

# Geothermal Heat Pump Well Permitting and Regulatory Requirements

Jim Goddard

Well Drilling Program Manager

---

Utah Division of Water Rights



# WHO REGULATES HEAT PUMP SYSTEMS

---

- # Utah Division of Water Rights
  - Vertical systems greater than 30 feet
- # Utah Division of Water Quality
  - Re-injection of open-loop systems
- # Utah Division of Occupational and Professional Licensing
  - Contractor's License for system beyond the well?
- # City or County Jurisdictions
  - Ordinances, codes, and permits



# Administrative Rules for Water Well Drillers (R655-4 Utah Administrative Code)

## STATE OF UTAH WATER WELL HANDBOOK

BASED ON THE ADMINISTRATIVE RULES  
FOR WATER WELL DRILLERS  
(R655-4 UAC)

Adopted September 2008



DIVISION OF WATER RIGHTS

KENT L. JONES, P.E.  
State Engineer

**“Provide  
order and certainty  
in the beneficial use  
of Utah’s water”**



# SCOPE OF RULES

## (Regulated Wells/License Required)

---

### # Production Wells Greater than 30 feet deep

- Permitted through WR Process in WR database and associated with a WR#
  - Domestic
  - Irrigation
  - Stock
  - Public Supply
  - Commercial/industrial
  - **Open Loop Heat Exchange Wells**
  - Well Renovation & Replacement



# SCOPE OF RULES

## (Regulated Wells/License Required)

---

- # Non-Production Wells (NPW) greater than 30 feet
  - Permitted through NPW process in well drilling database and associated with a NPW number (aka M00 #)
    - Test Wells
    - Monitoring Wells
    - Cathodic Protection Wells
    - **Closed Loop Heat Exchange Wells**
    - Misc. Wells (Piezometers, inclinometers, anode)

# WELL DRILLING DEFINITION

---

- Well drilling means the act of drilling, constructing, repairing, renovating, deepening, cleaning, developing, or abandoning a well
- Incidental or appurtenant work around the well is not regulated by the Rules

