffic would peak at 181 vehicles per day between late Year 5 and Year 9. Traffic would decrease to 172 vehicle round-trips per day between years 10 and 14, when Reclamation traffic for the Congo Pit would join Operations traffic at the Sheep Underground Mine and ore haul trucks (the analysis assumes that 80 truckloads of ore per day would be hauled to the Sweetwater Mill with both the surface and underground mines producing). Upon completion of the reclamation of the Congo Pit, Project traffic would fall to approximately 107 vehicle round-trips per day, which would include operational traffic for the Sheep Underground Mine and approximately 35 ore haul trips per day (assuming decreasing mine productivity). Traffic during the final 3 years of Project life would include approximately three vehicle round-trips per day associated with reclamation of the Sheep Underground Mine.

The direct impacts of Project-related vehicle trips on affected roads would be greatest with the Congo Pit and Sheep Underground Mine in operation and ore from both mines being transported to the Sweetwater Mill (Years 5 to 9). The Project-related traffic with off-site processing would include ore haul trucks that would not travel on state highways. Assuming that 70 percent of the Project's highway traffic would originate in Lander and Riverton, 25 percent of the highway traffic would originate in Rawlins, and 5 percent of the highway traffic would originate in Casper, peak Project traffic would result in the following traffic increases on state highways compared to 2011 traffic levels:

- a 2 percent increase in traffic on US Highway 287/WY 789 between Rawlins and Jeffrey City;
- a 6 percent increase in traffic on US Highway 287/WY 789 between Lander and Jeffrey City;
- a 14 percent increase in traffic on WY 135 between Sweetwater Station and WY 136;
- a 63 percent increase in traffic on WY 136 between WY 135 and WY 789 south of Riverton;
- a 1 percent increase in traffic on WY 789 between Riverton and WY 136; and
- less than a 1 percent increase in traffic on WY 220 between Muddy Gap and Casper.

Between Years 1 and 3, traffic impacts would be approximately 35 percent of peak impacts. Traffic impacts in Years 4 and 5 would be approximately 50 percent of peak impacts. Traffic impacts between Years 10 and 16 would be 60 to 95 percent of peak impacts. Traffic impacts during between Years 17 and 19 would be approximately 2 percent of peak impacts.

Project vehicles would result in a notable increase in traffic on Crooks Gap/Wamsutter Road between Jeffrey City and the Project Area. Ore haul trucks would lead to even greater traffic increases on Crooks Gap/Wamsutter Road and the western-most 3 miles of Minerals Exploration Road between the Project Area and Sweetwater Mill. Project traffic on these roads would remain high throughout mining operations in the Project Area.

Indirect impacts under this alternative would be similar to those under the Proposed Action with on-site processing, and would include increased road deterioration and an increase in maintenance requirements on roads affected by traffic increases, increased vehicular noise, increased dust on unpaved roads, and increased opportunities for vehicular crashes. Measures implemented by Energy Fuels to minimize these impacts would be similar to those described above for the Proposed Action with on-site processing. If ore is processed at the Sweetwater Mill, Energy Fuels would comply with Sweetwater County road use, improvement, and maintenance agreements and BLM roadway maintenance agreements in coordination with the Sweetwater Mill.

Peak traffic would result in an estimated 606,395 Project-related highway miles each year. Based on a fatal accident rate of 1.57 fatalities per hundred million vehicle miles traveled on rural roads in Wyoming, this could result in an additional 0.0095 highway fatalities each year, or 1 highway fatality every 106 years (NHTSA, 2014).

4.4.6.1.3 Monitoring and/or Compliance

No monitoring and/or compliance measures would be required for transportation and access.

4.4.6.2 BLM Mitigation Alternative

4.4.6.2.1 Impacts

The BLM Mitigation Alternative would use the same mining and ore processing procedures over the same timeframe as the Proposed Action Alternative. Under the BLM Mitigation Alternative, if on-site processing occurs, Energy Fuels would be required to identify and reclaim or enhance the reclamation of a portion of ground within the Project Area equal to the area to be removed from the public domain and transferred to the State of Wyoming or the DOE (TRA-1 in Table 2.4-1). Energy Fuels would be required to obtain agreements with appropriate county transportation departments or other road owners for which use is proposed. In particular, if off-site processing were to occur, agreements with appropriate counties would be required for hauling along the Crooks Gap/Wamsutter Road (TRA-2 in Table 2.4-1).

Under the BLM Mitigation Alternative, the direct impacts of additional vehicle trips associated with Construction, Operations, and Reclamation would be unchanged from those described for the Proposed Action. Indirect impacts, including increased road deterioration and an increase in maintenance requirements on roads affected by traffic increases, increased vehicular noise, increased dust on unpaved roads, increased opportunities for vehicular crashes, and additional increases in traffic to the Sweetwater Mill related to mill employees and deliveries would also be unchanged from the Proposed Action. Additional indirect impacts under the BLM Mitigation Alternative would include enhanced post-reclamation recreational opportunities, improved public safety, increased productivity of reclaimed areas through the restoration of natural conditions, improved wildlife habitat through enhanced revegetation, and decreased soil erosion, sedimentation, and habitat fragmentation.

