Colorado Abandoned Mine Land Information Metadata (06/17)

Mining has been a significant industry in Colorado since the 1850s. Abandoned mine land (AML) is associated with historical mining activities performed prior to the enactment of major federal and state laws that govern current mining practices. State AMLs contain physical structures, adits, shafts, waste piles, and other mining features related to the historic extraction and beneficiation of materials including precious metals, base metals, uranium, and coal. AMLs may pose physical and/or environmental hazards to the public. These associated hazards include falling, mine portal collapse, explosives, asphyxiation and degraded water quality (e.g. issues associated with drinking water, water recreation, and/or aquatic ecology). As of October 2007, the U.S. Government Accountability Office (GAO) estimated that there are about 7,300 locatable abandoned hardrock mine sites in Colorado that contain 17,000 features that pose a potential hazard to public health and safety and 150 sites with environmental degradation (GAO, 2008).

Historic mining activities were conducted in areas that are currently associated with both private and public land throughout the State. Currently, the Colorado Department of Reclamation Mining and Safety (CDRMS) works with public and private entities to reclaim AMLs. Also, several federal agencies identify, investigate, and remediating AML sites in the State. Currently, state/federal agencies collect and maintain different types of AML information depending on their mission, budget, and location of the AMLs. Many of these agencies work together to remediate AMLs across the State and meet regularly to discuss mixed ownership AMLs (e.g. AMLs with overlapping state and/or federal property ownership).

In 2015, the Water Quality Control Division (WQCD) of the Colorado Department of Public Health and the Environment (CDPHE) approached the Colorado Geological Survey (CGS) about creating an inventory of existing AML electronic databases for the State. The primary goals of this project were to determine what AML electronic information sources exist and to develop a multi-agency information hub with input from agency stakeholders. Between 2015 and 2016, the CGS researched electronic sources of AML information, formed a multi-agency AML Steering Committee, and compiled general information associated with existing electronic AML databases. At this time, due to the differences in the existing data sets collected by some agencies (e.g. databases created separately and for different purposes), it was determined that the current general AML data sets should be shared through a GIS-based map viewer. Using a GIS platform, these existing geographical data and/or geodatabases can be viewed in conjunction with other spatial information (e.g. base maps or overlays) to determine the relationship between existing AML inventories and other geographical information.

Currently, the following agencies have provided general AML site information data sets for this project:

- Bureau of Land Management (BLM);
- Department of Energy (DOE) Legacy Management;
- Environmental Protection Agency (EPA) Region 8;
- National Park Service; and
- United States Forest Service (USFS).

Two sets of public data from the United States Geological Survey (USGS) associated with the Animas River watershed and central Western Slope were also included. Also, the Colorado Division of

Reclamation Mining and Safety (CDRMS) has provided a data set associated with reclamation at AML sites.

A few AML inventories were completed within the State since the 1970's. Some of these AML inventories are working data sets and are updated with new information. Other data sets were a one-time assessment used to prioritize AML sites. The initial use of the AML information hub is to determine the geographical location of AML features identified by each agency, the types of features, and to provide contact information associated with the features. Specific information associated with these sites is not always available electronically therefore, the current status or the availability of other information may be available through each agency.

Brief Description (metadata) of the AML Data Sets

A brief description of the data sets is provided below. Any user should view the metadata associated with each set of data provided by the agencies as well as this document.

Bureau of Land Management

The State BLM program addresses environmental impacts and hazardous mine openings associated with AML. The 2016 data set provided by the BLM for this project contains information associated primarily with hardrock mines and some uranium/industrial mineral mines. No metadata were included with the file. The location data are associated with general AML site locations which sometimes have multiple mine features recorded at one site.

The BLM maintains their internal Abandoned Mine Site Cleanup Module (AMSCM) database which is used to support the BLM's AML related programs and stores information about inactive and abandoned mine sites. Under a BLM 1993 directive that was designed to include common data elements/guidelines to ensure that AML was characterized consistently, AML inventories were collected during field inspections. To date, only a small percent of all BLM public lands have been inventoried with these guidelines, and the data quality of the original inventory records varies widely. Therefore, the data contained in AMSCM needs significant "cleanup" and the BLM continues to conduct field inspections at some of the AML sites to improve data quality (BLM, 2007).

DOE Legacy Management

The National Defense Authorization Act for Fiscal Year 2013 mandated that the DOE prepare a report on abandoned uranium mines which included the development of the DOE Abandoned Uranium Mine (AUM) mine database also referred to as the Defense-Related Uranium Mine (DRUM) database. The data set included here is from 2016. The metadata provided with these data is included as Attachment 1. A DRUM site can be a single feature or it may include an area containing a complex of multiple inter-related excavations.

DOE defines an abandoned uranium mine as a feature or complex developed to extract uranium ore for atomic energy defense-related activities of the United States from 1947 to 1970, as verified by purchase of ore by the U.S. Atomic Energy Commission (AEC) or other means. Some mines listed as abandoned may have been reclaimed or remediated. Others may have current operating permits but may have abandoned mine features within the permitted area that have not been remediated. Mines associated

with these categories were included in the set of legacy mines that were considered for evaluation as part of their report (DOE, 2014).

DOE will be verifying and validating the condition of defense-related uranium mine sites on BLM and USFS managed land in Colorado. The agencies will conduct field investigations at a select number of sites over the next several years. Results of these field-based efforts will be incorporated into the DRUM database (Personal Communication 1, 2016).

Environmental Protection Agency Region 8

The EPA maintains a geodatabase containing mine feature location data from multiple Superfund sites throughout Region 8. These data are updated on an as needed basis and are housed in their internal ArcGIS system. The data set included in this project is from 2016 and the metadata included with it is provided in Attachment 2. At this time, this data set provides location and other information (e.g. feature type) associated with approximately 169 mine features. These data were acquired from multiple sources, including EPA contractors, at different times. Data fields include the CERCLA identification number, location, site name, mine name, feature type, elevation, and information sources.

National Park Service

Mining and other mineral resource development have occurred in many areas throughout the U.S. that are now units of the National Park System. The NPS conducted a new AML inventory between 2010 through 2013. This inventory was completed to provide a comprehensive AML inventory, to categorize the mitigation needs, and to estimate the resources needed to address priority sites (Burghardt et. al., 2014). The data included in this project is from early 2017. Additional notes and metadata about this data set are provided in Attachment 3.

United States Forest Service

The CGS completed a field inventory of abandoned and inactive hardrock mines on USFS lands in the State between 1991 and 1999. Approximately 18,000 abandoned mine-related features were inventoried. The USFS inventory process began with an office review of existing mining and geologic literature, previous mine inventories, and current/historical maps. Mine locations from these sources were compiled onto a work map. Aerial photographs (1:24,000-scale) were examined to locate potential mine sites not identified by other sources. Water quality information was used to identify streams potentially affected by acid mine drainage or other mine-site contaminants. When the office research process was complete, geologists visited specific mine locations (Sares et. al., 2000). Additional mines not identified in the literature search were found while performing the field inventory work.

Investigated mines were grouped geographically into “inventory areas” that were given identification numbers based on the Universal Transverse Mercator (UTM) coordinate system. An inventory area usually contained one to twenty mine features that could be grouped in relation to geographic features, such as a gulch or hillside. Mine features inventoried included adits, shafts, prospect pits, high walls, quarries, waste rock dumps, tailings, and spoils. All mine features within an inventory area were numbered sequentially (Sares et. al. 2000). Mine locations and data collected by the field geologists were entered on field forms and, subsequently, into a computer database and ArcGIS. Latitude/longitude information for each mine feature and water test were obtained by transferring mine location information from the field maps to Mylar overlays. Mine locations were then digitized from the

overlays into ArcGIS (Sares et. al., 2000). Reportedly, some of the locations were also collected using a handheld GPS.

Water quality data, such as pH and conductivity, were collected at all features where water was present, such as draining adits, seepage at the toe of dumps/tailings, and standing water in shafts. Water samples were collected where field tests indicated low pH and/or high conductivity, including several areas with natural acid rock drainage. Samples were analyzed for dissolved/total metals and for selected anions. The quality of any water associated with a mine feature was also assessed in the field by determining the pH, specific conductance, and physical observations. Observable characteristics were documented including precipitates and salts in the effluent drainage, opaque or cloudy water, stressed vegetation, and absence of aquatic organisms. This information was used to assign a qualitative "Environmental Degradation Rating" to the individual mine feature. Physical mine hazards were also rated in the field (Sares et. al., 2000). The CGS USFS database is in ArcGIS and Microsoft Access. The metadata is included in Attachment 4. Additional data, metadata, and database dictionary is included on CGS's website (CGS, 2017).

