

Responses to ICOMANTH Circular Letter #6

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- 1) What final changes should be made to Sections I through V of Circular Letter #5 before official ICOMANTH proposal to the USDA-NRCS system? There were no direct responses. There have been published proposals that suggested new soil orders and subgroups be added to US Soil Taxonomy, and there have been updates and revisions to the WRB system since the 1998 original. The second edition was published in 2006 and launched at the 18th World Congress of soil Sciences at Philadelphia, USA. World reference base for soil resources 2006. A framework for international classification, correlation and communication. (IUSS Working Group WRB. 2006. [World Soil Resources Reports No. 103](#). FAO, Rome; [corrected version](#), [\[track mode\]](#).)

All these publications carry the logos of the three main organizations involved in its development: The International Society for Soil Science (ISSS), The International Soil Reference and Information Centre (ISRIC) and the Food and Agriculture Organization of the United Nations (FAO).

- 2) Should densic materials and contacts created by humans be considered as artifacts? There were no direct responses to this question. However, updates in the [Glossary of Landform and Geologic Terms](#) (Part 629 of the USDA-NRCS National Soil Survey Handbook) lists the definition for **anthropogenic feature** as “An artificial feature on the earth’s surface (including those in shallow water), having a characteristic shape and range in composition, composed of unconsolidated earthy, organic materials, artificial materials, or rock, that is the direct result of human manipulation or activities; can be either constructional (e.g., artificial levee) or destructional (quarry).” It is implied that in construction some features, that densic horizons may be formed through human activity and tools. Exhibit 629-1 lists specific Anthropogenic features. The manufactured materials (M layers) used as root-limiting layers are artifacts.
- 3) Should asphalt and coal ash be considered noxious artifacts? There were no direct responses to this question. However, a literature search will undoubtedly produce many more research articles that most **bitumens** contain sulfur and several heavy metals such as nickel, vanadium, lead, chromium, mercury and also arsenic, selenium, and other elements that may be toxic in high concentration or through exposure to humans. The fate of and danger posed by those constituents is highly variable. **Coal ash** is the residue generated in the combustion of coal. Fly ash is the light material collected in chimneys and smokestacks of coal-burning power plants. Bottom ash is removed from the bottom of coal-burning furnaces of all types. Bottom ash stockpiles exist from the residues collected over centuries of use in urban areas.

Toxic constituents are variable, but may include one or more of the following elements or substances: arsenic, beryllium, boron, cadmium, chromium, chromium VI, cobalt, lead, manganese, mercury, molybdenum, selenium, strontium, thallium, and vanadium, along with dioxins and PAH compounds (Managing Coal Combustion Residues in Mines. Committee on Mine Placement of Coal Combustion Wastes, National Research Council of the National

Academies, 2006; and Human and Ecological Risk Assessment of Coal Combustion Wastes, RTI, Research Triangle Park, August 6, 2007, prepared for the U.S. Environmental Protection Agency (USEPA)). The fate of and danger posed by those constituents is highly variable.

Crystalline silica and lime along with the toxic chemicals are among the exposure concerns, especially in fly ash. Fly ash may be placed into landfills or used in manufacturing construction materials. Bottom ash is often used as landfill or to fill low areas in urbanizing areas. Exposure to fly ash through skin contact, inhalation of fine particle dust and drinking water may well present health risks. The National Academy of Sciences noted in 2007 that "the presence of high contaminant levels in many CCR (coal combustion residue) leachates may create human health and ecological concerns." (Managing Coal Combustion Residues in Mines. Committee on Mine Placement of Coal Combustion Wastes, National Research Council of the National Academies, 2006). Fine crystalline silica present in fly ash has been linked with lung damage, in particular silicosis. Occupational Health and Safety Administration (OSHA - <http://www.osha.gov/>) allows 0.10 mg/m³, (one ten-thousandth of a gram per cubic meter of air). Another fly ash component of some concern is lime (CaO). This chemical reacts with water (H₂O) to form calcium hydroxide [Ca(OH)₂], giving fly ash a pH somewhere between 10 and 12, a medium to strong base. This can also cause lung damage if present in sufficient quantities.

- 4) What should be the maximum percentage of noxious particulate or volume of discrete artifacts allowed in soils that are to be classified in Soil Taxonomy? AND 5) Should the standards established by USEPA for maximum contaminant and health advisory levels (<http://www.epa.gov/>) and for work-related safety by the OSHA be used to identify soils that are safety risks to soil scientists and others? There were no direct responses to this question. However, limits set by OSHA and USEPA should be taken into high regard at a minimum to protect humans. If so, how should that be done? There were no direct responses to this question. Knowledge that soils contain amounts of materials in excess of OSHA and USEPA human safety limits for any kind of direct or incidental contact should preclude the soil from being sampled or analyzed. The soil may be described by remote methods, marked on maps, and possibly analyzed by trained professionals in approved labs, but should not be placed into the conventional system of US Soil Taxonomy.
- 5) How can we identify soils that occur in pits and excavations (destructional anthropogenic landforms) as human-altered? There were no direct responses to this question. Depending on the extent of removal and the variability of the remaining solum, current methods would allow the areas to be mapped as a miscellaneous land type, classified to a higher taxa, or even described and classified into the closest soil series and phase available.