In their comment letter on the Preliminary Draft EIS dated February 23, 2015 Sweetwater County summarized the additional maintenance requirements that would be required to accommodate Project traffic:

- Crooks Gap/Wamsutter Road (4-23) – In order to utilize the upper Crooks Gap/Wamsutter Road as a haul road for the 70 to 80 heavy vehicle trips per day, additional road improvements and maintenance requirements, beyond what are currently being implemented by Sweetwater County and UR Energy, may be required. If this road is to be utilized as a haul road to the Sweetwater Mill, Sweetwater County may require a road use, improvement and maintenance agreement prior to project commencement.
- Minerals Exploration Road (4-63) – Within Sweetwater County, major improvements to the pavement of the Minerals Exploration Road would be required to utilize it for the

traffic levels as projected. If Minerals Exploration Road is to be utilized as a haul road in conjunction with the Sweetwater Mill, Sweetwater County may require a road use, improvement and maintenance agreement prior to the commencement of the Project.

- Bairoil Road (4-22) - Sweetwater County recommends against utilizing this road for Project purposes unless a significant capital investment is made to improve its condition for future maintenance.

4.4.6.2.2 Monitoring and/or Compliance

No monitoring and/or compliance measures would be required for transportation and access.

4.4.6.3 No Action Alternative

Under the No Action Alternative, mining and ore processing would not occur at the Sheep Mountain Project Area and ore processing would not occur at the Sweetwater Mill. There are approximately 6.5 miles of existing roads in the Project Area that connect previously constructed components of the Project. Under the No Action Alternative, some of these roads would be reclaimed due to current obligations under existing permits including the Project Access Road to the Sheep Declines Shop and McIntosh Pit up to the Sheep II Shaft, and Hanks Draw Road up to the Sheep I Shaft.

4.4.7 Public Health and Safety

The primary issues associated with public health and safety were identified by the BLM through internal scoping, consultation with cooperating agencies, and through comments provided during the scoping process, and include the following:

- health impacts from current radiological levels within the Project Area and from any increase to those levels from the Proposed Action;
- disclosure of the types and amounts of hazardous materials to be used and the types and amounts of solid and radioactive waste that would be generated;
- storage of hazardous materials, measures for spill containment, and protection of soil and groundwater; and
- likelihood of a transportation-related release of hazardous or radioactive materials and the potential impacts of such a release.

4.4.7.1 Proposed Action Alternative

4.4.7.1.1 Impacts with On-Site Processing

The BLM recognizes the NRC's expertise in, and jurisdiction over, the control and proper use of radiological materials, and therefore the analysis presented herein discloses impacts over which the BLM has no jurisdiction in regulating.

Impacts to public health and safety were identified using the following assumptions:

- enclosed buildings would be sufficiently ventilated to protect workers from excessive radon exposure;
- radioactivity of any solid waste generated by Construction or Operations would be low-level and disposal methods identified in Section 2.3.10, Waste Management, would be sufficient; and
- the transportation, storage, use, and disposal of hazardous materials for mine operations would continue for the life of the mine (approximately 20 years).

Exposure to Radioactive Materials

The short-lived decay products of radon-222 gas are the primary radioactive constituents of concern in a uranium mine. These "radon daughters" can accumulate in an enclosed space, and result in a potential increased risk of cancer. The EPA indicates that indoor radon gas may be

responsible for 21,000 deaths in the U.S. per year (EPA, 2013c). As provided in the Uranium Leasing Program Final Programmatic EA (DOE, 2007), EPA evaluated exposures from radon emissions for individuals located near uranium mines (EPA, 1989). For underground uranium mines, radon concentrations for nearby individuals (within 0.33 to 33 miles) ranged from 2.0 x 10^{-6} to 0.0031 working levels (EPA, 1989). Assuming that an individual was continuously exposed, this is equivalent to a probability of a latent cancer fatality of 5.5 x 10^{-8} to 8.5 x 10^{-5}, or about 5 chances in 100 million to 8 chances in 100,000. Over 10 years, the probability of a latent cancer fatality would range from 5.5 x 10^{-7} to 8.5 x 10^{-4}, or about 5 chances in 10 million to 8 chances in 10,000. For perspective, an individual has a lifetime probability of dying of cancer from all sources of about 220,000 in 1 million, or a risk of lung cancer of 60,000 in 1 million.

Regardless of the setting, whether residential or industrial, radon gas emissions are typically mitigated by external venting. The radon ventilated from the mine would quickly disperse upon reaching exhaust shafts or portals. The EPA would require monitoring of radon gas from mine vents as per 40 CFR § 61, subpart B, which would result in an annual assessment of incremental radon exposure to nearby residents. Because of the Project Area's remote location, no impacts to the general public are predicted. However, the EPA will further evaluate impacts from vent shafts during their permitting process to satisfy 40 CFR § 61 subpart B, and determine appropriate protection measures if warranted.

