

Considered: \_\_\_\_\_

WATER PERMIT NO. 5326-3

45

MAP NO. same 647-2286Name of Applicant City of Lennox (Floyd Beach, Mayor)Post Office Address 220 South Main, Lennox SD 57039-0228Amount of Water Claimed 232 acre-feet/year Total Acres N/ASource of Water Supply groundwater - 4 wellsWater to be used for municipal County LincolnAbout 3 miles SE of Lennox

PROOF OF PUBLICATION: Received \_\_\_\_\_ Not Received \_\_\_\_\_

APPLICATION: Approved \_\_\_\_\_ Subject to \_\_\_\_\_

F.F.C C.L. Adopted \_\_\_\_\_ Not Approved \_\_\_\_\_ Deferred \_\_\_\_\_

PRIORITY \_\_\_\_\_ Date Received March 31, 1989 Fee \$225.00 Remarks \_\_\_\_\_Corrected Application Received May 12, 1989 Period of Annual Use Jan 1 - Dec 31WATER QUALITY APPROVAL RECEIVED NA APPROVED/CONDITIONAL (Circle one)WI-1 Description same as Application YES NO REMARKS \_\_\_\_\_Diversion Point Sections 1, 11, 14, 12, 13, 2  
T98N-R51WLand to be Irrigated NA

|    |    |    |    |    |
|----|----|----|----|----|
| 5  | 4  | 3  | 2  | 1  |
| 8  | 9  | 10 | 11 | 12 |
| 17 | 16 | 15 | 14 | 13 |
| 20 | 21 | 22 | 23 | 24 |

Well Log: Driller SDGS Licensed YES NODepth of Well 595' REMARKS Test HolesType of Map Surveyor's PREPARED BY Eugene Maurice Reviewed and the Number assigned on May 16, 1989 By Susan Fowler

No. 5326-3 Hydrologic Unit 10170102  
Map No. Same Basin Vourellia R  
Newspaper Lennox Independent Box 16 57039  
Chur

523 E. Capitol  
Pierre, SD 57501  
(605) 773-3352

45

# Application For Permit To Appropriate Water Within The State Of South Dakota

Check use of water: Industrial ☐ Commercial ☐ Municipal ☒ Other Common Distribution System ☐  
Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐  
Domestic ☐ (above 18gpm) Other ☐

Type of Application: Check one or more of the following

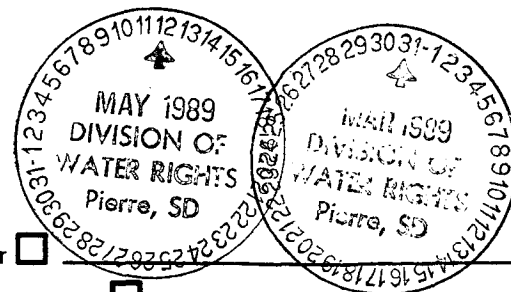
New ☒ Vested Right ☐ Future Use ☐ Change Use ☐

☐ Amend Permit No. \_\_\_\_\_ with old priority date retained

Change diversion point(s) ☐ Add diversion point(s) ☐ Other ☐

☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. \_\_\_\_\_

☐ Construction to use water reserved by Future Use Permit No. \_\_\_\_\_



1. Name of Applicant City of Lennox Phone No. 647-2286

Post Office Address 220 South Main Street Lennox State SD 57039-0228  
(Street, RR or Box) (City) Zip Code

2. Amount of water claimed (c.f.s) 0.62 C.F.S. peak 0.32 c.f.s. average 75,000,000 gallons  
(232 acre-feet/year) per year

3. Source of water supply Dakota Aquifer ( 4 Wells)

4. Location of point of diversion See attached map S.D. Geological Survey has shaded area  
for well drilling sites. S1/2 NW1/4, S1/2 NE1/4, Section 1-T98N-R51W --E1/2 Section  
11-T98N-R51W; E1/2 Section 14-T98N-R51W; W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 12-T98N-R51W;  
W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 13-T98N-R51W County Lincoln

5. Counties where water will be used Lincoln

6. Annual period during which water is to be used --At year-around Jan 1 - Dec 31

7. Give a brief description of proposed project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA)  
County of Lincoln)<sup>ss</sup>

I, Floyd Beach, Mayor of the City of Lennox

the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Signed Floyd Beach

Subscribed and sworn to before me this 30th day of March 19 89

Sharon Allers

SOUTH DAKOTA  
WATER PERMIT No. 5326-3

Date of first receipt of application March 31, 1989.

Date of return to applicant for corrections, amendments or changes April 26, 1989.

Date of receipt of corrected application May 12, 1989.

The Water Management Board approved Water Permit Application No. 5326-3 on December 7, 1989 for the City of Lennox, PO Box 228, Lennox SD 57039 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 5326-3 appropriates 0.62 cubic feet of water per second, with a maximum annual withdrawal of 232 acre-feet of water, from up to 3 wells (Dakota Formation) approximately 600 feet deep. The 3 wells are to be located in the NW1/4 NE1/4 section 14; SW1/4 SW1/4, NE1/4 NW1/4 section 12; all in T98N-R51W.
2. The water appropriated shall be used for the purpose of supplying the City of Lennox and may not exceed the amount of water needed for beneficial use for municipal purposes.
3. The water is to be used during the following described annual period: January 1 - December 31.
4. The date from which applicant may claim right is March 31, 1989.
5. One-fifth of the construction is to be completed on or before June 7, 1992.
6. All construction is to be completed on or before December 7, 1994.
7. Water is to be put to beneficial use on or before December 7, 1998.
8. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. That the City of Lennox report to the Chief Engineer annually the amount of water withdrawn each year from the Dakota Formation.
2. The wells authorized by Permit No. 5326-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted with cement (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:30.
3. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
4. Approval of Permit No. 5326-3 authorizes maximum annual withdrawals of up to 232 acre feet.
5. If any of the wells authorized by approval of Permit No. 5326-3 are located within the South Lincoln Rural Water system Future Use area reserved by Permit No. 4817-3, such wells will be junior in priority to No. 4817-3.

(continued)

**WATER PERMIT No. 5326-3**

Page 2

6. Approval of Permit No. 5326-3 is subject to submission of plans and specifications for the wells piping and appurtenances as prepared by a licensed engineer to the Division of Land and Water Quality for review and approval prior to construction.
7. Thermoplastic casing may not be used for test wells or production wells unless approved by the chief engineer.
8. The approval by the Board encompasses the right to construct up to three wells as identified. A fourth well may be drilled under the authority of this permit only after notice, hearing and approval of this Board.

**WATER MANAGEMENT BOARD**

By: \_\_\_\_\_

Chief Engineer, Water Rights Division  
Department of Water and Natural Resources

MAR 21 1990

\_\_\_\_\_  
(date)

(type or print in ink)

## 1. Well Information - Proposed construction

- a) Drill Hole Diameter 8 3/4" Depth 595'
- b) Casing Type Plastic Diameter 4 1/2" Thickness SDR-17-250-lbs
- c) Screen Type Stainless Steel Diameter 4 1/2" Thickness to be determined by  
formation analysis
- d) Gravel Pack Thickness 2" Length of Gravel Pack 189'
- e) Depth to Top of Water Bearing Material 406'
- f) Depth to Water (ground surface to water level) 105'
- g) Distance to nearest existing domestic well:  
 On applicants property See Attached Map On property owned by others See Attached Map

## 2. Dugout Information Estimates

- a) Surface Dimensions \_\_\_\_\_ Depth \_\_\_\_\_
- b) Depth to water (ground surface to water level) \_\_\_\_\_

## 3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below. The locations of each dam should be shown on the map submitted with the application.

- a) If a private engineering firm or government agency was involved in the design of this dam please give their name and address

\_\_\_\_\_  
 \_\_\_\_\_

b) Freeboard \_\_\_\_\_

c) Crest Width \_\_\_\_\_

Crest Length \_\_\_\_\_

d) Height \_\_\_\_\_

e) Primary Outlet Capacity \_\_\_\_\_

If Pipe, diameter \_\_\_\_\_

f) Secondary Spillway Capacity \_\_\_\_\_

Spillway width \_\_\_\_\_

g) X & Y Slope

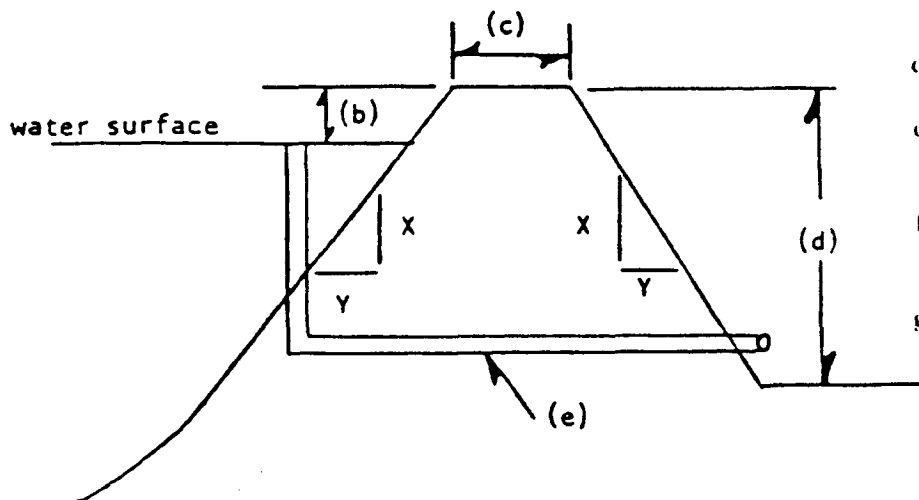
Upstream \_\_\_\_\_

Downstream \_\_\_\_\_

Surface Area of Impoundment \_\_\_\_\_

Storage \_\_\_\_\_ acre feet

Drainage area above dam \_\_\_\_\_



Signature of Applicant \_\_\_\_\_



Roger Almond  
February 27, 1989

### MAP INFORMATION

ML #5 Black Dot North-west corner of Mary Hill land and Highway 44  
ML #6 Black Dot South-west corner of Orlin Gedstad land

Farm Well #1 Blue Dot Merle Hill well 700' East of City's proposed Test Well #3  
Farm Well #2 Blue Dot Albert Hyronimus well 2000' East of City's proposed Test Well #3  
Farm Well #3 Blue dot Orlin Gedstad well 700' north of City's proposed Test Well #1  
Farm Well #4 Blue Dot Wendell Buus well 700' south of City's proposed Test Well #2

Proposed Test well #1 Red Dot Orlin Gedstad same location as ML#6 south-west corner of Orlin Gedstad farm.

Proposed Test Well #2 Red Dot Wendell Buus driveway east side

Proposed Test Well #3 Red Murl Hill Trees & Highway 44 of farmstead.

Map and driller test log completed by Geological Survey-1988





# Department of Water & Natural Resources

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

April 26, 1989

Floyd Beach  
City of Lennox  
220 S. Main  
Lennox, SD 57039-0228

Dear Mr. Beach:

I am writing in response to the water permit application for the City of Lennox received from you on March 31, 1989.

The application is not complete for the following reason(s):

1. The enclosed map needs to be signed by a South Dakota Registered Professional Engineer, a South Dakota Licensed Land Surveyor, or by a government employee who normally prepares maps as part of their regular duties (ASCS or SCS).
2. The maximum number of wells that you intend to develop needs to be listed under No. 3 of the enclosed application form.
3. The well locations will be added to your application (No. 4) as follows:

|                                          |           |
|------------------------------------------|-----------|
| S1/2 NW1/4, S1/2 NE1/4, S1/2 Section 11- | T98N-R51W |
| E1/2 Section 11-                         | " "       |
| E1/2 Section 14-                         | " "       |
| W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 12- | " "       |
| W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 13- | " "       |

unless I hear differently from you.

The Water Management Board cannot consider a water permit application until it is complete. Please return the map with the required signature and the application form indicating the maximum number of wells to be drilled in order to begin the processing of your water permit application.

Sincerely,

*Susan A. Bowar*

Susan A. Bowar  
Natural Resources Engineer  
Water Rights Division  
(605) 773-3352

enclosure



# RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

Pierre, March 31, 19 89

RECEIVED OF City of Lennox, 220 S. Main Street, Lennox, SD 57039

the following amount in fees for services rendered as provided for by law:

|                                                                                                                              |       |        |
|------------------------------------------------------------------------------------------------------------------------------|-------|--------|
| Fee for Application for Permit No. <u>5326-3</u> to Appropriate Water, to construct works and to put water to beneficial use | 225   | 00     |
| Fee for Application for Permit No. _____ to Appropriate Water for Future Use                                                 |       |        |
| Fee to retain Future Use Permit No. _____ after period of seven years.                                                       |       |        |
| Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____                          |       |        |
| Fee for Filing Transfer Form _____                                                                                           |       |        |
| Fee for Filing Extension Request _____                                                                                       |       |        |
| Fee for Certified Copy of _____                                                                                              |       |        |
| Fee for Print Copy of Map _____                                                                                              |       |        |
| Fee for Certifying _____                                                                                                     |       |        |
| Fee for _____                                                                                                                |       |        |
| (Any Other Work Provided by Law)                                                                                             | Total | 225 00 |

By

John Hatch (ma)  
Chief Engineer



PROJECT NUMBER: 10391  
DATE: MAY 8, 1989  
PREPARED FOR: CITY OF LENNOX

DESCRIPTION: LOCATION OF TEST  
BORINGS FOR THE CITY OF LENNOX



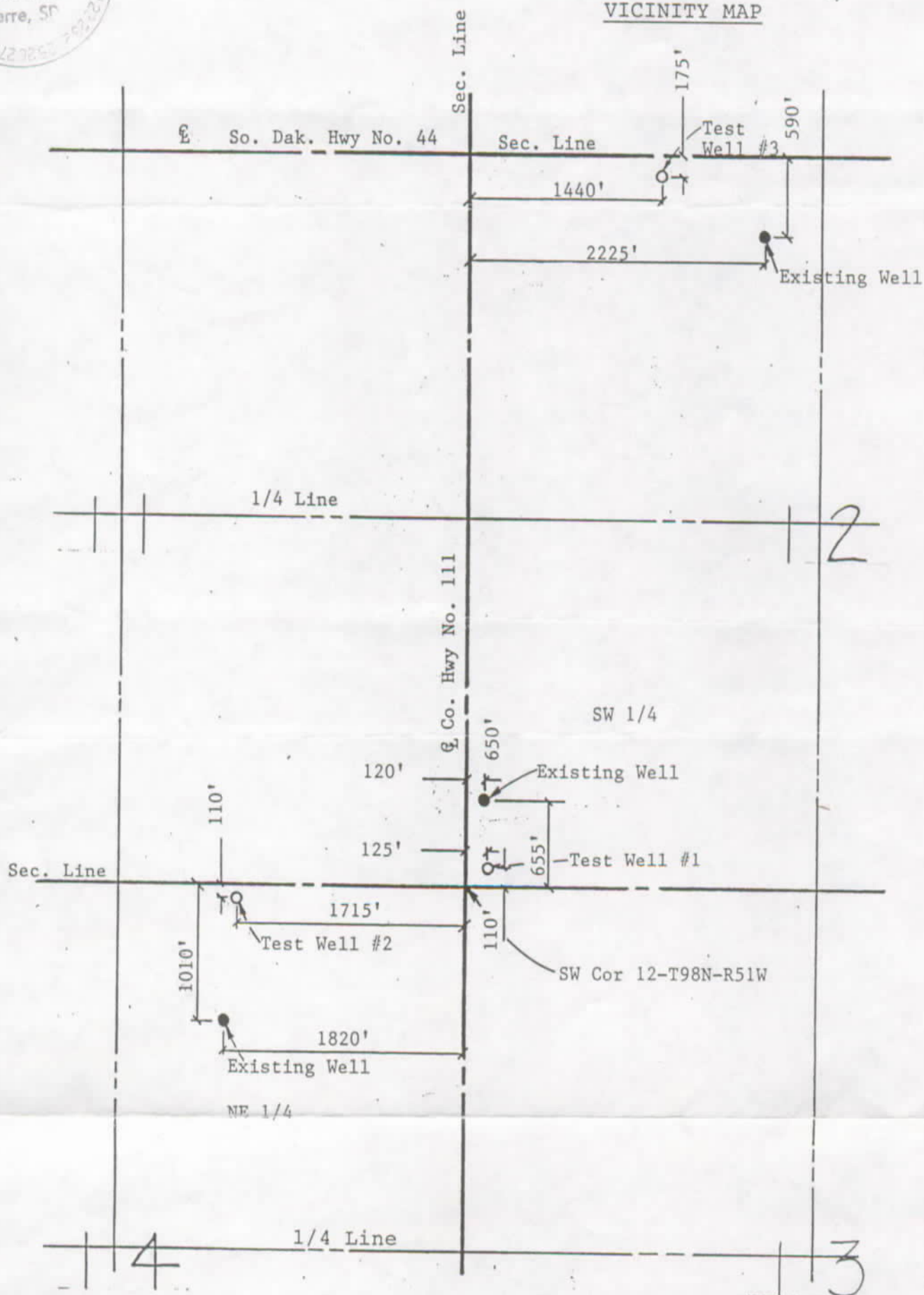
CITY OF  
LENNOX

HWY. 44

SITE

I-29

VICINITY MAP



PIN FOUND •

PIN SET ○

SCALE: 1" = 1000'

I HEREBY CERTIFY THAT THIS SURVEY, PLAN OR REPORT WAS  
PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT  
I AM A DULY REGISTERED LAND SURVEYOR UNDER THE LAWS OF  
THE STATE OF SOUTH DAKOTA.

REGISTERED LAND SURVEYOR

NUMBER: 9478

PREPARED BY:

R. F. SAYRE & ASSOCIATES  
CONSULTING ENGINEERS  
SIOUX FALLS, SOUTH DAKOTA

Appl. No. 5326-3

LEASE AND OPTION TO PURCHASE

Orlin M Gedstad of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

SW 1/4 of Section 12 Township 98  
R51W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 23rd day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

*Orlin Gedstad*

CITY OF LENNOX

By: *Dennis Weeldreyer*  
Its ~~Mayor~~ President of the Council

ATTEST: *Sharon Albers*  
FINANCE OFFICER

STATE OF SOUTH DAKOTA

SS

COUNTY OF LINCOLN

On this 23rd day of March, 1989, before, me, the undersigned officer, personally appeared Orlin Gedstad known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

*Sharon Albers*  
Notary Public - South Dakota  
Sharon Albers

(SEAL)

My Commission Expires: Oct. 1, 1989

STATE OF SOUTH DAKOTA

SS

COUNTY OF LINCOLN

On this 23rd day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the

President of the Council

~~Mayor~~ of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

*Sharon Albers*  
Notary Public - South Dakota

(SEAL)

My Commission Expires ~~My~~ Commission Expires Oct. 1, 1989



LEASE AND OPTION TO PURCHASE

Dorothy Stake of Lincoln  
County, South Dakota, hereinafter referred to as Owners, and City of Lennox,  
a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00  
and other good and valuable consideration, the Owners lease to the City for  
the purposes hereinafter more fully described a tract of land described as  
follows:

NW Quarter Section 14 Township 98 Range 51

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years  
from and after the date of the execution of this Lease and Option to  
Purchase.

3. The purpose of the lease is to grant to the City the right to  
enter upon the above described premises to conduct exploratory drilling,  
collection of soil samples, and other testing necessary to determine the  
suitability of the tract for the location of water well site. In connection  
therewith the City or its agents, shall be entitled to utilize all necessary  
drilling equipment, drill rigs and related equipment, and maintenance  
vehicles. The City may also install necessary fencing to protect its  
equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement not to exceed 100 feet in length from the nearest public road for the purpose of ingress and egress to test sites; and grants to the City the right to conduct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and the City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owner further grant to the City an option to drill up to three (3) well sites on property with total property not to exceed 1 acre.

9. The exact location of the storage facility and pumping station

shall be selected by the City with approval of land owner together with a thirty(30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. In the event of the exercise of the option by the City, the City shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 30th day of March, 1989, in Lincoln County,  
South Dakota.

OWNERS:

Sharon Albers

CITY OF LENNOX

By: Floyd Beach  
Its Mayor

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota  
COUNTY OF Lincoln SS

On this 30th day of April, 1989, before, me, the undersigned officer, personally appeared Dorothy Stake known to me or satisfactorily proven to be the person(s) whose name(s) (is, ~~are~~) subscribed to the within instrument and acknowledged that she executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA  
COUNTY OF LINCOLN SS

On this 30th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Floyd Beach, who acknowledged himself to be the Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

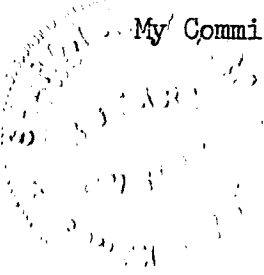
In witness whereof I hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota

(SEAL)

My Commission Expires Oct. 1, 1989

My Commission Expires: \_\_\_\_\_



**LEASE AND OPTION TO PURCHASE**

Murl E. & Betty Hill of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

E 1/2 NW 1/4 Section 12  
Grant Township, T98 N R51 W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$ 10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City shall receive credit for the consideration stated in this instrument against the purchase price.

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

Dated this 27th day of March, 1989, in Lincoln County,  
South Dakota.

OWNERS:

Muri E. Hill  
Muri E. Hill

Betty Hill  
Betty Hill  
CITY OF LENNOX

By: Floyd Beach  
Its Mayor

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota  
COUNTY OF Lincoln SS

On this 27th day of March, 1989, before, me, the undersigned officer, personally appeared Muri & Betty Hill known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that he y executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers

(SEAL)  
My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA  
COUNTY OF LINCOLN SS

On this 27th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Floyd Beach, who acknowledged himself to be the Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

*Spencer Adams*  
Notary Public - South Dakota

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1937

## LEASE AND OPTION TO PURCHASE

Wendell G. and Susan M. Buus

of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

N 1/2 NE 1/4 Section 14  
Grant Township T98 N R51 W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$ 10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 22 day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

Wendell G. Buus  
Susan M. Buus

CITY OF LENNOX

By: Dennis Weeldreyer  
~~Its Mayor~~ President of the Council  
XXXXXX

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota

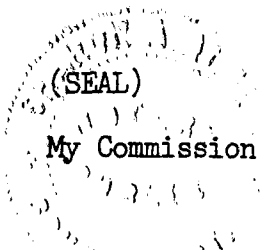
SS

COUNTY OF Lincoln

On this 22 day of March, 1989, before, me, the undersigned officer, personally appeared Wendell G. and Susan M. known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that they executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers



My Commission Expires My Commission Expires Oct. 1, 1993

STATE OF SOUTH DAKOTA

SS

COUNTY OF LINCOLN

On this 22 day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the

*President of the Council*  
Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

*L. Aaron Allen*  
Notary Public - South Dakota

(SEAL)

**My Commission Expires Oct. 1, 1982.**

My Commission Expires: \_\_\_\_\_

LEASE AND OPTION TO PURCHASE

Orlin M. Gedstad

of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

S 1/2 NE 1/4 Section 14  
Township 98 N R 51W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$ 10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 9th day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

Orlin M. Gedstad  
Orlin M. Gedstad

CITY OF LENNOX

By: Dennis Weeldreyer  
its

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota

SS

COUNTY OF Lincoln

On this 9th day of March, 1989, before, me, the undersigned officer, personally appeared Orlin M. Gedstad known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA

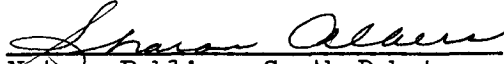
SS

COUNTY OF LINCOLN

On this 9th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the The President of the Council

of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

  
Notary Public - South Dakota

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

**LEASE AND OPTION TO PURCHASE**

Orlin M Gedstad of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

SW 1/4 of Section 12 Township 98  
R51W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 23rd day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

Orlin Gedstad

CITY OF LENNOX

By: Dennis Weeldreyer  
Its ~~Mayor~~ President of the Council

ATTEST:

Sharon Albers  
FINANCE OFFICER

STATE OF SOUTH DAKOTA

SS

COUNTY OF LINCOLN

On this 23rd day of March, 1989, before, me, the undersigned officer, personally appeared Orlin Gedstad known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA

SS

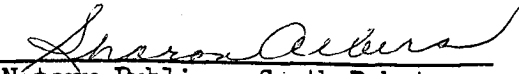
COUNTY OF LINCOLN

On this 23rd day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the

President of the Council

Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

  
Notary Public - South Dakota

(SEAL)

My Commission Expires: \_\_\_\_\_

LEASE AND OPTION TO PURCHASE

Orlin M. Gedstad

of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

S 1/2 NE 1/4 Section 14  
Township 98 N R 51W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 9th day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

Orlin M. Gedstad  
Orlin M. Gedstad

CITY OF LENNOX

By: Dennis Weeldreyer  
its

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota

SS

COUNTY OF Lincoln

On this 9th day of March, 1989, before, me, the undersigned officer, personally appeared Orlin M. Gedstad known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that he executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA

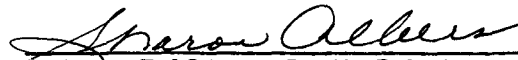
SS

COUNTY OF LINCOLN

On this 9th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the The President of the Council

of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

  
Notary Public - South Dakota

(SEAL)

**My Commission Expires Oct. 1, 1989**

My Commission Expires: \_\_\_\_\_

**LEASE AND OPTION TO PURCHASE**

Wendell G. and Susan M. Buus

of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

N 1/2 NE 1/4 Section 14  
Grant Township T98 N R51 W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City

shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 22 day of March, 1989, in Lincoln County, South Dakota.

