ENHANCING WYOMING'S UNDERGROUND INJECTION CONTROL PROGRAM DATABASE AND GEOGRAPHIC INFORMATION SYSTEM

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Final Report

1996 WWRC-96-14

Wyoming Water Resources Center University of Wyoming Laramie, Wyoming 82071

Prepared for:

Underground Injection Control Program Wyoming Department of Environmental Quality, Water Quality Division Herschler Building Cheyenne, Wyoming 82002

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Contents of this publication have been reviewed only for editorial and grammatical correctness, not for technical accuracy. The material presented herein resulted from research sponsored by U.S. Environmental Protection Agency and the Wyoming Department of Environmental Quality, Water Quality Division, through the Wyoming Water Resources Center, however views presented reflect neither a consensus of opinion nor the views and policies of, U.S. Environmental Protection Agency and the Wyoming Department of Environmental Quality, Water Quality Division, the Wyoming Water Resources Center, however views presented reflect neither a consensus of opinion nor the views and policies of, U.S. Environmental Protection Agency and the Wyoming Department of Environmental Quality, Water Quality Division, the Wyoming Water Resources Center, or the University of Wyoming. Explicit findings and implicit interpretations of this document are the sole responsibility of the author(s).

ACKNOWLEDGMENTS

This project was made possible by a USEPA grant administered by the Wyoming Department of Environmental Quality, Water Quality Division grant (contract # G008333-95). The authors wish to recognize Robert Lucht and Louise Cordova, DEQ/WQD for their technical assistance throughout the duration of the project.

Questions or requests for additional information regarding this document should be directed to Chris Arneson, Wyoming Water Resources Center, University of Wyoming, Laramie, Wyoming, 82071, (307) 766-2143.

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INTRODUCTION

In July 1992, the Wyoming Department of Environmental Quality (DEQ) contracted with the Wyoming Water Resources Center (WWRC) at the University of Wyoming to create an underground injection well geographic information system (GIS) database for Wyoming DEQ's Underground Injection Control (UIC) Program (Hamerlinck, 1993). This was an initial step toward the ongoing goal to obtain a comprehensive spatial inventory of all UIC facilities in Wyoming. This project was finalized on June 30, 1993 but has not been updated in the period since.

In order to maintain the accuracy and applicability of this GIS database updates, and reviews of the data were required. On September 30, 1995 DEQ contracted with the WWRC once again to both update and enhance the UIC GIS database as well as to update the Public Water Supply (PWS) Operator Certification Program database.

Wyoming has a requirement that operators of public water supplies and publicly owned disposal systems must have a licensed operator for each system. In addition, all mobile home parks must register with the Wyoming Department of Agriculture. To notify operators of public water systems (PWS) the UIC Program has utilized the Department of Agriculture's list of trailer parks. The operator certification program has surveyed many of the operators of public water supplies and questioned each about sewage disposal. Within cities and counties, records exist of the size and location of various public water supplies and sewage disposal systems to varying degrees.

The purposes of this project were to build on work previously completed by the WWRC in 1993 developing a UIC Geographic Information System (GIS) for Wyoming and to update UIC and PWS databases. This document is the project's final report and will detail the methods employed and results obtained from the revisions and updates made to the DEQ/WQD databases. For further background on the UIC program or on the previous project refer to the original UIC-GIS final report (Hamerlinck, 1993).

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SCOPE

The primary objectives of the project were to identify potential UIC facilities from the previously permitted DEQ/WQD archives, use those facilities to update the UIC GIS database, and while reviewing the archives, identify previously unidentified PWS facilities. While DEQ/WQD began granting *Permits to Construct* to facilities in 1974, Wyoming did not gain primacy over the UIC program until 1983, leaving several years of permitted facilities that were never identified as UIC sites.

For the purposes of this effort, Class V facilities were limited to drainfields and leachfields of greater than 2,000 gallons per day or to facilities which show non-sanitary waste disposal. Additionally, a public water system in Wyoming is limited to sites that supply more than 20 service connections.

Six major tasks were identified for the project:

- 1) Identify Class V UIC facilities which may have been inventoried by the Operator Certification Program
- 2) Review archived *Permits to Construct* and identify both Class V UIC facilities and public water supplies
- 3) Update DEQ/WQD computer records
- 4) Creation of metadata for existing ARC/INFO data layers
- 5) Create ArcView presentation of UIC GIS data
- 6) Provide final report

METHODS

TASK 1 - IDENTIFY CLASS V UIC FACILITIES WHICH MAY HAVE BEEN LOCATED BY THE OPERATOR CERTIFICATION PROGRAM:

Officer certification program records consist of questionnaires returned by operators concerning the size and type of their public water supplies and wastewater facilities.

Task 1 consisted of reviewing these questionnaires and identifying all facilities which contained Class V systems making sure not to duplicate existing facilities. This list was then referenced to the *Permits to Construct* catalog.

TASK 2 - REVIEW PERMITS TO CONSTRUCT AND LOCATE BOTH CLASS V UIC FACILITIES AND PUBLIC WATER SUPPLIES:

Task 2 involved searching through archived records for *Permits to Construct* issued between 1974 and the present looking for UIC facilities that had not been initially permitted as such as well as Public Water Supply facilities.

The initial contract proposed examining permits based on a review of DEQ/WQD card files. These files proved to be too vague to be useful as they provided limited information about what type of facility was being referred to. Instead, the task became one of looking through DEQ/WQD notebooks containing a photocopied permit for each of the *Permits to Construct* issued. These, while still being vague, contained more information on the type of facility being described. From these records, facilities were identified that might potentially include Public Water Supplies or UIC wells. In addition to these photocopied permits, DEQ/WQD also possessed a database containing basic information about recent permits beginning in 1983. This database proved very valuable for identifying potential facilities. Using these data sources and the permits identified in Task 1, an initial list was compiled.

From the initial list, it was necessary to access state archive copies of the original permit documents and determine if the permit described either a Class V facility or a public water supply. In order to find these permits in the State of Wyoming archives, however, location codes had to be collected for each of the permits. The first step in obtaining these codes was to determine archive "MA###" numbers which were available in a DEQ notebook for approximately 80% of the records. These "MA###" numbers and the unlocatable permit numbers were then forwarded to the Archives office where shelf and box codes were assigned for most of the permits.