Dose estimates at receptor locations at the boundary of the mining operation were calculated using the MILDOS-AREA model (see Appendix B in the AQTSD – Appendix 4-A). In addition to releases of radon from mine sources, including underground mine adits, radio-particulates resulting from transport of ore, grinding, and conveyance to the processing site were modeled. A location adjacent to the Hanks Draw Spoils Facility had the highest modeled total effective dose equivalent (TEDE) of 19.7 mrem/yr. The same location had an estimated dose to the bone of 29.3 mrem/yr without radon daughter products. The bone dose is slightly in excess of the 40 CFR § 190 25 mrem/yr for any organ, or to the whole body or 75 mrem/yr to the thyroid. It is important to note that the calculated doses are conservative (overestimates). MILDOS assumes 100 percent occupancy at the modeled location. In order to receive 19.7 mrem TEDE at the Hanks Draw Spoils Facility, a person would be required to be at that location for 8,760 hours during the year. Realistically, a person would only be there for a few hours annually. Likewise, the calculated bone dose of 29.3 mrem is an overestimate for the same reason.

Potential doses to members of the public were calculated for both mining and ore processing (see Table 4.4-10). The locations that were modeled were common to both mine and ore processing facilities.

Table 4.4-10
Modeled TEDE Doses from Mining and Ore Processing

	TEDE (mrem/yr)		
Name	**Mine**	**Mill**	**Total**
Claytor Ranch	7.76	0.927	8.69
Landfill Transfer	2.15	0.715	2.87
Jeffrey City	6.99	0.169	7.16
Maximum NRC – mine max (NRC5/NLA-NE)	12.9	2.23	15.1
Maximum NRC - processing max (NRC3/NLA-N1)	84.3	18.0	102.3

The nearest residence, the Claytor Ranch location, was estimated to receive a total of approximately 8.7 mrem from the combined mine and ore processing and less than 4 mrem/yr to bone, exclusive of radon exposure. The majority of the estimated dose would result from mining, which is reasonable given the locations of the mine and the ore processing facilities. The same is true for Jeffrey City, which would receive a total of 7.2 mrem/yr.

The doses calculated by MILDOS do not take into account those that might be received from existing background. Data shown in Table 3-14 of Appendix 3-A provide a basis to estimate doses from background radio-particulates. Applying the dose conversion factors from Federal Guidance Report #11 (EPA, 1988), assuming standard breathing rate and 100 percent occupancy for an adult to the average concentrations at the list air monitoring stations, a TEDE of approximately 18 mrem is calculated.

To provide a more realistic assessment of a potential dose to a member of the public based on an assumed exposure timeframe, doses were estimated for four different categories: courier, tour group, landfill worker, and camper. The estimated dose to each of those categories under certain scenarios was less than 1 mrem/yr in all cases (see Table 4.4-11).

Table 4.4-11
Potential Classes of Exposure to Members of the Public

Class	Annual Hours Exposed	Estimated Annual Dose [1]
Delivery Person	2.5 hr/wk * 50 wks/yr = 125 hr/yr	(125 hr/yr * 4.63 mrem/yr)/8,760 hr/yr = 0.066 mrem/yr
Tour Group	8 hr/yr	(8 hr/yr * 12.2 mrem/yr)/8,760 hr/yr = 0.011 mrem/yr
Landfill Worker	8 hr/wk * 50 wk/yr = 400 hr/yr	(400 hr/yr * 2.15 mrem/yr)/8,760 hr/yr = 0.098 mrem/yr
Camper [2]	1 wk/yr = 168 hr/yr	(168 hr/yr * 19.7 mrem/yr)/8,760 hr/yr = 0.38 mrem/yr

Source: MILDOS Report (see Appendix B in the AQTSD – Appendix 4-A).

[1] Doses were based on the modeled locations shown in Appendix B of the AQTSD (Appendix 4-A).

[2] Campers are not anticipated to be present due to limited access during Operations and lack of roads after Reclamation. However, hunters, who might camp, have been known to use the area, so for a conservative assessment, exposure during Operations was assessed. Exposure would be less after Reclamation.

Radon releases from the underground mine would be from the Sheep I and Sheep II shafts. Releases were modeled as point sources, resulting in a maximum estimate of 5.58 mrem/yr (see Appendix B in the AQTSD - Appendix 4-A for modeling locations). Using an average wind speed of 12.9 mph (5.8 m/sec) and the same release rate as modeled by MILDOS, the EPA COMPLY model calculated a dose to the nearest receptor, Claytor Ranch, or 2.55 mrem. The 40 CFR § 61.22 regulation limits the dose to a member of the public from an underground mine to 10 mrem/yr. As above, the modeled doses are subject to the assumption of 100 percent occupancy at the modeled location, which is a large overestimate even for a residence.

No detailed analysis of radio-particulate emissions from the Congo Pit was performed using modelling. Experience with open pit mines in Washington and California has shown there is no appreciable release of radio-particulates from the pit that would be accessible to members of the public (Little, 2015). The Congo Pit is several hundred feet deep. That coupled with the assumption that water spray is going to be used during mining operations, led to the assumption that no particulates would be released from the pit that would impact the public. Additionally, the

BLM must assume for this analysis that the requirements of the WDEQ-AQD air permit are met and particulate matter emissions are acceptable or are acceptable with conditions of approval from the Congo Pit as a result of this permit (through dust control and other measures). If particulate emissions are acceptable, then impacts as a result of radio-particulates would also be acceptable because there is no separate standard for radio-particulate emissions.

