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## Standard Practice for Minimum Geospatial Data for Abandoned Mine Land Keyword Feature<sup>1</sup>

This standard is issued under the fixed designation D7610/D7610M; 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 ( $\epsilon$ ) 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 geospatial data for defining an abandoned mine land (AML) keyword feature.

1.1.1 This practice addresses mining geospatial data relative to the Surface Mining Control and Reclamation Act of 1977 (SMCRA).<sup>2</sup> This geospatial data shall be obtained from each state, tribal, or federal (or combinations thereof) coal mining regulatory authority (RA) authorized under SMCRA to reclaim the surface and underground effects of past mining operations. Abandoned mine land, as specified in SMCRA Sections 404 (coal), 409 and 411 (non-coal) and cross-referenced in additional sections on eligible lands, consist of those lands and waters which were mined for coal or other minerals (or both) or impacted by processing operations prior to the enactment of SMCRA and abandoned or left in an inadequate condition of reclamation and for which there is no continuing reclamation responsibility under state or other federal laws for mitigation of adverse impacts to human health and safety or environmental resources.

1.1.2 Title IV of SMCRA establishes the national AML Reclamation Program under the Office of Surface Mining Reclamation and Enforcement (OSMRE), U.S. Department of the Interior (DOI). The program was developed to reclaim land and water resources adversely affected by past coal and non-coal mining and left abandoned or inadequately restored. During the years immediately following the enactment of SMCRA, OSMRE, states, and Indian tribes conducted surveys of eligible lands and waters and created individual inventories of problems to be addressed under Title IV. In 1990, SMCRA was amended and OSMRE was required to maintain a national inventory of high priority abandoned mine sites and provide standardized procedures for states and tribes to use in updating the data. The need for an automated nationwide inventory system led to the creation of the AML Inventory System

(AMLIS), a compilation of the individual state, tribe, Federal Reclamation Program (FRP), and Rural Abandoned Mine Program (RAMP) inventories. The AMLIS documents the counts for AML problem types and the costs to remedy those problems. The system captures estimated unfunded costs, estimated construction costs when funding is made available for reclamation projects, and the actual costs for completed construction projects. It is used in support of work plan development and to record the work completed under each RA's program and to report the extent and estimated cost to reclaim remaining AML problems.

1.1.3 As used in this practice, an AML keyword feature is a point, line, or polygon defining the location of a specific on-the-ground feature contained within an AML problem area (PA) as described in the AML Inventory Manual.<sup>3</sup>

1.1.4 This standard is one of several that have been approved or are in development related to characteristics of AMLs. Also under development is a terminology standard. Initial development of these standards is being done on an individual basis, however, they may be consolidated to reduce repetition of information between them.

1.2 This practice applies to pre-SMCRA AML keyword features that are inventoried in the AMLIS under the SMCRA Title IV Reauthorization to provide for identification and location of AML sites.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the 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*

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.01.03 on Geospatial Technology.

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

<sup>3</sup> U.S. Department of Interior Office of Surface Mining and Enforcement, Abandoned Mine Land Inventory Manual, September 2000, or latest.



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.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>4</sup>

**D653 Terminology Relating to Soil, Rock, and Contained Fluids**

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

**D7443 Practice for Minimum Geospatial Data for Underground Coal Mining Extents**

### 2.2 ANSI Standards:<sup>5</sup>

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

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

### 2.3 Federal Geographic Data Committee Standards:<sup>6</sup>

**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:<sup>7</sup>

**30 CFR Part 700 et seq.**

**30 CFR Part 800 et seq.**

**30 CFR Parts 870 – 887.15 et seq.**

**2.5 Surface Mining Control and Reclamation Act of 1977<sup>7</sup> Section 519(c) Public Law 95-87 August, 3, 1977**

## 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:

**3.2.1** The terms defined here are consistent with terms defined in 30 CFR Part 700 et seq., 30 CFR Part 800 et seq., though not verbatim.

