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Standard Practice for Minimum Geospatial Data for Representing Coal Mining Features¹

This standard is issued under the fixed designation D7780; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice defines a set of terms, procedures, and data required to define the accurate location and description of the minimum geospatial data for surface coal mining operations (CMO), underground coal mining extents, land reclamation and performance bond statuses, lands unsuitable for mining petitions (LUMP) and designated areas, coal spoil and refuse features, coal preparation plants, environmental resource monitoring locations (ERMLs), and postmining land uses.

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulator limitations prior to use.*

1.3.1 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the adequacy of a professional service, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

1.4 *Surface CMOs*—As used in this practice, a surface CMO represents an area where coal removal, reclamation, and related supporting activities have occurred, is occurring, is pending authorization or is authorized by the Regulatory Authority (RA) within a defined surface CMO or any other unpermitted area that has been identified by the RA.

¹ This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.01 on Surface and Subsurface Characterization.

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1.4.1 This practice addresses coal mining geospatial data, interim permits, and permanent program permits. Each RA shall be the authoritative data source (ADS) for coal mining geospatial data.

1.5 *Underground Coal Mining Extents*—This practice addresses underground coal mining extents that represent an area where coal removal has occurred within a defined underground CMO.

1.6 *Land Reclamation Status*—This practice addresses the land reclamation status of surface areas within a permitted CMO where coal removal, reclamation and related supporting activities has occurred, is occurring, or is planned and authorized by the RA.

1.7 *Performance Bond Status*—This practice shows the status of coal mine reclamation as outlined by each phase of reclamation. In addition to defining the status of individual areas covered by a performance bond, use of this standard will identify the changes of the reclamation and bond status to mined areas as they change over time. Reference to bond status means performance bond status.

NOTE 1—A single bond may cover multiple permits or multiple bonds may cover a single permit.

1.8 *Lands Unsuitable for Mining Petition*—This practice addresses boundary data pertaining to areas that have been petitioned and designated as unsuitable for mining. It also addresses those lands that have been found by the RA's process to be designated unsuitable for all or certain types of mining. These areas may be petitioned to be unsuitable for CMOs because they meet criterion that include, but are not limited to: fragile, historic, cultural, scientific, having esthetic values and natural systems such as aquifers that could be significantly damaged due to a CMO.

1.9 *Refuse Structures*—This practice addresses excess spoil and refuse features produced by CMOs. These features include excess spoil structures, coal refuse structures, and coal preparation plants.

1.9.1 *Excess Spoil Structures*—These structures are created when the total spoil produced during mining exceeds the volume of material that can be utilized for reclamation. This occurrence is common in steep slope areas, where the final grade of reclaimed slopes is limited by stability requirements.

It also occurs where overburden volume is significantly larger than the volume of minable coal. Spoil also exhibits a net increase in volume due to the introduction of void spaces in fragmented rock when overburden is removed to expose underlying coal seams. The production of excess spoil requires the creation of disposal structures that extend outside the mined area.

1.9.2 *Coal Preparation Plants*—Facilities where impurities are removed from coal and potentially crushed, resized, and blended with other grades of coal. Preparation plants produce refuse as a byproduct.

1.9.3 *Refuse*—A waste byproduct of coal processing, generally categorized as either coarse or fine. Fine coal refuse often is handled as a slurry containing a blend of water, fine coal, silt, sand, and clay particles.

1.9.4 *Impounding Refuse Structures*—These structures create a holding area for slurry that allows solids to settle out and water to be recovered. Cross-valley and diked impoundments utilize an embankment, often constructed of coarse coal refuse, which forms a basin for slurry retention, as shown in Fig. 1 and Fig. 2, respectively. Incised impoundments dispose of slurry in an excavated area below the natural surface and do not utilize a significant embankment for slurry retention, see Fig. 3.

1.9.5 *Non-Impounding Refuse Structures*—These structures may contain slurry that has been dewatered and stabilized prior to disposal. Non-impounding slurry cells are used to dispose of fine refuse. Methods that significantly reduce the water content of fine coal refuse may allow a refuse structure to avoid being classified as an impoundment.

1.10 *ERML*—This practice addresses locations where monitoring and sampling (such as water, air, soil sampling, and subsidence or air blasting monitoring) has occurred, is occurring, or is planned.

1.11 *Postmining Land Uses*—This practice describes data required to locate and identify postmining land uses for surface coal mining and reclamation operations. Postmining land use may include cropland, pasture/hayland, grazing land, forest, residential, fish and wildlife habitat, developed water resources, public utilities, industrial/commercial, and recreation.