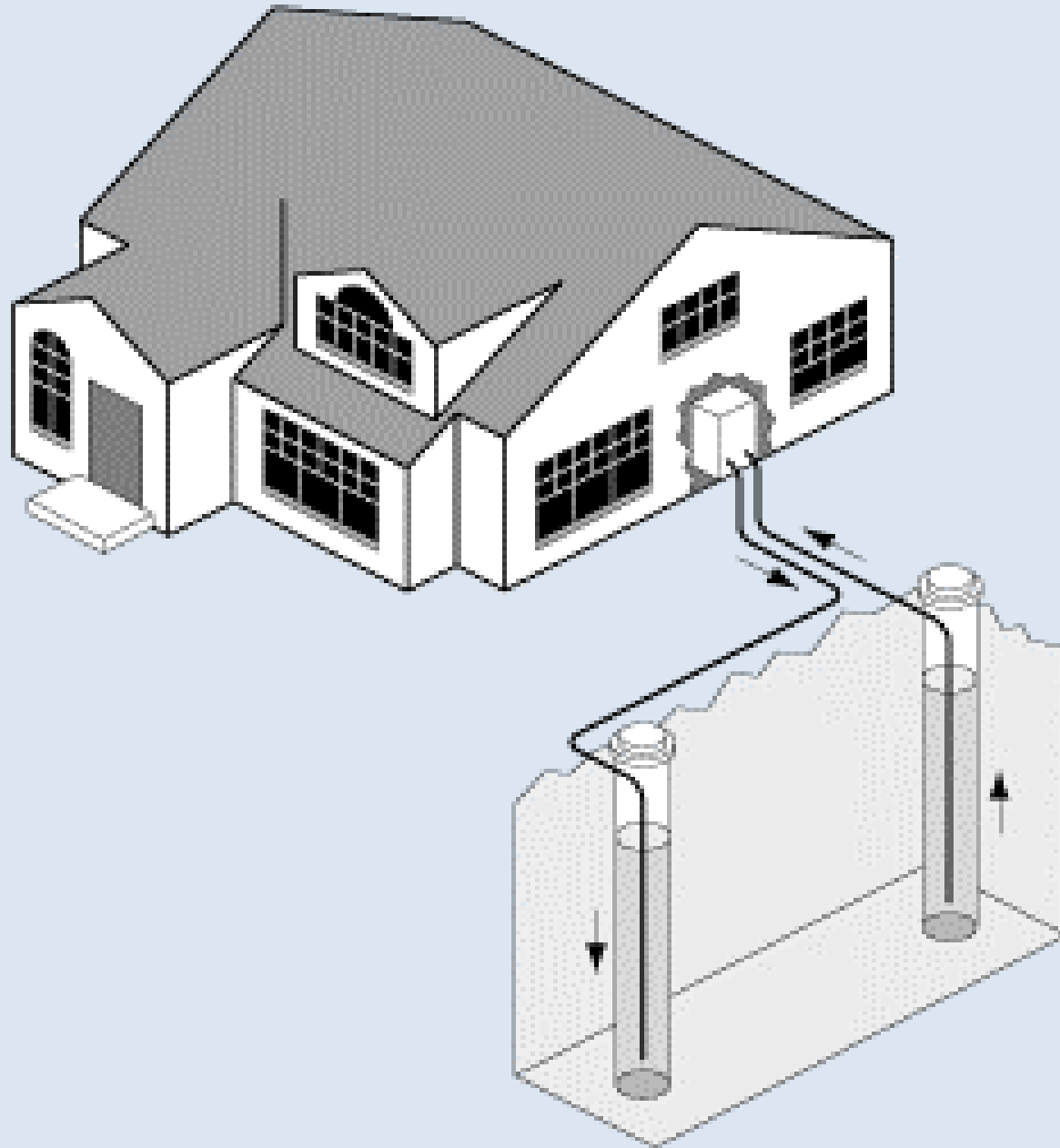


# OPEN LOOP SYSTEMS

---

- # Groundwater is removed from aquifer via well, circulated through heat exchange system, then re-injected back into aquifer
  - Re-injection into production well, separate injection well, or to a surface diversion
- # A non-consumptive use water right is required if re-injecting into same aquifer (aquifer protection and non-degradation standards apply)
- # A consumptive use water right is needed if discharging to surface
- # Wells must be drilled by a licensed driller and water well construction standards apply

