

# Greens Hollow Tract Mining Plan Modification Supplemental Environmental Assessment



Prepared in cooperation with the  
US Department of the Interior Bureau of Land Management, US Department of Agriculture Forest  
Service, and Utah Division of Oil, Gas, and Mining

**US DEPARTMENT OF THE INTERIOR**

**OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT**

**PROGRAM SUPPORT DIVISION**

**1999 BROADWAY, SUITE 3320**

**DENVER, CO 80202**

**PHONE 303-293-5000**

**FAX 303-293-5032**





## Table of Contents

<b>Chapter 1 Purpose and Need .....</b>	<b>1</b>
<b>1.1 Introduction .....</b>	<b>1</b>
<b>1.2 Background .....</b>	<b>3</b>
<b>1.3 Purpose and Need for Action.....</b>	<b>3</b>
<b>1.4 Regulatory Framework.....</b>	<b>3</b>
<b>1.5 Issues.....</b>	<b>4</b>
<b>Chapter 2 Alternatives .....</b>	<b>5</b>
<b>2.1 Introduction .....</b>	<b>5</b>
<b>2.2 Proposed Action.....</b>	<b>5</b>
<b>2.3 No Action.....</b>	<b>7</b>
<b>Chapter 3 Affected Environment and Environmental Consequences .....</b>	<b>9</b>
<b>3.1 Introduction .....</b>	<b>9</b>
<b>3.2 Affected Environment.....</b>	<b>9</b>
3.2.1 Regional Air Quality .....	9
3.2.2 Regulatory Requirements .....	10
<b>3.3 Direct and Indirect Effects.....</b>	<b>12</b>
3.3.1 Proposed Action .....	12
3.3.2 No Action .....	16
<b>3.4 Cumulative Effects .....</b>	<b>17</b>
3.4.1 Proposed Action .....	18
3.4.2 No Action .....	19
<b>Chapter 4 Consultations and Coordination.....</b>	<b>21</b>
<b>References.....</b>	<b>23</b>

## List of Tables

Table 1. Annual Coal Production at the Sufco Mine .....	6
Table 2. Shipments from the Sufco Mine to United States Power Plants (Short Tons) .....	6
Table 3. Triennial Emissions Inventory (Tons Per Year) for Sevier County (2014).....	10
Table 4. Large Industrial Source Emissions by Facility (Tons Per Year) - 2014.....	10
Table 5. Reported Total Annual Emissions (Tons) .....	13
Table 6. Annual Emissions from Truck Transportation of Coal .....	13
Table 7. Estimated Annual Employee and Delivery Traffic Emissions .....	14
Table 8. Estimated Indirect Range of Emissions from Coal Combustion (Tons Per Year) .....	15
Table 9. Mercury Produced from Coal Combustion.....	16
Table 10. Past, Present, and Reasonably Foreseeable Actions with Air and Emissions Effects .....	17
Table 11. Reasonably Foreseeable Actions Since The Greens Hollow FEIS Record of Decision ....	18
Table 12. Additional Estimated Indirect Emissions from Coal Combustion (Tons Per Year).....	19
Table 13. List of Preparers.....	21

## List of Figures

Figure 1. Greens Hollow Federal Coal Lease Tract Location Map .....	2
---	---



# Chapter 1

## Purpose and Need

---

### 1.1 Introduction

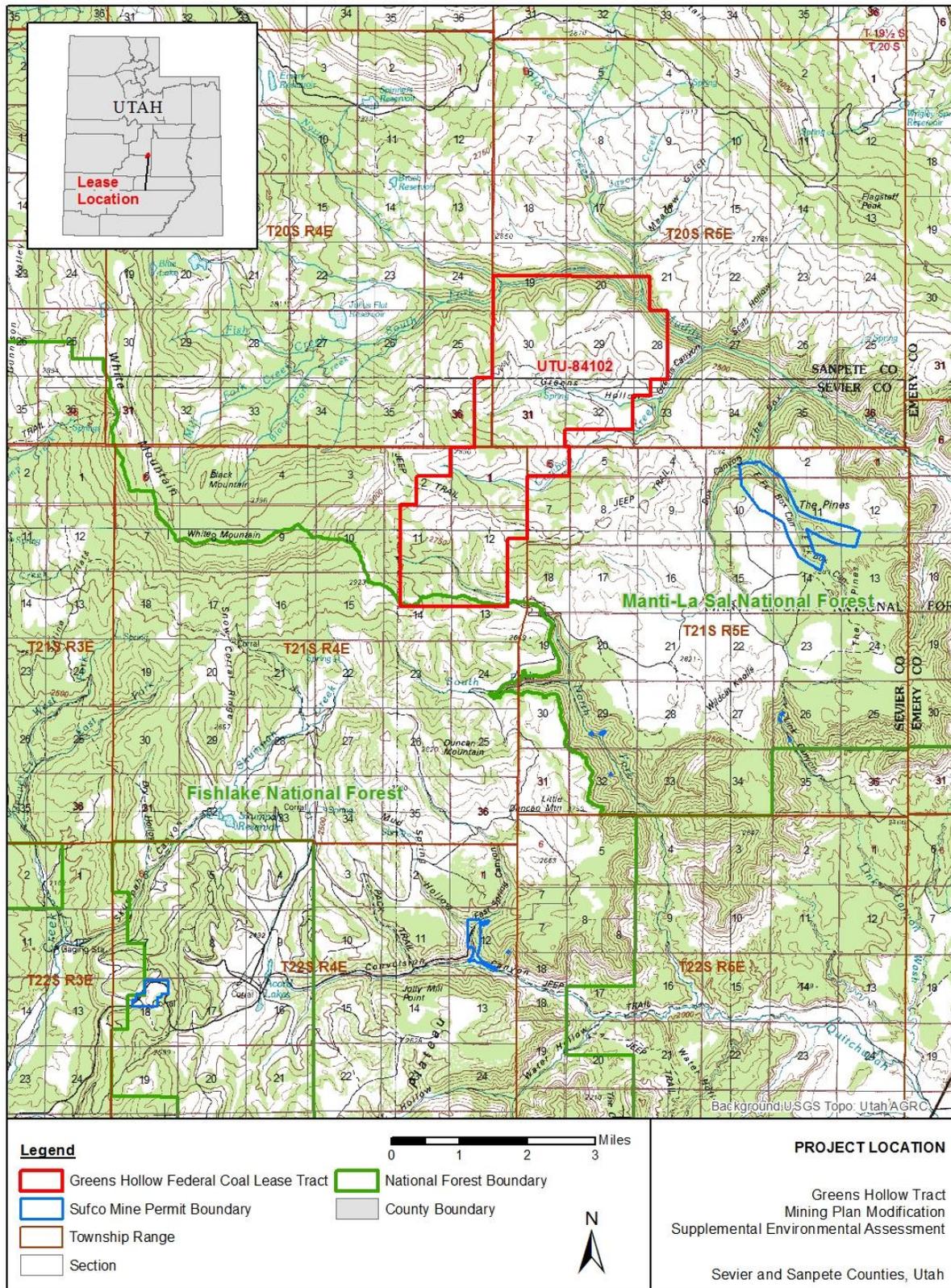
Canyon Fuel Company, LLC, operator of the Sufco Mine in Utah, submitted a permit application package (PAP) to the Utah Division of Oil, Gas, and Mining (DOG M) on April 17, 2017, to modify its approved Mine and Reclamation Plan (MRP) to add the federal coal included in the Greens Hollow Federal Coal Lease Tract UTU-84102 (**Figure 1**). DOGM implements the Utah Coal Rules (Utah Administrative Code R645) following the terms of the Federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) under the oversight of the United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSMRE) via the permanent program for Utah (30 Code of Federal Regulations [CFR] 944) (OSMRE, 1994). The OSMRE is required to evaluate the PAP before Canyon Fuel Company may conduct underground mining and reclamation operations to develop the Greens Hollow Federal Coal Lease Tract UTU-84102. OSMRE is the agency responsible for making a recommendation to the United States Department of the Interior Assistant Secretary for Land and Minerals Management (ASLM) to approve, disapprove, or approve with conditions the proposed mining plan modification.

