F. SUMMARY

F.1 BACKGROUND

The OSM has received an application from PWCC for the renewal of Permit AZ-0001D. This renewal application regards mining operations from 2010 through 2015 at the Kayenta Mine located in Navajo County, Arizona (Map A-1). This approval would authorize ongoing mining operations in coal resource areas N-9, J-19, and J-21 from July 6, 2010 through July 5, 2015.

Surface coal mining and reclamation activities are authorized in up to five-year periods to provide an opportunity for OSM to review the mine's compliance with applicable permit terms. Federal regulations in accordance with the Surface Mining Control and Reclamation Act (SMCRA) grant a right of successive renewal within the approved boundaries of an existing mining permit. Kayenta Mine operations are authorized under a permanent Indian Lands Program permit originally issued by OSM in 1990. The proposed permit renewal does not include any revisions to the mining and operations plan or the addition of any new mining areas. Coal-mining techniques and mine reclamation are described in more detail in Appendix A.

F.2 ALTERNATIVES

OSM considered two alternatives. Under Alternative 1, the OSM Western Region Director would approve the renewal permit AZ-0001D that would authorize continued mining in coal resource areas N-9, J-19, and J-21 of the Kayenta Mine permit area. Previously authorized existing mining facilities that would be used for the Kayenta Mine operations under this alternative include water supply wells, transportation facilities, office and equipment facilities, utilities, coal handling facilities, explosive storage facilities, environmental monitoring sites, water control facilities, and topsoil stockpiles. Appendix A provides details of mining operations, reclamation, and mitigation. Under Alternative 2, OSM would disapprove the permit application.

F.3 SUMMARY OF IMPACTS ASSESSED

This EA describes and evaluates the potential effects of the alternatives and Table F-1 briefly summarizes the effects of each of the alternatives including cumulative effects. Section E Environmental Impacts contains detailed information on the effects of the alternatives.

Impact Topic	Alternative 1 Approve the Renewal of Permit AZ-0001D	Alternative 2 Disapprove the Renewal of Permit AZ-0001D
Cultural Resources	Minor	Negligible
Hydrology	Negligible to Minor	Negligible
Vegetation	Minor	Negligible
Fish and Wildlife	Negligible to Minor	Negligible
Special Status Species (Federal and Navajo Nation listed species)	Negligible to Minor	Negligible to Minor
Soils	Minor	Minor
Recreation	Negligible to Minor	Negligible
Air Quality	Negligible	Negligible
Noise and Vibration	Negligible	Negligible
Landforms and Topography	Minor	Minor
Geology and Mineral Resources	Negligible to Minor	Negligible
Climate	Negligible	Negligible
Land Use	Negligible to Minor	Minor
Socioeconomic Conditions	Negligible	Major
Environmental Justice	Negligible	Minor
Indian Trust Assets	Negligible	Negligible
Visual Resources	Negligible to Minor	Negligible
Transportation	Negligible	Negligible
Human Health and Safety	Negligible	Negligible to Moderate

 Table F-1
 Environmental Consequences Summary

Impacts to federally listed species also have been analyzed in a supplemental biological assessment. This technical document was prepared as part of a Section 7 consultation with the USFWS. The findings were consistent with the conclusions reached for the same species in this EA.

G. PERSONS AND AGENCIES CONTACTED TO ASSIST IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

Name	Project Responsibility	Education
	OSM Western Region	
Rick Williamson	Mine Team Leader/Permit Coordinator	MS, Botany/Rangeland Ecology
		BS, Wildlife/Plant Ecology
Amy McGregor	Soil Scientist	MS, Soil Chemistry
		BS, Agronomy/Environmental Science
Paul Clark	Hydrologist	MS, Hydrology
		BA, Geology
Foster Kirby	Archaeologist	MA, Archaeology
	_	BA, Archaeology
		BA, Anthropology
Rick Pruszka	Hydrologist	BS, Geography
		BS, Geology
Dawn Pacula	Natural Resources Specialist	BA, Biology
Marcelo Calle	Hydrologist	BA, Anthropology
		BS, Watershed Science
Mychal Yellowman	Civil Engineer	BS, Civil Engineering, P.E.
Karen Jass	Mining Engineer	BS, Mine Engineering
Alex Birchfield	Ecologist	MS, Restoration Ecology
They blomield		BS, Zoology
	Office of Environmental Policy and C	
Robert F. Stewart	Regional Environmental Officer	MA, History
itobert i bio wait		BA, History
	Peabody Western Coal Compa	
Brian P. Dunfee	Project Oversight	MS, Range Ecology
		BS, Wildlife Biology
Vern Pfannenstiel	Reclamation, Vegetation, Land Use, and	BS, Range Ecology
vern i rannenstier	Wildlife	DS, Runge Deology
Gary Wendt	Permit Coordinator	BS, Soil Science
John Cochran	Hydrology, Air, and Meteorology	BS, Hydrology
	URS	25, 11, 6101085
Cary Roberts	Technical Review, QA/QC	MS, Environmental Management
		BS, Ecology and Evolutionary Biology
David Konopka	Visual Resources	BS, Natural Resources and Landscape
		Architecture
Deron Lozano	Soil Resources, Noise and Vibration,	BA, Environmental Planning and
201011 202000	Topography and Landform, Geology and	Sociology
	Mineral Resources	89
Jennifer Frownfelter	Principal-in-Charge	MS, Environmental Management
	g-	MS, Public Policy
		BS, Environmental, Population, and
		Organismic Biology
		BS, Environmental Conservation
Patricia Renter	Geographic Information Systems	Certified GISP
Katherine Bush	Transportation, Public Health and Safety	MS, Hazardous Materials Management
	, and the second s	BA, English