# Open Loop Systems





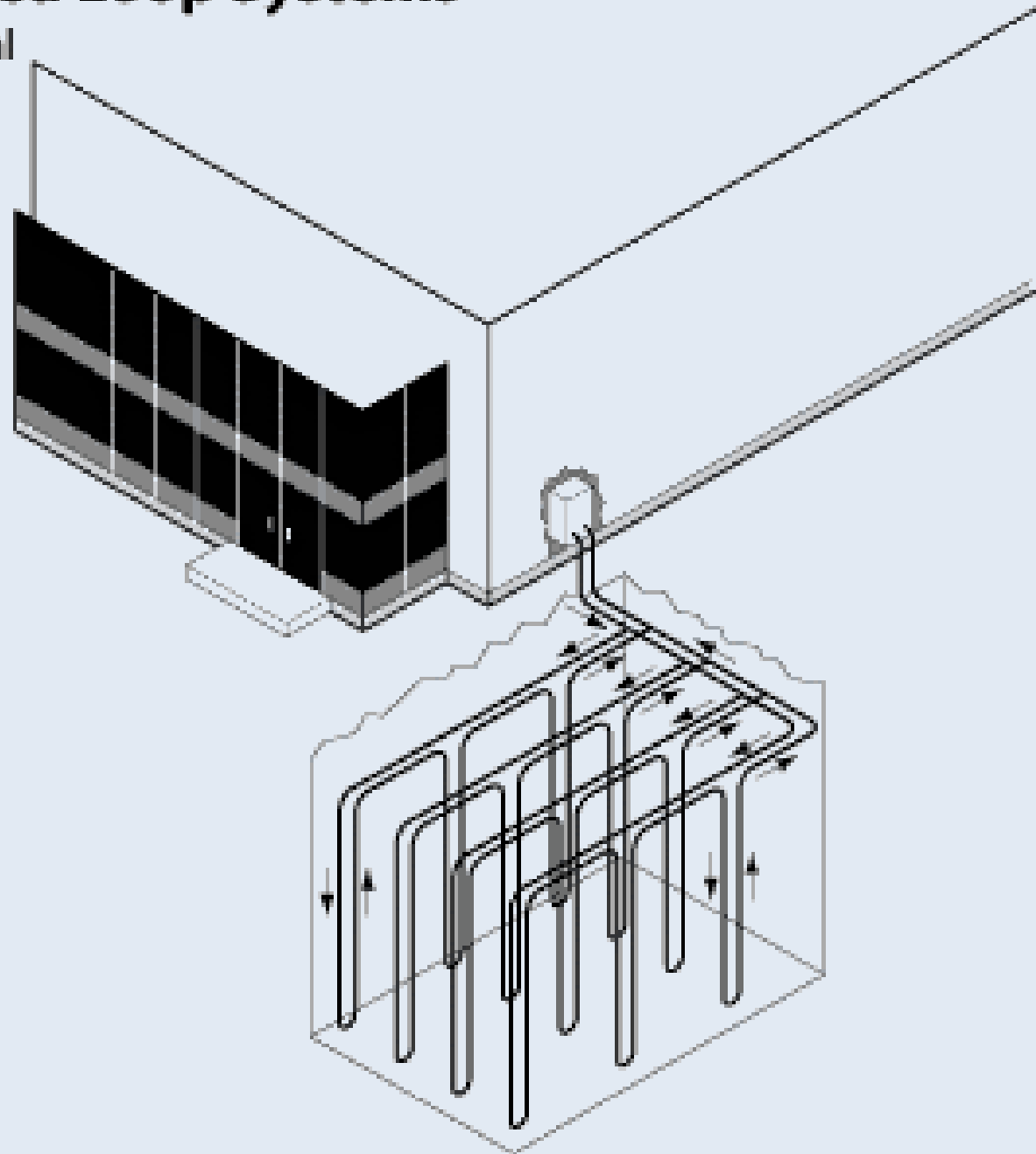
# CLOSED LOOP SYSTEMS

---

- # Groundwater is not removed, nor does the system fluid come into contact with groundwater (sealed and closed system)
- # A closed loop of poly pipe (standard) or copper tubing (direct exchange or DX) is installed into boring and grouted/sealed bottom to top, then an antifreeze/water solution or refrigerant is circulated through the loops
- # A Non-Production Well Permit is required
- # Must be drilled and constructed by a licensed driller and non-production well construction standards apply

