



SMC Martin Inc.

**INVENTORY OF CLASS V
INJECTION WELLS IN THE
INDIAN LANDS OF
EPA REGION VIII**

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INDIAN LANDS OF
EPA REGION VIII

Submitted to:

U.S. Environmental Protection
Agency
Region VIII
Groundwater Protection Section
1860 Lincoln Street
Denver, CO 80295

Submitted by:

SMC Martin Inc.
900 W. Valley Forge Road
P. O. Box 859
Valley Forge, PA 19482

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EXECUTIVE SUMMARY

Class V injection wells on Indian Lands in EPA Region VIII were inventoried during this study effort. Surveys of the 25 separate reservations in the Region VIII states revealed only two wells. One of the wells is for heat pump return flow and the other for sanitary waste disposal. Telephone contact with governmental agencies from the national level all the way to the individual reservations provided the basis for this inventory. Private sector contact such as well drillers, HVAC contractors and septic system installers confirmed the information gathered from individuals in government and tribal offices.

The limited number of Class V wells on Indian Lands is consistent with the low populations, depressed economies, and limited industrial development on the reservations. Because of the low number of Class V wells, their potential for environmental impact is limited and localized.

This inventory can most effectively be updated through periodic contact with individuals at the reservation governmental level. People in tribal councils and at reservation BIA offices are the best contacts to maintain the inventory because of their first-hand familiarity with reservation operations.

INTRODUCTION

The Underground Injection Control (UIC) program is being developed in order to prevent or reduce deterioration of water quality in potential or actual underground sources of drinking water. According to UIC regulations, an injection well is a "bored, drilled or driven shaft or a dug hole, whose depth is greater than the largest surface dimension" used for "the subsurface emplacement of fluids" (40 CFR 146.03).

These wells may be utilized for a variety of purposes including heat pump return flow, aquifer recharge, hydrocarbon and mineral production, sanitary waste disposal, and hazardous waste disposal. Properly designed and installed injection wells may impact ground-water resources, while injection facilities that are improperly designed, constructed, operated and/or abandoned may pose a serious threat to underground drinking water sources.

Five classes of injection wells have been defined by the UIC program. Class V wells are those wells not included in Classes I through IV and include wells used for heat pump return flow, aquifer recharge, waste disposal, experimental technologies, mine backfill and in situ oil shale recovery. Though Class V wells are reported to account for more than 61 percent of all injection wells in the United States, there is presently little information on the actual numbers, operation, and impact of this well class. This lack of information has prevented the

development of a regulatory system appropriate to Class V wells. Therefore, Class V wells throughout the United States are being inventoried.