Table G-1Preparers

Name	Project Responsibility	Education		
Kirsten Johnson	Cultural Resources, Land Use,	MA, Public History and U.S. History		
	Environmental Justice, Indian Trust	BA, History		
	Assets, and Recreation			
Kristen Roof	Socioeconomics	BS, Sociology		
Allison Getty	Project Coordination	MA, Natural Resources		
Leslie Watson	Project Management	BA, Zoology		
A.E. (Gene) Rogge, PhD	Cultural Resources	PhD, Anthropology		
		MA, Anthropology		
		BA, Anthropology		
Robert DeBaca, PhD	Vegetation, Fish and Wildlife, Land Use	BA, MS, PhD, Biology		
	(Livestock Grazing)	BA, Environmental Conservation		
Mitch Meek	Graphics	BFA, Graphic Design		
Meg Quarrie	Technical Editing	BA, Liberal Arts		
Bill Jackson	Technical Review, QA/QC	BS, Wildlife & Fisheries Science		
GeoTrans				
Richard Waddell	Principal Hydrologist, Vice President	PhD, Geology		
		MA, Geology		
		BA, Geology		
McVehil/Monnett				
Bill Monnett	Vice President	BS, Atmospheric Sciences		
Gary Garman	Modeling	BS, Biology		

H. PREPARER (OSM)

A. Rick L. Williamson; Program Director Indian Lands Program

Signature of Agency

Date

I. REFERENCES

- Arizona Department of Education. 2005. *School Report Cards: Find a School*. Accessed 02 August 2005, on the World Wide Web at: http://www.ade.az.gov/srcs/find_school.asp?rdoYear=2005.
- Arizona Department of Environmental Quality. 2006. *Final Arizona greenhouse gas inventory and reference case projections 1990-2020*. Arizona Climate Change Advisory Group, Phoenix, Arizona, 84pp. available at: http://www.azclimatechange.gov/download/O40F9293.pdf
- Arizona Department of Water Resources. 1989. *Hydrology of the Little Colorado River System. Special Report to the Settlement Committee.* In Re the General Adjudication of the Little Colorado River System and Source. October.
- Arizona Game and Fish Department. 2010. Element status designations by county, taxon, scientific name. Heritage Data Management System, Phoenix, Arizona. Updated November 24 2010. Available at: http://www.azgfd.gov/w_c/edits/hdms_species_lists.shtml, Accessed 30 November 2010, 98 pp.
- _____. 2006. *Arizona's Comprehensive Wildlife Conservation Strategy 2005-2015*. Compiled and edited by Arizona Game and Fish Department, Phoenix, Arizona.
- . 2005. Mexican spotted owl (*Strix occidentalis lucida*). Unpublished abstract. Compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, Arizona, 11 pp.
- Arizona Geologic Survey. 1979. *Guidebook to Field Trip no. 15 Phoenix-Black Mesa-Page, Arizona.* Open file report 79-4. November 3-4, 1979.
- Arizona State University, W.P. Carey School of Business, the Center for Business Research (for Arizona Department of Commerce). 2004. Economy of Unincorporated Navajo County: Kayenta Area (zip code 86033).
- Babbitt, Bruce. 2000. U.S. Department of the Interior Secretary's Order Number 3215. April 28. http://elips.doi.gov/app_so/act_getfiles.cfm?order_number=3215. Accessed 07 January 2011.
- Barber, J.R., K.R. Crooks, and K.M. Fistrup. 2010. The costs of chronic noise exposure for terrestrial organisms. *Trends in Ecology and Evolution*, 25:180-189.
- Bechard, M. J., and J. K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/172. Accessed 30 November 2010.