Workers are protected through MSHA regulations, as well as the Wyoming State Mine Inspector's Office, which establishes maximum exposure levels of radon and radon-daughter products. Between 1985 and 1989, the average occupational radiation dose for uranium miners in the United States was 350 mrem/yr (United Nations Committee on the Effects of Atomic Radiation - UNSCEAR, 2000). This radiation dose is equivalent to a probability of a latent cancer fatality of 2.1×10^{-4}, or about 2 chances in 10,000. Over 10 years, the probability of a latent cancer fatality would be 2.1×10^{-3}, or about 2 chances in 1,000. A radon-daughter monitoring program would be established in accordance with 57 CFR § 5037, in which exposure levels would be monitored and recorded. If radiation levels in a working area were found to be in excess of MSHA standards, the ventilation would be corrected immediately and more frequent monitoring would be required to verify compliance.

For the Heap Leach Pad, under NRC regulations (10 CFR § 20), workers would be limited to an annual radiation exposure limit of 5,000 mrem/year. In modern mills, the annual total effective dose equivalent (above background) received by a mill worker is typically on the order of 200 to 300 mrem with a maximum of approximately 700 mrem/yr, for normal working conditions. Of course, the dose would vary considerably by ore grade and job duties (Little, 2014). The maximum exposure limit set by the NRC (10 CFR § 20.1301) for the general public at the Property Boundary and beyond is 100 mrem/yr above background. Adherence to this limit is verified through sampling and monitoring. Exposure at the nearest residence is expected to be 10 mrem/year or less. The exposure limits for mill workers and the general public have been set by regulatory agencies based on input from health professionals and numerous health studies. Energy Fuels must maintain radiation levels below these regulatory limits.

The uranium ore and recycled materials such as scrap metal, batteries, and tires are the only radioactive materials that could be trucked from the site and potentially affect the general public. USDOT regulations require that the ore trucks be tarped and checked for radiation levels prior to leaving the mine site and the mill site on the return leg. In the event of an accident resulting in an ore spill, the spilled material and surrounding area would be cleaned up to background levels. Cleanup levels would be verified using a gamma meter or similar instrument. Energy Fuels' company policies require that all scrap metal and other recyclables be checked with an appropriate meter prior to leaving the mine site. If radiation levels were found to be elevated, the material would be cleaned using a power wash or other methods to meet appropriate radiation standards.

While no specific numeric standards for mine reclamation with respect to surficial radiological concentrations exist, Energy Fuels has proposed to employ the guidance developed by the WDEQ-AML for future mining and reclamation activities. Current WDEQ-AML practice is to reclaim mine lands for unrestricted use based on an assessment of radiological health risks. Based on the findings of Hersloff et al. (1988), the WDEQ-AML employs a surface clean up criteria of 20 pCi/g radium-226. For the Proposed Action, a near surface soils/overburden concentration of 20 pCi/g radium-226 would equate to approximately 70 µR/hr. Where local conditions and such factors as availability of cover and topsoil affect the ability to meet this goal, principals of ALARA ("as low as (is) reasonably achievable") would be employed. ALARA means making every reasonable effort to maintain exposures to ionizing radiation as low as practical. This approach was undertaken by WDEQ-AML with respect to mine reclamation projects within the Project Area, including the Paydirt Pit (west of the Congo Pit) and Sun Heald

(east of the proposed Ore Processing Facility) areas. The Paydirt Pit reclamation resulted in surface gamma levels of 75 µR/hr or less. At Sun Heald, the reclaimed surface exhibits higher gamma levels.

As part of the NRC's reclamation requirements, Energy Fuels would be required to survey areas surrounding the Heap Leach Pad for radiological contamination (i.e., windblown material from the Heap Leach Pad) and, as needed, remove contaminated soils to an NRC-approved disposal location (most likely in the reclaimed pad).

Section 2.3.4.2 notes the procedures which would be used during Operations and Reclamation for grade control to meet the proposed mine reclamation goal of 20 pCi/g radium-226 (equating to approximately 70 µR/hr). When implemented, this procedure would reduce existing surface gamma levels in areas such as the Congo Pit from current levels, which are well in excess of 70 µR/hr, to an acceptable range of 70 µR/hr or lower.

Wastes, Hazardous or Solid

Given the combination of waste management mitigation and controls to be utilized on-site (see Section 2.3.10), there should be no impacts associated with hazardous and solid wastes at the site. Impacts that may occur would be the result of incidental spills. Spill response measures are outlined in the Spill Contingency Plan and therefore, the overall impact attributable to this source would be minimal.

Solid Waste. Waste containers for organic materials (from lunchroom, etc.) would be provided. Non-hazardous materials would be recycled or disposed of off-site at a licensed facility. The only waste material that would be buried on-site would consist of the demolition debris generated during reclamation. Therefore, effects associated with solid waste would not occur or would be those allowed under the applicable laws and regulations.

Hazardous Waste (Non-Radioactive). All hazardous waste would be disposed of or recycled in accordance with state regulations and, in some cases, landfill-specific requirements. Therefore effects would not occur or would be those allowed under the applicable laws and regulations.

Radioactive Waste. As described previously, the NRC is the lead regulatory agency with jurisdiction to oversee use and disposal of radiological materials, such as uranium, and would regulate wastes from the Project. Again, BLM recognizes the NRC's expertise in, and jurisdiction over, the control and proper use of radiological materials.