1.12 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards*:²

D653 Terminology Relating to Soil, Rock, and Contained Fluids

2.2 *ANSI Standards*:³

ANSI INCITS 61-1986 (R2007) Geographic Point Locations for Information Interchange, Representation of (formerly ANSI X3.61-1986 (R1997))

ANSI INCITS 320-1998 (R2013) Information Technology—Spatial Data Transfer

2.3 *Federal Geographic Data Committee (FGDC) Standards*⁴

FGDC-STD-001 Content Standard for Digital Geospatial Metadata

Project 1574-D Information Technology—Geographic Information Framework Data Content Standard, Part 5 Governmental Unit and Other Geographic Area Boundaries

2.4 *Code of Federal Regulations*:⁵

30 CFR Part 700 et seq. 30 CFR Parts 800 et seq.

3. Terminology

3.1 Except as listed or noted below, all definitions are in accordance with Terminology **D653**.

NOTE 2—The terms defined here are based on the definitions included in United States 30 CFR Part 700 et seq., 30 CFR Part 800 et seq.

NOTE 3—Terminology and definitions for identifying geographical features and describing the data model have been adopted from the FGDC Spatial Data Transfer Standard (3) and the FGDC Framework Data Content Standard (FGDC Project 1574- D) Information Technology—Part 5 Governmental unit and other geographic area boundaries.

3.2 Definitions of Terms Specific to This Standard:

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Federal Geographic Data Committee, 590 National Center, Reston, VA 20192, www.fgdc.gov.

⁵ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

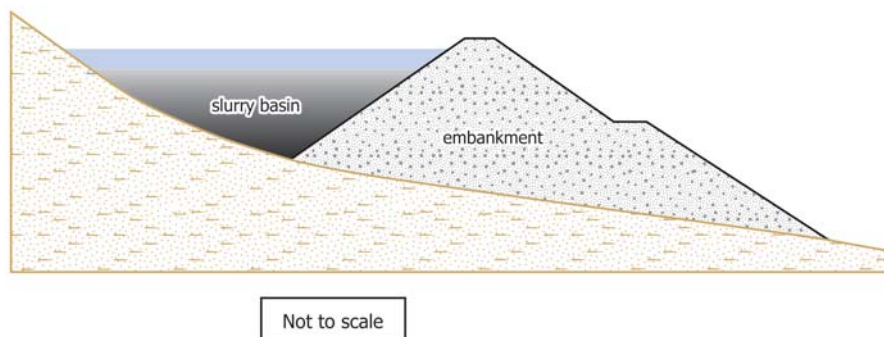


FIG. 1 Cross Sectional Depiction of a Cross-Valley Refuse Impounding Feature



Not to scale

FIG. 2 Cross Sectional Depiction of a Diked Refuse Impounding Feature



Not to scale

FIG. 3 Cross Sectional Depiction of an Incised Refuse Impounding Feature

3.2.1 *attribute, n*—a defined characteristic of a feature.

3.2.2 *attribute value, n*—a specific quality or quantity assigned to an attribute.

3.2.3 *basin, n*—for purposes of this standard, the area where slurry is deposited in an impoundment.

3.2.4 *bond forfeiture, n*—default of the performance bond resulting in revocation of the permit.

3.2.5 *bond release, n*—the process of releasing permit holder's performance bond following approval of having met reclamation requirements of affected lands.

3.2.6 *bonded area, n*—the land within the permit area upon which the operator has posted financial assurance to conduct surface coal mining and reclamation operations within the permit term. Bond is associated with the entire permit area or an increment of land within the permitted area.

3.2.7 *coal mining operation (CMO), n*—the extent of surface disturbance from surface and underground CMOs.

3.2.8 *coal preparation, n*—the chemical or physical processing and the cleaning, concentrating, or other processing or preparation of coal.

3.2.9 *coarse coal refuse, n*—a solid waste material separated from coal during processing, consisting primarily fragmented waste rock. Coarse coal refuse can vary widely in size, from silt to cobble, but is distinguished from fine coal refuse in that it is handled and disposed of as a dry solid, often in an embankment.

3.2.10 *cross-valley refuse impoundment, n*—a type of slurry impoundment formed by constructing an embankment across the downstream side of a catchment area, allowing slurry to be retained upstream of the embankment. See Fig. 1.

3.2.11 *diked refuse impoundment, n*—a type of impoundment in which slurry is retained by constructing an enclosed embankment. On flat terrain, the embankment may encircle the slurry basin completely. See Fig. 2.

3.2.12 *disturbed, n*—an area where vegetation, topsoil, or overburden is removed or upon which topsoil, spoil, coal processing waste, underground development waste, or non-coal waste is placed by CMO's. Those areas are classified as disturbed until reclamation is complete.

3.2.13 *domain, n*—a range of permissible values for a specified attribute.

