

Uranium Production on the Navajo Nation



Data format: Shapefile

File or table name: NN_AUM_Production

Coordinate system: Geographic

Theme keywords: Uranium Production, Vanadium Production, AUM Production, Host Rock, Above vs. Below Ground, Above vs. Below Water Table, Wet vs. Dry Mine, AUM Region

Abstract: This is a polygon dataset that tabulates uranium and vanadium production for Abandoned Uranium Mines (AUMs) on or within one mile of the Navajo Nation. Polygons are from the NN_AUM_Poly_Surf_Undrgnd.shp dataset that merges all surface and underground polygons that comprise a productive or unproductive AUM producing a dataset of multipart polygons. Attributes include: total mine production of pounds and percent for uranium (as uranium oxide or U₃O₈) and vanadium (as vanadium oxide or V₂O₅), tons of uranium and vanadium ore, the starting and final years of production for uranium and/or vanadium, comments on production, host rock for uranium and/or vanadium production, whether an AUM was mined above or below ground, whether an AUM was mined above or below the local water table, and the region in which an AUM is located.

FGDC and ESRI Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
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Metadata elements shown with blue text are defined in the Federal Geographic Data Committee's (FGDC) [Content Standard for Digital Geospatial Metadata \(CSDGM\)](#). Elements shown with green text are defined in the [ESRI Profile of the CSDGM](#). Elements shown with a green asterisk (*) will be automatically updated by ArcCatalog. ArcCatalog adds hints indicating which FGDC elements are mandatory; these are shown with gray text.

Identification Information:

Citation:

Citation information:

Originators: TerraSpectra Geomatics

Title:

Uranium Production on the Navajo Nation

***File or table name:** NN_AUM_Production

Publication date: July 2007

Geospatial data presentation form: vector and tabular digital data

Publication information:

Publication place: San Francisco, CA
Publisher: US EPA, Region 9, Superfund Program

***Online linkage:** \\Terra_dc\Navajo\NAUM_NN_Summary\Products\FINAL\TSG-07066\DVD_GIS\DB\AUM\NN_AUM_Production.shp

Description:

Abstract:

This is a polygon dataset that tabulates uranium and vanadium production for Abandoned Uranium Mines (AUMs) on or within one mile of the Navajo Nation. Polygons are from the NN_AUM_Poly_Surf_Undrgrnd.shp dataset that merges all surface and underground polygons that comprise a productive or unproductive AUM producing a dataset of multipart polygons. Attributes include: total mine production of pounds and percent for uranium (as uranium oxide or U3O8) and vanadium (as vanadium oxide or V2O5), tons of uranium and vanadium ore, the starting and final years of production for uranium and/or vanadium, comments on production, host rock for uranium and/or vanadium production, whether an AUM was mined above or below ground, whether an AUM was mined above or below the local water table, and the region in which an AUM is located.

Purpose:

This dataset was developed to support the U.S. Environmental Protection Agency (USEPA) in its undertaking of an extensive scientific study to determine if abandoned uranium mines (AUM) and related mine features pose a significant risk to human health and the environment, and to identify areas requiring action to reduce risk for the Navajo Nation.

***Language of dataset:** en

Time period of content:

Time period information:

Single date/time:

Calendar date: July 2007

Currentness reference:

publication date

Status:

Progress: Complete

Maintenance and update frequency: None planned

Spatial domain:

Bounding coordinates:

***West bounding coordinate:** -111.640152

***East bounding coordinate:** -107.836992

***North bounding coordinate:** 37.412150

***South bounding coordinate:** 35.316133

Local bounding coordinates:

***Left bounding coordinate:** -111.640152

***Right bounding coordinate:** -107.836992

***Top bounding coordinate:** 37.412150

***Bottom bounding coordinate:** 35.316133

Keywords:

Theme:

Theme keywords: Uranium Production, Vanadium Production, AUM Production, Host Rock, Above vs. Below Ground, Above vs. Below Water Table, Wet vs. Dry Mine, AUM Region

Theme keyword thesaurus: None

Place:

Place keywords: Navajo Nation, Arizona, New Mexico, Utah, United States

Place keyword thesaurus: None

Access constraints: None.