United States Geological Survey Digital Data Series 73 (central Western Slope)

The USGS DDS 73 database includes information associated with reconnaissance studies of mining districts located in the central portion of the Western Slope of Colorado (Nash, 2002). These studies were conducted between 1997 and 1999. The analytical results include chemical analysis of mine dumps, mill tailings, mine drainages, and surface water. The data set includes the locations of 124 smelters, mills, and tailings included here. It also includes sample results of 160 water samples collected between 1997 and 1998 and 30 water samples collected in 1999. The data associated with this study is provided as MS Excel, tab-delimited text, and ArcGIS files. Sample locations were reportedly recorded on 1:24,000 maps and measured with a GPS unit with an accuracy of about +/- 200 feet.

United States Geological Survey Professional Paper 1651 (Animas River Watershed)

The USGS PP 1651 database is a relational database designed to assist with the evaluation the impacts from historical mining in the Animas River watershed area. The database is included as an attachment to this publication. Data are stored within an MS Access database which is used in conjunction with ArcGIS for data analysis. Metadata are included on the USGS website (USGS, 2017). Sample data in the database were collected between 1982 and 2002 (Church et. al., 2007). There are approximately 2,389 sites in the database which include the locations of mines, mills, tailings, smelters, seeps, springs, streams, sample locations, and water quality data. The ArcGIS files included in this publication include three files which contain 344 mine sites, names, references, and a summary of the analytical laboratory results for these sites. Also, the ArcGIS files include records associated with 2,014 field sites.

Mine sites included in the database focused on the impact of these sites to the environment. Many mine sites were not included in the inventory including small prospects, sites located some distance from rivers/lakes, sites that without evidence of significant environmental impact. The locations provided in the database involved review of public records and data from the State of Colorado, USFS, BLM, USGS, CGS, and the Colorado Division of Minerals and Geology (now defunct). These locations were recorded in a digital file and one representative point was chosen to represent each site based on 1998 digital orthophoto quadrangles. USGS personnel and residents from the area familiar with study

area mines verified and revised the locations based on site visits, survey plats, and local knowledge of the area. Some of the site locations were determined from written descriptions (Church et. al., 2007).

Brief Description of the Reclamation Data

Colorado Division of Reclamation Mining and Safety

Within the Colorado Division of Reclamation, Mining and Safety (CDRMS), the Inactive Mine Reclamation Program (IMRP) was established in 1980 to address the hazards and environmental problems arising from abandoned mines in Colorado. It was instituted under the provisions in the Surface Mining Control and Reclamation Act (SMCRA) of 1977, which gives the states that have approved coal mining regulatory programs under Title V of SMCRA the ability to assume exclusive responsibility and authority to reclaim abandoned mine lands within their borders. Mines abandoned prior to 1977 are eligible for the program. The program was launched with an inventory of an estimated 23,000 abandoned mine sites and physical hazards associated with past mining activities (i.e., open adits/tunnels and high walls), throughout the state. Using this inventory, Colorado prepared a statewide reclamation plan, which was approved by the U.S. Department of the Interior, Office of Surface Mining in June of 1982. Approximately 10,058 abandoned mined features have been addressed through this program and 33 underground coal mine fires have been identified and investigated for safeguarding and control as of 2016.

The IMRP maintains the "Brasscap" database which contains an inventory of completed AML physical hazard abatements. No metadata were provided. The data set provided has multiple latitude and longitude fields therefore, the XUTM_1 and YUTM_1 fields were used to plot the locations. Approximately 440 points were not plotted due to the absence of values in these fields. Additionally, IMRP supplies the Office of Surface Mining and Reclamation (OSMRE) with information related to their eAMLIS database. Although the Brasscap database is not an inventory of AML sites throughout the State, it contains information about completed safety closure projects related to physical hazard abatement.

Data Limitations

The Colorado Geological Survey is not responsible and shall not be liable to the user for damages of any kind arising out of the use of data or information provided by the CGS, including the installation of the data or information, its use, or the results obtained from its use. ANY DATA OR INFORMATION PROVIDED BY THE CGS IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Data provided by other agencies also has data limitations as included in their metadata.

There is no guarantee concerning the accuracy of the data presented in this project. The quality assurance and control of these data are ongoing. Users should be aware that changes may occur throughout this process and therefore, some or parts of these data sets may no longer be applicable. Users should not use these data for critical applications without a full awareness of its limitations. Any user of these data specifically agrees not to misrepresent the data, nor to imply that changes made were approved or endorsed by the entities who provided the data. Although these data have been processed successfully on each agencies computer system, no warranty expressed or implied is made regarding the

display or utility of the data on any other system, or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. The agencies who provided these data and the CGS shall not be held liable for improper or incorrect use of the data described and/or contained herein.

Location data may have been recorded using different methods, between data sets, with varying degrees of accuracy. These methods include aerial photographs/maps which were later digitized, handheld GPS, digitized from mine maps or from USGS quadrangles, and/or township, range, section, quarter section, quarter section. Therefore, the exact location may only be precise to some scale (e.g. 1:24,000). Also, depending on the data set, some of the location data collected were from a desktop review and no field verification of these sites was completed.

Existing electronic AML inventories include the locations of certain features that may not be a threat to human health and/or the environment. For example, small prospect pits or gravel pits (e.g. industrial minerals) may have been documented in an area but may not present a significant physical or environmental hazard.

Depending on how each database was built, it could contain duplicate data (e.g. the same point or mine feature/site may be duplicated between agency data sets). Additionally, some agencies collect the number of adits, shafts, and other mine features as one location associated with one general AML site. So, there may be multiple AML features at the same location.

It is a common misconception that each one of these locations represents an individual abandoned mine - these data sets include the locations of waste piles (piles of waste rock from the mining process), prospect pits, and other mine features. Also, a set of mine features (e.g. adits, shafts, waste piles, etc.) can be associated with one abandoned mine. Therefore, it can be difficult to determine the actual number of "abandoned mines" in the State.

References

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Burghardt, J.E., Norby, E.S., and Pranger II, H.S., 2014, Abandoned Mineral Lands in the National Park System – Comprehensive Inventory and Assessment, Natural Resource Technical Report NPS/NRSS/GRD/NRTR – 2014/906.

Church, S.E., von Guerard, P., and Finger, S.E., 2007, Integrated Investigations of Environmental Effects of Historical Mining in the Animas River Watershed, San Juan County, Colorado, U.S. Geological Survey Professional Paper 1651.

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DOE, 2014, Final Defense-Related Uranium Mines Location and Status Topic Report, U.S. Department of Energy Legacy Management, LMS/S10693, August 2014.

Government Accountability Office (GAO), 2008, Testimony Before the Committee on Energy and Natural Resources, U.S. Senate, Hardrock Mining, Information on Abandoned Mines and Value and Coverage of Financial Assurances on BLM Land, Statement of Robin M. Nazzaro, Director, Natural Resources and Environment, GAO-08-574T.

Nash, J.T., 2002, Hydrogeochemical Investigations of Historic Mining Districts, Central Western Slope of Colorado, Including Influence on Surface-Water Quality, USGS Digital Data Series DDS-73, Version 1.0.

Personal Communication 1, 2016, Communication via email with Ms. Deborah Steckley, Land Management, Department of Energy, 12th July 2016.

Sares, M.A., Gusey, D.L., and Neubert, J.T., 2000, Abandoned Mines and Naturally Occurring Acid Rock Drainage on National Forest System Lands in Colorado in the International Conference on Acid Rock Drainage (ICARD) 2000: Proceedings from the Fifth International Conference on Acid Rock Drainage, Volume II, September 2000, published by the Society for Mining, Metallurgy, and Exploration, Inc., page 1361.

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ATTACHMENT 1

CO_DRUM_Sites

File Geodatabase Feature Class

Tags

There are no tags for this item.

Summary

This feature class includes mines in Colorado that produced uranium ore for defense-related activities of the United States. Ore was provided to the U.S. Atomic Energy Commission (predecessor agency to the U.S. Department of Energy) between 1947 to 1970. The majority of these mines are considered abandoned.