As a federal agency, OSMRE is subject to the National Environmental Policy Act of 1969 (NEPA), and therefore must conduct an environmental review, in form of either adoption of a prior NEPA document for the same project, supplementing a prior NEPA document for the same project, or creation of a new NEPA analysis, before proceeding the federal action of making a recommendation to the ASLM regarding the mining plan modification. The OSMRE has prepared this supplemental environmental assessment (EA), based on new information provided in the PAP. The new or updated information included in the PAP consisted of annual production data (5.5 to 6.3 million tons per year) and identification of no additional surface facilities (no powerline or vent shaft) that were previously identified in the *Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Lease Tract UTU-84102* (referred to as the Greens Hollow FSEIS throughout this EA). This EA is tiered to the descriptions and environmental analysis contained in the Greens Hollow FSEIS (BLM and USFS, 2015) and is incorporated by reference into this supplemental EA in accordance with 40 CFR 46.135 and available to the public at: <https://www.fs.usda.gov/project/?project=25561>. NEPA requires federal agencies to disclose the potential environmental impacts of projects they authorize. Additionally, NEPA requires agencies to make a determination as to whether the analyzed actions would “significantly” affect the environment. “Significantly” is defined by NEPA and is found in regulation 40 CFR 1508.27. If OSMRE determines that this project would have significant effects following the analysis in the EA, then an environmental impact statement (EIS) would be prepared. If the potential effects are not determined to be “significant”, a “Finding of No New Significant Impact” (FONNSI) statement<sup>1</sup> would document the reason(s) why implementation of the selected alternative would not result in

---

<sup>1</sup> A finding of no significant impact other than those already disclosed and analyzed in the EIS to which the EA is tiered may be called a “finding of no new significant impact” (43 CFR 46.140(c)).

Figure 1. Greens Hollow Federal Coal Lease Tract Location Map



significant environmental effects. An EA provides evidence for determining whether to prepare an EIS or a FONNSI statement. The United States Forest Service (Forest Service), Manti-La Sal National Forest, the Bureau of Land Management (BLM), Price Field Office, and the Utah DOGM are cooperating agencies in the preparation of this supplemental EA.

## **1.2 Background**

The Sufco underground coal mine, in Sevier County, Utah has been in operation since 1941. The Greens Hollow Federal Coal Lease Tract UTU-84102 is under National Forest lands managed by the Manti-La Sal and Fishlake National Forests. The coal resources are also federal resources and are managed by the BLM. On January 4, 2017, the BLM sold the Greens Hollow Federal Coal Lease Tract UTU-84102 to the highest bidder, which was Canyon Fuel Company (BLM, 2017). Prior to the lease sale, the BLM and the U.S. Forest Service conducted an EIS, supplemental EIS, and made their respective decisions. The Forest Service consented to the leasing of the Greens Hollow Federal Coal Lease Tract UTU-84102 on October 5, 2015 and the BLM issued the lease March 14, 2017. OSMRE participated as a cooperating agency along with Utah DOGM.

The Greens Hollow FSEIS decisions approved the sale of the Greens Hollow Federal Coal Lease Tract UTU-84102, approximately 6,175 acres, for production of federal coal reserves, along with conditions to protect the environment which were included as lease stipulations. The lease sale made approximately 55.7 million tons of recoverable coal available.

## **1.3 Purpose and Need for Action**

The purpose of the action (to make a recommendation to the ASLM to approve, disapprove, or approve with conditions the proposed mining plan modification) is established by the Mineral Leasing Act of 1920 and the SMCRA, which requires the evaluation of Canyon Fuel Company's PAP before they may conduct underground mining and reclamation operations to develop the Greens Hollow Federal Coal Lease Tract UTU-84102 30 CFR Part 746: 30 United States Code (USC)/208(c). OSMRE is the agency responsible for making a recommendation to the ASLM to approve, disapprove, or approve with conditions, the proposed mining plan modification. The ASLM will decide whether the mining plan modification is approved, disapproved, or approved with conditions. If the ASLM approves this action, operations would continue at the Sufco Mine for up to 8.8 years. The need for the action is to allow Canyon Fuel Company, LLC the opportunity to exercise its valid rights granted under the Greens Hollow Federal Coal Lease Tract UTU-84102 to extract coal from their federal lease under the Mineral Leasing Act.

## **1.4 Regulatory Framework**

The extensive regulatory framework for management of coal leasing, mining, reclamation, and environmental protection are described in detail in Section 1.5.2 of the Greens Hollow FSEIS (BLM and USFS, 2015). The major regulations relevant to OSMRE's evaluation of the Proposed Action are:

- Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1975, which authorizes the leasing of coal reserves and conditions of the leasing; and
- SMCRA, which provides a framework under which coal mining and surface uses are managed.

## **1.5 Issues**

In accordance with 40 CFR 1501.1 and 1506.3, OSMRE has identified the following environmental issues, that are deserving of further study, which have not been covered by a prior environmental review to supplement the existing analysis completed in the Greens Hollow FSEIS.