OWNERS:

Wendell G. Buus

Susan M Buus

CITY OF LENNOX

By: Dennis Weeldreyer  
Its ~~MAYOR~~ President of the Council

ATTEST: Sharon Albers  
FINANCE OFFICER  
Sharon Albers

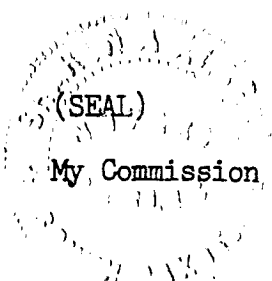
STATE OF South Dakota SS  
COUNTY OF Lincoln

On this 22 day of March, 1989, before, me, the undersigned officer, personally appeared Wendell G. and Susan M known to me or satisfactorily proven to be the person(s) whose name(s) (is, are) subscribed to the within instrument and acknowledged that they executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota

Sharon Albers



My Commission Expires: My Commission Expires Oct. 1, 1989

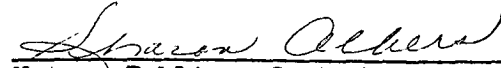
STATE OF SOUTH DAKOTA SS  
COUNTY OF LINCOLN

On this 22 day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Dennis Weeldreyer, who acknowledged himself to be the

*President of the Council*

~~Mayor~~ of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

  
Notary Public - South Dakota

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

LEASE AND OPTION TO PURCHASE

Muri E. & Betty Hill of Lincoln

County, South Dakota, hereinafter referred to as Owners, and City of Lennox, a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00 and other good and valuable consideration, the Owners lease to the City for the purposes hereinafter more fully described a tract of land described as follows:

E 1/2 NW 1/4 Section 12  
Grant Township, T98 N R51W

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years from and after the date of the execution of this Lease and Option to Purchase.

3. The purpose of the lease is to grant to the City the right to enter upon the above described premises to conduct exploratory drilling, collection of soil samples, and other testing necessary to determine the suitability of the tract for the location of water well site. In connection therewith the City or its agents, shall be entitled to utilize all necessary drilling equipment, drill rigs and related equipment, and maintenance vehicles. The City may also install necessary fencing to protect its equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement for the purpose of ingress and egress to test sites; and grants to the City the right to construct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owners further grant to the City an option to purchase up to three (3) well sites on property described above containing not more than one (1) acre per well site.

9. The exact location of the storage facility and pumping station

shall be selected by the City, together with a thirty (30) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 per well site (if in the event such well site is less than one (1) acre).

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. This lease and option may be renewed at the option of the City for a three (3) year period by the tender on the part of the City of the amount tendered \$10.00 for this lease and option.

13. In the event of the exercise of the option by the City, the City shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 27th day of March, 1989, in Lincoln County,  
South Dakota.

OWNERS:

Muri E. Hill  
Muri E. Hill

Betty Hill  
Betty Hill

CITY OF LENNOX

By: Floyd Beach  
Its Mayor

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota

SS

COUNTY OF Lincoln

On this 27th day of March, 1989, before, me, the undersigned officer, personally appeared Muri & Betty Hill known to me or satisfactorily proven to be the person(s) whose name(s) (~~is~~, are) subscribed to the within instrument and acknowledged that they executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota  
Sharon Albers

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA

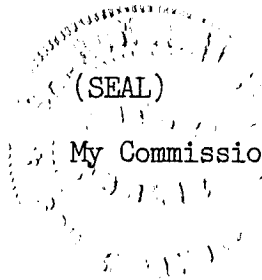
SS

COUNTY OF LINCOLN

On this 27th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Floyd Beach, who acknowledged himself to be the Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

Sparon Albers  
Notary Public - South Dakota



My Commission Expires Oct. 1, 1989

My Commission Expires: \_\_\_\_\_

LEASE AND OPTION TO PURCHASE

Dorothy Stake of Lincoln  
County, South Dakota, hereinafter referred to as Owners, and City of Lennox,  
a municipal corporation, hereinafter referred to as City, agree as follows:

1. In consideration of the sum of \$10.00  
and other good and valuable consideration, the Owners lease to the City for  
the purposes hereinafter more fully described a tract of land described as  
follows:

NW Quarter Section 14 Township 98 Range 51

said property in the amount and terms hereinafter described.

2. The terms of this Lease shall be for a period of three (3) years  
from and after the date of the execution of this Lease and Option to  
Purchase.

3. The purpose of the lease is to grant to the City the right to  
enter upon the above described premises to conduct exploratory drilling,  
collection of soil samples, and other testing necessary to determine the  
suitability of the tract for the location of water well site. In connection  
therewith the City or its agents, shall be entitled to utilize all necessary  
drilling equipment, drill rigs and related equipment, and maintenance  
vehicles. The City may also install necessary fencing to protect its  
equipment and the well site.

4. For the purpose of adequate testing, the City or its agents, will

conduct some or all of the following activities on the leased premises together with such other activities as may be deemed necessary to effect the purpose of this agreement.

Drill a test hole, or holes, and obtain necessary soil samples.

5. In order to provide access to the above described property, the Owners further grant to the City a thirty (30) foot wide easement not to exceed 100 feet in length from the nearest public road for the purpose of ingress and egress to test sites; and grants to the City the right to conduct necessary power lines to the above described property over and across said easement. The duration of the Easement shall be the same as the duration of the leasehold above referred to. Said Easement shall extend from the nearest public road to the leased property by the most direct route and the City shall have the right to maintain said access road as may be required, subject to compensation for damages to property as hereinafter provided.

6. At the expiration of the Lease and Easement, the City shall promptly remove all of its equipment, fences, lines and fill all holes or other excavations, and will restore the leased and eased ground to its present condition, or to compensate the Owners, for the cost of such restoration.

7. The City further agrees to reasonably compensate the Owners for all injury or damage to growing or planted crops on the leased premises and any and all damages to the leased, eased or surrounding property, occasioned by the negligent acts, or omission to act of its agents or employees.

8. The Owner further grant to the City an option to drill up to three (3) well sites on property with total property not to exceed 1 acre.

9. The exact location of the storage facility and pumping station

shall be selected by the City with approval of land owner together with a thirty(~~30~~) foot access road for purpose of ingress and egress and the construction of power lines, pipe lines and whatever other works may be necessary to remove water from said location. Such access road shall extend from the nearest public road to the leased property by the most direct route.

10. The consideration to be paid by the City to the Owners in the event of the exercise of the option for the purchase of the property herein referred to shall be the sum of \$ 2000.00 per acre for well site(s) or a minimum of \$ 2000.00 well site (if in the event such well site is less than one (1) acre)..

11. This option to purchase shall extend for a period of three (3) years from the date of this agreement and may be exercised by the City by giving notice in writing directed to the Owners at their last known address accompanied by payment of ten (10) percent of the purchase price. The balance of the purchase price shall be payable upon delivery of a good and sufficient warranty deed by owners to the City. The Owners shall not be required to furnish an abstract of title to the premises purchased, however, Owners shall convey said premises by warranty deed free and clear of any and all encumbrances and shall provide the City with an abstract for examination showing good, marketable title to the property. All costs of survey shall be the responsibility of the City.

12. In the event of the exercise of the option by the City, the City shall receive credit for the consideration stated in this instrument against the purchase price.

Dated this 30th day of March, 1989, in Lincoln County,  
South Dakota.

OWNERS:

Dorothy Stake

CITY OF LENNOX

By: Floyd Beach  
Its Mayor

ATTEST: Sharon Albers  
FINANCE OFFICER

STATE OF South Dakota  
COUNTY OF Lincoln SS

On this 30th day of April, 1989, before, me, the undersigned officer, personally appeared Dorothy Stake known to me or satisfactorily proven to be the person(s) whose name(s) (is, ~~are~~) subscribed to the within instrument and acknowledged that she executed the same for the purposes therein contained.

In witness whereof I have hereunto set my hand and official seal.

Sharon Albers  
Notary Public - South Dakota

(SEAL)

My Commission Expires Oct. 1, 1989

My Commission Expires: \_\_\_\_\_

STATE OF SOUTH DAKOTA  
COUNTY OF LINCOLN SS

On this 30th day of March, 1989, before me, Sharon Albers, the undersigned officer, personally appeared Floyd Beach, who acknowledged himself to be the Mayor of the City of Lennox, South Dakota, a municipal corporation organized and existing by virtue of the law of the State of South Dakota, and that he, as Mayor, being authorized so to do, executed the foregoing instrument for the purposes therein contained.

In witness whereof I hereunto set my hand and official seal.

*L Sharon Albers*  
Notary Public - South Dakota

(SEAL)

My Commission Expires: My Commission Expires Oct. 1, 1989

STATE OF SOUTH DAKOTA  
George S. Mickelson, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES  
John J. Smith, Secretary

DIVISION OF GEOLOGICAL SURVEY  
Merlin J. Tipton, State Geologist

OPEN-FILE REPORT 56-UR

INVESTIGATION OF THE EXTENT  
AND GROUND-WATER QUALITY  
OF THE DAKOTA FORMATION  
NEAR LENNOX, SOUTH DAKOTA

by

PATRICIA DAWSON HAMMOND

Science Center  
University of South Dakota  
Vermillion, South Dakota

1989

SOUTH DAKOTA GEOLOGICAL SURVEY  
SCIENCE CENTER  
VERMILLION, SOUTH DAKOTA 57069-2390  
605-677-5227

|                                  |                         |
|----------------------------------|-------------------------|
| Merlin J. Tipton, M.A.           | State Geologist         |
| Irene C. Iverson                 | Accounting Assistant    |
| Assad Barari, Ed.D               | Natural Resources Admr. |
| Sarah A. Chadima, M.S.           | Geologist               |
| Cleo M. Christensen, M.A.        | Natural Resources Admr. |
| Marjory C. Coker, M.A.           | Chemist Supervisor      |
| Tim C. Cowman, B.S.              | Hydrologist             |
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| Robert A. Schoon, M.A.           | Geologist               |
| Layne D. Schulz, B.S.            | Geologist               |
| Dennis W. Tomhave, B.A.          | Geologist               |
| Carolyn V. DeMartino, B.S.       | Natural Resources Tech. |
| Joan M. Hewitt                   | Staff Assistant         |
| Dennis D. Iverson                | Drilling Supervisor     |
| Gary W. Jensen                   | Drilling Supervisor     |
| Dennis W. Johnson                | Draftsman               |
| Colleen K. Odenbrett             | Word Processor          |
| Millard A. Thompson, Jr., A.A.   | Equipment Shop Foreman  |

SOUTH DAKOTA GEOLOGICAL SURVEY  
Western Field Office  
36 East Chicago  
Rapid City, South Dakota 57701  
605-394-2229

|                        |           |
|------------------------|-----------|
| James E. Martin, Ph.D. | Geologist |
|------------------------|-----------|

**STATE OF SOUTH DAKOTA  
George S. Mickelson, Governor**

**DEPARTMENT OF WATER AND NATURAL RESOURCES  
John J. Smith, Secretary**

**DIVISION OF GEOLOGICAL SURVEY  
Merlin J. Tipton, State Geologist**

**Open-File Report 56-UR**

**INVESTIGATION OF THE EXTENT AND GROUND-WATER QUALITY  
OF THE DAKOTA FORMATION NEAR LENNOX, SOUTH DAKOTA**

**by**

**Patricia Dawson Hammond**

**Science Center  
University of South Dakota  
Vermillion, South Dakota**

**1989**

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## **INTRODUCTION**

The investigation was conducted by the South Dakota Geological Survey (SDGS), at the request of the city of Lennox, South Dakota, to identify a potential source for a new municipal water supply. The investigation was financed by the city of Lennox and the state of South Dakota. This report contains the results of the investigation which was conducted in the Lennox area (fig. 1).

The city of Lennox (population 1,827) is located approximately 14 miles south of Sioux Falls, South Dakota, in Lincoln County. Because of the poor-quality water being obtained from the aquifer currently used by the city (Lennox aquifer), an investigation was designed to delineate that part of the Dakota Formation, near Lennox, which has a potential to yield a satisfactory quality and quantity of water.

## **METHODS AND PROCEDURES**

### **Drilling and Well Installation**

Drilling occurred during two periods; from May 9, 1988, through May 25, 1988, and from July 25, 1988, through August 4, 1988. Drilling was performed with a mud-rotary machine using a 5½-inch diameter drill bit. Nine test holes were drilled at map locations (ML) 2, 3, 4, 5, 6, 7, 10, 12, and 13 (fig. 2, app. A). Four of these test holes were completed as observation wells (ML 2, 3, 4, and 10). Geophysical logs are available, at the SDGS for eight of the holes and include the parameters single-point resistivity, natural gamma, and spontaneous potential (app. A).

Observation wells were constructed using 2-inch diameter, schedule 80, threaded, polyvinyl chloride (PVC) casing and screen. Data on screen length and well depth are presented in appendix A. Filter pack, either Wynot gravel (a poorly sorted, very fine sand to very coarse gravel) or Grand Island sand (a well sorted, coarse sand), was placed around the outside of the screen up to at least 7 feet above the top of the screen. A tremie pipe was used to ensure proper positioning of the filter pack. Bentonite grout was then pumped through the tremie pipe into the remaining annular space (from the bottom up to land surface) around the outside of the casing. At a later date, an upper portion of the annular space was filled with cement grout and finally topped with soil. These data are on file at the SDGS.

### **Surveying**

Casing-top elevations of the observation wells and land-surface elevations next to the wells were surveyed to the nearest 0.01 foot. The bench mark used as a datum was a U.S. Coast and Geodetic Survey bench mark located in SE¼SE¼SE¼SE¼ sec. 33, T. 98 N., R. 51 W. It is stamped "2 SAN 1961" and has an elevation of 1,327.4 feet above mean sea level.

*Index map of South Dakota  
showing location of Lincoln  
County.*

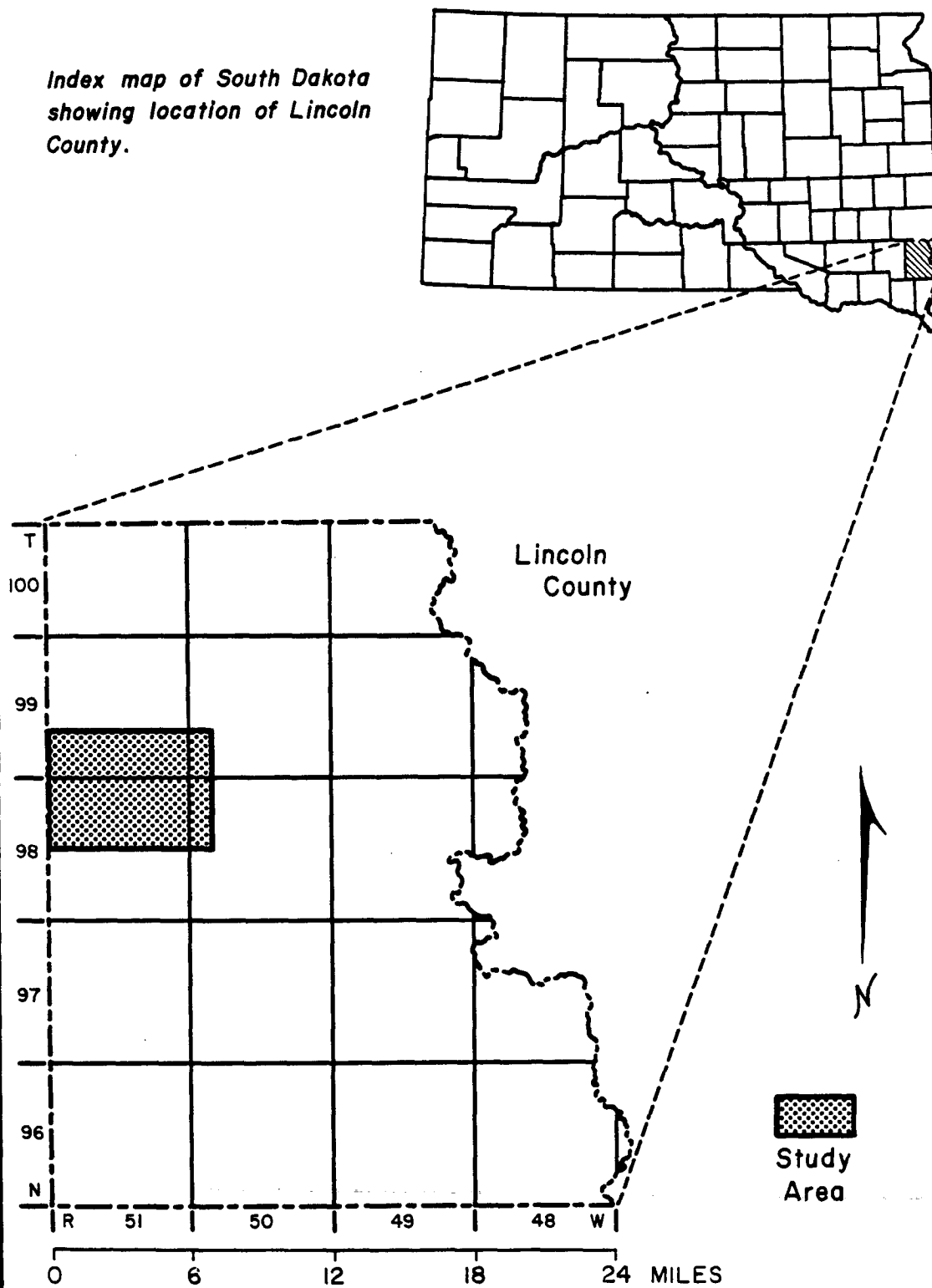


Figure 1. Location of the study area.

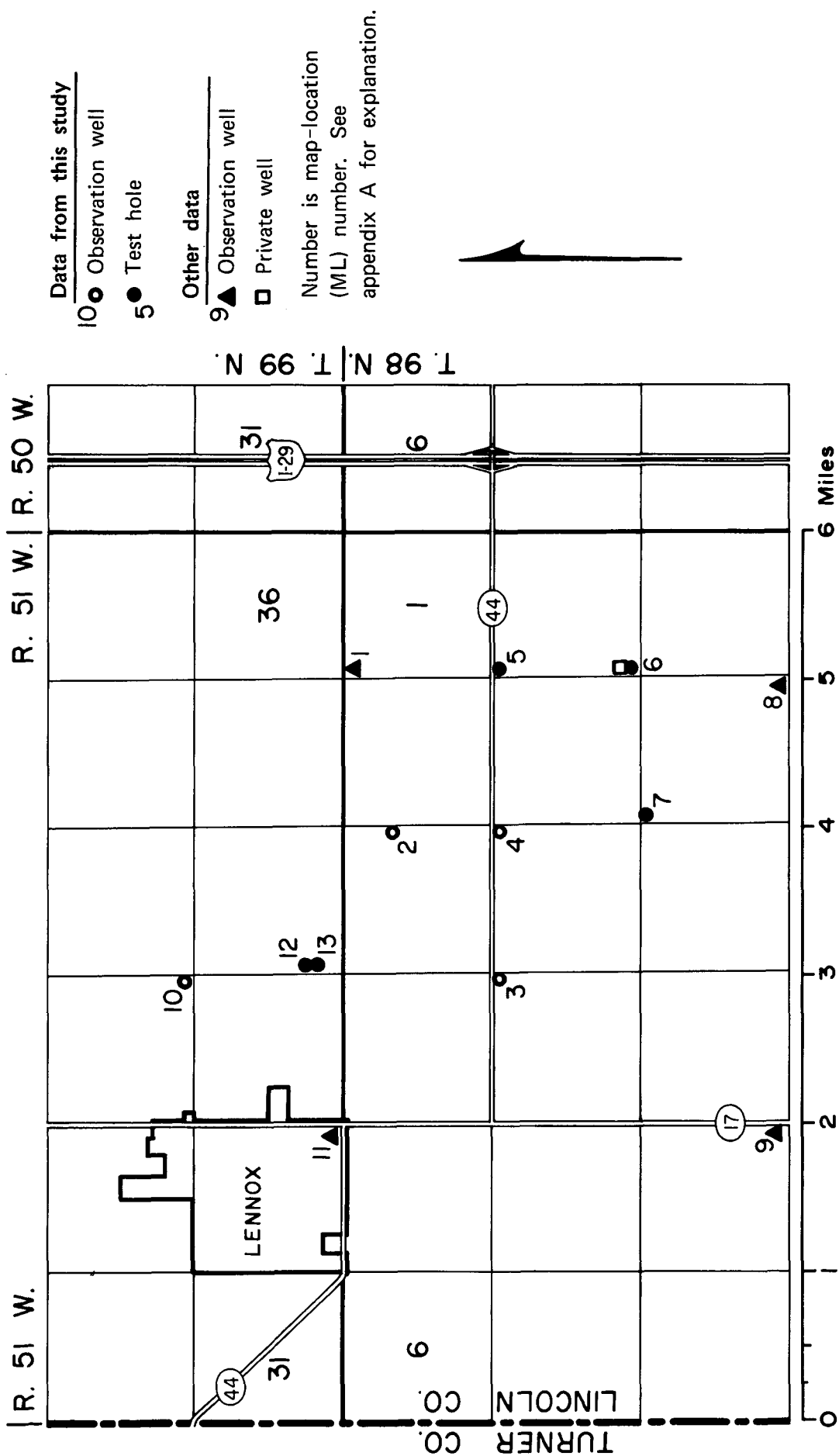


Figure 2. Locations of test holes and observation wells.

### Water-level Measurements

The depth to water in the observation wells was measured on two occasions (table 1) to the nearest 0.01 foot. Measurements were made using a fiber glass tape measure with a concave-shaped device on the end which makes an audible sound upon impact with the water.

### Well Development and Water Sampling

All observation wells were developed by pumping with compressed air. A minimum of 4 well volumes of water was removed from each well during this process.

All water samples, from observation wells, were collected with a bladder pump or, when that was not possible, with a bailer. A minimum of 3 well volumes of water were evacuated from each well before a sample was collected. Water samples were collected from the observation wells installed for this investigation, three observation wells controlled by the Division of Water Rights, and one private well. Water-quality analyses (table 2) were performed by the South Dakota Geological Survey.

=====

**Table 1. Water levels in Dakota Formation observation wells**

| Map<br>Location<br>Number<br>(1) | Location<br>(2)  | Well<br>ID<br>Number | Casing<br>Top<br>Elevation<br>(3) | Depths to water<br>and dates of<br>measurement<br>(4) |          |
|----------------------------------|------------------|----------------------|-----------------------------------|-------------------------------------------------------|----------|
|                                  |                  |                      |                                   | 07-28-88                                              | 08-10-88 |
| 1                                | 098N-51W-01BBBB  | LN-80I               | 1342.72                           | 107.91                                                | 108.09   |
| 2                                | 098N-51W-03ADAD  | R20-88-33            | 1327.33                           | 97.48                                                 | 97.70    |
| 3                                | 098N-51W-09AAAA  | R2-88-06             | 1315.91                           | 110.98                                                | 111.40   |
| 4                                | 098N-51W-10AAAA  | R2-88-07             | 1322.37                           | 102.34                                                | 102.32   |
| 9                                | 098N-51W-17DDDA  | LN-80L               | 1292.36                           | --                                                    | 88.64    |
| 10                               | 099N-51W-28DDDD  | R2-88-05             | 1359.30                           | 114.90                                                | 116.04   |
| 11                               | 099N-51W-32DDDD2 | LN-81F               | 1328.27                           | 88.87                                                 | 90.24    |

- =====
- (1) Map-Location Number - corresponds to number on figure 2 and in appendix A.  
(2) See appendix A for explanation of location format.  
(3) Presented in feet above mean sea level.  
(4) All water levels are presented in feet below top of casing.
- =====

Table 2. Chemical analyses of water samples, Dakota Formation, Lennox area

| Location<br>(2) | ML<br>Number<br>(2) | Well<br>ID<br>Number | Date<br>Sampled | Well<br>Depth<br>(feet) (3) | Conduc-<br>tivity<br>(mmhos)<br>(4) | Concentrations in milligrams per liter (1) |      |       |      |                 |                    |     |     |    |      |
|-----------------|---------------------|----------------------|-----------------|-----------------------------|-------------------------------------|--------------------------------------------|------|-------|------|-----------------|--------------------|-----|-----|----|------|
|                 |                     |                      |                 |                             |                                     | Hard-<br>ness<br>as<br>CaCO <sub>3</sub>   | TDS  | Fe    | Mn   | SO <sub>4</sub> | NO <sub>3</sub> -N | Na  | Ca  | Mg | K    |
|                 |                     |                      |                 |                             |                                     |                                            |      |       |      |                 |                    |     |     |    |      |
| -----           | -----               | -----                | -----           | -----                       | -----                               | ---                                        | 500  | 0.3   | 0.05 | 250             | 10                 | --  | --  | -- | 250  |
|                 |                     |                      |                 |                             |                                     | (5)                                        | (5)  | (5)   | (5)  | (5)             | (6)                |     |     |    | (5)  |
|                 |                     |                      |                 |                             |                                     |                                            |      |       |      |                 |                    |     |     |    |      |
| 98N-51W-018888  | ML 1                | LN-801               | 06-03-88        | 580                         | 952                                 | 286                                        | 612  | <0.05 | 0.05 | 211             | <0.04              | 98  | 75  | 24 | 16.8 |
| 98N-51W-0340AD  | ML 2                | R20-88-33            | 08-04-88        | 529                         | 1709                                | 854                                        | 1246 | 0.44  | 0.13 | 626             | <0.04              | 77  | 235 | 65 | 11.8 |
| 98N-51W-09AAAA  | ML 3                | R2-88-06             | 05-19-88        | 601                         | 1758                                | 858                                        | 1362 | 0.07  | 0.17 | 689             | <0.04              | 103 | 233 | 67 | 13.3 |
| 98N-51W-10AAAA  | ML 4                | R2-88-07             | 06-02-88        | 577                         | 1405                                | 178                                        | 914  | <0.05 | 0.05 | 270             | <0.04              | 264 | 45  | 16 | 14.0 |
| 98N-51W-12CCCC  | --                  | Private              | 08-04-88        | 499                         | 833                                 | 206                                        | 510  | 0.69  | 0.06 | 181             | <0.04              | 98  | 51  | 19 | 18.2 |
| 98N-51W-170DDA  | ML 9                | LN-80L               | 08-10-88        | 507                         | 1416                                | 721                                        | 1040 | 0.15  | 0.13 | 470             | <0.04              | 62  | 193 | 58 | 13.7 |
| 99N-51W-280DDD  | ML10                | R2-88-05             | 05-12-88        | 307                         | 2389                                | 1243                                       | 1944 | 1.68  | 0.99 | 1145            | 0.04               | 126 | 346 | 92 | 11.7 |
| 99N-51W-320DD02 | ML11                | LN-81F               | 05-31-88        | 418                         | 2162                                | 1099                                       | 1826 | 1.66  | 0.98 | 935             | <0.04              | 122 | 305 | 82 | 9.6  |
|                 |                     |                      |                 |                             |                                     |                                            |      |       |      |                 |                    |     |     |    | 8    |
|                 |                     |                      |                 |                             |                                     |                                            |      |       |      |                 |                    |     |     |    | 0.23 |

(1) TDS - total dissolved solids; Fe - iron; Mn - manganese; SO<sub>4</sub> - sulfate; NO<sub>3</sub>-N - nitrate-nitrogen; Na - sodium; Ca - calcium; Mg - magnesium; K - potassium; Cl - chloride; F - fluoride.

