



U.S. Department of the Interior
Office of Surface Mining
Reclamation and Enforcement



Appendix A—Supporting Documents

San Juan Mine Deep Lease Extension Mining Plan Modification



March 2019

Office of Surface Mining Reclamation and Enforcement
Western Region
1999 Broadway, Suite 3320
Denver, CO 80202-3050

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ACRONYMS AND ABBREVIATIONS

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Acronym	Definition
µg/L	microgram per liter
µg/m ³	microgram per cubic meter
95UCL	95 percent upper confidence level
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AF	acre-feet
AFC	armored face conveyor
AMP	Allotment Management Plan
APE	area of potential effect
APS	Arizona Public Service Company
As	arsenic
ASLM	Assistant Secretary for Land and Minerals Management
AST	above-ground storage tank
BA	Biological Assessment
BACT	best available control technology
BART	best available retrofit technology
BHP	Broken Hill Property Company
BLM	U.S. Bureau of Land Management
BLM/FFO	BLM Farmington Field Office
BMP	best management practice
BOR	U.S. Bureau of Reclamation
CCR	coal combustion residuals
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH ₄	methane
cm/s	centimeter per second
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
COG	New Mexico Council of Governments
COPC	chemical of potential concern
COPEC	constituent of potential ecological concern
CR	County Road
CWA	Clean Water Act
dba	A-weighted decibel(s)
DLE	Deep Lease Extension
DOI	U.S. Department of the Interior
DPM	diesel particulate matter
dV	deciview
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EPC	exposure point concentration
ERA	Ecological risk assessment
ESA	Endangered Species Act
ESV	ecological screening value
ESP	Electrostatic Precipitator
FGD	flue gas desulfurization
FIP	Federal Implementation Plan
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
FTA	Federal Transit Administration
FWS	U.S. Fish and Wildlife Service

Acronym	Definition
GHG	greenhouse gas
GVB	gob vent borehole
HAP	hazardous air pollutant
HFC	hydrofluorocarbon
Hg	mercury
HHRA	human health risk assessment
HQ	hazard quotient
IPAC	Information for Planning and Conservation
IPCC	Intergovernmental Panel on Climate Control
IRP	Integrated Resource Plan
kg	kilogram
kg/m ³	Kilogram per cubic meter
KOP	Key Observation Point
L _{dn}	day-night average noise level
L _{eq}	equivalent noise level
LOAEL	lowest observed adverse effects level
MATS	Mercury Air Toxic Standards
MDN	Mercury Deposition Network
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGD	million gallons per day
MMBtu	million British thermal units
MMD	New Mexico Mining and Minerals Division
MSHA	U.S. Mine Safety and Health Administration
MT	metric tonne(s)
MVY	measured value per year
MW	megawatt(s)
N/A	not applicable
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NMAAQs	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMCRIS	New Mexico Cultural Resources Information System
NMDGF	New Mexico Department of Game and Fish
NMDOH	New Mexico Department of Health
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of the State Engineer
NMSA	New Mexico Statutes Annotated
NNHP	Navajo Natural Heritage Program
NO	nitric oxide
NO ₂	nitrogen dioxide
NO ₃	nitrate
NO _x	nitrogen oxide
NOAEL	no observed adverse effects level
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NR	not reported
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OHV	off-highway vehicle
OSMRE	Office of Surface Mining Reclamation and Enforcement
PA	Programmatic Agreement
PAH	polyaromatic hydrocarbon

Acronym	Definition
PAP	Permit Application Package
PCB	polychlorinated biphenyls
PCS	Pictured Cliffs Sandstone
PHC	potential hydrologic consequences
PM	particulate matter
PM _{2.5}	particulate matter less than or equal to 2.5 microns in diameter
PM ₁₀	particulate matter less than or equal to 10 microns in diameter
PNM	Public Service Company of New Mexico
POWER	Partnership for Opportunity and Workforce and Economic Revitalization
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
ppt	parts per trillion
PPV	peak particle velocity
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
RMP	Resource Management Plan
ROD	Record of Decision
ROI	region of influence
SCC	social cost of carbon
SDA	Specially Designated Area
Se	selenium
SF ₆	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJCC	San Juan Coal Company
SMCRA	Surface Mining Control and Reclamation Act
SNCR	selective non-catalytic reduction
SO ₂	sulfur dioxide
SO ₄	sulfate
SPCC	Spill Prevention Containment and Countermeasures Plan
TDS	total dissolved solids
TEP	Tucson Electric Power Company
TMDL	Total Maximum Daily Load
tpy	tons per year
TRD	Technical Resource Document
TRI	Toxics Release Inventory
TSP	total suspended particulate
USACE	U.S. Army Corps of Engineers
USC	United States Code
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRI	Visual Resource Inventory
VRCR	Visual Resource Contrast Rating
VRM	Visual Resource Management