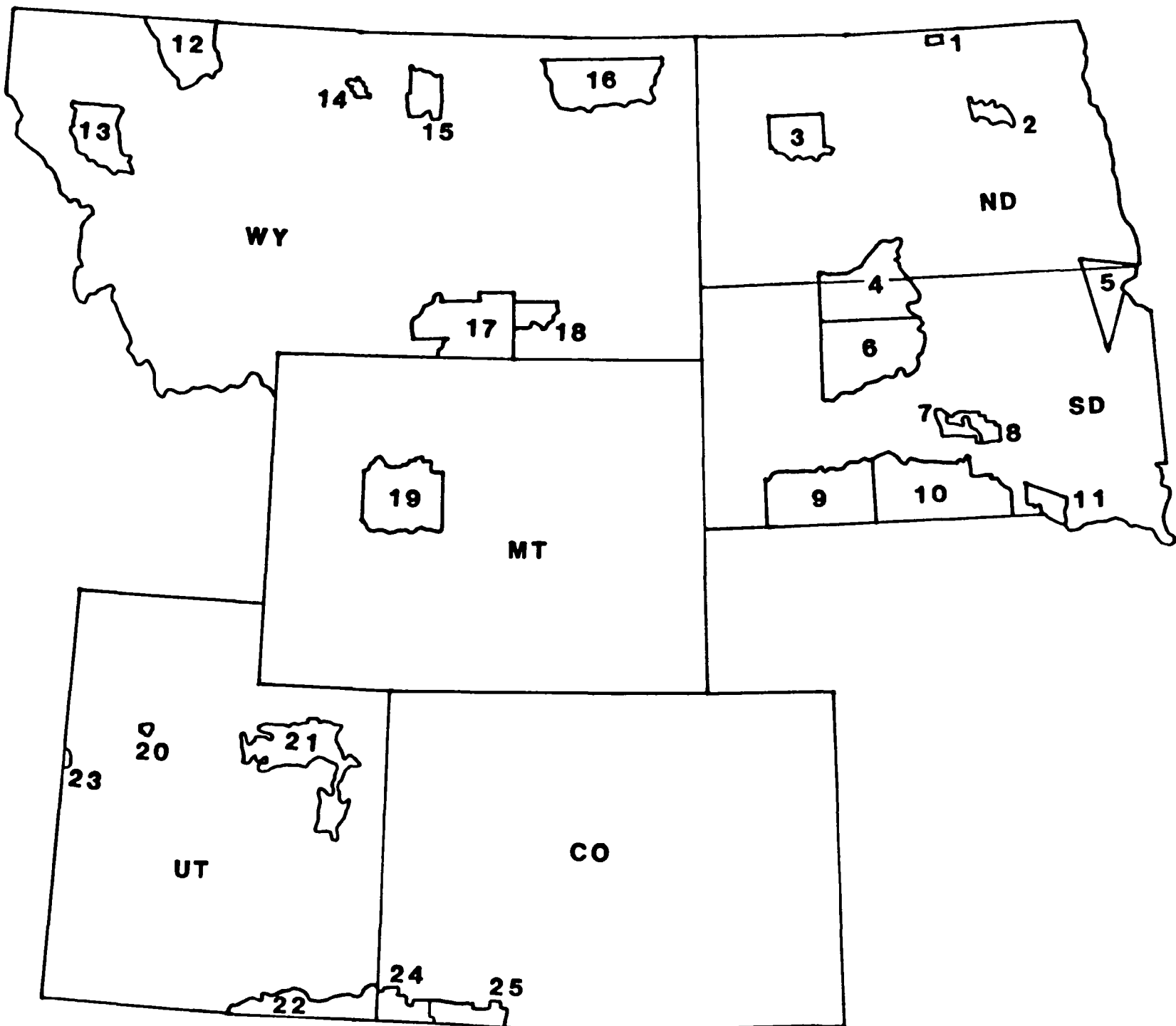
The U.S. EPA has been mandated to administer the UIC program on Indian Lands. SMC Martin, under U.S. EPA Contract #68-01-6288, has compiled an inventory of Class V injection wells on Region VIII Indian Lands. There are 25 separate, autonomous reservations lying either completely or partly within Region VIII. These reservations are listed in Table 1 and mapped on Figure 1.

TABLE 1
REGION VIII INDIAN LANDS

Map #	Reservation	Tribe(s)	State(s)
1	Turtle Mountain	Turtle Mtn. Chippewa	ND
2	Fort Totten	Devil's Lake Sioux	ND
3	Fort Berthold	Sioux	ND
4	Standing Rock	Standing Rock Sioux	ND & SD
5	Sisseton	Sisseton-Wahpeton Sioux	ND & SD
6	Cheyenne River	Cheyenne River Sioux	SD
7	Lower Brule	Lower Brule Sioux	SD
8	Crow Creek	Crow Creek Sioux	SD
9	Pine Ridge	Ogala Sioux	SD
10	Rosebud	Rosebud Sioux	SD
11	Yankton	Yankton Sioux	SD
12	Black Feet	Black Feet	MT
13	Flathead	Salish, Kootenai	MT
14	Rocky Boys	Chippewa Cree	MT
15	Ft. Belknap	Chippewa Cree, Turtle Mtn.	MT
16	Fort Peck	Assiniboine, Sioux	MT
17	Crow	Crow	MT
18	Northern Cheyenne	Northern Cheyenne	MT
19	Wind River	Northern Arapaho, Shoshone	WY
20	Skull Valley	Ute	UT
21	Uintah and Ouray	Ute	UT
22	Navajo	Navajo Nation	UT (AZ, NM)
23	Goshute	Goshute	UT (NV)
24	Ute Mountain	Ute Mtn. Ute	UT & CO
25	Southern Ute	Southern Ute	CO

Map numbers correspond to Figure 1.

Figure 1. Map of Region VIII indicating Indian Reservations.
(Numbers correspond to Table 1.)



METHODOLOGY

To implement this inventory, telephone contacts were made with governmental agencies from the national level down to individual reservation offices. Private sector contacts included well drillers, septic system installers, and HVAC contractors. Phone contacts for this inventory are compiled in Appendix A. This general methodology has been successfully applied in EPA Region VIII states to complete and verify existing inventories. However, the governmental structure of the Indian Lands, being quite different from that for the Region's states, necessitated a very different "slate" of governmental contacts to solicit the required information.