(2) See appendix A for explanation of location format and map location (ML) number.

(3) Well depth is presented in feet below land surface.

(4) mmhos - micromhos.

(5) U.S. Environmental Protection Agency recommended maximum limit, (U.S. Environmental Protection Agency, 1985b).

(6) U.S. Environmental Protection Agency enforceable maximum limit, (U.S. Environmental Protection Agency, 1985a).

## **PRESENT LENNOX WATER SUPPLY**

The city of Lennox pumps water from the Lennox aquifer (fig. 3). This aquifer consists of glacial outwash and lies directly on the bedrock surface (Iles, 1984). Two city wells completed in this aquifer are currently operational; well 1 was drilled in March, 1972, to a depth of 300 feet, and well 2 was drilled in September, 1972, to a depth of 295 feet. After construction, well 1 had a capacity of 300 gallons per minute at 19 feet of drawdown and well 2 had a capacity of 285 gallons per minute at 18 feet of drawdown. The static water level was approximately 100 feet below land surface in both wells.

Water produced from the two wells mentioned above is of poor quality. The Lennox municipal water supply (after treatment for iron and fluoride) has a total dissolved solids content of 2,080 milligrams per liter (mg/L), a hardness concentration (as  $\text{CaCO}_3$ ) of 1,293 mg/L, a sulfate concentration of 1,157 mg/L, an iron concentration of 0.20 mg/L, and a manganese concentration of 0.36 mg/L (analyses performed by the State Health Laboratory, November 25, 1986).

## **HYDROGEOLOGIC SETTING**

The study area is underlain by Pleistocene drift (Beffort, 1969). The drift is directly underlain by bedrock, either Cretaceous sediments (Niobrara Formation or Carlile Shale) or Precambrian Sioux Quartzite.

Drift is composed of till and outwash, both of which are present in the study area. Till, which forms the land surface in the study area, consists of a heterogeneous mixture of boulders, gravel, sand, clay, and silt. The till matrix is composed predominantly of clay and silt. Outwash consists primarily of sand and gravel that has been washed, sorted, and deposited by flowing glacial meltwater. Varying amounts of less permeable materials, silt and clay, are found dispersed throughout the outwash matrix. One particular outwash, named the Lennox aquifer, is the source of water for the city of Lennox.

If all commonly encountered bedrock units in the study area were present at one location, they would be encountered in descending order (from youngest to oldest) as follows: Cretaceous Niobrara Formation, Carlile Shale, Greenhorn Limestone, Graneros Shale, and Dakota Formation followed by quartzite wash, weathered quartzite and finally Precambrian Sioux Quartzite. For a brief description of the commonly encountered bedrock units, refer to table 3. The surface of the Sioux Quartzite generally rises in elevation from south to north in and near the study area. The relatively flat lying Cretaceous sediments above the Sioux Quartzite "pinch out" as the quartzite rises in elevation.

In the study area, the Dakota Formation, the zone of weathered quartzite, quartzite wash and occasionally the Sioux Quartzite

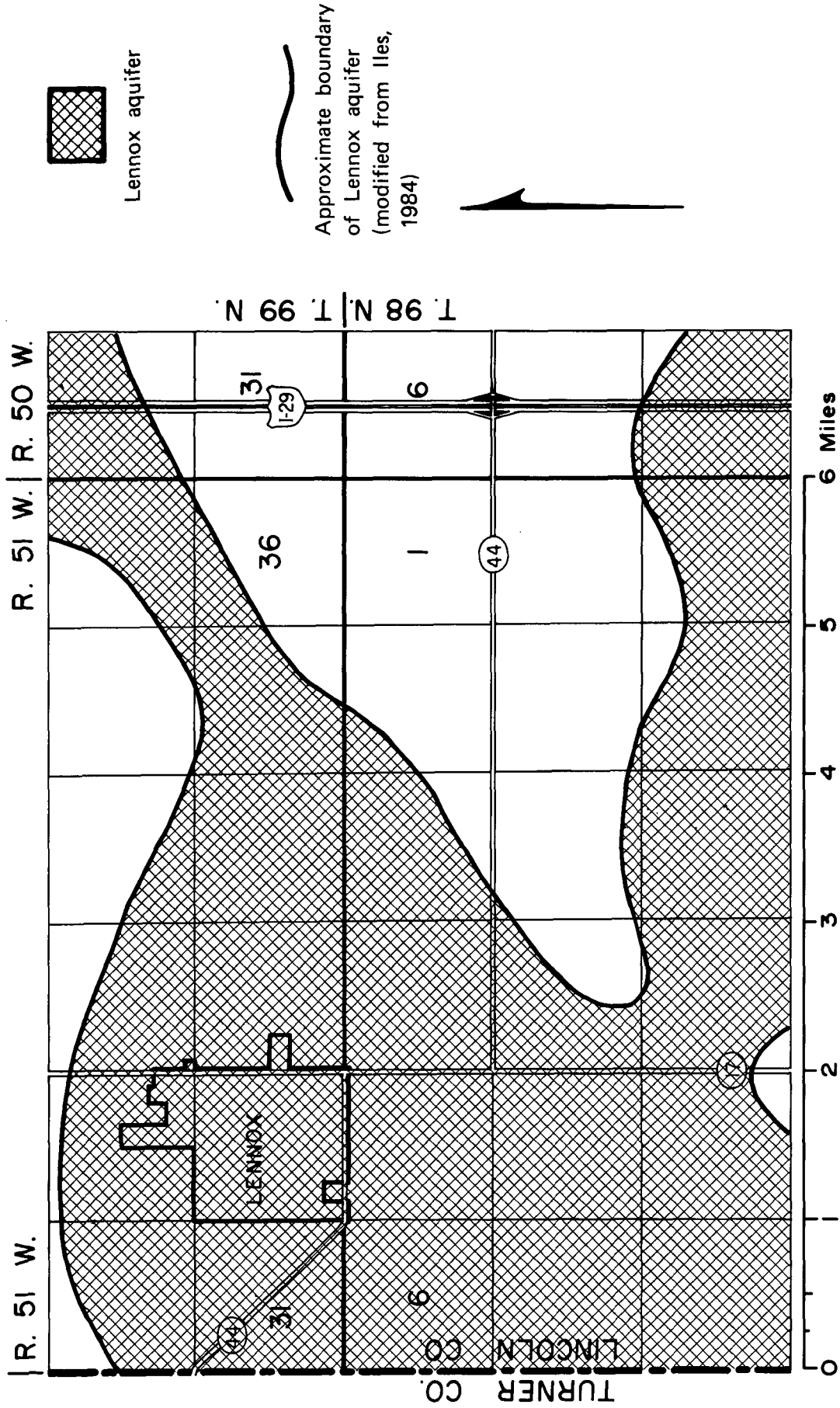


Figure 3. Extent of the Lennox aquifer.

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**Table 3. Description of bedrock geologic units**

| Geologic unit                            | General description                                                                                                             |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Niobrara Formation                       | White to buff, massive calcareous chalk; fossiliferous                                                                          |
| Carlile Shale                            | Medium- to dark-gray shale with pyrite concretions; includes nearshore facies siltstone (Split Rock Creek Formation) at ML 12   |
| Greenhorn Limestone                      | Dark-gray shale and buff to white fossiliferous limestone                                                                       |
| Graneros Shale                           | Light- to dark-gray silicious shale, hard                                                                                       |
| Dakota Formation *                       | Fine to coarse, loose to cemented, light-brown sand or sandstone with alternating layers of shale; coal seams are often present |
| Quartzite wash and weathered quartzite * | Pinkish sand with white clay fragments; sand is composed almost entirely of Sioux Quartzite fragments                           |
| Sioux Quartzite                          | Pink to purple, very hard, orthoquartzite                                                                                       |

\* In this report, the Dakota Formation, quartzite wash and weathered quartzite are considered to act as one hydrologic unit and therefore are identified together as the Dakota Formation on figures 5, 6, 7, and 8.

General descriptions from Beffort (1969), and from drillers logs from this investigation.

=====

are considered aquifers. The Dakota Formation and the directly underlying quartzite wash, when present, probably act as one hydrologic unit, therefore, in this report, the quartzite wash is considered to be a part of the Dakota Formation. The Sioux Quartzite is considered an aquifer only where fractures exist that will yield sufficient quantities of water. The presence and extent of these fractures is very difficult to predict.

The Dakota Formation, in the Lennox area, consists of inter-bedded sand, sandstone, shale, and sandy shale. In the western part of the study area, the Dakota Formation "pinches out" against the quartzite surface and the Lennox aquifer lies directly on the quartzite surface (Iles, 1984). Thus, the Lennox aquifer and the Dakota Formation exist at essentially the same elevation and may be in contact beneath the city of Lennox (Iles, 1984).

## **RESULTS OF INVESTIGATION**

### **General Geology**

Three cross sections, whose locations are shown on figure 4, illustrate the spatial distribution of sediments in the study area (figs. 5, 6, and 7). The Niobrara Formation was encountered in only two drill holes (ML 6 and ML 7). Actual thickness of the Niobrara is unknown because after drilling 99 feet into the Niobrara at ML 7, drilling-mud circulation was lost and the hole was abandoned due to the possibility of hole collapse. Thickness of the Niobrara at ML 6 is 56 feet, but the bottom few feet are very shaley. Carlile Shale ranges in thickness from 62 feet (ML 10) to 250 feet (ML 6) and the Greenhorn Limestone varies in thickness from 5 feet (ML 11) to 47 feet (ML 8). Graneros Shale is very thin or absent in the study area and was found only at ML 1, ML 2, ML 6, and ML 8. Thickness of the Graneros varies from 5 feet (ML 2) to 20 feet (ML 1). A test hole at ML 12 encountered the Split Rock Creek Formation which is a nearshore facies of the Cretaceous age sediments (Shurr and others, 1987).

### **Dakota Formation**

Extent and thickness of the Dakota Formation is shown in figure 8. Directly below the Dakota Formation, and the quartzite wash where present, is the Precambrian Sioux Quartzite (and possibly a Paleozoic sandstone, ML 2, or shale, ML 5). Directly above the Dakota Formation is either the Greenhorn Limestone or the Graneros Shale.

In the study area, the Dakota Formation has a minimum thickness of 41 feet (ML 10) and a maximum thickness of 238 feet (ML 6, which includes 11 feet of quartzite wash). In test holes which encountered it, the quartzite wash ranges in thickness from 11 feet (ML 6) to 35 feet (ML 1). It is important to remember, however, that not all of the Dakota Formation thickness consists

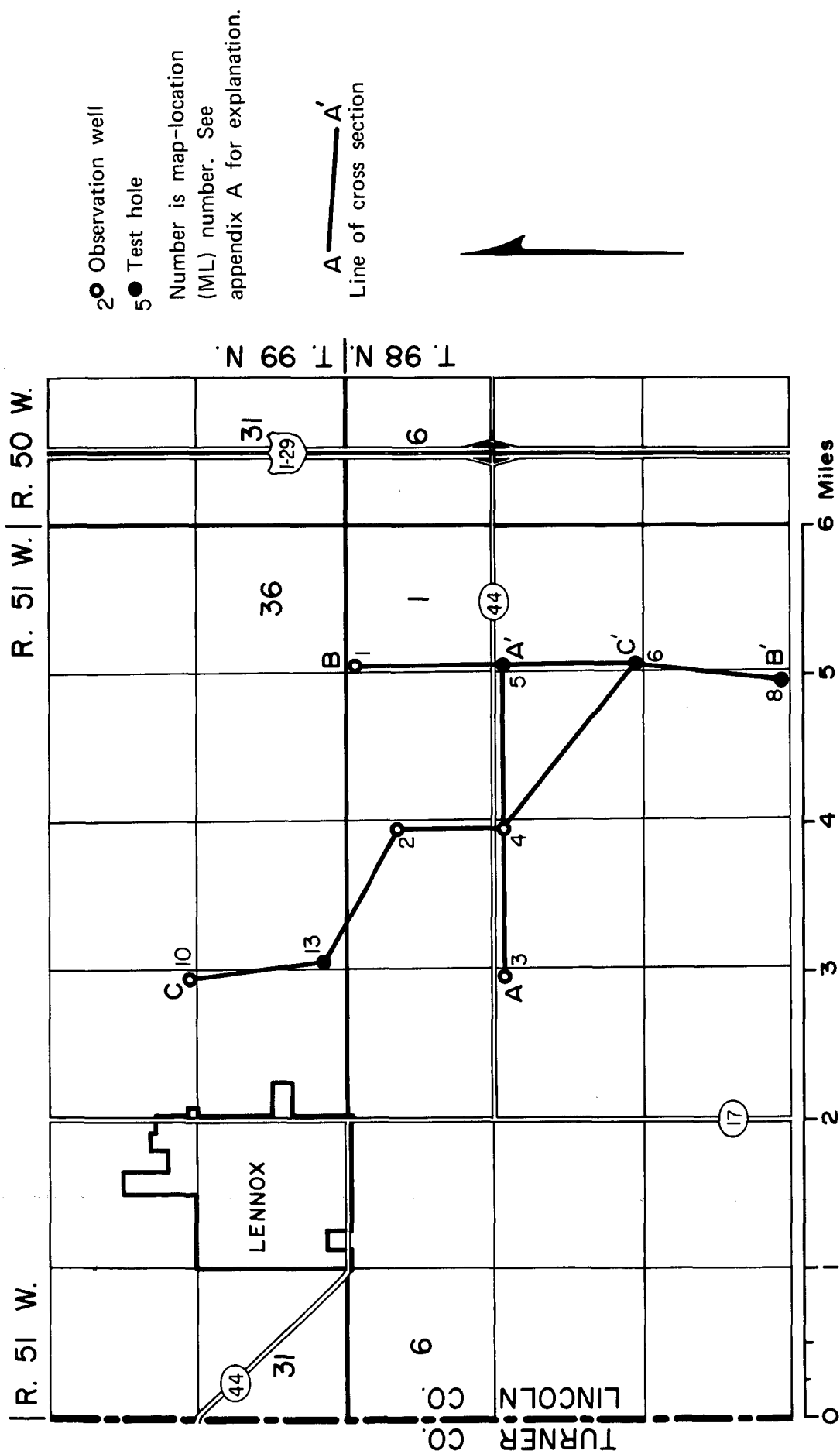
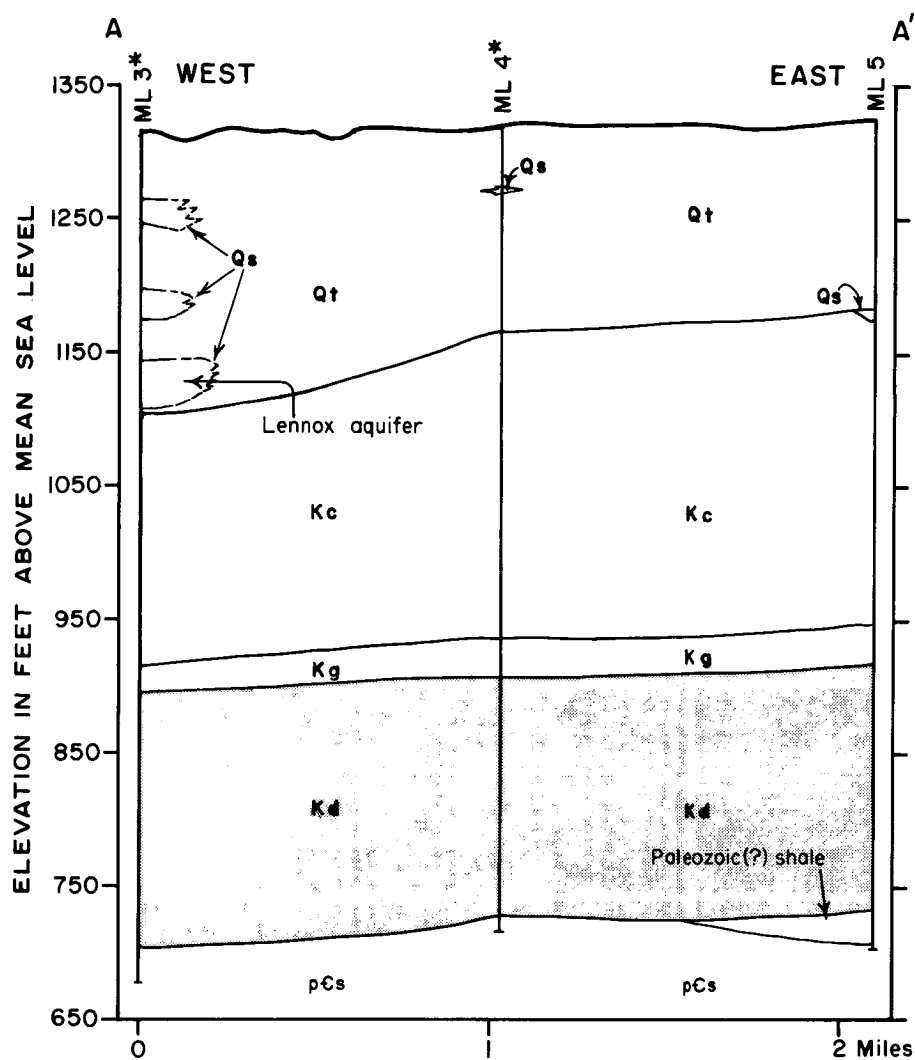


Figure 4. Locations of geologic cross sections.



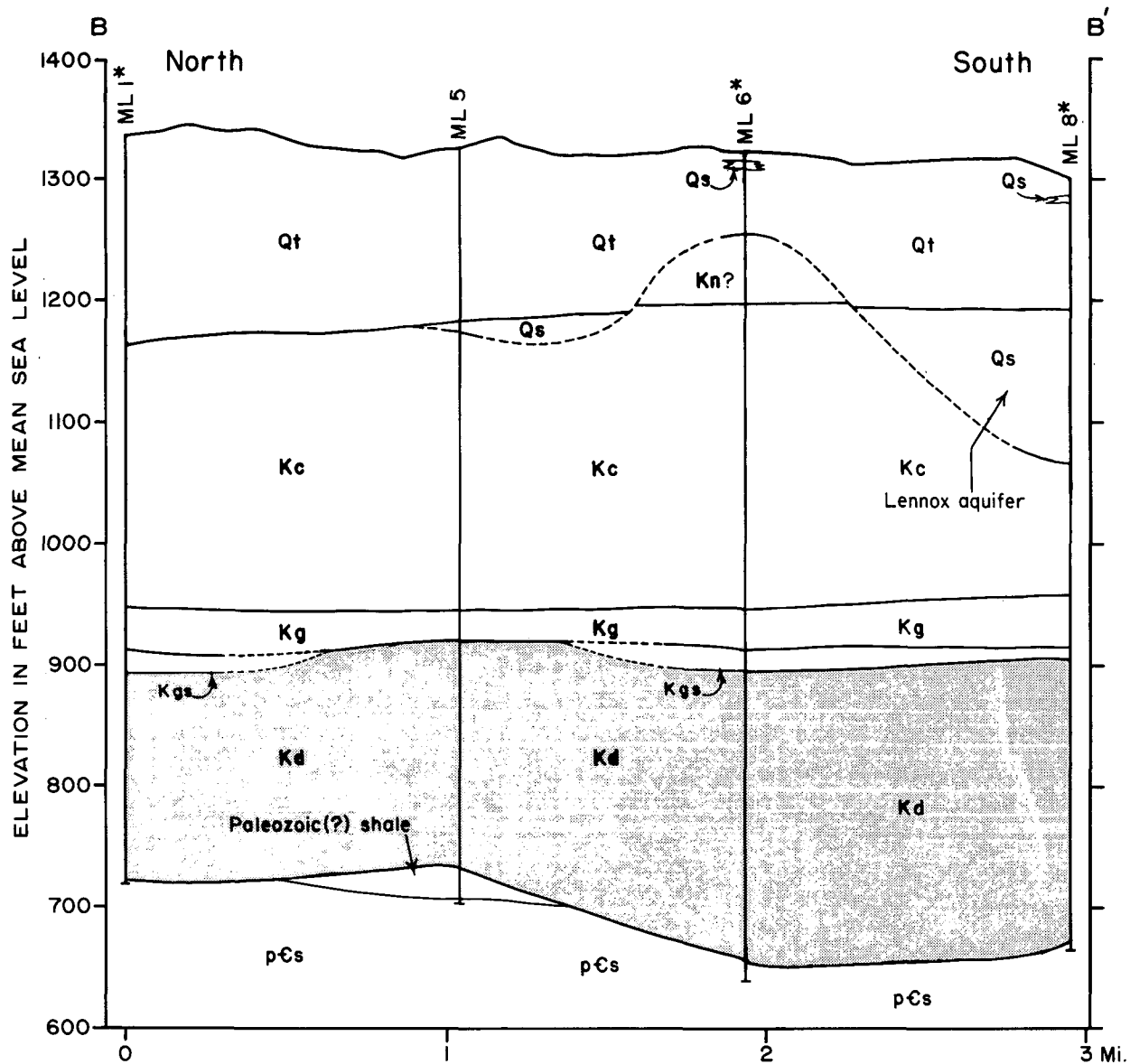
- Quaternary { Qt.....Glacial till  
Qs.....Glacial sand and gravel
- Cretaceous { Kn.....Niobrara Formation  
Kc.....Carlile Shale  
Kg.....Greenhorn Limestone  
Kgs.....Graneros Shale  
Kd.....Dakota Formation
- Precambrian—pCs.....Sioux Quartzite

— Lithologic contact. Dashed where approximate.

\* Well or test hole. Number is map-location (ML) number. See appendix A for explanation. An asterisk (\*) indicates an underlying quartzite wash is included in the total thickness of the Dakota Formation.

Vertical exaggeration = 20x.

Figure 5. Geologic cross section A-A'.