- BIOME Ecological and Wildlife Research (BIOME). 2003. Biological report: Wildlife habitat reconnaissance of proposed life of mine coal resource areas, Black Mesa and Kayenta Mines, Black Mesa, Arizona. Report submitted to Peabody Western Coal Company, Kayenta, Arizona, ii+20 pp.
- Black Mesa Review Board. 2011. Black Mesa Inc. Retrieved from http://www.empowerblackmesa.org
- Botz, M.K. and Pedersen, D. 1976 *Summary of Water Quality Criteria*. Water Quality Bureau, Montana Department of Health and Environmental Sciences. Helena, Montana.
- Brogan-Johnson Consultants, Inc. 1996. *The Characterization of Seeps and Their Relationship to Impoundments, Black Mesa Complex, Arizona*. (1995 Seep Study report submitted to the USEPA on August 2, 1996).
- Brown, David E. (ed.). 1994. *Biotic Communities: Southwestern United States and northwestern Mexico*. University of Utah Press, Salt Lake City, Utah, 344 pp.
- Brown, D.E., T.C. Brennan, and P.J. Unmack. 2007. A Digitized Biotic Community Map for Plotting and Comparing North America Plant and Animal Distributions. *Canotia, 3, 1-12*.
- Brown, J.G., and J.H. Eychaner. 1998. Simulation of Five Ground-water Withdrawal Projections for the Black Mesa Area, Navajo and Hopi Indian Reservations, Arizona. U.S. Department of the Interior. U.S. Geological Survey Water-Resources Investigations Report 88-4000, February. 51 pp.
- Bryson, C.T., and R. Carter. 2004. Biology of pathways for invasive weeds. Weed Technol 18:1216–1220
- Bureau of Indian Affairs. 1987. Status of Mineral Resource Information, Hopi Indian Reservation, Coconino and Navajo Counties, Arizona. M. Thompson and Jean A. Dupree, U.S. Bureau of Mines. Administrative Report BIA-111, January.
- California Information Node. 2010. Crisis Maps. Weed Map and Data Server. http://cain.nbii.gov, accessed 30 November 2010.
- Chamblin, H.D. 2002. Small mammal communities on a reclaimed mountaintop mine/valley fill landscape in southern West Virginia. Unpublished master's thesis, West Virginia University, West Virginia, 123 pp.
- Cooley, M.E., J.W. Harshbarger, J.P. Akers, and W.F. Hardt. 1969. *Regional Hydrogeology of the Navajo* and Hopi Indian Reservations, Arizona, New Mexico, and Utah. Geological Survey Professional Paper 521-A.
- Corman, Troy E., and Cathryn Wise-Gervais. 2005. *Arizona Breeding Bird Atlas*. University of New Mexico Press, Albuquerque, New Mexico, 636 pp.

- Daly. M., P.R. Behrends, M.I. Wilson, and L.F. Jacobs. 1992. Behavioural modulation of predation risk: moonlight avoidance and crepuscular compensation in a nocturnal desert rodent, Dipodomys merriami, Animal Behaviour, 44:1-9.
- Davis, D., and E. Patronis, Jr. 2006. Sound system engineering. Elsevier, Jordan Hill, Oxford, UK, 504pp.
- Delaney, D.K., T.G. Grubb, and L.L. Pater. 1997. Effects of Helicopter Noise on Nesting Mexican Spotted Owls. New Mexico: Holloman Air Force Base. Project Order No. CE PO, 95-4 Rkp. U.S. Air Force 49 CES/CEV.
- Easterling, D., and M. Wehner. 2009. Is the climate warming or cooling? *Geophysical Research Letters*, 36: L08706, 3pp.
- Ecosystem Management, Inc. 2010. 2009 Wildlife monitoring report, Peabody Western Coal Company, Black Mesa Complex. Albuquerque, New Mexico, 17 pp plus appendices.
- _____. 2009. 2008 *Wildlife monitoring report, Peabody Western Coal Company, Black Mesa Complex,* Albuquerque, New Mexico, 16 pp plus appendices.
- Elion, G.R. 1979. Electro-optics handbook. Marcel Dekker, New York, New York, 365pp.
- ESCO Associates. 2010. 2009 Annual Vegetation Monitoring Report, March 2010. Prepared by ESCO Associates for Peabody Western Coal Company.
- .2003. 2003 Baseline Vegetation Sampling Report. Life of Mine Coal Resource Areas. Black Mesa Mining Complex. Attachment 6 of Volume 8, Chapter 9 – Vegetation Resources, Peabody Mining and Reclamation Plan for Black Mesa and Kayenta Mines.
- _____. 2000a. 1999 Baseline vegetation report. J9 Coal Resource Area and J9 Haul Road Corridor. Black Mesa Mining Complex. Prepared by ESCO Associates and Peabody Western Coal Company.
- _____. 2000b. 1999 Baseline Vegetation Report. J23 Conveyor Alternatives. Black Mesa Mining Complex. Prepared by ESCO Associates and Peabody Western Coal Company.
- Eychaner, J.H. 1983. *Geohydrology and Effects of Water Use in the Black Mesa Area, Navajo and Hopi Indian Reservations, Arizona*. U.S. Department of the Interior U.S. Geological Survey Water-Supply Paper 2201.
- Fenn, M.E., J.S. Baron, E.B. Allen, H.M. Rueth, K.R. Nydick, L. Geiser, W.D. Bowman, J.O. Sickman, T. Meixner, D.W. Johnson, and P. Neitlich. 2003. Ecological effects of nitrogen deposition in the western United States. *Bioscience*, 54:404-420.
- Fenneman, Nevin M. 1931. *Physiography of the Western United States*. New York: McGraw-Hill Book Company.