Approximately 1,100 permits were individually inspected and the plans reviewed on site; no permits were initially removed from the archives office. Proposed UIC and PWS permits were then identified and submitted to DEQ/WQD. This list was reviewed to identify and remove duplicate facilities. A formal request of these permits was then made from the Archives office. Upon Receipt, relevant information and maps from the permits for the UIC and PWS files was photocopied at DEQ/WQD. No original permits left the state offices. Once each permit was copied it was returned to the Wyoming State Archives.

TASK 3 - UPDATE DEQ/WQD COMPUTER RECORDS:

The DEQ/WQD maintains a database called FURS (Federal UIC Reporting System) for UIC records (Hamerlinck et al., 1993). This database is located on a personal computer in the DEQ/WQD office in Cheyenne. DEQ/WQD also maintains a database of operator certification records for all public water supplies and publicly owned treatment systems.

Task 3 included entering all relevant data fields in dBASE III format to allow both the UIC and operator certification databases to be updated.

From the permit copies obtained in Task 2, point locations were added to the ARC/INFO¹ GIS files originally created in 1993 for the DEQ/WQD by the WWRC (Hamerlinck et al., 1993). These locations were then attributed with a permit number and joined to the previously updated FURS database. Most of the permits had no detailed locational information other than Township, Range, Section, and Quarter/Quarter Section. This information and the coarse maps that existed in each permit were used to locate the facilities. Approximately 10 percent of the facilities contained detailed and well referenced maps. The facilities were referenced to 1:100,000 scale data available statewide. The GIS locations created should then be referred to as 1:100,000 scale.

¹ ARC/INFO is a registered trademark of Environmental Systems Research Institute, Inc., Redlands, CA USA

To reference the permits geographically, the point locations were added manually to the GIS database. A visual backdrop of Public Land Survey System (PLSS), Hydrography, and Transportation databases were used as reference. These GIS layers were previously compiled at 1:100,000 scale by the WWRC for previous projects. Each point was then visually located based on the reference map contained in the original Permit to Construct. Each point location was attributed with the DEQ permit number so it could later be tied to the FURS database.

TASK 4 - CREATION OF METADATA FOR EXISTING UIC ARC/INFO DATA LAYERS

The WWRC using the DOCUMENT.AML routine available with the ARC/INFO¹ version 7.1 software, created Federal Geographic Data Committee (FGDC) compliant metadata for the existing ARC/INFO data layers completed in 1993 (Appendix C). This metadata allows DEQ/WQD to conform with the FGDC Content Standards for Digital Geospatial Metadata as outlined in Executive Order 12906 instructing Federal agencies and other organizations utilizing federal funding to use this standard to document new and existing geospatial data beginning in 1995. This information describes the content, quality, condition, and other characteristics of the UIC digital database. Full metadata was also created for the new GIS point locations added to the database.

TASK 5 - CREATE ARCVIEW PRESENTATION OF UIC GIS DATA

Task 5 provided that an ArcView GIS project be created of existing UIC point data and new points to be created in this project to allow DEQ/WQD to easily access the GIS database created previously. ArcView GIS Version 3.0 (E.S.R.I., Inc, Redlands, CA) was to be purchased and installed on DEQ/WQD's UNIX workstations. Because of the extremely limited amount of data storage space available on these workstations, the task was revised to change the location of this ArcView presentation. The ArcView presentation and data were instead to be loaded onto a new Windows NT personal computer purchased by DEQ/WQD. ArcView will allow DEQ/WQD to not only access their UIC well locations, but also display them relative to existing DEQ/WQD transportation and hydrography data to produce simple and effecient maps. Spatial queries will also be available to DEQ personnel. Because several other independent GIS projects were to be housed on the same computer, a review of necessary data was necessary to prevent any unnecessary duplication of data.

TASK 6 - FINAL REPORT

A brief final report was to be submitted to DEQ/WQD at the conclusion of the project detailing work completed as part of the revised contract. This document fulfills that requirement.

RESULTS

As detailed earlier, approximately 1,100 individual permits were examined at the State of Wyoming archives office. Of those permits 129 have been proposed to the UIC program as potential permits (See appendix A). Photocopies of each permit and applicable maps have been made available to the UIC program. All of these permits have been located within the GIS files. In addition, 18 permits have been recommended for inclusion in the PWS program files (Appendix B).

In addition to the tasks mentioned above, a thorough review process was performed on both the methodology used and the final results obtained from the earlier project (Hamerlinck et al., 1993). First, at the request of the UIC program the revised GIS database no longer attempts to conform to the EPA Minimum Set of Data Elements (MSDE) (US EPA, 1992). This attempt to conform to the MSDE created approximately 400 fields in the database which contained no usable information and proceeded to make the database cumbersome in nature. Secondly, several of the point locations in the earlier GIS database were deleted when it was discovered that the facilities had never been constructed. Nine records were also modified to correct formatting errors.

CONCLUSIONS

The completed GIS database now contains two ARC/INFO coverages representing the locations of 805 UIC permitted facilities across the state updated through October 22, 1995. Of these facilities 509 individual injection wells are located as points at 1:100,000 scale, 296 wells located at 1:6,000 scale, and several thousand wells are included within the 42 polygon permit boundaries.

The completion of the underground injection well GIS will continue the progress that DEQ has made towards spatially referenced facility management. The GIS has the ability to provide comprehensive well-by-well tracking at the program implementation level as well as extensive map and report generating capabilities. Potential future applications of the database include the utilization of global positioning systems (GPS) technology to more accurately locate existing and new injection facilities. This technology will also be instrumental if the injection well database is expanded or integrated with other databases such as the public water supply database. This database, completed in 1996, was created exclusively with the use of GPS technology (Oakleaf, et. al.). These data layers together with the Ground-Water Vulnerability to Shallow UIC Facility maps being currently finalized provide a solid foundation for the continuance of GIS as a vital tool in UIC management.

REFERENCES

Hamerlinck, J. D., V. R. Hasfurther, and S. Needham. 1993. <u>Development of an Underground</u> <u>Injection Well Geographic Information System for Wyoming, WWRC-93-22</u>. Laramie, Wyoming: Wyoming Water Resources Center.

Oakleaf, J. R., and J. D. Hamerlinck, 1996. <u>Global Positioning System-Based Mapping of Public</u> <u>Water System Facilities in Wyoming, WWRC-96-13</u>. Laramie, Wyoming: Wyoming Water Resources Center.