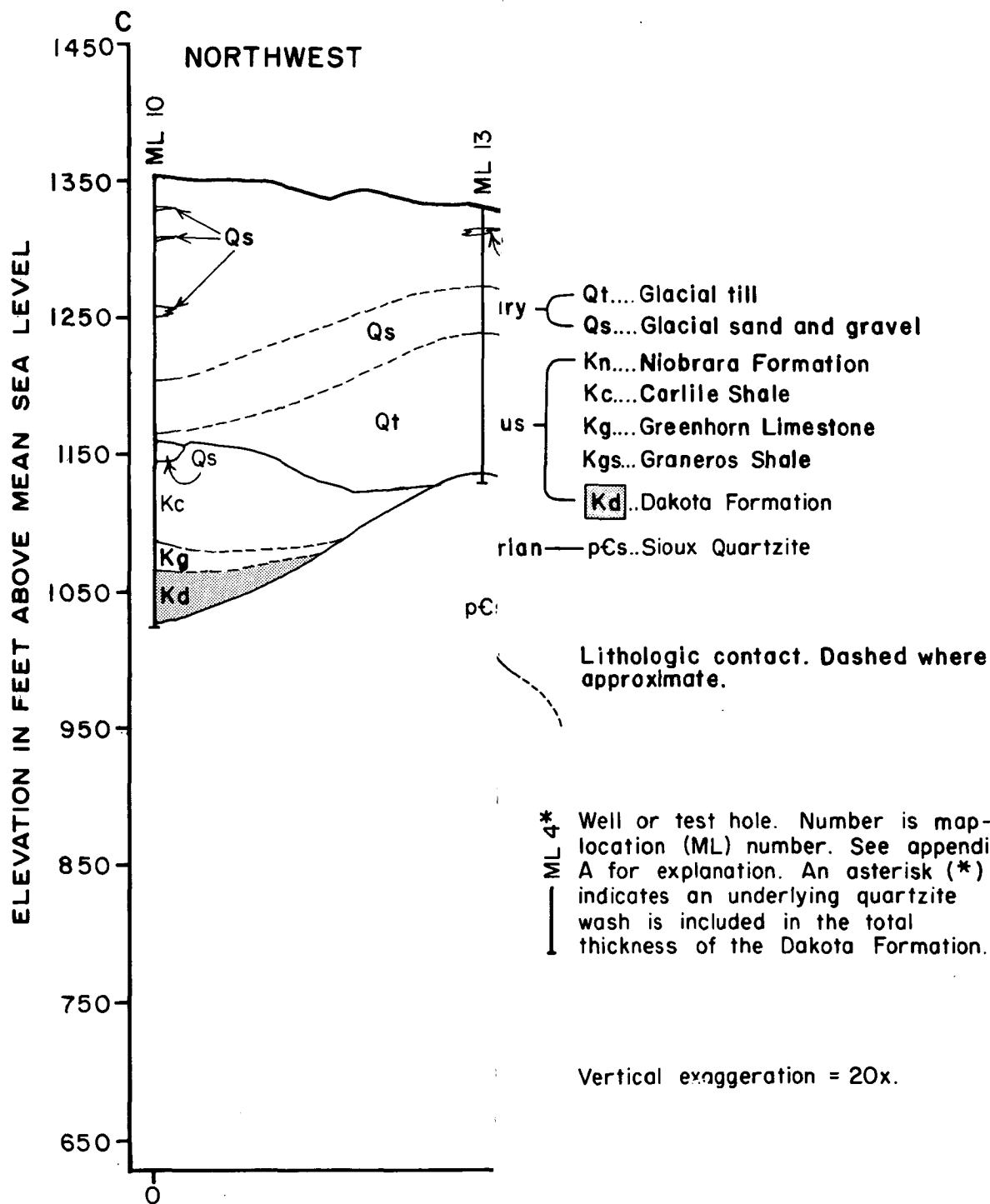
- |             |   |                                 |
|-------------|---|---------------------------------|
| Quaternary  | { | Qt.....Glacial till             |
|             |   | Qs.....Glacial sand and gravel  |
| Cretaceous  | { | Kn.....Niobrara Formation       |
|             |   | Kc.....Carlile Shale            |
|             |   | Kg.....Greenhorn Limestone      |
|             |   | Kgs.....Graneros Shale          |
|             | { | <b>Kd</b> .....Dakota Formation |
| Precambrian |   | pCs.....Sioux Quartzite         |

ML 6\* Well or test hole.  
Number is map-  
location (ML) number.  
See appendix A for  
explanation. An  
asterisk (\*) indicates  
an underlying quartzite  
wash is included in the  
total thickness of the  
Dakota Formation.

Vertical exaggeration = 20x.

----- Lithologic contact. Dashed where  
approximate.

Figure 6. Geologic cross section B-B'.





of sand. Varying thicknesses of clay are interbedded with the sand. Note also, that the test hole at ML 2 encountered a Paleozoic(?) sandstone between 569 feet and 585 feet and the test hole at ML 5 encountered a Paleozoic(?) Shale between 595 feet and 620 feet. For this report, neither the sand nor the shale unit were included as part of the Dakota Formation because their character was distinctly different than the Dakota Formation identified elsewhere in the study area.

The Dakota Formation is under confined conditions and the potentiometric surface slopes downward to the south (fig. 9). The quality of water found near the northern extent of the Dakota Formation is relatively poor but improves farther to the east and southeast of this boundary. This trend is illustrated in figures 10 and 11. Iles (1984) observed the same type of trend only over a much larger area of the Dakota Formation in Lincoln County. In the Lennox area, one water sample, collected from a private farm well drilled in 1976, shows an elevated iron concentration (0.69 mg/L) which is contrary to the trend mentioned above (fig. 11). Overall, however, the quality of water in the private well follows the trend (table 2).

#### SUMMARY AND RECOMMENDATIONS

Currently, the city of Lennox pumps water from the Lennox aquifer. The quality of water from this aquifer is poor with high concentrations of total-dissolved solids, hardness, and sulfates. This investigation was designed to delineate that part of the Dakota aquifer, near Lennox, which has a potential to yield a satisfactory quality and quantity of water.

As a result of this investigation and previous studies in the area, it was concluded that the Dakota Formation "pinches out" against the Sioux Quartzite in the western part of the study area (figs. 7 and 8). In this location, the Lennox aquifer also lies on the quartzite surface, and consequently, the Lennox aquifer and Dakota Formation may be in contact beneath the city of Lennox. Also, the quality of water from wells located in the Dakota Formation, near the northern extent of the Dakota Formation, is of poorer quality than water from wells located in the Dakota Formation farther east and southeast of this boundary. This means that, in general, the quality of water in the Dakota Formation improves to the east and southeast of the city of Lennox.

Based on the above conclusions, the area outlined in figure 12 is recommended for further testing. The process used to select this recommended area was to find a portion of the Dakota Formation, as close to Lennox as possible, which had a sufficient thickness and contained water of good quality.

If the city officials should decide to drill a well and conduct an aquifer test in the recommended area, they should hire a consulting engineer, licensed in South Dakota, to plan and

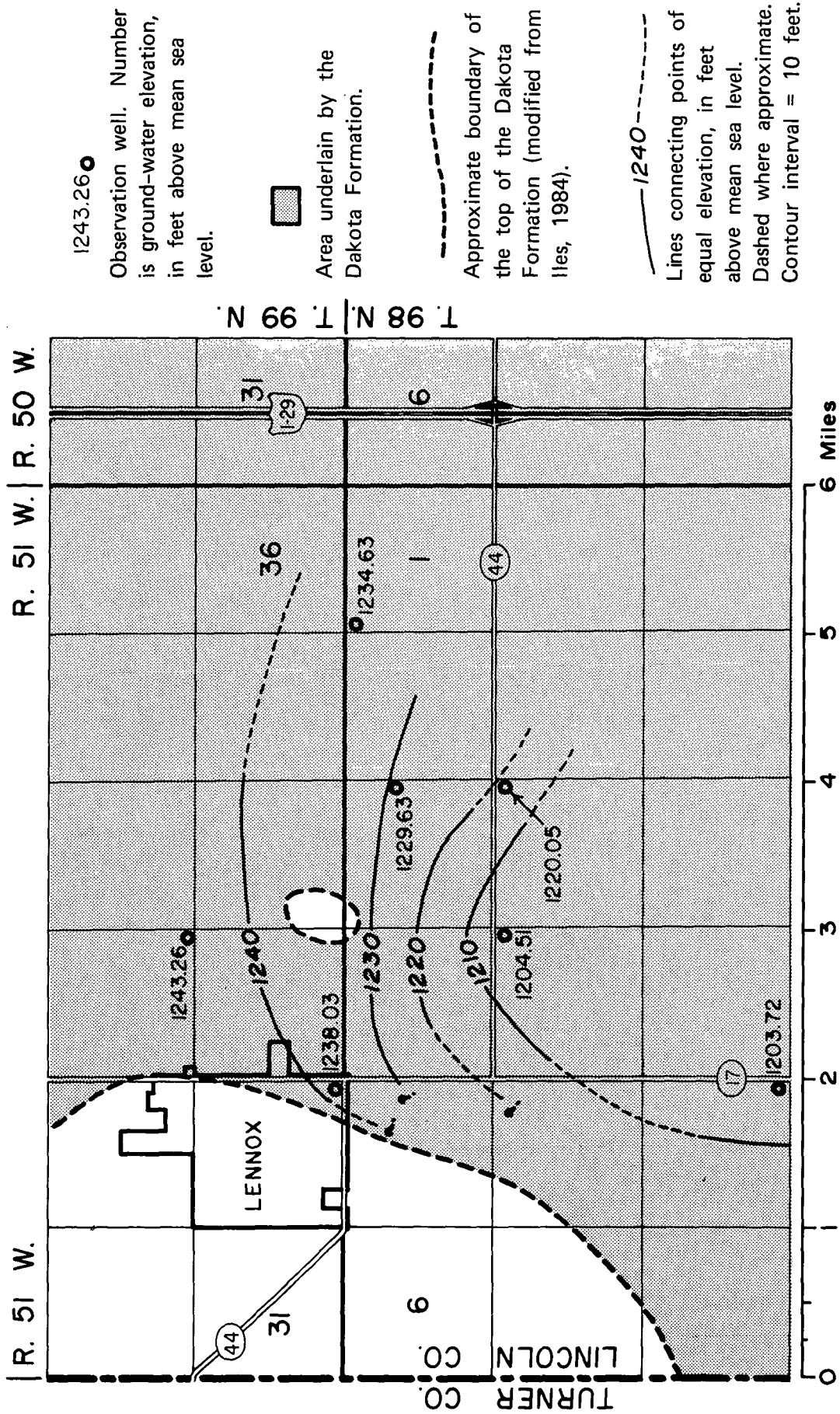


Figure 9. Potentiometric surface of the Dakota Formation, August 10, 1988.

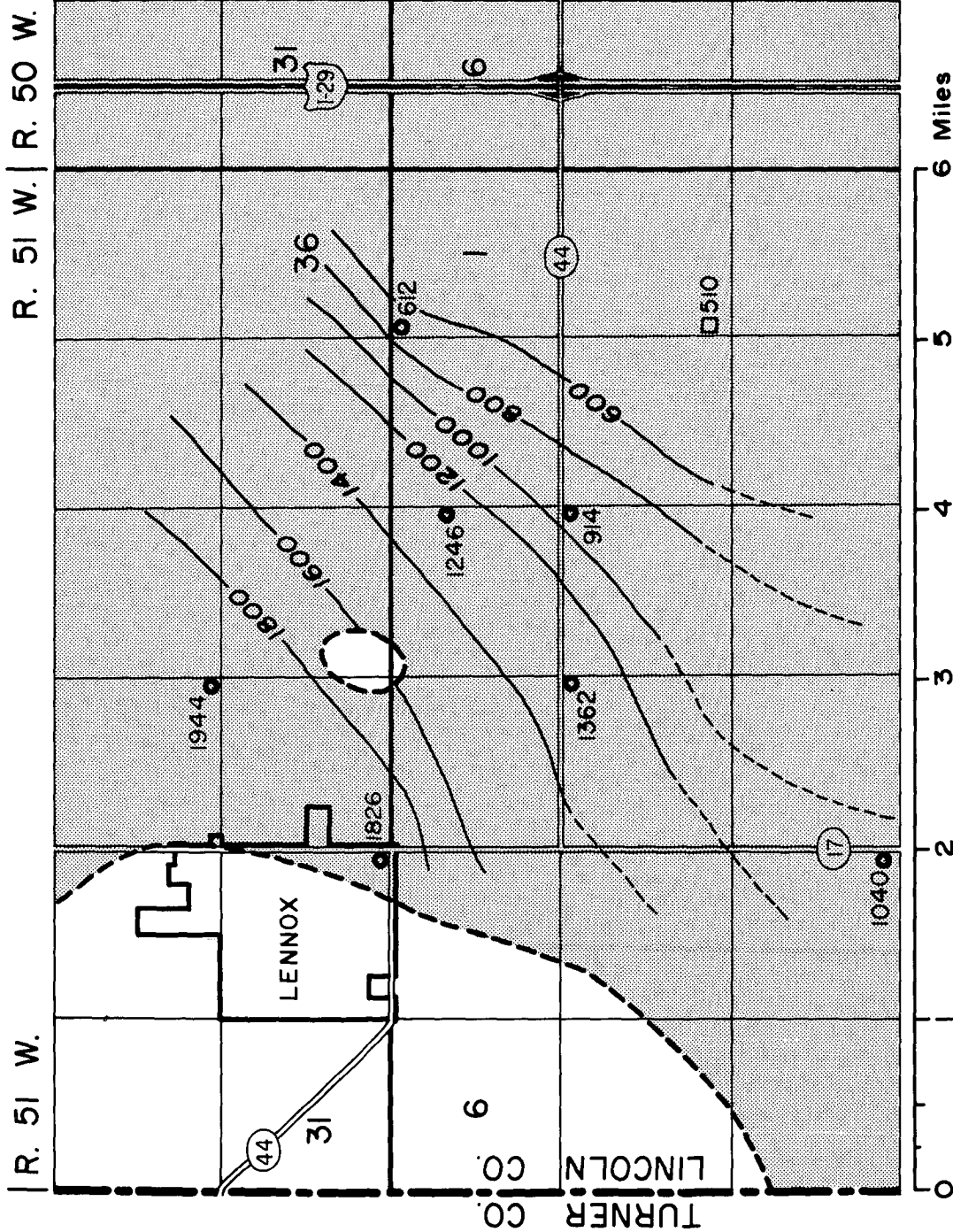


Figure 10. Distribution of total-dissolved solids in the Dakota Formation.

612

Observation well

510

Private well

Number is concentration of total-dissolved solids in milligrams per liter. (mg/l).



Area underlain by the Dakota Formation.

Approximate boundary of the top of the Dakota Formation (modified from Iles, 1984).

1200

Lines connecting points of equal concentration of total-dissolved solids.

Dashed where approximate. Contour interval = 200 milligrams per liter (mg/l).

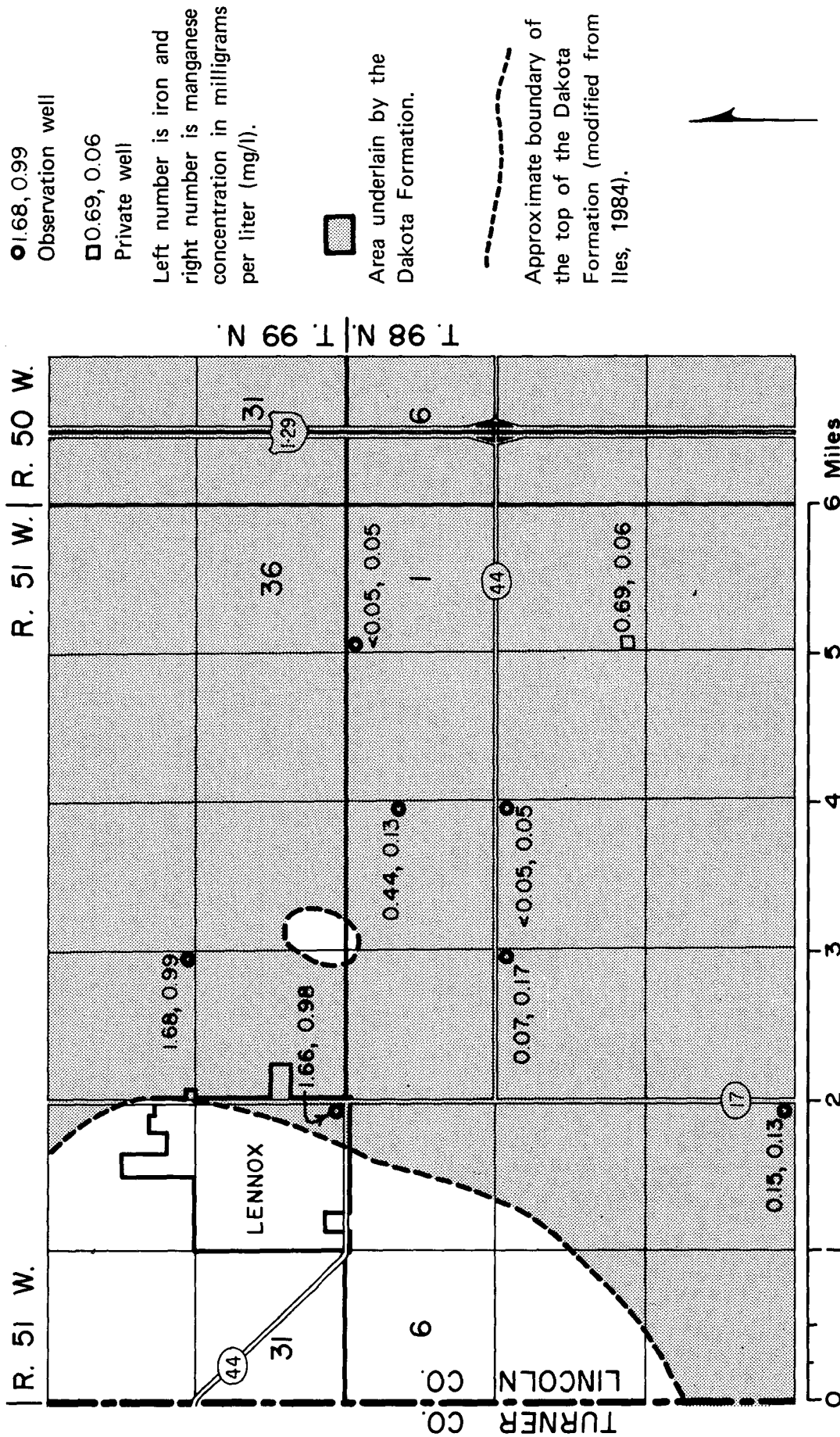


Figure 11. Distribution of iron and manganese concentrations in the Dakota Formation.

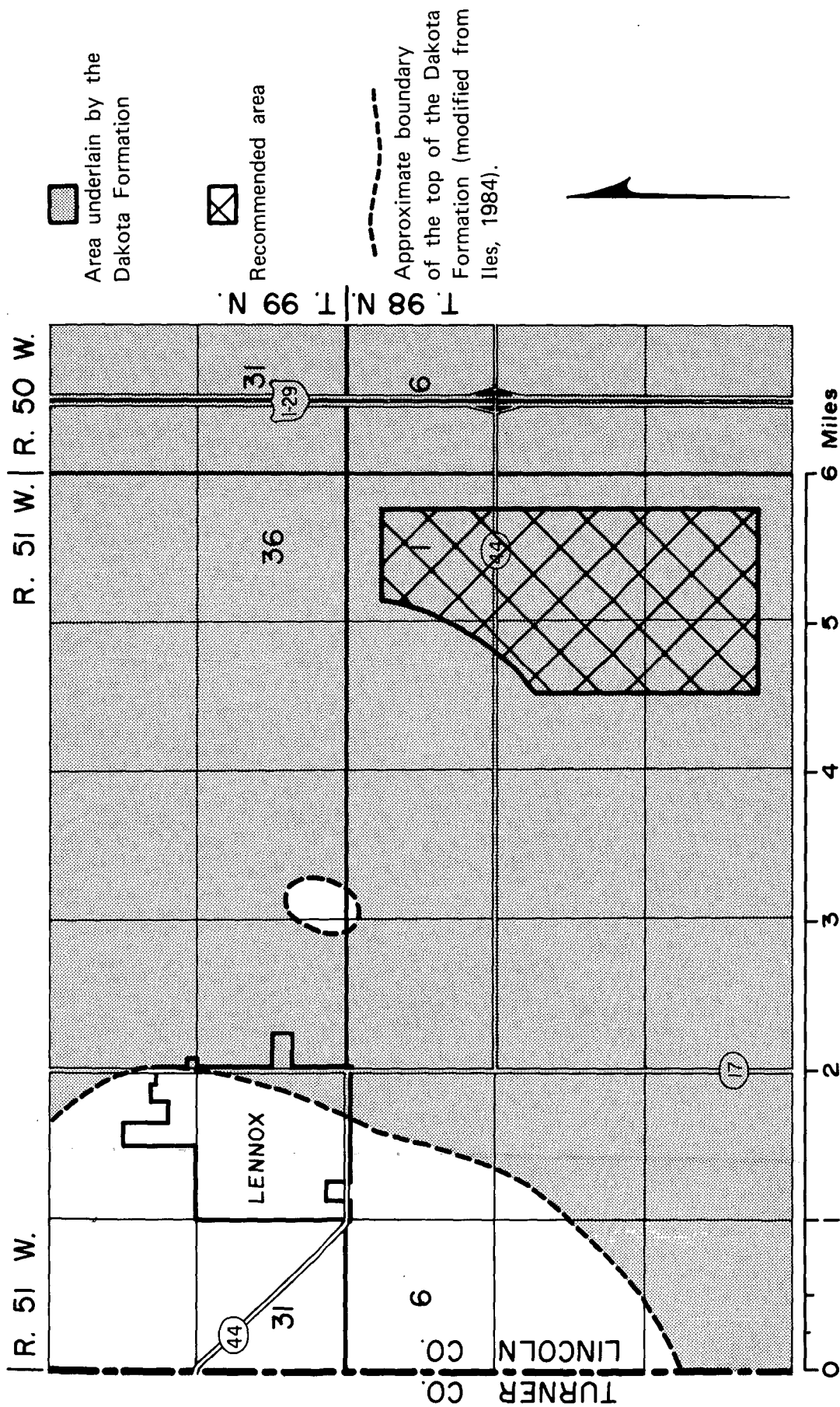


Figure 12. Area recommended for further testing.

coordinate additional testing. On the basis of the engineer's recommendation, a commercial well drilling company should be hired to drill a test hole, construct a production well, and install additional observation wells as necessary. An aquifer test should be conducted for a minimum of 72 hours. Water levels should be measured during the test and water samples collected for chemical analyses. At least one water sample should be collected during the test and sent to the Department of Health, Pierre, South Dakota, to determine the biological and chemical suitability of the water. If requested, the South Dakota Geological Survey will supervise the aquifer test and analyze the data. The results of these tests will help to determine the suitability of this site for development of a municipal well field. The Division of Water Rights, Department of Water and Natural Resources in Pierre, South Dakota, should be contacted to obtain water rights and a permit to drill a municipal well.

#### REFERENCES

- Beffort, J. D. 1969, Ground-water investigation for the city of Lennox: South Dakota Geological Survey Special Report 46, 44 p.
- Iles, Derric L., 1984, Pleistocene recharge to Dakota Formation in Lincoln County, South Dakota, in *Geohydrology of the Dakota aquifer*. Proceedings of the first C. V. Theis Conference on Geohydrology. National Well Water Association Ground Water Technology Division and the United States Geological Survey Water Resources Division, March 1984, p. 135-146.
- Shurr, George W., Gilbertson, Jay P., Hammond, Richard H., and others, 1987, Cretaceous rocks on the eastern margin of the western interior seaway: a field guide for western Minnesota and eastern South Dakota, in *Field Trip Guidebook for Quaternary and Cretaceous geology of west-central Minnesota and adjoining South Dakota*: Minnesota Geological Survey Guidebook Series no. 16, p. 47-84.
- U.S. Environmental Protection Agency, 1985a, National interim primary drinking water regulations - maximum contaminant levels for inorganic chemicals: Code of Federal Regulations, Title 40, Part 141, Section 141.11, p. 523-524.
- \_\_\_\_\_, 1985b, National secondary drinking water regulations - secondary maximum contaminant levels: Code of Federal Regulations, Title 40, Part 143, Section 143.3, p. 584.

## **APPENDIX A**

### **Logs of test holes and observation wells**

#### **MAP LOCATION (ML)**

A number arbitrarily assigned to the log according to the order in which it is listed (see **LEGAL LOCATION and LOCATION**). This number corresponds to the numbers listed on figure 2.

#### **LEGAL LOCATION and LOCATION**

The logs are listed by smallest township number, then the smallest range number, the smallest section number, and then by quarter section: NE = A; NW = B; SW = C; SE = D. A comparison of **LEGAL LOCATION and LOCATION** is as follows. A **LEGAL LOCATION** of NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 09, T. 98 N., R. 51 W. is the same as a **LOCATION** of 098N-51W-09AAAA. In several **LOCATIONS**, the smallest quarter section is followed by the number 1 or 2 which indicates that more than one log may exist for that particular location.

#### **LATITUDE and LONGITUDE**

The format is **DD.MMSS** where **D** is degrees, **M** is minutes, and **S** is seconds.

#### **DRILLING COMPANY**

SDGS is an abbreviation for South Dakota Geological Survey.

#### **TOTAL DRILL HOLE DEPTH, SCREEN LENGTH, TOTAL CASING AND SCREEN, and CASING STICK-UP**

The numbers are presented in feet.

#### **SCREEN TYPE and CASING TYPE**

PVC is an abbreviation for polyvinyl chloride. MFG. is an abbreviation for manufactured and indicates a product that is commercially available. Slot size is the size, in inches, of the openings on the screen. SCH is an abbreviation for schedule.

#### **CASING DIAMETER**

The numbers are presented in inches.

#### **CASING TOP ELEVATION and GROUND SURFACE ELEVATION**

The numbers are presented in feet above mean sea level. I - the elevation was determined using a surveying instrument. T - the elevation was estimated from 7 $\frac{1}{2}$  minute series topographic map.