3.2.14 *durable rock fill, n*—a type of valley fill, containing excess overburden spoil that consists of at least 80 percent durable rock on a unit volume basis, or rock that can pass certain strength and weathering tests, such as a slake durability test.

3.2.15 *embankment, n*—man-made deposits of earth or coarse coal refuse that is raised above the natural surface of the land. For the purposes of this standard, embankments are a component of an impoundment used to retain slurry.

3.2.16 *ERML point, n*—a geometric point that specifies the locations of environmental resources associated with permitted CMO's, as indicated on the latest map approved by the RA.

3.2.17 *excess spoil, n*—spoil material disposed of in a location outside of the mined-out area, excluding spoil material used to achieve the approximate original contour or to blend the mined-out area with the surrounding terrain.

3.2.18 *feature, n*—a geographical representation of either a discrete real-world phenomenon, such as a building, or an abstract concept, such as a governmental boundary.

3.2.19 *feature class, n*—a collection of similar features having the same geometry type, coordinate system, and a common set of descriptive attributes.

3.2.20 *fine coal refuse, n*—waste material that is hydraulically separated from coal during processing. Particle size varies from clay or very fine silt to fine sands. Solids are suspended in a water solution, or slurry, and usually transported through a pipeline.

3.2.21 *head-of-hollow fill, n*—a type of valley fill, in which the top surface of the fill, when completed is at or blends into the adjacent ridge line, and no significant area of natural drainage occurs above the fill draining into the fill area.

3.2.22 *hydrologic balance, n*—the relationship between the quality and quantity of water inflow to and water outflow from a hydrologic unit including water stored in the unit. It encompasses the dynamic relationships between precipitation, runoff, evaporation, and changes in ground and surface water availability.

3.2.23 *impoundment, n*—a structure created for the retention of water, slurry, refuse, or sediment.

3.2.24 *incised refuse impoundment, n*—an impoundment formed by excavation below the original surface elevation, see Fig. 3.

3.2.25 *incremental bond area, n*—a portion of a permitted area which allows each independent area and its posted performance bond to be released according to its reclamation schedule.

3.2.26 *mine boundary, n*—the perimeter defining the land area upon which surface CMOs have occurred. Some RAs refer to these lands as affected lands. Mine boundaries may include surface CMOs that existed in the early 1900s before any formal permitting or regulatory process had been developed and there was no permit or permittee.

3.2.27 *mine discharge, n*—discharge of water emanating from or hydrologically connected to a mined area or an area of mining-related activities, which may remain after activities have been completed or abandoned. These discharges have the potential to pollute groundwater or surface water or both, with a detrimental impact upon the environment or public safety.

3.2.28 *National Mine Map Repository, n*—the central database location for the collection, archival, maintenance, and retention of abandoned (coal and non-coal) mine map images and information.

3.2.29 *National Pollutant Discharge Elimination System (NPDES), n*—a permit program that controls water pollution by regulating point sources that could potentially discharge pollutants into waters of the United States.

3.2.30 *overburden, n*—consolidated or unconsolidated material of any nature which overlies a coal deposit, excluding topsoil.

3.2.31 *Office of Surface Mining (OSM), n*—the national agency with responsibility for regulation of CMO's and reclamation of abandoned mine land.

3.2.32 *permit, n*—written authorization to conduct surface coal mining and reclamation operations issued by an RA to a permittee.

3.2.33 *permit area, n*—the area of land described by a legal description, metes and bounds, or indicated on the latest map approved by the RA, upon which the permittee has approval to conduct surface coal mining and reclamation operations.

3.2.34 *permit boundary, n*—the perimeter of the land on which the permittee may conduct surface coal mining and reclamation operations described by a legal description, metes and bounds, or indicated on the latest map approved by the RA.

3.2.35 *point, n*—a one-dimensional geometric object that specifies a geographic location.

3.2.36 *polygon, n*—a two-dimensional closed geometric shape that specifies the boundaries of a geographic area.

3.2.37 *preparation plant, n*—a facility where coal is subjected to chemical or physical processing, cleaning, concentrating, or other preparation. It includes facilities associated with coal preparation activities, including, but not limited to: loading facilities; storage and stockpile facilities; sheds; shops and other buildings; water-treatment and water-storage facilities.

3.2.38 *reclamation, n*—those actions taken to reestablish and return mined land to an approved land use from the effects of mining and mining-related disturbances.

3.2.39 *regulatory authority, n*—entity(s) with exclusive jurisdiction over the regulation of coal or non-coal mining, or both, and reclamation operations or mitigation, or both, of AML problems.

3.2.40 *side-hill fill, n*—a controlled earth and rock fill located on the side of an existing hill that is designed as a stable, permanent structure for excess spoil.