U.S. Environmental Protection Agency. 1992. <u>Definitions for the Minimum Set of Data</u> <u>Elements for Ground Water Quality</u>. Washington, DC: Office of Water.

Appendix A **Proposed UIC Facilities**

Permit	Facility Name
75-106	40 Unit Motel
75-112	Green Acres Village
75-116	Cottonwood Court
75-121	Hilltop MHP
75-201	Wenger's Apt Bldg
75-3	Stansbury Mine
75-33	Stroup Addition
75-74	Ted's Supper Club
7 5-86	Skelly Truck Stop, Douglas
76-100	Uranium Supply Services
76-113	Stuckey's Septic
7 6- 134	Village Park MHP
76-143	Jaygee Bros
76-168	West Gas Hills
76-176	Bill White MHP
76-348	Mitchell Subdivision
76-84	Stampede Grounds, Cody
77-128	Brad Abelseth MHP
77-52	Sleeping Giant Ski Area
77-531	Sand Draw, Northern Utilities
77-8	Karls KOA, Cheyenne
77 -90	Lyon Moore MHP
78-205	Burleson Store
78-240	Assembly of God
78-384	Radon Springs, Texas Gulf
78-494	Federal American Partners
78-511	Neosho MHP
78-522	Kerr McGee
78-654	Ernie Johnson's MHP
78-713	Crescent H Lodge
78 -94	Trout Creek Inn
78 -9 8	Union Carbide
7 9-2 27	Chalk Butte MHP
79-230	Chabot Camp #1
79-3 7	Stauffer Chemical
79-443	Leuenberger Septic
7 9-4 7	Uinta Co. Youth Camp
79-548	LDS Church, Lyman
79-620	Roadside Inc
79-623	L & L MHP
79-715	Rainbow Subdivision
7 9- 728	Medicine Bow Coal
79-738	Antellope Valley Baptist
7 9- 88	Phil Campbell Motel
80-577	Porter Chopping
80-6 18	Moore Ranch

81-009	ROJO CABALLOS MINE
81-221	TENNESSEE ERNIES TRAILER ACRES
81-227	BUZZARDS ROOST REST ROOMS
81-350	WASTE DISPOSAL FACILITY
81-398	WASTEWATER TREATMENT FACILITY
82-040	2 C ALL EVENTS CENTER, INC.
82-376	ETNA ELEMENTARY SCHOOL
82-548	CARBON BASIN MINE
83-123	THE BELVEDERE
83-131	RED GRADE CHRISTIAN ACADEMY
83-199	STAR VALLEY JUNIOR HIGH SCHOOL
83-347	JOHNSON BROTHER'S CONSTRUCTION
83-494	LORD OF LORDS EVANGELICAL
83-554	WASTEWATER TREATMENT PLANT
84-057	GILCHRIST SCHOOL
84-123	FREEDOM L.D.S. WARD BUILDING
84-135	SUGARLAND URBAN MANOR MHP
84-146	IRA FELLOWS SEPTIC SYSTEM
84-310	GIRL SCOUTS OF THE U.S.A.
84-341	MARANATHA CHAPEL SEPTIC SYSTEM
84-368	TRIANGLE C RANCH
84-462	LUCKY MC MINE
84-470	HATCHET MOTEL
84-49 7	PAHASKA TEEPEE
84-518	HOLEMAN G.M. DIESEL WASTEWATER
84-555	TETON SHADOWS LEACHFIELD
85-077	HIGH VIEW MOBILE HOME PARK
85-129	HOY MHP SEP SYS MODIFICATIONS
85-160	RED LANE MOBILE HOME PARK
85-250	MORRIS MHP WW DISPOSAL SYSTEM
85-296	TETON SHADOWS WWT & DISPOSAL
85-351	HOGODON SKI AREA WWTF
85-355	BIG BEAR TRAILER CT SEP SYS
85-454	PRISONER MAN-CAMP
85-470	TETON PINES TEMPORAY WW FAC
85-494	PRISONER MAN-CAMP
85-613	WHD PORT OF ENTRY AND SHOP
85-620	RANCH A FISH TECHNOLOGY LAB
86-089	TEXACO SERVICE STATION
86-129	LAKESIDE LODGE SWW SYSTEM
86-238	SWEETWATER JUNCTION REST AREA
86-249	CATHEDRAL HOME FOR CHILDREN
86-332	TETON VALLEY RANCH CAMP
86-440	CALVARYMAN WW SYSTEM
86-454	DOWELL SCHLUMBERGER HYDRO SYS
87 -0 47	LARAMIE TIE PLANT-OIL ETC
87-160	UPRR LARAMIE TIE PLANT
87-359	TETON HIGH ADVENTURE BASE
87-416	WASTEWATER DRAIN FIELD
87-451	GRANDVIEW GARDENS TRAILER PARK

88-060	FIELD NO. 1 - SEPTIC SYSTEM
88-06 1	ANTELOPE COAL CO SEPTIC SYSTEM
88-063	BLACK THUNDER MINE SEPTIC SYS
88-095	KEYHOLE RESORT CAMPGROUND
88-103	ROLLAR, INC. SEWAGE DISPOSAL
88-191	MT VIEW ESTATES TC SECTION E
88-216	CHRISTENSEN RANCH PROD UNIT 3
88-326	OLD CHEYENNE
88-359	CRYSTAL VALLEY VIEW APARTMENTS
88-403	MOUNTAIN VIEW MOBILE HOME PARK
88-452	GLENROCK COAL COMPANY SUBSURF.
88-528	GOOSEBERRY CREEK REST AREA
89-016	BOAT CLUB DISPOSAL
89-219	T-JOE'S CAMP PARK
89-239	JENNY LAKE COMFORT STATION WWT
89-323	DEVIL'S TOWER KOA SEPTIC SYS
90-348	VEE BAR GUEST RANCH WW SYSTEM
90-438	CAVALRYMAN WASTEWATER SYSTEM 2
91-148	STRING LAKE COMFORT STATION
91-160	OSMOND ELEMENTARY SCHOOL ADDIT
91-324	LAKE VIVA NAUTHTON SEPT SYSTEM
91-347	MOOSE ENTERPRISE WATER & SEWER
92-051	HOLIDAY TRAVEL PKLONE EAGLE
92-318	COASTAL CHEM-MOD TO SEP SYSTEM
92-339	LINE SHACK SEPTIC SYSTEM
93-06 7	NATIONAL WILDLIFE ART MUSEUM
93-361	GEORGIA PACIFIC SEP TNK/LEACH
94-143	JENNY LAKE SEPTIC TANK/LEACH
94-209	RANCHO MOBILE HOME PARK
94-314	METCALF ELEMENTARY ON-SITE
94-404	ANTELOPE TRUCK STOP
95-163	TETON SCIENCE SCHOOL LEACH
95-166	ROOSEVELT LODGE WWTF