Response to an Accidental Release. Response to all spills of hazardous materials would be implemented according to a Spill Plan and would ensure any spills that occur during transportation and loading/unloading on-site would be cleaned up as soon as possible. Spills exceeding the reportable quantity would be reported to the NRC, WDEQ, EPA, National Response Center, BLM, and the county Emergency Response Coordinator. Releases occurring en-route to or from the Project would be the responsibility of the transportation company. Law enforcement and fire protection agencies also could be involved to initially secure a spill site and protect public safety. Hazardous material transporters are required to maintain an emergency response plan which details the appropriate response, treatment, and cleanup for a material spilled onto land or into water.

For on-site spills, the procedures outlined in the Spill Plan would be used to contain chemicals and fluids used for the Project operations. Specific procedures would be developed for other hazardous materials stored and used at the mine. Any cleanup would be followed by appropriate restoration of the disturbed area, which could include replacing removed soil, seeding the area to prevent erosion, and returning the land to its previous use.

Potential Effects of an Accidental Release. Depending on the material released, the amount released, and the location of the release, an accident resulting in a release could affect soils, water, biological resources, and human health. The remediation of spills, whether non-radioactive hazardous material or radioactive material, would be under the jurisdiction of the NRC, WDEQ, and EPA; cleanup would be conducted in compliance with those agencies' rules to be protective of human health and the environment.

Waste Transportation. All hazardous or radioactive waste generated by the Project would be transported to licensed disposal facilities in accordance with applicable federal and state regulations. Non-radioactive solid wastes would be disposed of appropriately depending upon waste type. The risk of transportation of radioactive waste would be low and the same emergency management procedures would apply.

Non-radioactive hazardous materials would be transported by commercial carriers or vendors in accordance with the requirements of Title 49 of the CFR. Carriers would be licensed and inspected as required by the WYDOT and USDOT. Permits, licenses, and certificates would be the responsibility of the carrier. Title 49, Parts 71 and 171-180, of the CFR requires that all shipments of hazardous substances be properly identified and placarded. Shipping papers must be accessible and must include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, firefighting information, procedures for handling leaks or spills, first aid measures, and emergency response telephone numbers.

4.4.7.1.2 Impacts with Off-Site Processing

Carriers involved with the transportation of radioactive materials between the Project Area and the Sweetwater Mill would comply with USDOT rules regarding Hazard Category 7 (radioactive material). In the event of an accident involving a truck trailer with uranium-laden material or chemicals, Energy Fuels would implement response procedures that would include a course of action for responding to a transportation spill, preparedness requirements for transporters, and notification procedures. Energy Fuels would also be prepared to assist with transportation-related emergency responses through a cleanup contractor that would be on 24-hour call.

In the event of a trucking accident with the release of potentially hazardous materials, proper implementation of a response plan would minimize exposure to the public, emergency response personnel, and workers. Following an Incident Command Structure, Energy Fuels and its contractors would notify appropriate agencies and emergency response personnel and would respond, monitor, and clean the affected site until the site was considered acceptable. For some types of spills, cleanup criteria are established by agencies and would be met before Energy Fuels' responsibility would end. Consequently, the hazard posed by trucking of the radioactive material and hazardous chemicals poses minimal risks to public health or to the environment. Additionally, WYDOT would respond immediately to hazardous materials accidents to minimize the spread of contaminants. If Energy Fuels did not respond, WYDOT would contract emergency cleanup services and relay the cost to the hauling contractor.

Impacts associated with off-site processing would be the same as those described above for on-site processing. Any additional impact to public health and safety at the Sweetwater Mill is not anticipated considering the mill currently exists and is a licensed facility with the NRC, required to meet the regulatory radiation exposure limits described under on-site processing. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analyses as necessary.

4.4.7.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.4.7.2 BLM Mitigation Alternative

4.4.7.2.1 Impacts

Impacts to public health and safety under the BLM Mitigation Alternative would be similar to those under the Proposed Action Alternative.

4.4.7.2.2 Monitoring and/or Compliance

Monitoring under the BLM Mitigation Alternative would be the same as that described above for the Proposed Action Alternative.

4.4.7.3 No Action Alternative

Under the No Action Alternative, land use and surface-disturbing activities would continue as currently authorized. Because the Project as proposed is entirely within an active mine permit, Energy Fuels is obligated to complete certain reclamation efforts under the existing WDEQ-LQD Permit to Mine 381C that would occur under the No Action Alternative and WDEQ-AML Project 16-O would also occur. Existing radon levels would remain the same or be decreased through the required reclamation, and waste management would remain the same.

4.5 LAND RESOURCES

4.5.1 Recreation

Potential issues associated with impacts to recreation were identified by the BLM through the public scoping process and public comment on the Draft EIS. Issues include:

- Reduction and user conflict in dispersed recreation activities such as hunting and OHV use;
- Potential effects on recreation activities at Western Nuclear Pond;
- Reduction in the naturalness of the recreation setting; and
- Hazards posed to recreational use of the area due to increased Project-related traffic.