Description

This feature class of defense-related uranium mine (DRUM) sites in Colorado was developed from tabular data exported from the DOE DRUM Database. The DOE DRUM Database compiles uranium mine information from multiple data sources including, but not limited to: U.S. Atomic Energy Commission production records; the U.S. Environmental Protection Agency's Uranium Location Database; U.S. Bureau of Land Management (BLM) tables of active and closed claims in Colorado; the BLM Abandoned Mine Sites Cleanup Module; Colorado Division of Reclamation, Mining, and Safety data pertaining to permitted mines and uranium closures; and Bulletin 40 published by the Colorado Geological Survey. All coordinates obtained from the various data sources were assumed to be NAD83. The U.S. Department of Energy Office of Legacy Management will be verifying and validating informaton in the DOE database through field based activities at DRUM sites over the next several years.

Credits

There are no credits for this item.

Use limitations

DISCLAIMER for U.S. Department of Energy Office of Legacy Management Defense-Related Uranium Mines Data

There is no guarantee concerning the accuracy of the data. The quality assurance and control of these data is ongoing. Users should be aware that changes may occur throughout this process; therefore some or parts of these data set may no longer be applicable. Users should not use these data for critical applications without a full awareness of its limitations.

User specifically agrees not to misrepresent the data, nor to imply that changes made were approved or endorsed by the U.S. Department of Energy Office of Legacy Management. Although these data have been processed successfully on a computer system at the U.S. Department of Energy Office of Legacy Management, no warranty expressed or implied is made regarding the display or utility of the data on any other system, or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. The U.S. Department of Energy Office of Legacy Management shall not be held liable for improper or

incorrect use of the data described and/or contained herein.

Extent

West -109.710759 **East** -104.822700
North 40.661900 **South** 37.288360

Scale Range

Maximum (zoomed in) 1:5,000
Minimum (zoomed out) 1:150,000,000

You are currently using the Item Description metadata style. Change your metadata style in the Options dialog box to see additional metadata content.

ATTACHMENT 2

US EPA Region 8 – MIN_MINES METADATA

```
Identification_Information:
  Citation:
    Citation_Information:
      Originator: U.S. Environmental Protection Agency
      Title: Mine Locations
      Publication_Information:
        Publisher: U.S. Environmental Protection Agency, Region 8
        Publication_Place: Denver, CO
      Publication_Date: 08/23/2016
  Description:
      Abstract: This dataset consists of mine location data from multiple
      sites in U.S. EPA Region 8.  These data were acquired from multiple
      sources at different times and were combined into one region-wide
      layer. Attribution includes Mine Status (whether the mine is
      abandonded or active); Origination (how the data came to be a part
      of this dataset); Federal Facility Indicator (whether or not the
      site is a Federal Facility); and Ownership Status (the ownership of
      the mine site, whether it is an NPL site, mixed ownership, some
      other form of ownership, or unknown); and Remedial Project Manager
      (who the RPM is of the site).
  Purpose: Identifies mine locations (point coverage).
  Status:
    Progress: Complete
    Maintenance_and_Update_Frequency: As needed
  Time_Period_of_Content:
    Currentness_Reference: Ground condition
    Time_Period_Information:
      Range_of_Dates/Times:
        Beginning_Date: 2009
        Ending_Date: 2016
  Keywords:
    Theme:
      Theme_Keyword_Thesaurus: ISO 19115 Topic Category
      Theme_Keyword: environment
    Theme:
      Theme_Keyword_Thesaurus: EPA GIS Keyword Thesaurus
      Theme_Keyword: Environment
      Theme_Keyword: Facilities
      Theme_Keyword: Remediation
      Theme_Keyword: Sites
    Place:
      Place_Keyword_Thesaurus: None
      Place_Keyword: Colorado
      Place_Keyword: Montana
      Place_Keyword: North Dakota
      Place_Keyword: South Dakota
      Place_Keyword: U.S. EPA Region 8
      Place_Keyword: United States
      Place_Keyword: Utah
      Place_Keyword: Wyoming
  Spatial_Domain:
    Bounding_Coordinates:
```

```
      West_Bounding_Coordinate: -116.063531
      East_Bounding_Coordinate: -96.439395
      North_Bounding_Coordinate: 49.000027
      South_Bounding_Coordinate: 36.988994
  Access_Constraints: None.
  Use_Constraints: None. Please check sources, scale, accuracy,
          currentness and other available information. Please confirm
          that you are using the most recent copy of both data and
          metadata.  Acknowledgement of the EPA would be appreciated.
  Security_Information:
    Security_Classification_System: FIPS Pub 199
    Security_Classification: No Confidentiality
    Security_Handling_Description: Standard Technical Controls
  Point_of_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
                              Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Metadata_Reference_Information:
  Metadata_Date: 08/23/2016
  Metadata_Standard_Name: FGDC Content Standard for Digital Geospatial
Metadata
  Metadata_Standard_Version: FGDC-STD-001-1998
  Metadata_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
                              Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Data_Quality_Information:
  Logical_Consistency_Report: Tests for integrity have not been
                              performed.
  Completeness_Report: Features represented have not been tested for
                       completeness
  Positional_Accuracy:
```

Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report: Data were collected using methods that have unknown accuracy (EPA National Geospatial Data Policy [NGDP] Accuracy Tier 10). For more information, please see EPA's NGDP at http://epa.gov/geospatial/policies.html)

Lineage:

Process_Step:
Process_Date: 06/10/2009, 06/11/2009
Process_Description: Georgetown Mines - Mine site location collected using DGPS by U.S. EPA Region 8 (06/10/2009). Data downloaded, differentially corrected, attributed, and loaded to ArcSDE by ESAT (06/11/2009).

Process_Step:
Process_Date: 09/30/2009
Process_Description: Mogul/Grand Mogul Mine(s) - Mine site location collected using DGPS by U.S. EPA Region 8 (08/2009). Data attributed and loaded to ArcSDE by ESAT (09/30/2009).

Process_Step:
Process_Date: 12/16/2009
Process_Description: Peru Creek - Mine Locations delineated by ESAT Contractor from 1:24K DRG Topological map in 12/2007. Features loaded to SDE by ESAT Contractor in 12/2009.

Process_Step:
Process_Date: 01/27/2010
Process_Description: Nelson Tunnel/Commodore Waste Rock - Mine coordinates were provided by U.S. EPA Region 8 to ESAT Contractor. Features loaded to SDE by ESAT Contractor in 01/2010.

Process_Step:
Process_Date: 07/27/2010
Process_Description: Coordinates for numerous Federal Facilities Mine locations were provided by U.S. EPA Region 8 to ESAT Contractor. Features loaded to SDE by ESAT Contractor on 07/2010.

Process_Step:
Process_Date: 06/10/2009, 06/11/2009
Process_Description: Georgetown Mines - Mine site location collected using DGPS by U.S. EPA Region 8 (06/10/2009). Data downloaded, differentially corrected, attributed, and loaded to ArcSDE by ESAT (06/11/2009).

Process_Step:
Process_Date: 01/19/2011
Process_Description: Additional mine locations added by ESAT contractor in late 2010, early 2011. These mine sites were collected from U.S. EPA Region 8 staff. Schema was altered to accomodate additional information that was needed for the sites. Features loaded to SDE in 1/2011.

Process_Step:
Process_Date: 02/28/2011
Process_Description: Mine locations for the Barker-Hughesville and Carpenter/Snow Creek mining district have been added. Source data were saved to shared network drive (SAN). Schema was changed to accommodate additional information.