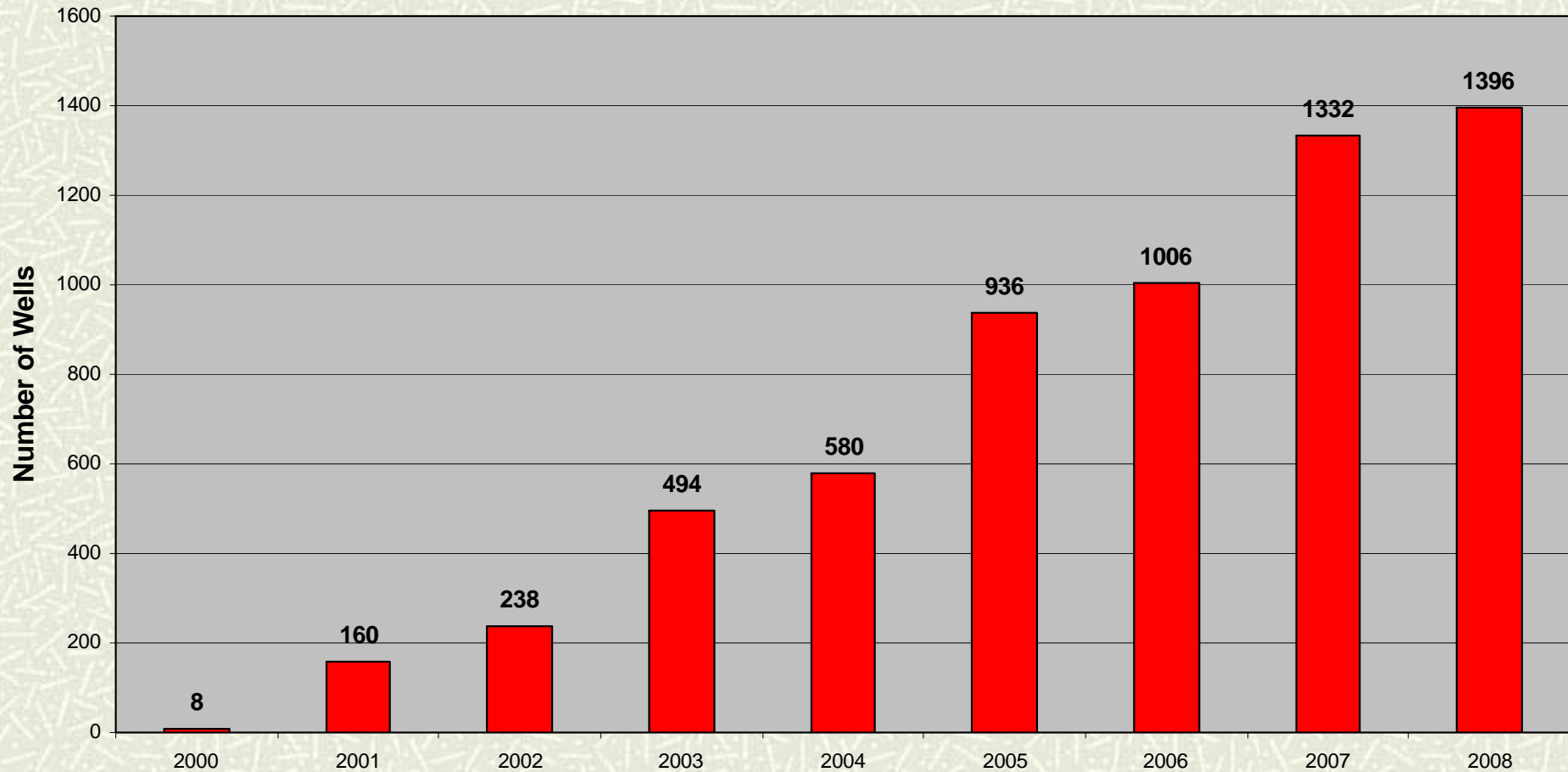
# Closed Loop Systems

Vertical





## Utah Closed Loop Well Activity



# Holes in the Regulations?

---

- # Systems installed less than 30 feet deep
- # No control over incidental or appurtenant activity beyond the well
- # Accidental or intentional non-compliance by driller
- # Closed loop system abandonment



# How to Find Heat Pump Well Info?

---

- # From the driller page
- # From the online Well Drilling Database
- # From the online Water Rights Database

[www.waterrights.utah.gov](http://www.waterrights.utah.gov)



State Online Services

Agency List

Business.utah.gov

Search Utah.gov

GO

## UTAH DIVISION OF WATER RIGHTS

WATER RIGHTS

WELLS

DAMS

STREAM ALTERATION

GIS DATA

PUBLICATIONS

FLOW RECORDS

MEETINGS

WEB SITE  
INFORMATION

## Main Page

Revised: June 27, 2002

The Utah Division of Water Rights is an agency of Utah State Government within the Department of Natural Resources. Records, information, and forms for regulatory activities administered by the agency are available from this WWW site. We hope the information will be of assistance to you. We welcome suggestions and questions.

[Natural Resources](#) | [Contact](#) | [Disclaimer](#) | [Privacy Policy](#) | [Accessability Policy](#)



start



2 Novell Gr...



Infractions



3 Microsoft...



2003 Enforc...



Radio@Nets...



Utah Water ...



Internet



10:23 AM





State Online Services

Agency List

Business.utah.gov

Search Utah.gov

GO

## UTAH DIVISION OF WATER RIGHTS

FORMS

QUERIES

NOTICES

RULES/POLICIES

ADJUDICATION

GLOSSARY OF  
TERMS

## Water Right Information

Revised: August 1, 2003

The Division of Water Rights is the state agency that regulates appropriation and distribution of water in the state of Utah. It is an office of public record. All water right records are available in the Salt Lake City office or from this WWW site.

The Utah pioneers in the late 1840's were the first Anglo-Saxons to practice irrigation on an extensive scale in the United States. Being a desert, Utah contained much more cultivable land than could be watered from the incoming mountain streams. The principle was established that those who first made beneficial use of water should be entitled to continued use in preference to those who came later. This fundamental principal was later sanctioned and is known as the Doctrine of Prior Appropriation. This means those with earliest priority dates who have continuously used the water since that time have the right to water from a certain source before others with later priority dates.

In the early Territorial days, rights to the use of public streams of water were acquired by actual diversion and application of water to beneficial use, or by legislative grant. A county courts water legislation was enacted in 1852, and was in effect until 1880, when it was replaced by a statute for the provision for county water commissioners.

The Utah State Engineer's Office was created in 1897. The State Engineer is the chief water rights administrative officer. A complete "water code" was enacted in 1903 and was revised and reenacted in 1919. This law, with succeeding complete reenactments of State statutes, and, as amended, is presently in force mostly as [Utah Code, Title 73](#). In 1963 the name was changed to the Division of Water Rights, but the public sometimes still refers to the division as the State Engineer's Office.

All waters in Utah are public property. A water right is a right to the use of water based upon 1) quantity, 2) source 3) priority date, 4) nature of use, 5) point of diversion and 6) physically putting water to beneficial use.

Rights for water use prior to 1903 can be claimed according to statute by filing a water user's claim with the State Engineer. Certain underground water diversions established prior to 1935 are also a basis for a water right and claims may be filed at the office of the State Engineer.



start



Internet

10:24 AM



State Online Services

Agency List

Business.utah.gov

Search Utah.gov

GO

## UTAH DIVISION OF WATER RIGHTS

WATER RIGHT  
NUMBER

NAME / SOURCE

POINT OF  
DIVERSION  
(POD)PLACE OF USE  
(POU)

LISTS

## Querying Water Right Records

Revised: October 3, 2003

The Utah Division of Water Rights maintains a file for each water right in the State of Utah. A water right file contains applications, correspondence, and other historical documents which pertain to the right. These paper documents are scanned and can be accessed through this query page.