Indian Lands are divided into reservations which lie both within and across state borders. The reservations are autonomous regions whose governing bodies (Tribal and Reservation Councils) are directly responsible to the Federal government. The Federal organizations which deal with the reservations include the Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), and Environmental Protection Agency (EPA). The regional and local offices of these organizations may have direct input into issues concerning resources on the individual reservations. Of the Federal organizations contacted, BIA "agencies" (local reservation offices) were by far the most valuable sources of information for this inventory.

Tribal governmental groups on the reservations have influence over many aspects of environmental legislation that might involve Class V injection wells. Tribal Departments of Water Resources, Public Health, Realty, and Environmental Quality are among the organizations that may have knowledge of, and control over, Class V wells. Contacts with individuals in tribal offices provided a significant amount of valuable information for this inventory.

Individuals in reservation BIA and tribal offices provided the names of people and agencies at higher governmental levels who might have information about injection wells. People in reservation offices have the most intimate knowledge of reservation facilities and operations that could involve injection wells. Therefore, they were the best contacts for this inventory. Appendix B lists the contacts who were most knowledgeable about Class V injection wells.

The governmental structure of the Indian Lands generally involves only Federal and reservation (tribal) agencies. However, on some reservations, state and/or county agencies such as highway departments and irrigation districts also have some influence over and/or knowledge about Class V injection wells. Because state agencies may have some jurisdiction over Class V injection wells on Indian Lands, all potentially relevant offices in Region VIII states were contacted (Appendix A). Very little specific information was gathered from state agency contacts.

INVENTORY RESULTS AND DISCUSSION

Two Class V injection wells were identified on Region VIII Indian Lands. The inventory forms for these wells are presented in Appendix B. One of the wells is for heat pump return flow and the other for septic system effluent disposal. The scarcity of Class V wells is attributed to the limited population and generally depressed economic conditions on the Indian Lands in Region VIII. Other factors which restrict the utilization of Class V wells include limited industrial development other than mineral exploration and production (Class II and Class III wells), and the use of surface waters rather than ground water for irrigation in some Indian Lands.

In total, the Indian Lands in the Region VIII states of Colorado, Montana, South Dakota, North Dakota, Utah, and Wyoming comprise an area of about 47,000 square miles. The total population of all 25 Indian Lands is estimated by the BIA to be 108,311 (January, 1985 number) for an approximate population density of about 2.3 people/square mile. This is in contrast to Wyoming's 4.4 people/square mile, the lowest population density of the Region VIII states. Indian towns within reservations are quite small, ranging in size from about 3,000 (Sisseton, SD) to less than 300 (Box Elder, MT). These towns often serve as tribal headquarters and are served, with one exception, by sewage systems utilizing waste treatment systems with leach

fields or lagoons for effluent disposal. The town of Sisseton, SD uses seepage pits to dispose of its sewage.

Outside of the towns, single dwellings or small groups of houses provide residence for the Native American inhabitants. None of those dwellings was reported to use injection for sanitary waste disposal. The abundant open space available to reservation dwellers encourages the use of ditches, fields, and other means of spreading sanitary waste rather than injecting it via a well.

Surface discharge of sanitary and other wastes through lagoons, ponds, ditches, etc., is the most common means of disposal on the Indian Lands. Though this is not injection per se according to the EPA, these wastes may directly infiltrate into shallow aquifers and impact drinking water in a manner little different from well injection. An example of such a situation is the uranium mine tailings and processing waste pile at the abandoned Susquehanna Western Uranium Processing Plant on the Wind River Reservation.

Class V injection wells used for cooling water return flow are not found in the Indian Lands because of the absence of industrial operations that might utilize them. Heat pump return flow wells are absent, with one exception, because heat pumps of any kind, much less the more expensive ground-water systems with both supply and recharge wells, are relatively high-cost items,

out of place on the economically depressed and sparsely populated reservations.

Other types of Class V injection wells were also found to be unsuited to the Indian Lands for physical and/or economic reasons. Conversations with people familiar with operations and conditions on the reservations made it clear that very few Class V wells would be found there.

POTENTIAL ENVIRONMENTAL IMPACT OF CLASS V WELLS
ON THE INDIAN LANDS

Heat pump return flow wells have a variety of potential environmental impacts. Among them are: change of temperature in the receiving aquifer; mixing of waters from different aquifers; and introduction of contaminants into the receiving aquifer. Ground-water heat pumps inject water which is warmer or colder than the receiving aquifer. This temperature change could change chemical reaction rates, effect ground-water biota, and alter mineral stabilities in the receiving aquifer.