- Non-greenhouse gas emissions from mining (particulate matter less than 2.5 microns (PM<sub>2.5</sub>) and hazardous air pollutants (HAPs)), described in section 3.3.1.1;
- Emissions from the transportation of coal to the Hunter Power Plant, described in Section 3.3.1.2;
- Emissions from employee transportation, described in Section 3.3.1.3;
- Emissions from coal combustion, described in Section 3.3.1.4; and
- Mercury emissions from coal combustion in Section 3.3.1.5.

## Chapter 2 Alternatives

---

### 2.1 Introduction

This section presents the description of the Proposed Action for which the issues identified in Section 1.5 are analyzed, along with the description of the No Action alternative for effects comparison purposes.

### 2.2 Proposed Action

The Proposed Action is for the OSMRE to submit a mining plan decision document to make a recommendation to the Department of the Interior, Assistant Secretary for Land and Minerals Management. The mining plan modification incorporates the revisions to the MRP submitted to Utah DOGM and is substantially similar to Alternative 3 selected by the Forest Service and BLM in their respective Record of Decision documents (USFS, 2015; BLM, 2016).

The modifications from the currently approved mining plan are:

- Add the Greens Hollow Federal Coal Lease Tract UTU-84102 (6,175 acres, 55.7 million tons);
- A ventilation and escape way shaft facility may be required to safely mine the Greens Hollow Federal Coal Lease Tract UTU-84102. Such a shaft has not been permitted, nor has it been proposed; and
- Extend the Sufco Mine life by 9 to 10 years, depending on the production rate (the Greens Hollow FSEIS projects 8.8 years extra mine life).

The mining plan modification would not change several aspects of the ongoing mining activity that may affect air and emissions:

- Mining will continue to be by underground longwall and room-and-pillar methods;
- Coal production would stay within the limits established by the Air Quality Approval Order. Coal production from 2017 through 2021 will range from approximately 5.5 million to 6.3 million tons<sup>2</sup> per year; and
- The Sufco Mine will continue to be considered a minor source of air emissions according to the Utah Department of Environmental Quality (DEQ).

**Table 1** shows the recent annual coal production at the Sufco Mine. **Table 2** shows the amount of coal that was shipped and which power plants the coal was shipped to in the recent past.

---

<sup>2</sup> The Greens Hollow FSEIS used a slightly higher production rate of 6.43 million tons per year which estimated an 8.8 year mine life. This supplemental EA uses a range instead of a single rate. As shown in **Table 1**, production has decreased slightly since the Greens Hollow FSEIS analysis. In several locations in the Greens Hollow FSEIS, there was either 6.43 million tons per year, 7 million tons per year, or 10 million tons per year depending on the resource. These different rates were deliberate to indicate the “conservative” impacts on economics and air quality.

**Table 1. Annual Coal Production at the Sufco Mine**

	2010	2012	2013	2014	2015	2016
Production (short tons)	6,398,350	5,650,446	5,960,266	6,539,322	6,024,483	5,375,171
Average Number of Employees	374	368	366	373	369	370

Source: (EIA, 2016a)

**Table 2. Shipments from the Sufco Mine to United States Power Plants (Short Tons)**

Plant	2010	2012	2013	2014	2015	2016 <sup>1</sup>
Carbon	-	-	13,030	-	-	-
Hunter	2,625,575	2,347,039	2,434,403	1,949,997	1,238,753	21,846
Huntington	293,908	395,127	118,462	417,260	1,042,569	984,094
Intermountain Power Project	2,355,180	1,951,650	2,068,543	2,197,885	1,957,865	1,902,571
North Valmy	204,130	24,261	35,786	35,393	-	-
Reid Gardner	310,607	588,301	433,939	330,758	-	-
Total Shipped to Power Plants	5,789,400	5,306,378	5,104,163	4,931,293	4,417,946	2,908,511
Production (short tons)	6,398,350	5,650,446	5,960,266	6,539,322	6,024,483	5,375,171
Not shipped to Power Plants	608,950	344,068	856,103	1,608,029	2,121,376	2,466,660
Percent (%) of Sufco Coal Shipped to United States Power Plants	90%	94%	86%	75%	68%	48%

Source: (EIA, 2016b)

<sup>1</sup>Note that data for the most current time periods (2016) typically represent preliminary estimates based on samples collected by the surveys. After the end of a calendar year, the estimates are replaced by actual values from a final data collection, except in the case of missing values. The number of missing values (non-responses) are typically minimal.

As shown in **Table 2**, approximately 50 percent or less of the coal produced from the Sufco Mine in previous years has been bound for coal-fired power plants outside the United States. **Table 2** shows the variability of how much coal could be exported based on domestic and international coal markets. The exact destinations and transportation routes to export terminals is not known and any analysis of those impacts would be too speculative to provide meaningful information to the decision maker. In 2014, the Norwest Report evaluated potential market conditions (domestic and international markets) for the Greens Hollow, Flat Canyon, and Long Canyon tracts for the BLM. The report used representative destinations, but did not provide exact buyer locations or transportation routes that would allow for an in-depth analysis to be conducted. According to the report, *“the results of the analysis clearly show that exports from these tracts (Greens Hollow, Flat Canyon, and Long Canyon) are unlikely because domestic markets offer a much higher selling price at the mine gate...In that case (Greens Hollow Tract), the net selling price for export coal is near or below zero”* (Norwest Corporation, 2014).

Indirect air emissions from the Proposed Action were estimated for activities that are reasonably foreseeable, and included; coal transport (where a destination and quantity of delivered coal is known), mine worker commutes, and downstream coal combustion (see Section 3.3).

## **2.3 No Action**

Under the No Action Alternative the OSMRE would not recommend approval of the mining plan decision document. The ASLM would deny the action and as a result, the coal reserves in the Greens Hollow Federal Coal Lease Tract UTU-84102 would not be recovered. DOGM would still have authority to approve the significant permit revision (to include the Greens Hollow Federal Coal Lease Tract UTU-84102 into its state SMCRA permit), however, as stated above, mining would not occur within the Greens Hollow Federal Coal Lease Tract UTU-84102. The Sufco Mine would continue to operate and mine coal until its other reserves run out in about 2020.



## Chapter 3

# Affected Environment and Environmental Consequences

---

### 3.1 Introduction

This chapter describes the existing conditions of the issues shown in Section 1.5, then evaluates the direct, indirect, and cumulative impacts that would likely occur as a result of implementing the Proposed Action and No Action. Impacts are described by level of significance:

- **Minor Impact:** Impacts that potentially could be detectable but slight.
- **Negligible Impact:** Impacts in the lower limit of detection of an impact that could cause an insignificant change or stress to an environmental resource or use.
- **No Impact:** No discernible or measurable impacts.