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REFERENCES

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- AECOM. 2017a. Ambient Air Quality Modeling Report – San Juan Generating Station and San Juan Mine. Public Service Company of New Mexico. September 2017.
- _____. 2017b. Use of Existing Information to Support the San Juan Mine EIS for Ozone, Total Particulate Matter Less than 2.5 Microns, and Regional Haze Contributions from the San Juan Generating Station. Memorandum from AECOM to San Juan Generating Station. August 28, 2017.
- _____. 2017c. Greenhouse Gas Emissions Report – San Juan Generating Station. AECOM. September 2017.
- _____. 2017d. Deposition Area Ecological Risk Assessment – Draft. San Juan Generating Station and San Juan Mine Public Service Company of New Mexico. November 2, 2017.
- _____. 2017e. Health and Human Risk Assessment Report – Draft. San Juan Generating Station. Prepared for Public Service Company of New Mexico. September 2017.
- _____. 2017f. Screening Level Deposition Modeling Report. San Juan Generating Station and San Juan Mine. Prepared for Public Service Company of New Mexico. September 2017.
- ALS (Arizona Office of Economic Opportunity, Arizona Labor Statistics). 2016. Balance of State Long Term Industry Employment Projections 2014-2024. Released on October 25, 2016. Accessed: June 2, 2017. Available: <https://laborstats.az.gov/employment-forecasts>
- ATSDR (Agency for Toxic Substances and Disease Registry). 1999. Toxicological Profile for Mercury. U.S. Department of Health and Human Services. March 1999. Accessed: August 2017. Available: <https://www.atsdr.cdc.gov/toxprofiles/tp46.pdf>
- AZ EPS (Arizona Office of Employment and Population Statistics). 2015a. Population Projections: 2015-2050 State and County Population Projections. Accessed: April 25, 2017. Available: <https://population.az.gov/population-projections>
- _____. 2015b. Population Estimates. Accessed: April 25, 2017. Available: <https://population.az.gov/sites/default/files/documents/files/pop-estimates2010-04pla.pdf>
- Baker, L.L. and Estrada. 2007. Investigations into the Effects of Subsidence on Cultural Resources at the San Juan Underground Mine, San Juan County, New Mexico. Prepared by Larry L. Baker and Orlando J. Estrada. Paper presented at the 72nd Annual Meeting of the Society for American Archaeology, Austin, Texas. April 28, 2007.
- BIA (U.S. Department of Interior Bureau of Indian Affairs). 2017. What We Do. Last updated April 27, 2017. Accessed: April 27, 2017. Available: <https://www.bia.gov/WhoWeAre/RegionalOffices/Southwest/What/index.htm>
- BLM/FFO (U.S. Bureau of Land Management, Farmington Field Office). 1998. Coal Leasing Area RMP Amendment/Environmental Assessment. April 1998.

- _____. 2003. Farmington Resource Management Plan with Record of Decision. Farmington Field Office, Farmington, NM. Accessed on July 19, 2017 at: https://eplanning.blm.gov/epl-front-office/projects/lup/64524/96667/116772/FDO_-_FFO_-_2003_-_Farmington_RMP_and_ROD.pdf
- BLM (U.S. Bureau of Land Management). 2016. New Mexico Special Status Species.
- Catalyst Environmental Solutions. 2016. Site Photographs.
- CDC (Centers for Disease Control and Prevention). 2016. Current Cigarette Smoking Among Adults in the United States. Accessed: August 21, 2017. Available: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm
- CDLE (Colorado Department of Labor and Employment, Office of Labor Market Information). 2015. Quarterly Census of Employment and Wages.
- CDPHE (Colorado Department of Public Health and Environment). 2016. Colorado's Air Quality Control Region Designations of Non-Attainment, Attainment and Attainment/Unclassifiable for the 2015 Revised 9-Hour Ozone NAAQS. Letter report from CDPHE Regional Administrator to EPA Region 8. September 2016. Accessed October 2017 at: <https://www.epa.gov/sites/production/files/2016-11/documents/co-rec.pdf>
- _____. 2017. Colorado Health Indicators – La Plata and Montezuma Counties. Accessed: July 20, 2017. Available: <https://www.colorado.gov/pacific/cdphe/colorado-health-indicators>
- CEQ (Council on Environmental Quality). 1997. Environmental Justice Guidance Under the National Environmental Policy Act. December 10, 1997.
- _____. 2016. Final NEPA Guidance on Greenhouse Gas Emissions and Climate Change. August 5, 2016.
- DOLA (Colorado Department of Local Affairs). 2016. Population Totals for Colorado Counties, 5-year increments, 2000-2050. Forecasts produced October 2016. Accessed: April 25, 2017. Available: <https://demography.dola.colorado.gov/population/population-totals-counties/#population-totals-for-colorado-counties>
- Ecosphere (Ecosphere Environmental Services). 2005. Biological Assessment for the Proposed 160.6 Acre Coal Lease Extension San Juan Underground Mine, San Juan County, New Mexico. 25pp.
- _____. 2017a. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Air Quality Resources. Ecosphere Environmental Services, Inc. April 2017.
- _____. 2017b. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Climate Change Resources. Ecosphere Environmental Services, Inc. April 2017.
- _____. 2017c. Deep Lease Extension Project San Juan Mine Baseline Data, Summary Report Land Use Resources. April. Prepared for the San Juan Coal Company.

- _____. 2017d. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Surface Water Resources. March. Prepared for the San Juan Coal Company.
- _____. 2017e. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Groundwater Resources. March. Prepared for the San Juan Coal Company.
- _____. 2017f. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Vegetation Resources. April 2017, Revised June 2017. Prepared for San Juan Coal Company.
- _____. 2017g. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report. General Wildlife Resources. Prepared for the San Juan Coal Company.
- _____. 2017h. 2016 Annual Raptor and Wildlife Monitoring Report. San Juan Mine Deep Lease/Deep Lease Extension, San Juan Coal Company. Prepared for BHP Billiton New Mexico Coal, San Juan Coal Company, Kirtland, New Mexico. 35pp.
- _____. 2017i. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Special Status Species Resources. San Juan Coal Company.
- _____. 2017j. Deep Lease Extension Project with San Juan Mine Baseline Data Summary Report Recreation Resources. Prepared for San Juan Coal Company.
- _____. 2017k. Socioeconomic and Environmental Justice Baseline Summary Report. Prepared for the San Juan Coal Company.
- _____. 2017l. Deep Lease Extension Project San Juan Mine Baseline Data Summary Report Noise and Vibration Sources. April 2017. Prepared for the San Juan Coal Company.
- _____. 2017m. Deep Lease Extension Project, San Juan Mine Baseline Data, Summary Report, Waste Management Resources. March 2017. Prepared for the San Juan Coal Company.
- _____. 2017n. Deep Lease Extension Proposed Action - San Juan Mine Baseline Data Summary Report, Health and Safety Resources. April. Prepared for the San Juan Coal Company.
- _____. 2017o. Deep Lease Extension Proposed Action – San Juan Mine Baseline Data Summary Report, Visual Resources. April. Prepared for the San Juan Coal Company
- EPA (U.S. Environmental Protection Agency). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March 2017.
- _____. 1989. Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response. U.S. Environmental Protection Agency; Washington, D.C. EPA 540/1-89/002.
- _____. 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final). U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response. EPA 540/R-97/006. June 1997.

