

UTAH MINERAL OCCURRENCE SYSTEM (UMOS) DATABASE, 2023 UPDATE

by Utah Geological Survey (Energy and Minerals Program)



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UTAH GEOLOGICAL SURVEY
UTAH DEPARTMENT OF NATURAL RESOURCES
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Cover photo: *Boulder with kaolinite veins from a quarry in Beaver County.*

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INTRODUCTION AND BACKGROUND

The Utah Mineral Occurrence System (UMOS) is a database that includes known mineral mines, quarries, prospects, and deposits in Utah. The database focuses on metallic and industrial minerals, but also includes information on energy minerals (particularly uranium). The database includes extensive information for each record including location, related mineral commodities, geology, mineralogy, production data, resource size, important references, and other relevant information. Over recent decades, UMOS has been a useful tool for mineral explorers, mining companies, land managers, and the general public.

UMOS (a name that was not imparted until the 1990s) began in the late 1970s as part of the Computerized Resources Information Bank (CRIB), which was part of the U.S. Geological Survey's (USGS) Mineral Resource Data System (MRDS). In the early development of CRIB, the Utah Geological Survey (UGS) worked in cooperation with the U.S. Bureau of Land Management (BLM) and the USGS to catalog Utah's mineral occurrences. Initially, the UGS was responsible for collecting and preparing information for mineral occurrence records through literature and field reviews. The records were subsequently reviewed by the BLM and then passed on to the USGS, who was responsible for the framework of the database. The CRIB database was initially built upon a collection of fewer than 3000 records compiled by USGS geologists Edwin Tooker and George Wong. However, due to the general nature of that database, essentially all of those records were replaced early on.

Specifically, in the early stages of UMOS (at that time, CRIB), the UGS compiled available mineral resource information from literature, did onsite field reviews, and prepared detailed records for any known mineral occurrences (from literature, claim maps, workings on topographic maps, etc.) on a county by county basis. These occurrences were also located on topographic maps (primarily 7.5' quadrangles) and filed with the record data at the UGS and USGS. Most of this initial work on UMOS took place during the 1980s.

Since the initial submittals to the BLM and USGS, which ended in the late 1980s, UMOS has diverged substantially from the data included in MRDS. For instance, MRDS included records from the initial database prepared by Tooker and Wong, which were almost entirely updated and replaced by the UGS in an earlier version of CRIB. MRDS also included records from MAS/MILS (Minerals Availability System/Minerals Industry Location System), a mine-focused database from the U.S. Bureau of Mines (to which the UGS also contributed) that are also not included in UMOS. In the early 1990s, the UGS version of CRIB was renamed to UMOS and has remained entirely under UGS purview since then. UMOS has incrementally undergone extensive updating and revision under the care of various curators who have attempted to improve and develop consistency and uniformity within the database. Numerous UGS geologists over several decades have been involved in the compilation of existing data, creation of new records, and revision of existing records. Overall, the UMOS database represents a tremendous amount of work.

We are releasing the current version of UMOS as an Open-File Report (OFR) in order to preserve versioning of the database. Over the years, UMOS or parts thereof have been released in UGS publications and a few of those references are cataloged below. We consider it worth noting that the current digital database consists solely of point data for each record, but many of the paper files and maps from the initial UMOS records provide additional information on the aerial extent of an occurrence or deposit. Some records also include substantial details or other reports that are not captured in the digital database. These paper files remain available at the UGS office in Salt Lake City.

The database in its various forms can be downloaded from: https://ugspub.nr.utah.gov/publications/open_file_reports/ofr-757/ofr-757.zip. Because the UMOS database is the sum of work of several geologists over many years, some inconsistency exists within the database regarding the type of information contained in the various fields. The definitions below often describe the ideal type of information that should be contained within each field. Any feedback on or questions about the database can be directed to Andrew Rupke (andrewrupke@utah.gov).

CONTRIBUTORS

As mentioned, numerous geologists have contributed to the development of UMOS. Below is a list of contributors in approximate descending order of the number of records that they authored or updated:

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PREVIOUS DATA RELEASES

Sprinkel, D.A., 1999, Digital geologic resources atlas of Utah: Utah Geological Survey Bulletin 129 DF, 15 p., <https://doi.org/10.34191/B-129>.

Tripp, B.T., Shubat, M.A., Bishop, C.E., and Blackett, R.E., 1989, Mineral occurrences of the Tooele 1° x 2° quadrangle, west-central Utah: Utah Geological and Mineral Survey Open-File Report 153, 85 p., 3 plates, <https://doi.org/10.34191/OFR-153>.

