



Designation: D7443 – 09

Standard Practice for Minimum Geospatial Data for Underground Coal Mining Extents¹

This standard is issued under the fixed designation D7443; 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 covers the minimum elements for the accurate location and description of data for defining underground coal mining extents.

1.1.1 This practice addresses coal mining geospatial data relative to the Surface Mining Control and Reclamation Act of 1977 (SMCRA).² This geospatial data shall be obtained from each state, tribal, or federal (or combinations thereof) coal mining regulatory authority (RA) authorized under SMCRA to regulate the surface effects of underground coal mining operations (UCMO).

1.1.2 As used in this practice, underground coal mining extents represent an area where coal removal has occurred within a defined UCMO.

1.2 This practice applies to pre-SMCRA and post-SMCRA underground coal mining extents.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *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 regulatory limitations prior to use.*

1.5 *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 standard of care by which the adequacy of a given professional service must be judged, 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 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.

Current edition approved July 1, 2009. Published August 2009. Originally approved in 2008. Last previous edition approved in 2008 as D7443 – 08. DOI: 10.1520/D7443-09.

² Public Law 95-87, the Surface Mining Control and Reclamation Act of 1977 (SMCRA), passed August 3, 1977, as amended.

2. Referenced Documents

2.1 ASTM Standards:³

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D5254 Practice for Minimum Set of Data Elements to Identify a Ground-Water Site

D5911 Practice for Minimum Set of Data Elements to Identify a Soil Sampling Site

D7384 Practice for Minimum Geospatial Data for a Surface Coal Mining Permit Boundary

2.2 ANSI Standards:⁴

ANSI INCITS 61-1986 (R2002) Geographic Point Locations for Information Interchange, Representation of (formerly ANSI X3.61-1986 (R1997))

ANSI INCITS 320-1998 (R2003) Information technology—Spatial Data Transfer

2.3 Federal Geographic Data Committee Standards:⁵

FGDC-STD-001 Content Standard for Digital Geospatial Metadata

Project 1574–D Information Technology—Part 5 Governmental unit and other geographic area boundaries

2.4 Code of Federal Regulations:⁶

30 CFR Part 700 et seq.

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:* (the terms defined here are consistent with those defined in 30 CFR Part 700 et seq. though not verbatim.)

3.2.1 *active UCMO*—a UCMO that has ongoing underground coal production, reclamation activities, or both.

³ 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.

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

⁵ Available from Federal Geographic Data Committee, 590 National Center, Reston, VA 20192, http://www.fgdc.gov.

⁶ 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.

*A Summary of Changes section appears at the end of this standard.



3.2.2 *attribute*—a defined characteristic of a feature type (an attribute example would be mine status active).

3.2.3 *attribute value*—a specific quality or quantity assigned to an attribute for a specific feature instance.

3.2.4 *contact*—jurisdictional regulatory authority responsible for issuance and compliance of a coal-mining permit.

3.2.5 *data status*—date when state and tribal data, or feature, was edited in national UCMO permit data set.

3.2.6 *domain*—a finite list (or range) of permissible values for a specified attribute. Included are tables of: units of measure, types, styles, status, names, methods, materials, dispositions, sources, dimensions, data, classes, etc. (for example, active, inactive, NA).

3.2.7 *feature class*—a logical group of related feature types (for example, grouping of water system components feature types such as water hydrant, water line, water pump, water reservoir, water tank, etc. into a water system feature class).

3.2.8 *feature instance*—real-world spatial phenomenon about data that is collected, maintained, and disseminated. Feature instances are the geospatial objects that are graphically delineated in a spatial database.

3.2.9 *feature type*—definition and description of a set (class of real world phenomena) into which similar feature instances are classified (for example, water reservoir).

3.2.10 *g-ring*—a ring created from strings, arcs, or both.

3.2.11 *g-polygon*—an area consisting of an interior area, one outer g-ring and zero or more non-intersecting, non-nested inner g-rings. No ring, inner or outer, must be collinear or intersect any other ring of the same g-polygon.