Process_Step:

```
      Process_Date: 07/06/2011
      Process_Description: Henson Creek Mines - Latitude and Longitude
            for the Henson Creek mines were found in a report by Colorado
            Division of Reclamation, Mining, and Safety titled
            "Reclamation Feasibility Report Henson Creek Watershed"
            published June 2006.  These locations were attributed and
            added to SDE on 07/06/2011 by ESAT Contractor.
    Process_Step:
      Process_Date: 07/07/2011
      Process_Description: Carpenter/Snow Creek Mine locations added
            7/6/2011 by ESAT contractor. Mine locations were received
            from EPA staff as PDF file with coordinates. Geometry from
            PDF file was adopted to replace previous geometry. Features
            loaded to SDE by ESAT in 7/2011.
    Process_Step:
      Process_Date: 02/26/2013
      Process_Description: Philipsburg Mining Area added.  Data received
            from the state of MT and loaded to SDE by Region 8 GIS staff.
    Process_Step:
      Process_Date: 07/27/2016
      Process_Description: Mines obtained from USGS for Bonit Peak Mining
            District were added to SDE Mines Layer.
Distribution_Information:
  Resource_Description: Offline Data
  Distribution_Liability: Although these data have been processed
            successfully on a computer system at the Environmental
            Protection Agency, no warranty expressed or implied is made
            regarding the accuracy or utility of the data on any other
            system or for general or scientific purposes, nor shall the
            act of distribution constitute any such warranty. It is also
            strongly recommended that careful attention be paid to the
            contents of the metadata file associated with these data to
            evaluate data set limitations, restrictions or intended use.
            The U.S. Environmental Protection Agency shall not be held
            liable for improper or incorrect use of the data described
            and/or contained herein.
  Distributor:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
                                    Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Entity_and_Attribute_Information:
  Detailed_Description:
    Entity_Type:
```

```
  Entity_Type_Label: MIN_MINES
Attribute:
  Attribute_Label: OBJECTID
  Attribute_Definition: Internal feature number.
  Attribute_Definition_Source: ESRI
  Attribute_Domain_Values:
    Unrepresentable_Domain: Sequential unique whole numbers that are
                            automatically generated.
Attribute:
  Attribute_Label: SITE_NAME
  Attribute_Definition: Name of the feature
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: SHAPE
  Attribute_Definition: Internal feature geometry
  Attribute_Definition_Source: ESRI
  Attribute_Domain_Values:
    Unrepresentable_Domain: Coordinates defining the features.
Attribute:
  Attribute_Label: MINE_NAME
  Attribute_Definition: Name of mine
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: FED_FACILITY
  Attribute_Definition: Status as a Federal Facility
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: ORIGINATION
  Attribute_Definition: How the data became part of this dataset
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: STATUS
  Attribute_Definition: Whether the site is abandoned or active
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: OWNERSHIP
  Attribute_Definition: Who has ownership of the site
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: STATE
  Attribute_Definition: State mine site resides in
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: ELEVATION_FT
  Attribute_Definition: Elevation in feet
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: ELEVATION_M
  Attribute_Definition: Elevation in meters
  Attribute_Definition_Source: U.S. EPA
Attribute:
  Attribute_Label: LATITUDE_NAD83
  Attribute_Definition: Latitude in decimal degrees - NAD83
                        projection
```

```
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: LONGITUDE_NAD83
      Attribute_Definition: Longitude in decimal degrees - NAD83
                            projection
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: SOURCE
      Attribute_Definition: Source of feature
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: CERCLA_ID
      Attribute_Definition: Unique CERCLA site identifier
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: COMMENTS
      Attribute_Definition: Comments
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: RPM
      Attribute_Definition: Remedial Project Manager of Site
      Attribute_Definition_Source: U.S. EPA
Spatial_Reference_Information:
  Horizontal_Coordinate_System_Definition:
    Geographic:
      Geographic_Coordinate_Units: Decimal degrees
    Geodetic_Model:
      Horizontal_Datum_Name: North American Datum of 1983
      Ellipsoid_Name: Geodetic Reference System 1980
      Semi-major_Axis: 6378137.000000
      Denominator_of_Flattening_Ratio: 298.257222
Spatial_Data_Organization_Information:
  Point_and_Vector_Object_Information:
```

US EPA Region 8 – MIN_MINE_FEATURES METADATA

Identification_Information:
  Citation:
    Citation_Information:
      Originator: U.S. Environmental Protection Agency
      Title: Mine Features
      Publication_Information:
        Publisher: U.S. Environmental Protection Agency, Region 8
        Publication_Place: Denver, CO
      Publication_Date: 08/23/2016
  Description:
      Abstract: This dataset consists of mine feature location data from multiple Superfund sites in U.S. EPA Region 8. These data were acquired from multiple sources at different times and were combined into one region-wide layer.
    Purpose: Site-specific mapping and display
  Status:
    Progress: Complete
    Maintenance_and_Update_Frequency: As needed
  Time_Period_of_Content:
    Currentness_Reference: Ground condition
    Time_Period_Information:
      Range_of_Dates/Times:
        Beginning_Date: 2009
        Ending_Date: 2016
  Keywords:
    Theme:
      Theme_Keyword_Thesaurus: ISO 19115 Topic Category
      Theme_Keyword: environment
      Theme_Keyword: inlandWaters
    Theme:
      Theme_Keyword_Thesaurus: EPA GIS Keyword Thesaurus
      Theme_Keyword: Facilities
      Theme_Keyword: Hazards
      Theme_Keyword: Monitoring
      Theme_Keyword: Toxics
    Place:
      Place_Keyword_Thesaurus: None
      Place_Keyword: Colorado
      Place_Keyword: Montana
      Place_Keyword: U.S. EPA Region 8
  Spatial_Domain:
    Bounding_Coordinates:
      West_Bounding_Coordinate: -116.063531
      East_Bounding_Coordinate: -96.439395
      North_Bounding_Coordinate: 49.000027
      South_Bounding_Coordinate: 36.988994
  Access_Constraints: None.
  Use_Constraints: None. Please check sources, scale, accuracy, currentness and other available information. Please confirm that you are using the most recent copy of both data and metadata. Acknowledgement of the EPA would be appreciated.
  Security_Information:

```
    Security_Classification_System: FIPS Pub 199
    Security_Classification: No Confidentiality
    Security_Handling_Description: Standard Technical Controls
  Point_of_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Metadata_Reference_Information:
  Metadata_Date: 08/23/2016
  Metadata_Standard_Name: FGDC Content Standard for Digital Geospatial
    Metadata
  Metadata_Standard_Version: FGDC-STD-001-1998
  Metadata_Contact:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
                                    Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Data_Quality_Information:
  Logical_Consistency_Report: Tests for integrity have not been
                              performed.
  Completeness_Report: Features represented have not been tested for
                       completeness
  Positional_Accuracy:
    Horizontal_Positional_Accuracy:
      Horizontal_Positional_Accuracy_Report: Data were collected using
           methods that have unknown accuracy (EPA National Geospatial
           Data Policy [NGDP] Accuracy Tier 10). For more information,
           please see EPA's NGDP at
           http://epa.gov/geospatial/policies.html)
  Lineage:
    Process_Step:
      Process_Date: 05/21/2002, 11/27/2007
```

Process_Description: Chalk Creek features collected using GPS on May 21, 2002 by U.S. EPA Region 8 staff. Unknown if features were differentially corrected. Features attributed and loaded to SDE by ESAT on 11/27/2007.

Process_Step:
Process_Date: 08/23/2007, 11/27/2007
Process_Description: Chalk Creek features collected using Trimble GeoXT GPS units on August 23, 2007 by U.S. EPA Region 8 and ESAT staff. Features downloaded, differentially corrected, and attributed by ESAT between September and November of 2007. Features loaded to SDE by ESAT on 11/27/2007.

Process_Step:
Process_Date: Unknown, 11/27/2007
Process_Description: Chalk Creek features provided to EPA by Colorado Division of Reclamation, Mining, and Safety. No other metadata was provided. Features were attributed and loaded to SDE by ESAT on 11/27/2007.

Process_Step:
Process_Date: 10/24/2007, 03/25/2008
Process_Description: Summitville - features collected using Trimble GeoXT GPS units, downloaded, differentially corrected, and attributed by ESAT Contractor (10/24/2007). Features loaded to the U.S. EPA Region 8 Superfund ArcSDE Geodatabase by ESAT Contractor (03/25/2008).

Process_Step:
Process_Date: 07/15/2008, 07/16/2008, 07/29/2008
Process_Description: Chalk Creek features collected using Trimble GeoXT GPS units on July 15 & 16, 2008 by U.S. EPA Region 8 and ESAT staff. Features downloaded, differentially corrected, attributed, and loaded to SDE by ESAT on July 29, 2008.

Process_Step:
Process_Date: 06/08/2005, 08/17/2005, 08/18/2005, 08/19/2005, 11/18/2008
Process_Description:
Standard Mine - features collected using differential GPS by U.S. EPA Region 8 Biology staff throughout the 2005 field season. Features attributed and loaded to the USEPA Region 8 Superfund ArcSDE instance by ESAT contractor (11/18/2008).

