



SMC Martin Inc.

**EVALUATION OF THE INVENTORY
AND ASSESSMENT OF CLASS V
INJECTION WELLS IN THE STATE
OF SOUTH DAKOTA**

EVALUATION OF THE INVENTORY
AND ASSESSMENT OF CLASS V
INJECTION WELLS IN THE STATE
OF SOUTH DAKOTA

DRAFT

Submitted to:

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Executive Summary

SMC Martin, under EPA Contract #68-01-6288, reviewed and evaluated the Class V injection wells inventory that was conducted in 1983 by Delvin DeBoer of the Water Resources Institute at the South Dakota State University. This inventory was conducted under a contract with the State of South Dakota, Department of Water and Natural Resources. The inventory located 49 ground-water heat pumps that disposed of effluent through injection into the subsurface and one community mound used to dispose of cooling water from an air compressor owned by the City of Ward.

SMC Martin contacted 33 percent of the inventory entries to verify the information provided by the South Dakota State University inventory. Representatives of various commercial establishments were contacted and questioned about ground-water heat pump installation and were asked for names of some of the owners of these units. This was done in order to verify that the existing inventory was thorough in terms of gathering information from all the available sources.

The environmental impact of ground-water heat pump injection wells appears to be minimal in South Dakota, and only one instance of return well contamination was reported. However, significant complications may arise in the future with increasing popularity of ground-water heat pumps.

A current inventory can most easily be maintained by the South Dakota Department of Water and Natural Resources by requiring that water wells be designated as "supply" or "injection" wells on drilling permits.

INTRODUCTION

In accordance with the regulations established under the Underground Injection Control (UIC) program, injection wells are defined (40 CFR 144.3) as man-made holes which are deeper than wide and whose principal purpose is to emplace fluids into the subsurface. Injection wells are often utilized for secondary petroleum recovery, waste disposal, aquifer recharge, drainage, and mineral extraction. As a result of poor construction, operation, abandonment, and/or misuse, injection wells may pose a significant hazard to underground sources of drinking water. The purpose of the UIC program is to regulate the usage of injection wells to prevent or reduce the potential threat to the quality of existing or potential sources of drinking water.

Five classes of injection wells have been defined by the UIC program. Class V injection wells are defined as "All other injection wells not incorporated in Classes I through IV;" these are primarily recharge and waste disposal wells.

Examples of Class V injection wells include:

- o Industrial waste disposal wells
- o Recharge wells
- o Storm water drainage wells
- o Subsidence control wells
- o Agricultural drainage wells
- o Ground-water heat pump return wells

- o Sanitary waste disposal wells
- o Experimental wells

As a subtask under U.S. EPA Contract #68-01-6288, SMC Martin was asked to evaluate the existing inventory and assessment of Class V wells in South Dakota compiled by the South Dakota State University ("Assessment of Extent and Impact of Class V Injection Wells," 1983).

METHODOLOGY

The report entitled "Assessment of Extent and Impact of Class V Injection Wells" (1983) prepared by the Water Resources Institute at the South Dakota State University was carefully examined by SMC Martin. The methodology used by South Dakota State University to conduct the inventory was scrutinized in order to evaluate its accuracy and completeness.

The methodology employed by the South Dakota State University consisted of telephone surveys soliciting information concerning the use of ground-water heat pumps and the names of owners of these heating units. The sources contacted included:

- o rural electric cooperative member service directors
- o plumbing and heating contractors
- o water well drillers

The South Dakota State University put forth a limited effort to attempt to identify and locate other Class V injection wells in South Dakota. The methodology employed by the University consisted primarily of contacts with various state agencies that might deal with Class V injection wells. Aside from State agencies, the South Dakota State University relied on HVAC and water well contractors for their information. Thus, the methodology used by the University to locate Class V wells other than ground-water heat pump return wells was very limited and considered to be of subordinate priority as very few of these wells (only 1 non-heat pump injection well) was located in the

entire state. Therefore, the University's efforts were concentrated mostly on ground-water heat pump return wells.

As a result of the inventory, 147 ground-water heat pumps were located. Of these, 49 used injection wells to dispose of heat pump effluent. Through the course of the South Dakota State University study, only one non-heat pump injection well was located. This facility was located in the City of Ward and was used to discharge cooling water from an air compressor.

SMC Martin verified the accuracy of the inventory by a telephone survey of a representative sample of the inventory entries. The inventory entries that were contacted included:

- o Private residences
- o Industrial and commercial sites
- o Various public facilities including schools, churches, etc.
- o Municipal and other government level operations

The type of entries that were contacted was varied to acquire as broad a cross section as possible. For each inventory entry, the information required by the U.S. EPA was verified (or updated) through direct communication with the legal contact for the facility. The data that was obtained included:

- o Facility name and location
- o Name and address of the legal contact
- o Ownership of the facility

- o Type and number of the injection wells
- o Operational status of the wells.

Additional information was collected whenever possible regarding well construction, well depth, and problems involving the source or return wells. In each case, all the information was confirmed, corrected, or updated and an individual inventory sheet was completed. Inventory forms for all Class V injection wells in South Dakota are compiled in the Appendix.

To evaluate the completeness of the ground-water heat pump inventory, SMC Martin contacted a representative sample of commercial and industrial HVAC installers and dealers. These included:

- o All State members of the Contractor Division of the National Water Well Association
- o Water well drillers
- o Water treatment contractors
- o 80 percent of all the heating contractors, ground-water heat pump dealers, and installers
- o U.S. Geological Survey
- o South Dakota Department of Environmental Protection
- o South Dakota Department of Water & Natural Resources
- o South Dakota Department of Economic & Tourist Development
- o South Dakota Geological Survey
- o South Dakota Department of Health

- o South Dakota State University
- o Municipal water departments

All of these sources were asked for the names of the people who own ground-water heat pumps. These references were compared against the South Dakota State University inventory to verify whether or not these businesses were contacted during their study. All the new ground-water heat pump installations that were identified were contacted and entered into the inventory.