The Division also maintains a computerized database of water right information which contains pertinent information for each right. Various search and listing routines are available to access the database information quickly and easily.

[Natural Resources](#) | [Contact](#) | [Disclaimer](#) | [Privacy Policy](#) | [Accessibility Policy](#)

start



Internet

10:24 AM



State Online Services

Agency List

Business.utah.gov

Search Utah.gov

GO

## UTAH DIVISION OF WATER RIGHTS



## WRPLAT Point of Diversion Query Program

Version: 2004.01.05.00

Rundate: 01/14/2004 10:15 AM

Section/Township Search

Radius Search

Traverse Area Search

Online Map Search

Quit

## QUERY TYPE LIMITATIONS

STATUS OF RIGHT	TYPE OF DIVERSION	APPLICATION TYPE	WATER USE TYPE
<input checked="" type="checkbox"/> Unapproved	<input checked="" type="checkbox"/> Underground	<input checked="" type="checkbox"/> Water Right	<input checked="" type="checkbox"/> Irrigation
<input checked="" type="checkbox"/> Approved	<input checked="" type="checkbox"/> Surface	<input checked="" type="checkbox"/> Changes	<input checked="" type="checkbox"/> Stock Water
<input checked="" type="checkbox"/> Perfected	<input checked="" type="checkbox"/> Springs	<input checked="" type="checkbox"/> Exchanges	<input checked="" type="checkbox"/> Domestic
<input type="checkbox"/> Terminated	<input checked="" type="checkbox"/> Drains	<input type="checkbox"/> Test Wells	<input checked="" type="checkbox"/> Municipal
	<input checked="" type="checkbox"/> Point to Point	<input type="checkbox"/> Sewage Reuse	<input checked="" type="checkbox"/> Mining
	<input checked="" type="checkbox"/> Rediversion		<input checked="" type="checkbox"/> Power
			<input checked="" type="checkbox"/> Other

[Natural Resources](#) | [Contact](#) | [Disclaimer](#) | [Privacy Policy](#) | [Accessability Policy](#)



**WRPLAT Point of Diversion Query Program****Version: 2004.01.05.00      Rundate: 01/14/2004 10:15 AM****Section Query Page**   

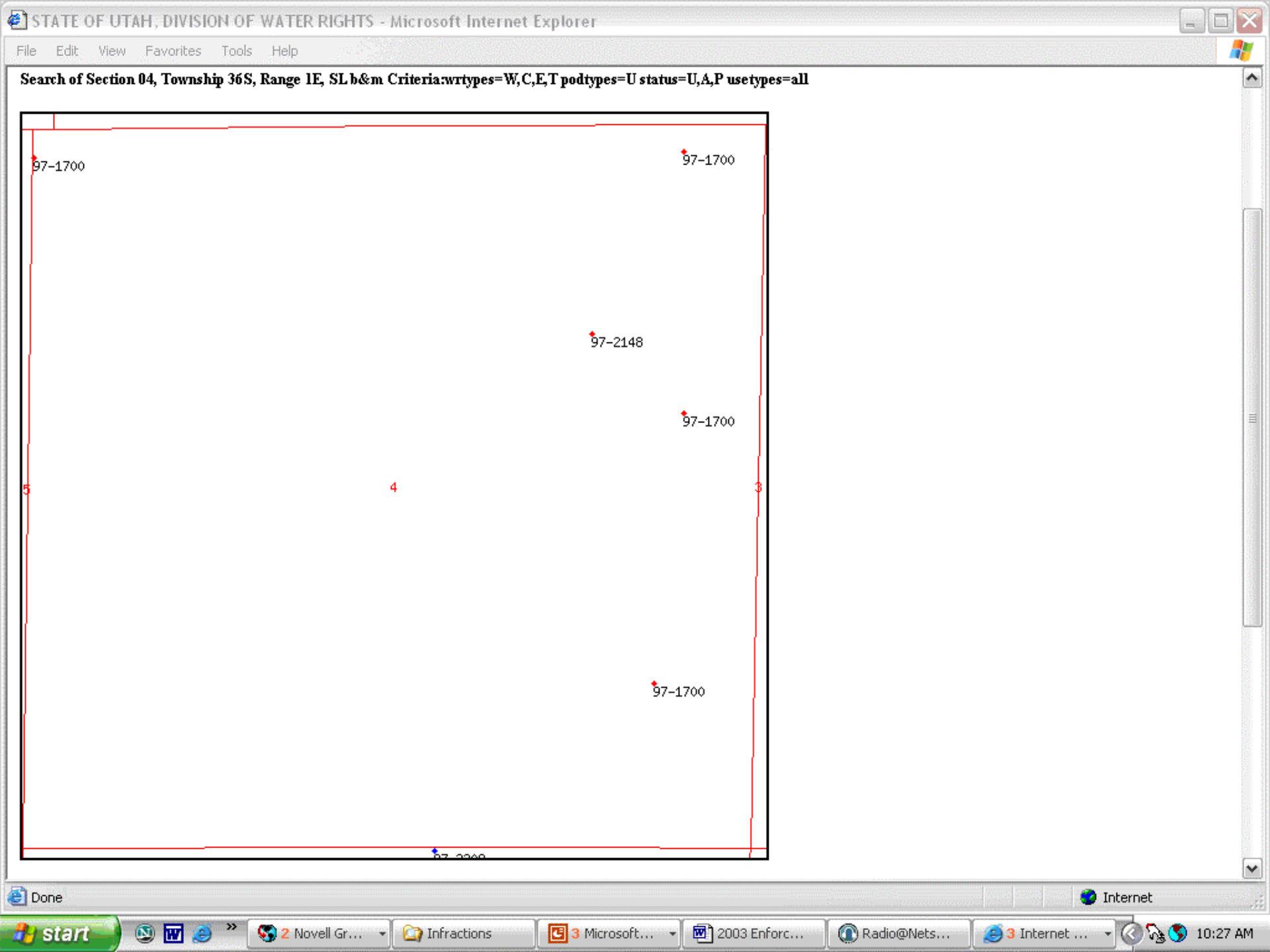
Fill in the information below and press "Search" or "Browse" buttons to perform a point of diversion search on a section or township.