Process_Step:
Process_Date: 07/22/2008, 12/01/2008
Process_Description: St. Kevins Gulch features collected using Trimble GeoXT GPS units on July 22 2008 by U.S. EPA Region 8 ESAT staff. Features loaded to SDE by ESAT on 12/01/2008.

Process_Step:
Process_Date: 06/10/2009, 06/11/2009
Process_Description: Georgetown Mines - Mill site location collected using DGPS by U.S. EPA Region 8 (06/10/2009). Data downloaded, differentially

corrected, attributed, and loaded to ArcSDE by ESAT (06/11/2009).

Process_Step:
Process_Date: 07/07/2009
Process_Description: Carbonero Mill features collected using Trimble GeoXT GPS units on 06/23/2009 by ESAT staff. Features downloaded, differentially corrected, attributed, and loaded to SDE by ESAT on 07/07/2009.

Process_Step:
Process_Date: 12/01/2009
Process_Description: Lincoln Park image was received by Fred C. Hart Associates in 11/2009. The image was georeferenced by DDS and features delineated by ESAT contractor in 11/2009. Features loaded to SDE by ESAT contractor in 12/2009

Process_Step:
Process_Date: 12/16/2009
Process_Description: Peru Creek - Features provided by USFS and U.S. EPA Region 8. Features loaded to SDE by ESAT contractor in 12/2009.

Process_Step:
Process_Date: 07/15/2010
Process_Description: Barrow Pit locations acquired from U.S. EPA Region 8 were incorporated into SDE mine feature class.

Process_Step:
Process_Date: 09/09/2010
Process_Description: Nelson Tunnel/Commodore Waste Rock - Locations for the Nelson Tunnel mine portal and the Commodore mine portal were taken during June field event with differential GPS and post processed using Trimble Pathfinder software. These portal locations were added to SDE on 09/09/2010

Process_Step:
Process_Date: 07/01/2011
Process_Description: Schema was changed to accomodate field split. MINE_NAME is newly created.

Process_Step:
Process_Date: 07/26/2011
Process_Description: Carpenter Snow Creek - Adits and Portals added by ESAT contractor in 7/2011. Features were collected in July 2011 field event. Features with GPS data were collected in field. Those features without GPS date were captured via 2009 NAIP aerial photograph and contractor sketches provided by project manager. These features were verified on the ground during field event. Features loaded to SDE in 7/2011.

Process_Step:
Process_Date: 06/25/2012
Process_Description: Half Moon Creek/Mt. Champion - Adit digitized from USGS Topo map by ESAT conractor. Features loaded to SDE on 06/25/2012.

Process_Step:
Process_Date: 12/05/2012

```
      Process_Description: Mine features (23) were added to SDE for
                      Buckskin/Mosquito Creek Mining District
    Process_Step:
      Process_Date: 05/30/2014
      Process_Description: Kennecott - Mine Feature Locations spatail data
                      were obtained from Rio Tinto and processed by ESAT
                      Contractor.  This data has been loaded to SDE by
                      ESAT on 05/30/2014.
      Process_Contact:
        Contact_Information:
          Contact_Person_Primary:
            Contact_Organization: ESAT Contrator to U.S. Environmental
            Protection Agency, Region 8
            Contact_Person: Ryan Bahnfleth
          Contact_Position: ESAT GIS Task Lead
          Contact_Address:
            Address_Type: mailing and physical address
            Address: 16194  W. 45th Drive
            City: Golden
            State_or_Province: CO
            Postal_Code: 80403
          Contact_Voice_Telephone: (303) 312-7723
          Contact_Electronic_Mail_Address: bahnfleth.ryan@epa.gov
    Process_Step:
      Process_Date: 07/27/2016
      Process_Description: Additional mine features were added from USGS
                      for Bonita Peak Mining District.
      Process_Contact:
        Contact_Information:
          Contact_Person_Primary:
            Contact_Organization: U.S. Environmental Protection Agency,
                                  Region 8
            Contact_Person: Dawit Kidane
          Contact_Position: GIS Contractor
          Contact_Address:
            Address_Type: mailing and physical address
            Address: 16194 W. 45th Drive
            City: Golden
            State_or_Province: CO
            Postal_Code: 80403
          Contact_Voice_Telephone: (303) 312-7749
          Contact_Electronic_Mail_Address: kidane.dawit@epa.gov
Distribution_Information:
  Resource_Description: Offline Data
  Distribution_Liability: Although these data have been processed
        successfully on a computer system at the Environmental
        Protection Agency, no warranty expressed or implied is made
        regarding the accuracy or utility of the data on any other
        system or for general or scientific purposes, nor shall the act
        of distribution constitute any such warranty. It is also
        strongly recommended that careful attention be paid to the
        contents of the metadata file associated with these data to
        evaluate data set limitations, restrictions or intended use. The
        U.S. Environmental Protection Agency shall not be held liable
```

```
          for improper or incorrect use of the data described and/or
          contained herein.
  Distributor:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: U.S. Environmental Protection Agency,
Region 8
        Contact_Person: John Wieber
      Contact_Position: GIS Coordinator
      Contact_Address:
        Address_Type: mailing and physical address
        Address: 1595 Wynkoop Street
        City: Denver
        State_or_Province: CO
        Postal_Code: 80202
      Contact_Voice_Telephone: (303) 312-6118
      Contact_Electronic_Mail_Address: wieber.john@epa.gov
Entity_and_Attribute_Information:
  Detailed_Description:
    Entity_Type:
      Entity_Type_Label: MIN_MINE_FEATURES
    Attribute:
      Attribute_Label: OBJECTID
      Attribute_Definition: Internal feature number.
      Attribute_Definition_Source: ESRI
      Attribute_Domain_Values:
        Unrepresentable_Domain: Sequential unique whole numbers that are
            automatically generated.
    Attribute:
      Attribute_Label: CERCLA_ID
      Attribute_Definition: Unique CERCLA site identifier
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: SITE_NAME
      Attribute_Definition: Name of the site
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: MINE_NAME
      Attribute_Definition: Name of the mine site
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: DESCRIPTION
      Attribute_Definition: Description of the feature
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: TYPE
      Attribute_Definition: Type of feature
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: LATITUDE_NAD83
      Attribute_Definition: Latitude in decimal degrees - NAD83
      projection
      Attribute_Definition_Source: U.S. EPA
    Attribute:
```

```
      Attribute_Label: LONGITUDE_NAD83
      Attribute_Definition: Longitude in decimal degrees - NAD83
      projection
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: SHAPE
      Attribute_Definition: Feature geometry.
      Attribute_Definition_Source: ESRI
      Attribute_Domain_Values:
        Unrepresentable_Domain: Coordinates defining the features.
    Attribute:
      Attribute_Label: ELEVATION_FT
      Attribute_Definition: Elevation above sea level in feet
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: GPS_DATE
      Attribute_Definition: Date feature collected using GPS
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: SOURCE
      Attribute_Definition: Source of the feature
      Attribute_Definition_Source: U.S. EPA
    Attribute:
      Attribute_Label: ELEVATION_M
      Attribute_Definition: Elevation above sea level in meters
      Attribute_Definition_Source: U.S. EPA
Spatial_Reference_Information:
  Horizontal_Coordinate_System_Definition:
    Geographic:
      Geographic_Coordinate_Units: Decimal degrees
    Geodetic_Model:
      Horizontal_Datum_Name: North American Datum of 1983
      Ellipsoid_Name: Geodetic Reference System 1980
      Semi-major_Axis: 6378137.000000
      Denominator_of_Flattening_Ratio: 298.257222
Spatial_Data_Organization_Information:
  Point_and_Vector_Object_Information:
```

ATTACHMENT 3

Colorado AML Data Notes

This document briefly describes the AML data provided to the Colorado School of Mines. Along with this document, you will find an ESRI file-based geodatabase (gdb) that contains a subset of the AML database for Colorado Sites. This subset has been "de-sensitized" so that actual feature locations have been obscured and are represented by Township boundaries. All of the attribute data and relationships between object classes in the geodatabase have been preserved. At a high level, the geodatabase relationships are as follows and are documented in the physical geodatabase implementation through relationship object classes.