- Federal Transit Authority. (2006). *Transit noise and vibration impact assessment guidance manual.* (FTA-VA-90-1003-06). Washington, DC: Retrieved from http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.
- Fildes, R. and N. Kourentzes. 2011. Validation and forecasting accuracy in models of climate change. International Journal of Forecasting. In press, corrected proof available at: doi:10.1016/j.ijforecast.2011.03.008.
- GeoTrans, Inc. 2006. A three-dimensional Flow Model of the D and N Aquifers, Black Mesa Basin, Arizona, Draft Supplement 2, for Peabody Western Coal Company.
- _____. 2005. A three-dimensional Flow Model of the D and N Aquifers, Black Mesa Basin, Arizona, Supplement 1, for Peabody Western Coal Company, July.
- . 2001. Modeling Evaluation of the Feasibility of Supplementing Water Supplies at the Kayenta and Black Mesa Mines, Using the D-Aquifer. Unpublished report.
- _____. 1987. A Two-Dimensional, Finite-Difference Flow Model Simulating the Effects of Withdrawals to the N Aquifer, Black Mesa Area, Arizona. Prepared for Peabody Western Coal Company.
- Getz, L.L. 2009. Circadian Activity Rhythm and Potential Predation Risk of the Prairie Vole, *Microtus* ochrogaster. Southwestern Naturalist, 54:146-150.
- Hegerl, G.C., Jones, P.D., and Barnett, T.P. 2001. Effect of observational sampling error on the detection of anthropogenic climate change. *Journal of Climate 14:198-207*.
- Hopi Office of Community Planning & Economic Development. 2001. *Hopi Tunatya'at 2000: The Hopi Strategic Land Use and Development Plan.* Prepared for The Hopi Tribal Council. Kykotsmovi, Arizona.
- Hopi Tribe. 2008. Department of Water Resources. *Draft Hopi Water Quality Standards. Kykotsmovi, Arizona*. (New draft standards, as well as the earlier draft standards may be viewed at http://www.hopitribe.org/planning/htm).
- Housing and Urban Development. 1991. United States Department of Housing and Urban Development. *The Noise Guidebook.* September.
- Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis,* Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, 996pp. Available at: http://www.ipcc.ch/publications_and_data/ publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm.

- International Energy Agency. 2010. *IEA Statistics: CO*₂ *emissions from fuel combustion: Highlights.* 9 rue de la Fédération 75739 Paris Cedex 15, France, 130 pp.
- Ireland T.T., G.L. Wolters, and S.D. Schemnitz. 1994. Recolonization of wildlife on a coal strip-mine in northwestern New Mexico. *Southwestern Naturalist*, *39:53-37*.
- Jacobs, Brian F. 2008. Southwestern U.S. juniper savanna and piñon-juniper woodland communities: Ecological history and natural range of variability. In: Gottfried, Gerald J.; Shaw, John D.; Ford, Paulette L., compilers. 2008. Ecology, management, and restoration of piñon-juniper and ponderosa pine ecosystems: combined proceedings of the 2005 St. George, Utah and 2006 Albuquerque, New Mexico workshops. Proceedings RMRS-P-51. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 11-19.
- Kalnay, E. and M. Cai. 2003. Impact of urbanization and land-use change on climate. *Nature*, 423:528-531.
- Kasner, A.C., and R.D. Slack. 2002. Use of Reclaimed Mine Land by Disturbance Oriented Avian Species: Implications for Conservation and Management. 2002 National Meeting of the American Society of Mining and Reclamation, Lexington KY, June 9-13, 2002. Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502
- Kempenaers, B., P. Borgström, P. Loës, E. Schlicht, and M. Valcu. 2010. Artificial night lighting affects dawn song, extra-pair siring success, and lay date in songbirds. *Current Biology*, 20:1735 1739.
- Kennedy, P.L. 2003. Northern Goshawk (Accipiter gentiles atricapillus): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/northerngoshawk.pdf. Accessed 04 December 2010.
- King, Thomas F., and Ethan Rafuse. 1994. *NEPA and the Cultural Environment: An Assessment and Recommendations*. Prepared for the Council on Environmental Quality. CEHP, Washington, D.C.
- LaRue, C.T. 1994. Birds of Northern Black Mesa, Navajo County, Arizona. *Great Basin Naturalist,* 54:1-63.
- Lopes, T.J., and J.P. Hoffmann. 1997. Geochemical Analyses of Ground-water Ages, Recharge Rates, and Hydraulic Conductivity of the N Aquifer, Black Mesa Area, Arizona. U.S. Department of the Interior U.S. Geological Survey Water-Resources Investigations Report 96-4190.
- Macy, J.P. 2010. *Groundwater, surface-water, and water-chemistry data, Black Mesa area, northeastern Arizona*, 2008-2009: U.S. Geological Survey Open-File Report 2010-1038, 43 p.