To gain information on non-heat pump injection wells, SMC Martin contacted businesses in various industries that would require the use of Class V injection wells. These industries included:

- o Septic tank installers (sanitary waste disposal wells)
- o Mining companies (backfill wells, solution mining, oil shale injection wells)
- o Testing laboratories (experimental wells)
- o Water well drillers (waste disposal wells, drainage wells, recharge wells, etc.)

Government agencies that would monitor Class V injection wells were contacted, including:

- o U.S. Geological Survey
- o U.S. Bureau of Mines
- o South Dakota Geological Survey
- o South Dakota Department of Health
- o South Dakota Department of Highways

- o South Dakota Department of Environmental Protection
- o South Dakota Department of Water & Natural Resources

RESULTS

SMC Martin contacted 33 percent of the entries in the South Dakota State University inventory and verified all of the inventory data. It was not necessary to contact all the facilities on the inventory, as the data was generally accurate. The inventory conducted by the South Dakota State University provided sufficient and accurate information to contact and identify all the facilities by telephone. Minor discrepancies did occur but most of these were errors in zip codes or name misspellings. Errors were corrected on the revised inventory forms. The inventory forms for all Class V wells in South Dakota are in the Appendix.

Conversations with people in both the government and industry indicated that injection wells are not widely used throughout the state and no additional wells were discovered. HVAC contractors and water well drillers estimated that approximately 60 ground-water heat pump return wells have been installed. Though many of the HVAC representatives indicated that heat pumps are widely used (estimates of over 700 were recorded), more than 90 percent of the heat pumps utilize air-to-air heat exchangers. The number of ground-water heat pump return wells (49) inventoried by the South Dakota State University closely approximates the estimate of 60 ground-water heat pump recharge wells obtained from industry sources. All of the facilities named by heat pump installers and drillers had

been inventoried by the South Dakota State University. For these reasons, the South Dakota State University inventory consists of 49 ground-water heat pump return wells and a cooling water return flow well owned by the City of Ward.

The elevated numbers estimated by HVAC industries may reflect air-to-air units or water-to-air units installed since the South Dakota State University inventory was completed.

SMC Martin contacted all the accessible sources of information concerning non-ground-water heat pump injection wells. Representatives in various industries including mining companies, septic tank installers, testing laboratories, and boring contractors indicated that their respective companies did not possess and did not expect to install any types of Class V injection wells. Therefore, no new Class V non-heat pump injection wells were located in spite of SMC Martin's extensive efforts to do so.

PROCEDURES TO MAINTAIN A CURRENT INVENTORY

The initial inventory conducted by the South Dakota State University in 1983 is both thorough and accurate. The methodology used to conduct the inventory proved to be quite effective and established a stable data base for the inventory. However, this is an impractical methodology to maintain a current inventory.

Figure 1 is a copy of Statute #74:03:12:04 of the South Dakota State Regulations. Under Statute #74:03:12:04, all owners or operators of Class V injection wells must provide the necessary information required by the U.S. EPA within 30 days of the completion of the wells. Thus, the responsibility of reporting the injection well rests upon the owner or operator of the well.

Currently, no regulations exist requiring water well drillers to submit drilling permits in the state of South Dakota. Instead, each driller is required to submit a drilling log of each well. However, no standardized drilling logs exist in the state of South Dakota. As a result, there is no requirement by which the Department of Water and Natural Resources can ascertain the functions of wells drilled in the state unless the information is voluntarily provided by the drillers. Therefore, it may be necessary to generate standardized drilling logs that require that the intended use of each well be indicated on the drilling logs.

74:03:12:03. Authorization of Class V wells to inject. A Class V well may inject subject to the provisions of SDCL 34A-2 governing the prevention of pollution of the waters of the state.

Source: 8 SDR 71, effective December 24, 1981.

General Authority: SDCL 34A-2-7, 34A-2-12.

Law Implemented: SDCL 34A-2-21, 34A-2-28.

74:03:12:04. Reporting requirements for Class V wells. The owner or operator of a Class V well shall, within 30 days of completion, notify the secretary of the department of water and natural resources of the existence of any well meeting the definitions of Class V under his control and shall submit the inventory information on forms provided by the secretary.

Source: 8 SDR 71, effective December 24, 1981; 11 SDR 30, effective August 30, 1984.

General Authority: SDCL 34A-2-7, 34A-2-12.

Law Implemented: SDCL 34A-2-21, 34A-2-28.

Figure 1. Statutes 74:03:12:03 and 74:03:12:04 governing the registration of Class V injection wells.
Source: South Dakota State Regulations.

An updated inventory may be maintained by requiring drillers to register for injection wells with the governing agency (namely the South Dakota Department of Water and Natural Resources). These measures would generate new data for the inventory with minimal effort on the part of both the well drillers or heat pump installers and the State government.

In order to maintain an updated inventory of the existing wells, it is recommended that the owners be contacted periodically to update the status of the injection wells.

ENVIRONMENTAL ASSESSMENT

In general, a ground-water heat pump operates on the same principles as a refrigerator. Figure 2 is a schematic diagram of a typical ground-water heat pump. The unit transfers heat from the ground water to the atmosphere in the heating cycle and vice versa during the cooling cycle. The transfer of heat takes place through a refrigerant, generally freon.

The ground water, after exchanging heat with refrigerant, is injected or returned back into an aquifer. In the subsurface injection method of disposal, there are several types of injection systems. One method has separate supply and return wells (Figure 3). Another method is the twin-purpose well method (Figure 4). These two methods are the most prevalent systems employed by owners of heat pumps in South Dakota. The impact of ground-water heat pump injection wells is discussed in the following paragraphs. Very few problems with the heat pump wells (source or injection) were reported during this study. Ground-water heat pump return wells have the potential to alter many characteristics of the receiving aquifer. These impacts may be due to several factors including:

- o Temperature Fluctuations
- o Mixing waters from different aquifers
- o Chemical contamination from additives or refrigerants