**3.2.2 abandoned mine land (AML)**—as specified in SMCRA Sections 404 (coal), 409 (non-coal) and 411 (non-coal) and cross referenced in additional sections on eligible lands, consists of those lands and waters which were mined for coal

and other minerals or impacted by processing operations prior to enactment of the SMCRA and abandoned or left in an inadequate condition of reclamation and for which there is no continuing reclamation responsibility under state or other federal laws for mitigation of adverse impacts to human health and safety or environmental resources.

**3.2.3 AML Inventory System (AMLIS)**—a national database of AML PAs and associated qualitative and quantitative information developed and maintained by the Office of Surface Mining Reclamation and Enforcement and state and tribe RAs in accordance with SMCRA Title IV mandates.

**3.2.4 AML keyword**—A defined category of AML problem types and coded values, such as clogged stream-CS, dangerous highwall-DH, or dangerous slide-DS. AML keywords are also referred to as AML hazards, features, and problems. Refer to **Table 1** for AML keywords and coded values.

**3.2.5 AML keyword feature**—a point, line, or polygon defining the location of a specific on-the-ground feature that meets the definition of one of the AML keywords as described in the OSMRE AML Inventory Manual.<sup>3</sup> Refer to **Table 1** for AML keywords and coded values.

**3.2.6 AML planning unit (PU)**—a closed polygon defining the boundary of an area of land identified by unique numbers and names. In general, PUs east of the Mississippi River have historically corresponded to subdivision(s) of water cataloging units (WCU) or watersheds; PUs west of the Mississippi River have been defined in a number of ways, including quadrangles, grazing districts, townships, counties, or entire WCU.

**3.2.7 AML problem area (PA)**—a closed polygon subdivision of an AML PU that contains one or more AML keyword features together with impacted land or water (or both) resources, identified by unique numbers and names.

**3.2.8 AML problem area description (PAD)**—a collection of quantitative and qualitative data relating to sites contained within a PA subdivision of an AML PU that contains one or more keyword features together with impacted or water (or both) resources.

**3.2.9 AML problem area ID**—a unique alpha-numeric identifier assigned to an AML PA, prefixed with state or tribal abbreviation and suffixed by AMLIS program area for administrative purposes.

**3.2.10 AML problem type**—a specific on-the-ground feature that meets the definition of one of the AML keywords as described in the OSMRE AML Inventory Manual.<sup>3</sup> Refer to **Table 1** for AML problem type keywords and coded values.

**3.2.11 AML problem type priority**—the priority status of the AML problem type as described in the OSMRE AML Inventory Manual.<sup>3</sup> Refer to **Table 2** for AML problem type priority descriptions.

**3.2.12 AML program area**—a coded value representing a defined programmatic category of reclamation under the SMCRA, for example, SGA = Pre-SMCRA Coal State/Tribe Program. Refer to **Table 3** for AML program area descriptions and coded values.

**3.2.13 AML project site**—a closed polygon defining the boundary of an area of land within which the AML problem

<sup>4</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>5</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<sup>6</sup> Available from Federal Geographic Data Committee, 590 National Center, Reston, VA 20192, [www.fgdc.gov](http://www.fgdc.gov).

<sup>7</sup> 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>.