- McGavock, E.H., R.J. Edmonds, E.L. Gillespie, and P.C. Halpenny. 1966. Geohydrologic data in the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah—Part I-A— Supplemental records of ground-water supplies. Arizona State Land Department Water-Resources Rcpt. 12-E, 55 p.
- McKitrick, R.R. and P.J. Michaels. 2007. Quantifying the influence of anthropogenic surface processes and inhomogeneities on gridded global climate data. *Journal of Geophysical Research*, 112, D24S09, 14pp.
- Minor, Michael & Associates. 2000. True North Mine Noise and Vibration Analysis. Portland, Oregon.
- Mine Safety and Health Administration. 1977. Title 30 CFR, Parts 1 through 199. Accessed at http://www.msha.gov/30CFR/CFRINTRO.HTM on 06 December 2010.
- Mohamed, M.T. 2010. *Vibration control*. In M Lallart (Ed.), Vibration Control (pp. 355-380). Rikeka, Croatia: Sciyo.
- National Academy of Sciences [NAS]. 1972. National Academy of Engineering. *Water Quality Criteria*, Washington, D.C.: U.S. Government Printing Office. 1974
- National Oceanic and Atmospheric Administration. 2010. *State of the Climate: Global Analysis for May 2010*. National Climatic Data Center, published online June 2010, retrieved on June, 2011 from http://www.ncdc.noaa.gov/sotc/global/2010/5.
- National Park Service [NPS] 2009. RoMANS *Rocky Mountain Atmospheric Nitrogen & Sulfur Study*. Fort Collins, Colorado, 460 pp plus appendices.
- National Research Council. 2006. *Surface temperature reconstructions for the last 2,000 years*. National Academy of Sciences, National Academy Press, Washington, D.C., 146pp.
- Nations, J.D., R.L. Swift, and H.W. Haven, Jr. 2000. *Chapter H Summary of Cretaceous Stratigraphy and Coal Distribution, Black Mesa Basin, Arizona*, in Kirschbaum, M.A., L.N.R. Roberts, and L.R.H. Biewick, eds., Geologic Assessment of Coal in the Colorado Plateau: Arizona, Colorado, New Mexico, and Utah, compiled by Colorado Plateau Coal Assessment Group: U.S. Geological Survey Professional Paper 1625-B, Version 1.0, p. H1-H31 [CD-ROM]. Accessed 08 December 2010 at http://pubs.usgs.gov/pp/p1625b/Reports/Chapters/Chapter_H.pdf.
- Natural Resources Conservation Service. 2011. *Plant Fact Sheet, Four-wing saltbush*. The PLANTS Database (http://plants.usda.gov, 22 March 2011). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

- 2009. Soil Survey of Navajo Mountain Area, Arizona, Parts of Apache, Coconino and Navajo Counties. Retrieved from http://soildatamart.nrcs.usda.gov/Manuscripts/AZ711/0/Navajo%20Mountain.pdf. Accessed on 10 December 2010.
- _____. 2005. Steve Smarik, letter to Jamie Wood, Project Planner, URS Corporation, received August 12.
- Navajo Nation. 2008. Navajo Nation Environmental Protection Agency. Surface Water Quality Standards. Water Quality Program. Window Rock, Arizona. (Document available at http://www/navajonationepa.org).
- Navajo Nation. Navajo Nation Division of Community Development. 2005. *Leupp Chapter Land Use Plan.* January. Navajo Nation Department of Fish and Wildlife. 2008. Navajo endangered species list: Resources committee resolution, No. RCS-41-08. The Navajo Nation. Window Rock, Arizona, 4 pp.
- Navajo Nation Division of Economic Development. 2010. 2009-2010 Comprehensive Economic Development Strategy, the Navajo Nation.
- Navajo Natural Heritage Program. 2008. Navajo Nation endangered species list: Species accounts. Version 3.08, August. Updated by D. Mikseic and D. Roth. Navajo Nation, Window Rock, Arizona. Available at: http://nnhp.nndfw.org/sp_account.htm. Accessed: 01 December 2010.
- NEMO IMS. 2010. "Make Your Own Map." Little Colorado River Watershed. University of Arizona, n.d. Web. 09 December 2010. http://nemo/srnr.arizona.edu/nemo/ims/littlecolorado/text.htm.
- O'Farrell, M.J. 1974. Seasonal activity patterns of rodents in a sagebrush community. *Journal of Mammalogy*, 54:809-823.
- Office of Surface Mining Reclamation and Enforcement [OSM]. 2010a. Transcript of Informal Conference on Peabody Western Coal Company Application to Renew Mining Operations in Kayenta, Arizona. May 26. Second Mesa. Arizona. OSM.
- _____. 2010b. Transcript of Informal Conference on Peabody Western Coal Company Application to Renew Mining Operations in Kayenta, Arizona. May 27. Kayenta. Arizona. OSM.
- _____. 2008. *Cumulative Hydrologic Impact Assessment of the Peabody Western Coal Company Black Mesa Complex.* Prepared by the Office of Surface Mining Reclamation and Enforcement. December.
- _____. 1990. Proposed Permit Application, Black Mesa-Kayenta Mine, Navajo and Hopi Indian Reservation, Arizona Final Environmental Impact Statement, June.