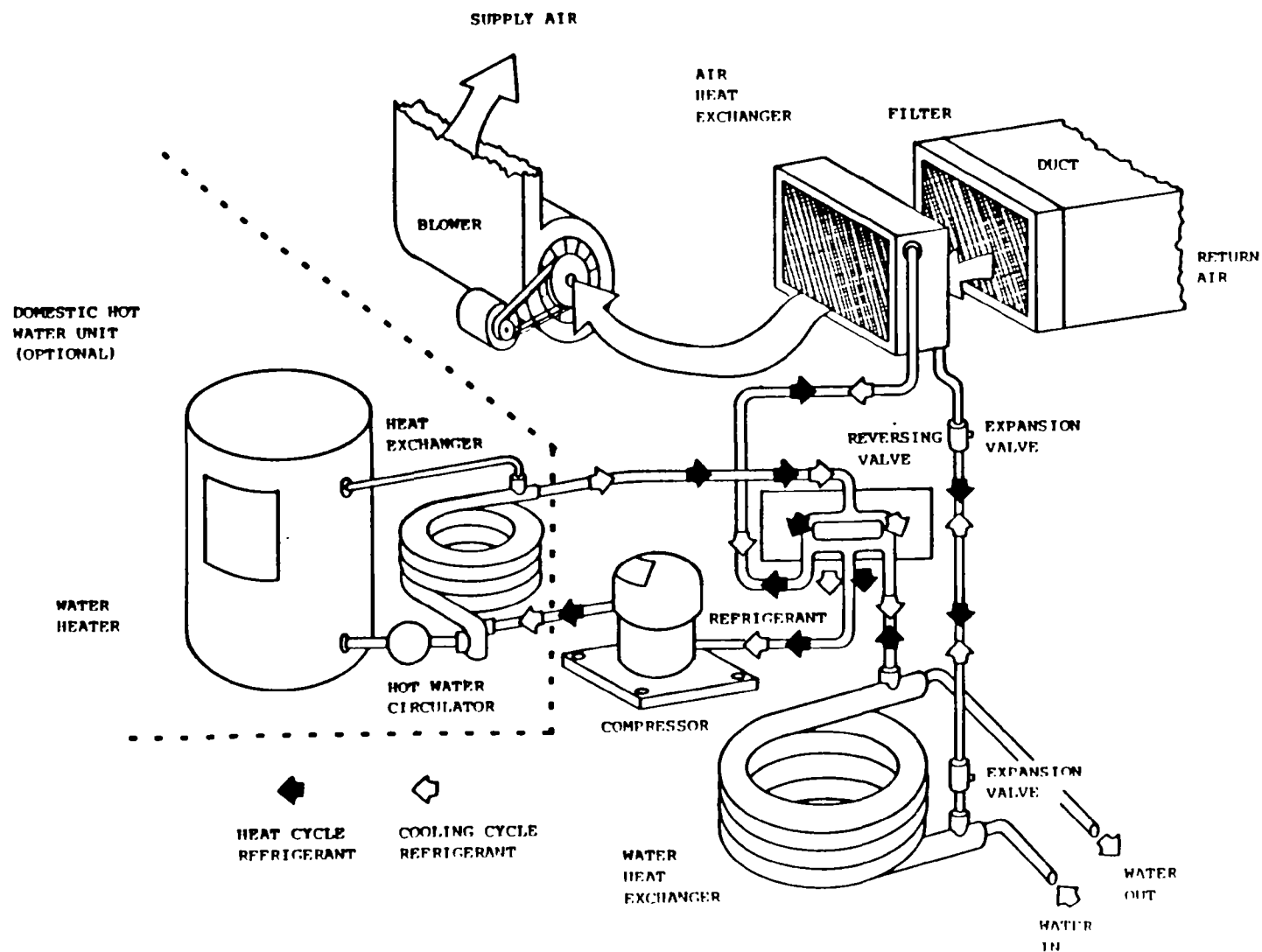


Figure 2. Schematic diagram of a ground-water heat pump. Source: An Inventory and Assessment of Class V Injection Wells in North Dakota for North Dakota State Health Department, 1983).

