



## **DATABASE OF URANIUM MINES, PROSPECTS, OCCURRENCES, AND MILLS IN NEW MEXICO**

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## **Introduction**

Uranium and thorium in New Mexico are found in rocks of all ages and lithologies in all but two counties in New Mexico. More than 1,500 uranium mines and prospects are found in New Mexico (McLemore, 1983). Over 200 mines in 18 counties in New Mexico yielded 164,575 tons of  $U_3O_8$  from 1948 to 2000, which is nearly 40% of the total uranium production from the United States. A compilation of these mines and prospects and data on the location, production, reserves, geology, development, ownership, type of deposit, geochemistry, environmental hazards, and sources of other information was developed by McLemore (1983) and summarized by McLemore and Chenoweth (1989) and is now available in this computerized database. The database is in Microsoft Access; Microsoft Excel files also are included.

This database includes available data, published and unpublished, on the uranium mines, deposits, occurrences, and mills located in New Mexico. The purpose of this database is to provide computerized data that will aid in identifying and evaluating possible environmental concerns, such as physical hazards (i.e. hazardous mine openings), indoor radon, regional exposure to radiation from the mines, and point-sources of possible pollution in areas of known mineral deposits. These data will be useful to the State of New Mexico, as well as other government agencies in order to make land-use decisions. These data also are crucial in evaluating areas for mineral-resource potential. In addition, this information will inform the general public on potential environmental effects of uranium mines and prospects.

Funding for this project was provided directly or indirectly by a variety of sources. The original compilation of uranium occurrences, prospects, and mines was funded by the U. S. Department of Energy and the NMBGMR (formerly NMBMMR) and released as McLemore (1983). Funding for inputting data into a computerized database that is GIS compatible was provided in part by the U. S. Environmental Protection Agency. The New Mexico State Land Office funded a mineral resource assessment of Luna County (McLemore et al., 2001), of which numerous mines were included into this database.

## **Formats**

The data are available in two file formats to allow both PC and MAC users access to the data. To read the data users will require either a database or spreadsheet program that can read one of the two file formats listed below.

1. Microsoft Access 97. This includes the entire relational database with Tables, Queries (Searches), Forms, and Reports.
2. MS Excel 5.0. Tables only.

MS Excel 5.0 files can be read by both MACs and PCs.

The bibliography of references cited is available as a WORD document and Endnote file.

## **Startup**

### **For MS Access 97 Users:**

- 1) Open Access.
- 2) Click on File.
- 3) Click on Open Database.
- 4) Select the CD-ROM drive.
- 5) Click on uranim\_mbd.
- 6) Click OK. This will open the entire database.

### **For EXCEL Users:**

- 1) Open EXCEL.
- 2) Click on File.
- 3) Click on Open.
- 4) Select the CD-ROM drive.
- 5) Double click on uranium.xls.

### **Problems:**

If you have any problems opening the files from the CD-ROM, copy the files to your hard drive and open them from the hard drive.

### **List of tables in database**

There are 30 tables in the database. Not all of the fields contain data. Some of the information does not exist. Other information still has to be entered into the database. Updates to the database can be obtained by contacting the NMBGMR.

1. Access—method of access to the site, see access table below. This is a drop down table in the uranium\_mines table.
2. Aliases\_mines— listing of other names the mine is known by. Linked to the uranium\_mines table by the Mine\_id.
3. Aliases\_district—listing of other names the district is known by. Linked to the District table by the District\_id.
4. AMD—Evidence of potential acid drainage. This is a drop down table in the uranium\_mines table.
5. Chemistry—chemical analyses of samples collected by NMBGMR staff. Linked to the uranium\_mines table by the Mine\_id.
6. Commodities—list of possible commodities.
7. Commodities present; not produced district—commodities present, but not produced, linked to the district table by the District\_id.
8. Commodities present; not produced mines—commodities present, but not produced, linked to the uranium\_mines table by the Mine\_id.
9. Commodities produced district—commodities produced, linked to the District table by the District\_id.
10. Commodities produced mines—commodities produced, linked to the uranium\_mines table by the Mine\_id.
11. Commodity\_category—unique commodity category (aggregate, uranium, metals, coal, industrial minerals). This is a drop down table in the District and uranium\_mines tables.