3.2.41 *slurry, n*—a waste product generated from processing coal, consisting of a mixture of water and fine particulate waste which is most commonly disposed of in an impoundment.

3.2.42 *slurry cell, n*—a disposal method in which coal slurry refuse is placed in dug-out isolated troughs. The slurry material is covered with coarse refuse encapsulating the cell.

3.2.43 *spoil, n*—overburden that has been removed during a CMO.

3.2.44 *valley fill, n*—an excess spoil structure where side slopes of the existing valley, measured at the steepest point, are greater than 20 degrees, or where the average slope of the profile of the valley from the toe of the fill to the top of the fill is greater than 10 degrees, see Fig. 4.

3.3 Acronyms:

3.3.1 *ADS*—Authoritative Data Source

3.3.2 *AMD*—Acid Mine Drainage

3.3.3 *CAD*—Computer Aided Design

3.3.4 *CMO*—Coal Mining Operation

3.3.5 *ERML*—Environmental Resource Monitoring Location

3.3.6 *GIS*—Geographic Information System

3.3.7 *LUMP*—Lands Unsuitable for Mining Petition (also known as “petition”)

3.3.8 *NMMR*—National Mine Map Repository



FIG. 4 Planimetric View of a Reclaimed Excess Spoil Valley Fill

3.3.9 *NPDES*—National Pollutant Discharge Elimination System

3.3.10 *OSM*—Office of Surface Mining

3.3.11 *RA*—Regulatory Authority

3.3.12 *TOJ*—Termination of Jurisdiction

4. Significance and Use

4.1 This practice addresses coal mining geospatial data in general and is significant to the coal mining community because it provides uniformity of geospatial data pertaining to coal mining features.

4.2 Some RA data for coal mining feature attributes may not have values. Those RAs may not collect those attributes as part of their regulatory program or those attributes may not be applicable within their area of responsibility. As a result, a national dataset of coal mining features may appear to be incomplete for those RAs.

4.3 Within its area of exclusive jurisdiction, each RA is the ADS for the coal mining geospatial data that it creates and uses to regulate mining activity.

4.4 *Limitations of Use*—Uses of a national dataset are limited by several factors affecting the completeness, currency, and accuracy, of various data sources.

4.4.1 *Completeness*—Participation in the compilation of spatial data may not be uniform across RAs, which may affect completeness, both in terms of spatial data, and associated attributes. For some RAs, this standard may not be applicable because features described herein do not occur within their area of responsibility.

4.4.2 *Currency*—Source data is subject to change as a result of regulatory actions that may change the geographical location, extent, or attributes of particular features which may not be reflected in the national dataset. If detailed information

is needed for individual features, the appropriate RA should be contacted for additional information.

4.4.3 Data compiled in accordance with this standard is not intended to be used as a primary source for evaluating risk or safety.

4.4.4 Data compiled in accordance with this standard is intended for informative purposes; it is not authoritative.

5. Procedure

5.1 *Introduction*—The individual location and attribute characteristics listed in this section represent the data necessary to develop and maintain these geospatial datasets. Geospatial data and descriptions may be obtained from state, tribal, and federal RAs. The use of this standard's data will help ensure uniformity of the geospatial data developed and maintained by RAs.

5.2 *Coordinates and Related Data*—Coordinates and related geospatial data allow features to be accurately positioned on the earth's surface in a variety of recognized datums, grid systems, and geographic projections. The data is generally compiled from various sources that may utilize different known datum, coordinate, and projection systems. All submitted data will have known datum, coordinate, and projection systems which will be described in the metadata statement. ANSI INCITS 61-1986 (R2007) contains additional guidance on representation of coordinates.

5.3 *ADS Responsibilities*—Subject to the applicability and capability of the ADS. Each ADS will provide relevant data for its area of responsibility, compiled in accordance with this standard, to OSM for compilation in a national dataset.

5.4 A designee within OSM will serve as the data steward for the national geospatial dataset that complies with this standard. This designee will coordinate with individual RA's

for submission of data that adheres to this standard. OSM will compile a national dataset and map service.

5.5 Source Data—Information for each feature class will be compiled by each ADS from the best available source. Digital data in CAD or GIS format should be used if available.

5.5.1 Data Format—Data should be provided in a commonly recognized format, such as shapefile, coverage, geodatabase, or XML recordset.

5.5.2 Coordinate System—The coordinate system and datum used will be identified by the ADS. This information will be sufficient for OSM to reproject the dataset to a common coordinate system.

5.5.3 Metadata—Metadata documentation must be in accordance with published standard (for example, the United States, FGDC-STD-001).

5.5.4 Update Frequency—Subject to the applicability and capability of the ADS. Each ADS will provide updated versions of their dataset periodically, so that changes can be propagated to the national dataset.