Permit	Facility Name	Number of Connections
88-300	Shady Acres Trailer Park	Unknown
88-338	A-K Trailer Court	40
76-176	Bill Wylie Trailer Court	20
78-68	East Saddle Subdivision	Many
76-168	Village Park Trailer Court	79
85-77	High View Mobile Home Park	Unknown
84-146	IRA Fellows	16 current + 4 later
78-240	Assembly of God Campground	30
78-511	Neosho Mobile Home Park	20
78-654	Ernie Johnson's Trailer Park Phase II	Many
89-219	T-Joe's Camppark	24
92-051	Holiday Travel Park	80
85-160	Red Lane Mobile Home Park	23
75-33	Stroup Addition	26
79-7 15	Rainbow Subdivision	23
77 -9 0	Lyon Moore Trailer Court	20
81-221	Tennessee Ernie's Mobile Home Park	30
88-95	Keyhole Resort Campground	20+

Appendix B Proposed PWS Facilities

Metadata for UIC-POINTS

Table of Contents

Identification_Information Abstract Purpose Supplemental Information Data_Quality_Information Spatial_Data_Organization_Information Entity_and_Attribute_Information Detailed Description Overview Distribution_Information Metadata Reference Section

Identification_Information

Citation Information

Originator: Christopher S. Arneson Publication Date: 1996 Title: 'Wyoming''s Enhanced Underground Injection Control GIS Database' Online_Linkage: www.sdvc.uwyo.edu

Description

Abstract

Contains all wells permitted by Wyomings Underground Injection Control (UIC) program which contain sufficient information in the permits to be locatable. Scale should be assumed to be approximately 1:100,000 but the spatial accuracy of each point varies according to the quality of locational information included in the original permits.

Purpose

This dataset was created for the Wyoming Department of Environmental Quality (DEQ), Water Quality Division for regional UIC planning purposes. It is not intended or suitable for site specific analysis at a scale larger than 1:100,000.

Supplemental Information

Procedures_Used

The procedures are more completely documented in the final reports for the two projects (Arneson and Hamerlinck, 1996; Hamerlinck, et. al., 1993a) responsible for the creation of the data. These publications are available from the Wyoming Water Resources Center.

Wyoming DEQ maintains a UIC file for each permitted facility in the state. Each file contains locational information of some sort and of varying quality. Many of these files contain maps showing facility location, but most contain only Township-Range descriptions. Because of this limitation these facilities are only located in the database by nearest Quarter-Quarter section (40 acres). When more detailed maps are available locations were transferred to 1:100,000 scale quadrangle maps and then digitized in ARC/INFO. The maps were paper copies and required to register with an RMS error of less than 0.006 inches. When wells had to be located using only the Township-Range description the TRLL program written by USGS in Fortran was used. (No reference available) An additional method was used to locate urban permits. Address matching from TIGER/Line files allowed point locations in the cities of Casper and Cheyenne to be located within their respective city blocks.

Revisions

This dataset contains revision 2.0 finalized in 1996. The previous version 1.0 was finalized in 1993 as a final product for the "Development of an Underground Injection Well Geographic Information System for Wyoming" project. This latest revision adds 129 new permits to the database. These permits were previously not viewed as UIC facilities.

Reviews Applied to Data

The data was reviewed by Robert Lucht, Engineering Supervisor, UIC Program, Wyoming Department of Environmental Quality.

Related Spatial and Tabular Data Sets

This GIS layer should not be used without first relating to the latest version of the FURS (Federal UIC Reporting System) database created by the UIC Program at WY-DEQ.

References Cited

Arneson, C.A.; and J.D. Hamerlinck. 1996. ENHANCING WYOMINGS UNDERGROUND INJECTION CONTROL PROGRAM DATABASE AND GEOGRAPHIC INFORMATION SYSTEM WWRC-96-14. Laramie, Wyoming. Wyoming Water Resources Center.

Hamerlinck, J.D.; V.R. Hasfurther and S. Needham. 1993a. DEVELOPMENT OF AN UNDERGROUND INJECTION WELL GEOGRAPHIC INFORMATION SYSTEM FOR WYOMING WWRC-93-22. Laramie, Wyoming. Wyoming Water Resources Center.

Hamerlinck, J.D.; D.R. Wrazien and S. Needham. 1993b. "Underground Injection Well Database Development for Groundwater Vulnerability Assessment Applications," in PROCEEDINGS, GIS/LIS 91, Minneapolis, MN, pp. 270-281.

INJECTION WELLS: AN INTRODUCTION TO THEIR USE, OPERATION, AND REGULATION. 1990. Oklahoma City, OK: Underground Injection Practices Council.

Notes

Time Period of Content Range of Dates/Times

Beginning_Date: 1974 Ending_Date: 1996 Currentness_Reference Metadata last edited 11-04-97.

Status

Progress: Version 2.0, updated through 10-22-95
Maintenance_and_Update_Frequency
Changes are made to this dataset as requested by WY-DEQ. They are
infrequent and dependent on unallocated discretionary funds becoming

available.

Spatial Domain

Bounding_Coordinates West_Bounding_Coordinate: -111.25 East_Bounding_Coordinate: -103.99999824 North_Bounding_Coordinate: 45.00000386 South_Bounding_Coordinate: 40.99999993

Keywords

Theme

Theme_Keyword_Thesaurus: None Theme_Keyword: Underground Injection Control, UIC, Wells, Injection Place Place_Keyword_Thesaurus: None Place_Keyword: State of Wyoming Stratum Stratum_Keyword_Thesaurus: None Stratum_Keyword: Temporal Temporal_Keyword:

Access_Constraints

Access to this dataset is available to the public. However, to obtain the FURS database which contains all attributing information, permission must be granted in writing by the Wyoming DEQ/WQD UIC program.

Use Constraints

This data is not intended for site specific analysis at a scale larger than 1:100,000. If used for regional analysis it should be joined or related to DEQs FURS database. This database contains detailed information about the nature and size of each permit.