Use constraints:

This polygon dataset compiles uranium and vanadium production statistics and makes estimates that separate uranium and vanadium production reported during the 1940s by lease and plot rather than by mine. Comments document minor production of radium in the 1920s. Uranium, vanadium and radium are all compiled because they were produced from the same "carnotite" ores (a general term used here for group of hydrated uranium vanadate minerals). Datas are compiled for AUMs on the Navajo Nation and within one mile of its outer boundary. Post-Atomic Energy Commission production data is largely not included for the period after the middle of 1983 for the area of the Grants Uranium District in the Eastern AUM Region. However, production on the Navajo Nation after 1983 had ceased.

Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

The data are provided "as-is," without warranty of any kind, either express or implied.

These data have been compiled as part of a desktop project to collect existing spatial data to support the study of Navajo abandoned uranium mines. No field verifications were undertaken as part of this desktop study.

Point of contact:

Contact information:

Contact organization primary:

Contact organization: U. S. Environmental Protection Agency, Region 9, Superfund Program

Contact address:

Address type: mailing and physical address

Address:

75 Hawthorne St (SFD 8-2)

City: San Francisco

State or province: CA

Postal code: 94105

Country: USA

Contact voice telephone: 415-972-3167

Data set credit:

William L Chenoweth, retired Atomic Energy Commission/Department of Energy geologist that worked throughout the Colorado Plateau published most of the reports about uranium/vanadium production on the Navajo Nation, and compiled and provided unpublished data on uranium/vanadium production.

Security information:

Security classification system: None

***Native dataset format:** Shapefile

***Native data set environment:**

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.1.0.780

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Data Quality Information:

Attribute accuracy:

Attribute accuracy report:

Attributes were compiled from published and unpublished sources. Tabular data were checked against these sources and were reviewed by William L Chenoweth.

Logical consistency report:

None

Completeness report:

This polygon dataset compiles uranium and vanadium production statistics and makes estimates that separate uranium and vanadium production reported during the 1940s by lease and plot rather than by mine. Comments document minor production of radium in the 1920s. Uranium, vanadium and radium are all compiled because they were produced from the same "carnotite" ores (a general term used here for group of hydrated uranium vanadate minerals). Data are compiled for AUMs on the Navajo Nation and within one mile of its outer boundary. Post-Atomic Energy Commission production data is largely not included for the period after the middle of 1983 for the area of the Grants Uranium District in the Eastern AUM Region. However, production on the Navajo Nation after 1983 had ceased.

Positional accuracy:

Horizontal positional accuracy:

Horizontal positional accuracy report:

Positional accuracy is the same as for NN_AUM_Poly_Surf_Undrgrnd.shp.

Lineage:

Source information:

Source citation abbreviation:

Attributes

Source contribution:

Multiple published and unpublished sources were used and are documented by the Skey fields PROD_SRC, HOST_SRC, S_U_SRC, and WTRTBL_SRC. These Skeys document the sources used for these attribute data and can be found in the reference part of the database.

Source information:

Source citation abbreviation:

Polygons

Source contribution:

The polygon extents are from the NN_AUM_Poly_Surf_Undrgrnd.shp polygon dataset.

Process step:

Process description:

Attributes were compiled from multiple published and unpublished sources and are documented by the Skey fields PROD_SRC (production data source), HOST_SRC (Host Rock Source), S_U_SRC (surface or underground mine source), and WTRTBL_SRC (above or below local water table source). These Skeys document the sources used for these attribute data and can be found in the reference part of the database. Production was compiled for the period beginning with radium production in the 1920s (see the Comments field for this information). Production for the vanadium production period of 1942 - 1945 and 1948 - 1950 was typically reported as combined production by lease and plot even when multiple mines were located and leases and plots. Using published and unpublished production provided by William L Chenoweth as well as Chenoweth's personal knowledge and site

visits of these mines during their operational and post-operation periods, production was estimated by mine. This process included development of estimates for uranium production from these vanadium ores during the secret Manhattan Project during World War II.