5.5.5 Feature Classes—Features relevant to this standard are organized into multiple feature classes. Each feature class is defined by describing what features are to be included, how the features are represented geographically, and what descriptive attributes are associated with each feature.

5.6 Common Descriptive Attributes—Defined characteristics associated with a feature class. Common attributes include:

5.6.1 Calculated Area—The area of a feature as calculated from a polygon (acres).

5.6.2 Coal Bed Name(s)—The geologic name of the coal seam extracted as reported in the permit document, determined by the RA, or identified as unknown/undetermined.

5.6.3 Comment—Any additional comments as reported by the RA.

5.6.4 Company—The name of the coal company that operated the underground mine.

5.6.5 Contact—The name of the RA responsible for overseeing the permitted and non-permitted mining operation(s) and for creating or maintaining the CMO geospatial data.

5.6.6 Date of Map—The date of the source document used to generate the underground coal mining extent data. The source document may not represent the actual “final” extent of mining.

5.6.7 Edit Date—Represents the last date the record was updated or changed for a coal mining feature or attribute, or both, as recorded by the ADS.

5.6.8 Mine Name—The legal name for a CMO.

5.6.9 Mine ID—The unique identifier for a CMO, which is usually a number or an alphanumeric combination.

5.6.10 National ID—A unique identifier created by combining a location code and the Permit ID assigned by the RA; this unique identifier helps in organization, retrieval, and analysis of individual state or tribal data combined into the nationwide data set.

5.6.11 Permit Application Date—The date of the original application or an application to revise the permit that brings about a change to the geospatial feature.

5.6.12 Permit Application Approval Date—The date the permit application was approved by the RA that could result in creation or change to a geospatial feature.

5.6.13 Permit Application Types—Permit types as defined in [Table 4](#).

5.6.14 Permit ID—The unique identifier assigned by the RA which issues a coal mining and reclamation permit; the identifier is usually a number or alphanumeric combination.

5.6.15 Permit Status—The status of the coal mining and reclamation permit operations, as defined by the RA.

5.6.16 Permittee—The entity to whom a permit has been issued by the RA to conduct surface coal mining and reclamation operations.

5.6.17 Reported Area—The area of a feature as reported to the RA (acres).

5.6.18 Local Mine ID—The unique identifier assigned by the RA which issues a coal mining and reclamation mine ID; the identifier is usually a number or alphanumeric combination.

5.7 Coal Mining Operations (CMO)—This dataset defines the extent of surface disturbance from surface and underground CMOs.

5.7.1 CMOs Feature Class—This feature class contains polygons depicting boundaries of surface CMOs and surface disturbance due to underground CMOs.

5.7.2 The list of CMOs attributes represent the data necessary to develop and maintain a nationwide geospatial data set depicting surface coal mining boundary locations.

5.7.3 Origin of CMOs Geometry—The feature geometry must originate from the most accurate data available to the ADS. If a permit has been issued, the most recently approved map in the permit application issued by the RA should be used. Otherwise, the best available map available to the ADS should be used regardless of whether or not a permit had been issued.

5.7.4 Geographical Representation—CMOs features will be represented using a polygon.

5.7.5 CMOs Attributes—Individual attributes contain information about a particular polygon. Each attribute associated with a polygon contributes to the unique identity of the site and helps in analysis and retrieval of additional information. The feature attributes specific to the CMOs feature layer are defined below. See [Table 1](#) for attributes.

5.7.5.1 Coal Mine Operation Status—The status of coal mining and reclamation operations, as defined by the RA.

5.7.5.2 Inspectable Unit—An Inspectable Unit is defined by the regulatory authority and may include multiple small and neighboring Initial Program Sites or Permanent Program Permits that have been grouped together as one Inspectable Unit for inspection efficiency. An Inspectable Unit also may be one of multiple inspectable units for one Permanent Program Permit that was divided into multiple inspectable units to allow full coverage of complete inspections of the site.

5.7.5.3 Surface Mining Method(s)—Method of coal mine operations/activities/mine types within the surface coal mining boundary.