- _____. 1998a. Guidelines for Ecological Risk Assessment. Risk Assessment Forum. U.S. Environmental Protection Agency; Washington, D.C. EPA/630/R-95/002F. April 1998.
- _____. 1998b. Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis. Washington, D.C.: U.S. Environmental Protection Agency, Office of Federal Activities. April.
- _____. 1999a. Consideration of Cumulative Impacts in EPA Review of NEPA Documents. EPA 315-R-99-002. May.
- _____. 1999b. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA530-D-99-001A. August 1999.
- _____. 2002. Role of Background in the CERCLA Cleanup Program. U.S. EPA Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002. OSWER 9285.6-07P.
- _____. 2005. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Office of Solid Waste and Emergency Response. EPA530-R-05-006. September.
- _____. 2009. EPA/R-08/139B: Integrated Science Assessment for Particulate Matter. Second External Review Draft. National Center for Environmental Assessment, Office of Research and Development.
- _____. 2011a. Compilation of Air Pollution Emission Factors (Document AP-42), Fifth Edition (1995-2017). Office of Air Quality Planning and Standards. Accessed October 2017 at: <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors>
- _____. 2011b. Four Corners Power Plant Federal Implementation Plan.
- _____. 2014. Air Quality State Implementation Plans; Approval and Promulgation: New Mexico; Regional Haze and Interstate Transport Affecting Visibility State Implementation Plan Revisions. EPA-R06-OAR-2014-0214, Final rule. 79 FR 60985, November 10, 2014).
- _____. 2017a. National Ambient Air Quality Standards (NAAQS) Table (webpage). Accessed October 2017 at: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>
- _____. 2017b. Mercury and Air Toxics Standards (MATS)/Cleaner Power Plants (webpage) Accessed October 2017 at: <https://www.epa.gov/mats/cleaner-power-plants>
- _____. 2017c. New Source Review (NSR) Permitting/Prevention of Significant Deterioration (PSD) Basic Information (webpage). Accessed October 2017 at: <https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information>
- _____. 2017d. Air Quality System/U.S. Environmental Protection Agency. Monitor Values Report 2008-2016. Accessed: May 2017. Available at: <https://www.epa.gov/outdoor-air-quality-data>

- _____. 2017e. Overview of Greenhouse Gases; Climate Change Home. United States Environmental Protection Agency (EPA). Accessed: October 2017. Available: https://19january2017snapshot.epa.gov/ghgemissions/overview-greenhouse-gases_.html
- _____. 2017f. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. Chapter 2 – Trends in Greenhouse Gas Emissions. United States Environmental Protection Agency. EPA 430-P-17-001. April 2017. Accessed: October 2017. Available: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015>
- _____. 2017g. Learn about Lead. Accessed: August 22, 2017. Available: <https://www.epa.gov/lead/learn-about-lead>
- _____. 2017h. Regional Screening Levels for Chemical Contaminants at Superfund Sites. Table version June 2017. Available at: <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017>
- EPRI (Electric Power Research Institute). 2009. Updated Hazardous Air Pollutant (HAP) Emissions Estimates and Inhalation Human Health Risk Assessments for U.S. Coal-fired Electric Engineering Units. December 2009.
- Farmington Metropolitan Planning Office. 2017. Farmington MPO Interactive Traffic Count Map. Accessed November 14, 2017. Available at: <http://www.fmtn.org/375/MPO-Traffic-Counts>
- Fassett, J.E. 2000. “Geology and coal resources of the Upper Cretaceous Fruitland Formation, San Juan Basin, New Mexico and Colorado” in M.A. Kirschbaum, L.N.R. Roberts, and L.R.H. Biewick, eds., *Geologic Assessment of Coal in the Colorado Plateau: Arizona, Colorado, New Mexico, and Utah*: U.S. Geological Survey Professional Paper 1625-B, Chapter Q, p. Q1-Q131.
- FHWA (Federal Highway Administration). 2006. Construction Noise Handbook. Accessed: 26 June 2017: Available: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/
- FWS (U.S. Fish and Wildlife Service). 2001. Biological Opinion for the Public Service Company of New Mexico Fish Passage. New Mexico Ecological Services Field Office. Albuquerque, NM.
- _____. 2002. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: Amendment and Supplement to the Colorado Squawfish Recovery Plan. Mountain-Prairie Region (Region 6), Denver, CO.
- _____. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. Biological Technical Publication BTP-R6001-2003.
- _____. 2006. Final Biological Opinion for Navajo Reservoir Operations, Colorado River Storage Project, Colorado-New Mexico-Utah. January 5.