12. Counties—the county where the occurrence is located. This is a drop down table in the uranium\_mines table.
13. County\_district—listing of counties that a specific district falls in. This is linked to the District table by the District\_id.
14. Cultural\_resources—structures or other historical features, see table below. This is a drop down table in the uranium\_mines table.
15. Deposits—type\_of\_deposit according to McLemore (2001) and McLemore and Lueth (in press). This is a drop down table in the uranium\_mines table.
16. District—list of mining districts, coal fields, or the geographical areas as defined by File and Northrop (1966), North and McLemore (1986), McLemore and Chenoweth (1989), Hoffman (1996), and McLemore (2001). This is linked to the uranium\_mines table by the District\_id.
17. Elevation\_method—see elevation method table. This is a drop down table in the uranium\_mines table.
18. Hazard—see hazard table. This is a drop down table in the uranium\_mines table.
19. Hydrology—information concerning hydrology at the site. This is a drop down table in the uranium\_mines table.
20. Inspected\_by—person who last examined the deposit, see inspected by table. This is a drop down table in the uranium\_mines table.
21. Land\_status—federal, Indian, state, private, patented. This is a drop down table in the uranium\_mines table.
22. Location\_assurance—comments on the accuracy of the location of the occurrence, see location assurance table below. This is a drop down table in the uranium\_mines table.
23. Mitigation\_status—description of mitigation status at the site, see mitigation status table. This is a drop down table in the uranium\_mines table.
24. Operating\_status—current operating status, see operating status table below. This is a drop down table in the uranium\_mines table.
25. Patented\_mines—information on patented mines (mineral survey number, patent number, date of patent). This is linked to the uranium\_mines table by the Mine\_id.
26. Point\_of\_location—point of reference for locational position of mine, see point of reference table. This is a drop down table in the uranium\_mines table.
27. Prod\_category—see production category table. This is a drop down table in the uranium\_mines table.
28. Reclamation—This is a drop down table in the uranium\_mines table.
29. Uranium\_mines—information on the uranium mines, deposits, and mills located in New Mexico. This is the main table and is indexed by the Mine\_id.
30. Uranium\_production—uranium production from mines in New Mexico. This is linked to the uranium\_mines table by the Mine\_id.

#### **Explanation of fields in uranium\_mines table**

1. Mine\_id—A location where minerals and common materials have been extracted or found. The site may contain buildings, pits, drill holes, adits, shafts, mill sites, and other mining related features. The mine identification number is a unique number consisting of a prefix NM (for New Mexico), two-letter abbreviation that represents

the county (see County table) followed by a unique number. This is a required text field.

2. County—the county where the occurrence is located, see County table. This is a required text field.
3. District\_id—unique identification number of the district, see district table. This is a text field.
4. District—mining district, coal field, or the geographical area as defined by File and Northrop (1966), North and McLemore (1986), McLemore and Chenoweth (1989), Hoffman (1996), and McLemore (2001). This is a text field.
5. Mine\_name—the name of the occurrence, prospect, mine, deposit, or mill as found in the literature. Incorrect names are listed as aliases and unknown properties have no identification name. This is a required text field.
6. Aliases—other names associated with this location. This is a text field.
7. Township—township mine is located (Township 25 North would be entered as 25N), New Mexico meridian. A township is approximately 36 miles square and divided into 36 sections. This is a text field.
8. Range—range mine is located (Range 5E would be entered as 5E), New Mexico meridian. This is a text field.
9. Section—section mine is located (Section 21 would be entered as 21), New Mexico meridian. A section is approximately 36 miles square and contains 3600 acres. This is a text field.
10. Subsection—portion of section mine is located. This is a text field.
11. Latitude—latitude (decimal degrees) mine is located, all are latitude north. The datum used is the same as the USGS topographic map.
12. Longitude—longitude (decimal degrees) mine is located, all are longitude west. The datum used is the same as the USGS topographic map.
13. UTM easting—UTM easting (in meters) mine is located. The datum used is the same as the USGS topographic map.
14. UTM northing—UTM northing (in meters) mine is located. The datum used is the same as the USGS topographic map.
15. UTM zone—UTM zone mine is located. The datum used is the same as the USGS topographic map.
16. Location\_assurance—comments on the accuracy of the location of the occurrence, see location assurance table below. This is a text field.
  - Est\_sec: Estimated location from file data to nearest section
  - Est: Estimated location from literature or file data, to nearest ¼ section
  - Est\_topo: Estimated from topographic map
  - Topo: Accurate location from topographic map
  - HHGPS: Location from hand-held GPS, SA on ( $\pm 100$  m)
  - HHGPSoff: Location from hand-held, GPS, SA off ( $\pm 20$  m)
  - DCGPS: Location from differential-corrected GPS
  - WAGPS: Location from wide-area augmentation GPS
17. Point\_of\_location—point of reference for locational position of mine, see point of reference table. This is a text field.
  - Literature
  - map symbol