### 3.2 Affected Environment

The air quality evaluation conducted for the Greens Hollow FSEIS included a review of the Manti-La Sal Coal Tracts Air Quality Evaluation Muddy Creek Technical Report (MESI, 2004), the area of significant impacts based on stationary and mobile sources, and potential receptors within a 100-kilometer (62-mile) radius of the surface facility. The analysis provided in this supplemental EA is provided to supplement the information and analysis contained within the Greens Hollow FSEIS.

The air quality of a region is determined by the topography, meteorology, location of air pollutant sources, and type, quantity, and combination of air pollutants. The calculated or measured concentrations of various pollutants are compared to established standards to evaluate the impact of a given source and to evaluate regional air quality.

#### 3.2.1 Regional Air Quality

Air quality in the region is affected by emissions from the Sufco Mine, trucks used in hauling the coal, and two power plants in the area: the Hunter Power Plant located near Castle Dale, Utah and the Huntington Power Plant located in Huntington Canyon, Utah. Additionally, potential local sources of air pollution include minor point sources, automobiles, trains, generators, and wood stoves/fireplaces (in the winter). These sources typically generate carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>) and other nitrous oxides, volatile organic carbons (VOCs), and particulate matter less than 10 microns (PM<sub>10</sub>). Ozone may also form when nitrogen oxides (NO<sub>x</sub>) and VOCs react with sunlight.

Utah's air monitoring network includes monitoring stations throughout Utah (DAQ, 2016a) and monitors conditions where there is a concern based on the annual emissions inventory. **Table 3** presents the results of the 2014 triennial inventory (most recently available) reported for Sevier County, Utah. There are no stations in Sevier and Sanpete counties, Utah because air quality is in compliance with the National Ambient Air Quality Standards (NAAQS) and, there is no indication from the emissions inventory that there is a concern.

**Table 3. Triennial Emissions Inventory (Tons Per Year) for Sevier County (2014)**

County	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOCs
Sevier County	9,058	2,012	7,512	1,092	36	16,843

Source: Table 4 (DAQ, 2016a).

The analysis area is classified as a Class II area for all criteria pollutants. The only Class I area within 100 kilometers of the project area is Capitol Reef National Park which is located approximately 27 miles from the project area. Numerous air pollutant sources are located in the area that could impact the Class I area. Table 1.3 of the Air Quality Summary Report (MESI, 2004), in the Greens Hollow FSEIS, outlines the point source emissions from numerous sources near Capitol Reef National Park. The largest contributors to air pollutant emissions in the region are power plants and generating stations.

Coal is currently mined at the Sufco Mine under an air quality permit issued by the Utah DEQ, Division of Air Quality (DAQ) approval order DAQE-AN106650014-13 (DAQ, 2013). The allowable emissions from this source, as stated in the approval, and permitted air quality emissions sources (DEQ, 2017) located in Sevier County are presented in **Table 4**.

**Table 4. Large Industrial Source Emissions by Facility (Tons Per Year) - 2014**

Site Name <sup>2</sup>	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOCs
<i>Sufco Mine</i> <sup>1</sup>	15.59	65.70	20.29	10.15	5.25	4.68
United States Gypsum Company	12.72	12.80	9.25	4.53	0.86	5.54
Western Clay Company	7.42	15.82	29.07	13.83	1.14	2.60
Hales Sand & Gravel Inc.	1.55	6.63	2.26	0.82	1.09	0.22
Georgia Pacific Gypsum - Sigurd Plant	0.02	0.04	2.47	0.94	0.00	0.00

Source:

<sup>1</sup> (DAQ, 2013)

<sup>2</sup> (DEQ, 2017)

### 3.2.2 Regulatory Requirements

Federal actions must meet the requirements of the Clean Air Act and must not cause or contribute to a violation of applicable air quality standards. The DAQ is the delegated authority for implementing the Clean Air Act in Utah and has developed a State Implementation Plan, outlining the requirements and regulations that the state will follow to assure that it is and will remain in compliance. There are no county or local air quality requirements. The Greens Hollow FSEIS describes regulatory requirements for the Proposed Action, including the NAAQS, clean air designations, and Prevention of Significant Deterioration (PSD). The section below addresses HAPs and how they relate to the Proposed Action.

#### 3.2.2.1 Hazardous Air Pollutants

The Clean Air Act enacted the New Source Performance Standards and National Emissions Standards for HAPs for specific types of equipment located at new or modified stationary pollutant sources. The New Source Performance Standards regulations limit emissions from source categories to minimize the deterioration of air quality. Stationary sources are required to meet these limits by

installing newer equipment or adding pollution controls to older equipment that reduce emissions below the specified limit. The Proposed Action would not include equipment that is subject to these regulations. The New Source Performance Standards and National Emissions Standards for HAPs will apply to final coal combustion.

Unlike criteria pollutants, there are no NAAQS for HAPs. Although, these pollutants are also regulated under the Clean Air Act, the approach taken is focused on restricting or limiting emission of pollutants, setting emission standards and control requirements, and requiring record keeping and reporting of emissions to demonstrate on-going compliance with applicable limits and requirements.

HAPs are defined in 40 CFR 61 as pollutants that cause or may cause cancer or serious health impacts such as birth defects. There are currently 187 listed HAPs (EPA, 2005). The majority of HAPs originate from stationary sources (factories, refineries, power plants) and mobile sources (cars, trucks, buses), as well as indoor sources (building materials and cleaning solvents). Specific permitting requirements are a function of the type of source or activity to be permitted, the type(s) of pollutants, and the quantity of pollutants to be emitted. Sources that have the potential to emit greater than 10 tons per year of any one HAP; or more than 25 tons per year of all HAPs in aggregate; are classified as major sources. Sources are considered minor if they are less than the limits for major sources.

A protocol to estimate what is referenced as the “social cost of carbon” (SCC) associated with greenhouse gas emissions was developed by a federal Interagency Working Group (IWG), to assist agencies in addressing Executive Order (EO) 12866. EO 12866 required federal agencies to assess the cost and the benefits of intended regulations as part of their regulatory impact analyses. The SCC protocol was also developed for use in cost-benefit analyses of proposed regulations that could impact cumulative global emissions (Shelanski & Obstfeld, 2015).