- _____. 2009. Final Biological Opinion for the Navajo-Gallup Water Supply Project, U.S. Bureau of Reclamation, Durango, Colorado.
- _____. 2017. Official Species List. Information for Planning and Conservation (IPaC). Environmental Conservation Online System.
- GOMB (Utah Governor's Office of Management and Budget). 2012. 2012 Baseline Projections: Population by Age and Area. Based on 2010 Census Data. Accessed: April 23, 2017. Available: <http://gomb.utah.gov/budget-policy/demographic-economic-analysis>
- Grover, H. 2017. State Tests for Blood Lead Levels in Local Children. The Daily Times. April 16, 2017. Accessed: August 22, 2017. Available: <http://www.daily-times.com/story/news/local/2017/04/16/state-tests-blood-lead-levels-local-children/100421106/>
- Health Effects Institute. 2010. HEI Panel of the Health Effects of Traffic-Related Air Pollution: Traffic-related air pollution: a critical review of the literature on emissions, exposure, and health effects. Health Effects Institute. Available at: <http://pubs.healtheffects.org/view.php?id=334>
- Horn, J. 1997. Cultural Resource Inventory of the Deep Lease Extension at the San Juan Mine, San Juan County, New Mexico. Report prepared for BHP World Minerals, San Juan Coal Company, San Juan Mine, Waterflow, NM. On file at the Farmington District, Bureau of Land Management. Alpine Archaeological Consultants, Inc., Montrose, CO. NMCRIS No. 58135.
- Huffman, C. 1987. Petroleum Geology and Hydrocarbon Plays of the San Juan Basin Petroleum Province. USGS Open-File Report 87-450-B. Accessed at: <http://pubs.er.usgs.gov/publication/ofr87450B>.
- IMPROVE (Interagency Monitoring of Protected Visual Environments). 2017. AQRV Summaries: Visibility Status and Trends Following the Regional Haze Rule Metrics. Accessed: October 2017. Available: <http://vista.cira.colostate.edu/Improve/aqr-summaries/>
- IPCC (Intergovernmental Panel on Climate Change). 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. Accessed: October 2017. Available: http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm
- ISO (International Standards Organization). 1996. 9613-2: Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation.
- Kendall, J. 2017. Wildlife Biologist, BLM Farmington Field Office (FFO), personal communication with Ecosphere Environmental Services, Inc. regarding BLM/FFO sensitive species, March 1, 2017.

- Meininger, J., and L.L. Baker. 2006. An Overview of the Cultural Resources of BHP Billiton's Navajo Mine Area 4 North, Area 4 South, and Area 5, San Juan County, New Mexico. San Juan County Archaeological Research Center and Library DCA Report No. 05-DCA-180. Report prepared for BHP Billiton Navajo Coal Company, Fruitland, New Mexico. San Juan County Museum Association, Division of Conservation Archaeology, Bloomfield, New Mexico.
- MMD (New Mexico Mining and Minerals Division). 2014. San Juan Mine Deep Lease Extension Permit 14-01.
- MSHA (Mine Safety and Health Administration). 2017a. Rules to Live By Calculation Results for San Juan Mine 1, January 2016 – June 2017. Mine Data Retrieval System. Accessed: August 2017. Available: <https://arlweb.msha.gov/drs/ASP/RLBEval2.asp>
- _____. 2017b. Mine Citations, Orders and Safeguards for San Juan Mine. Mine Data Retrieval System. Accessed: August 2017. Available: <https://www.msha.gov/data-reports/data-sources-calculators>
- NADP (National Atmospheric Deposition Program) 2017. Mercury Deposition Network/Maps & Data/MDN Data. Accessed October 2017 at: <http://nadp.sws.uiuc.edu/mdn/>
- Navajo Nation DED (Navajo Nation Division of Economic Development). 2012. Last updated May 17, 2012. Accessed: April 27, 2017. Available: http://navajobusiness.com/pdf/Ads/2010SF1/DEC_10_SF1_P1_NavajoNationPopulation_051712.pdf
- NNHP (Navajo Natural Heritage Program). 2008. Navajo Endangered Species List. Navajo Nation Department of Fish and Wildlife. Resources Committee Resolution No. RCS-41-08. https://www.nndfw.org/nnhp/nnhp_home.htm
- Nishimura, K., J. Galanter, L. Roth, S. Oh, N. Thakur, E. Nguyen, S. Thyne, H. Farber, D. Serebrisky, R. Kumar, E. Brigino-Buenaventura, A. Davis, M. LeNoir, K. Meade, W. Rodriguez-Cintron, P. Avila, L. Borrell, K. Bibbins-Domingo, J. Rodrigues-Santana, S. Sen, F. Lurmann, J. Balmes, E. Burchard. 2013. Early Life Air Pollution and Asthma Risk in Minority Children: The GALA II and SAGE II Studies. *American Journal of Respiratory and Critical Care Medicine* 188(3): 309-318.
- NM-IBIS (New Mexico Indicator-Based Information System). 2012. Health Highlight Report for San Juan County – Lead Exposure, Children under the age of three years with confirmed elevated blood lead levels: Percentage of children 2012. Accessed: August 22, 2017. Available: <https://ibis.health.state.nm.us/community/highlight/report/GeoCnty/45.html>
- _____. 2015. Health Indicator Report of Invasive Pneumococcal Disease - Persons Aged 65 Years and Older. Accessed: August 21, 2017. Available: https://ibis.health.state.nm.us/indicator/view/InvasivePneumo.Year.NM_US.html
- _____. 2016. Health Indicator Report of Tobacco Use – Adult Smoking Prevalence. Accessed: July 20, 2017. Available: https://ibis.health.state.nm.us/indicator/view/TobaccoSmokeAdult.Year.NM_US.html