Sites -> FeaturePolygons

Sites are tabular records (table gdb object class) and are related to the feature polygons (feature gdb object class) through a one to many relationship. Sites can have multiple features associated with them. The primary key (PK) in the sites table is Global_ID (text representation of GUID*) and the foreign key (FK) in the Feature Polygons is Site_ID_Txt (text representation of GUID*). A geodatabase relationship object class has been included in the schema with these PK -> FK relationships.

FeaturePolygons -> FeatureMonitoring

FeaturePolygons are features (feature gdb object class) and are related to the FeatureMonitoring tabular records (table gdb object class) through a one to many relationship. Features can have multiple monitoring visits associated with them. The primary key (PK) in the FeaturePolygons table is Global_ID (text representation of GUID*) and the foreign key (FK) in the FeatureMonitoring is Feature_ID_Txt (text representation of GUID*). A geodatabase relationship object class has been included in the schema with these PK -> FK relationships.

*The original geodatabase contained GUIDs for primary and foreign keys that changed when the database structure was modified for this request. To keep the keys stable, they were re-calculated as text fields to maintain referential integrity and to ensure that the keys were stable during export from the source data. This details is provided so that anyone working with the data will understand the non-standard text based GUIDs being use for keys.

In addition to the data, we have also provided the AML_Database_Fields-DataDictionary-Servicewide-2013-0906.pdf document which contains a data dictionary for the data structure and defines the AML database fields. There is also an ArcGIS Map document that contains a reference to data with the appropriate display fields to make data review easy using the identify tool. All ArcGIS files (map document and gdb) are version 10.4.1.

National Park Service (NPS) Servicewide Abandoned Mineral Lands (AML) Database
Field Descriptions / Data Dictionary

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
SITE / GENERAL			
Region	V	Region	AKR, IMR, MWR, NCR, NER, PWR, SER
Park_Code	V	Park Code	4-character park acronym - e.g., ACAD, DEVA, BISO
Site_Name	V	Site Name	Enter the official name, or if not known, an identifying name (e.g., "Unknown 1," "Grizzly Gulch 1," etc.)
CAMLU_Site_Number	I	CAMLU Site Number	California Parks Only - State AML Unit's unique site identification number
Site_Type	V	Site Type	Underground Mine, Surface Mine, Placer Mine, Mill, Well, Road, Underground Mine - Mill, Surface Mine - Mill, Underground-Surface Mine, Underground-Surface Mine - Mill, Other
State	V	State	2-letter postal code (if site crosses state line, pick primary and list other in Site_Notes)
County	V	County	(if more than one county, pick primary and list other in Site_Notes)
Congressional_Dist	V	Congressional District	(often requested in funding proposals - these sometimes change)
Watershed	V	Watershed	Primary watershed name that would be used when partnering with other agencies on major clean-up projects.
Site_Acres	F	Site Acreage	Measure or estimate size of surface disturbance for entire site (tenths of acres used for smaller sites)
Ownership	V	Ownership	Legal ownership: Federal, Private (including patented mining claims), Unpatented (unpatented mining claim), State, County, Other, Unknown
Admin_Use	V	Administrative Use	Yes/No/Unknown - Is the site used administratively by NPS, e.g., sand/gravel quarry for park roads?
FMSS_Loc_ID	I	Location ID	Facility Management Software System Location ID
FMSS_API	I	Asset Priority Index	Facility Management Software System Asset Priority Index (1-100)
FMSS_FCI	F	Facility Condition Index	Facility Management Software System Facility Condition Index (0.000 - X.XXX)
CERCLA	V	CERCLIS #	If this is a CERCLA site, give CERCLIS #. Alphanumeric code starting with State Acronym followed by 10 digits (e.g., AK1231231231)
EDL	V	EDL #	Environmental and Disposal Liabilities database number - DOI list that tracks environmentally contaminated sites (formerly "ECL"). Alphanumeric code: Bureau Code ("5" for NPS) + Region Code + Site # (1 to 4-digit number) - e.g., 5AR1, 5IMR3161
Compliance_Date	D	Compliance Date (MM/DD/YYYY)	Give date that compliance was completed, and list compliance type (Categorical Exclusion, EA FONSI, or EIS ROD) in Site_Notes.
PEPC	I	5-digit PEPC number	Give PEPC number, or if multiple PEPC numbers were used for various features at this site, list the main one and record others in Site_Notes. PEPC can be used to track NEPA and other compliance requirements, such as NHPA, ESA, wetlands/Section 404 permitting, etc.There is no need to replicate those records in the AML database.
Site_Notes	V	Site Notes	Include other ID numbers from differnent databases **or additional PEPC numbers** here.

Field Name	Field Type	Field Description	Comments
Essential Data			
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 2			
FEATURE IDENTIFICATION / STATUS - GENERAL			
NPS_ID	V	Servicewide Identification Code	**NOT AN INPUT FIELD. GENERATED AUTOMATICALLY BY DATABASE FROM INPUT DATA:** <Park_ID>-<Site_Name>-<Feature_Type>-<number (assigned sequentially by database)> (e.g., DEVA-Skidoo-OS-01, NERI-Kaymore-AD-03). **Unique to each feature.**
Park_ID	V	Park Identification Code	**Park's verbatim in-house identification code**. If park has its own database and nomenclature, we want to be able to link that to the Servicewide Database. Some parks have multiple features listed under one identifier. The Servicewide Database separates these out with a unique NPS_ID for each feature.
Legacy_ID	V	Legacy Identification Code	**Previously-used identification code that has since been changed due to uncovering new information -** When early inventories are updated and information is found that may link a mine more specifically to a particular operation than previously known, or to a different operation, this field preserves the name given in previous surveys, by which some personnel may more commonly know it. Example 1: Ownership previously unknown, so park called a particular solo adit, "Unknown #8" (Legacy_ID). Subsequently, we learn that the Acme Mining Company operated the mine, so now the park calls it "Acme Adit" (Park_ID), and in the Servicewide AML Database, it becomes "PARK-Acme-AD-01" (NPS_ID).
CAMLU_Feature_Number	I	CAMLU Feature Number	California Parks Only - State AML Unit's unique feature identification number
Other_ID	V	Other Identification Code	This field has been added due to demand to track other numbering systems, such as the BLM Mining Claim Number, USGS-USBOM MAS/MILS SEQ number, Smithsonian Trinomial Number, American Petroleum Institute (API) Well #, etc. Please indicate in Feature Notes to which numbering system your Other ID pertains.
Feature_Type	V	Feature Type	Underground Excavations: Adit, Shaft, Incline, Tunnel, Open Stope, Vent Raise, Glory Hole, Subsidence, Prospect. Surface Excavations: Surface Mine, Highwall, Trench. Other Features: Waste Rock, Tailings, Ore Pile, Topsoil Stockpile, Road, Impoundment, Embankment, Building, Structure, Equipment, Well, Hazmat Cache, Artifact Concentration, Trash Pile, Explosives Cache, Other, Unknown (for legacy data only). [SEE DETAILED LIST]
Action_Required	V	Action Required	Yes/No/Unknown - Is action required for this feature other than monitoring and maintenance?
High_Risk	V	High Risk	Yes/No/Unknown - Is this feature "high risk" described in the Director's 10/02/08 memorandum? (Director Bomar's 10/02/08 memorandum was in response to the DOI Inspector General's July 2008 Audit Report of the NPS and BLM AML Programs. The IG called for prompt closure of all "high-risk" sites. Risk is determined by each park based on degree of danger and likelihood of visitation. Suggest "Yes" if Hazard Rating is 3 or more ***AND*** Access Rating is 4 or more.
Source	V		General text field - staff person, literature, etc.
Rev_Date	D	Revision Date (MM/DD/YYYY)	Update this field every time you make a revision. Database provides pop-up date-picker calendar.
Feature _Notes	V	Feature Notes	If "other," describe: e.g., drill hole, trench, arrastra. Use this field for any necessary additional feature description.