Notably, the SCC protocol does not measure the actual incremental impacts of a project on the environment and does not include all damages or benefits from carbon emissions. The SCC protocol estimates economic damages associated with an increase in carbon dioxide (CO<sub>2</sub>) emissions -- typically expressed as a one metric ton increase in a single year -- and includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results “across models, over time, across regions and impact categories, and across 150,000 scenarios” (Rose, 2014). The dollar cost figure arrived at, based on the SCC calculation, represents the value of damages avoided if, ultimately, there is no increase in carbon emissions.

On March 28, 2017, the President issued an EO entitled, “Promoting Energy Independence and Economic Growth,” that directed the IWG be disbanded and that technical documents issued by the IWG be withdrawn as no longer representative of federal policy. The 2017 EO further directed that when monetizing the value of changes in greenhouse gas emissions resulting from regulations, agencies follow the guidance contained in Office of Management and Budget Circular A-4 of September 17, 2003. In all cases, a federal agency should ensure that its consideration of the information and other factors relevant to its decision is consistent with applicable statutory or other authorities, including requirements for the use of cost-benefit analysis.

Based on emission estimates for coal combustion, SCC calculations can quickly rise to large values; however, specific threshold levels for the determination of significance can vary depending on numerous project factors. OSMRE has elected not to specifically quantify the SCC in its assessment of the mining plan modification. NEPA does not require a cost-benefit analysis (40 C.F.R. 1502.23) or the presentation of the SCC cost estimates quantitatively in all cases, and that analysis was not undertaken here. Without a complete monetary cost-benefit analysis, which would include the social benefits of energy production to society as a whole and other potential positive benefits, inclusion solely of a SCC analysis would be unbalanced, potentially inaccurate, and not useful.

Given the uncertainties associated with assigning a specific and accurate social cost of carbon resulting from 8.8 additional years of operation under the mining plan modification, and that the SCC protocol and similar models were developed to estimate impacts of regulations over long time frames, this supplemental EA quantifies direct and indirect GHG emissions and evaluates these emissions in the context of global, United States, and Utah GHG emission inventories as discussed in Section 3.13.7.1 and cumulative emissions in Section 4.13.3.6 and in Table 4.13.

Further, any increased economic activity, in terms of revenue, employment, labor income, total value added, and output, that is expected to occur with the Proposed Action is simply an economic impact, rather than an economic benefit, inasmuch as such impacts might be viewed by another person as negative or undesirable impacts due to potential increase in local population, competition for jobs, and concerns that changes in population will change the quality of the local community.

Economic impact is distinct from “economic benefit” as defined in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from cost-benefit analysis, which is not required. To summarize, this supplemental EA does not undertake an analysis of SCC because 1) it is not engaged in a rulemaking for which the protocol was originally developed; 2) the IWG, technical supporting documents, and associated guidance have been withdrawn; 3) NEPA does not require cost-benefit analysis and the agency did not undertake one here; and 4) because the full social benefits of coal-fired energy production have not been monetized, quantifying only the costs of GHG emissions would provide information that is both potentially inaccurate and not useful.

### **3.3 Direct and Indirect Effects**

The following sections address potential impacts from the Proposed Action on ambient air quality, specifically non-greenhouse gas emissions from mining, emissions from transportation of coal, employee transportation, and emissions including mercury emissions from coal combustion.

#### **3.3.1 Proposed Action**

##### **3.3.1.1 Non-Greenhouse Gas Emissions from Mining**

###### **Criteria Pollutants**

The Proposed Action would utilize existing surface facilities and coal movement operations at the Sufco Mine. The emission rates for the existing mining operation were included in the Greens Hollow FSEIS. The reported total annual emissions are shown in **Table 5**.

**Table 5. Reported Total Annual Emissions (Tons)**

PM <sub>10</sub>	NO <sub>x</sub>	CO	SO <sub>x</sub>	VOCs
24.1	62.0	17.7	4.7	4.7

Source: (Cirrus, 2004)

## PM<sub>2.5</sub>

Particulate matter (PM) is the general term used for a mixture of solid particles and liquid droplets found in the air. Airborne PM comes from many different sources. Primary particles are released directly into the atmosphere from sources such as cars, trucks, heavy equipment, forest fires, and other burning activities. Primary particles also consist of crustal material from sources such as unpaved roads, stone crushing, construction sites, and metallurgical operations. Secondary particles are formed in the air from reactions involving precursor chemicals (EPA, 2017a).

A 2006 study (Krause & Smith, 2006) showed that generally the fraction of PM<sub>2.5</sub> from PM<sub>10</sub> in surface coal mines was 0.292. Using this fraction, the estimated PM<sub>2.5</sub> emission rate would be 7.04 tons per year. This is considered to be a conservative estimate as the mining associated with the Proposed Action is underground rather than on the surface.

Emissions of criteria pollutants and PM<sub>2.5</sub> impacts under the Proposed Action would be considered minor as concentrations would not exceed the NAAQS and short term because they would only occur during mining operations.

### 3.3.1.2 Emissions from Transport of Coal to Hunter Power Plant

Emissions from the hauling of coal by diesel truck from the Sufco Mine to the Hunter Power Plant were calculated using the Environmental Protection Agency's Diesel Emissions Quantifier (EPA, 2017b). The calculator uses the number of vehicles, annual miles, annual idle time, and age of vehicle to make the calculation. The results are shown in **Table 6**. The calculations were generated using the following assumptions:

- The fleet is on-road, Class 8 combination long haul truck.
- The Sufco Mine reports there were 14,388 average trips per month for the most recent 3-month period reported.
- Default annual fuel usage generated by the calculator is 17,349 gallons per truck.
- Round trip distance is 72 miles for 12,431,232 miles traveled per year (14,388 trips/month for 12 months at 72 miles each).
- Annual truck idle time is 520 hours (an average of 2 hours per day for 260 working days).
- Average truck was made in 2010 and will be replaced in 2020.

**Table 6. Annual Emissions from Truck Transportation of Coal**

Annual Results (tons)	NO <sub>x</sub>	PM <sub>2.5</sub>	HC	CO	CO <sub>2</sub>
Baseline of Entire Fleet	23.471	0.487	1.143	4.910	195.2

Notes: HC = hydrocarbon

Black carbon is a form of particulate air pollution that can be emitted through gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuel. It comprises a significant portion of PM. Black carbon emissions from diesel tailpipe emissions are an expected by-product from haul trucks used during coal mining operations. The level of emissions from diesel tailpipe emissions are largely dependent upon the content of the diesel fuel used and, therefore black carbon emissions from the Proposed Action have not been quantified as part of this analysis, although PM concentrations were calculated and reported in Section 4.13.1.1 in the Greens Hollow FSEIS and reported in **Table 5** above in this supplemental EA. Black carbon is an unregulated pollutant; however, the EPA regulates diesel fuel quality.