- _____. 2017. Community Snapshot for San Juan County - Community Health Status Indicator. New Mexico Department of Health. Accessed: July 20, 2017. Available: <https://ibis.health.state.nm.us/community/snapshot/report/CommunityInd/GeoCnty/45.html?PageName=>
- NMDGF (New Mexico Department of Game and Fish). 2016. Threatened and Endangered Species of New Mexico. 2014 Biennial Review. October 5, 2016. 162 pp.
- _____. 2017. New Mexico Wildlife of Concern – Threatened and Endangered, San Juan County. Biota Information System of New Mexico (BISON-M).
- NMDWS (New Mexico Department of Workforce Solutions). 2016. New Mexico Annual Social and Economic Indicators Statistical Abstract for Data Users. Accessed: April 25, 2017. Available: https://www.dws.state.nm.us/Portals/0/2016_ASEI.pdf
- NMED (New Mexico Environmental Department). 2013. Revised BART Determination – San Juan Generating Station Units 1 – 4. Appendix D to New Mexico’s Regional Haze SIP. New Mexico Environment Department, Air Quality Bureau. Revised June 2013
- _____. 2015. Air Quality Bureau New Source Review Permit/San Juan Generating Station. Permit No. 0063-M9. May 14, 2015.
- _____. 2016a. Title V Operating Permit PNM San Juan Generating Station, No. P062R3. New Mexico Environment Department, Air Quality Bureau. November 2016.
- _____. 2016b. Inventory of New Mexico Greenhouse Gas Emissions: 2000-2013. New Mexico Environment Department (NMED). December 2016. Accessed: October 2017. Available: https://www.env.nm.gov/wp-content/uploads/2017/01/NM_GHGInventory_2013_Update.pdf
- NPS (National Park Service). 2017. Southern Colorado Plateau Ecosystems. Accessed: August 3, 2017. Available: <https://science.nature.nps.gov/im/units/scpn/about/ecosystem.cfm#>
- NRC (National Research Council). 2006. Managing Coal Combustion Residues in Mines: National Academies Press, Washington, DC.
- NRCS (National Resources Conservation Service). 1998. Response for BHP World Minerals Request for Additional Information. June 19, 1998.
- _____. 2017. Prime Farmland. Web Soil Survey. Available: <https://websoilsurvey.nrcs.usda.gov/>
- OSMRE (Office of Surface Mining Reclamation and Enforcement). 1989. Handbook on Procedures for Implementing the National Environmental Policy Act. March.
- _____. 2008. Mining Plan Modification for Federal Lease NM-99144 at San Juan Coal Company’s San Juan Mine located in San Juan County, New Mexico. January 17, 2008.
- _____. 2015. Final Environmental Impact Statement for the Four Corners Power Plant and Navajo Mine Energy Project. May 2015. Available at: <https://www.wrcc.osmre.gov/initiatives/fourCorners/documentLibrary.shtm>

- Patel, M.M., and R.L. Miller. 2009. Air Pollution and Childhood Asthma: Current Advances and Future Directions. *Current Opinion in Pediatrics*, 21(2): 235-42.
- PNM (Public Services Company of New Mexico). 2017a. San Juan Generating Station Historic Emissions 2008-16. Monitoring data available at Clean Air Markets Air Markets Program Data. Accessed October 2017 at: <https://ampd.epa.gov/ampd/>
- _____. 2017b. PNM 2017-2036 Integrated Resource Plan. Public Comment Draft. April 20, 2017.
- _____. 2017c. Response to OSMRE Request for Additional Information. April 18, 2017
- Rajagopalan, S. and R.D. Brook. 2012. Air Pollution and Type 2 Diabetes - Mechanistic Insights. *Diabetes* 2012 Dec; 61(12): 3037-3045. Accessed July 21, 2017. Available: <https://doi.org/10.2337/db12-0190>
- San Juan Mine. 2017. MSHA Recordable Injuries/Occupational Illnesses 2008 thru 2017. Document made available by San Juan Mine.
- Simpson, Erik and Jason Meininger. 2017. The Relocation and Evaluation of Sixty-One Archaeological Sites within the 500 and 600 Districts of San Juan Coal Company's San Juan Mine Deep Lease Extension, San Juan County, New Mexico. NMCRIS No. 137736.
- SJCC (San Juan Coal Company). 2015. Stormwater Pollution Prevention Plan.
- _____. 2017a. San Juan Mine Greenhouse Gas Emission 2008 – 2016. San Juan Coal Company, 2017.
- _____. 2017b. Memorandum. Response for Additional Information. July 6, 2017.
- _____. 2017c. San Juan Mine Deep Lease Extension Project Description. March 24, 2017.
- S.S. Papadopulos & Associates, Inc. 2006. Coalbed Methane Stream Depletion Assessment Study Northern San Juan Basin, Colorado. February. Accessed: July 25, 2017. Available: https://cogcc.state.co.us/documents/library/AreaReports/SanJuanBasin/CMSDA_Study.pdf
- Strode et al. 2008. Trans-Pacific Transport of Mercury. *Journal of Geophysical Research*, 113 (DI 5305), August 7, 2008.
- Thomson, B.J. Stormont, M. Stone, R. Webb, C. Parker, K. Bramlett. 2012. Analysis of Coal Combustion By-Product Disposal Practices at San Juan Mine; Hydrologic and Water Quality Issues. Final Report. Submitted to Mines and Minerals Division, State of New Mexico.
- University of Utah, Kem C. Gardner Policy Institute. 2016. Kem C. Gardner Policy Institute 2015-2065 State Projections. Released October 12, 2016. Accessed: April 25, 2017. Available: <http://gardner.utah.edu/wp-content/uploads/2016/11/Data-Release-Tables-Workbook.xlsx>