DEFINITION OF FIELDS IN DATABASE

SITE_NAME: Most recent or most well-known name of site. Typically contains some description of the type of site such as mine, prospect, occurrence, claim, gravel pit, etc. “Unnamed” or “Unidentified” are used for sites with no names or sites that are unknown. In some cases, sites are named by the reporter and given a geographic tie (e.g., Cash Creek SW prospect).

SYNONYM: Other known names for mine or property. Multiple names are separated by semicolons. Some records include the Utah Division of Oil, Gas and Mining file number in this field.

DISTRICT: Mining district or area. Many entries are not formal or accepted district names, but the field gives some indication of the location of the site and if other mines/prospects are nearby in the area.

COMMODITY: Listing of commodities present at the site. *Commodities are listed by commodity codes which can be found at the end of this document.* The commodity codes typically (but not always) follow codes used in the U.S. Geological Survey’s Mineral Resource Data System (MRDS). Generally, the commodities are listed in order of importance. This field includes all commodities found from major commodities to occurrences.

TYPE: The type of mineral commodity, such as metal, industrial mineral (IND. MIN.), or energy. Multiple classifications can be used.

AGE_MA: Best known age (in millions of years) of mineralization, most commonly magmatic-hydrothermal mineralization.

DEP_MODEL: U.S. Geological Survey deposit model number. Many records use Cox and Singer’s (1992) mineral deposit models. Another helpful reference is Heran (2000), which compiles several of the deposit model publications.

PRODUCTION: Estimated amount of production from site. This classification is qualitative and includes large, medium, small, undetermined (UND), or none. Rankings reflect the judgment of reporters and are not consistent throughout the database. In some cases, reporters exaggerated the size and importance of sites and many sites classified as small may have no production.

DEP_SIZE: Deposit size. Represents the estimated size of the deposit. The estimate includes past production, reserves, and resources. Rankings are recorded as small, medium, large, and giant. The rankings vary depending on the commodity. Ideally, ranking follows classifications of Guild (1981), but Guild did not rank all commodities. Deposit size rankings in the database are often exaggerated.

ORE_MINERALS: List of ore minerals present in deposit. Order of listed minerals is not significant.

NON-ORE_MINERALS: List of non-ore minerals in deposit. Includes gangue and alteration minerals and may include less abundant ore minerals.

ALTERATION: Identifies type(s) of alteration of host unit and may provide information on size, zoning, paragenesis, etc. of alteration. The terms “kaolinization” and “argillization” may be somewhat overused and are often used for weathering.

MAJOR: Major commodities produced. Up to four commodities are listed by commodity code. Commonly listed in order of importance.

MINOR: Minor commodities or byproducts produced. Up to four commodities are listed by commodity code. Commonly listed in order of importance.

OCCURRENCE: Commodities found at site but with no current or known economic significance. Listed by commodity code. Often used for commodities present in trace or subeconomic quantities.

COMMOD_INFO: Additional descriptive information about mined or produced commodities. Often used to identify use or provide characteristics of products (e.g., size, color, or appearance of dimension stone).

DEP_TYPE: Brief description of deposit type (e.g., hydrothermal vein and replacement, unconsolidated sediments, playa brine, stratabound disseminated, etc.).

DEP_FORM: Description of geometric form of deposit. Commonly includes a combination of deposit shapes. Common shapes include lens, tabular, blanket, wedge, pod, irregular, discontinuous, lenticular, massive, disseminated, vein, fissure filling, chimney, pipe, nodules, and more. Marginal consistency exists among terminology used.

DEP_DESCRIPTION: Deposit description. A longer form field for any other information about the deposit.

STATUS: Status of site. Defined using the following descriptions: occurrence; active; inactive; proposed; active prospect; inactive prospect; active, little developed; inactive, little developed; active, developed producer; inactive, developed producer; inactive, reclaimed; unknown, developed producer; intermittent producer. Unless recently updated, this field is out of date for many records.

WORKINGS: Category of workings: none, drilling, surface, underground, or both (indicating surface and underground). Unless recently updated, this field is out of date for many records.

WORK_DEPTH_FT: Depth of workings. Depth below the ground surface of deepest workings or bottom of open pit; in feet.

EXPLOR_COMMENTS: Comments on exploration activities at mine or prospect.

WORK_DESCRIPTIONS: Comments on or description of workings.

LOCAL_STRUCTURE: Local structures that characterize the site and are important in locating the commodity in question. However, few existing entries give specific information related to the deposit; most are very general (faulting, folding, etc.; few give strike and dip). Many records, particularly those of sites in the Basin and Range, give the name of an associated mountain range (e.g., Wellsville Mt).

STRIKE: Strike of deposit, vein, or feature. Ideally bearing is in degrees. Bearings are typically converted to northern quadrant measurement (e.g., N45E, N30W). May include ranges, averages (AVG), or multiple entries (above conventions also apply to dip, plunge, and plunge direction). Note: Often represents strike and dip of host sedimentary unit if deposit is bedded or even crudely stratabound such as sandstone uranium which may not accurately represent strike of deposit or strike of mineralization.