TABLE 1 AML Keywords

| Priority 1 and 2 Keywords |                                          |                      | Units        |
|---------------------------|------------------------------------------|----------------------|--------------|
| Abbreviation <sup>a</sup> | Problem Type                             | Inch-Pound (English) | SI [Metric]  |
| CS                        | Clogged Streams                          | Miles                | Meters       |
| CSL                       | Clogged Stream Lands                     | Acres                | Hectares     |
| DH                        | Dangerous Highwalls                      | Feet                 | Meters       |
| DI                        | Dangerous Impoundments                   | Count                | Count        |
| DPE                       | Dangerous Piles & Embankments            | Acres                | Hectares     |
| DS                        | Dangerous Slides                         | Acres                | Hectares     |
| GHE                       | Gases: Hazardous/Explosive               | Count                | Count        |
| HEF                       | Hazardous Equipment & Facilities         | Count                | Count        |
| HWB                       | Hazardous Water Body                     | Count                | Count        |
| IRW                       | Industrial/Residential Waste             | Acres                | Hectares     |
| P                         | Portal                                   | Count                | Count        |
| PWAI                      | Polluted Water: Agriculture & Industrial | Count                | Count        |
| PWHC                      | Polluted Water: Human Consumption        | Count                | Count        |
| S                         | Subsidence                               | Acres                | Hectares     |
| SB                        | Surface Burning                          | Acres                | Hectares     |
| UMF                       | Underground Mine Fire                    | Acres                | Hectares     |
| VO                        | Vertical Opening                         | Count                | Count        |
| Priority 3 Keywords       |                                          |                      | Units        |
| Abbreviation <sup>a</sup> | Problem Type                             | Inch-Pound (English) | SI [Metric]  |
| BE                        | Bench                                    | Acres                | Hectares     |
| DP                        | Industrial/Residential Waste             | Acres                | Hectares     |
| EF                        | Equipment/Facilities                     | Count                | Count        |
| GO                        | Gob                                      | Acres                | Hectares     |
| H                         | Highwall                                 | Feet                 | Meters       |
| HR                        | Haul Road                                | Acres                | Hectares     |
| MO                        | Mine Openings                            | Count                | Count        |
| O                         | Other                                    | NA                   | NA           |
| PI                        | Pits                                     | Acres                | Hectares     |
| SA                        | Spoil Area                               | Acres                | Hectares     |
| SL                        | Slurry                                   | Acres                | Hectares     |
| SP                        | Slump                                    | Acres                | Hectares     |
| WA                        | Water                                    | Gallons/Minute       | Litre/Minute |
| Priority 4 and 5 Keywords |                                          |                      | Units        |
| Code                      | Description                              | Inch-Pound (English) | SI [Metric]  |
| 4 COAL                    | RCF—Recreational Facilities              | Count                | Count        |
| 4 COAL                    | CNF—Conservation Facilities              | Count                | Count        |
| 4 COAL                    | ROD—Roads                                | Feet                 | Meters       |
| 5 COAL                    | OSB—Open Space Benefit                   | Acres                | Hectares     |
| 5 COAL                    | RCT—Recreation Purpose                   | Acres                | Hectares     |
| 5 COAL                    | HST—Historic Purpose                     | Acres                | Hectares     |
| 4 NON-COAL                | UTL—Public Utilities                     | Count                | Count        |
| 4 NON-COAL                | STR—Public (Infra) Structure             | Count                | Count        |
| 4 NON-COAL                | ROD—Roads                                | Feet                 | Meters       |
| 4 NON-COAL                | RCF—Recreational Facilities              | Count                | Count        |
| 4 NON-COAL                | CNF—Conservation Facilities              | Count                | Count        |
|                           | O—Other                                  |                      |              |

an AML reclamation project. The AML project site may cross into other AML PAs and may contain within its spatial boundary one or more AML keyword features.

3.2.14 *attribute*—a defined characteristic of a feature, for example, attributes of a PA feature would include its name and number.

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

3.2.16 *domain*—a finite list or range of permissible values for a specified attribute. Domain tables may include units of measure, types, styles, status, names, methods, materials, dispositions, sources, dimensions, or data classes.

3.2.17 *feature class*—a logical group of related feature types.

3.2.18 *feature instance*—real-world spatial phenomenon about which data is collected, maintained, and disseminated.

Feature instances are the geospatial objects that are graphically delineated in a spatial database.

3.2.19 *feature type*—definition and description of a set of real world phenomena into which similar feature instances are classified.

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

3.2.21 *point*—a one-dimensional geometric object that specifies geographic location.

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

3.2.23 *reclamation*—those actions taken to restore mined land.

3.2.24 *regulatory authority*—entity(s) with jurisdiction over the regulation of coal or non-coal (or both) mining and reclamation operations and/or mitigation of AML problems under a program approved by the Secretary of the Interior.