4.5.1.1 Proposed Action Alternative

4.5.1.1.1 Impacts with On-Site Processing

Current and potential recreational activities in the Project Area and vicinity include hunting, fishing, and OHV use. Big game hunting and fishing have historically been allowed on BLM and private lands within and surrounding the Project Area where access is available, and the lands are still actively used for these purposes. The area would continue to be used for hunting throughout all phases of the Project; however, hunting would not be allowed in areas of active mining for safety reasons, and access would be limited.

Direct impacts to recreational users would occur through removal or restriction of areas currently used for hunting within the Project Area. No developed recreational facilities or sites would be affected. Because of historical uranium mining in the area and the presence of more attractive regional recreational opportunities, the Project Area and vicinity is not highly sought after for its recreational resources.

Indirect effects would be associated with Construction, Operations, and Reclamation of surface infrastructure (Congo Pit, spoils facilities, Ore Pad, Ore Processing Facility, Conveyor, topsoil stockpiles, building and parking, power lines) resulting in a more urbanized setting. Increased traffic on area roads and noise from traffic and mining and ore processing would be indirect impacts during all phases of the Project.

The increased development of the area would result in reduced naturalness although the setting is already highly modified due to historical uranium mining. Hunting and OHV use could be affected by alteration of existing travel patterns for vehicles and wildlife during all phases of the Project. Surface disturbing activities may remove or reduce wildlife habitat, which could displace big game.

Existing roads would be upgraded and new roads would be constructed; however, some of these may be within areas that would be fenced off or closed to recreational users. In areas where roads are closed, but not fenced, motorized access would be reduced but the area would be enhanced for non-motorized hunters.

Fishing at Western Nuclear Pond would continue under the Proposed Action. As discussed in Section 2.5, improvements to Western Nuclear Pond are being conducted under the WDEQ-AML Project 16-O. Access to the area would not be blocked and area roads would remain open. Visitors to the area could encounter increased traffic, dust, and noise levels due to the Proposed Action. Overall, impacts to recreational users would be expected to be minor due to acclimation to historical uranium development in the Project Area and vicinity.

4.5.1.1.2 Impacts with Off-Site Processing

If off-site processing occurs, truck traffic between the Project Area and the Sweetwater Mill would increase the opportunity for wildlife-vehicle collisions and would also increase noise and dust. These effects to recreational users would be minimized because the increased traffic would only occur on the existing Crooks Gap/Wamsutter Road. Although the generally low volume traffic setting would be altered, overall impacts to recreational users are expected to be minimal.

Any additional impact to recreation at the Sweetwater Mill is not anticipated considering the mill currently exists. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analyses as necessary.

4.5.1.1.3 Monitoring and/or Compliance

No monitoring or compliance would be associated with recreation resources.

4.5.1.2 BLM Mitigation Alternative

4.5.1.2.1 Impacts

The BLM Mitigation Alternative includes the same surface disturbing activities and impacts discussed for the Proposed Action above; however, impacts to recreational users could be less under this alternative. Roads and reclamation could be planned with hunters and recreationists in mind, creating opportunities for them where possible. Energy Fuels would be required to inventory roads which currently or could during development access hazardous areas of the mine and pose safety hazards for hunters or recreationists during operations. These roads would be reclaimed and/or blocked off during operations reducing safety risks to hunters or recreationists (REC-1 in Table 2.4-1). Wildlife habitat could be increased by enhancing the reclamation success of poorly reclaimed areas which could increase hunting opportunities within the Project Area.

4.5.1.2.2 Monitoring and/or Compliance

No monitoring or compliance would be associated with recreation resources.

4.5.1.3 No Action Alternative

Under the No Action Alternative, no uranium mining would take place in the Sheep Mountain Project Area and no ore processing would occur at either the Sheep Mountain Project Area or at the Sweetwater Mill. As a result, recreation activities would continue at levels comparable to that of recent years. Ongoing reclamation for which Energy Fuels has obligations would continue under this alternative as well as reclamation under WDEQ-AML Project 16-O (BLM, 2014b). Opportunities for recreational users would increase as the area becomes less industrialized and wildlife habitat increases with reclamation, creating better opportunities for hunters.

4.5.2 Livestock Grazing

Potential issues associated with livestock grazing were identified by the BLM through the public scoping process, as well as internal scoping. Issues include:

- Loss of forage through removal and construction of new roads;
- Hazards posed to livestock due to increased Project-related traffic;
- Potential impacts to existing water sources and range improvements;
- Potential effects from the spread of noxious weeds and invasive species; and
- Potential effects to seasonal livestock movement within grazing allotments.

4.5.2.1 Proposed Action Alternative

4.5.2.1.1 Impacts with On-Site Processing

The direct effect to grazing resources through forage removal would occur during Construction and Operations. Surface disturbance would occur on two grazing allotments coinciding with the Project Area. Disturbance for the Congo Pit and Hank's Draw Spoils Facility would be located on the Mountain Allotment. The Ore Processing Facility would be located on Crooks Gap Allotment. About 356.5 acres of new disturbance across both grazing allotments would result from the Proposed Action. The Project would also utilize approximately 572.5 acres of existing or previously disturbed lands. Based on existing conditions, including steep slopes, existing surface disturbance, fenced areas, limited water sources, and low carrying capacity, the area lacks contributing rangeland for livestock grazing in the two allotments and therefore, effects are expected to be minimal. No range improvement sites exist within the Project Area and therefore, none would be affected. When the permit renewal for the Crooks Gap and Mountain allotments are up for renewal, the effects of the Project will be considered in the AUM's permitted in these allotments.