Point of Contact: See Distribution Information for contact information.

Data Set Credit

If this dataset is used, please reference the Wyoming Water Resources Center (creator of the data) and the Wyoming Department of Environmental Quality, Water Quality Division (provider of the source files)

Security Information

Security_Classification_System: None Security_Classification: UNCLASSIFIED Security_Handling_Description: None

Native Data Set Environment: IRIX64 UNIX, ARC/INFO version 7.0.4

Cross_Reference Originator: Arneson, C.S. and J.D. Hamerlinck Publication_Date: 1996 Publication_Time: Title: Enhancing Wyomings Underground Injection Control Program and GIS Edition: Geospatial_Data_Presentation_Form: Series_Information Series_Name: WWRC-96

Issue Identification: 14 Publication Information Publication Place: Laramie, Wyoming Publisher: Wyoming Water Resources Center Other Citation Details: Online Linkage: Larger Work Citation: **Cross Reference** Originator: Hamerlinck, J.D., V.R. Hasfurther, and S. Needham Publication Date: 1993 Publication Time: Title: Development of a UIC Well GIS for Wyoming Edition: Geospatial Data Presentation Form: Series_Information Series Name: WWRC-93 Issue Identification: 22 Publication Information Publication_Place: Laramie, Wyoming Publisher: Wyoming Water Resources Center Other Citation Details: Online Linkage: Larger Work Citation: Cross Reference Originator: Hamerlinck, J.D., D.R. Wrazien and S. Needham Publication Date: 1993 Publication Time: Title: UIC Database for Groundwater Vulnerability Assesment Applications Edition: Geospatial Data Presentation Form: Series Information Series Name: Issue Identification: Publication Information Publication Place: Atlanta, GA Publisher: GIS/LIS Other Citation Details: GIS/LIS 91 Proceedings Online Linkage: Larger Work Citation:

Data_Quality_Information

Attribute Accuracy Attribute Accuracy Report: See Entity_Attribute_Information Quantitative Attribute Accuracy Assessment Attribute_Accuracy_Value: See Explanation Attribute_Accuracy_Explanation: Attribute accuracy is described, where present, with each attribute defined in the Entity and Attribute Section.

Logical Consistency Report: Point features present.

Completeness Report

All known UIC permits in Wyoming with sufficient locational information are

included.

```
Positional Accuracy
    Horizontal Positional Accuracy
        Horizontal Positional Accuracy Report:
        Unknown
        Quantitative Horizontal Positional Accuracy Assessment:
            Horizontal Positional Accuracy Value: N/A
            Horizontal Positional Accuracy Explanation: Resolution as reported
    Vertical Positional Accuracy
        Vertical Positional Accuracy Report:
        Unknown
Lineage: See Supplemental Information for overview.
Process Steps
    Process_Step
    Process Description: ARNESON APPEND UIC-POINTS POINT
    Source Used Citation Abbreviation:None
    Process Date: 19970408
Process Time: 1450
    Source Produced Citation Abbreviation: None
    Process Step
    Process Description: ARNESON
                                    DOCUMENT UIC-POINTS COPY
                                                              /DATA5/UIC/WY UIC ARNE
    Source Used Citation Abbreviation:None
    Process Date: 19970408
Process Time: 1654
    Source Produced Citation Abbreviation: None
    Process Step
    Process Description: ARNESON
                                   DOCUMENT UIC-POINTS UPDATE ARNESON
    Source Used Citation Abbreviation:None
    Process Date: 19970408
    Process Time: 1707
    Source Produced Citation Abbreviation: None
    Process Step
    Process Description: ARNESON
                                    DOCUMENT UIC-POINTS UPDATE ARNESON
    Source Used Citation Abbreviation:None
    Process Date: 19970411
    Process Time: 1448
    Source Produced Citation Abbreviation: None
Cloud Cover
N/A
```

Spatial_Data_Organization_Information

```
Direct Spatial Reference Method: Point
```

```
Point and Vector Object Information
SDTS Terms Description
SDTS Point and Vector Object Type: Point
```

```
Point_and_Vector_Object_Count: 805
SDTS_Point_and_Vector_Object_Type: String
Point_and_Vector_Object_Count: 0
SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains'
Point_and_Vector_Object_Count: 0
```

Spatial_Reference_Information

```
Horizontal_Coordinate_System_Definition

Geographic

Latitude_Resolution:

Longitude_Resolution:

Geographic_Coordinate_Units: Decimal Degrees

Geodetic Model

Horizontal_Datum_Name:

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6,378,206.4

Denominator_of_Flattening: 294.98
```

Entity_and_Attribute_Information

```
Detailed Description
    Entity Type
    Entity_Type_Label: UIC-POINTS.PAT
    Entity_Type_Definition: Table containing UIC permit numbers
    Entity Type Definition Source: WY DEQ UIC files
    Attribute:
        Attribute Label: -
        Attribute Definition: Table containing UIC permit numbers
        Attribute Definition Source: WY DEQ UIC files
        Attribute Domain Values
            Enumerated Domain
                Enumerated Domain Value: -
                Enumerated_Domain_Value_Definition
                Enumerated Domain Value Definition Source:
    Attribute:
        Attribute_Label: AREA
        Attribute Definition: Degenerate area of point
        Attribute_Definition_Source: Assigned
        Attribute_Domain_Values
            Enumerated Domain
                Enumerated Domain_Value: 0
                Enumerated Domain Value Definition
                Enumerated Domain Value Definition Source:
    Attribute:
        Attribute Label: PERIMETER
        Attribute Definition: Degenerate perimeter of point
        Attribute Definition Source: Assigned
        Attribute Domain Values
            Enumerated Domain
                Enumerated_Domain_Value: 0
                Enumerated Domain Value Definition
                Enumerated Domain Value Definition Source:
    Attribute:
        Attribute Label: UIC-POINTS#
```