3.2.12 *inactive UCMO*—a UCMO that has no coal extraction or reclamation activity taking place.

3.2.13 *national ID*—permit ID assigned to UCMO by RA, prefixed with state or tribal abbreviation.

3.2.14 *National Mine Map Repository*—the National Mine Map Repository (NMMR), is part of the United States Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE). It is the central location where OSMRE collects, archives and maintains over 134 000 abandoned (coal and non-coal) mine map images and information on microfilm and in their database for the United States. This information is available to the public.

NOTE 1—Images are archived on microfilm or in electronic format at the repository, but the actual maps are returned to their owners.

3.2.15 *line segment*—a direct line between two points.

3.2.16 *permit*—written authorization to conduct coal mining and reclamation operations issued by a RA to a permittee.

3.2.17 *permit area*—the area of land, indicated on the latest map approved by the RA, upon which the permittee may conduct coal mining and reclamation operations.

3.2.18 *permit boundary*—the border of potential coal mining operations indicated on the latest map approved by the RA.

3.2.19 *permit ID*—unique identifier assigned by the RA for administrative purposes.

3.2.20 *permit status*—to distinguish between active and inactive UCMO.

3.2.21 *permittee*—an entity to whom a permit has been issued by a RA to conduct underground coal mining and reclamation operations.

3.2.22 *point*—a zero-dimensional geometric object that specifies geographic location.

3.2.23 *polygon*—a two-dimensional closed geometric shape that specifies a geographic area.

3.2.24 *reclamation*—actions taken to restore mined land to the post-mining land use approved by the RA.

3.2.25 *regulatory authority*—entity with exclusive jurisdiction over the regulation of coal mining and reclamation operations under a program approved by the Secretary of the U.S. Department of the Interior.

3.2.26 *underground coal mining extents*—underground mining areas where coal extraction has occurred; the perimeter of mine workings or coal extraction areas in an UCMO.

3.3 *Acronyms:*

3.3.1 *CFR*—Code of Federal Regulations

3.3.2 *FGDC*—Federal Geodetic Data Committee

3.3.3 *GIS*—Geographic information system

3.3.4 *NAD*—North American Datum

3.3.5 *MSHA*—Mine Safety and Health Administration

3.3.6 *NMDS*—National Map Data Steward (OSMRE designated liaison with the RA)

3.3.7 *NMMR*—National Mine Map Repository

3.3.8 *OSMRE*—Office of Surface Mining Reclamation and Enforcement, U.S. Department of the Interior

3.3.9 *RA*—Regulatory Authority

3.3.10 *SI*—International system of units

3.3.11 *SMRCA*—Surface Mining Control and Reclamation Act of 1977, as amended

3.3.12 *UCMO*—Underground Coal Mining Operations(s)

4. Significance and Use

4.1 This practice addresses underground coal mining extent geospatial data relative to the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and **30 CFR Part 700 et seq.** This practice is significant to the coal mining community because it provides for uniformity of geospatial data pertaining to underground coal mine extents for mines located throughout the United States. These standards will help ensure uniformity of data contributed by each RA and assist organizations in future efforts to create and utilize geospatial data relative to underground coal mining extents in the United States. The first standard developed is Practice **D7384**, Practice for Minimum Geospatial Data for a Coal Surface Mining Permit Boundary.

4.2 Underground mine geospatial data shall be obtained from State and Federal regulatory authorities for underground mining extents. The coal mining community encompasses all entities directly and indirectly affected by coal mining activities, including industry, environmental groups and the government at all levels within the United States. Use of this standard will help create consistent maps and increase awareness of underground mining extents throughout the United States. This standard creates well organized and easily accessible underground coal mining extents data, and it will lead to better communication between the RAs and federal offices, the public, industry and environmental groups.

4.3 As used in this practice, the geospatial data represents an area where coal removal occurred within a defined UCMO. An underground mine extent is defined as a polygon or polygons. A lack of data from any RA will create a gap in the national