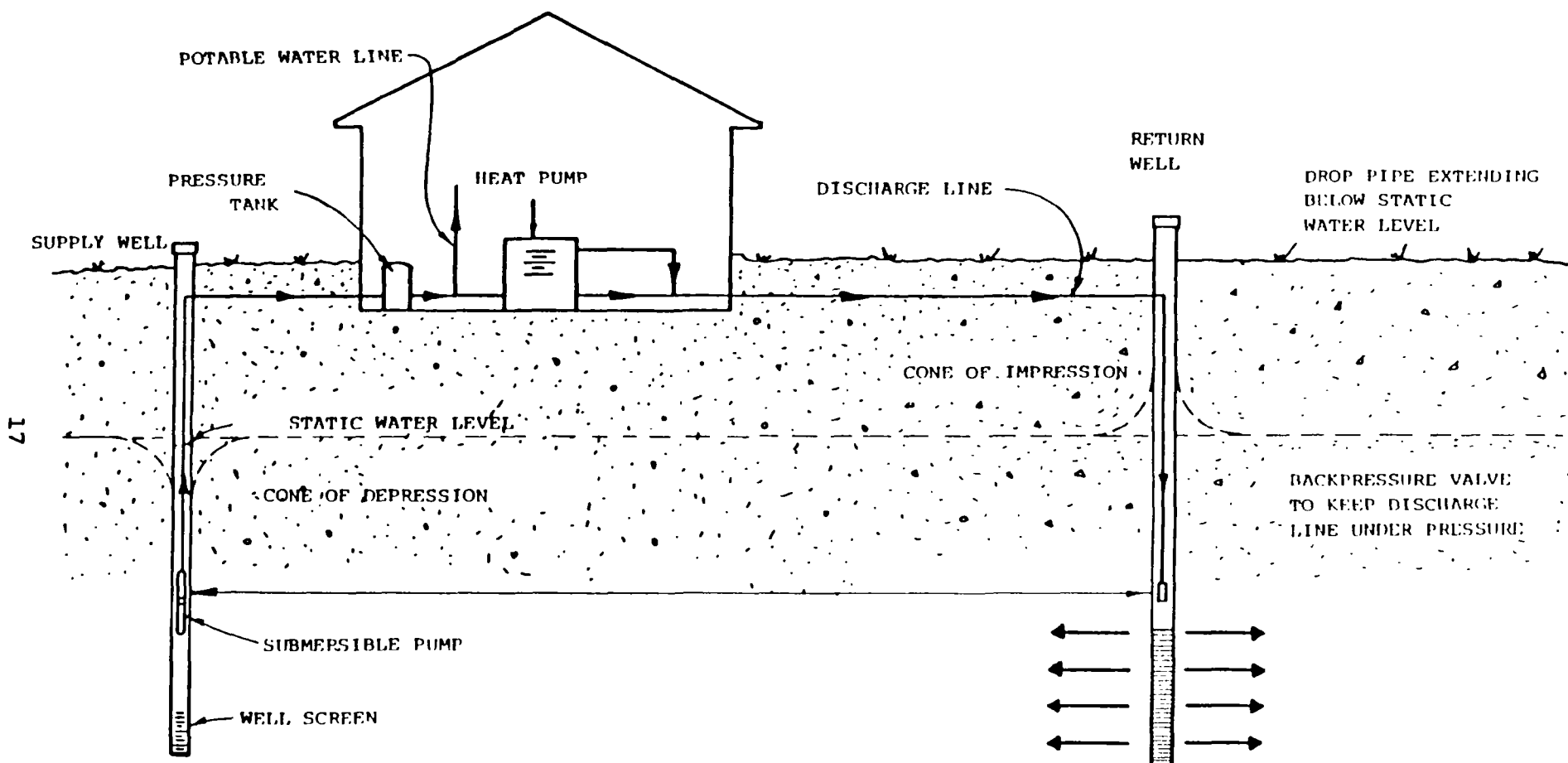


Figure 3. Separate supply and injection well system.
 Source: An Inventory and Assessment of Class V
 Injection Wells in North Dakota for North Dakota
 State Health Department, 1983).

Temperature Fluctuations

The utilization of ground-water heat pumps is relatively new, and long-term effects of temperature fluctuations on ground-water quality have not been studied in detail. These effects may include chemical precipitation or dissolution (corrosion) in the heat pump and/or receiving aquifer and effects on microorganisms in the aquifer.

Only one facility reported problems with the ground-water heat pump return well. Warmer water increased the growth of iron bacteria and eventually clogged the return well. Chlorinating the recharge well alleviated the problem for about five months. The owner indicated that his next course of action would be to add muriatic acid to the well.

Similarly, the primary effect of the cooling water return well in the City of Ward is the introduction of temperature fluctuations in the proximity of the injection well. Problems with this type of well have not been reported though the consequences are expected to be similar to those encountered by the ground-water heat pump return wells.

Mixing of Water from Different Aquifers

When the supply and recharge wells are finished in different aquifers, water from a deep aquifer is injected into a shallow aquifer, or vice versa. The effects of mixing waters from different aquifers have not been carefully studied. Generally, water from shallow aquifers contain less dissolved solids than water from deep aquifers. Thus, the introduction of water from

one aquifer to another may cause a disequilibrium to occur and result in precipitation or corrosion, thereby altering the productivity of the recharge well and the surrounding aquifer.

Chemical Contamination

Chemicals may be introduced into the aquifer as the result of two possible processes: adding chemicals to rejuvenate the well; or leakage of refrigerant from the heat pump unit itself. However, as very few problems which would require chemicals treatment of the wells reported, the immediate impact of the limited amounts of chemicals added to the wells is small. Similar treatments are used to improve productivity of water supply wells, and the potential for degradation of the aquifer is low.

The potential for refrigerants to be introduced into the ground water is low, as most refrigerants (generally Freon 22) are inert and small volumes are involved. Therefore, the contamination of the ground water by refrigerants is anticipated to be minimal. Further study is needed to evaluate this.

In summary, the primary effect of ground-water heat pump return wells is the creation of temperature fluctuations in the vicinity of the well bore. This has been found to cause problems in South Dakota and elsewhere in a very small proportion of the return wells. Further study is needed to evaluate the impact of ground-water heat pump return wells.

However, it is anticipated that any effects would be generally limited to the vicinity of the well bore.

SUMMARY

Close examination of the Class V injection well inventory for the State of South Dakota indicates it is both accurate and complete. The methodology employed by the South Dakota State University was sufficiently effective in generating the data required by the U.S. EPA. Contacts with people in the HVAC industries and various other commercial establishments indicate that of the Class V injection wells, ground-water heat pump return wells are the most prevalent in South Dakota, as concluded by the South Dakota State University study.

Fifty Class V injection wells were located by the South Dakota State University during the inventory. These included 49 ground-water heat pump return wells and one cooling water return well. SMC Martin found that the lack of non-heat pump wells is not a reflection on the inventory but rather due to an absence of other types of Class V injection wells. The injection of fluids into the substratum apparently is not a common practice in the State.

The total number of ground-water heat pump injection wells estimated to exist in the state by members of the HVAC industries and water well drillers closely approximated the total number of injection wells listed on the inventory. All of the facilities known to industry sources contacted by SMC Martin had previously been inventoried by South Dakota State University. Therefore, it is concluded that the inventory is

extensively researched and includes most if not all of the existing injection wells.

An updated inventory can be most economically maintained by requiring drillers and/or heat pump installers to register injection wells with the Department of Natural Resources. These permits must state whether the system uses injection wells and how many.