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
FEATURE ACCESS			
Method	V	Access Method	Paved Road, Improved Dirt Road, 4WD Road, Hike, Boat, Helicopter
Dist_road	F	Distance from drivable road (tenths of miles)	Straight-line distance if cross-country; distance on path if path is near site
Dist_path	F	Distance from established path (tenths of miles)	If a road is closer than a path, enter the distance from the road.
Published	V	Where is location published	Map (e.g., symbol on USGS topo map, or indicated on other map), Brochure, Book, Internet, **Peer-Reviewed Paper, Gray Literature**, Not Published, Unknown
Wilderness	V	Is feature in designated wilderness	Yes/No/Unknown
Evid_Visit	V	Evidence of visitation	None, Moderate (some trash, footprints), High (lots of trash, etc. or feature is known to have high visitation), Underground Access (graffiti, trash, footprints, etc., within mine workings).
Access_Notes	V	Notes on Access	
FEATURE GEOGRAPHIC DESCRIPTION			
Quad	V	Quadrangle Name	USGS Quad Map Name
Lat_ddeg_NAD83	F	Latitude North	**NAD83 decimal degrees - 6 decimal places** (**NOTE:** All new data should be entered in NAD83 LAT/LONG DECIMAL DEGREES, preferably to 6 decimal places if we actually have that degree of accuracy (~ 1 meter). UTM and Public Land Survey System (PLSS: Township/Range/Section) data fields are only to retain historic data where we have not yet updated with recent GPS readings. (Essential only for new entries)
Long_ddeg_NAD83	F	Longitude West	NAD83 decimal degrees - 6 decimal places. (Essential only for new entries)
Elevation	V	Elevation	Feature elevation, given in feet.
Location_Accuracy	V	Location Accuracy	Location Information Accuracy - Differential GPS, Uncorrected GPS, General Site Coordinates, Topo Symbol, Imagery (aerial photo, satellite, etc.), X on map, ¼ Section, Section. (Essential only for new entries)
GPS_Year	I	GPS Year	Year of GPS reading
Aspect	V	Aspect	**Direction of slope where feature is situated.** Lookup Table: N, NE, E, SE, S, SW, W, NW, V (vertical). This can have great significance in predicting potential habitat, particularly in underground mines, e.g., a south-facing shallow adit is unlikely to support hibernation.
Boundary	V	Within park boundary?	Yes/No/Unknown - Within park boundary? (Some sites straddle the park boundary with features inside and outside of the park. Many parks record sites just outside their boundaries that may require management attention / resources. We don't want to lose track of that data, but need to be able to separate them out as not being our ultimate responsibility.)
UTM_N	F	UTM North	UTM Northing (meters)
UTM_E	F	UTM East	UTM Easting (meters)
UTM_Zone	I	UTM Zone	UTM Zone (1 to 60)

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
Meridian	V	Meridian	Principle Meridian
Township	V	Township	PLSS Township - Enter N or S after number
Range	V	Range	PLSS Range - Enter E or W after number
Section	I	Section	PLSS Section - 1 to 36
Quadrant	V	Quadrant	PLSS Quadrant / quarter-section description - NE, SE, SW, NW
FEATURE DIMENSIONS			
Feature_Dim_X	F	Shaft width 1 / Pit width 1 / Adit width / Trench width (feet)	
Feature_Dim_Y	F	Shaft width 2 / Pit width 2 / Adit height / Trench length (feet)	
Feature_Depth	F	Shaft depth / Pit depth / Adit length / Trench depth (feet)	Directly measured, or estimated where direct measurement is not possible. If estimated, enter YES under "Feature Depth Uncertain." If feature is collapsed at the entry, leave this field blank, mark YES for "Feature depth uncertain" and "Feature naturally reclaimed," and mark NO for "Action Required."
Feature_Depth_Uncertain	V	Feature Depth Uncertain	Yes/No/Unknown - Answer "Yes" where mine workings continue out of sight, either because underground entry is not permissible or if full underground survey is not possible due to hazards. Enter "Yes" for deep shafts where estimate has been made by timing how long it takes a dropped rock to hit bottom (Distance (ft) = 0.5 x 32.17 x sec^2), or where a "false bottom" is suspected. Discuss details in Access Notes field.
Distub_Area	F	Area of disturbance around feature (square feet)	Some parks include measurements on the disturbed area immediately surrounding each feature, either by total area (Disturb_Area) or by length x width dimensions (Distub_Length x Disturb_Width). These fields are not to be confused with total site area (Site_Acres), although they may be the same for single-feature sites.
Distub_Area_L	F	Disturbed Area Length (feet)	
Disturb_Area_W	F	Disturbed Area Width (feet)	
FEATURE BIOLOGICAL RESOURCES			
BiolRes_Signif	V	Significant biological resource values?	Yes/No/Unknown
Species_TE	V	T & E species present?	Yes/No/Unknown
Species_Concern	V	Other species of concern present?	Yes/No/Unknown (e.g., former Category 2 Species, State-listed species, or significant habitat for common species)
Bats	V	Bats (or evidence of bats) observed?	Yes/No/Unknown (Bats are singled out because they so often determine closure type, making this a good field on which to search.)
Biology_Notes	V	Notes on biological issues present	

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types:** **V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
FEATURE HAZARDS			
Hazards	V	Hazards in need of mitigation?	Yes/No/Unknown
Debris	V	Debris at this feature?	Yes/No/Unknown - Note: Large, discrete piles that merit further characterization can be called out as separate "Trash" features.
Highwall	V	Highwall present?	Yes/No/Unknown
Rockfall	V	Rockfall hazards present, esp. at entry?	Yes/No/Unknown
Fall	V	Falling hazards due to vertical drop-offs present?	Yes/No/Unknown
Flooded	V	Flooded, or evidence of flooding?	Yes/No/Unknown (Flooded shaft, seasonally flooded shaft, or impoundments inside adit that trap water?)
Explosives	V	Explosives present?	Yes/No/Unknown
Bad_Air	V	Bad air present or documented previously?	Yes/No/Unknown [Note that this can change from visit to visit.]
Subsidence	V	Areas of subsidence or collapse?	Yes/No/Unknown (e.g., slump zones on the surface, underground collapses, or slope failure caused by feature)
Fire	V	Evidence of underground fire?	Yes/No/Unknown (Includes coal mine fires, burned timbers, campfire ring, etc. underground)
Hazsub	V	Hazardous substances (other than explosives) present?	Yes/No/Unknown
Haz_Notes	V	Notes on hazards	
FEATURE MITIGATION REQUIRED - SPECIFIC			
Temp_Safe	V	Temporary safing method required	Sign, Fence, Administrative Closure, etc.
Mitig_Opt1	V	Mitigation Option 1	Proposed long-term mitigation technique - OPTION 1 - Reclamation, Bat Gate, Bat Cupola, Bat Culvert, Gate, Grate, **Concrete Cover,** Cablenet, Backfill, PUF, Bulkhead, Fence, Blasting, Structure Removal, Structure Stabilization, Sign, To be determined, Other, No Action. Please explain "Other" and "To be Determined" in Mitig_Req_Notes field.
Opt1_Cost	F	Estimated cost of Option 1	If "To be Determined," please give very rough estimate so that we have a general idea of overall cost for the Comptroller.
Opt1_Cost_Year	I	Year of mitigation cost estimate for Option 1.	
Mitig_Opt2	V	Mitigation Option 2	Proposed long-term mitigation technique - OPTION 1 - Reclamation, Bat Gate, Bat Cupola, Bat Culvert, Gate, Grate, **Concrete Cover,** Cablenet, Backfill, PUF, Bulkhead, Fence, Blasting, Structure Removal, Structure Stabilization, Sign, To be determined, Other, No Action. Please explain "Other" and "To be Determined" in Mitig_Req_Notes field.
Opt2_Cost	F	Estimated cost of Option 2.	