Process software and version: Microsoft Office Excel 2003

Process date: July 2007

Source used citation abbreviation:

Attributes

Process contact:

Contact information:

Contact organization primary:

Contact organization: TerraSpectra Geomatics

Contact address:

Address type: mailing and physical address

Address:

2700 E Sunset Rd, Ste A-10

City: Las Vegas

State or province: NV

Postal code: 89120

Country: USA

Contact voice telephone: 702-795-8254

Process step:

Process description:

Polygons are from the NN_AUM_Poly_Surf_Undrgrnd.shp shapefile. Surface and underground polygons that comprise a productive or unproductive AUM were merged producing a dataset of multipart polygons based on the compiled tabular production information.

Process software and version: ESRI ArcGIS 9.1

Process date: July 2007

Source used citation abbreviation:

Polygons

Process contact:

Contact information:

Contact organization primary:

Contact organization: TerraSpectra Geomatics

Contact address:

Address type: mailing and physical address

Address:

2700 E Sunset Rd, Ste A-10

City: Las Vegas

State or province: NV

Postal code: 89120

Country: USA

Contact voice telephone: 702-795-8254

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Spatial Data Organization Information:

***Direct spatial reference method:** Vector

Point and vector object information:

SDTS terms description:

- ***Name:** NN_AUM_Production
- ***SDTS point and vector object type:** G-polygon
- ***Point and vector object count:** 520

ESRI terms description:

- ***Name:** NN_AUM_Production
- ***ESRI feature type:** Simple
- ***ESRI feature geometry:** Polygon
- ***ESRI topology:** FALSE
- ***ESRI feature count:** 520
- ***Spatial index:** TRUE
- ***Linear referencing:** FALSE

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Spatial Reference Information:

Horizontal coordinate system definition:

Coordinate system name:

- ***Geographic coordinate system name:** GCS_North_American_1983

Geographic:

- ***Latitude resolution:** 0.000000
- ***Longitude resolution:** 0.000000
- ***Geographic coordinate units:** Decimal degrees

Geodetic model:

- ***Horizontal datum name:** North American Datum of 1983
- ***Ellipsoid name:** Geodetic Reference System 80
- ***Semi-major axis:** 6378137.000000
- ***Denominator of flattening ratio:** 298.257222

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Entity and Attribute Information:

Detailed description:

- ***Name:** NN_AUM_Production

Entity type:

- ***Entity type label:** NN_AUM_Production
- ***Entity type type:** Feature Class
- ***Entity type count:** 520

Entity type definition:

Uranium and Vanadium Production

Attribute:

- ***Attribute label:** FID
- ***Attribute alias:** FID

- * **Attribute definition:**
Internal feature number.
- * **Attribute definition source:**
ESRI

- * **Attribute type:** OID
- * **Attribute width:** 4
- * **Attribute precision:** 0
- * **Attribute scale:** 0

Attribute domain values:

- * **Unrepresentable domain:**
Sequential unique whole numbers that are automatically generated.

Attribute:

- * **Attribute label:** Shape
- * **Attribute alias:** Shape
- * **Attribute definition:**
Feature geometry.
- * **Attribute definition source:**
ESRI

- * **Attribute type:** Geometry
- * **Attribute width:** 0
- * **Attribute precision:** 0
- * **Attribute scale:** 0

Attribute domain values:

- * **Unrepresentable domain:**
Coordinates defining the features.

Attribute:

- * **Attribute label:** Mine_ID
- * **Attribute alias:** Mine_ID
- * **Attribute type:** Number
- * **Attribute width:** 4

Attribute:

- * **Attribute label:** AllMineIDs
- * **Attribute alias:** AllMineIDs
- * **Attribute type:** String
- * **Attribute width:** 45

Attribute:

- * **Attribute label:** Mine_Name
- * **Attribute alias:** Mine_Name
- * **Attribute type:** String
- * **Attribute width:** 75

Attribute:

- * **Attribute label:** Aliases
- * **Attribute alias:** Aliases
- * **Attribute type:** String
- * **Attribute width:** 175

Attribute:

- * **Attribute label:** Stratum
- * **Attribute alias:** Stratum

- * **Attribute type:** String
- * **Attribute width:** 35

Attribute:

- * **Attribute label:** PRODUCER
- * **Attribute alias:** PRODUCER

- * **Attribute type:** String
- * **Attribute width:** 5

Attribute:

- * **Attribute label:** TONS
- * **Attribute alias:** TONS

- * **Attribute type:** Number
- * **Attribute width:** 15

Attribute:

- * **Attribute label:** U308_LBS
- * **Attribute alias:** U308_LBS

- * **Attribute type:** Number
- * **Attribute width:** 15

Attribute:

- * **Attribute label:** U308_PRCNT
- * **Attribute alias:** U308_PRCNT

- * **Attribute type:** Number
- * **Attribute width:** 14
- * **Attribute number of decimals:** 2

Attribute:

- * **Attribute label:** V205_LBS
- * **Attribute alias:** V205_LBS

- * **Attribute type:** Number
- * **Attribute width:** 15

Attribute:

- * **Attribute label:** V205_PRCNT
- * **Attribute alias:** V205_PRCNT

- * **Attribute type:** Number
- * **Attribute width:** 14
- * **Attribute number of decimals:** 2

Attribute:

- * **Attribute label:** START_YEAR
- * **Attribute alias:** START_YEAR

- * **Attribute type:** Number
- * **Attribute width:** 5

Attribute:

***Attribute label:** END_YEAR
***Attribute alias:** END_YEAR

***Attribute type:** Number
***Attribute width:** 5

Attribute:

***Attribute label:** PROD_SRC
***Attribute alias:** PROD_SRC

***Attribute type:** String
***Attribute width:** 120

Attribute:

***Attribute label:** COMMENT
***Attribute alias:** COMMENT

***Attribute type:** String
***Attribute width:** 225

Attribute:

***Attribute label:** HOST_ROCK
***Attribute alias:** HOST_ROCK

***Attribute type:** String
***Attribute width:** 15

Attribute:

***Attribute label:** HOST_SRC
***Attribute alias:** HOST_SRC

***Attribute type:** String
***Attribute width:** 10

Attribute:

***Attribute label:** SURF_UNDER
***Attribute alias:** SURF_UNDER

***Attribute type:** String
***Attribute width:** 8

Attribute:

***Attribute label:** S_U_SRC
***Attribute alias:** S_U_SRC

***Attribute type:** String
***Attribute width:** 25

Attribute:

***Attribute label:** WTR_TABLE
***Attribute alias:** WTR_TABLE

***Attribute type:** String
***Attribute width:** 10

Attribute:

***Attribute label:** WTRTBL_SRC
***Attribute alias:** WTRTBL_SRC

***Attribute type:** String

***Attribute width:** 10

Attribute:

***Attribute label:** REGION

***Attribute alias:** REGION

***Attribute type:** String

***Attribute width:** 15

Overview description:

Dataset overview:

This dataset is comprised of 520 polygons representing productive and unproductive AUMs.

Entity and attribute overview:

There are 22 thematic polygons:

- Mine_ID - the single Mine_ID or one of the Mine_IDs that comprises a named productive mine or an unproductive AUM
- AllMineIDs - listing of all AUM Mine_IDs that comprise a named productive AUM or an unproductive AUM
- Mine_Name - name of productive AUM or unproductive AUM. A few cases are combined mines where production could not be separated
- Aliases - alternative name(s) of productive mine or unproductive AUM
- Stratum - identifies whether a named productive AUM or unproductive AUM is comprised of a surface or an underground, or a surface and underground AUM polygon (s)
- PRODUCER - identifies with a "Yes" or "No" whether an AUM was productive
- TONS - provides the total AUM production in short tons of ore for uranium and vanadium ores
- U3O8_LBS - provides the total AUM production in pounds of uranium oxide for uranium and vanadium ores
- U3O8_PRCNT - provides the grade in percent of uranium oxide for uranium and vanadium ores, based only on actual production and not on estimated production
- V2O5_LBS - provides the total AUM production in pounds of vanadium oxide for uranium and vanadium ores
- V2O5_PRCNT - provides the grade in percent of vanadium oxide for uranium and vanadium ores, based only on actual production and not on estimated production
- START_YEAR - provides the initial year of production for uranium and vanadium ores
- END_YEAR - provides the final year of production for uranium and vanadium ores, and together with initial year provides the range of years of production including intervening years of non-production
- PROD_SRC - provides the source of information for production for uranium and vanadium ores
- COMMENT - provides comments about production for uranium and vanadium ores, and may include comments on radium production
- HOST_ROCK - host rock from which ore was extracted, including:
 - Tbm = Tertiary (Pliocene) Middle Member of the Bidahochi Formation
 - Kd = Cretaceous Dakota Sandstone
 - Kt = Cretaceous Toreva Fm.
 - Jmb = Jurassic Brushy Basin Member of the Morrison Fm.
 - Jmp = Jurassic Poison Canyon Sandstone of the Morrison Fm.
 - Jmru = Jurassic upper unit of Recapture Member of Morrison Fm.
 - Jr = Jurassic Recapture Member of the Morrison Fm.
 - Jmsw = Jurassic Salt Wash Member of Morrison Fm.
 - Jmsw = Jurassic Salt Wash Member of Morrison Fm.
 - Jmw = Jurassic Westwater Member of the Morrison Fm.
 - Jk = Jurassic Kayenta Fm.

Jn = Jurassic Navajo Sandstone
 Jt = Jurassic Todilto Limestone
 TRcp = Triassic Petrified Forest Member of the Chinle Fm.
 TRcs = Triassic Shinarump Member of the Chinle Fm.

- HOST_SRC - source for host rock information
- SURF_UNDER - identifies whether ore was mined at the surface, underground, or surface and underground; this attribute identifies underground mines where maps of the underground working do not exist
- S_U_SRC - source for whether ore was mined at the surface, underground or surface and underground
- WTR_TABLE - identifies whether ore was mined from "above" (i.e. a dry mine) or "below" (i.e. a wet mine) a local water table
- WTRTBL_SRC - source for whether ore was mined from "above" (i.e. a dry mine) or "below" (i.e. a wet mine) a local water table
- REGION - identifies the AUM Region that the AUM is located to facilitate compilation of production statistics by AUM Region

NOTE "-999" is used as a Null or No Data value.

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Distribution Information:

Distributor:

Contact information:

Contact organization primary:

Contact organization: U. S. Environmental Protection Agency, Region 9,
 Superfund Records Center

Contact address:

Address type: mailing address

Address:

95 Hawthorne St (SFD-7C)

City: San Francisco

State or province: CA

Postal code: 94105

Country: USA

Contact voice telephone: 415-536-2033

Resource description: Downloadable Data

Distribution liability:

Although these data have been processed successfully on a computer system for the USEPA, no warranty expressed or implied is made by the USEPA or its contractors regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. No responsibility is assumed by USEPA or its contractors in the use of these data.

Standard order process:

Digital form:

Digital transfer information:

***Transfer size:** 0.470

***Dataset size:** 0.470

Custom order process:

Contact the USEPA for a custom order.

Technical prerequisites:

Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

Available time period:

Time period information:

Single date/time:

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Metadata Reference Information:

***Metadata date:** 20070811

***Language of metadata:** en

Metadata contact:

Contact information:

Contact person primary:

Contact person: Andrew Bain

Contact organization: U. S. Environmental Protection Agency, Region 9, Superfund Program

Contact position: Project Manager

Contact address:

Address type: mailing and physical address

Address:

75 Hawthorne St (SFD 8-2)

City: San Francisco

State or province: CA

Postal code: 94105

Country: USA

Contact voice telephone: 415-972-3167

***Metadata standard name:** FGDC Content Standards for Digital Geospatial Metadata

***Metadata standard version:** FGDC-STD-001-1998

***Metadata time convention:** local time

Metadata access constraints: None.

Metadata use constraints:

None.

Metadata security information:

Metadata security classification system: None

Metadata extensions:

***Online linkage:** <http://www.esri.com/metadata/esriprof80.html>

***Profile name:** ESRI Metadata Profile

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Binary Enclosures:

Thumbnail:

Enclosure type: Picture



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