Section: 04  
Township: 36S  
Range: 1E  
B&M: SL

**QUERY TYPE LIMITATIONS**

STATUS OF RIGHT	TYPE OF DIVERSION	APPLICATION TYPE	WATER USE TYPE
<input checked="" type="checkbox"/> Unapproved	<input checked="" type="checkbox"/> Underground	<input checked="" type="checkbox"/> Water Right	<input checked="" type="checkbox"/> Irrigation
<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Surface	<input checked="" type="checkbox"/> Changes	<input checked="" type="checkbox"/> Stock Water
<input checked="" type="checkbox"/> Perfected	<input type="checkbox"/> Springs	<input checked="" type="checkbox"/> Exchanges	<input checked="" type="checkbox"/> Domestic
<input type="checkbox"/> Terminated	<input type="checkbox"/> Drains	<input checked="" type="checkbox"/> Test Wells	<input checked="" type="checkbox"/> Municipal
	<input type="checkbox"/> Point to Point	<input type="checkbox"/> Sewage Reuse	<input checked="" type="checkbox"/> Mining
	<input type="checkbox"/> Rediversion		<input checked="" type="checkbox"/> Power
			<input checked="" type="checkbox"/> Other

[Natural Resources](#) | [Contact](#) | [Disclaimer](#) | [Privacy Policy](#) | [Accessibility Policy](#)