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types:** **V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
Opt2_Cost_Year	I	Year of mitigation cost estimate for Option 2.	
PMIS	V	PMIS number	**Recovery Act Reporting Field -** Numeric identifier ***with alpha components included***
FMSS_Asset_ID	I	FMSS Asset ID	Facility Management Software System Asset ID - numeric identifier
Mitig_Req_Notes	V	Notes on mitigation required	Give details (e.g., location of gate 8 feet inside of portal).
FEATURE MITIGATION COMPLETED - SPECIFIC			
Nat_Recl	V	Feature naturally reclaimed?	Yes, No, Unknown - Has this feature naturally reclaimed such that no work is required?
Temp_Safe_Used	V	Temporary safing method used	**Recovery Act Reporting Field -** Sign, Fence, Fence and Sign, Administrative Closure, Other
Temp_Safe_Date	D	Date of temporary closure (MM/DD/YYYY)	Database provides pop-up date-picker calendar.
Mitig_Used	V	Mitigation technique used	**Recovery Act Reporting Field -** Reclamation, Bat Gate, Bat Cupola, Bat Culvert, Gate, Grate, **Concrete Cover,** Cablenet, Backfill, PUF, Bulkhead, Fence, Blasting, Structure Removal, Structure Stabilization, Sign, Other. Please explain "Other" in Mitig_Compl_Notes field.
Mitig_Date	D	Date feature was reclaimed/mitigated (MM/DD/YYYY)	Database provides pop-up date-picker calendar.
Mitig_Cost	F	Cost of mitigation ($)	May need to estimate proportion of multi-opening projects
Mitig_Funds	V	Source of funding	NRPP, Recovery Act (ARRA), Fee Program, GRD, State, Park Base, Region, OSM, Other
Mitig_by	V	Who mitigated the feature?	Who performed the mitigation work? NPS (in-house job), Contractor (NPS-hired contractor), State (State-hired contractor), Other
Partners	V	What partners were used?	Federal, State, Industry, Volunteers, Other (e.g., conservation groups), None
Mitig_Compl_Notes	V	Notes on completed mitigation	(list partners, if applicable)

Field Name	Field Type	Field Description	Comments
Essential Data			**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		
Detail 2			
FEATURE SAMPLE AND RANKING DATA (refer to Ranking System Guide, below)			
Water_Samp	V	Was water sampled?	Yes/No/Unknown
pH_Effl	F	pH of effluent (to nearest tenth)	
pH_bg	F	Background pH (to nearest tenth)	
Water_Contam	V	Elevated contaminant levels in the water?	Yes/No/Unknown. If conductivity meter is used, please record levels in Contam_Notes.
Soil_Samp	V	Soils / tailings / waste rock sampled?	Yes/No/Unknown
Soil_Contam	V	Elevated contaminant levels in the soil?	Yes/No/Unknown
Contam_Notes	V	Notes on contamination	If contamination is suspected, please record notes / recommendations.
Hazard_Rating	I	Danger associated with hazards	5/4/3/2/1/0 (See Ranking System Guide, below) [Field required except for legacy data.]
Workings_Extensive	I	Are underground workings extensive (> 500' or multilevel)?	Yes = 1, No = 0 (This adds one point to the total ranking score for more complex fearures.) (See Ranking System Guide) [Field required except for legacy data.]
Access_Rating	I	Difficulty of access	5/4/3/2/1/0 (See Ranking System Guide) (Essential only for new entries) [Field required except for legacy data.]
Resource_Rating	I	Importance of resource	4/2/0 (See Ranking System Guide) (Essential only for new entries) [Field required except for legacy data.]
Impact_Rating	I	Severity of resource impacts	4/2/0 (See Ranking System Guide) (Essential only for new entries) [Field required except for legacy data.]
FEATURE MONITORING			
Monit_Date	D	Monitoring Date (MM/DD/YYYY)	Date of Observation. Database provides pop-up date-picker calendar.
Monit_Observation	V	Monitoring Observation	Notes for each date

Field Name	Field Type	Field Description	Comments
Essential Data			
Detail 1	**Note Recovery Act (ARRA) Reporting Fields, pp. 5-6.**		**SQL Server Data Types: V = varchar** (variable-length, character data); **I = int** (integer); **F = float** (floating point numeric data); **D = datetime** (date field)
Detail 2			

Hazard Rating ***(possible score: 0 to 5)***	
5	• Any coal mine • Vertical shafts, winzes, or underhand collapsed stopes > 6' • Irrespirable air • Instantaneous fatal injury could occur due to mine-related hazard
4	• Large unstable structures • Deep pools of water from which it would be difficult to climb out. • Potential fatal injury could occur • Major collapse zones
3	• Radiation potential • Large stopes overhead - seemingly stable • Highwalls > 10' drop-off not apparent from above • Serious injury could occur
2	• Highwalls > 10' - drop-off apparent from above • Rubble around but rock is generally stable • Moderate injury could occur
1	• Minimal injuries could occur like tripping, bumping head, cutting oneself • Highwalls < 10' in area where such drop-offs are common naturally • Minimal injury possible
0	• No inherent hazards; no injury potential above normal condition
Workings Extensive	If underground mine feature is extensive (i.e., known to have over 500' of workings or multiple levels), 1 point will be added to the total ranking score since complex mines tend to be more hazardous and better wildlife habitat.
Access Rating (likelihood of visitation - possible score: 0 to 5)	
5	Good road with mine as the specific destination; car accessible
4	Good dirt road, but mine is not specific destination
3	Dirt road or path without specific destination; no car access; easy hiking access < 1 mile
2	Near a road/path (within 1 mile); Easy hike > 5 miles or moderate hike < 5 miles
1	> 1 mile from road/path; Moderate hike > 5 miles or hard hike < 5 miles
0	Hard hike > 5 miles; site not easily seen
Resource Rating ***(possible score: 0, 2, or 4)***	
4	Endangered species present or site is listed on National or Local Historic Register
2	Species of concern present or site has significant cultural values
0	No species of concern present and site has minimal cultural value
Impacts Rating ***(possible score: 0, 2, or 4)***	
4	Highly elevated contaminants or greatly altered pH in water/soils; High visual impact
2	Moderately elevated contaminants or pH alteration in water/soils; Moderate visual impact
0	Minimal contaminants or pH alteration in water/soils; Minimal visual impact
TOTAL RANKING SCORE	Hazard_Rating + Workings Extensive + Access_Rating + Resource_Rating + Impact_Rating (Possible score = 0 to 19)

ATTACHMENT 4

USFS_CGS_HDR_Mine_Inventory_Areas_Final

Shapefile

Tags

There are no tags for this item.

Summary

The information in this digital dataset and the associated summary reports for each USFS Ranger District are useful for State and Federal agencies in prioritizing mine land reclamation and environmental remediation activities on a statewide basis. The data will also be helpful in developing realistic and cost-effective site reclamation plans on the local level.

Description

U.S. Forest Service Abandoned Mine Land Inventory Project - Colorado The Colorado Geological Survey completed an inventory of environmental degradation associated with abandoned and inactive mines on National Forest System lands in Colorado during the years 1991 through 1999. In the course of the inventory, areas with natural acid rock drainage were also noted. Approximately 18,000 abandoned mine-related features were inventoried. Water quality data, such as pH and conductivity were gathered at all features where water was present, such as draining adits, seepage at the toe of dumps and tailings, and standing water in shafts. Water samples were taken where field tests indicated low pH and/or high conductivity, including several areas with natural acid rock drainage. Samples were analyzed for dissolved and total metals, and for selected anions. All mine locations and data collected by the field geologists were entered on field forms and, subsequently, into a computer database and GIS format. With the information provided by the inventory, the Forest Service, in cooperation with other agencies, has been able to prioritize abandoned mines for reclamation. In most cases, cleanup is approached on a watershed basis. Mines in priority watersheds were selected for reclamation first. Watershed studies and mine cleanup are taking place or have been completed in the upper Animas River, Willow Creek (tributary to the upper Rio Grande), Chalk Creek (tributary to the upper Arkansas River), the upper Snake River, the Uncompahgre River, the Alamosa River, and additional Colorado watersheds. During the inventory, evidence of natural water quality degradation was found in areas where little or no evidence of mining activity exists. These areas include the upper Alamosa River, the Middle Fork of Mineral Creek, Peekaboo Gulch, Handcart Gulch, and elsewhere. Water from natural sources has been found to exceed Colorado water quality standards significantly for several metals in these areas and must be considered in reclamation decisions and remedial activities. Authorship & Personnel Principal Investigator: Matthew A. Sares Geographic Information System Coordinator: Randal C. Phillips John T. Neubert Robert H. Wood II Jonathan R. Lovekin Robert M. Kirkham Robert G. Benson Douglas A. Fehlmann Randall K. Streufert Clarence E. Ellis Jonathan L. White Andrew J. Flurkey Peter W. Nichols Christopher Lawson John P. Cann, IV Peter Stelling S. Donald Brown Peter A. Dodson Joseph Klein J.T. Harris Michael J. Satre William M. Sheriff GIS Administration: Jason Wilson, Nick Watterson, William James

Credits

There are no credits for this item.

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Extent

West -108.944433 **East** -102.397542
North 41.005961 **South** 36.996403

Scale Range

Maximum (zoomed in) 1:5,000
Minimum (zoomed out) 1:150,000,000

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