- _____. 1989. *Cumulative Hydrologic Impact Assessment* of the Peabody Coal Company Black Mesa-Kayenta Mine.
- _____. 1983. Blasting Download Page, Rules, Regulations, Research and Resources, OSM Blasting Regulations Section 780. Accessed at http://arblast.osmre.gov on 23 June 2011.
- Peabody Western Coal Company [PWCC]. 2011a. 2009 Kayenta MIne Greenhouse Gas Production Memorandum. July 22, 2011
- _____. 2011b. Geographic information system data, LocalAffairs geodatabase, Residences feature class.
- _____. 2010a. OSM Permit Application Package AZ-0001D. Kayenta Mine Permit Renewal. Submitted February 2010.
- _____. 2010b. 2009 Annual Hydrology Report.
- _____. 2010c. 2009 Annual Seepage Monitoring and Management Report.
- _____. 2008. Interim Final Report Seepage Monitoring and Management Report, April 1.
- _____. 2006. 2005 Annual Hydrology Report.
- _____. 2005a. 2004 Seepage Monitoring and Management Report, NPDES Permit No. AZ0022179. Black Mesa and Kayenta Mines. April 12.
- _____. 2005b. Kayenta Mine Permit AZ-0001D (as amended).
- _____. 2002. Life-of-mine permit application, revised January 26, Chapter 2: General Description of the Mining Location and Activities.
- _____. 2001. Mexican spotted-owl summary.
- _____. 2001a. Submission to the Office of Surface Mining Reclamation and Enforcement in support of a Revision to Chapter 16, Hydrologic Monitoring Program
- _____. 2000. 1999 Seepage Monitoring and Management Report, April 5
- _____. 1999. A Three-Dimensional Flow Model of the D and N Aquifers, Black Mesa Basin, Arizona. Volumes I, II, and III.
- . 1992. Wildlife Resources Report Black Mesa and Kayenta Mines. Peabody Western Coal Company, Western Division, Kayenta. Arizona
- Peters, D.P.C, I. Mariotto, K.M. Havestad, and L.W. Murray. 2006. Spatial variation in remnant grasses after a grassland-to-shrubland state change: implications for restoration. *Rangeland Ecology and Management* 59:343–350.

- Pielke, R.A., Sr., J. Nielsen-Gammon, C. Davey, J. Angel, O. Bliss, N. Doesken, M. Cai, S. Fall, D. Niyogi, K. Gallo, R. Hale, K.G. Hubbard, X. Lin, H. Li, and S. Raman. 2007. Documentation of uncertainties and biases associated with surface temperature measurement sites for climate change assessment. *Bulletin of the American Meteorological Society*, 88:913-928.
- Powell, S., G.J. Gumerman, and F.E. Smiley. 2002. A History and Retrospective of the Black Mesa Archaeological Project. In *Prehistoric Culture Change on the Colorado Plateau: Ten Thousand Years on Black Mesa*, edited by Shirley Powell and Francis E. Smiley, pp. 1-11. University of Arizona Press. Tucson, Arizona.
- Pyke, D.A. 1999. Invasive Exotic Plants in Sagebrush Ecosystems of the Intermountain West. in Entwistle, P.G., A.M. DeBolt, J.H. Kaltenecker, and K. Steenhof, compilers. 2000. Proceedings: Sagebrush Steppe Ecosystems Symposium. Bureau of Land Management Publication No. BLM/ID/PT-001001+1150, Boise, Idaho, USA.
- Rainey, K D., and K.R. Adams. 2004. Plant Use by Native Peoples of the American Southwest: Ethnographic Documentation [HTML Title]. Available: http://www.crowcanyon.org/plantuses. Date of use: June 22, 2011.
- Reichenbacher, F., S.E. Franson, and D.E. Brown. 1998. The biotic communities of North America (scale 1:10,000,000). University of Utah Press, Salt Lake City, Utah.
- Rosenthal, M., and G. Morlock. 1987. Office of Surface Mining Reclamation and Enforcement Blasting Guidance Manual.
- Ryer, A.D. 1998. Light measurement handbook. International Light, Newburyport, MA. 64pp.
- Schuman, G.E. 2002. Minded Land Reclamation in the Northern Great Plains: Have we been successful?
 National Meeting of the American Society of Mining and Reclamation, Lexington, Kentucky,
 June 9-13, 2002. Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.
- Smith, B.E., and D.A. Keinath. 2007. Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. January 16. Available: http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf._Accessed 04 December 2010.
- Solomon S., K.H. Rosenlof, R.W. Portmann, J.S. Daniel, S.M. Davis, T.J. Sanford, and Gian-Kasper Plattner. 2010. Contribution of Stratospheric Water Vapor to Decadal Changes in the Rate of Global Warming. 327:1219-1223 accessed from http://www.sciencemag.org/cgi/rapidpdf/science.1182488v1.pdf
- Spencer, R. W. and W.D. Braswell. 2010. On the diagnosis of radiative feedback in the presence of unknown radiative forcing. *J. Geophys. Res.*, *115*, *D16109*, *doi:10.1029/2009JD013371*.