- UNM (University of New Mexico). 2012. Geospatial and Population Studies Group. New Mexico County Population Projections July 1, 2010 to July 1, 2040. Released November 2012. Accessed: April 19, 2017. Available: <http://bber-old.unm.edu/demo/PopProjTable1.htm>
- USBOR (U.S. Bureau of Reclamation). 2006. Final Environmental Impact Statement. Navajo Reservoir Operations. FES-0606.
- U.S. Census Bureau. 2008. A Compass for Understanding and Using American Community Survey Data. Issued October 2008. Accessed: April 25, 2017. Available: <https://www.census.gov/content/dam/Census/library/publications/2008/acs/ACSGeneralHandbook.pdf>
- _____. 2010a. San Juan County, Utah. Based on 2010 Census Data. Accessed: April 25, 2017. Available: <https://www.census.gov/quickfacts/table/PST045216/49037,00>
- _____. 2010b. 2010 Decennial Census.
- _____. 2010c. 2011-2015 American Community Survey 5-Year Estimates. Accessed: April 25, 2017. Available: <https://www.census.gov/tribal/>
- _____. 2010d. 2011-2015 American Community Survey, 5-Year Estimates.
- _____. 2015. Small Area Income and Poverty Estimates (SAIPE).
- _____. 2016. Last revised April 13, 2016. Accessed: April 25, 2017. Available: <https://www.census.gov/topics/income-poverty/poverty/guidance/data-sources.html>
- USDOE (U.S. Department of Energy). 2016. Protective Action Criteria (PAC) with AEGLs, ERPGs, and TEELs: Rev. 29 for Chemicals of Concern. Office of Environment, Health, Safety, and Security. May.
- UTDWS (Utah Department of Workforce Services). 2016. Utah Long-Term Industry Projections. 2014-2024 Employment Projections. Accessed: August 15, 2017. Available: <http://edo.dws.state.ut.us/wi/data/employment/indprojections.html><http://edo.dws.state.ut.us/wi/data/employment/indprojections.html>
- WHO (World Health Organization). 2016. Ambient (Outdoor) Air Quality and Health. Accessed: August 24, 2017. Available: <http://www.who.int/mediacentre/factsheets/fs313/en/>
- WQCC (Water Quality Control Commission). 2017. Water Quality Standards for Interstate and Intrastate Surface Waters. New Mexico Environment Department.
- WRAP 2013. West-side Jump-start Air Quality Modeling Study. Final Report. Western Regional Air Partnership (WRAP). September 2013. Available at: https://www.wrapair2.org/pdf/WestJumpAQMS_FinRpt_Finalv2.pdf
- Zeigler Geologic Consulting, LLC. 2017a. San Juan Coal Co. San Juan Mine Deep Lease Extension Area, Paleontological Resource Survey Summary Report. May 23, 2017.
- _____. 2017b. Mitigation and Unanticipated Discovery Plan for Paleontological Resources: San Juan Coal Co. San Juan Mine Deep Lease Extension Area.

GLOSSARY

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A

Acid Rain: A rain or any other form of precipitation that is unusually acidic, meaning that it possesses elevated levels of hydrogen ions (low pH). It can have harmful effects on plants, aquatic animals, humans, and infrastructure. Acid rain is caused by emissions of sulfur dioxide and nitrogen oxide, which react with the water molecules in the atmosphere to produce acids.

Acre-foot: The volume (as of irrigation water) that would cover 1 acre to a depth of 1 foot (43,560 cubic feet).

Action: In the context of the NEPA, describes actions proposed to meet a specific purpose and need and that may have effects on the environment, which are potentially subject to Federal control and responsibility. Federal actions generally fall into the categories of adoption of official policy, formal plans, and programs; or approval of specific projects. For this document, the term action applies to a specific project.

Air quality: A measure of the health-related and visual characteristics of the air; often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Alluvium: A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative: Any one of a number of options for a project.

Ambient: Of the environment surrounding a body, encompassing on all sides. Most commonly applied to air quality and noise.

American Indian tribe (or tribe): Any American Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Annual Average Daily Traffic: A measure used primarily in transportation planning and transportation engineering. It is the total volume of vehicle traffic of a highway or road for a year divided by 365 days.

Approximate Original Contour (AOC): term used to describe the final topography of a mine site following completion of reclamation activities. This is also referred to as the Final Surface Configuration.

Aquatic: Growing or living in or near the water.

Aquifer: A water-bearing rock unit (unconsolidated or bedrock) that will yield water in a usable quantity to a well or spring.

Archaeological site: A discrete location that provides physical evidence of past human use.

Archaeology: the scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern: A BLM designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

Arroyo: A dry gully or a stream in a dry region
Artifact: Any object showing human workmanship or modification, especially from a prehistoric or historic culture.

Ash: The residue that remains when something is burned. Also, one component of coal; generally, high ash-content coal is considered to be low-grade.

Assessment: The act of evaluating and interpreting data and information for a defined purpose.

Attainment Area: As defined by the Clean Air Act of 1970, as amended, areas with concentrations of criteria pollutants that are below the levels established by the NAAQS.

B

Backfill: The fill, often mine waste or rock, that replaces the void left from where a rock or ore has been removed. Also, the material used to fill in a trench in the groundbed (i.e., pipeline trench). The composition of the backfill varies based on the soil type being used and the component being covered.

Background (visual): That portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Baghouse: An air pollution control device containing a large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 microns in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baseline: The existing conditions against which impacts of the alternatives are compared.

Basin: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

Best management practices: A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes and help to protect the environmental resources by avoiding or minimizing impacts of an action.

Big game: Large species of wildlife that are hunted (such as elk, deer, pronghorn antelope).

Biological assessment: Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat.

Biological opinion: A document that is the product of formal consultation, stating the opinion of the USFWS on whether or not a Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Boiler: Any device used to burn coal fuel to heat water for generating steam.

Butte: A steep hill standing alone in a plain.

C

Candidate species: A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the USFWS.

Climate Change: any measurable alteration of climate lasting for an extended period of time (i.e., several decades or longer), and includes recordable changes in temperature, precipitation, or wind patterns.

Coal Combustion Residue: CCRs are the materials that remain after burning coal for electricity. CCRs consist of fly ash, bottom ash, coal slag, and flue gas desulfurization (FGD) residue. CCRs contain a broad range of metals, for example, arsenic, selenium, cadmium, lead, and mercury, but the concentrations of these are generally low.

Coal: A fossil fuel extracted from the ground by deep mining. It is a readily combustible black or brownish-black sedimentary rock composed primarily of carbon and hydrocarbons along with other elements including sulfur. Coal is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time. It is primarily used as a solid fuel to produce heat through combustion and is the most common source of electricity generation worldwide.

Compaction: Process by which the volume or thickness of rock is reduced due to pressure from overlying layers of sediment.

Connected Action: Actions currently proposed or that will be proposed in the near future that could not happen but for implementation of the proposed action.

Cooperating agency: Assists the lead Federal agency in developing an environmental assessment or environmental impact statement. The CEQ regulations implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, state, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality: An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effort on environmental studies, and advises the President on environmental matters.

Criteria: Standards on which a judgment or decision can be based.