If ground water extracted for heat pump use is returned to a different aquifer, then disruption of the receiving aquifer's geochemistry could take place. A lowering of the receiving aquifer's ground-water quality could occur if its ground-water quality is higher than that of the source aquifer.

Contaminants such as air, bacteria, pipe scale, or Freon might be introduced by injection of heat pump return flow. These substances have the potential to impact the receiving aquifer by altering redox conditions, changing volatile concentrations, plugging pore space, and introducing contamination.

Although there is a long list of potential environmental impacts, a properly constructed and maintained heat pump system is likely to have only a minor and localized environmental impact. No adverse effects have been reported from the single heat pump return flow well on the Indian Lands.

Wells for the injection of septic system effluent have a number of significant potential environmental impacts. Primary among these is the introduction of bacterial and viral contamination into ground water. Other household wastes disposed of in the septic system may also enter ground water. Septic tanks are designed for primary and limited secondary treatment of sewage. Effluent leaving a septic tank will enter the ground water and degrade water quality, particularly if the septic system does not use a leach field. The problem of contamination of ground water from sanitary waste injection wells is most acute if extraction wells for drinking water are nearby. No problems have been reported related to the single inventoried septic system injection well on Indian Lands, but site specific investigation would be needed to determine the specific environmental impact of this well.

UPDATING THE INVENTORY

This inventory can best be updated if individuals in local agencies who are familiar with the operations of individual reservations are periodically contacted to determine if any activity involving Class V injection wells has recently taken place on the reservation. Local BIA officials and/or tribal council members should be contacted. A knowledgeable person on each reservation could be empowered by the EPA to monitor Class V (and perhaps all) injection wells on that reservation. Periodic reporting by these people to EPA would ensure that the inventory remains current.

SUMMARY AND CONCLUSIONS

This inventory presents an accurate picture of Class V injection wells on Region VIII Indian Lands. No major projects (e.g., irrigation, oil shale recovery) which might use injection wells were found, and none are believed to exist. Individual well types including mine backfill, solution mining of conventional mines, experimental technology, aquifer recharge, and cooling water return flow wells were not found on the Indian Lands and most probably do not exist there. One each of heat pump return flow wells and septic system discharge wells were identified and inventoried. Largely because of economic constraints, no other heat pump wells are likely to be present on the Indian Lands. It is possible that some small septic system injection wells and drainage wells installed by individual property owners may have been inadvertently missed by this inventory. Comprehensive lists of injection wells on Indian Lands do not exist because it was necessary to depend almost solely on contact with knowledgeable individuals for well information. Therefore, it is possible that a "missed connection" may have resulted in a non-inventoried injection well. SMC Martin does feel that this small inventory is due to the almost total lack of injection wells on the Indian Lands and the extremely limited environmental impact of the wells that do exist.

APPENDIX A

PHONE CONTACTS FOR INDIAN LANDS INVENTORY

APPENDIX A

Contacts for Indian Lands Inventory

Federal Level

- Department of the Interior
 - Bureau of Indian Affairs (BIA)
 - Indian Health Services
 - U.S.G.S.
 - Bureau of Land Management (BLM)
- Department of Agriculture
 - Soil Conservation Service

Regional Level

- Department of the Interior
 - BIA Area Offices
 - Aberdeen
 - Albuquerque
 - Billings
 - Navajo
 - Phoenix
 - BLM Offices
 - Cheyenne
 - Lander Resource Area
 - Durango

State Level

For each state in Region VIII (ND, SD, MT, WY, CO, UT), the following agencies or their equivalent were contacted:

- Department of Health
 - Waste Management Division
- Department of Natural Resources
 - Water Resources Division
 - Land Resources Division
 - Geological Survey
- Department of Environmental Quality
 - Water Quality Division
 - Land Quality Division
- Highway Department
 - Engineers Office

Reservation Level

For each of the 25 separate reservations in Region VIII (listed in Table 1), the following offices or their equivalents (if present) were contacted:

- BIA Agencies
- Public Health
- Natural Resources
- Tribal Council
- Realty
- Environmental Quality
- Water Resources
- Housing Authority

APPENDIX B

CONTACTS FOR INDIAN LANDS INVENTORY WHO PROVIDED
THE MOST USEFUL INFORMATION

APPENDIX B

Contacts for Indian Lands Inventory who Provided the Most Useful Information

Wind River Reservation

Ed Baruth, Wyoming DEQ Lander office
Lander, WY (307) 332-3144
Gary Collins, Wind River Reservation Joint Tribal Council
Ft. Washakie, WY (307) 255-8210
Charles Dillahanty, BIA Agency, Lease Compliance Office
Ft. Washakie, WY (307) 255-8306
Bruce Maytebbe, BIA Agency, Realty Office
Ft. Washakie, WY (307) 255-8243