- Spencer, R. W., W.D. Braswell, J.R. Christy, and J. Hnilo. 2007. Cloud and radiation budget changes associated with tropical intraseasonal oscillations. *Geophysical Research Letters*, 34: L15707.
- SWCA Environmental Consultants. 2005. Socioeconomic Study for Black Mesa-Kayenta Mines Life-of-Mine Permit Revision. Prepared for Peabody Western Coal Company.
- _____. 2000. *1999 Wildlife Monitoring Report*, Peabody Western Coal Company, Black Mesa Complex, Flagstaff, Arizona.
- Thompson, Robert N., and Jean A. Dupree. 1987. United States. *Status of Mineral Resource Information Hopi Indian Reservation, Coconino and Navajo Counties.*
- Truini Margot, and Steve A. Longsworth. 2003. *Hydrogeology of the D Aquifer and Movement and Ages of Ground Water Determined from Geochemical and Isotopic Analyses, Black Mesa Area, Northeastern Arizona.* Water-Resources Investigations Report 03—4189_Version 1.1. 38 p.
- Truini, Margot, J.P. Macy, and T.J. Porter. 2005. *Ground-water, surface-water, and water-chemistry data, Black Mesa area, northeastern Arizona*—2003–04: U.S. Geological Survey Open-File Report 2005–1080, 44 p.
- U.S. Bureau of Labor Statistics. 2005-2009. State and Regional Unemployment, 2005-2009 Annual Averages. http://www.bls.gov/lau/.
- U.S. Census Bureau. 2010. Profile of General Population and Housing Characteristics: 2010. Accessed June 23, 2011 on the World Wide Web at: http://factfinder.census.gov.
- _____. 2004. Small Area Income & Poverty Estimates: School District Estimates for 2001 and 2002 and County Estimates for 2001 and 2002. Accessed 02 August 2005, on the World Wide Web at: http://www.census.gov/hhes/www/saipe.
- _____. 2000. Summary File 1, Tables P1, P4, P8, P12, and P15, and Summary File 3, Tables P49, P77, P82, and P87. Accessed 08 July to 23 August 2005, on the World Wide Web at: http://factfinder.census.gov.
- _____. 1990. Summary Tape File 1, Tables P1 and P7, and Summary Tape File 3, Tables P61 and P117. Accessed 08 July to 23 August 2005, on the World Wide Web at: http://factfinder.census.gov.
- U.S. Council on Environmental Quality. 1997. Environmental Justice: Guidance Under the National Environmental Policy Act. http://www.whitehouse.gov/administration/eop/CEQ/.
- U.S. Department of Agriculture, Forest Service. 1995. *Landscape Aesthetics: A Handbook for Scenery Management*. USDA Agriculture Handbook No. 701. Washington, D.C.