5.8 Underground Coal Mining Extents—This dataset defines the extent of an underground mining operation.

TABLE 1 Surface CMOs Attributes^A

Attribute Name	Definition	Example	Data Type	Preferred Domain	Clarification
Permittee	See 5.6.16	ACME Coal Mining Co., Inc.	Text		The ADS should consider naming conventions for this attribute
Company	See 5.6.4	XYZ Coal Co.	Text		
Coal Mine Operation Status	See 5.7.5.1	Active	Text	See Table 2 for domains and definitions	Status of mining operations
Mine Name	See 5.6.8	Peterson Mine No. 1	Text		
Permit ID	See 5.6.14	1201834	Text		
Mine ID	See 5.6.9	39-39022	Text		
Local Mine ID	See 5.6.18	WA001	Text		Identification number issued by RA
National ID	See 5.6.10	VA2020010	Text		
Coal Bed Name(s)	See 5.6.2	Appleton No. 2	Text		Local/regional name or state geological survey stratigraphic name
Date of Map	See 5.6.6	3/11/1977	Date		The source document used to show the actual "final" extent of mining
Inspectable Unit Status	See 5.7.5.2	Active	Text	See Table 3 for domains and definitions	Use terms as defined by the approved RA
Calculated Area	See 5.6.1	23200	Numeric		For comparison with reported value
Reported Area	See 5.6.17	23300	Numeric		For comparison with calculated value
Permit Application Types	See 5.6.13	IBR	Text	See Table 4 for domains and definitions	
Permit Application Date	See 5.6.11	01/30/2009	Date		
Permit Application Approval Date	See 5.6.12	01/30/2010	Date		
Edit Date	See 5.6.7	01/30/2011	Date		Last update of data
Surface Mining Method(s)	See 5.7.5.3	Area mine	Text	See Table 5 for domains and definitions	Type of surface mining method(s)
Comment	See 5.6.3	Virginia Department of Mines, Minerals, and Energy	Text		
Contact	See 5.6.5		Text		

^AThis data is also associated with the bonded areas for underground coal mine operations.

TABLE 2 Preferred Domain Definitions for CMO Status and Permit Status

Domain Value	Definition
Active	Mine site has ongoing coal production and/or reclamation activities.
Inactive	Mine site has no coal extraction or reclamation activity taking place.
Abandoned	All surface coal mining activities have ceased and operator has left the site without completing reclamation.
Revoked	Surface mine permit that has been repealed, rescinded, cancelled, or annulled by the RA.
Initial (Interim) Program	Interim surface mine permit has been issued by the RA.
Released	The permittee has met all reclamation requirements for final bond release.

TABLE 3 Preferred Domain Definitions for Inspectable Unit

Domain Value	Definition
Active	Mine site has ongoing coal production and/or reclamation activities.
Inactive	Mine site has no coal extraction or reclamation activity taking place.
Abandoned	All surface and underground coal mining activities have ceased and operator has left the site without completing reclamation.
Unpermitted or Illegal	Coal mining activity is occurring without a permit.

TABLE 4 Preferred Domain Definitions for CMO Permit Application Types

Domain Value	Definition
Pending Application	Surface mine permit application that has been submitted, but not approved by the RA.
Permit Revision	A revision that is a significant departure from the existing permit which may result in a significant impact in the health, safety, and welfare of the public, the hydrologic balance in the area of the operation and in the postmining land use.
Incremental Boundary Revision (IBR)	A revision limited to minor shifts or extensions of the permit boundary into non-coal area(s) where any coal extraction is incidental. IBR's also includes the addition or deletion of bonded permit acreage.

TABLE 5 Preferred Domain Definitions for Surface Mining Method(s)

Domain Value	Definition
Area Mine	A surface mining method that is carried out on level to gently rolling topography or relatively large tracts of land.
Contour	A mining method commonly used in eastern mountainous topography where coal is removed in a narrow strip around the hillside.
Mountaintop	A mining operation that removes an entire coal seam or seam(s) in an upper fraction of a mountain, ridge, or hill and creating a level plateau or a gently rolling contour with no highwalls.
Steep Slope	Coal mining and reclamation operations on natural slopes that exceed 20 degrees that are subject to performance standards.
Highwall	Highwall mining systems capable of mining parallel underground entries from the surface to predetermined depths to maximize mineral recovery and limit personnel exposure to underground hazards.
Auger	Method of recovering coal by boring into the coal seam exposed by excavation.

5.8.1 *Underground Coal Mining Extents Feature Class*—This feature class contains polygons depicting the locations of underground coal mining extents.

5.8.2 The list of Underground Coal Mining Extents attributes represent the data necessary to develop and maintain a nationwide geospatial data set depicting underground coal mining extents.

5.8.3 The dataset is subject to change as a result of regulatory actions that may change the boundary area or feature attribute data. If detailed underground coal mining extents information is needed, the appropriate RA should be contacted for additional information.

5.8.4 *Origin of Underground Coal Mining Extents Geometry*—The feature geometry must originate from the best data available to the RA. For contemporary underground coal mining extents, feature geometry and attributes will be captured using the most recently approved map submitted to the RA. For older underground mining extents, feature geometry and attributes will be captured using the best available map resources.

5.8.5 *Geographical Representation*—Underground Coal Mining Extents features will be represented using a polygon.