COUNTY: LINCOLN LOCATION: 098N-51W-01BBBB  
MAP LOCATION: 1  
LEGAL LOCATION: NW NW NW NW SEC. 01, T. 098 N., R. 51 W.  
LATITUDE: 43.2038 LONGITUDE: 96.4932  
LAND OWNER:  
PROJECT: SIOUX FALLS-BRANDON STUDY  
DRILLING COMPANY: SDGS  
DRILLER: L. HELSETH/M. KOFFLER DRILLER'S LOG:  
GEOLOGIST: D. ILES GEOLOGIST'S LOG: X  
DATE DRILLED: 07-22-1980 DRILLING METHOD: ROTARY  
GROUND SURFACE ELEVATION: 1338.00 T  
TOTAL DRILL HOLE DEPTH: 618.0 TEST HOLE NUMBER: SFB-175  
WATER RIGHTS WELL: LN-80I SDGS WELL NAME:  
OTHER WELL NAME:  
BASIN: VERMILLION AQUIFER: DAKOTA  
MANAGEMENT UNIT:  
SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 10.0  
CASING TYPE: PVC CASING DIAMETER: 2.0  
CASING TOP ELEVATION: 1342.72 I  
CASING STICK-UP: TOTAL CASING AND SCREEN:  
WELL MAINTENANCE DATE:  
USGS HYDROLOGICAL UNIT CODE: 10170102  
ELECTRIC LOG INFORMATION:  
SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X  
NATURAL GAMMA: X EXTRA:  
SAMPLES:

BOTTOM OF WELL AT 580 FEET. TWO 5-FOOT SAND-  
POINTS GLUED TOGETHER.

|       |   |       |                                                                                                                                                                                                            |
|-------|---|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | - | 8.0   | CLAY, YELLOWISH-BROWN, SILTY, PEBBLY<br>(TILL)                                                                                                                                                             |
| 8.0   | - | 21.0  | CHALK, YELLOWISH-BROWN; VERY CALCAREOUS                                                                                                                                                                    |
| 21.0  | - | 34.0  | CLAY, BROWNISH-GRAY, SILTY, PEBBLY;<br>NONCALCAREOUS (TILL)                                                                                                                                                |
| 34.0  | - | 71.0  | CLAY, GRAY, SILTY, SLIGHTLY PEBBLY;<br>SLIGHTLY CALCAREOUS (TILL)                                                                                                                                          |
| 71.0  | - | 111.0 | CLAY, GRAY, SILTY, SLIGHTLY GRAVELLY;<br>ROCKS AT 79, 84, AND 111 FEET (TILL)                                                                                                                              |
| 111.0 | - | 125.0 | CLAY, GRAY; LOTS OF CHALK IN THE CUTTINGS<br>(TILL)                                                                                                                                                        |
| 125.0 | - | 173.0 | CLAY, GRAY, SILTY; GRAVELLY IN SPOTS,<br>SLIGHTLY CALCAREOUS, LOTS OF YELLOW<br>CALCAREOUS CHALK IN THE CUTTINGS (TILL)                                                                                    |
| 173.0 | - | 327.0 | CLAY, GRAY; NONCALCAREOUS, HARD SPOT AT<br>208 FEET (CARLILE SHALE)                                                                                                                                        |
| 327.0 | - | 392.0 | CLAY, GRAY; SLIGHTLY CALCAREOUS, WITH<br>SOME HARD LAYERS (CARLILE SHALE)                                                                                                                                  |
| 392.0 | - | 424.0 | UNKNOWN; HARD LAYER, DARK-GRAY, CEMENTED,<br>VERY CALCAREOUS WITH SOME WHITE SHELL-<br>LIKE FRAGMENTS, ALSO SOME MEDIUM-GRAY<br>TO DARK-BROWN CUTTINGS WHICH WERE VERY<br>CALCAREOUS (GREENHORN LIMESTONE) |
| 424.0 | - | 444.0 | CLAY, LIGHT- TO MEDIUM-GRAY; SLIGHTLY                                                                                                                                                                      |

|         |       |                                                                                                       |
|---------|-------|-------------------------------------------------------------------------------------------------------|
|         |       | CALCAREOUS, FISSILE, POSSIBLY WITH SOME SAND LAYERS (GRANEROS SHALE)                                  |
| 444.0 - | 474.0 | SAND (DAKOTA FORMATION)                                                                               |
| 474.0 - | 481.0 | CLAY, GRAY (DAKOTA FORMATION)                                                                         |
| 481.0 - | 485.0 | CLAY, GRAY; WITH SAND (DAKOTA FORMATION)                                                              |
| 485.0 - | 498.0 | SAND; INTERBEDDED WITH GRAY CLAY (DAKOTA FORMATION)                                                   |
| 498.0 - | 535.0 | SAND (DAKOTA FORMATION)                                                                               |
| 535.0 - | 570.0 | CLAY, GRAY; INTERBEDDED WITH SAND (DAKOTA FORMATION)                                                  |
| 570.0 - | 582.0 | SAND (DAKOTA FORMATION)                                                                               |
| 582.0 - | 617.0 | QUARTZITE, PINK; WITH WHITE CLAY, VERY WEATHERED(?) (SIOUX QUARTZITE)                                 |
| 617.0 - | 618.0 | QUARTZITE, PINK; HARD, THERE WAS ACTUALLY ONLY A FEW INCHES OF PENETRATION ACHIEVED (SIOUX QUARTZITE) |

\* \* \* \*

|                                                          |                                |
|----------------------------------------------------------|--------------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 098N-51W-03ADAD      |
| MAP LOCATION: 2                                          |                                |
| LEGAL LOCATION: SE NE SE NE SEC. 03, T. 098 N., R. 51 W. |                                |
| LATITUDE: 43.2023                                        | LONGITUDE: 96.5047             |
| LAND OWNER:                                              |                                |
| PROJECT: LINCOLN-UNION CO. STUDY                         |                                |
| DRILLING COMPANY: SDGS                                   |                                |
| DRILLER: G. JENSEN                                       | DRILLER'S LOG:                 |
| GEOLOGIST: R. HAMMOND                                    | GEOLOGIST'S LOG: X             |
| DATE DRILLED: 07-18-1988                                 | DRILLING METHOD: ROTARY        |
| GROUND SURFACE ELEVATION: 1326.02 I                      |                                |
| TOTAL DRILL HOLE DEPTH: 585.0                            | TEST HOLE NUMBER: R20-88-33    |
| WATER RIGHTS WELL:                                       | SDGS WELL NAME: R20-88-33      |
| OTHER WELL NAME:                                         |                                |
| BASIN: VERMILLION                                        | AQUIFER: DAKOTA                |
| MANAGEMENT UNIT:                                         |                                |
| SCREEN TYPE: PVC, MFG.                                   | SCREEN LENGTH: 10.0            |
| CASING TYPE: PVC, SCH. 80                                | CASING DIAMETER: 2.0           |
| CASING TOP ELEVATION: 1327.33 I                          |                                |
| CASING STICK-UP: 1.31                                    | TOTAL CASING AND SCREEN: 530.0 |
| WELL MAINTENANCE DATE:                                   |                                |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                                |
| ELECTRIC LOG INFORMATION:                                |                                |
| SPONTANEOUS POTENTIAL: X                                 | SINGLE POINT RESISTIVITY: X    |
| NATURAL GAMMA: X                                         | EXTRA:                         |
| SAMPLES:                                                 |                                |

|         |       |                                                     |
|---------|-------|-----------------------------------------------------|
| 0 -     | 2.0   | TOPSOIL, BROWN                                      |
| 2.0 -   | 21.0  | CLAY, YELLOW-BROWN, PEBBLY, SILTY, SANDY (TILL)     |
| 21.0 -  | 99.0  | CLAY, GRAY, SANDY, PEBBLY, SILTY; CALCAREOUS (TILL) |
| 99.0 -  | 116.0 | SAND, FINE TO MEDIUM, VERY SILTY                    |
| 116.0 - | 142.0 | GRAVEL, MEDIUM, SANDY, SUBANGULAR                   |
| 142.0 - | 186.0 | CLAY(?), GRAY; VERY POOR SAMPLES (TILL?)            |

|         |       |                                                                             |
|---------|-------|-----------------------------------------------------------------------------|
| 186.0 - | 223.0 | SAND, WHITE, MEDIUM TO FINE ("WESTERN SAND?)"                               |
| 223.0 - | 243.0 | CLAY, REDDISH-BROWN, SILTY, PEBBLY, VERY SANDY (TILL)                       |
| 243.0 - | 249.0 | GRAVEL, VERY COARSE; COBBLES                                                |
| 249.0 - | 376.0 | SHALE, LIGHT-GRAY; VERY HARD; SLIGHTLY CALCAREOUS IN SPOTS (CARLILE SHALE)  |
| 376.0 - | 393.0 | SHALE, GRAY-BROWN; HARD; CALCAREOUS (FAIRPORT SHALE MEMBER - CARLILE SHALE) |
| 393.0 - | 415.0 | SILTSTONE, GRAY; VERY CALCAREOUS (GREENHORN LIMESTONE)                      |
| 415.0 - | 420.0 | SHALE, DARK-GRAY; SLIGHTLY CALCAREOUS (GRANEROS SHALE)                      |
| 420.0 - | 426.0 | SANDSTONE, WHITE, FINE (DAKOTA FORMATION)                                   |
| 426.0 - | 472.0 | SHALE, DARK-GRAY, SILTY (DAKOTA FORMATION)                                  |
| 472.0 - | 569.0 | SANDSTONE, WHITE, FINE, SHALEY AT 542 TO 550 FEET (DAKOTA FORMATION)        |
| 569.0 - | 585.0 | SANDSTONE, WHITE, MEDIUM TO FINE, CLAYEY; VERY HARD (PALEOZOIC? SANDSTONE?) |

\* \* \* \*

|                                                          |                                |
|----------------------------------------------------------|--------------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 098N-51W-09AAAA      |
| MAP LOCATION: 3                                          |                                |
| LEGAL LOCATION: NE NE NE NE SEC. 09, T. 098 N., R. 51 W. |                                |
| LATITUDE: 43.1949                                        | LONGITUDE: 96.5201             |
| LAND OWNER:                                              |                                |
| PROJECT: LENNOX CITY STUDY-1988                          |                                |
| DRILLING COMPANY: SDGS                                   |                                |
| DRILLER: T. MCCUE                                        | DRILLER'S LOG:                 |
| GEOLOGIST: P. DAWSON                                     | GEOLOGIST'S LOG: X             |
| DATE DRILLED: 05-16-1988                                 | DRILLING METHOD: ROTARY        |
| GROUND SURFACE ELEVATION: 1313.58 I                      |                                |
| TOTAL DRILL HOLE DEPTH: 635.0                            | TEST HOLE NUMBER: R2-88-06     |
| WATER RIGHTS WELL:                                       | SDGS WELL NAME: R2-88-06       |
| OTHER WELL NAME:                                         |                                |
| BASIN: VERMILLION                                        | AQUIFER: DAKOTA                |
| MANAGEMENT UNIT:                                         |                                |
| SCREEN TYPE: PVC, MFG., SLOT SIZE 0.016 IN.              | SCREEN LENGTH: 10.0            |
| CASING TYPE: PVC, SCH. 80                                | CASING DIAMETER: 2.0           |
| CASING TOP ELEVATION: 1315.91 I                          |                                |
| CASING STICK-UP: 2.33                                    | TOTAL CASING AND SCREEN: 634.5 |
| WELL MAINTENANCE DATE:                                   |                                |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                                |
| ELECTRIC LOG INFORMATION:                                |                                |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY: X    |
| NATURAL GAMMA: X                                         | EXTRA:                         |
| SAMPLES:                                                 |                                |

31 FEET OF BLANK CASING (CLOSED TO SCREEN) FROM  
632 TO 601 FEET, SCREENED FROM 601 TO 591 FEET.

0 - 2.0 TOPSOIL, BLACK

|         |       |                                                                                                |
|---------|-------|------------------------------------------------------------------------------------------------|
| 2.0 -   | 9.0   | CLAY, YELLOW-BROWN, SILTY (TILL)                                                               |
| 9.0 -   | 16.0  | CLAY, GRAY, SILTY, PEBBLY (TILL)                                                               |
| 16.0 -  | 22.0  | CLAY, BROWN, SANDY, PEBBLY (TILL)                                                              |
| 22.0 -  | 52.0  | CLAY, GRAY, SILTY, PEBBLY (TILL)                                                               |
| 52.0 -  | 64.0  | SAND AND GRAVEL, COARSE SAND TO COARSE<br>PEBBLE GRAVEL, SILTY; WITH INTERBEDDED<br>CLAY       |
| 64.0 -  | 115.0 | CLAY, GRAY, SILTY, PEBBLY (TILL)                                                               |
| 115.0 - | 139.0 | GRAVEL, MEDIUM TO COARSE PEBBLE GRAVEL;<br>OXIDIZED                                            |
| 139.0 - | 171.0 | CLAY, GRAY, SANDY (TILL)                                                                       |
| 171.0 - | 204.0 | SAND AND GRAVEL, MEDIUM SAND TO COARSE<br>PEBBLE GRAVEL; CLAY STRINGER FROM 193<br>TO 197 FEET |
| 204.0 - | 209.0 | CLAY, GRAY, SANDY, PEBBLY (TILL)                                                               |
| 209.0 - | 397.0 | SHALE, LIGHT-GRAY TO DARK-GRAY;<br>NONCALCAREOUS (CARLILE SHALE)                               |
| 397.0 - | 418.0 | LIMESTONE, BROWN; CALCAREOUS (GREENHORN<br>LIMESTONE)                                          |
| 418.0 - | 453.0 | SAND, FINE (DAKOTA FORMATION)                                                                  |
| 453.0 - | 508.0 | CLAY, LIGHT-GRAY, SANDY (DAKOTA<br>FORMATION)                                                  |
| 508.0 - | 522.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                           |
| 522.0 - | 564.0 | SAND, FINE (DAKOTA FORMATION)                                                                  |
| 564.0 - | 568.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                           |
| 568.0 - | 572.0 | SAND, FINE (DAKOTA FORMATION)                                                                  |
| 572.0 - | 578.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                           |
| 578.0 - | 581.0 | SAND, FINE (DAKOTA FORMATION)                                                                  |
| 581.0 - | 588.0 | CLAY, GRAY TO BLACK; COAL SEAM(?) (DAKOTA<br>FORMATION)                                        |
| 588.0 - | 611.0 | SAND, PINK, FINE; WITH WHITE CLAY PIECES                                                       |
| 611.0 - | 635.0 | QUARTZITE, PINK; HARD (SIOUX QUARTZITE)                                                        |

\* \* \* \*

COUNTY: LINCOLN

LOCATION: 098N-51W-10AAAA

MAP LOCATION: 4

LEGAL LOCATION: NE NE NE NE SEC. 10, T. 098 N., R. 51 W.

LATITUDE: 43.1948

LONGITUDE: 96.5047

LAND OWNER:

PROJECT: LENNOX CITY STUDY-1988

DRILLING COMPANY: SDGS

DRILLER: T. MCCUE/M. THOMPSON

DRILLER'S LOG:

GEOLOGIST: P. DAWSON

GEOLOGIST'S LOG: X

DATE DRILLED: 05-26-1988

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1320.41 I

TOTAL DRILL HOLE DEPTH: 605.0

TEST HOLE NUMBER: R2-88-07

WATER RIGHTS WELL:

SDGS WELL NAME: R2-88-07

OTHER WELL NAME:

BASIN: VERMILLION

AQUIFER: DAKOTA

MANAGEMENT UNIT:

SCREEN TYPE: PVC, MFG., SLOT SIZE 0.016 IN. SCREEN LENGTH: 10.0

CASING TYPE: PVC, SCH. 80

CASING DIAMETER: 2.0

CASING TOP ELEVATION: 1322.37 I

CASING STICK-UP: 1.96 TOTAL CASING AND SCREEN: 599.0  
WELL MAINTENANCE DATE:  
USGS HYDROLOGICAL UNIT CODE: 10170102  
ELECTRIC LOG INFORMATION:  
SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X  
NATURAL GAMMA: X EXTRA:  
SAMPLES:

20 FEET OF BLANK CASING (CLOSED TO SCREEN) FROM  
597 TO 577 FEET, SCREENED FROM 577 TO 567 FEET.

|       |   |       |                                                                                         |
|-------|---|-------|-----------------------------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                                                          |
| 2.0   | - | 8.0   | CLAY, YELLOW-BROWN, SILTY, SANDY, PEBBLY (TILL)                                         |
| 8.0   | - | 11.0  | CLAY, BROWN, SANDY, PEBBLY (TILL)                                                       |
| 11.0  | - | 23.0  | CLAY, BROWN TO GRAY, SILTY, SANDY (TILL)                                                |
| 23.0  | - | 28.0  | CLAY, LIGHT-GRAY, SANDY, PEBBLY (TILL)                                                  |
| 28.0  | - | 46.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                                        |
| 46.0  | - | 50.0  | SAND, MEDIUM TO COARSE                                                                  |
| 50.0  | - | 154.0 | CLAY, GRAY, SANDY, PEBBLY (TILL)                                                        |
| 154.0 | - | 382.0 | SHALE, GRAY; NONCALCAREOUS (CARLILE SHALE)                                              |
| 382.0 | - | 414.0 | LIMESTONE, DARK-GRAY; CALCAREOUS, HARD LAYER FROM 386 TO 391 FEET (GREENHORN LIMESTONE) |
| 414.0 | - | 432.0 | SAND, FINE (DAKOTA FORMATION)                                                           |
| 432.0 | - | 442.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                    |
| 442.0 | - | 466.0 | SAND, FINE (DAKOTA FORMATION)                                                           |
| 466.0 | - | 506.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                    |
| 506.0 | - | 516.0 | SAND, FINE (DAKOTA FORMATION)                                                           |
| 516.0 | - | 534.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                                                    |
| 534.0 | - | 546.0 | SAND, FINE (DAKOTA FORMATION)                                                           |
| 546.0 | - | 570.0 | CLAY, GRAY TO BLACK; COAL SEAM(?) (DAKOTA FORMATION)                                    |
| 570.0 | - | 591.0 | SAND, PINK, FINE; WITH WHITE CLAY PIECES                                                |
| 591.0 | - | 605.0 | QUARTZITE, PINK; HARD (SIOUX QUARTZITE)                                                 |

\* \* \* \*

COUNTY: LINCOLN LOCATION: 098N-51W-12BBBB  
MAP LOCATION: 5  
LEGAL LOCATION: NW NW NW NW SEC. 12, T. 098 N., R. 51 W.  
LATITUDE: 43.1938 LONGITUDE: 96.4938  
LAND OWNER:  
PROJECT: LINCOLN-UNION CO. STUDY  
DRILLING COMPANY: SDGS  
DRILLER: D. IVERSON DRILLER'S LOG:  
GEOLOGIST: R. HAMMOND GEOLOGIST'S LOG: X  
DATE DRILLED: 07-11-1988 DRILLING METHOD: ROTARY  
GROUND SURFACE ELEVATION: 1326.00 T  
TOTAL DRILL HOLE DEPTH: 622.0 TEST HOLE NUMBER: R20-88-31  
USGS HYDROLOGICAL UNIT CODE: 10170102  
ELECTRIC LOG INFORMATION:  
SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X  
SAMPLES:

EXTRA:

THIS HOLE WAS PLUGGED WITH A BENTONITE GROUT FROM  
622 TO 5 FEET. CEMENT GROUT FROM 5 FEET TO 0  
FEET.

|       |   |       |                                                                                                          |
|-------|---|-------|----------------------------------------------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, DARK-BROWN                                                                                      |
| 2.0   | - | 16.0  | CLAY, YELLOW-BROWN, SILTY, PEBBLY;<br>ABUNDANT CHALK PEBBLES, VERY CALCAREOUS<br>(TILL)                  |
| 16.0  | - | 90.0  | CLAY, GRAY, SANDY, SILTY, PEBBLY; SAND<br>LENS AT 64 TO 65 FEET (TILL)                                   |
| 90.0  | - | 98.0  | CLAY, GRAY-BROWN, SANDY, SILTY, PEBBLY<br>(TILL)                                                         |
| 98.0  | - | 142.0 | CLAY, GRAY, SANDY, SILTY, PEBBLY (TILL)                                                                  |
| 142.0 | - | 150.0 | GRAVEL, MEDIUM, VERY SANDY                                                                               |
| 150.0 | - | 278.0 | SHALE, BLACK TO DARK-GRAY; VERY FISSILE;<br>NONCALCAREOUS (CARLILE SHALE)                                |
| 278.0 | - | 378.0 | SHALE, DARK-GRAY-BROWN; HARD, FISSILE;<br>SLIGHTLY CALCAREOUS (FAIRPORT SHALE<br>MEMBER - CARLILE SHALE) |
| 378.0 | - | 406.0 | SILTSTONE, DARK-GRAY; VERY HARD, ABUNDANT<br>SHELL DEBRIS (GREENHORN LIMESTONE)                          |
| 406.0 | - | 419.0 | SANDSTONE, LIGHT-BROWN, FINE;<br>NONCALCAREOUS (DAKOTA FORMATION)                                        |
| 419.0 | - | 454.0 | SHALE, LIGHT-GRAY; VERY HARD AT 430 FEET<br>(DAKOTA FORMATION)                                           |
| 454.0 | - | 489.0 | SANDSTONE, LIGHT-GRAY, FINE (DAKOTA<br>FORMATION)                                                        |
| 489.0 | - | 563.0 | SHALE, GRAY, SANDY; ABUNDANT THIN<br>SANDSTONE LENSES (DAKOTA FORMATION)                                 |
| 563.0 | - | 571.0 | SANDSTONE, WHITE, FINE TO MEDIUM (DAKOTA<br>FORMATION?)                                                  |
| 571.0 | - | 595.0 | SHALE, LIGHT-GRAY; VERY HARD,<br>NONCALCAREOUS, SEVERAL SANDSTONE LENSES<br>(DAKOTA FORMATION?)          |
| 595.0 | - | 620.0 | CLAYSTONE, WHITE, SANDY; VERY HARD<br>(PALEOZOIC SHALE?)                                                 |
| 620.0 | - | 622.0 | QUARTZITE, PINK; VERY HARD; POOR SAMPLES<br>(SIOUX QUARTZITE?)                                           |

\* \* \* \*

COUNTY: LINCOLN

LOCATION: 098N-51W-12CCCC

MAP LOCATION: 6

LEGAL LOCATION: SW SW SW SW SEC. 12, T. 098 N., R. 51 W.

LATITUDE: 43.1854

LONGITUDE: 96.4937

LAND OWNER:

PROJECT: LENNOX CITY STUDY-1988

DRILLING COMPANY: SDGS

DRILLER: G. JENSEN/D. IVERSON

GEOLOGIST: P. DAWSON

DATE DRILLED: 08-04-1988

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1325.00 T  
 TOTAL DRILL HOLE DEPTH: 685.0 TEST HOLE NUMBER: R20-88-35  
 USGS HYDROLOGICAL UNIT CODE: 10170102  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
 NATURAL GAMMA: X EXTRA:  
 SAMPLES:

|       |   |       |                                                                   |
|-------|---|-------|-------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                                    |
| 2.0   | - | 6.0   | CLAY, BROWN, SANDY, PEBBLY (TILL)                                 |
| 6.0   | - | 8.0   | CLAY, GRAY, SANDY, PEBBLY (TILL)                                  |
| 8.0   | - | 14.0  | SAND, RED; ORTHOCLASE; WEATHERED GRANITE BOULDER(?)               |
| 14.0  | - | 66.0  | CLAY, GRAY, SILTY                                                 |
| 66.0  | - | 70.0  | CLAY, LIGHT-GRAY, SILTY                                           |
| 70.0  | - | 126.0 | CHALK, WHITE, SHALEY WITH DEPTH; CALCAREOUS (NIOBRARA FORMATION?) |
| 126.0 | - | 376.0 | SHALE, DARK-GRAY TO BLACK, FISSILE; NONCALCAREOUS (CARLILE SHALE) |
| 376.0 | - | 412.0 | LIMESTONE, BROWN; CALCAREOUS (GREENHORN LIMESTONE)                |
| 412.0 | - | 429.0 | SHALE, BROWN; NONCALCAREOUS (GRANEROS SHALE)                      |
| 429.0 | - | 444.0 | SAND, LIGHT-BROWN, FINE; NONCALCAREOUS (DAKOTA FORMATION)         |
| 444.0 | - | 449.0 | CLAY, LIGHT-GRAY, SANDY (DAKOTA FORMATION)                        |
| 449.0 | - | 482.0 | SAND, FINE, CLAYEY BETWEEN 450 AND 471 FEET (DAKOTA FORMATION)    |
| 482.0 | - | 495.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                              |
| 495.0 | - | 539.0 | SAND, FINE; CLEAN (DAKOTA FORMATION)                              |
| 539.0 | - | 656.0 | CLAY, GRAY; EXTREMELY SANDY (DAKOTA FORMATION)                    |
| 656.0 | - | 667.0 | SAND, FINE; WITH WHITE CLAY PIECES                                |
| 667.0 | - | 685.0 | PIPESTONE(?), REDDISH-PINK; VERY HARD (SIOUX FORMATION)           |

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|                                                          |                             |
|----------------------------------------------------------|-----------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 098N-51W-14BBBB   |
| MAP LOCATION: 7                                          |                             |
| LEGAL LOCATION: NW NW NW NW SEC. 14, T. 098 N., R. 51 W. |                             |
| LATITUDE: 43.1857                                        | LONGITUDE: 96.5047          |
| LAND OWNER:                                              |                             |
| PROJECT: LENNOX CITY STUDY-1988                          |                             |
| DRILLING COMPANY: SDGS                                   |                             |
| DRILLER: G. JENSEN                                       | DRILLER'S LOG:              |
| GEOLOGIST: P. DAWSON                                     | GEOLOGIST'S LOG: X          |
| DATE DRILLED: 07-26-1988                                 | DRILLING METHOD: ROTARY     |
| GROUND SURFACE ELEVATION: 1318.00 T                      |                             |
| TOTAL DRILL HOLE DEPTH: 327.0                            | TEST HOLE NUMBER: R20-88-34 |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                             |
| ELECTRIC LOG INFORMATION:                                |                             |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY:   |

NATURAL GAMMA:  
SAMPLES:

EXTRA:

|       |   |       |                                                                                         |
|-------|---|-------|-----------------------------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                                                          |
| 2.0   | - | 22.0  | CLAY, BROWN, SANDY, PEBBLY (TILL)                                                       |
| 22.0  | - | 26.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                                        |
| 26.0  | - | 34.0  | SAND, COARSE TO MEDIUM                                                                  |
| 34.0  | - | 56.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                                        |
| 56.0  | - | 100.0 | SAND AND GRAVEL, MEDIUM SAND TO MEDIUM<br>PEBBLE GRAVEL; OXIDIZED                       |
| 100.0 | - | 141.0 | CLAY, LIGHT-GRAY, SILTY                                                                 |
| 141.0 | - | 240.0 | CHALK, LIGHT-GRAY; VERY CALCAREOUS<br>(NIOBRARA FORMATION)                              |
| 240.0 | - | 327.0 | UNKNOWN; CHALK(?), SAND(?), VERY<br>CALCAREOUS; VERY POOR CUTTINGS, LOST<br>CIRCULATION |

HOLE WAS TAKING LOTS OF WATER - POSSIBILITY OF  
HOLE COLLAPSE, ABANDONED HOLE AT 327 FEET.