- U.S. Department of the Interior. 2008a. *Report of the Subcommittee on Science: An integrated DOI Science Plan for addressing the effects of climate change on natural systems*. Task Force on Climate Change, 34pp. Available at: http://www.usgs.gov/global_change/doi_taskforce.asp
- U.S. Department of the Interior, Bureau of Land Management. 2004. *Visual Resource Management*. BLM Manual 8400. Washington, D.C.
- U.S. Department of the Interior, Bureau of Reclamation, Upper Colorado Region. 2010. Reclamation to Begin Field Work for Navajo-Gallup Water Supply Project.
- U.S. Department of the Interior, Bureau of Reclamation. 2011. SECURE Water Act Section 9503(c) *Reclamation Climate Change and Water*. Report to Congress, 206pp.
- U.S. Department of the Interior, Office of the Assistant Secretary Indian Affairs. 2000. Departmental Manual, Part 303: Indian Trust Responsibilities, Chapter 2: Principles for Managing Indian Trust Assets. October, 31, 2000. Retrieved from http://elips.doi.gov/app_DM/act_getfiles.cfm?relnum=3346
- U.S. Department of the Interior, Office of the Solicitor. 2008. *Guidance on the applicability of the Endangered Species Act's consultation requirements to proposed actions involving the emission of greenhouse gases.* Memorandum to the Secretary, M-37017:7pp.
- U.S. Department of Labor. 1998. Mine Safety and Health Administration, 30 CFR Part 77, Safety Standards for Reporting Daily Inspections of Surface Coal Mines; Technical Amendment; Final Rule. Accessed at http://www.msha.gov/REGS/FEDREG/FINAL/19998 finl/98-29089.pdf on 06 December 2010.
- U.S. Department of Labor. Occupational Safety and Health Administration. 1999. OSHA Instruction CPL 2.103, Field Inspection Reference Manual. Office of Science and Technology Assessment, 200 Constitution Ave NW, Room N-3653, Washington, D.C. 20010. Accessed at http://www.osha.gov/dts/osta/otm/otm_abstract.html on 04 February 2010.
- U.S. Environmental Protection Agency (EPA). 2011a. Natural Sources and Sinks of Carbon Dioxide. Retrieved from <u>http://www.epa.gov/climatechange/emissions/co2_natural.html</u>
- _____. 2011b. Global Greenhouse Data. Retrieved from http://www.epa.gov/climatechange/emissions/globalghg.html
- . 2011c. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009, USEPA #430-R-11-005. Washington D.C. 20460.
- . 2010. Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. Docket ID No. EPA-HQ-OAR-2009-0517

- . 2009a. Endangerment and cause or contribute findings for greenhouse gases under Section 202(a) of the Clean Air Act. Federal Register 74:66496-66546.
- _____. 2009b. *Technical support document for: Endangerment and cause or contribute findings for greenhouse gases under Section 202(a) of the Clean Air Act*. Climate Change Division, Office of Atmospheric Programs, Washington, D.C., 198 pp.
- . 2009c. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act: EPA's Response to Public Comments; Volume 3: Attribution of Observed Climate Change. Climate Change Division, Office of Atmospheric Programs, Washington, D.C., 53 pp.
- . 1974. Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety, Publication EPA-550/9-74-004, March.
- . 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances. Environmental Protection Agency. Washington, D.C.
- U.S. Fish and Wildlife Service. 2010. Threatened and endangered species county list, Navajo County, Arizona. Revised: July 8. Available at: http://www.fws.gov/southwest/es/arizona/ Documents/CountyLists/Navajo.pdf. Accessed: 30 November 2010.
- 2003. Biological opinion and letter of concurrence for effect to bald eagles, marbled murrelets, northern spotted owls, bull trout, and designated critical habitat for marbled murrelets and northern spotted owls from Olympic National Forest program of activities for August 5, 2003, to December 31, 2008. Lacey, Washington
- U.S. Geological Survey. 2010. Groundwater, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona, 2008-2009.
- _____. 2007. Southwest exotic plant information clearinghouse (SWEPIC). Available at: http://sbsc.wr.usgs.gov/research/projects/swepic/swepic.asp. Accessed: 30 November 2010.
- _____. 2004. Southwest Exotics Mapping Program. Accessed on the World Wide Web at: http://tek.usgs.nau.edu/website/SWEMP2004a.
- _____. 1985-2005. Various authors. *Results of Black Mesa Ground-water, surface-water and water chemistry monitoring program*, U.S. Geological Survey Open-file Reports 85-483, 86-414, 87-458, 88-467, 89-383, 92-4008, 96-616, 97-566, 00-453, 00-66, 02-485, 03-503, 03-503, 2005-1080 and Water-Resources Investigations 92-4008, 92-4050, 93-4111, 95-4156, 95-4238, 02-4211.

- U.S. Geological Survey, National Gap Analysis Program. 2004. Provisional Digital Land Cover Map for the Southwestern United States. Version 1.0. RS/GIS Laboratory, College of Natural Resources, Utah State University.
- Vickery, W.L. and J.R. Bider. 1981. The Influence of Weather on Rodent Activity. Journal of *Mammalogy*, 62:140-145.
- West, N. 1997. Distribution, Composition and Classification of Current Juniper-Pinyon Woodlands and Savannahs across Western North America. in Monsen, Stephen B.; Stevens, Richard, comps. 1999. Proceedings: ecology and management of pinyon-juniper communities within the Interior West; 1997 September 15-18; Provo, UT. Proc. RMRS-P-9. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 411 p.
- Wiens, J.D., B.R. Noon, and R.T. Reynolds. 2006. Post-fledging survival of northern goshawks: The importance of prey abundance, weather, and dispersal. *Ecological Applications*, *16*, 406-418.
- Zhu, Chen. 2000. Estimate of Recharge from Radiocarbon Dating of Groundwater and Numerical Flow and Transport Modeling. *Water Resources Research, Volume 36, No. 9, pages 2607-2620.*