Indirect effects to grazing could occur if available forage is reduced or converted due to the potential spread of invasive non-native species and noxious weeds and increased fugitive dust. Additionally, the amount of available forage near roads also could be impacted by fugitive dust, making vegetation unpalatable. However, these effects are expected to be minimal given the low carrying capacity in the Project Area.

Effects of uranium and radium chemical toxicity and radiation on grazing cattle during operation and post-reclamation of the Project are not expected given the overall low carrying capacity of the Project Area and potential effects such as those described above in Section 4.3.5.1.1 for big game.

Cattle could be directly affected by Project-related traffic which could cause vehicle-cattle collisions, spooked herds, and cattle trailing disruptions. Cattle could also be directly affected if they come in contact with potential hazards in the Project Area; however, most of these areas would be fenced, except for the highwalls of the Congo Pit which would be bermed (4 feet tall)

and ditched to divert water and promote safety. There is a potential that cattle could overtake the 4 foot berm and fall into the pit.

4.5.2.1.2 Impacts with Off-Site Processing

Potential impacts to grazing resources with off-site processing would be similar to those described above for on-site processing. Additional traffic associated with trucking ore from the Project Area to the Sweetwater Mill would increase the potential for traffic-related effects described above. Impacts to water sources and vegetation for forage for livestock associated with Crooks Creek through surface discharge under the approved WYPDES Permit are anticipated to only be minor. As described in Section 4.2.5.1.2 and 4.3.3.1.2, the average increase in flow rate (from 2.3 to 3.2 cfs) is so miniscule as to be inconsequential to the vegetation and health regimes of riparian areas along Crooks Creek, but the increase in flow from the lowest recorded flows in Crooks Creek (from 4.8 to 5.7 cfs) may provide more consistent, year-round flow in the creek making livestock utilize Crooks Creek more frequently during operations (short term, indirect, beneficial impact). However, once discharge ceases, these livestock could be negatively impacted as the water in the creek would decrease, but not disappear, leading to only minor, long term impacts. Any additional impact to grazing resources at the Sweetwater Mill is not anticipated considering the mill currently exists and is a licensed facility with the NRC. If any changes or updates to the existing permits become necessary at the Sweetwater Mill, the appropriate agencies would conduct separate NEPA analyses as necessary.

4.5.2.1.3 Monitoring and/or Compliance

Environmental and Operational Monitoring Programs and Compliance are summarized in Section 2.3.12.3 and 2.3.12.4 and in Tables 1 and 2 in Appendix 2-B.

4.5.2.2 BLM Mitigation Alternative

4.5.2.2.1 Impacts

Mining under this alternative would be the same as under the Proposed Action. The Proposed Action describes reclaiming lands to the previous land use of grazing and wildlife habitat. Under this alternative, reclamation could be more successful and more likely to progress faster. Noxious weeds and invasive species would potentially be under more scrutiny and thus could reduce threats to grazing resources. The impacts on forage from fugitive dust would likely be lessened under this alternative. Fencing of the Congo Pit highwalls would more effectively decrease potential falls, entrapments, or other impacts to livestock under the BLM Mitigation Alternative than the berms described under the Proposed Action (WHB-1 in Table 2.4-1). Fencing of disturbance would facilitate reclamation success beyond that under the Proposed Action (W-4).

4.5.2.2.2 Monitoring and/or Compliance

Monitoring and/or Compliance under the BLM Mitigation Alternative would be similar to that under the Proposed Action Alternative. Additional monitoring may occur as a result of implementation of the revised Reclamation Plan and Weed Management Plan.

4.5.2.3 No Action Alternative

Under the No Action Alternative, mining and ore processing would not take place within the Project Area or on area access roads. As a result, livestock grazing in the area would continue at levels comparable to those of recent years. Thus, there would be no need for mitigation and monitoring. Reclamation under Energy Fuels' Reclamation Plan in the WDEQ-LQD Permit to Mine 381C and WDEQ-AML Project 16-O would continue. Implementation of these plans could increase available forage in the Project Area.

4.6 UNAVOIDABLE ADVERSE IMPACTS

NEPA section 102(c) mandates disclosure of "any adverse environmental effects which cannot be avoided should the proposal be implemented." These are impacts for which there are no mitigation measures or impacts that remain even after the implementation of mitigation measures. Implementation of the Proposed Action would result in unavoidable adverse impacts to some resources. The CEQ regulations (40 CFR § 1500.2(e)) define unavoidable adverse impacts as those that cannot be avoided due to constraints in alternatives. These impacts do not have to be avoided by the planning agency, but they must be disclosed, discussed, and mitigated, if possible.