APPENDIX

INVENTORY FORMS FOR ALL CLASS V INJECTION WELLS
IN SOUTH DAKOTA



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS10NG61W24S

III. TRANSACTION TYPE ('X' one)

- ☐ 1. DELETION
☐ 2. FIRST TIME ENTRY
☐ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

C	A. NAME	
01	BENSON RICK	
C	B. STREET ADDRESS OR ROUTE NUMBER	
02	RR 1 BOX 49	
C	C. CITY OR TOWN	D. ST. E. ZIP CODE F. COUNTY G. INDIAN LAND (mark 'X')
03	WOLSEY	SD 57384 005

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

C	A. TYPE (mark 'X')	B. NAME (last, first, & middle initial)	C. PHONE (area code & no.)
04	<input checked="" type="checkbox"/> OWNER <input type="checkbox"/> S. OPERATOR	BENSON RICK	6056931674
C	D. ORGANIZATION		
05			
C	E. STREET OR P.O. BOX		
06	RR 1 BOX 49		
C	F. CITY OR TOWN	G. ST. H. ZIP CODE	I. OWNERSHIP ('X' one)
07	WOLSEY	SD 57384	<input checked="" type="checkbox"/> R. PRIVATE <input type="checkbox"/> M. PUBLIC <input type="checkbox"/> O. OTHER (specify) <input type="checkbox"/> S. STATE <input type="checkbox"/> F. FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS:			UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE					
C	A. CLAM AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS					D. COMMENTS (optional)
			UC	AC	TA	PA	AN	
08	5A	0001		001				Well Depth 100'
09								
10								
11								
12								
13								
14								



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS15N51W30S

III. TRANSACTION TYPE ("X" one)

- ☐ 1. DELETION
☐ 2. FIRST TIME ENTRY
☒ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

C. A. NAME
01 CHING WILBUR

C. B. STREET ADDRESS OR ROUTE NUMBER

02 R R I BOX 38

C. C. CITY OR TOWN

03 CASTLEWOOD

D. ST.

SD

E. ZIP CODE

57227

F. COUNTY

057

G. INDIAN LAND (mark "X")

V. LEGAL CONTACT, TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

C. A. TYPE (mark "X")

04 ☒ 1. OWNER
☐ 2. OPERATOR

D. NAME (last, first, & middle initial)

CHING WILBUR

E. PHONE (area code & no.)

5057932600

C. D. ORGANIZATION

05

C. E. STREET OR P.O. BOX

06 R R I BOX 38

C. F. CITY OR TOWN

07 CASTLEROCK

D. ST.

SD

H. ZIP CODE

57227

I. OWNERSHIP ("X" one)

☒ 1. PRIVATE ☐ 2. PUBLIC ☐ 3. OTHER (specify)

☐ 4. STATE ☐ 5. FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS:

UC = UNDER CONSTRUCTION

AC = ACTIVE

TA = TEMPORARILY ABANDONED


PA = PERMANENTLY ABANDONED AND APPROVED BY STATE

AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

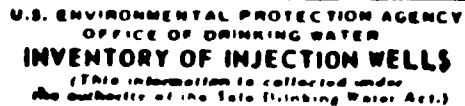
C	A. CLASS AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
08	5A	0001		001			
09	5G	0001		001			
10							
11							
12							
13							
14							

D. COMMENTS (optional)

5A Well = 250' deep
5G Well is a discharge well for air conditioner
and is 250-240' deep

 U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS <small>(This information is collected under the authority of the Safe Drinking Water Act.)</small>		I. DATE PREPARED <small>(mo., day, & year)</small>		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ("X" one)			
		012485		SDS09N49W8NW		<input type="checkbox"/> 1. DELETION <input type="checkbox"/> 2. FIRST TIME ENTRY <input checked="" type="checkbox"/> 3. CHANGE OF ENTRY			
IV. FACILITY NAME AND LOCATION									
C. NAME 01 GLANZER JOJAE									
C. STREET ADDRESS OR ROUTE NUMBER 02 RR 1 BOX 37									
C. CITY OR TOWN 03 BRIDGEWATER									
D. ST.		E. ZIP CODE		F. COUNTY		G. INDIAN LAND (mark "X")			
SD		57319		067					
V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
C. A. TYPE (mark "X")		D. NAME (last, first, & middle initial)				E. PHONE (area code & no.)			
<input checked="" type="checkbox"/> 1. OWNER <input type="checkbox"/> 2. OPERATOR		GLANZER JOJAE				6057292480			
C. D. ORGANIZATION 05									
C. E. STREET OR P.O. BOX 06 RR 1 BOX 37									
C. F. CITY OR TOWN		G. ST.		H. ZIP CODE		I. OWNERSHIP ("X" one)			
07 BRIDGEWATER		SD		57319		<input checked="" type="checkbox"/> 1. PRIVATE <input type="checkbox"/> 2. PUBLIC <input type="checkbox"/> 3. OTHER (specify) <input type="checkbox"/> 4. STATE <input type="checkbox"/> 5. FEDERAL			
VI. WELL INFORMATION									
WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. A. CLASS AND TYPE		B. TOTAL NO. OF WELLS		C. WELL OPERATION STATUS				D. COMMENTS (optional)	
				UC	AC	TA	PA		AN
08 5A		0001			001				Well Depth = 120'
09									
10									
11									
12									
13									
14									

EPA		U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS (This information is collected under the authority of the Safe Drinking Water Act.)		I. DATE PREPARED (mo., day, & year)		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ('X' one)	
				012485		SDS01N62W35S		<input type="checkbox"/> 1. DELETION <input checked="" type="checkbox"/> 2. FIRST TIME ENTRY <input type="checkbox"/> 3. CHANGE OF ENTRY	
IV. FACILITY NAME AND LOCATION									
C. A. NAME									
01 HOFFMAN NORBERT									
C. B. STREET ADDRESS OR ROUTE NUMBER									
02 R R 1 BOX 88									
C. C. CITY OR TOWN									
03 DIMOCK									
D. ST. E. ZIP CODE									
SD 57331									
F. COUNTY									
035									
G. INDIAN LAND (mark 'X')									
V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
C. A. TYPE (mark 'X')									
<input checked="" type="checkbox"/> 1. OWNER									
<input type="checkbox"/> 2. OPERATOR									
B. NAME (last, first, & middle initial)									
04 HOFFMAN NORBERT									
L. PHONE (area code & num.)									
6052274620									
C. D. ORGANIZATION									
05									
C. E. STREET OR P.O. BOX									
06 R R 1 BOX 88									
C. F. CITY OR TOWN									
07 DIMOCK									
G. ST. H. ZIP CODE									
SD 57331									
I. OWNERSHIP ('X' one)									
<input checked="" type="checkbox"/> R PRIVATE <input type="checkbox"/> M PUBLIC <input type="checkbox"/> O OTHER (specify)									
<input type="checkbox"/> S STATE <input type="checkbox"/> F FEDERAL									
VI. WELL INFORMATION									
WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. WELL OPERATION STATUS									
UC AC TA PA AN									
08 5A 0001 001									
09									
10									
11									
12									
13									
14									
D. COMMENTS (optional)									
Well Depth 220'									