Attribute Definition: Internal feature number Attribute Definition Source: Computed Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: Sequential unique positive integer Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: UIC-POINTS-ID Attribute_Definition: User-assigned feature number Attribute Definition Source: User-defined Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: Integer Enumerated_Domain_Value_Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: PERMIT NO Attribute Definition: WY DEQ, Water Quality Permit Number Attribute Definition Source: WY DEQ, Water Quality Permit archives Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: n/a Enumerated_Domain_Value_Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: X-COORD Attribute Definition: longitude of point in decimal degrees east from the pr Attribute Definition Source: derived from locational information in UIC perm Attribute Domain Values Enumerated Domain Enumerated Domain Value: -104 through -111.2 degrees Enumerated_Domain_Value_Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: Y-COORD Attribute Definition: Latitude of point in decimal degrees north from equato Attribute Definition Source: derived from UIC well permit Attribute Domain Values Enumerated Domain Enumerated Domain Value: Approximately 41 - 45 degrees Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: DLONG Attribute Definition: Degrees of Longitude Attribute Definition Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: -104 through -111 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: MLONG Attribute Definition: Minutes of Longitude Attribute Definition Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated_Domain_Value_Definition Enumerated Domain Value Definition Source:

Attribute: Attribute Label: SLONG Attribute Definition: Seconds of Longitude Attribute Definition Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: DLAT Attribute Definition: Degrees of Latitude Attribute Definition Source: converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 40 to 45 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: MLAT Attribute_Definition: Minutes of Latitude Attribute Definition Source: converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: 0 to 60 Enumerated_Domain_Value_Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: SLAT Attribute Definition: Seconds of Latitude Attribute Definition Source: Converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: MAP-SCALE Attribute_Definition: Scale the data was created at Attribute_Definition_Source: Attribute Domain Values Enumerated Domain Enumerated Domain Value: 6000 & 100000 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Overview Description

Entity and Attribute Overview

All attribute information for this dataset is contained in the .PAT table. This table contains locational information in geographic coordinates (lat/long) as well as a permit number field. This field is specifically created to join to DEQs FURS database.

Entity and Attribute Detail Citation: Not Available

Distribution_Information

Metadata_Reference_Section

Metadata Date: 19970411 Metadata Contact: Contact_Information: Contact Person Primary: Contact Person: Margo Herdendorf Contact Organization: Wyoming Water Resource Center Contact Position: GIS and Metadata Analyst Contact Address: Address Type: mailing address Address: PO BOX 3067 City: Laramie State_or_Province: WY Postal_Code: 82071 Country: USA Contact_Voice_Telephone: 307-766-2735 Contact Electronic Mail Address: mar@headwaters.wwrc.uwyo.edu Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata Metadata_Standard_Version: 19940608 Metadata_Time_Convention: Local Time Metadata_Security_Information: Metadata_Security_Classification_System: None Metadata_Security_Classification: UNCLASSIFIED Metadata_Security_Handling_Description: None

Last modified: 97-04-11.15:53:44.Fri

Metadata for UIC-POLY

Table of Contents

Identification_Information Abstract Purpose Supplemental Information Data_Quality_Information Spatial_Data_Organization_Information Entity_and_Attribute_Information Detailed Description Overview Distribution_Information Metadata Reference Section

Identification_Information

Citation Information

Originator: Christopher S. Arneson Publication_Date: 1996 Title: 'Wyoming''s Enhanced Underground Injection Control GIS Database' Online_Linkage: www.sdvc.uwyo.edu

Description

Abstract

Contains all wells permitted by Wyomings Underground Injection Control (UIC) program which contain sufficient information in the permits to be locatable. Scale should be assumed to be approximately 1:100,000 but the spatial accuracy of each point varies according to the quality of locational information included in the original permits. This file contains polygon boundaries of injection facilities. Often hundreds or thousands of individual wells can be contained within one polygon boundary.

Purpose

This dataset was created for the Wyoming Department of Environmental Quality (DEQ), Water Quality Division for regional UIC planning purposes. It is not intended or suitable for site specific analysis at a scale larger than 1:100,000.

Supplemental Information

Procedures Used

The procedures are more completely documented in the final reports for the two projects (Arneson and Hamerlinck, 1996; Hamerlinck, et. al., 1993a) responsible for the creation of the data. These publications are available from the Wyoming Water Resources Center. Wyoming DEQ maintains a UIC file for each permitted facility in

the state. Each file contains locational information of some sort and of varying quality. Many of these files contain maps showing facility location, but most contain only Township-Range descriptions. Because of this limitation these facilities are only located in the database by nearest Quarter-Quarter section (40 acres). When more detailed maps are available locations were transferred to 1:100,000 scale quadrangle maps and then digitized in ARC/INFO. The maps were paper copies and required to register with an RMS error of less than 0.006 inches.

Revisions

This dataset contains revision 2.0 finalized in 1996. The previous version 1.0 was finalized in 1993 as a final product for the "Development of an Underground Injection Well Geographic Information System for Wyoming" project. This latest revision adds 129 new permits to the database. These permits were previously not viewed as UIC facilities.

Reviews Applied to Data

The data was reviewed by Robert Lucht, Engineering Supervisor, UIC Program, Wyoming Department of Environmental Quality.

Related Spatial and Tabular Data Sets

This GIS layer should not be used without first relating to the latest version of the FURS (Federal UIC Reporting System) database created by the UIC Program at WY-DEQ.

References Cited

Arneson, C.A.; and J.D. Hamerlinck. 1996. ENHANCING WYOMINGS UNDERGROUND INJECTION CONTROL PROGRAM DATABASE AND GEOGRAPHIC INFORMATION SYSTEM WWRC-96-14. Laramie, Wyoming. Wyoming Water Resources Center.

Hamerlinck, J.D.; V.R. Hasfurther and S. Needham. 1993a. DEVELOPMENT OF AN UNDERGROUND INJECTION WELL GEOGRAPHIC INFORMATION SYSTEM FOR WYOMING WWRC-93-22. Laramie, Wyoming. Wyoming Water Resources Center.

Hamerlinck, J.D.; D.R. Wrazien and S. Needham. 1993b. "Underground Injection Well Database Development for Groundwater Vulnerability Assessment Applications," in PROCEEDINGS, GIS/LIS 91, Minneapolis, MN, pp. 270-281.

INJECTION WELLS: AN INTRODUCTION TO THEIR USE, OPERATION, AND REGULATION. 1990. Oklahoma City, OK: Underground Injection Practices Council.

Notes

Time_Period_of_Content

Range of Dates/Times
Beginning Date: 1974
Ending Date: 1996
Currentness Reference
Metadata last edited 11-April-97.

Status

Progress: Version 2.0, updated through 10-22-95 **Maintenance and Update Frequency** Changes are made to this dataset as requested by WY-DEQ. They are infrequent and dependent on unallocated discretionary funds becoming available.