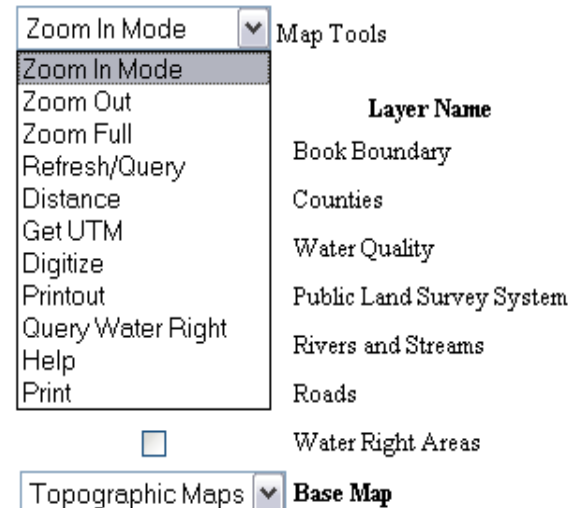


**Water Rights**

WR Number	Diversion Type/Location	Well Log	Status	Priority	Uses	CFS	ACFT	Owner Name
<a href="#">97-1700</a>	Underground S2100 W600 NE 04 36S 1E SL		U	19810603	DP	40.000	0.000	Garkane Power Association Inc. 56 East Center
<a href="#">97-1700</a>	Underground S200 E10 NW 04 36S 1E SL		U	19810603	DP	40.000	0.000	Garkane Power Association Inc. 56 East Center
<a href="#">97-1700</a>	Underground N1200 W700 SE 04 36S 1E SL		U	19810603	DP	40.000	0.000	Garkane Power Association Inc. 56 East Center
<a href="#">97-1700</a>	Underground S200 W600 NE 04 36S 1E SL		U	19810603	DP	40.000	0.000	Garkane Power Association Inc. 56 East Center
<a href="#">97-2148</a>	Underground N1114 W1206 E4 04 36S 1E SL	<a href="#">well info</a>	A	19980223	DIS	0.015	1.730	Hill, Tom and Gael PO Box 332

[Natural Resources](#) | [Contact](#) | [Disclaimer](#) | [Privacy Policy](#) | [Accessibility Policy](#)