4.6.1 Unavoidable Adverse Impacts under the Proposed Action Alternative

Unavoidable adverse impacts to soils and vegetation could occur where topsoil is stripped and/or compacted during mining operations. Effects to surface water would be unavoidable where ephemeral drainages may be rerouted, and effects to groundwater would be unavoidable due to withdrawal. Unavoidable adverse impacts might occur to wildlife where habitat is removed. If unknown cultural, tribal, and/or paleontological resources were excavated, those effects would be unavoidable. Effects to recreation and grazing resources would be unavoidable during Operations and Reclamation but would resume following Project completion. These impacts are unavoidable and adverse to the existing conditions; however, none of these impacts would result in undue or unnecessary degradation of public lands as defined in 43 CFR § 3809.5.

4.6.2 Unavoidable Adverse Impacts under the BLM Mitigation Alternative

Unavoidable adverse impacts would be the same as those described under the Proposed Action Alternative.

4.6.3 Unavoidable Adverse Impacts under the No Action Alternative

The Proposed Action would re-disturb and reclaim about 572.5 acres of land that was previously disturbed and either not reclaimed or reclaimed to older, less stringent standards. Unavoidable adverse impacts to soils, vegetation, and surface waters would continue through the exposure of any unreclaimed or older reclaimed areas within the 572.5 acres that would not be reclaimed under the No Action Alternative.

4.7 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY (ALL RESOURCES)

The CEQ establishes (40 CFR § 1502.16) that the balance or trade-off between short-term uses and long-term productivity needs to be defined in relation to the activity in question. The decision maker and members of the public need a clear sense of what they are gaining or losing in both the short- and long-term. For the purpose of this analysis, the short-term is considered Operations and Reclamation and the long-term begins after Reclamation.

4.7.1 Relationship of Short-Term Uses and Long-Term Productivity under the Proposed Action Alternative

All resources identified as relevant in Chapter 3 and described and analyzed in Chapters 3, 4, and 5 would be affected by the change of short-term land use to mineral development. These short-term uses have potential to affect the long-term productivity of these resources as identified in Chapter 4. Beneficial effects to people in the short-term would include employment and generation of revenue. Long-term productivity of resources such as, soils, vegetation, groundwater, wildlife habitat, and livestock grazing would be expected to return or continue following successful reclamation of the Project Area.

4.7.2 Relationship of Short-Term Uses and Long-Term Productivity under the BLM Mitigation Alternative

Short-term uses and long-term productivity would be the same as those described under the Proposed Action Alternative.

4.7.3 Relationship of Short-Term Uses and Long-Term Productivity under the No Action Alternative

Under the No Action Alternative, short-term uses would include reclamation of some portions of the Project Area, which would lead to long-term productivity of those areas in terms of soils, vegetation, wildlife habitat, and livestock grazing resources. The Proposed Action would re-disturb and reclaim about 572.5 acres of land that was previously disturbed and either no reclaimed or reclaimed to older, less stringent standards. Long-term productivity of any unreclaimed or older reclaimed areas would remain compromised within the 572.5 acres that would not be reclaimed under the No Action Alternative.

4.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS (ALL RESOURCES)

Irreversible commitments are those that cannot be reversed, except perhaps in the extreme long-term. Examples of irreversible impacts would be species extinction, ore extraction, and logging of an old growth forest.

Irretrievable commitments are those that are lost for a long period of time. Extraction of uranium would constitute an irretrievable impact because the mineral cannot be renewed in the current location within a reasonable timeframe.

Impacts to resources can be both irreversible and irretrievable. Management actions most likely to result in irreversible and/or irretrievable impacts include those related to development and surface disturbance such as mineral extraction and energy development.

4.8.1 Irreversible and Irretrievable Commitments of Resources under the Proposed Action Alternative

As shown in Table 4.8-1, the only irreversible and irretrievable commitment would be the extraction of the uranium ore. If cultural, paleontological, or tribal resources were unexpectedly excavated, effects to those resources could be irreversible and/or irretrievable.

Table 4.8-1
Irreversible and Irretrievable Commitment of Resources

Affected Resource	Irreversible Commitment	Irretrievable Commitment
Climate, Climate Change, and Air Quality	No	No
Geologic/Mineral	Yes	Yes
Soils	Possible [1]	Possible [1]
Water (Surface, Ground, Water Use	No	No
Invasive, Non-Native Species	No	No
Vegetation	Possible [1]	Possible [1]
Wetlands and Riparian Zones	No	No
Special Status Species	No	No
Wildlife	No	No
Wild Horse and Burros	No	No
Cultural	Possible	Possible
Paleontological	Possible	Possible
Tribal	Possible	Possible
Socioeconomic	No	No
Environmental Justice	No	No
Transportation/Access	No	No
Public Health and Safety	No	No
Recreation	No	No
Livestock Grazing	No	No

[1] If the On-Site Ore Processing Facility is constructed, then up to 90 acres of public lands and 115 acres of private lands would be reclaimed in accordance with NRC requirements for long-term stability, which could include rock cover for erosion protection, rather than replacement of soil and vegetation.

4.8.2 Irreversible and Irretrievable Commitments of Resources under the BLM Mitigation Alternative

Effects would be the same as those described for the Proposed Action Alternative.

4.8.3 Irreversible and Irretrievable Commitments of Resources under the No Action Alternative

The No Action Alternative would not result in irreversible or irretrievable commitments of resources as portions of the site would continue to be reclaimed.

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