\* \* \* \*

COUNTY: LINCOLN

LOCATION: 098N-51W-14DDDD 1

MAP LOCATION: 8

LEGAL LOCATION: SE SE SE SE SEC. 14, T. 098 N., R. 51 W.

LATITUDE: 43.1806

LONGITUDE: 96.4933

LAND OWNER:

PROJECT: SIOUX FALLS-BRANDON STUDY

DRILLING COMPANY: SDGS

DRILLER: E. KOGLIN/M. KOFFLER

GEOLOGIST: D. ILES

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DATE DRILLED: 07-31-1980

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1305.00 T

TOTAL DRILL HOLE DEPTH: 631.0

TEST HOLE NUMBER: SFB-180

USGS HYDROLOGICAL UNIT CODE: 10170102

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: X

SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X

EXTRA:

SAMPLES:

|       |   |       |                                                                                                         |
|-------|---|-------|---------------------------------------------------------------------------------------------------------|
| 0     | - | 16.0  | CLAY, TAN, SILTY, SANDY, PEBBLY (TILL)                                                                  |
| 16.0  | - | 20.0  | SAND, FINE TO MEDIUM                                                                                    |
| 20.0  | - | 22.0  | CLAY, TAN, SILTY, SANDY, PEBBLY (TILL)                                                                  |
| 22.0  | - | 73.0  | CLAY, MEDIUM-GRAY, SILTY, SANDY, PEBBLY<br>(TILL)                                                       |
| 73.0  | - | 107.0 | CLAY, TAN-GREEN, SILTY, PEBBLY;<br>CALCAREOUS, DRILLS SLOWER THAN<br>INTERVAL FROM 22 TO 73 FEET (TILL) |
| 107.0 | - | 223.0 | SAND AND GRAVEL, FINE SAND TO COARSE,<br>GRAVEL; WITH SOME CLAY AND SOME CLAY<br>LAYERS                 |
| 223.0 | - | 342.0 | CLAY, GRAY; SOME SAND (CARLILE SHALE)                                                                   |
| 342.0 | - | 389.0 | CLAY, MEDIUM-BROWN, SILTY; CALCAREOUS,<br>HARDER THAN INTERVAL FROM 223 TO 342                          |

|         |       | FEET (GREENHORN LIMESTONE)                                                                                             |
|---------|-------|------------------------------------------------------------------------------------------------------------------------|
| 389.0 - | 397.0 | CLAY, GRAY (GRANEROS SHALE)                                                                                            |
| 397.0 - | 423.0 | SAND; INTERBEDDED WITH GRAY CLAY<br>(DAKOTA FORMATION)                                                                 |
| 423.0 - | 442.0 | SAND; SOME CLAY (DAKOTA FORMATION)                                                                                     |
| 442.0 - | 446.0 | COAL(?), BLACK; SOFT (DAKOTA FORMATION)                                                                                |
| 446.0 - | 462.0 | SAND (DAKOTA FORMATION)                                                                                                |
| 462.0 - | 468.0 | CLAY, GRAY (DAKOTA FORMATION)                                                                                          |
| 468.0 - | 487.0 | SAND (DAKOTA FORMATION)                                                                                                |
| 487.0 - | 509.0 | CLAY, GRAY; DECREASING IN SAND CONTENT<br>TOWARDS THE BOTTOM OF THE INTERVAL<br>(DAKOTA FORMATION)                     |
| 509.0 - | 514.0 | SAND (DAKOTA FORMATION)                                                                                                |
| 514.0 - | 517.0 | CLAY, GRAY (DAKOTA FORMATION)                                                                                          |
| 517.0 - | 525.0 | SAND (DAKOTA FORMATION)                                                                                                |
| 525.0 - | 598.0 | CLAY, GRAY; SANDY IN SPOTS (DAKOTA<br>FORMATION)                                                                       |
| 598.0 - | 630.0 | SAND, FINE TO COARSE; WITH WHITE CLAY                                                                                  |
| 630.0 - | 631.0 | QUARTZITE; HARD, THERE WAS ACTUALLY<br>NO PENETRATION IN THIS INTERVAL AND NO<br>SAMPLE WAS OBTAINED (SIOUX QUARTZITE) |

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|                                                          |                           |
|----------------------------------------------------------|---------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 098N-51W-17DDDA |
| MAP LOCATION: 9                                          |                           |
| LEGAL LOCATION: NE SE SE SE SEC. 17, T. 098 N., R. 51 W. |                           |
| LATITUDE: 43.1809                                        | LONGITUDE: 96.5309        |
| LAND OWNER:                                              |                           |
| PROJECT: SIOUX FALLS-BRANDON STUDY                       |                           |
| DRILLING COMPANY: SDGS                                   |                           |
| DRILLER: E. KOGLIN/M. KOFFLER                            | DRILLER'S LOG:            |
| GEOLOGIST: D. ILES                                       | GEOLOGIST'S LOG: X        |
| DATE DRILLED: 08-06-1980                                 | DRILLING METHOD: ROTARY   |
| GROUND SURFACE ELEVATION: 1289.00 T                      |                           |
| TOTAL DRILL HOLE DEPTH: 520.0                            | TEST HOLE NUMBER: SFB-181 |
| WATER RIGHTS WELL: LN-80L                                | SDGS WELL NAME:           |
| OTHER WELL NAME:                                         |                           |
| BASIN: VERMILLION                                        | AQUIFER: DAKOTA           |
| MANAGEMENT UNIT:                                         |                           |
| SCREEN TYPE: PVC, MFG.                                   | SCREEN LENGTH: 10.0       |
| CASING TYPE: PVC                                         | CASING DIAMETER: 2.0      |
| CASING TOP ELEVATION: 1292.36 I                          |                           |
| CASING STICK-UP:                                         | TOTAL CASING AND SCREEN:  |
| WELL MAINTENANCE DATE:                                   |                           |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                           |
| ELECTRIC LOG INFORMATION:                                |                           |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY: |
| NATURAL GAMMA:                                           | EXTRA:                    |
| SAMPLES:                                                 |                           |

THE DRILLERS WERE UNABLE TO DETECT THE GRANEROS  
SHALE BUT IT IS UNDOUBTEDLY THERE. THEY WERE  
ALSO UNABLE TO DETECT THE CLAY LAYERS IN THE DA-

KOTA FORMATION (SEE LOG AT 98N-51W-17DDDD)  
 BOTTOM OF WELL AT 507 FEET.

|       |   |       |                                                                                                |
|-------|---|-------|------------------------------------------------------------------------------------------------|
| 0     | - | 10.0  | CLAY, TAN, SILTY, SANDY, PEBBLY (TILL)                                                         |
| 10.0  | - | 17.0  | SAND, FINE TO COARSE                                                                           |
| 17.0  | - | 22.0  | CLAY, TAN, SILTY                                                                               |
| 22.0  | - | 47.0  | SAND, FINE TO COARSE                                                                           |
| 47.0  | - | 175.0 | CLAY, MEDIUM-GRAY, PEBBLY, VERY SANDY;<br>SOME SHALE PEBBLES IN THE SAND AND<br>PEBBLES (TILL) |
| 175.0 | - | 316.0 | CLAY, MEDIUM-GRAY, SILTY (CARLILE SHALE)                                                       |
| 316.0 | - | 348.0 | CLAY, MEDIUM-BROWN-GRAY, SILTY; VERY<br>CALCAREOUS (GREENHORN LIMESTONE)                       |
| 348.0 | - | 520.0 | SAND, FINE TO COARSE; COMPOSED OF QUARTZ<br>(DAKOTA FORMATION)                                 |

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|                                                          |                                |
|----------------------------------------------------------|--------------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 099N-51W-28DDDD      |
| MAP LOCATION: 10                                         |                                |
| LEGAL LOCATION: SE SE SE SE SEC. 28, T. 099 N., R. 51 W. |                                |
| LATITUDE: 43.2135                                        | LONGITUDE: 96.5203             |
| LAND OWNER:                                              |                                |
| PROJECT: LENNOX CITY STUDY-1988                          |                                |
| DRILLING COMPANY: SDGS                                   |                                |
| DRILLER: T. MCCUE                                        | DRILLER'S LOG:                 |
| GEOLOGIST: P. DAWSON                                     | GEOLOGIST'S LOG: X             |
| DATE DRILLED: 05-11-1988                                 | DRILLING METHOD: ROTARY        |
| GROUND SURFACE ELEVATION: 1355.97 I                      |                                |
| TOTAL DRILL HOLE DEPTH: 330.0                            | TEST HOLE NUMBER: R2-88-05     |
| WATER RIGHTS WELL:                                       | SDGS WELL NAME: R2-88-05       |
| OTHER WELL NAME:                                         |                                |
| BASIN: VERMILLION                                        | AQUIFER: DAKOTA                |
| MANAGEMENT UNIT:                                         |                                |
| SCREEN TYPE: PVC, MFG., SLOT SIZE 0.016 IN.              | SCREEN LENGTH: 10.0            |
| CASING TYPE: PVC, SCH. 80                                | CASING DIAMETER: 2.0           |
| CASING TOP ELEVATION: 1359.30 I                          |                                |
| CASING STICK-UP: 3.33                                    | TOTAL CASING AND SCREEN: 334.0 |
| WELL MAINTENANCE DATE:                                   |                                |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                                |
| ELECTRIC LOG INFORMATION:                                |                                |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY: X    |
| NATURAL GAMMA: X                                         | EXTRA:                         |
| SAMPLES:                                                 |                                |

24 FEET OF BLANK CASING (CLOSED TO SCREEN) FROM  
 331 TO 307 FEET, SCREENED FROM 307 TO 297 FEET.

|      |   |      |                                          |
|------|---|------|------------------------------------------|
| 0    | - | 2.0  | TOPSOIL, BLACK                           |
| 2.0  | - | 9.0  | CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL) |
| 9.0  | - | 10.0 | CHALK, WHITE; CALCAREOUS                 |
| 10.0 | - | 17.0 | CLAY, YELLOW-BROWN-GRAY, PEBBLY (TILL)   |
| 17.0 | - | 25.0 | CLAY, GRAY, SILTY, PEBBLY (TILL)         |
| 25.0 | - | 27.0 | SAND, FINE                               |

|         |       |                                                                     |
|---------|-------|---------------------------------------------------------------------|
| 27.0 -  | 45.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                    |
| 45.0 -  | 47.0  | SAND, MEDIUM                                                        |
| 47.0 -  | 62.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                    |
| 62.0 -  | 71.0  | CLAY, GRAY, SILTY (TILL)                                            |
| 71.0 -  | 95.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                                    |
| 95.0 -  | 102.0 | SAND, MEDIUM                                                        |
| 102.0 - | 118.0 | CLAY, GRAY, SILTY, PEBBLY (TILL)                                    |
| 118.0 - | 152.0 | CLAY, GRAY, VERY SANDY (TILL)                                       |
| 152.0 - | 189.0 | GRAVEL, MEDIUM TO COARSE; OXIDIZED                                  |
| 189.0 - | 194.0 | CLAY, GRAY, PEBBLY (TILL)                                           |
| 194.0 - | 206.0 | GRAVEL, MEDIUM TO COARSE; OXIDIZED                                  |
| 206.0 - | 268.0 | SHALE, DARK-GRAY; NONCALCAREOUS (CARLILE SHALE)                     |
| 268.0 - | 287.0 | LIMESTONE, BROWN; CALCAREOUS (GREENHORN LIMESTONE)                  |
| 287.0 - | 314.0 | SAND, FINE; OXIDIZED (DAKOTA FORMATION)                             |
| 314.0 - | 322.0 | CLAY, BLACK, SOMEWHAT SANDY; SLIGHTLY CALCAREOUS (DAKOTA FORMATION) |
| 322.0 - | 328.0 | SAND, FINE; OXIDIZED (DAKOTA FORMATION)                             |
| 328.0 - | 330.0 | QUARTZITE, PINK; HARD (SIOUX QUARTZITE)                             |

\* \* \* \*

|                                                          |                             |
|----------------------------------------------------------|-----------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 099N-51W-32DDDD 2 |
| MAP LOCATION: 11                                         |                             |
| LEGAL LOCATION: SE SE SE SE SEC. 32, T. 099 N., R. 51 W. |                             |
| LATITUDE: 43.2043                                        | LONGITUDE: 96.5312          |
| LAND OWNER:                                              |                             |
| PROJECT: SE SO. DAK. UNIT STUDY                          |                             |
| DRILLING COMPANY: SDGS                                   |                             |
| DRILLER: M. THOMPSON                                     | DRILLER'S LOG:              |
| GEOLOGIST: D. ILES                                       | GEOLOGIST'S LOG: X          |
| DATE DRILLED: 10-05-1981                                 | DRILLING METHOD: ROTARY     |
| GROUND SURFACE ELEVATION: 1326.00 T                      |                             |
| TOTAL DRILL HOLE DEPTH: 420.0                            | TEST HOLE NUMBER:           |
| WATER RIGHTS WELL: LN-81F                                | SDGS WELL NAME: SESD-2      |
| OTHER WELL NAME:                                         |                             |
| BASIN: VERMILLION                                        | AQUIFER: DAKOTA             |
| MANAGEMENT UNIT:                                         |                             |
| SCREEN TYPE: PVC, MFG.                                   | SCREEN LENGTH: 5.0          |
| CASING TYPE: PVC                                         | CASING DIAMETER: 2.0        |
| CASING TOP ELEVATION: 1328.27                            |                             |
| CASING STICK-UP:                                         | TOTAL CASING AND SCREEN:    |
| WELL MAINTENANCE DATE:                                   |                             |
| USGS HYDROLOGICAL UNIT CODE: 10170203                    |                             |
| ELECTRIC LOG INFORMATION:                                |                             |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY: X |
| NATURAL GAMMA:                                           | EXTRA:                      |
| SAMPLES:                                                 |                             |

BOTTOM OF WELL AT 418 FEET.

|       |      |                                          |
|-------|------|------------------------------------------|
| 0 -   | 1.0  | TOPSOIL, BLACK                           |
| 1.0 - | 16.0 | CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL) |

|         |       |                                                            |
|---------|-------|------------------------------------------------------------|
| 16.0 -  | 23.0  | CLAY, YELLOW-GRAY, SILTY, PEBBLY (TILL)                    |
| 23.0 -  | 50.0  | CLAY, GRAY, SILTY, PEBBLY (TILL)                           |
| 50.0 -  | 99.0  | CLAY, GRAY, SILTY, PEBBLY, GRAVELLY<br>(TILL)              |
| 99.0 -  | 103.0 | SILT, BLACK                                                |
| 103.0 - | 108.0 | GRAVEL, MEDIUM                                             |
| 108.0 - | 114.0 | CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)                   |
| 114.0 - | 119.0 | GRAVEL, FINE TO MEDIUM                                     |
| 119.0 - | 153.0 | CLAY, GRAY, SILTY, PEBBLY, GRAVELLY<br>(TILL)              |
| 153.0 - | 160.0 | GRAVEL, FINE TO MEDIUM                                     |
| 160.0 - | 188.0 | CLAY, GRAY, SILTY, GRAVELLY (TILL)                         |
| 188.0 - | 198.0 | GRAVEL                                                     |
| 198.0 - | 271.0 | CLAY, GRAY (CARLILE SHALE)                                 |
| 271.0 - | 276.0 | CLAY, GRAY; HARD (GREENHORN LIMESTONE)                     |
| 276.0 - | 306.0 | SAND, FINE TO COARSE; WITH SOME CLAY<br>(DAKOTA FORMATION) |
| 306.0 - | 320.0 | CLAY, GRAY (DAKOTA FORMATION)                              |
| 320.0 - | 420.0 | SAND, FINE TO COARSE; WITH SOME CLAY<br>(DAKOTA FORMATION) |

\* \* \* \*

|                                                          |                             |
|----------------------------------------------------------|-----------------------------|
| COUNTY: LINCOLN                                          | LOCATION: 099N-51W-34CCBB   |
| MAP LOCATION: 12                                         |                             |
| LEGAL LOCATION: NW NW SW SW SEC. 34, T. 099 N., R. 51 W. |                             |
| LATITUDE: 43.2053                                        | LONGITUDE: 96.5156          |
| LAND OWNER:                                              |                             |
| PROJECT: LINCOLN-UNION CO. STUDY                         |                             |
| DRILLING COMPANY: SDGS                                   |                             |
| DRILLER: D. IVERSON                                      | DRILLER'S LOG:              |
| GEOLOGIST: R. HAMMOND                                    | GEOLOGIST'S LOG: X          |
| DATE DRILLED: 07-13-1988                                 | DRILLING METHOD: ROTARY     |
| GROUND SURFACE ELEVATION: 1330.60 I                      |                             |
| TOTAL DRILL HOLE DEPTH: 203.0                            | TEST HOLE NUMBER: R20-88-32 |
| USGS HYDROLOGICAL UNIT CODE: 10170102                    |                             |
| ELECTRIC LOG INFORMATION:                                |                             |
| SPONTANEOUS POTENTIAL:                                   | SINGLE POINT RESISTIVITY:   |
| NATURAL GAMMA:                                           | EXTRA:                      |
| SAMPLES: X                                               |                             |

THIS HOLE WAS PLUGGED WITH A BENTONITE GROUT FROM  
0 TO 8 FEET, GRANULAR BENTONITE FROM 8 FEET TO  
7 FEET, NON-SLIP PLUG AT 7 FEET, CEMENT GROUT  
FROM 7 FEET TO 0 FEET.

|         |       |                                                                                               |
|---------|-------|-----------------------------------------------------------------------------------------------|
| 0 -     | 2.0   | TOPSOIL, BLACK                                                                                |
| 2.0 -   | 38.0  | CLAY, YELLOW-BROWN, SANDY, SILTY, PEBBLY<br>(TILL)                                            |
| 38.0 -  | 166.0 | CLAY, GRAY, SANDY, SILTY, PEBBLY;<br>CALCAREOUS (TILL)                                        |
| 166.0 - | 197.0 | CLAYSTONE, GRAY; FISSILE; HARD; SOME COAL<br>AND PEAT LENSES (SPLIT ROCK CREEK<br>FORMATION?) |

197.0 - 203.0 QUARTZITE, PINK; FAIR TO POOR CEMENT  
(SIOUX QUARTZITE)

CORED FROM 197 TO 203 FEET.

\* \* \* \*

COUNTY: LINCOLN LOCATION: 099N-51W-34CCBC  
MAP LOCATION: 13  
LEGAL LOCATION: SW NW SW SW SEC. 34, T. 099 N., R. 51 W.  
LATITUDE: 43.2050 LONGITUDE: 96.5158  
LAND OWNER:  
PROJECT: LENNOX CITY STUDY-1988  
DRILLING COMPANY: SDGS  
DRILLER: T. MCCUE DRILLER'S LOG:  
GEOLOGIST: P. DAWSON GEOLOGIST'S LOG: X  
DATE DRILLED: 05-09-1988 DRILLING METHOD: ROTARY  
GROUND SURFACE ELEVATION: 1332.72 I  
TOTAL DRILL HOLE DEPTH: 202.0 TEST HOLE NUMBER: R2-88-04  
USGS HYDROLOGICAL UNIT CODE: 10170102  
ELECTRIC LOG INFORMATION:  
SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY: X  
NATURAL GAMMA: X EXTRA:  
SAMPLES:

|       |   |       |                                                           |
|-------|---|-------|-----------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                            |
| 2.0   | - | 9.0   | CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)                  |
| 9.0   | - | 15.0  | CLAY, OLIVE, SILTY, PEBBLY (TILL)                         |
| 15.0  | - | 17.0  | CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)                  |
| 17.0  | - | 19.0  | SAND, FINE TO MEDIUM                                      |
| 19.0  | - | 23.0  | CLAY, YELLOW-BROWN, SILTY, SANDY, PEBBLY<br>(TILL)        |
| 23.0  | - | 37.0  | CLAY, BROWN, SILTY, SANDY (TILL)                          |
| 37.0  | - | 58.0  | CLAY, GRAY, SANDY, PEBBLY (TILL)                          |
| 58.0  | - | 92.0  | GRAVEL, FINE TO MEDIUM PEBBLE GRAVEL;<br>OXIDIZED         |
| 92.0  | - | 132.0 | CLAY, GRAY, SANDY (TILL)                                  |
| 132.0 | - | 172.0 | CLAY, GRAY, SILTY (TILL)                                  |
| 172.0 | - | 194.0 | CLAY, LIGHT-GRAY, SILTY (TILL)                            |
| 194.0 | - | 199.0 | QUARTZITE, PINK; SOFT, FRIABLE CHIPS<br>(SIOUX QUARTZITE) |
| 199.0 | - | 202.0 | QUARTZITE, PINK; HARD (SIOUX QUARTZITE)                   |

ROCK BIT (5 1/2 INCHES) PUT ON AT 194 FEET, ROCK  
BIT REPLACED AGAIN AT 199 FEET.

\* \* \* \*

Report on Application No. 5326-3  
City of Lennox  
June 13, 1989

This application proposes to appropriate 0.62 cfs with a maximum annual withdrawal of 232 acre feet from 4 wells approximately 600 feet deep. The wells are to be located in the S1/2 NW1/4, S1/2 NE1/4, S1/2 of Section 1; SE1/4 SE1/2 of Section 2; E1/2 of Section 11; E1/2 of Section 14; W1/2, W1/2 NE1/4, W1/2 SE1/4 of Section 12; W1/2, W1/2 NE1/4, W1/2 SE1/4 of Section 13; all in T98N, R51W in Lincoln County. Water is to be used by the City of Lennox for municipal purposes.

Aquifer - Dakota Formation

The Dakota Formation consists of interbedded sand, sandstone, shale and sandy shale and attains a maximum thickness of 238 feet in the Lennox area (Hammond, 1989). The SDGS has estimated there is 4.3 million acre feet of recoverable water in storage in the Dakota Formation in Lincoln County (Hedges, 1982). The Dakota Formation is confined by shales and till and is under artesian conditions. General water chemistry and hydrogeology is explained in the SDGS study for Lennox (Hammond, 1989).

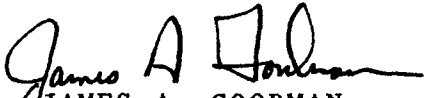
The Division of Water Rights monitors 37 Dakota Formation observation wells in Lincoln County. Two of which, LN-80I and LN-77F are located within 2 miles of potential city well sites. Hydrographs for these wells show some response to recharge due to wet conditions in 1983 through 1986 and LN-77F does appear to respond to pumping by South Lincoln Rural Water System (SLRWS) (Water Rights, 1989). In general, water levels have not changed much for the period of record.

Review of Existing Water Permits

Portions of the area specified by the application (including two diversions) are located within the future use area specified by Permit NO. 4817-3 for SLRWS. Also a portion of the area advertised for potential well sites is within the area specified by Future Use Permit Application No. 5101-3 for the City of Lennox. This application was advertised but has not been considered by the Water Management Board as a result of a request by the City of Lennox. There are three water permit holders within 3 miles of this application, the Town of Worthing, SLRWS and Clifford Elcock (Water Hauler). None of the diversion points for these water users is within 2 miles of a proposed well located for the City of Lennox. Interference should not be a problem. Testing done for SLRWS indicated drawdowns do occur and fluctuations can be expected; however, this will not adversely affect adequate wells or impair water availability from the aquifer. There are domestic wells within the area and some may be less than 700 feet from a production well.