- ◆ Location
- ↗ Search Boundary







Online Services

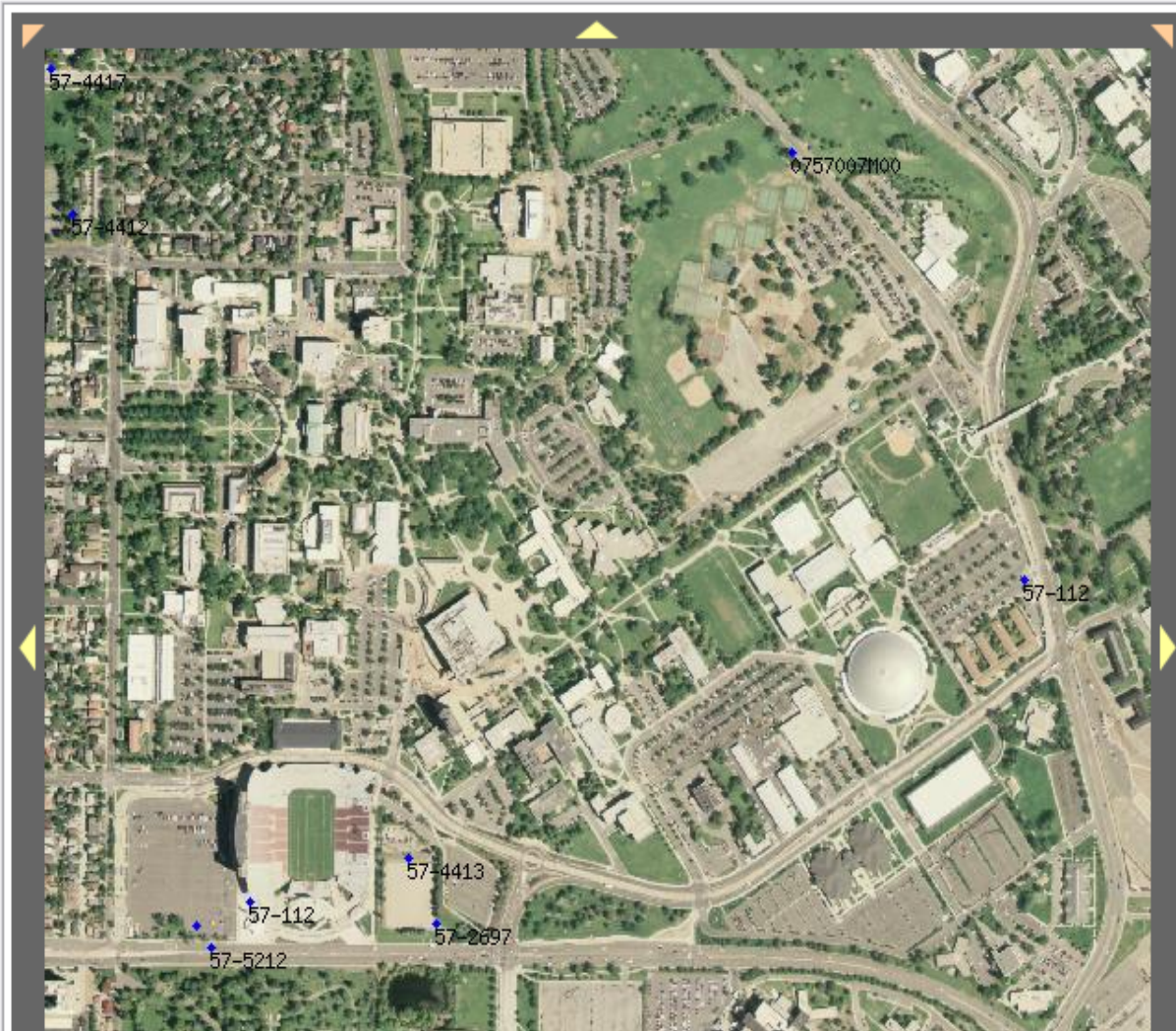
Agency List

Business



Search Utah.gov GO

# Utah Division of Water Rights



Zoom In Mode

Map Tools

## Display

☐

Book Boundary

☐

Counties

☐

Water Quality

☐

Public Land Survey System

☐

Rivers and Streams

☐

Roads

☐

Water Right Areas

Aerial Photographs

Base Map

No Base Image

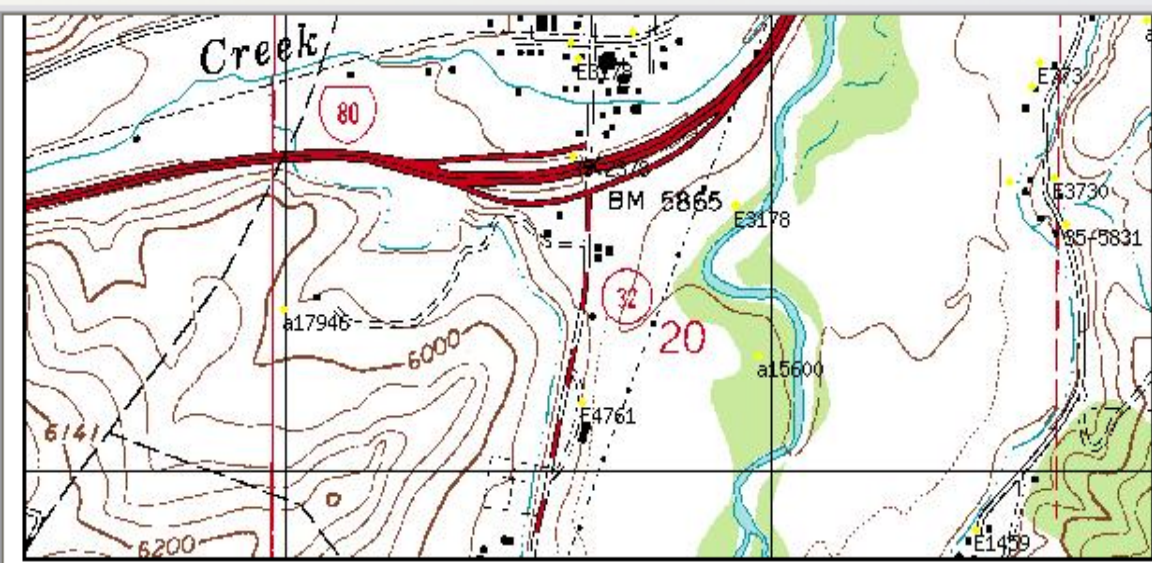
Aerial Photographs

Geology

Relief

Topographic Maps





0 500 1000 1500 2000 ft

Water Rights

WR Number	Diversion Type/Location	Well Log	Status	Priority	Uses	CFS	ACFT	Owner Name
<a href="#">0335005P00</a>	Underground S1891 W1187 N4 17 1N 5E SL	<a href="#">well info</a>	A			0.000	0.000	PARK CITY MUNICIPAL PO BOX 1480
<a href="#">0335617P00</a>	Underground S1902 W437 N4 17 1N 5E SL	<a href="#">well info</a>	A			0.000	0.000	BOGDANICH, ANN 365 EAST 1400 SOUTH WEST HOYTVILLE ROAD
<a href="#">9535006P00</a>	Underground S660 E660 W4 17 1N 5E SL	<a href="#">well info</a>	A			0.000	0.000	DELOUGHER, MICHAEL J. P.O. BOX 435
<a href="#">35-10888</a>	Underground N497 E121 SW 16 1N 5E SL	<a href="#">well info</a>	P	1860	DS	0.000	0.618	LEONARD W. AND STACY BURNINGHAM 1227 EAST GILMER DRIVE
<a href="#">35-2367</a>	Underground S275 E260 N4 20 1N 5E SL		P	19060000	DO	0.000	0.000	C/O JACK NELSON UNION PACIFIC RAILROAD COMPANY 1416 DODGE STREET -- ROOM 1100





# QUESTIONS?

---

Jim Goddard

Office: 801-538-7314

Cell: 801-505-8677

Email: [jimgoddard@utah.gov](mailto:jimgoddard@utah.gov)

Web: [waterrights.utah.gov](http://waterrights.utah.gov)

*“A wise man can see more  
from the bottom of a well  
than a fool can from the  
top of a mountain”*