Spatial Domain

Bounding Coordinates

West_Bounding_Coordinate: -109.9429778 East_Bounding_Coordinate: -105.33080877 North_Bounding_Coordinate: 44.15618718 South_Bounding_Coordinate: 41.2929291

Keywords

Theme Theme_Keyword_Thesaurus: None Theme_Keyword: Underground Injection Control, UIC, Wells, Injection Place Place_Keyword_Thesaurus: None Place_Keyword: State of Wyoming Stratum Stratum_Keyword_Thesaurus: None Stratum_Keyword: Temporal Temporal_Keyword: None Temporal_Keyword:

Access_Constraints

Access to this dataset is available to the public. However, to obtain the FURS database which contains all attributing information, permission must be granted in writing by the Wyoming DEQ/WQD UIC program.

Use Constraints

This data is not intended for site specific analysis at a scale larger than 1:100,000. If used for regional analysis it should be joined or related to DEQs FURS database. This database contains detailed information about the nature and size of each permit.

Point of Contact: See Distribution Information for contact information.

Data Set Credit

If this dataset is used, please reference the Wyoming Water Resources Center (creator of the data) and the Wyoming Department of Environmental Quality, Water Quality Division (provider of the source files)

Security Information

Security_Classification_System: None Security_Classification: UNCLASSIFIED Security Handling Description: None

Native_Data_Set_Environment: IRIX64 UNIX, ARC/INFO version 7.0.4

Cross_Reference Originator: Arneson, C.S. and J.D. Hamerlinck Publication_Date: 1996 Publication_Time: Title: Enhancing Wyomings Underground Injection Control Program and GIS Edition: Geospatial_Data_Presentation_Form: Series_Information Series_Name: WWRC-96 Issue_Identification: 14 Publication_Information Publication Place: Laramie, Wyoming

```
Publisher: Wyoming Water Resources Center
    Other Citation Details:
    Online Linkage:
   Larger Work Citation:
Cross Reference
    Originator: Hamerlinck, J.D., V.R. Hasfurther, and S. Needham
   Publication Date: 1993
   Publication Time:
    Title: Development of a UIC Well GIS for Wyoming
    Edition:
    Geospatial Data Presentation Form:
    Series Information
        Series Name: WWRC-93
        Issue Identification: 22
    Publication Information
       Publication Place: Laramie, Wyoming
        Publisher: Wyoming Water Resources Center
    Other Citation Details:
    Online Linkage:
    Larger Work Citation:
Cross Reference
    Originator: Hamerlinck, J.D., D.R. Wrazien and S. Needham
    Publication Date: 1993
    Publication Time:
    Title: UIC Database for Groundwater Vulnerability Assesment Applications
    Edition:
    Geospatial Data Presentation Form:
    Series Information
        Series Name:
        Issue Identification:
    Publication Information
        Publication Place: Atlanta, GA
        Publisher: GIS/LIS
    Other Citation Details: GIS/LIS 91 Proceedings
    Online Linkage:
    Larger Work Citation:
```

Data_Quality_Information

```
Attribute Accuracy

Attribute Accuracy Report: See Entity_Attribute_Information

Quantitative Attribute Accuracy Assessment

Attribute Accuracy_Value: See Explanation

Attribute Accuracy Explanation:

Attribute accuracy is described, where present, with each

attribute defined in the Entity and Attribute Section.
```

Logical Consistency Report: Polygon topology present.

Completeness Report

All known UIC permits in Wyoming with sufficient locational information are included.

Positional Accuracy Horizontal Positional Accuracy Horizontal Positional Accuracy_Report: Unknown Quantitative_Horizontal Positional Accuracy Assessment: Horizontal_Positional_Accuracy_Value: N/A Horizontal Positional Accuracy Explanation: Resolution as reported Vertical Positional Accuracy Vertical Positional Accuracy Report: Unknown Lineage: See Supplemental Information for overview. Process Steps Process Step Process Description: ARNESON APPEND ../OLD-UIC-POL POLY Source_Used Citation Abbreviation:None Process_Date: 19960905 Process_Time: 1102 Source_Produced_Citation_Abbreviation: None Process Step Process Description: ARNESON RENAME OLD-UIC-POL OLD-UIC-POLY Source Used Citation Abbreviation:None Process Date: 19960905 Process Time: 1106 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON CLEAN OLD-UIC-POLY OLD-UIC-POLY1 0 .0000000001 Source Used Citation Abbreviation:None Process Date: 19960905 Process Time: 1112 Source_Produced_Citation_Abbreviation: None Process Step Process Description: ARNESON ARCEDIT /DATA2/GIS/UIC2/OLD-UIC-POLY1 Source Used Citation Abbreviation:None Process Date: 19960919 Process Time: 1035 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON RENAME OLD-UIC-POLY1 OLD-UIC-POLY Source Used Citation Abbreviation:None Process Date: 19960919 Process Time: 1035 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON ARCEDIT /DATA2/GIS/UIC2/OLD-UIC-POLY Source Used Citation Abbreviation:None Process Date: 19960919