5.8.6 *Underground Coal Mining Extents Attributes*—Attributes contain information about a particular polygon. Each attribute associated with a polygon contributes to the unique identity of the site and helps in analysis and retrieval of

additional information. The feature attributes specific to the Underground Coal Mining Extents feature layer are defined below. See Table 2 for attributes.

5.8.6.1 *Mine Status*—The regulatory status of the underground mining operation, as reported by the RA.

5.8.6.2 *National Mine Map Repository ID*—The unique identifier assigned by the NMMR when a map is added to the repository collection. The identifier is usually an alphanumeric combination.

5.8.6.3 *Underground Mining Method(s)*—The type of mining operation, as reported in the permit document, that is, longwall, room and pillar, breast and pillar, highwall, and auger.

5.9 *Performance Bond and Land Reclamation Status*—This dataset defines the status of an area where coal removal, reclamation and related supporting activities has occurred, is occurring, or is planned within a CMO.

5.9.1 *Performance Bond and Land Reclamation Status Feature Class*—This feature class contains polygons depicting performance bond and land reclamation statuses for CMO's.

5.9.2 The list of coal mining Performance Bond and Land Reclamation Status attributes represent the data necessary to develop and maintain a nationwide geospatial data set depicting the performance bond and land reclamation status of individual areas within each CMO.

TABLE 6 Underground Coal Mining Extents Attributes^A

Attribute Name	Definition	Example	Data Type	Preferred Domain	Clarification
Permittee	See 5.6.16	AC/ME Coal Mining Co., Inc.	Text		The ADS should consider naming conventions for this attribute
Company	See 5.6.4	XYZ Coal Co.	Text		
Mine Name	See 5.6.8	Peterson Mine No. 1	Text		
Permit ID	See 5.6.14	2939829	Text		
Mine ID	See 5.6.9	39-39022	Text		
Local Mine ID	See 5.6.18	WA001	Text		Alternate mine identification number Unique OSM identifier
National ID	See 5.6.10	WV1201834	Text		
National Mine Map Repository ID	See 5.8.6.2	700000A	Alphanumeric		
Coal Bed Name(s)	See 5.6.2	Appleton No. 2	Text		Local/regional name or state geological survey stratigraphic name The source document used to show the actual "final" extent of mining As defined by the approved RA
Date of Map	See 5.6.6	3/11/1977	Date		
Mine Status	See 5.8.6.1	Active	Text	See Table 7 for domains and definitions See Table 8 for domains and definitions	
Underground Mining Method(s)	See 5.8.6.3	Longwall	Text		
Calculated Area	See 5.6.1	23400	Numeric		For comparison with reported value For comparison with calculated value
Reported Area	See 5.6.17	23600	Numeric		
Permit Application Types	See 5.6.13	IBR	Text	See Table 4 for domains and definitions	
Permit Application Date	See 5.6.11	01/30/2009	Date		
Permit Application Approval Date	See 5.6.12	01/30/2009	Date		
Edit Date	See 5.6.7	01/30/2007	Date		
Comment	See 5.6.3	Multi seam, combined surface and underground operation, highwall	Text		To determine last update of data
Contact	See 5.6.5	West Virginia Department of Environmental Protection	Text		

^AThis data is also associated with the bonded areas for underground coal mine operations.

TABLE 7 Preferred Domain Definitions for Underground Mine Status

Domain Value	Definition
Active	Mine site has ongoing coal production and/or reclamation activities.
Inactive	Mine site has no coal extraction or reclamation activity taking place.
Abandoned	All surface and underground coal mining activities have ceased and operator has left the site without completing reclamation.
Temporary Cessation	RA has granted cessation of mining.

TABLE 8 Preferred Domain Definitions for Underground Mining Method(s)

Domain Value	Definition
Long wall	A method of working a coal seam in a single operation by means of a long working face in a continuous line, generally several hundred feet in width. The resultant space from which the coal has been removed is allowed to collapse (caving) behind the mining face.
Room & Pillar	System of mining in which typically flat-lying beds of coal are mined in room-type openings, separated by pillars of undisturbed coal left for roof support.
Breast and Pillar	A system of working anthracite coal using passages with narrow pillars between them, connected at specific intervals.
Highwall	Highwall mining systems capable of mining parallel underground entries from the surface to predetermined depths to maximize mineral recovery and limit personnel exposure to underground hazards.
Auger	Method of recovering coal by boring into the coal seam exposed by excavation.

5.9.3 *Origin of Coal Mining Performance Bond and Land Reclamation Status Geometry*—The feature geometry and attributes must originate from the most accurate data available to the RA, using the most recently approved permit application map.