DIP: Dip of deposit, vein, or feature, ideally direction in degrees. Number followed by compass direction (e.g., 55 NE).

HR_AGE: Best known age of host rocks. Abbreviation of geologic eon, period, or epoch (epoch only used for Tertiary or Quaternary period). Note: PAL - Paleozoic; PALEO - Paleocene. Can be multiple ages if more than one age of rock acts as host.

HR_FORMATION: Name of formation or member name and formation name. Abbreviations used: FM - formation, MBR - member. Includes both formal and informal unit names.

HR_TYPE: Host rock type or lithology. Several distinct rock types can be included. Some entries include additional descriptive information (e.g., color, grain size, bedding characteristics, etc.) if the feature is important in determining favorability of host rock.

IGNEOUS_AGE: Age of associated igneous rock or host igneous rock. Uses the same conventions as host rock age. A single age is reported even though multiple igneous events may be present; some records have multiple ages.

IGNEOUS_NAME: Name of igneous host unit (e.g., Park City stock) or associated igneous unit, or a lithologic description. Initially, the field was restricted to igneous host units but was later expanded to include associated igneous units.

IGNEOUS_TYPE: Type of host or associated igneous rock. Multiple rock types can be included. Some entries include additional descriptive information.

MINERAL_AGE: Best known age of mineralization. For many industrial minerals (including many sand and gravel records), the field represents the age of host rock.

ORE_CONTROL: Ore control (i.e., one or more controls of mineralization). Many entries are for sand/gravel, brines, and other industrial minerals and are quite general. Common entries include stream channels, lake margins, terraces, etc.

GEOLOGY_COM: Geologic comments. Text field for additional descriptive information on geology.

GENERAL_COM: General comments. Text field for additional comments about the deposit or prospect. Includes information on geology of deposit, workings, mining/milling operations, mining history of site, etc.

PRODUCT_COM: Production comments. Text field to clarify or expand any information in previous production fields. In some cases, production numbers from the mine or prospect are included. Often used for information not specific enough for tables or for information that does not easily fit into other production fields.

LAND_STATUS: Administration or ownership of the site or property. Typically refers to surface ownership rather than mineral ownership. Common entries include: US BLM, STATE, PRIVATE, NATIVE INDIAN LANDS, FEDERAL, USFS, DEPT. OF DEFENSE. In some cases, multiple owners are listed. Many records are out of date.

OWNER: Owner(s) of property. Name of agency, individual, or company that holds the surface rights, mineral rights, mineral leases, or mining claims to the deposit or prospect. In some cases, the field includes an individual or company that is leasing from an underlying claim or lease holder. Some records include contact information. Many records are out of date.

OPERATOR: Name of operator(s), past or current. In some cases, associated information (e.g., contact information) is included. Many records are out of date.

REFERENCE1(2, 3, 4): References for site. Intended to be in order of relevance. References are in UGS format, but commonly abbreviated.

TECTONIC_SETTING: Most entries classify the physiographic province that the deposit is in (e.g., Colorado Plateau, Basin and Range, Rocky Mountains, or transition zone).

REGIONAL_STRUCTURE: Regional structures that may bear some relevance to the deposit (e.g., San Rafael Swell, Uinta Basin, Paradox Basin).

DISCOVERED: Year of discovery. Entries include the exact or approximate year of discovery.

DISCOVERY: Nature of discovery. Entries include: ore in place, ill defined, ore not in place, geophysical anomaly, geochemical anomaly, drill hole, and other.

DISCOVERER: Name of discoverer. Entries include individual names, companies, and/or other identifying information.

LOCATION: This field includes comments or details on location of the deposit or prospect. Level of detail varies significantly from record to record.

COUNTY: County name.

QUADRANGLE_24000: U.S. Geological Survey 1:24,000-scale quadrangle name on which site is located.

AGENCY: Agency of reporter. UGS - Utah Geological Survey; USGS - U.S. Geological Survey.

DATE: Date of most recent update of record.

REPRESENTATIVE: Name of individual that created the record. In some cases, multiple names are listed that may indicate the supervisor of the record creator or individual(s) that updated the record.

UTM_E_NAD83: Easting coordinate of site in UTM (Universal Transverse Mercator) meters.

UTM_N_NAD83: Northing coordinate of site in UTM (Universal Transverse Mercator) meters.

UTM_ZONE: UTM (Universal Transverse Mercator) Zone. UTM zones in Utah are 11 or 12; however, all records are reported in zone 12.