Compared to the emissions inventory for Sevier County, Utah shown in **Table 3**, the emissions from truck transportation are negligible.

### 3.3.1.3 Emissions from Employee Transportation

Emissions from employee or delivery traffic have been estimated in **Table 7**. Emissions are generally limited to gasoline or diesel vehicles. Table 3.21 in the Greens Hollow FSEIS explains the criteria pollutants and the NAAQS.

**Table 7. Estimated Annual Employee and Delivery Traffic Emissions**

Vehicle Type	Daily Trips <sup>2</sup>	Daily Average Miles <sup>3</sup>	Work-days per Year <sup>4</sup>	CO <sub>2</sub> Emission Factor (pounds per mile)	Methane Emission Factor (pounds per mile)	N <sub>2</sub> O Emission Factor (pounds per mile)	CO <sub>2</sub> (pounds)	CH <sub>4</sub> (pounds)	N <sub>2</sub> O (pounds)
<i>Commuting to Mine (Monday – Friday)</i>									
Car	65	30	260	0.802	0.068	0.071	406,614	34,476	35,997
Passenger Vans <sup>1</sup>	6	30	260	1.14	0.079	0.104	53,352	3,697	4,867
Bus	6	30	260	0.236	0.001	0.001	11,045	47	47
<i>Commuting to Salina Bus Stop (Monday – Friday)</i>									
Car	193	15	260	0.802	0.068	0.071	603,665	51,184	53,442
<i>Commuting to Mine (Saturday – Sunday)</i>									
Car	13	30	104	0.802	0.068	0.071	32,529	2,758	2,880
Passenger Vans <sup>1</sup>	2	30	104	1.14	0.079	0.104	7,114	493	649
Bus	2	30	104	0.236	0.001	0.001	1,473	6	6
<i>Commuting to Salina Bus Stop (Saturday – Sunday)</i>									
Car	65	15	104	0.802	0.068	0.071	81,323	6,895	7,199
Total Annual Emissions (lbs)							1,197,115	99,556	105,087
Total Annual Emissions (Tons)							598.56	49.78	52.54

Source: (EPA, 2008)

<sup>1</sup>Considered equivalent to light-duty truck emission factor.

<sup>2</sup>Provided by Sufco Mine.

<sup>3</sup>Estimated from proximity to nearby communities, actual mileage unknown.

<sup>4</sup>Based on 52 week calendar year.

The impacts from vehicles under the Proposed Action would be short term by extending current operations at the Sufco Mine through 2027 and, would have minor impacts when compared to air quality in the region (see **Table 4**) and would not exceed any of the NAAQS.

### 3.3.1.4 Emissions from Coal Combustion

As discussed in the Greens Hollow FSEIS, burning of coal is an indirect impact that is a reasonable progression of the mining activity. The Hunter Power Plant (Utah DEQ DAQ Operating Permit # 1500101002), located approximately 27 miles from the Sufco Mine, is used as a representative plant for report effects from coal combustion, although in past years, both the Intermountain and Huntington power plants and others have received coal from the Sufco Mine. Permitted air quality emissions from the Hunter Power Plant are presented in **Table 8**. Intermountain is slated for closure in 2025 or conversion to gas, so the Hunter Power Plant is used as a representative plant (Power Engineering, 2017). Any other potential end users are unknown. Impacts from coal going to other locations would be too speculative to quantify and therefore would not be meaningful to the decision maker.

The Hunter Power Plant burns approximately 4.5 million tons per year of coal (PacifiCorp, 2011). For purposes of this analysis, it has been assumed that emissions from the Hunter Power Plant will be at their maximum permitted level when burning 4.5 million tons of coal per year. Additionally, because the Hunter Power Plant is the largest consumer of coal from the Sufco Mine, emission rates calculated from the Hunter Power Plant have been applied to all indirect emissions from the Proposed Action. In actuality, the various control technologies that may or may not be utilized by operators of facilities that ultimately burn the coal will cause emission rates to vary.

Based on the permitted emissions data presented in **Table 4**, and the reported 4.5 million tons of coal burned per year, emission rates have been extrapolated and used to estimate the indirect emissions from the Proposed Action. The estimated range of emissions due to the Proposed Action are presented in **Table 7**. The estimates provided are for information purposes only, as the end users of the coal produced from the Proposed Action are unknown at this time, and the rate at which the coal is burned is also unknown. Table 4.13 of the Greens Hollow FSEIS includes potential greenhouse gas emissions from combustion of coal, reporting 21.8 million metric tons per year of CO<sub>2</sub>. Based on this yearly estimate, the total for coal produced for 8.8 years would be 191.8 million metric tons of CO<sub>2</sub>.

**Table 8. Estimated Indirect Range of Emissions from Coal Combustion (Tons Per Year)**

Coal Burned	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
4.5 Million Tons	4,343.40	11,491.17	747.44	426.03	3,939.31	125.93
5.5 Million Tons	5,308.60	14,044.76	913.54	520.70	4,814.74	153.91
6.3 Million Tons	6,080.76	16,084.64	1,046.42	596.44	5,515.03	176.30

Source: (PacifiCorp, 2011).

The Hunter Power Plant would likely continue as one end user of coal from the Proposed Action. The Hunter Power Plant is anticipated to continue operations for the life of the facility; therefore, regional impacts to ambient air quality from the combustion of coal within the region would be generally the same for the Proposed Action.

### 3.3.1.5 Mercury Emissions from Coal Combustion

The mercury content of the Blackhawk Formation coal (which is what Sufco mines) is 3.7 pounds per trillion British thermal unit (TBtu) (Tabet, et al., 2009). The BTU content of bituminous coal is about 24 million Btu per ton of coal. **Table 9** shows the calculated mercury present in coal consumed annually at the Hunter Power Plant and the total coal that would be mined from the Greens Hollow lease. The indirect mercury emissions from combustion of the coal cannot consider specific control strategies and equipment. Mercury emissions from burning coal depends on control strategies and equipment used to minimize emissions and the quality and characteristics of the coal.

The final destination of the coal from the Proposed Action varies, so again, the Hunter Power Plant is used as a representative plant for the disclosure of impacts. Ultimately, the actual mercury emissions from the Proposed Action will depend on the final destination and emissions control technology and permit requirements at those facilities. Hunter Power Plant’s Title V air permit 1500101002 (DAQ, 2016b) limits emissions of mercury to no greater than 1.2 pounds per TBtu and requires monitoring, record keeping, and reporting to demonstrate continuous compliance. Because the effects would be within the air permit limits, which are set to be protective of the environment, the impacts from mercury emissions would be negligible.