### Conclusions

1. Water is available from the Dakota Formation.
2. The Aquifer is under artesian conditions and fluctuations due to pumping are expected. This should not adversely affect area domestic users with adequate wells.
3. There should not be any adverse effect upon the existing permit holders. Water level records from the observation wells indicated adverse interference will not occur.
4. Any wells drilled as a result of this application must be completed in accordance with SD Well Construction Standard 74:02:04:30.
5. The City of Lennox should retain professional services to design and construct the wells and distribution system. The well design as proposed by the application is not adequate.
6. There are three test wells located on the map submitted with the application. A fourth well location is not specified.
7. If four wells are drilled, spacing should not be critical. The maximum yield for the permit is 282 GPM with an average use of 144 GPM. The well spacing shown on the map should be adequate for these pumping rates and should be maintained. Actual well construction and testing will be required to evaluate the aquifer characteristics at this site.
8. The City of Lennox has a Future Use Application No. 5101-3 which has been delayed at the request of Lennox. A portion of the proposed future use area is within the proposed area for well construction for this permit.
9. The City of Lennox will be able to obtain better quality water from the Dakota Formation than their existing supply from the Lennox Aquifer.
10. The City of Lennox has obtained easements from landowners in the proposed well construction area.

  
JAMES A. GOODMAN  
Hydrologist

### Bibliography

Hammond, P.D, 1989, Investigation of the Extent and Ground Water Quality of the Dakota Formation near Lennox, South Dakota, Open file report, 56-UR, SD DWR, SDGS, Vermillion, SD 57069

Hedges, L.S, 1982, Evaluation of Ground Water Resources Eastern SD and Upper Big Sioux River, SD and Iowa for US Army Corps of Engineers, SD DWR, SDGS, Vermillion, SD 57069

Water Rights, 1989, Records of Dakota Formation Observation Wells in Lincoln County, SD DWR, Division of Water Rights, Joe Foss Bldg, Pierre, SD 57501

COUNTY: LINCOLN

LOCATION: 098N-51W-12CCCC

MAP LOCATION: 6

LEGAL LOCATION: SW SW SW SW SEC. 12, T. 098 N., R. 51 W.

LATITUDE: 43.1854

LONGITUDE: 96.4937

LAND OWNER:

PROJECT: LENNOX CITY STUDY-1988

DRILLING COMPANY: SDGS

DRILLER: G. JENSEN/D. IVERSON

GEOLOGIST: P. DAWSON

DATE DRILLED: 08-04-1988

GROUND SURFACE ELEVATION: 1325.00 T

TOTAL DRILL HOLE DEPTH: 685.0

USGS HYDROLOGICAL UNIT CODE: 10170102

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL:

NATURAL GAMMA: X

SAMPLES:

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

TEST HOLE NUMBER: R20-88-35

SINGLE POINT RESISTIVITY:

EXTRA:

|       |   |       |                                                                   |
|-------|---|-------|-------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                                    |
| 2.0   | - | 6.0   | CLAY, BROWN, SANDY, PEBBLY (TILL)                                 |
| 6.0   | - | 8.0   | CLAY, GRAY, SANDY, PEBBLY (TILL)                                  |
| 8.0   | - | 14.0  | SAND, RED; ORTHOCLASE; WEATHERED GRANITE BOULDER(?)               |
| 14.0  | - | 66.0  | CLAY, GRAY, SILTY                                                 |
| 66.0  | - | 70.0  | CLAY, LIGHT-GRAY, SILTY                                           |
| 70.0  | - | 126.0 | CHALK, WHITE, SHALEY WITH DEPTH; CALCAREOUS (NIOBRARA FORMATION?) |
| 126.0 | - | 376.0 | SHALE, DARK-GRAY TO BLACK, FISSILE; NONCALCAREOUS (CARLILE SHALE) |
| 376.0 | - | 412.0 | LIMESTONE, BROWN; CALCAREOUS (GREENHORN LIMESTONE)                |
| 412.0 | - | 429.0 | SHALE, BROWN; NONCALCAREOUS (GRANEROS SHALE)                      |
| 429.0 | - | 444.0 | SAND, LIGHT-BROWN, FINE; NONCALCAREOUS (DAKOTA FORMATION)         |
| 444.0 | - | 449.0 | CLAY, LIGHT-GRAY, SANDY (DAKOTA FORMATION)                        |
| 449.0 | - | 482.0 | SAND, FINE, CLAYEY BETWEEN 450 AND 471 FEET (DAKOTA FORMATION)    |
| 482.0 | - | 495.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                              |
| 495.0 | - | 539.0 | SAND, FINE; CLEAN (DAKOTA FORMATION)                              |
| 539.0 | - | 656.0 | CLAY, GRAY; EXTREMELY SANDY (DAKOTA FORMATION)                    |
| 656.0 | - | 667.0 | SAND, FINE; WITH WHITE CLAY PIECES                                |
| 667.0 | - | 685.0 | PIPESTONE(?), REDDISH-PINK; VERY HARD (SIOUX FORMATION)           |



COUNTY: LINCOLN

LOCATION: 098N-51W-12CCCC

MAP LOCATION:

6

LEGAL LOCATION: SW SW SW SW SEC. 12, T. 098 N., R. 51 W.

LATITUDE: 43.1854

LONGITUDE: 96.4937

LAND OWNER:

PROJECT: LENNOX CITY STUDY-1988

DRILLING COMPANY: SDGS

DRILLER: G. JENSEN/D. IVERSON

GEOLOGIST: P. DAWSON

DATE DRILLED: 08-04-1988

GROUND SURFACE ELEVATION: 1325.00 T

TOTAL DRILL HOLE DEPTH: 685.0

USGS HYDROLOGICAL UNIT CODE: 10170102

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL:

NATURAL GAMMA: X

SAMPLES:

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

TEST HOLE NUMBER: R20-88-35

SINGLE POINT RESISTIVITY:

EXTRA:

|       |   |       |                                                                   |
|-------|---|-------|-------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, BLACK                                                    |
| 2.0   | - | 6.0   | CLAY, BROWN, SANDY, PEBBLY (TILL)                                 |
| 6.0   | - | 8.0   | CLAY, GRAY, SANDY, PEBBLY (TILL)                                  |
| 8.0   | - | 14.0  | SAND, RED; ORTHOCLASE; WEATHERED GRANITE BOULDER(?)               |
| 14.0  | - | 66.0  | CLAY, GRAY, SILTY                                                 |
| 66.0  | - | 70.0  | CLAY, LIGHT-GRAY, SILTY                                           |
| 70.0  | - | 126.0 | CHALK, WHITE, SHALEY WITH DEPTH; CALCAREOUS (NIOBRARA FORMATION?) |
| 126.0 | - | 376.0 | SHALE, DARK-GRAY TO BLACK, FISSILE; NONCALCAREOUS (CARLILE SHALE) |
| 376.0 | - | 412.0 | LIMESTONE, BROWN; CALCAREOUS (GREENHORN LIMESTONE)                |
| 412.0 | - | 429.0 | SHALE, BROWN; NONCALCAREOUS (GRANEROS SHALE)                      |
| 429.0 | - | 444.0 | SAND, LIGHT-BROWN, FINE; NONCALCAREOUS (DAKOTA FORMATION)         |
| 444.0 | - | 449.0 | CLAY, LIGHT-GRAY, SANDY (DAKOTA FORMATION)                        |
| 449.0 | - | 482.0 | SAND, FINE, CLAYEY BETWEEN 450 AND 471 FEET (DAKOTA FORMATION)    |
| 482.0 | - | 495.0 | CLAY, GRAY, SANDY (DAKOTA FORMATION)                              |
| 495.0 | - | 539.0 | SAND, FINE; CLEAN (DAKOTA FORMATION)                              |
| 539.0 | - | 656.0 | CLAY, GRAY; EXTREMELY SANDY (DAKOTA FORMATION)                    |
| 656.0 | - | 667.0 | SAND, FINE; WITH WHITE CLAY PIECES                                |
| 667.0 | - | 685.0 | PIPESTONE(?), REDDISH-PINK; VERY HARD (SIOUX FORMATION)           |

COUNTY: LINCOLN

LOCATION: 098N-51W-12BBBB

MAP LOCATION: 5

LEGAL LOCATION: NW NW NW NW SEC. 12, T. 098 N., R. 51 W.

LATITUDE: 43.1938

LONGITUDE: 96.4938

LAND OWNER:

PROJECT: LINCOLN-UNION CO. STUDY

DRILLING COMPANY: SDGS

DRILLER: D. IVERSON

DRILLER'S LOG:

GEOLOGIST: R. HAMMOND

GEOLOGIST'S LOG: X

DATE DRILLED: 07-11-1988

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1326.00 T

TOTAL DRILL HOLE DEPTH: 622.0

TEST HOLE NUMBER: R20-88-31

USGS HYDROLOGICAL UNIT CODE: 10170102

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: X

SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X

EXTRA:

SAMPLES:

THIS HOLE WAS PLUGGED WITH A BENTONITE GROUT FROM  
622 TO 5 FEET. CEMENT GROUT FROM 5 FEET TO 0  
FEET.

|       |   |       |                                                                                                          |
|-------|---|-------|----------------------------------------------------------------------------------------------------------|
| 0     | - | 2.0   | TOPSOIL, DARK-BROWN                                                                                      |
| 2.0   | - | 16.0  | CLAY, YELLOW-BROWN, SILTY, PEBBLY;<br>ABUNDANT CHALK PEBBLES, VERY CALCAREOUS<br>(TILL)                  |
| 16.0  | - | 90.0  | CLAY, GRAY, SANDY, SILTY, PEBBLY; SAND<br>LENS AT 64 TO 65 FEET (TILL)                                   |
| 90.0  | - | 98.0  | CLAY, GRAY-BROWN, SANDY, SILTY, PEBBLY<br>(TILL)                                                         |
| 98.0  | - | 142.0 | CLAY, GRAY, SANDY, SILTY, PEBBLY (TILL)                                                                  |
| 142.0 | - | 150.0 | GRAVEL, MEDIUM, VERY SANDY                                                                               |
| 150.0 | - | 278.0 | SHALE, BLACK TO DARK-GRAY; VERY FISSILE;<br>NONCALCAREOUS (CARLILE SHALE)                                |
| 278.0 | - | 378.0 | SHALE, DARK-GRAY-BROWN; HARD, FISSILE;<br>SLIGHTLY CALCAREOUS (FAIRPORT SHALE<br>MEMBER - CARLILE SHALE) |
| 378.0 | - | 406.0 | SILTSTONE, DARK-GRAY; VERY HARD, ABUNDANT<br>SHELL DEBRIS (GREENHORN LIMESTONE)                          |
| 406.0 | - | 419.0 | SANDSTONE, LIGHT-BROWN, FINE;<br>NONCALCAREOUS (DAKOTA FORMATION)                                        |
| 419.0 | - | 454.0 | SHALE, LIGHT-GRAY; VERY HARD AT 430 FEET<br>(DAKOTA FORMATION)                                           |
| 454.0 | - | 489.0 | SANDSTONE, LIGHT-GRAY, FINE (DAKOTA<br>FORMATION)                                                        |
| 489.0 | - | 563.0 | SHALE, GRAY, SANDY; ABUNDANT THIN<br>SANDSTONE LENSES (DAKOTA FORMATION)                                 |
| 563.0 | - | 571.0 | SANDSTONE, WHITE, FINE TO MEDIUM (DAKOTA<br>FORMATION?)                                                  |
| 571.0 | - | 595.0 | SHALE, LIGHT-GRAY; VERY HARD,<br>NONCALCAREOUS, SEVERAL SANDSTONE LENSES<br>(DAKOTA FORMATION?)          |
| 595.0 | - | 620.0 | CLAYSTONE, WHITE, SANDY; VERY HARD                                                                       |

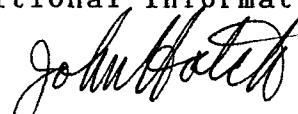
RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT  
APPLICATION NO. 5326-3, City of Lennox

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 5326-3, City of Lennox, 220 South Main, Lennox SD.

The Chief Engineer is recommending APPROVAL of Application No. 5326-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) in the public interest with the following qualifications:

1. That the City of Lennox report to the Chief Engineer annually the amount of water withdrawn each year from the Dakota Formation.
2. The well authorized by Permit No. 5326-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted with cement (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:30.
3. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
4. Approval of Permit No. 5326-3 authorizes maximum annual withdrawals of up to 232 acre feet.
5. If any of the four wells authorized by approval of Permit No. 5316-3 are located within the South Lincoln Rural Water system Future Use area reserved by Permit No. 4817-3, such wells will be junior in priority to No. 4817-3.
6. Approval of Permit No. 5326-3 is subject to submission of plans and specifications for the wells, piping and appurtenances as prepared by a licensed engineer to the Division of Land and Water Quality for review and approval prior to construction.
7. Thermoplastic casing may not be used for test wells or production wells unless approved by the chief engineer.

See the attached report for additional information.

  
JOHN HATCH, Chief Engineer  
June 14, 1989

 **Department of  
Water & Natural Resources**

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

June 15, 1989

NOTE: TO BE SURE OF PUBLICATION ON  
THE CORRECT DATES, CONTACT  
THE NEWSPAPER RIGHT AWAY.

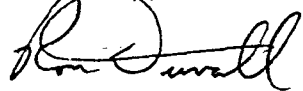
Floyd Beach, Mayor  
City of Lennox  
220 S. Main St.  
Lennox, SD 57039

Dear Mr. Beach:

Water Permit Application No. 5326-3 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Lennox Independent printed at Lennox SD. For your information, a copy of the notice is enclosed. Copies of the report and the Chief Engineer's recommendation will be sent to you at a later date. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice of Intent to Appropriate Water and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. We must receive Proof of Publication before the application can be considered by the Water Management Board.

Sincerely,



Ron Duvall  
Natural Resources Engineer  
605 773-3352

enclosures



**SOUTH Dakota** Department of  
**Water & Natural Resources**

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

June 15, 1989

Lennox Independent  
Box 76  
Lennox, SD 57039

Dear Sir:

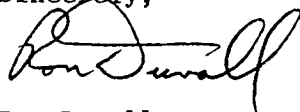
Enclosed is a Notice of Hearing on Application No. 5326-3 to be published twice. Please publish the first notice on or before June 22, 1989 with the second publication 7 days later.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you make the first publication. Please BILL the APPLICANT for the cost of publication. The APPLICANT is the City of Lennox c/o Floyd Beach, Mayor, 220 S. Main, Lennox, SD 57039-0228.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,



Ron Duvall  
Natural Resources Engineer  
605 773-3352

enclosures

-----CUT HERE-----

FIRST TRANSMITTAL NOTICE

TO: Ron Duvall  
Water Rights Division  
Joe Foss Building  
Pierre SD 57501-3181

No. \_\_\_\_\_

Date \_\_\_\_\_

We are in receipt of your letter of \_\_\_\_\_ enclosing Notice of Hearing to Appropriate Water by Application No. \_\_\_\_\_ which was first published in our issue of \_\_\_\_\_. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name \_\_\_\_\_

Newspaper \_\_\_\_\_



Instruction to Newspaper - Publish first Notice on or before June 22, 1989 with 2nd publication 7 days later. The applicant is responsible for payment.

---

NOTICE OF HEARING on Application No. 5326-3 to Appropriate Water

Notice is given that the City of Lennox, 220 S. Main Street, Lennox, SD 57039-0228 has filed an application for a water permit to appropriate 0.62 cubic feet of water per second, with a maximum annual withdrawal of 232 acre-feet of water, from 4 wells (Dakota Formation) approximately 600 feet deep. The wells are to be located in the S1/2 NW1/4, S1/2 NE1/4, S1/2 Section 1; SE1/4 SE1/4 Section 2; E1/2 Section 11; E1/2 Section 14; W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 12; W1/2, W1/2 NE1/4, W1/2 SE1/4 Section 13; all in T98N, R51W. Water is to be used by the City of Lennox for municipal purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5326-3 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water and 4) it is in the public interest. This application will be considered by the Water Management Board at the Hilton Inn, Deerfield Room, 445 Mt. Rushmore Road, Rapid City, SD, July 26, 1989 at 10:00 am. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer or 4) deny this application based on the facts presented at the public hearing.

Any interested person that intends to participate in the hearing before the Board by presenting evidence or cross-examining witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and Chief Engineer by July 14, 1989. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)". The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application and the signature and mailing address of the petitioner or legal counsel if legal counsel is obtained. The applicant need not file a petition. Contact the Water Rights Division to request information on this application or to assure access to the hearing by the handicapped.

This hearing is an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. The time of the hearing will also be automatically delayed for at least twenty days upon written request to the Chief Engineer from the applicant or a petitioner. The request for a delay must be received by July 14, 1989.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.

No. \_\_\_\_\_



PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA )  
County Lincoln ) ss.

I, Verly Hofer hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the Lennox Independent

A newspaper which during the whole time of publication of said notice  
herein after stated, has been and is printed and published in the \_\_\_\_\_

City of Lennox

County of Lincoln and State of South Dakota;  
that the said notice was published in said newspaper on the following  
two dates:

June 15, 1989  
June 22, 1989

Verly Hofer  
(Signature)

Publisher  
(Title)

6-23-89  
(Date Signed)

Cost of Printing: \$ 35.12

NOTICE OF HEARING  
on Application No. 5326-3 to  
Appropriate Water

Notice is given that the City of Lennox, 220 S. Main Street, Lennox, SD 57039-0228, has filed an application for a water permit to appropriate 0.62 cubic feet of water per second, with a maximum annual withdrawal of 232 acre-feet of water, from 4 wells (Dakota Formation) approximately 600 feet deep. The wells are to be located in the S $\frac{1}{2}$  NW $\frac{1}{4}$ , S $\frac{1}{2}$  NE $\frac{1}{4}$ , S $\frac{1}{2}$  Section 1; SE $\frac{1}{4}$  SE $\frac{1}{4}$  Section 2; E $\frac{1}{2}$  Section 11; E $\frac{1}{2}$  Section 14; W $\frac{1}{2}$ , W $\frac{1}{2}$  NE $\frac{1}{4}$ , W $\frac{1}{2}$  SE $\frac{1}{4}$  Section 12; W $\frac{1}{2}$ , W $\frac{1}{2}$  NE $\frac{1}{4}$ , W $\frac{1}{2}$  SE $\frac{1}{4}$  Section 13; all in T98N, R51W. Water is to be used by the City of Lennox for municipal purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 5326-3 because: 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. This application will be considered by the Water Management Board at the Hilton Inn, Deerfield Room, 445 Mt. Rushmore Road, Rapid City, SD, July 26, 1989, at 10:00 a.m. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to: 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing.

Any interested person that intends to participate in the hearing before the Board by presenting evidence or cross-examining witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and Chief Engineer by July 14, 1989. The Chief Engineer's address is "Water Rights Division, Foss Building, 523 E. Capitol, Pierre, SD 57501 (605/773-3352)". The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or legal counsel, if legal counsel is obtained. The applicant need not file a petition. Contact the Water Rights Division to request information on this application or to assure access to the hearing by the handicapped.

This hearing is an adversary proceeding. Any person filing a petition and/or the applicant have the right to be represented by a lawyer. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law. The time of the hearing will also be automatically delayed for at least twenty days upon written request to the Chief Engineer from the applicant or a petitioner. The request for a delay must be received by July 14, 1989.

This application is made pursuant to SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31; 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15.



# **South Dakota Department of Water & Natural Resources**

State Foss Building  
333 East Capitol  
Pierre, South Dakota 57501-3181

July 6, 1989

Floyd Beach, Mayor  
City of Lennox  
220 S Main St.  
Lennox SD 57039

Dear Mayor Beach:

Enclosed is a copy of the report and the recommendation of the  
Chief Engineer for Water Permit Application No. 5326-3.

Sincerely,



KAREN SCHLAAK  
Senior Secretary  
605 773-3352

enclosures





# Department of Water & Natural Resources

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

MAR 21 1990

Floyd Beach, Mayor  
City of Lennox  
Box 228  
Lennox, SD 57039

Dear Mr. Beach:

Enclosed is Water Permit No. 5326-3 as approved by the Water Management Board authorizing you to construct your water diversion system and put the water to beneficial use, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,

A handwritten signature in dark ink, appearing to read "John Hatch". The signature is written in a cursive, flowing style.

JOHN HATCH, Chief Engineer  
Water Rights Division  
605 773-3352

enclosures

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period - i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.



# SADDLE CREEK FARM, INC.

RT. 2 BOX 82

BERESFORD, SOUTH DAKOTA 57004

PHONE 372-4688 OR 372-4689

AREA CODE 605

July 10, 1989



Chief Engineer  
Water Rights Division  
Foss Building  
523 E Capitol  
Pierre, SD 57501

Dear Sir:

Re: Application # 5326-3

This is to give notice that we wish to participate in the hearing held on the above application and that we are opposed to granting this permit.

The reasons for our opposition is as follows: We have two domestic wells within the Dakota Formation in close proximity to the proposed well locations and these domestic wells have shown a significant decline in water quality over the past few years which we feel is a result of the high capacity withdrawal being allowed. We believe the well design proposed by the application should be adequate prior to granting of the permit. It would seem prudent to have the fourth well site identified prior to granting of the permit. There are inconsistencies between the report on this application and the report on Application # 5320-3 covering the future use application of South Lincoln Rural Water System which need to be clarified prior to granting of this permit. While it is undisputed that the Dakota Formation will provide better quality water to Lennox than what they now obtain from their existing supply, the applicant should be aware of the possibility that since the water quality is already declining, with high capacity withdrawal apparently being advocated, the water quality may decline to a point that it would be unacceptable by the citizens of Lennox. We also reserve the right to present additional data to support our opposition at the time of the hearing in the event it becomes available.

Pursuant to SDCL 46-2A-5, we are requesting a postponement of the hearing.

Sincerely,

Wanda Sletten, Secretary

cc: City of Lennox

**MASTEN LAW OFFICE, P.C.**

A Professional Corporation  
110 S. Broadway  
Canton, South Dakota 57013-0316  
Telephone (605) 987-2717



Sam W. Masten (1915 - 1980)  
Jeff Masten

Data: (605) 987-2719  
ABA/net: ABA16851  
CIS: 71320,556

July 11, 1989

Board of Water Management  
S.D. Department of Water & Natural Resources  
Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

re: Application Nos. 5320-3, 5326-3, 5101-3 & 4817-3

Dear Sir:

This letter is respectfully submitted on behalf of South Lincoln Rural Water System in the matter of the above-referenced applications. Three matters are of substantial concern to the SLRWS Board.

First, we are advised that the Chief Engineer has recommended in his letter of May 26, 1989, that No. 5320-3 be deferred to allow time for review of Future Use Permit No. 4817-3. The cautious approach to allocation of the water contained in the Dakota Formation evidenced by the Engineer's recommendation is an important part of protecting the public trust in this resource, but we believe that it is being exercised in a rather piecemeal fashion when all of the applications are considered, which is not in the public interest. Specifically, we believe that if this application is to be deferred, then the Worthing and Lennox applications ought also be deferred, properly advertised and all considered together.

Stated another way, we believe that the deferral of the SLRWS applications is arbitrary when the recommendation is measured against all of the activity in the Dakota Formation in the relevant area.

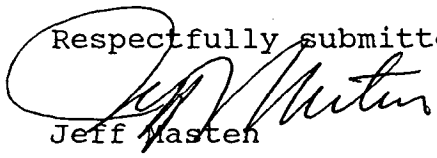
Second, with respect to the pending Lennox applications, we do not believe the same have been properly advertised. We do desire the opportunity to be heard and make a case on those applications which is difficult to do under the circumstances.

Board of Water Management  
July 11, 1989  
Page 2

Third, this Board is concerned about the interplay between the deferrals of the various applications by interested parties and the matter of the priority attached to the individual permits, should permits be issued. The SLRWS Board believes that it is imperative that BWM clean up all the details of the current permits prior to moving in additional users not already in the Dakota Formation.

We strongly urge you to reconsider deferral of 5320-3, or in the alternative, to set one hearing date with an appropriate amount of time reserved for full consideration of all the applications.

Respectfully submitted,



Jeff Masten

JPM:jm  
cc: John Sievers, SLRWS  
John Hatch, Chief Engineer DWNR

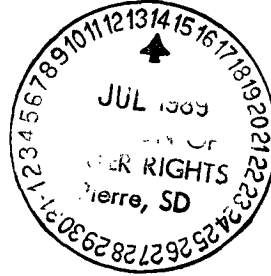
City of  
**LENNOX, SOUTH DAKOTA**

PROUD OF WHAT IT OFFERS YOU AND YOURS

From the Office of the  
Finance Officer

July 12, 1989

Phone (605) 647-2286



Karen Schlaak  
SD Department of Water &  
Natural Resources  
Joe Foss Building  
523 East Capitol  
Pierre, SD 57501

Dear Ms. Schlaak:

The City of Lennox will have representatives present at the hearing scheduled for July 26, 1989 on application No. 5326-3, As follows, Alvin Dykstra, Alderman; Water Superintendent, Consulting Engineers and Lawyer.

If any further information is required, please let us know.

I remain,

*Sharon Albers*  
Sharon Albers,  
Finance Officer

DAVID M. BUECHLER  
ATTORNEY-AT-LAW  
193 W. First Avenue  
P.O. Box 308  
Parker, South Dakota 57053



July 13, 1989

Dept. of Natural Resources  
523 E. Capitol  
Joe Foss Building  
Pierre, SD 57501-381

ATTN: Ron DuVale

RE: City of Lennox future water right permit-  
South Lincoln future water right permit

Gentlemen:

Pursuant to SDCL 46-2A-4, this is to inform you that the City of Lennox intends to participate in the South Lincoln Rural Water Hearing. As you know, the City of Lennox has also filed their own application for future water rights on March 31, 1989, and also on May 12, 1989. The City of Lennox would oppose the application of South Lincoln Rural Water on the basis that the City of Lennox is applying for future water rights in an area that overlaps with South Lincoln Rural Water.