Ute Mountain and Southern Ute Reservations

Al Henning, BIA Agency, Indian Health Services
Towaoc, CO, Public Health Services (303) 565-4441
Ignacio, CO, Public Health Services (303) 563-4581
Byron Red Southern Ute Nation, Water Resources Council
Ignacio, CO, (303) 563-4525
Lynda Taylor, BIA Agency Office
Towaoc, CO, (303) 565-8471

Uintah and Ouray Reservation

Skull Valley Reservation

Uintah and Ouray Tribal Energy and Minerals Dept.
Fort Duchesne, UT (801) 722-5141, Ext. 255

Navajo Reservation

Steve Hallesey, BIA Agency Office
Public Health Service
Window Rock, AZ (602) 871-5151, Ext. 5320
Carol Larery, Navajo Tribe, Water Development Division
Window Rock, AZ (602) 871-4941
Arlene Luther, Navajo Tribe, Environmental Protection Adm.
Window Rock, AZ (602) 871-4941

Turtle Mountain Reservation

Allen Shinwalt, Tribal Public Health Dept.
Belcourt, ND (701) 477-6111

Fort Totten Reservation

Mike Doctor, Tribal Public Health Dept.
Fort Totten, ND (701) 766-4291

Fort Berthold Reservation

Tribal Natural Resources Council
New Town, ND (701) 627-3628

Sisseton Reservation

Vine Marks, Sisseton Housing Authority
Sisseton, SD (605) 698-7606

Standing Rock Reservation

Craig Larson, BIA Indian Health Services
(605) 845-7245

Cheyenne River Reservation

John Lind, Tribal Health Department
Eagle Butte, SD (605) 964-6111

Lower Brule Reservation

Dave Moser, Tribal Public Health Department
Lower Brule, SD (605) 224-1644

Pine Ridge Reservation

Wayne Iteska, Ogala Sioux Nat'l. Resources Council
Pine Ridge, SD (605) 867-5821

Yankton Reservation

Delton Woodford, BIA Indian Health Services
Aberdeen, SD (605) 225-0250, Ext. 461

Rosebud Reservation

Terry Hoskins, BIA Indian Health Services
Aberdeen, SD (605) 225-0250, Ext. 451

Blackfoot Reservation

Charles Farmer, Tribal Planning Office
Browning, MT (406) 338-7406

Rocky Boys Reservation

Don Bradford, Tribal Public Health Department
Box Elder, MT (406) 395-4490

Fort Belknap Reservation

Bill Stiffarm, Tribal Water Department
Harlem, MT (406) 353-2205, Ext. 340

Fort Peck Reservation

Jerry Lee, Tribal Environmental Health Department
Poplar, MT (406) 768-5301, Ext. 407

Northern Cheyenne Reservation

Richard Rubudahl, Northern Cheyenne Utilities
Lame Deer, MT (406) 477-6205

Crow Reservation

Ronnie Stewart, Crow Public Health Department
Crow Agency, MT (406) 638-2626

APPENDIX C

INVENTORY FORMS FOR INDIAN LANDS INVENTORY

 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)																																																																														
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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)

013085

II. FACILITY I.D. NUMBER

SD5465246051

III. TRANSACTION TYPE ('X' one)

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

IV. FACILITY NAME AND LOCATION

A. NAME
01 SISSETON HOUSING AUTHORITY

B. STREET ADDRESS OR ROUTE NUMBER

02

C. CITY OR TOWN

03 SISSETON

D. ST.

SD

E. ZIP CODE

57262

F. COUNTY

109

G. INDIAN LAND (mark 'X')

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)

MARKS VINE

C. PHONE (area code & no.)

6056987606

D. ORGANIZATION

05 SISSETON HOUSING AUTHORITY

E. STREET OR P.O. BOX

06

F. CITY OR TOWN

07 SISSETON

G. ST.

SD

H. ZIP CODE

57262

I. OWNERSHIP ('X' one)

☒ R. PRIVATE

☐ M. PUBLIC

☒ O. OTHER (specify)

Indian

☐ 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	5X	0001		001			
09							
10							
11							
12							
13							
14							

D. COMMENTS (optional)

16 - 18 unit septic tank