COMMODITY CODES IN DATABASE

Commodity Codes

Commodity	Commodity Code
Alum	ALM
Aluminum (general)	AL
Bauxite	AL1
Aluminum (from other source materials)	AL2
Alunite	AL3
Amber	AMB
Anhydrite, gypsum	GYP
Antimony	SB
Arsenic	AS
Asbestos	ASB
Ash (see volcanic materials)	
Ball clay	CLY4
Barium, Barite	BA
Bentonite	CLY1
Beryllium	BE
Bismuth	BI
Bloating material (includes clay, shale, slate)	CLY6
Boron, Borates	B
Brines, Salines	BRI
Brucite	MG
Building stone	STN2
Cadmium	CD
Calcium	CA

Carbon	C
Carbon dioxide	CO2
Carbonates	CAR
Cement rock	CER
Cerium	CE
Cesium	CS
Chlorine	CL
Chromium	CR
Cinders (see volcanic materials)	
Clay (general)	CLY
Bentonite	CLY1
Fuller's earth	CLY2
Kaolin	CLY3
Ball clay	CLY4
Fire clay	CLY5
Bloating material	CLY6
Common brick clay	CLY7
Coal	COA
Anthracite	COA1
Bituminous	COA2
Sub-bituminous	COA3
Lignite	COA4
Cobalt	CO
Columbium (Niobium)	NB
Concentrate	CON
Copper	CU
Corundum	COR
Cryolite	CY
Diamond	DIA
Diatomite	DIT
Dimension stone	STN2
Dolomite	DOL
Ultra-pure dolomite	DOL1
High-magnesium dolomite	DOL2
Emery	EMY
Evaporites	EVA
Feldspar	FLD
Fire clay	CLY5
Fluorine, Fluorite	F
Fossil	FOS
Fuller's earth	CLY2
Kaolin	CLY3

Gallium	GA
Garnet	GAR
Gas (see natural gas)	
Geothermal	GEO
Gemstones	GEM
Germanium	GE
Gilsonite, solid hydrocarbons	BIT
Glaucconite	GLA
Gold	AU
Granite	GRT
Graphite	GRF
Gravel	SDG
Gypsum, anhydrite	GYP
Hafnium	HF
Halite	HAL
Helium	HE
Humate (humic shale)	HUM
Indium	IN
Iridium	IR
Iron	FE
Kyanite, sillimanite, andalusite, dumortierite	KYN
Lanthanum	LA
Laterite	LAT
Lead	PB
Lignite	COA4
Limestone	LST
Ultra-pure limestone	LST1
High-calcium limestone	LST2
Lithium	LI
Lightweight aggregate	LWA
Magnesite	MG
Magnesium	MG
Manganese	MN
Marble	MBL
Mercury	HG
Mica (general)	MIC
Sheet mica	MIC1
Scrap mica	MIC2
Flake mica	MIC3
Mineral pigments	MPG
Molybdenum	MO
Monazite	MON

Natural gas	GAS
Nickel	NI
Niobium (columbium)	NB
Nitrogen (nitrates)	N
Oil (petroleum)	OIL
Oil-impregnated sandstone (see tar sand)	
Oil sand (see tar sand)	
Oil shale	SHO
Osmium, Iridium (osmiridium)	OI
Olivine	OLV
Ore	ORE
Osmium	OS
Overburden	OVB
Oxides	OXD
Palladium	PD
Peat	PEA
Perlite	PER
Phosphorous, phosphates	P
Platinum	PT
Potassium	K
Pozzolan	POZ
Pumice	PUM
Pyrite	PYR
Pyrrhotite	PYR1
Pyrophyllite, talc	PYF
Quartz	QTZ
Radium	RA
Rare earth elements (REE)	REE
Radioactive materials	RAM
Refractory material	REF
Rhenium	RE
Rhodium	RH
Rubidium	RB
Ruthenium	RU
Salines	BRI
Salt	BRI
Sand and gravel	SDG
Sand, molding	SAM
Sandstone	SST
Saprolite	SAP
Scandium	SC
Selenium	SE

Shale	SHL
Silica	SIL
Silver	AG
Slate	SLA
Sodium	NA
Stone	STN
Stone material (crushed, broken)	STN1
Dimension or building stone (includes flagstone and decorative stone)	STN2
Strontium	SR
Sulfides	SUL
Sulfur	S
Sulfuric acid	SLF
Talc, soapstone	TLC
Tantalum	TA
Tar sand	SAO
Tellurium	TE
Thallium	TL
Thorium	TH
Tin	SN
Titanium	TI
Tungsten	W
Uintaite	BIT
Unidentified commodity	UNIDENTIFIED
Uranium	U
Vanadium	V
Volcanic materials	VOL
Vermiculite	VRM
Wollastonite	WOL
Ytterbium	YB
Yttrium	Y
Zeolites	ZEO
Zinc	ZN
Zinc oxides	ZN1
Zirconium	ZR

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