IL FACILITY I.D. NUMBER

☐ 1. DELETION
☒ 2. FIRST TIME ENTRY
☐ 3. CHANGE OF ENTRY

S D S 9 6 N 6 3 W 3 4

C		A. NAME	
01	K R S N A K M I K E		
C		B. STREET ADDRESS OR ROUTE NUMBER	
02	R R 1 B O X 3 1 A		
C		C. CITY OR TOWN	D. ST. E. ZIP CODE
03	W A G N E R	S D	5 7 3 8 0
C		F. COUNTY	G. INDIAN LAND (mark 'X')
		0 2 3	

C		A. TYPE (mark "E")		B. NAME (last, first, & middle initial)		C. PHONE (area code & no.)	
04	<input checked="" type="checkbox"/> 1. OWNER <input type="checkbox"/> 2. OPERATOR	K R S N A K M I K E		6 0 5 3 8 4 3 3 4 6			
C		D. ORGANIZATION					
05							
C		E. STREET OR P.O. BOX					
06	R R 1 B O X 3 1 A						
C		F. CITY OR TOWN		G. ST.	H. ZIP CODE		
07	W A G N E R		S D	5 7 3 8 0	<input checked="" type="checkbox"/> I. PRIVATE <input type="checkbox"/> J. STATE <input type="checkbox"/> K. PUBLIC <input type="checkbox"/> L. FEDERAL <input checked="" type="checkbox"/> M. OTHER (specify)		

[illegible]



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS05N49W18S

III. TRANSACTION TYPE (check one)

- ☐ 1. DELETION
☐ 2. FIRST TIME ENTRY
☒ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

A. NAME
01 LACEY JIM

B. STREET ADDRESS OR ROUTE NUMBER
02 R R 1 BOX 24

C. CITY OR TOWN **D. ST.** **E. ZIP CODE** **F. COUNTY** **G. INDIAN LAND** (mark 'X')
03 DELL RAPIDS SD 57022 101

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

A. TYPE (mark 'X') **B. NAME** (last, first, & middle initial) **C. PHONE** (area code & num.)
04 ☒ 1. OWNER LACEY JIM 6054285979
☐ 2. OPERATOR

D. ORGANIZATION
05

E. STREET OR P.O. BOX
06 R R 1 BOX 24

F. CITY OR TOWN **G. ST.** **H. ZIP CODE** **I. OWNERSHIP** (mark 'X')
07 DELL RAPIDS SD 57022 ☒ 1. PRIVATE ☐ 2. PUBLIC ☐ 3. OTHER (specify)
☐ 4. STATE ☐ 5. FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED
PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLAIM AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS					D. COMMENTS (optional)
			UC	AC	TA	PA	AN	
08	5A	0001		001				Well Depth 15-20'
09								
10								
11								
12								
13								
14								



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS10NG1W24S

III. TRANSACTION TYPE ('X' one)

- ☐ 1. DELETION
☒ 2. FIRST TIME ENTRY
☐ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

C. A. NAME
01 MILLS FLOYD

C. B. STREET ADDRESS OR ROUTE NUMBER

02 BOX 927

C. C. CITY OR TOWN

03 HURON SD 57350 005

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

C. A. TYPE (mark 'X')
☒ 1. OWNER
☐ 2. OPERATOR
B. NAME (last, first, & middle initial)
MILLS FLOYD
C. PHONE (area code & no.)
6053524486

C. D. ORGANIZATION

05

C. E. STREET OR P.O. BOX

06 BOX 927

C. F. CITY OR TOWN

07 HURON SD 57350
G. OWNERSHIP ('X' one)
☒ R. PRIVATE ☐ M. PUBLIC ☐ O. OTHER (specify)
☐ S. STATE ☐ F. FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS:
UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED
PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLAIM AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
08	5A	0001		001			
09							
10							
11							
12							
13							
14							

D. COMMENTS (optional)



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS01N49W7NW

III. TRANSACTION TYPE ('X' one)

- ☐ 1. DELETION
☐ 2. FIRST TIME ENTRY
☒ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

A. NAME
01 MISSOURI BASIN MUNICIPAL POWER

B. STREET ADDRESS OR ROUTE NUMBER

02 3005 W. RISSELL AVENUE

C. CITY OR TOWN

03 SIOUX FALLS

D. ST.

SD

E. ZIP CODE

57118

F. COUNTY

099

G. INDIAN LAND (mark 'X')

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

A. TYPE (mark 'X')

04 ☒ 1. OWNER
☐ 2. OPERATOR

B. NAME (last, first, & middle initial)

STRONSNES ROY

C. PHONE (area code & no.)

6053384042

D. ORGANIZATION

05 MISSOURI BASIN MUNICIPAL POWER

E. STREET OR P.O. BOX

06 P.O. BOX 84610

F. CITY OR TOWN

07 SIOUX FALLS

G. ST.

SD

H. ZIP CODE

57118

I. OWNERSHIP ('X' one)

- ☒ R PRIVATE ☐ M PUBLIC ☐ O OTHER (specify)
☐ S STATE ☐ F FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS

UC = UNDER CONSTRUCTION

AC = ACTIVE

TA = TEMPORARILY ABANDONED

PA = PERMANENTLY ABANDONED AND APPROVED BY STATE

AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLASS AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
08	5A	0001		001			
09							
10							
11							
12							
13							
14							

D. COMMENTS (optional)

Well Depth 50'

Please print or type with an ELITE typewriter in the shaded area only. INSTRUCTIONS ON REVERSE.