**Table 9. Mercury Produced from Coal Combustion**

Million Tons of Coal	TBtu Generated	Mercury (3.7 pound per TBtu)
4.5 Annual consumed at Hunter	108.0	399.6
55.7 Total	1,336.8	4,946.16

Power plants can emit mercury into the atmosphere with coal combustion which can then affect the quality of surface water as it settles into streams and lakes through deposition or precipitation. Mercury can go through a series of chemical transformations that convert it to a highly toxic form, which may concentrate in fish and birds (Irwin, 2007). However, mercury contamination through atmospheric deposition is extremely difficult to determine as atmospheric mercury can be derived from any number of local, regional, or global sources. The Hunter Power Plant is used as the representative user of coal from the Greens Hollow Federal Coal Lease Tract UTU-84102 and actual buyers and combustion locations would vary depending on coal market conditions. Thus, it is not possible to determine how much mercury emissions would be deposited into surface water or where it would be deposited as an indirect impact of mining the Greens Hollow Federal Coal Lease Tract UTU-84102 at the Sufco Mine.

### 3.3.2 No Action

Under the No Action, the Greens Hollow Federal Coal Lease Tract UTU-84102 coal would not be produced, shipped, or burned. Therefore, there would be no impacts on air quality.

### 3.4 Cumulative Effects

When considering which actions had or will have cumulative effects, activities that are completed and reclaimed are assumed to not be producing cumulative impacts on air or emissions. Air quality and emissions impacts from those activities have already dissipated or are reflected in the current air quality, but cannot be differentiated individually from projects within or even outside of the cumulative impacts analysis area. For this reason, only current and reasonably foreseeable actions that will be occurring during the same time frame as the mining and use of the coal from the Greens Hollow Federal Coal Lease Tract UTU-84102 are considered in the cumulative impacts analysis. For example, it is assumed that coal mined prior to 2017 has been consumed.

In evaluating the potential cumulative impacts of the alternatives when combined with the effects of the past, present, and reasonably foreseeable future actions, the Table 2.1 in the Greens Hollow FSEIS listed actions considered. Actions identified in the Greens Hollow FSEIS that have cumulative effects on air and emissions are summarized below in **Table 10**. These actions are also included in the cumulative impacts analysis for this supplemental EA. The Table 2.1 in the Greens Hollow FSEIS indicated which past and present actions were having residual effects and on which resources these residual effects were occurring. Actions which did not list residual effects that may affect air were eliminated from **Table 9**. After the Greens Hollow FEIS Record of Decision, additional actions have been proposed that may have cumulative air and emissions impacts. These actions are shown in **Table 11**.

**Table 10. Past, Present, and Reasonably Foreseeable Actions with Air and Emissions Effects**

<b>Actions</b>	<b>Dates</b>	<b>Residual, Current, and Future Effects</b>
<b>Ongoing Actions</b>		
<b>Minerals</b>		
Vent fan operating in the North Fork of Quitcupah Canyon.	1996 to present	Fan site includes 0.70 acres of disturbance. Continual noise is produced by the fan.
Link Canyon power line and substation.	2000 to present	Current facility includes 0.25 acres of disturbance.
Link Canyon intake ventilation breakout and access.	2003 to present	Current structure encompasses 0.38 acres of disturbance.
<b>Recreation and Transportation</b>		
Vehicle (passenger, off-highway vehicle, snowmobile) access for Christmas tree cutting, firewood gathering, grazing management, mining, recreation, hunting, timber and private land access.	Ongoing	Emissions from vehicles.
<b>Future Actions</b>		
<b>Minerals</b>		
Seven exploratory drill holes to determine geologic factors. Drill holes would be considered a cumulative action since their authorization occurs independently.		Each drill pad is approximately .006 acres for a total permitted disturbance of 0.042 acres. In sensitive areas or areas of extreme terrain, helicopter assisted drilling may be used. Drill holes will be plugged, reclaimed, and revegetated. Exposed soil that could contribute

Actions	Dates	Residual, Current, and Future Effects
		PM would be short-term until the pads are revegetated.
Ventilation (vent) shaft(s) would be a reasonably foreseeable future action to provide adequate ventilation to mine workings underground and for safety escape ways. Two vent shafts could be necessary for operation of the Greens Hollow Federal Coal Lease Tract UTU-84102. One of the two vent shafts could require a large electric fan, and the site could also house intake shafts, utility boreholes (for conveying electricity, communications, and other utilities into the Sufco Mine), diesel generators, electrical transformers, and fuel storage tanks.		The ventilation fan system would run year-round. It is reasonably foreseeable that a vent shaft would be between some 15 to 30 feet in diameter.
Vehicle access and road use for construction and maintenance of an electrical power line to supply the Sufco Mine and the vent fan. Access would be via existing National Forest System roads (no new road construction).		Emissions from vehicle access to the vent shaft site(s) would be required on a daily basis.

The Sufco Mine has decided not to construct a previously approved coal segregation facility which was considered in the cumulative impacts analysis in the Greens Hollow FSEIS. Associated air quality impacts from additional disturbance will not occur.

**Table 11. Reasonably Foreseeable Actions Since The Greens Hollow FEIS Record of Decision**

Actions	Dates	Residual, Current, and Future Effects
<b>Minerals</b>		
South Fork Lease Modifications	2018-2019	Emissions from 6.35 million tons of coal mined, transported, and combusted.
3 Right 4 East Panel Amendment (Quitcupah Lease) (received by Utah DOGM 24-Jan-2017). Includes mining part of the Quitcupah Tract which was previously approved but not mined. The panel orientation has been modified. No additional surface disturbance would occur.	2017-2021	Emissions from 2.01 million tons of coal mined, transported, and combusted.
4 Right 4 East Panel Amendment (received by Utah DOGM 26-Oct-2017). Includes mining part of the Quitcupah Tract which was previously approved but not mined. No additional surface disturbance would occur.	2017-2021	Emissions from 1.67 million tons of coal mined, transported, and combusted.

### 3.4.1 Proposed Action

Vehicle use for recreation and management of National Forest resources is ongoing, and not increasing above previous levels that are reflected in the current condition. As discussed in Section 3.2.1, these ongoing activities are not adversely affecting air quality to the degree that air quality standards for criteria pollutants are not being met.

Emissions from ongoing and future mining listed in **Table 11** (including drilling and ventilation) would contribute additional cumulative effects in the cumulative impacts analysis area during the same time frame as the Proposed Action, however, as described in Section 3.3.2, the impacts are not additive due to atmospheric dissipation.