Process Time: 1319

Process Date: 19960919 Process Time: 1319

Process Step

Source Produced_Citation_Abbreviation: None

Source_Produced Citation Abbreviation: None

Source_Used Citation Abbreviation:None

Process Description: ARNESON BUILD OLD-UIC-POLY

Process Step Process Description: EXTERNALALL Source Used Citation Abbreviation:None Process Date: 19961003 Process Time: 1503 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON PROJECT COVER OLD-UIC-POLY OLD-UIC-POLY1 Source Used Citation Abbreviation:None Process_Date: 19970106 Process_Time: 848 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON BUILD OLD-UIC-POLY1 Source Used Citation Abbreviation:None Process_Date: 19970106 Process Time: 848 Source Produced Citation Abbreviation: None Process Step Process_Description: ARNESON RENAME OLD-UIC-POLY1 OLD-UIC-POLY Source_Used_Citation_Abbreviation:None Process_Date: 19970106 Process Time: 848 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON COPY ../UIC2/OLD-UIC-POLY UIC-POLY Source Used Citation Abbreviation:None Process Date: 19970106 Process Time: 950 Source Produced Citation Abbreviation: None Process Step Process Description: ARNESON PROJECT COVER UIC-POLY UIC-POLY1 Source Used Citation Abbreviation:None Process Date: 19970106 Process Time: 1505 Source Produced Citation_Abbreviation: None Process Step Process Description: ARNESON BUILD UIC-POLY1 Source Used Citation Abbreviation:None Process Date: 19970106 Process Time: 1506 Source Produced_Citation_Abbreviation: None Process Step Process Description: ARNESON BUILD UIC-POLY1 Source Used Citation Abbreviation:None Process Date: 19970106 Process Time: 1507 Source_Produced_Citation_Abbreviation: None Process Step Process Description: ARNESON RENAME UIC-POLY1 UIC-POLY Source Used Citation Abbreviation:None Process Date: 19970106 Process Time: 1509 Source Produced Citation Abbreviation: None Process Step DOCUMENT UIC-POLY COPY /DATA5/UIC/UIC-POINTS AR Process Description: ARNESON Source Used Citation Abbreviation:None Process_Date: 19970411 Process Time: 1450 Source Produced Citation Abbreviation: None Process Step

```
Process Description: ARNESON DOCUMENT UIC-POLY UPDATE ARNESON
Source_Used_Citation_Abbreviation:None
Process_Date: 19970411
Process_Time: 1458
Source_Produced_Citation_Abbreviation: None
```

Cloud_Cover N/A

Spatial_Data_Organization_Information

```
Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information

SDTS_Terms_Description

SDTS_Point_and_Vector_Object_Type: Point

Point_and_Vector_Object_Count: 43

SDTS_Point_and_Vector_Object_Type: String

Point_and_Vector_Object_Count: 52

SDTS_Point_and_Vector_Object_Type: GT-polygon_composed of chains'

Point_and_Vector_Object_Count: 42
```

Spatial_Reference_Information

```
Horizontal_Coordinate_System_Definition

Geographic

Latitude_Resolution:

Longitude_Resolution:

Geographic_Coordinate_Units: Decimal Degrees

Geodetic Model

Horizontal_Datum_Name: North American Datum of 1927

Ellipsoid_Name: Clarke 1866

Semi-major_Axis: 6,378,206.4

Denominator_of_Flattening: 294.98
```

Entity_and_Attribute_Information

```
Detailed Description

Entity_Type

Entity_Type_Label: UIC-POLY.PAT

Entity_Type_Definition: Table containing UIC permit numbers

Entity_Type_Definition_Source: WY DEQ UIC files

Attribute:

Attribute_Label: -

Attribute_Definition: Table containing UIC permit numbers

Attribute_Definition_Source: WY DEQ UIC files

Attribute_Domain_Values

Enumerated_Domain

Enumerated_Domain_Value: -

Enumerated_Domain_Value_Definition

Enumerated_Domain_Value_Definition_Source:
```

Attribute: Attribute Label: AREA Attribute Definition: Degenerate area of point Attribute Definition Source: Assigned Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: PERIMETER Attribute Definition: Degenerate perimeter of point Attribute Definition Source: Assigned Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: UIC-POLY# Attribute Definition: Internal feature number Attribute Definition Source: Computed Attribute Domain Values Enumerated Domain Enumerated Domain Value: Sequential unique positive integer Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: UIC-POLY-ID Attribute Definition: User-assigned feature number Attribute Definition Source: User-defined Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: Integer Enumerated Domain Value Definition Enumerated_Domain_Value_Definition_Source: Attribute: Attribute Label: PERMIT NO Attribute Definition: WY DEQ, Water Quality Permit Number Attribute Definition Source: WY DEQ, Water Quality Permit archives Attribute Domain Values Enumerated Domain Enumerated Domain Value: n/a Enumerated Domain Value Definition Enumerated_Domain_Value_Definition_Source: Attribute: Attribute Label: X-COORD Attribute Definition: longitude of point in decimal degrees east from the pr Attribute Definition_Source: derived from locational information in UIC perm Attribute Domain Values Enumerated Domain Enumerated Domain Value: -104 through -111.2 degrees Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: Y-COORD Attribute Definition: Latitude of point in decimal degrees north from equato Attribute Definition Source: derived from UIC well permit Attribute Domain Values Enumerated Domain Enumerated Domain Value: Approximately 41 - 45 degrees

Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: DLONG Attribute Definition: Degrees of Longitude Attribute Definition Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: -104 through -111 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute_Label: MLONG Attribute Definition: Minutes of Longitude Attribute_Definition_Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: SLONG Attribute Definition: Seconds of Longitude Attribute Definition Source: converted from X-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated_Domain_Value_Definition Source: Attribute: Attribute Label: DLAT Attribute Definition: Degrees of Latitude Attribute_Definition_Source: converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated_Domain_Value: 40 to 45 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: MLAT Attribute Definition: Minutes of Latitude Attribute Definition Source: converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated Domain Value Definition Source: Attribute: Attribute Label: SLAT Attribute Definition: Seconds of Latitude Attribute Definition Source: Converted from Y-Coord Attribute Domain Values Enumerated Domain Enumerated Domain Value: 0 to 60 Enumerated Domain Value Definition Enumerated_Domain_Value_Definition_Source: Attribute: Attribute Label: MAP-SCALE Attribute Definition: Scale the data was created at Attribute Definition Source: Attribute Domain Values

Enumerated_Domain Enumerated_Domain_Value: 6000 & 100000 Enumerated_Domain_Value_Definition Enumerated_Domain_Value_Definition_Source:

Overview Description

Entity and Attribute Overview

All attribute information for this dataset is contained in the .PAT table. This table contains locational information in geographic coordinates (lat/long) as well as a permit number field. This field is specifically created to join to DEQs FURS database.

Entity and Attribute Detail Citation: Not Available

Distribution_Information

Metadata_Reference_Section

Metadata_Date: 19970411
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact Person: Margo Herdendorf
Contact_Organization: Wyoming Water Resource Center
Contact_Position: GIS and Metadata Analyst
Contact Address:
Address Type: mailing address
Address: PO BOX 3067
City: Laramie
State or Province: WY
Postal Code: 82071
Country: USA
Contact Voice Telephone: 307-766-2735
Contact Electronic Mail Address: mar@headwaters.wwrc.uwyo.edu
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: 19940608
Metadata_Time_Convention: Local Time
Metadata_Security_Information:
Metadata_Security_Classification_System: None
Metadata_Security_Classification: UNCLASSIFIED
Metadata_Security_Handling_Description: None

Last modified: 97-04-11.15:54:31.Fri