- field location
  - center of section
  - center of NE section
  - center of NW section
  - center of SW section
  - center of SE section
  - center of mine complex
  - center section line
18. Production\_category—see production category table. This is a text field.
19. Commodity\_category—unique commodity category. This is a text field.
- uranium
  - coal
  - metals
  - Industrial minerals
  - aggregate.
20. Commodities\_produced—commodities that were produced at the locality, see commodities table for listing and definition of abbreviations. A commodity is any mineral or rock that was or can be extracted economically and traded on the open market. This is a text field.
21. Commodities\_present\_not\_produced—commodities that are present, but were not produced from the mine, see commodities table for listing and definition of abbreviations. This is a text field.
22. Year\_of\_initial\_production—first year of known production. This is a number field.
23. Year\_of\_last\_production—last year of known production, 9999 represents active, operating mines. This is a number field.
24. Comments\_on\_production—text field on other information concerning production.
25. Development—description of the extent of the development of the deposit.  
 Adit: a horizontal passage driven into rock from the surface for working or dewatering an underground mine.  
 Shaft: a vertical excavation to access underground mine or for ventilating underground workings.  
 Stope: an underground excavation from which ore has been removed.  
 Glory hole: a funnel-shaped excavation from which ore has been removed.  
 Open pit: surface excavation to remove ore.  
 Winze: vertical or inclined shaft driven from an adit or drift.  
 Drift: horizontal passage in underground mine with no surface opening.
26. Depth\_of\_workings—This is a text field.
27. Length\_of\_workings—This is a text field.
28. Disturbed\_area\_acres—the size of the site that includes all of the disturbed or impacted areas, in acres. This is a number field.
29. Operating\_status—current operating status, see operating status table. This is a text field.
- Standby
  - Inactive
  - Active

- Suspended
  - Decommissioned
  - Abandoned
  - Deve
  - Exploration
  - Occurrence
  - Temp sus
30. Production—amounts of production, as available, with production figures obtained from references cited. This is a text field.
  31. Mining\_methods—as available. This is a text field.
  32. Surface\_land\_status—federal, state, private, Indian. This is a text field.
  33. Mineral\_land\_status—federal, state, private, Indian. This is a text field.
  34. Ownership—as available.
  35. Primary\_company—as available.
  36. Access—method of access to the site, see access table below.
    - 2WD: 2 wheel drive vehicles.
    - 4WD: four wheel drive vehicles.
    - Hike
    - other
  37. Mining history.
  38. Cultural\_features—structures or other historical features, see table below
    - Buildings
    - Foundations
    - Headframe: vertical metal or wood frame at the top of a shaft, which carries the sheave or pulley for the hoist, used to transport ore, men, and equipment into and out of the mine.
    - Homesite
    - Mill: mineral treatment facility where the ore was crushed, ground, and further processed to produce a marketable product.
    - None
    - Powerlines
    - Refinery
    - Trestles/tramways: framework of timbers, piles, or steelwork serving as support.
    - Mining equipment: equipment used to mine ore.
  39. Host\_formation—the type and formation name of the host.
  40. Age\_of\_host\_rock
  41. Age\_of\_mineralization
  42. Rock\_type—lithology hosting the deposit.
  43. Geology—briefly describes the geology, structure, and character of the deposit.
  44. Mineralogy—briefly describes the mineralogy of the deposit.
  45. Size—size of the deposit in area or volume.
  46. Alteration—briefly describes the alteration associated with the deposit.
  47. Type\_of\_deposit—characterizes the type of deposit according to McLemore (2001) and McLemore and Lueth (in press).