The combined amount of coal added to the Sufco Mine mining plan that is reasonably foreseeable is 10.03 million tons. Based on the annual production rate of 5.5 million to 6.3 million tons per year identified in Section **Error! Reference source not found.**, this amount of coal would extend the ufco Mine life by 1.5 to 1.8 years. The amount of non-greenhouse gas emissions annually reported in **Table 5** from mining would continue for 1.5 to 1.8 years. Likewise, the annual rate of PM<sub>2.5</sub> emissions from mining (7.04 tons per year, see Section 3.3.1.1) would continue for the same amount of time. The annual emissions from employees and delivery traffic are reported in **Table 7**. Emissions from employees and delivery traffic would continue at the same rate for the extended 1.5 to 1.8 years.

Indirect emissions from the combustion of coal mined from the reasonably foreseeable actions has been estimated below.

Combustion of the 10.03 million tons of coal that would be mined in the reasonably foreseeable future (as identified in **Table 11**) are shown in **Table 12**.

**Table 12. Additional Estimated Indirect Emissions from Coal Combustion (Tons Per Year)**

Coal Burned	CO	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	VOC
10.03 Million Tons	9,680.956	25,612.54	1,665.961	949.5735	8,780.284	280.684

### 3.4.2 No Action

As the No Action would have no additional direct or indirect effects on air quality or emissions, there would be no cumulative effects.



## Chapter 4 Consultations and Coordination

---

This supplemental EA was prepared by the people listed in **Table 13**.

**Table 13. List of Preparers**

Name	Role
Gretchen Pinkham	Project Manager
Nicole Caveny	Mining Plan Decision Document Manager
Cameo Flood	Project Description
Chris Hayes	Air Quality



## References

---

- BLM and USFS, 2015. Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Lease Tract UTU-84102. Sanpete and Sevier Counties, Utah, Price and Richfield, Utah: USDI Bureau of Land Management and USDA Forest Service.
- BLM, 2016. Record of Decision. Decision to Hold Competitive Lease Sale: Greens Hollow Federal Coal Lease Tract. August 12. Salt Lake City, Utah: Department of the Interior, Bureau of Land Management, Utah State Office.
- BLM, 2017. Press release: BLM conducts coal lease sale for Greens Hollow Tract. January 4. Salt Lake City(Utah): Department of the Interior, Bureau of Land Management.
- Cirrus, 2004. Coal tract evaluations on the Manti-La Sal Nationals Forest; Muddy Creek Technical Reports. Prepared for the Manti-La Sal National Forest, Price, UT., Logan, Utah: Cirrus Ecological Solutions, LC.
- DAQ, 2013. Approval Order: Approval order modification to add a second emergency generator. January 28, Salt Lake City, Utah: Utah Department of Environmental Quality, Division of Air Quality.
- DAQ, 2016a. Utah Division of Air Quality 2016 Annual Report, Salt Lake City, Utah: Division of Air Quality.
- DAQ, 2016b. Title V Operating Permit. Permit Number 1500101002. March 3, Salt Lake City: State of Utah.
- DEQ, 2017. 2014 Statewide Point Sources by County, Salt Lake City, Utah: Utah Department of Environmental Quality.
- EIA, 2016a. Annual Sufco Mine Production, Washington, DC: US Department of Energy, US Energy Information Agency.
- EIA, 2016b. Coal Shipments from Sufco Mine, Washington DC: US Department of Energy, US Energy Information Agency.
- EPA, 2005. Initial list of hazardous air pollutants with modifications. [Online] Available at: <https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications> [Accessed 16 November 2017].
- EPA, 2008. Optional emissions from commuting, business travel and product transport. May, Washington, DC: Climate Leaders GHG Inventory protocol.
- EPA, 2017a. Ambient Concentrations of Particulate Matter. [Online] Available at: <https://cfpub.epa.gov/roe/indicator.cfm?i=9> [Accessed 16 November 2017].

- EPA, 2017b. Diesel Emissions Quantifier. [Online]  
Available at: <https://cfpub.epa.gov/quantifier/index.cfm?action=results.quantify>  
[Accessed 21 November 2017].
- Irwin, B. B. a. M., 2007. Basic Mercury Data & Coal Fired Power Plants. [Online]  
Available at:  
<https://www.purdue.edu/discoverypark/energy/assets/pdfs/cctr/outreach/Basics2-Mercury-Mar07.pdf>  
[Accessed March 2016].
- Krause, M. & Smith, S., 2006. Final - Methodology to calculate particulate matter (PM) 2.5 and PM 2.5 significance thresholds. October, California: South Coast Air Quality Management District Governing Board.
- MESI, 2004. Mant-La Sal Coal Tracts air quality evaluation Muddy Creek technical Report. February, Golden Colorado: Marquez Environmental Services, Inc..
- Norwest Corporation, 2014. Coal market Analysis. October 9, Salt Lake City, Utah: Norwest Corporation.
- OSMRE, 1994. Federal Register Notice. 30 CFR Part 944. July 29, Washington DC: Federal Register Volume 59, Number 145 .
- PacifiCorp, 2011. Hunter Power Plant. [Online]  
Available at:  
[https://www.pacificorp.com/content/dam/pacificorp/doc/Energy\\_Sources/EnergyGeneration\\_FactSheets/RMP\\_GFS\\_Hunter.pdf](https://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/EnergyGeneration_FactSheets/RMP_GFS_Hunter.pdf)  
[Accessed 16 November 2017].
- Power Engineering, 2017. Utah's Largest Coal Plant to Close, Convert by 2025. [Online]  
Available at: <http://www.power-eng.com/articles/2017/05/utah-s-largest-coal-plant-to-close-convert-by-2025.html>  
[Accessed 12 December 2017].
- Rose, S., 2014. Understanding the social cost of carbon: A technical assessment. December 8, s.l.: US Energy Association.
- Shelanski, H. & Obstfeld, M., 2015. Estimating the benefits from carbon dioxide emissions reductions, Washington DC: The Whitehouse.gov.
- Tabet, D. E., Hucka, B. P., Quick, J. C. & Wakefield, S. I., 2009. Available coal resource for the Salina Canyon and southwestern part of the Wasatch Plateau coalfields, Sevier County, Utah. Salt Lake City, Utah: Utah Department of Natural Resources, Utah Geological Survey.
- USFS, 2015. Record of Decision. Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Lease Tract UTU-84102. October 5. Price and Richfield, Utah: USDA Forest Service, Manti-La Sal and Fishlake National Forests.