Form Approved OMB No. 158-R0170



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

02 13 85

II. FACILITY I.D. NUMBER

S D S 4 6 G 1 1 9 0 H 1

III. TRANSACTION TYPE ('E' one)

- ☐ 1. DELETION
☒ 2. FIRST TIME ENTRY
☐ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

A. NAME
01 OLSON DRILLING CO

B. STREET ADDRESS OR ROUTE NUMBER
02 1310 NORTH G STREET

C. CITY OR TOWN **D. ST.** **E. ZIP CODE** **F. COUNTY** **G. INDIAN LAND (mark 'E')**
03 GROTON SD 57422 013

V. LEGAL CONTACT, TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

A. TYPE (mark 'E') **B. NAME (last, first, & middle initials)** **C. PHONE (area code & no.)**
04 ☒ OWNER ☐ OPERATOR OLSON ROY 6053978262

D. ORGANIZATION
05 OLSON DRILLING CO

E. STREET OR P.O. BOX
06 1310 NORTH G STREET

F. CITY OR TOWN **G. ST.** **H. ZIP CODE** **I. OWNER/EMP ('E' one)**
07 GROTON SD 57422 ☒ PRIVATE ☐ PUBLIC ☐ OTHER (specify)
☐ STATE ☐ FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED
PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLASS AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS					D. COMMENTS (optional)
			UC	AC	TA	PA	AN	
08	5A	0002		001		001		First return well clogged with rust, 50' deep Used chlorine to clean well, worked for 5 months
09								
10								
11								
12								
13								
14								

EPA		U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS (This information is collected under the authority of the Safe Drinking Water Act.)		I. DATE PREPARED (mo., day, & year)		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ('X' one)	
				012485		SDS01N79W12N		<input type="checkbox"/> I. DELETION <input checked="" type="checkbox"/> II. FIRST TIME ENTRY <input type="checkbox"/> III. CHANGE OF ENTRY	
IV. FACILITY NAME AND LOCATION									
C. NAME									
01PAJL EF									
C. STREET ADDRESS OR ROUTE NUMBER									
02RR1 BOX 74									
C. CITY OR TOWN									
03WITTEN									
D. ST. E. ZIP CODE									
SD57584									
F. COUNTY									
123									
G. INDIAN LAND (mark 'X')									
V. LEGAL CONTACT, TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
C. A. TYPE (mark 'X')									
0410 owner 10 <input type="checkbox"/> B. OPERATOR									
C. NAME (last, first, & middle initials)									
PAJL EF									
C. PHONE (area code & no.)									
6058792500									
C. ORGANIZATION									
05									
C. STREET OR P.O. BOX									
06RR1 BOX 74									
C. CITY OR TOWN									
07WITTEN									
D. ST. E. ZIP CODE									
SD57584									
I. OWNERSHIP ('X' one)									
<input checked="" type="checkbox"/> R. PRIVATE <input type="checkbox"/> M. PUBLIC <input type="checkbox"/> O. OTHER (specify)									
<input type="checkbox"/> S. STATE <input type="checkbox"/> F. FEDERAL									
VI. WELL INFORMATION									
WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. WELL OPERATION STATUS									
UC AC TA PA AN									
085A 0001 001									
09									
10									
11									
12									
13									
14									
D. COMMENTS (optional)									



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

01 24 85

II. FACILITY I.D. NUMBER

SDS08N48W235

III. TRANSACTION TYPE ('X' one)

- ☐ 1. DELETION
☐ 2. FIRST TIME ENTRY
☒ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

A. NAME
01 SMITH LOREN

B. STREET ADDRESS OR ROUTE NUMBER
02 R R L BOX 69

C. CITY OR TOWN **D. ST.** **E. ZIP CODE** **F. COUNTY** **G. INDIAN LAND** (mark 'X')
03 ELKTON SD 57026 101

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

A. TYPE (mark 'X') **B. NAME** (last, first, & middle initial) **C. PHONE** (area code & no.)
04 ☒ 1 OWNER SMITH LOREN 6059973572
☐ 2 OPERATOR

D. ORGANIZATION
05

E. STREET OR P.O. BOX
06 R R L BOX 69

F. CITY OR TOWN **G. ST.** **H. ZIP CODE** **I. OWNERSHIP** (mark 'X')
07 ELKTON SD 57026 ☒ R PRIVATE ☐ M. PUBLIC ☐ O. OTHER (specify)
☐ S. STATE ☐ F. FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS: UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED
PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLAIM AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS					D. COMMENTS (optional)
			UC	AC	TA	PA	AN	
08	5A	0001		001				Well Depth = 13-15'
09								
10								
11								
12								
13								
14								

EPA		U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS (This information is collected under the authority of the Safe Drinking Water Act.)		I. DATE PREPARED (mo., day, & year)		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ('X' one)	
				012485		SDS00N61W7NW		<input type="checkbox"/> 1. DELETION <input checked="" type="checkbox"/> 2. FIRST TIME ENTRY <input type="checkbox"/> 3. CHANGE OF ENTRY	
IV. FACILITY NAME AND LOCATION									
C. A. NAME									
01 TECKLENBURG ELVIN									
C. B. STREET ADDRESS OR ROUTE NUMBER									
02 R R 1									
C. C. CITY OR TOWN									
03 DIMOCK									
D. ST. E. ZIP CODE									
SD 57331									
F. COUNTY									
067									
G. INDIAN LAND (mark 'X')									
V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
C. A. TYPE (mark 'X')									
04 <input checked="" type="checkbox"/> 1. OWNER									
TECKLENBURG ELVIN									
C. B. NAME (last, first, & middle initial)									
6059283660									
C. C. PHONE (area code & no.)									
05									
D. ORGANIZATION									
06 R R 1									
E. STREET OR P.O. BOX									
07 DIMOCK									
F. CITY OR TOWN									
SD 57331									
G. ST. H. ZIP CODE									
I. OWNERSHIP ('X' one)									
<input checked="" type="checkbox"/> R PRIVATE <input type="checkbox"/> M PUBLIC <input type="checkbox"/> O OTHER (specify)									
<input type="checkbox"/> S STATE <input type="checkbox"/> F FEDERAL									
VI. WELL INFORMATION									
WELL OPERATION STATUS									
UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. WELL OPERATION STATUS									
UC AC TA PA AN									
08 5A 0001 001									
09									
10									
11									
12									
13									
14									
D. COMMENTS (optional)									
Well Depth 200'									