48. USGS\_quadrangle—the name of the quadrangle map (7.5 minute) on which the deposit is located.
49. Elevation—vertical distance from mean sea level, in feet, of the deposit.
50. Method\_of\_obtaining\_elevation—see elevation method table
- **Est:** Estimated from topographic map
  - **HHGPSoff:** Location from hand-held, GPS, SA off ( $\pm 20$  m)
  - **DCGPS:** Location from differential-corrected GPS
  - **WAGPS:** Location from wide-area augmentation GPS
  - **Surveyed:** by mining company
  - **Other**
51. Land\_use
- Recreation: activities like camping, picnicing, hiking, biking, day use, or other are easily identified in the area.
  - Residential: building used solely as a housekeeping unit with cooking, living, sanitary, and sleeping facilities.
  - Wildlife refuge or preserve
  - other
52. Potential\_hazardous\_materials—see hazard table, includes radiation readings
- Chemical spills or piles
  - Cyanide leaching operation
  - Acid or chemical odor
  - Asbestos
  - Petrochemical products
  - Dump sites
  - Power substations
  - Transformers: device employing the principle of mutual induction to convert variations of current in a primary circuit into variation of voltage and current in a secondary circuit.
  - Barrels, tanks, containers
    - Leaking
    - Contents
  - Underground storage tanks (LUST)
  - Radiation
  - Explosive: explosive agent or substance, such as dynamite, used to break rock.
  - Trash dump: an accumulation of refuse and discarded materials.
  - Other
  - None
53. Evidence of potential acid drainage, see AMD table below.
- Arsenopyrite: iron-arsenic sulfide, FeAsS
  - Marcasite: iron sulfide, FeS<sub>2</sub>.
  - None
  - Other sulfides
  - pH of water less than 4
  - pyrite: iron sulfide, FeS<sub>2</sub>.



- Pyrrhotite: iron sulfide,  $\text{Fe}_{1-x}\text{S}$ .
  - sulfate minerals
54. Hydrology— information concerning hydrology at the site, see hydrology table
- Above water table
  - Adjacent water sources
  - Mine flooded
  - Water flowing from workings
  - Standing water in workings
  - Water flowing through/over workings
  - Water flowing through/over waste rock
  - Water flowing through/over ore
  - Adjacent water sources
  - Pit lakes
  - Ground water: water below the ground surface in a zone of saturation.
  - Surface water
  - Springs: where the aquifer or water table intersects the surface.
  - Dump in drainage
  - None
  - other
55. Receiving\_stream—natural stream or river that water/runoff from the site drains into.
56. Reclamation—see reclamation table
- Erosion
  - Unstable rock
  - Slope instability
  - High walls
  - Wind erosion: wearing away of land surface by wind.
  - Other
57. Mitigation\_status—description of mitigation status at the site, see mitigation status table
- Backfilled shaft
  - Fencing
  - Gate
  - None
  - None needed
  - Other
  - Safety hazards mitigated
  - signs
58. Sample\_number—of samples collected from the deposit.
59. MRDS\_number—USGS Mineral Records Data System.
60. Other\_agency\_number—any other number identifying the site.
61. Chemical\_analyses—of samples collected from the deposit.
62. Comments—additional information, published maps or cross sections are cited.
63. Recommendations—concerning the deposit.
64. References—pertaining to the deposit. The references are in a separate WORD file.

65. Inspected by—person who last examined the deposit, see inspected by table.

- DL Dave Lindsey
- DS Dave Supthin
- IG Ibrihim Gundiler
- JVM James V. McLemore
- OJA Orin J. Anderson
- SM Sherman Marsh
- SW Susan Winkler
- VTM Virginia T. McLemore

66. Date inspected—deposit was last inspected or examined. This is a short date field.

67. Date\_of\_last\_modification—date record was last modified. This is a short date field.

## Abbreviations

USAEC	U.S. Atomic Energy Commission
USGS	U.S. Geological Survey
PRR	Preliminary Reconnaissance Report (by USAEC)
CRIB	Computerized Resource Information Bank (by USBM, now incorporated into the USGS MAS/MILS and MRDS)
MAS/MILS	Mineral Availability System/Mineral Information System (USGS)
MRDS	Mineral Resource Data System (USGS)
NMBMMR	New Mexico Bureau of Mines and Mineral Resources (now NMBGMR)
NMBGMMR	New Mexico Bureau of Geology and Mineral Resources

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