Cultural resources: Remains of human activity, occupation, or endeavor as reflected in districts, sites, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

Cumulative effect (or impact): The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. Cumulative impacts are evaluated as part of the EIS, and may include consideration of additive or interactive effects regardless of what agency or person undertakes the other actions.

D

Decibel: A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel, a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Decommission: to withdraw from service or shut-down.

Discharge: Outflow of surface water in a stream or canal (water). Discharge from an industrial facility that may contain pollutants harmful to fish or animals if it is released into nearby water bodies usually requires a permit issued by the EPA and is monitored.

Distance zone: A visibility threshold distance where visual perception changes. They usually are defined as foreground, middleground, and background.

Diversion: A channel, embankment, or other manmade structure constructed to divert water from one area to another; the process of using these structures to move water.

Drawdown: The decrease in elevation of the water surface in a well, the local water table or the pressure head on an artesian well due to extraction of groundwater or decrease in recharge to the aquifer.

E

Easement: A right afforded a person, agency, or organization to make limited use of another's real property for access or other purposes.

Ecology: The relationship between living organisms and their environment.

Effect (or impact): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An effect may be direct, indirect, or cumulative. The terms effect and impact are synonymous under the NEPA. A direct effect is caused by an action and occurs at the same time and same place (40 CFR 1508.8(a)). An indirect effect is caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Emission: Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

Endangered species: A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are rarely identified by the Secretary of the Interior in accordance with the ESA of 1973.

Environmental impact statement: A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies (see Executive Order 12898).

Ephemeral wash or stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and has a channel bottom that is always above the local water table.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as “gravitation creep.”

F

Federal Register: Published by the Office of the Federal Register, National Archives and Records Administration, the Federal Register is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents.

Fines: Coal with a maximum particle size usually less than one-sixteenth inch and rarely above one-eighth inch.

Floodplain: That portion of a river or stream valley, adjacent to a river channel, that is built of sediments and is inundated with water when the stream overflows its banks.

Fly ash: A product of burning finely ground coal in a boiler to produce electricity. It is removed from the plant exhaust gases by baghouses and scrubber systems. Physically, fly ash is a very fine, powdery material composed mostly of silica nearly all particles are spherical in shape. Fly ash is generally light tan in color and consists mostly of silt-sized and clay-sized glassy spheres.

Foreground: The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Fossil: Any remains, trace, or imprint of a plant or animal that has been preserved by natural process in the earth's crust since some past geologic time.

G

Geology: The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.

Groundwater: Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

Gypsum: A soft white mineral, the most common sulfate mineral.

H

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, group of species, or large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Hazardous Air Pollutant: Those pollutants known or suspected to cause cancer or other serious health effects or adverse environmental effects.

Haze: A form of air pollution caused when sunlight encounters tiny pollution particles in the air, which reduce the clarity and color of what we see, and particularly during humid conditions.

Highwall: The unexcavated face of exposed overburden and coal in a surface mine.

Hydrology: The study of the movement, distribution, and quality of water throughout the earth, addresses both the hydrologic cycle and water resources.

I

Impact (or effect): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An impact may be direct, indirect, or cumulative. The terms effect and impact are synonymous under NEPA.

Indirect effect (or impact): Secondary effects that occur in locations other than the initial action or later in time, but that are caused by the proposed action.

Infrastructure: The facilities, services, and equipment needed for a community or facility to function, such as and including roads, sewers, water lines, and electric lines.

Interburden: Material of any nature that lies between two or more bedded ore zones or coal seams.

Intermittent: A river or stream that flows for a period of time, usually seasonally during rainy periods, and stops during dry periods. In arid regions, dry periods may be interrupted by occasional flash floods from brief but intense rain storms.

Issue: Describes the relationship between actions (proposed, connected, cumulative, similar) and environmental (natural, cultural, and socioeconomic) resources. Issues may be questions, concerns, problems, or other relationships, including beneficial ones. Issues do not predict the degree or intensity of harm the action might cause, but simply alert the reader as to what the environmental problems might be. The NEPA document should address issues identified through interaction with agencies and/or the public, and/or through resource studies.

L

Labor force: All persons 16 years of age or over who are either employed or unemployed and actively looking for a job.

Land use plan: A plan or document developed by a government entity, which outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

Landform: A term used to describe the many land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape: An area composed of interacting ecosystems that are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern, which are determined by interacting ecosystems.

Lead Agency: The federal agency with primary responsibility for complying with NEPA on a given proposed action.

Lease: An authorization or contract by which one party (lessor) conveys the use of property to another (lessee) in return for rental payments. In cases of resource production, lessees pay royalties to the lessor in addition to rental payments.

M

Megawatt: A unit for measuring power equal to one million watts. The productive capacity of electrical generators is measured in megawatts.

Mesa: An isolated, nearly level land mass, formed on nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.

Mineral Resources: Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Mitigation: The abatement or reduction of an impact on the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering data (e.g., archaeological or paleontological) prior to disturbance.

N

Noise: Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities.

Noxious weed: Nonnative plant species that negatively impact crops, native plant communities, and/or management of natural or agricultural systems. Noxious weeds are officially designated by a number of states (including Arizona and Nevada) and Federal agencies.

O

Overburden: The material that lies above the coal seam.

P

Perennial stream: A stream or that part of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff.

Prime farmland: A special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law of 1977.

Public land: Land or interest in land owned by the United States and administered through the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf, and land held in trust for the benefit of American Indians, Aleuts, and Eskimos.

R

Range: A large, open area of land over which livestock can wander and graze.

Raptor: A bird of prey.

Rare: A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.

Recharge: Replenishment of a groundwater reservoir (aquifer) by the addition of water, through either natural or artificial means.

Reclamation: Restoration of land disturbed by natural or human activity (e.g., mining) to original contour, use, or condition. Also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to disturbance.

Recontouring: Return a surface to or near to its original form through some type of action such as grading.

Record of Decision: A document separate from, but associated with, an EIS that publicly and officially discloses the responsible official's decision on a proposed action.