EPA		U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS (This information is collected under the authority of the Safe Drinking Water Act.)		I. DATE PREPARED (mo., day, & year)		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ('X' one)	
				012485				<input type="checkbox"/> 1. DELETION <input type="checkbox"/> 2. FIRST TIME ENTRY <input type="checkbox"/> 3. CHANGE OF ENTRY	
IV. FACILITY NAME AND LOCATION									
C. NAME									
01 WHIPKEY VINSON									
C. STREET ADDRESS OR ROUTE NUMBER									
02 R R 1 BOX 23									
C. CITY OR TOWN									
03 DELL RAPIDS									
D. ST. E. ZIP CODE									
SD 57022									
F. COUNTY									
101									
G. INDIAN LAND (mark 'X')									
V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
C. A. TYPE (mark 'X')									
04 <input checked="" type="checkbox"/> 1. OWNER									
B. NAME (last, first, & middle initials)									
WHIPKEY VINSON									
C. PHONE (area code & no.)									
6054183945									
D. ORGANIZATION									
05									
E. STREET OR P.O. BOX									
06 R R 1 BOX 23									
F. CITY OR TOWN									
07 DELL RAPIDS									
G. ST. H. ZIP CODE									
SD 57022									
I. OWNERSHIP ('X' one)									
<input checked="" type="checkbox"/> 1. PRIVATE <input type="checkbox"/> 2. PUBLIC <input type="checkbox"/> 3. OTHER (specify)									
<input type="checkbox"/> 4. STATE <input type="checkbox"/> 5. FEDERAL									
VI. WELL INFORMATION									
WELL OPERATION STATUS									
UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. WELL OPERATION STATUS									
UC AC TA PA AN									
08 SA 0001 001									
09									
10									
11									
12									
13									
14									
D. COMMENTS (optional)									
Well Depth 24'									

EPA		U.S. ENVIRONMENTAL PROTECTION AGENCY OFFICE OF DRINKING WATER INVENTORY OF INJECTION WELLS (This information is collected under the authority of the Safe Drinking Water Act.)		I. DATE PREPARED (mo., day, & year)		II. FACILITY I.D. NUMBER		III. TRANSACTION TYPE ('X' one)	
				012485		SDS10N49W34S		<input type="checkbox"/> 1. DELETION <input checked="" type="checkbox"/> 2. FIRST TIME ENTRY <input type="checkbox"/> 3. CHANGE OF ENTRY	
IV. FACILITY NAME AND LOCATION									
A. NAME									
01 WHITEHEAD GEORGE									
B. STREET ADDRESS OR ROUTE NUMBER									
02 R R 1 BOX 82A									
C. CITY OR TOWN									
03 AURORA									
D. ST.									
SD									
E. ZIP CODE									
57002									
F. COUNTY									
003									
G. INDIAN LAND (mark 'X')									
V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP									
A. TYPE (mark 'X')									
<input checked="" type="checkbox"/> 1. OWNER <input type="checkbox"/> 2. OPERATOR									
B. NAME (last, first, & middle initial)									
04 WHITEHEAD GEORGE									
C. PHONE (area code & no.)									
5056933819									
D. ORGANIZATION									
05									
E. STREET OR P.O. BOX									
06 R R 1 BOX 82A									
F. CITY OR TOWN									
07 AURORA									
G. ST.									
SD									
H. ZIP CODE									
57002									
I. OWNERSHIP ('X' one)									
<input checked="" type="checkbox"/> 1. PRIVATE <input type="checkbox"/> 2. PUBLIC <input type="checkbox"/> 3. OTHER (specify)									
VI. WELL INFORMATION									
WELL OPERATION STATUS:									
UC = UNDER CONSTRUCTION AC = ACTIVE TA = TEMPORARILY ABANDONED PA = PERMANENTLY ABANDONED AND APPROVED BY STATE AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE									
C. WELL OPERATION STATUS									
UC AC TA PA AN									
08 5A 0001 001									
09									
10									
11									
12									
13									
14									
D. COMMENTS (optional)									
Well depth = 20'									



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF DRINKING WATER
INVENTORY OF INJECTION WELLS
(This information is collected under
the authority of the Safe Drinking Water Act.)

I. DATE PREPARED
(mo., day, & year)

012485

II. FACILITY I.D. NUMBER

SDS20N49W10N

III. TRANSACTION TYPE ('X' one)

- ☐ 1. DELETION
☒ 2. FIRST TIME ENTRY
☐ 3. CHANGE OF ENTRY

IV. FACILITY NAME AND LOCATION

A. NAME
01 WIESE RUSS

B. STREET ADDRESS OR ROUTE NUMBER

02 R R 1 BOX 36

C. CITY OR TOWN

03 TWIN BROOKS

D. ST.

SD

E. ZIP CODE

57269

F. COUNTY

051

G. INDIAN LAND (mark 'X')

V. LEGAL CONTACT: TYPE, NAME, PHONE, MAILING ADDRESS, AND OWNERSHIP

A. TYPE (mark 'X')

04 ☒ OWNER
☐ B. OPERATOR

B. NAME (last, first, & middle initial)

WIESE RUSS

C. PHONE (area code & num.)

6054326371

D. ORGANIZATION

05

E. STREET OR P.O. BOX

06 R R 1 BOX 36

F. CITY OR TOWN

07 TWIN BROOKS

G. ST.

SD

H. ZIP CODE

57269

I. OWNERSHIP ('X' one)

☒ R PRIVATE

☐ M PUBLIC

☐ O. OTHER (specify)

☐ S STATE

☐ F FEDERAL

VI. WELL INFORMATION

WELL OPERATION STATUS

UC = UNDER CONSTRUCTION

AC = ACTIVE

TA = TEMPORARILY ABANDONED

PA = PERMANENTLY ABANDONED AND APPROVED BY STATE

AN = PERMANENTLY ABANDONED AND NOT APPROVED BY STATE

C	A. CLASS AND TYPE	B. TOTAL NO. OF WELLS	C. WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
08	5A	0001		001			
09							
10							
11							
12							
13							
14							

D. COMMENTS (optional)

Well Depth 75'