5.9.4 *Geographical Representation*—Performance Bond and Land Reclamation Status features will be represented using a polygon.

5.9.5 *Permitted Coal Mining Performance Bond and Land Reclamation Status Attributes*—Attributes contain information about a particular polygon. Each attribute associated with a polygon contributes to the unique identity of the site and helps in analysis and retrieval of additional information. The feature attributes specific to the Performance Bond and Land Reclamation Status feature layer are defined below. See [Table 9](#) and [Table 11](#) for attributes.

5.9.5.1 *Bond Amount*—Amount of posted bond attached to a specific permit or incremental bond area within the permit area.

5.9.5.2 *Increment Area ID*—An identifier that helps in organization, retrieval, and analysis of individual state or tribal data associated with the area, based on increment identification(s) issued by the RA.

5.9.5.3 *Land Reclamation Status*—Designates the current state of reclamation on individual areas within permitted coal mining and reclamation operations represented by disturbed, backfilled/regraded, revegetated, topsoiled, TOJ, and not disturbed.

5.9.5.4 *Reclamation Bond Status*—Designated by the RA for individual areas within permitted coal mining and reclamation operations. The bond statuses may be represented by bonded, not bonded, Phase I Release, Phase II Release, or Phase III Release, Forfeited or TOJ.

5.9.5.5 *Reclamation Bond Status Date*—Date of approval by the RA.

5.9.5.6 *Release Eligibility*—Designates the phase of bond release for which an individual area within a permitted coal mining and reclamation operation boundary is eligible and may represent Phase I, Phase II, and Phase III or Not Applicable (NA) if on interim lands.

5.10 *Lands Unsuitable for Mining Petition Area (LUMP)*—This dataset defines an area(s) that has been petitioned to be designated as unsuitable for mining.

5.10.1 *LUMP Area Feature Class*—This feature class contains polygons that depict areas that have been petitioned to be designated as unsuitable for CMO's.

5.10.2 The list of LUMP Area attributes represent the data necessary to develop and maintain a nationwide geospatial data set depicting these area types.

5.10.3 *Origin of LUMP Area Geometry*—The feature geometry and attributes must originate from the most accurate data available to the RA.

5.10.4 *Geographical Representation*—LUMP Area features will be represented using a polygon.

5.10.5 *LUMP Area Attributes*—Attributes contain information about a particular polygon. Each attribute associated with a polygon contributes to the unique identity of the site to help in analysis and retrieval of additional information. The feature attributes specific to the LUMP Area feature layer are defined below. See [Table 14](#) for attributes.

5.10.5.1 *LUMP Basis*—The rationale for the petition or LUMP.

5.10.5.2 *LUMP Date*—Date petition received for review by the RA.

5.10.5.3 *LUMP Designation Date*—Designation date of petition decision assigned by RA.

5.10.5.4 *LUMP Name*—Name given to petition by RA.

5.10.5.5 *LUMP Status*—The status of the decision regarding petition area.

5.11 *Lands Unsuitable for Mining Designated Areas*—This dataset defines an area(s) that is designated as unsuitable for mining.

5.11.1 *Lands Unsuitable for Mining Designated Areas Feature Class*—This feature class contains polygons that depict areas that are designated lands unsuitable for mining.

5.11.2 The list of Lands Unsuitable for Mining Designated Areas attributes represent the data necessary to develop and maintain a nationwide geospatial data set depicting these area types.

TABLE 9 Bond Status Attributes

Attribute Name	Definition	Example	Data Type	Preferred Domain	Clarification
Permittee	See 5.6.16	ACME Coal Mining, Inc.	Text		The ADS should consider naming conventions for this attribute
Company	See 5.6.4	XYZ Coal Co.	Text		
Permit ID	See 5.6.14	1201834	Text		
National ID	See 5.6.10	VA1201834	Text		
Increment Area ID	See 5.9.5.2	Increment 3	Text		Area, Increment ID, or permit ID(s) associated with a bond
Reclamation Bond Status	See 5.9.5.4	Phase II Release	Text	See Table 10 for domains and definitions	Status of reclamation according to phase
Reclamation Bond Status Date	See 5.9.5.5	10/01/2000	Date		
Bond Amount	See 5.9.5.1	4200000	Numeric		For comparison with reported value
Calculated Area	See 5.6.1	1402	Numeric		For comparison with calculated value
Reported Area	See 5.6.17	1400	Numeric		
Permit Application Date	See 5.6.11	01/30/2009	Date		
Permit Application Approval Date	See 5.6.12	01/30/2009	Date		
Edit Date	See 5.6.7	01/30/2007	Date		
Comment	See 5.6.3		Text		
Contact	See 5.6.5	West Virginia Department of Environmental Protection	Text		Last update of data