Revegetation: The re-establishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.

Right-of-way: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, such as a road or utility.

Riparian: Referring or relating to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position of a watershed. Pertaining to, living, or situated on banks of rivers, streams, or other body of water. Normally used to refer to the plants of all types that grow along, around, or in wet areas.

Rural: Sparsely settled places away from the influence of large cities and towns. Such areas are distinct from more intensively settled urban and suburban areas, and also from unsettled lands such as outback or wilderness. People tend to live in villages, on farms, and in other isolated houses on large plots of land.

S

Scoping: The process open to the public early in the preparation of an EIS for determining the scope of issues related to a proposed action and identifying significant issues to be addressed in an EIS.

Screen: An initial assessment performed with few data and many assumptions to identify alternatives that should be evaluated more carefully.

Sediment: Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.

Sedimentation: The result when soil or mineral is transported by moving water, wind, gravity, or glaciers and deposited in streams or other bodies of water, or on land. Also, letting solids settle out of wastewater by gravity during treatment.

Sensitive receptor: People that may hear a noise or be sensitive to increased noise levels within their range of hearing, or may be more sensitive to the health effects of air emissions (e.g., daycare facilities, schools, nursing homes, or retirement centers).

Sensitivity: The state of being readily affected by the actions of external influence.

Special status species: Wildlife and plant species either federally listed or proposed for listing as endangered or threatened; state-listed; or priority species of concern to Federal agencies or tribes.

Spoil: Waste material brought up during the course of a mining operation.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

T

Terrain: Used to describe the geophysiographic characteristics of land in terms of elevation, slope, and orientation.

Threatened or Endangered Species: Animal or plant species that are listed under the Federal ESA of 1973, as amended (federally listed), or under similar state laws (state-listed).

Topdressing: topsoil substitute material, identified and determined according to criteria set forth in SMCRA.

Total dissolved solids: A term that describes the quantity of dissolved material in a sample of water.

Traditional cultural lifeway/resources: Resources that are significant for retention and transmission of traditional cultures. Biological resources that could have traditional cultural significance include plants collected for food, medicine, ceremonies, and other traditional uses, as well as raptors (e.g., eagles and hawks) collected for ceremonial uses. Other natural resources that could have traditional cultural significance include minerals or clay deposits and sources of surface water or shallow groundwater pumped for traditional purposes.

Traditional cultural places: These named places (landscape features) comprise the cultural landscape that provides the context for evaluating specific traditional cultural properties.

Transition zone: The area between two discrete environmental areas, and thus containing elements of each. For example, the transition zone between an upland piñon forest and a lowland desert scrub environment.

Transmissivity: The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Tribal trust lands: Lands held in trust by the United States government for use by a tribe, wherein the United States holds the legal title and the tribe has the beneficial interest.

Tribe: Any Indian tribe, band, group, or community having a governing body recognized by the Secretary of Interior.

U

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval of a Federal agency.

Urban: An area where there is an increased density of human-created structures in comparison to the areas surrounding it. Urban areas are frequently referred to as cities or towns. The US Census Bureau defines an urbanized area as: “Core census block groups or blocks that have a population density of at least 1,000 people per square mile and (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer).”

V

Vegetation communities: Species of plants that commonly live together in the same region or ecotone.

Vibration: A series of small, fast movements back and forth or from side to side.

Visibility: The distance to which an observer can distinguish objects from their background. The determinants of visibility include the characteristics of the target object (shape, size, color, pattern), the angle and intensity of sunlight, the observer’s eyesight, and any screening present between the viewer and the object (i.e., vegetation, landform, even pollution such as regional haze).

W

Waters of the United States: All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including adjacent wetlands and tributaries to water of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watershed: All land and water within the confines of a drainage divide.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of wetlands include marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas.

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PREPARERS AND CONTRIBUTORS

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PREPARERS AND CONTRIBUTORS

U.S. DOI, OSMRE

Name	Contribution
Marcelo Calle	Program Manager
Elizabeth Schaeffer	Program Manager
Gretchen Pinkham	Project Manager; Land Use; Visual Resources; Noise; Socioeconomics; Environmental Justice; Hazardous Materials and Wastes
Nicole Caveny	Deputy Project Manager
Jeremy Iliff	Cultural Resources
Roberta Martinez-Hernandez	Air Quality; Climate Change; Geology and Soils; Public Health and Safety
Flynn Dickinson	Water Resources
Ed Vasquez	Wildlife; Vegetation; Special Status Species
Erica Trent	Biological Resources
Amy McGregor	Geology and Soils
Jacob Mulinix	Geology and Soils

CATALYST ENVIRONMENTAL SOLUTIONS

Name	Contribution
Dan Tormey, PhD, PG	Project Manager; Technical Plan and Review, Coordination of NEPA with other consultations and programs
Megan Schwartz	Deputy Project Manager; Water Resources
Maravilla Clemens	Land Use, Agriculture, Transportation
Lindsey Garner, PhD	Administrative Record
Charles Piechowski	Recreation
Ben Pogue	Public Involvement; Visual Resources; Socioeconomics, Environmental Justice
Paden Voget, PE	Noise, Hazardous Materials and Wastes
David Blankenhorn, PG	Geology and Soils, Quality Assurance/Quality Control

ENVIRONMENTAL RESOURCES MANAGEMENT

Name	Contribution
Justin Bedard	Cultural Resources
Robert W. Farmer	Air Quality and Climate Change
Griffin Fraser	Graphics, Geographic Information Systems
Kris Hiatt	Production
Kara Lagerloaf	Public Health
Greg Lockard	Cultural Resources
Becky Moores	Vegetation, Wildlife, Special Status Species
Steven C. Peterson	Vegetation and Terrestrial Wildlife Ecological Risk
Sharon J. Quiring	Public Health
Christopher R. Rutledge	Wildlife, Vegetation, Special Status Species
Mark F. Shibata	Aquatic Resources and Ecological Risk
Emily Smith	Production

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