The City of Lennox has a population of approximately 1850 people. Lennox has had a long history of poor water quality. The chief engineer's report supports this in that the City of Lennox's water quality does not meet recommended standards. The sulfite and chloride levels are well over recommended levels. Lennox has been informed that it would not be economically feasible to treat their existing water to meet standard. The City of Lennox has suffered from this problem long enough.

Being born and raised in Lennox, I know from personal experience that our water heater needed replacement at least every five (5) Years. Water pressure throughout the homes in Lennox have decreased due to the clogging of pipes. Water flushings from water heaters are enough to nauseate any human being. Friends of mine in Lennox have to start drawing their bathwater three (3) hours ahead of time.

In reference to Miss Sletten's opposition to the City of Lennox's water rights application, I would like to state for the record, the City of Lennox vehemently opposes her request for an automatic extension. To allow one person to interfere with the water needs of 1800 people is not fair. She is not even required to state a reason for the delay.

Please inform the City of Lennox of the time and place of hearing of their objection of South Lincoln Rural Water application. I would appreciate being notified of the new hearing date in regards to the City of Lennox's future water rights application.

My mailing address is David Buechler, Attorney for the City of Lennox, Box 308, Parker, South Dakota 57053.

Sincerely,



David Buechler  
Attorney for the City of Lennox

DB/jc

cc: Howard Paul  
P.O. Box 3098  
Mitchell, SD 57301

Sharon Albers  
Lennox Finance Officer  
City Hall, 220 S. Main  
Lennox, SD 57039



# Department of Water & Natural Resources

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

July 13, 1989

Floyd Beach, Mayor  
City of Lennox  
220 S Main Street  
Lennox SD 57039-0228

Dear Mr. Beach:

This letter is in response to a petition dated July 11, 1989, received from Jeff Masten, attorney, representing the South Lincoln Rural Water System. Enclosed for your information is a copy of the petition regarding, in part, the city's Application No. 5326-3 to appropriate water. A notice will also follow this letter indicating the hearing on Application No. 5326 has been automatically delayed at the request of Wanda Sletten.

Please contact me if you have any questions.

Sincerely,

Ron Duvall  
Natural Resources Engineer  
605 773-3352

enc.

cc: David Buechler, attorney  
Box 308  
Parker SD 57053





# Department of Water & Natural Resources

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

July 17, 1989

## NOTICE

TO: Floyd Beach, Mayor  
City of Lennox  
220 S Main Street  
Lennox SD 57039-0228  
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer  
Water Rights Division  
605 773-3352 

SUBJECT: Automatic Delay of Hearing on Water Permit Application  
No. 5326-3

A petition opposing Water Permit Application No. 5326-3 has been filed by Wanda Sletten, secretary, of Saddle Creek Farm, Inc. The petition also requests postponement of the hearing. Therefore, the hearing on Application No. 5326-3 is automatically delayed pursuant to SDCL 46-2A-4 and 46-2A-5 and will NOT be held on July 26, 1989.

The Water Management Board will now consider Application No. 5326-3 on September 27, 1989 at 10:30 am, in Room 216, Joe Foss Building, 523 E Capitol, Pierre SD. The agenda time is an estimate. The actual time of hearing may be later than 10:30 am due to prior agenda items. Applicable provisions of the Notice of Hearing published on June 15 and 22, 1989 in the Lennox Independent will still apply at this hearing.

cc: Water Management Board  
John Guhin, Assistant Attorney General  
John Haak, Assistant Attorney General



CERTIFICATION

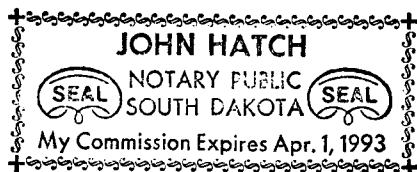
I hereby certify that on July 17, 1989 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of Automatic Delay of Hearing on Water Permit Application No. 5326-3 addressed as shown on the Parties of Record sheet.

*Karen Schlaak*

KAREN SCHLAACK  
Senior Secretary

STATE OF SOUTH DAKOTA )  
                                  ) SS  
COUNTY OF HUGHES )

Sworn to, before me, this 19<sup>th</sup> day of July, 1989.



*John Hatch*  
Notary Public

July 12, 1989  
(date)

page 1

Parties of Record before Water Management Board regarding Water Permit  
Application No. 5326-3, City of Lennox

Proponents:

Floyd Beach, Mayor  
City of Lennox  
220 S Main Street  
Lennox SD 57039-0228  
represented by  
David Buechler, attorney  
Box 308  
Parker SD 57053

Opponents:

Wanda Sletten, Secretary  
Saddle Creek Farm, Inc.  
Route 2, Box 82  
Beresford SD 57004  
Charles Kuehl, Chairman  
South Lincoln Rural Water System  
PO Box 155  
Canton SD 57013  
represented by:  
Jeff Masten, attorney  
Masten Law Office, P.C.  
110 S Broadway  
Canton SD 57013-0316

 **Department of  
Water & Natural Resources**

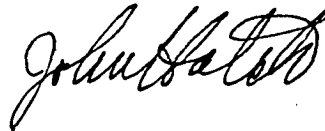
Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

October 4, 1989

NOTICE

TO: City of Lennox  
Floyd Beach, Mayor  
PO Box 228  
Lennox SD 57039  
and Parties of Record

FROM: John Hatch, Chief Engineer  
Water Rights Division  
605 773-3352



SUBJECT: Preparation of Findings of Fact, Conclusions of Law and  
Final Decision

The Water Management Board has directed John Guhin, the Board's attorney to prepare proposed Findings of Fact, Conclusions of Law and a Final Decision approval of Water Permit Application No. 5326-3. The Board will consider the proposed Findings, Conclusions and Final Decision at 1:00 pm, December 6, 1989, Room 216, Joe Foss Building, Pierre SD. The agenda time is an estimate. The actual time of consideration may be delayed due to prior agenda items.

The Board has requested that a copy of the proposed Findings, Conclusions and Final Decision be mailed to each Board member and all Parties of Record and their attorneys (copy enclosed) by November 16, 1989. Any comments pertaining to the proposed Findings, Conclusions and Decision are to be mailed to each Board member, the Board attorney and all Parties of Record and their attorneys by November 24, 1989.

The public hearing on this application was completed September 27, 1989. No additional testimony will be received on December 6, 1989.



## CERTIFICATION

I hereby certify that on October 4, 1989 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice to prepare Findings of Fact, Conclusions of Law and Final Decision for Water Permit Application No. 5326-3 address as shown on the Parties of Record sheet.

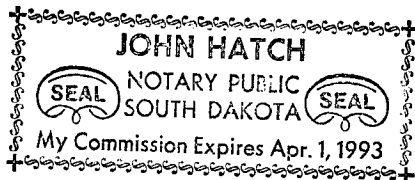
Haren Schlack

KAREN SCHLAAK  
Senior Secretary

STATE OF SOUTH DAKOTA )  
 ) SS  
COUNTY OF HUGHES )

Sworn to, before me, this 5<sup>th</sup> day of October, 1989.

*John Hatch*  
Notary Public





# Department of Water & Natural Resources

Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501-3181

January 8, 1990

## NOTICE

TO: City of Lennox  
Floyd Beach, Mayor  
PO Box 228  
Lennox SD 57039  
and Parties of Record

FROM: John Hatch, Chief Engineer  
Water Rights Division  
605 773-3352

A handwritten signature in black ink, appearing to read "John Hatch". The signature is written in a cursive, flowing style.

SUBJECT: Adoption of Findings of Fact, Conclusions of Law and  
Final Decision

This is to notify you that a Final Decision, including Findings of Fact, Conclusions of Law were adopted by the Water Management Board for approval of Water Permit Application No. 5326-3 which was considered at the December 6-7, 1989 meeting.

A copy of the signed final Decision, Findings and Conclusion is enclosed for the applicant. Copies will be furnished to anyone else upon request. South Dakota Statutes provide that the decision of the Board may be appealed to the Courts.

# CERTIFICATION

I hereby certify that on January 8, 1990 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of adoption of Findings of Fact, Conclusions of Law and Final Decision for Water Permit Application No. 5326-3 addressed as shown on the Parties of Record sheet and to:

Steve Helmer, Attorney, PO Box 8250, Rapid City SD 57709  
(sent a copy of findings also)

*Karen Schlaak*  
KAREN SCHLAAK  
Senior Secretary

STATE OF SOUTH DAKOTA )  
 ) SS  
COUNTY OF HUGHES )

Sworn to, before me, this 9<sup>th</sup> day of January, 1989<sup>90</sup>.



*John H. Bates*  
Notary Public

STATE OF SOUTH DAKOTA  
BEFORE THE WATER MANAGEMENT BOARD

|                                  |   |                    |
|----------------------------------|---|--------------------|
| IN THE MATTER OF THE APPLICATION | ) | FINDINGS OF FACT   |
| FOR WATER PERMIT NO. 5326-3,     | ) | CONCLUSIONS OF LAW |
| CITY OF LENNOX,                  | ) | AND FINAL DECISION |

FINDINGS OF FACT

I

This is an application proposing to appropriate .62 CFS of water with the maximum annual withdrawal of 232 acre feet from four (4) wells approximately six hundred (600) feet deep. The water is to be used by the City of Lennox for municipal purposes.

II

The water is to be drawn from the Dakota Sandstone Formation.

III

The applicant has identified a location for three wells but has not identified a location for a fourth well which it desires.

IV

There is approximately 4.3 million acre feet of recoverable water in the Dakota Sandstone aquifer underlying and within the boundaries of Lincoln County.

V

A portion of the future use area covered by Future Use Permit No. 5101-3, is also included in this application.

## VI

A portion of the area in which the applicant desires to drill wells is found within the Future Use Area of South Lincoln Rural Water System under Permit No. 4817-3.

## VII

In particular, the proposed location of two of the wells sought under this permit falls within the future use area of South Lincoln Rural Water System under Permit No. 4817-3. The location of the third well is outside that area. The location of the fourth well has not been determined.

## VIII

There is a reasonable probability there is unappropriated water available for the applicant's proposed use.

## CONCLUSIONS OF LAW

### I

This Board has jurisdiction of this matter.

### II

There is unappropriated water available for the use of the applicant.

### III

South Lincoln Rural Water System has a future use permit to drill wells in the area in which Lennox wishes also to drill wells. The Board finds that it is not inconsistent with State law to allow placement of wells by a

later applicant in a future use area already established by another applicant.

#### IV

South Lincoln Rural Water System has established a prior use to water within the Future Use area covered by its Future Use Permit.

#### V

The Board finds that, in the context of this case, it is likely that any conflict can be avoided between South Lincoln Rural Water System and the City of Lennox by judicious placement of wells.

#### VI

The Board finds further that it is desirable and proper to direct the parties to this proceeding to adjust well placement so as to allow each to withdraw water from the Dakota Formation. This direction serves the purpose of maximizing the beneficial use of water as demanded by South Dakota law.

#### VII

Should a conflict between the water rights of South Lincoln Rural Water System and the City of Lennox be unavoidable, the South Lincoln Rural Water System future use will take priority.

#### VIII

The Board does not approve the site for the fourth well without a more precise indicator.

## IX

Existing rights will not be unlawfully impaired by this permit as conditioned.

## X

The use of the water by the City of Lennox for municipal purposes is beneficial use of water.

## XI

Use of water by the City of Lennox for municipal purposes is in the public interest.

## XII

While artesian head pressure may be influenced in this area by drawdowns caused by pumping these wells, it should not significantly effect the quantity of water available from the aquifer. The request is for 282 gallons per minute from three or four wells, which will not be substantial.

## XIII

The evidence indicates that as Dakota Sandstone water is utilized, the quality of water withdrawn from that formation will have a tendency to deteriorate. The Board finds that, while the precise degree and speed of the deterioration is unknown, that deterioration will be gradual. The Board finds that notwithstanding this fact, it is in the public interest to allow grant for this permit.

## FINAL DECISION

The application of the City of Lennox for Water Permit No. 5326-3 is approved subject to the following qualifications:

1. That the City of Lennox report to the Chief Engineer annually the amount of water withdrawn each year from the Dakota Formation.

2. The well authorized by Permit No. 52326-3 shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted with cement (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:30.

3. The wells approved under this Permit will be located near domestic wells and other wells which may obtain from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies inadequate domestic wells or in adequate wells having prior water rights.

4. Approval of Permit No. 5326-3 authorizes maximum annual withdrawals of up to 232 acre feet.

5. If any of the wells authorized by approval of Permit No. 5316-3 are located within the South Lincoln Rural Water system future use area reserved by Permit No. 4817-3, such wells will be junior in priority to No. 4817-3.

6. Approval of Permit No. 5326-3 is subject to submission of plans and specifications for the wells, piping and appurtenances as prepared by a licensed engineer to the Division of Land and Water Quality for review and approval prior to construction.

7. Thermoplastic casing may not be used for test wells or production wells unless approved by the chief engineer.

8. The approval by the Board encompasses the right to construct up to three wells as identified. A fourth well may be drilled under the authority of this permit only after notice, hearing and approval of this Board.

Dated this 4 day of January, 1990  
BY THE BOARD:

*Marian B. Henderson*

City of  
**LENNOX, SOUTH DAKOTA**

PROUD OF WHAT IT OFFERS YOU AND YOURS



From the Office of the  
Finance Officer

Phone (605) 647-2286

December 17, 1990

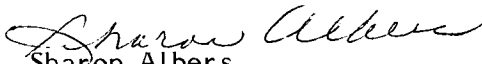
Ron DuVall,  
Natural Resources Engineer  
for John Hatch, Chief Engineer  
Water Rights Division

Dear Sir,

The City of Lennox is still working on funding as follows:

The City of Lennox is now on the State Water Plan for 1991 and also, going after a C D B G Grant for 1991, for the purpose of drilling new wells on Water Permit #5326-3. Therefore, at this time no water is being used.

Sincerely ,

  
Sharon Albers,  
Finance Officer



5326-3

**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

January 7, 1992

City of Lennox  
Sharon Albers  
PO Box 228  
Lennox SD 57039

Dear Ms. Albers:

Pursuant to a qualification on Water Permit/Right No(s). 5326-3, we are requesting that the City of Lennox report to the Chief Engineer the amount of water withdrawn for the year 1991. Please respond by February 10, 1992.

If you have any questions concerning this or other water rights questions, please contact Don Frye, Natural Resources Analyst, (605) 773-3352.

Very truly yours,

Ron Duvall,  
Natural Resources Engineer  
for JOHN HATCH, Chief Engineer  
Water Rights Division



5326-3

**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

February 11, 1992

Sharon Albers  
City of Lennox  
PO Box 228  
Lennox SD 57039

Dear Ms. Albers:

Pursuant to a qualification on Water Permit/Right No(s). 5326-3, we requested in our January 7, 1992 letter that the City of Lennox report to the Chief Engineer the amount of water withdrawn for the year 1991. We have not received a reply to that request and would appreciate your earliest reply.

If you have any questions concerning this or other water rights questions, please contact Don Frye, Natural Resources Analyst, (605) 773-3352.

Very truly yours,

Ron Duvall,  
Natural Resources Engineer  
for JOHN HATCH, Chief Engineer  
Water Rights Division

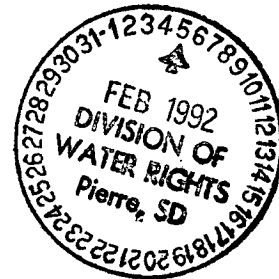
February 4, 1992

BOX 398

MITCHELL, S. DAK. 57301

PHONE (605) 996-7761

Kent Buhler  
Water Rights  
SD Dept of Environment and Natural Resources  
Foss Building  
Pierre SD 57501



RE: Water Supply Improvements  
Lennox, South Dakota  
SPN #5176

**SCHMUCKER, PAUL, NOHR & ASSOCIATES**

**ENGINEERS  
SURVEYORS**

Dear Mr. Buhler:

Enclosed please find a marked up plat showing proposed well sites for the City of Lennox. The area marked in yellow was that described in Permit #5326-3. The City would like to locate the wells in the areas colored in blue based on this permit. This property is readily available to the City and would cut pipeline costs on the project.

In our conversation on this date you indicated the advertisement covered the West 1/2 of Section 12 and the East 1/2 of Section 14, T 98 N, R 51 W. You also indicated you felt these locations would meet permit requirements. If the proposed locations create a problem, please advise.

Sincerely,

SCHMUCKER, PAUL, NOHR & ASSOCIATES

B. E. Schmucker, P.E.

BES:rf

Enclosure

cc: City of Lennox w/enc



Water Rights Division - DENR  
Conversation File Documentation

NAME OF PERSON OR FILE: City of Lennox - WP No. 5326-3

ADDRESS: \_\_\_\_\_ COUNTY: Lennox

DATE: 2/12/92 TELEPHONE: \_\_\_\_\_

RE: Conversation with Bernie Schmucker, engineer for the city

COMMENTS:

I called Bernie Schmucker (996-7761) regarding his letter (dated 2/4/92) on the location of the 3 wells for the City of Lennox. In a previous conversation with Ken Buhler, this office indicated that if the wells were to be drilled within 660 feet of the advertised location and in the same water source that the wells could be drilled without amending the permit.

This permit was approved back in 1989. Originally, the City of Lennox applied for 4 wells, 3 of the wells were to be located in the NE1/4 NW1/4, SW1/4 SW1/4 Section 12, NW1/4 NE1/4 Section 14, T98N, R51W and the fourth well was not specifically located but instead proposed to be located within a large area. The advertisement of the notice of hearing specified the large area to include the area that the fourth well could be located.

The permit was approved for the the 3 wells specifically located by the quarter-quarter but the fourth well was not approved. Since the 3 wells were specifically located and the permit was issued for these well described by the quarter-quarter, if the city decides to move the wells a greater distance than the described quarter-quarter an application for a change of diversion point would be necessary.

I told Mr. Schmucker this and he said he would convey this information to the city. He said they may just keep the wells in the permitted area. File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.

NAME: Eric Henderson

## Conversation or File Documentation

NAME OF PERSON OR FILE: 5326-3ADDRESS: City of Zennox COUNTY \_\_\_\_\_DATE: 2/13/92 TELEPHONE \_\_\_\_\_RE: Report of annual water usage

COMMENTS: Sharon Albers called and said their annual  
usage was 62,247,300 gal = 191 acre feet. I updated  
the data base. She called back and said she looked  
at the figures for the wrong well, they didn't pump  
any water from the well covered by 5326-3.

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

November 20, 1992

The Honorable Floyd Beach  
Mayor of the City of Lennox  
P.O. Box 228  
Lennox, SD 57039

Dear Mayor Beach:

A petition to intervene in the City of Lennox's Water Permit Application No. 5326A-3 has been submitted by John Sievers, Manager of the South Lincoln Rural Water System. Water Permit Application No. 5326A-3 proposes to change the location of a well authorized by Water Permit No. 5326-3. A copy of the petition to intervene is enclosed.

A hearing before the Water Management Board to consider this application will be held, as published, on December 2, 1992, at 10:00 am in the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Ave., Pierre, SD.

I will send a letter to all parties reminding them of the hearing after the November 23, 1992 deadline to file petitions has past. If you have any question about the upcoming hearing, please feel free to contact me.

Sincerely,

Eric Gronlund  
Water Rights Division  
(605) 773-3352

enclosure

cc: Jay Larson, Schmucker, Paul & Nohr & Associates  
John Sievers, South Lincoln RWS, Box 155, Canton, SD 57013

## Conversation or File Documentation

NAME OF PERSON OR FILE: Jay Larson, Smucker, Paul, No. 1 & 2

ADDRESS: \_\_\_\_\_ COUNTY \_\_\_\_\_

DATE: 10/1/81 TELEPHONE \_\_\_\_\_RE: Permit 5326, Qualification #1

## COMMENTS:

LARSON WANTED TO KNOW IF HE COULD USE 2" PVC FOR ANOBSERVATION WELL. I TOLD HIM HE COULD BUT SHOULD GETADVICE OF POSSIBLE PROBLEMS WITH HOLE OF HOLE.

File in Permit or other file as necessary. Use to document conversations and what the other party was told; why action or decision was made.



5326-3

**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

January 13, 1994

Sharon Albers  
City of Lennox  
PO Box 228  
Lennox, SD 57039

Dear Ms. Albers:

Pursuant to a qualification on Water Permit/Right No. 5326-3, I am requesting that the City of Lennox report the total amount of water diverted from the Dakota Formation during 1993. Please respond by January 31, 1994.

If you have any questions concerning this or other water rights questions, please contact Barry McLaury, Natural Resources Analyst, (605) 773-3352.

Sincerely,

RON DUVALL, Natural Resources Engineer  
for JOHN HATCH, Chief Engineer  
Water Rights Division

The City of Lennox didn't pump  
any water from Permit NO.  
5326-3 in 1993. They plan to  
pump in 1994.

Barry A. McLary



**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

October 15, 1997

5080-3  
5326-3  
5753-3

Roger Almond, City Utilities Superintendent  
City of Lennox  
220 S. Main Street  
Lennox, SD 57039

Dear Mr. Almond:

The investigation of your water use system, including the extent of application of water to beneficial use, as developed under Water Permit Nos. 5080-3, 5326-3 and 5753-3, has been completed. Your final water right documents, the Water Licenses, can now be issued.

Statutes require that we charge a \$50.00 fee per license (\$150.00 total) for the investigation and issuance of the Water Licenses. Upon receipt of the \$50.00 fee per license (\$150.00 total) from you, we will begin processing your Water Licenses.

**Please remit fee to:  
Department of Environment & Natural Resources  
Water Rights Program  
523 E. Capitol  
Pierre, SD 57501-3181**

Sincerely,

Cheryl F. Frost  
Secretary  
Water Rights Program  
(605) 773-3352

NOTE: On check or money order, please specify your permit numbers. This will insure proper handling of the fee.

# RECEIPT

## Division of Water Rights

### South Dakota Department of Environment and Natural Resources

415513

Pierre, \_\_\_\_\_ November 3, 19 97

RECEIVED OF City of Leech, P.O. Box 228, Leech, SD 57039-0228

the following amount in fees for services rendered as provided for by law:

|                                                                                                                      |       |       |
|----------------------------------------------------------------------------------------------------------------------|-------|-------|
| Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use _____ |       |       |
| Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____                                  |       |       |
| Fee to retain Future Use Permit No. _____ after period of seven years.                                               |       |       |
| Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>5326--3</u>         | 50    | 00    |
| Fee for Filing Transfer Form _____                                                                                   |       |       |
| Fee for Filing Extension Request _____                                                                               |       |       |
| Fee for _____                                                                                                        |       |       |
| _____                                                                                                                |       |       |
| _____                                                                                                                |       |       |
| (Any Other Work Provided by Law)                                                                                     | Total | 50 00 |

By John H. Hatcher  
Chief Engineer

**Permit No. 5326-3**  
**Big Sioux River** - Water District

**Report Of Examination Of Works And/Or Application of Water To Beneficial Use**

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, September 11, 1997 made a thorough examination of the water use system constructed by City of Lennox of 220 S. Main St., Lennox SD 57039 holder of Permit No. 5326-3, bearing the priority of March 31, 1989 authorizing the diversion of 0.62 cu. ft. per second or 232 acre-feet annually of the waters of the Dakota Formation for municipal purposes, in Lincoln County.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

Well B is 636 feet deep with 450 feet of 12 inch steel casing and 170 feet of stainless steel screen; Goulds submersible pump model no. 6CLC; Hitachi motor rated at 40 hp; well capacity is 180 gpm.

Well C is 567 feet deep with 400 feet of 12 inch steel casing and 160 feet of stainless steel screen; Goulds submersible pump model no. 6CLC; Franklin motor rated at 40 hp; well capacity is 120 gpm.

B. Works used to transport water to place of use:

Mainline to town is 2,075 feet of 4 inch pvc and 32,600 feet of 8 inch pvc.

C. Works used to apply water to beneficial use:

100,000 gallon cement reservoir and a 50,000 gallon water tower hooked to the municipal water system.

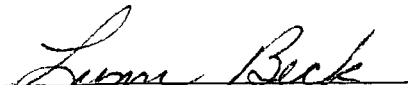
The system is in the following condition good. The point of diversion is located well B - 100' N and 120' E of the SW corner Section 12 and well C - 145' S and 1850' E of the NW corner Section 12; all in T98N, R51W. The works are capable of diverting and conveying to the place of use a combined 0.667 cu. ft. per second of water or 235 acre feet of water annually which is to be used for municipal purposes. Water has been put to beneficial use to the maximum extent as follows:

Municipal water system for the City of Lennox.

The license should be issued for 0.62 cfs and 232 acre-feet annually.

Applicable permit qualifications have been complied with: yes

Exceptions to compliance are: none



Lynn Beck

Natural Resources Engineer

DENR, Water Rights Program

9-19-97

Date

## **REPORT ON INSPECTION OF PERMIT NO. 5326-3**

**DATE OF INSPECTION: 9-11-97**

Other permit(s) associated with the project: 5080-3 standby wells and 5753-3.

NAME & ADDRESS OF INSPECTION CONTACT: Roger Almond, 220 S. Main St., Lennox SD 57039.

RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE: City Utilities Superintendent

NAME & ADDRESS OF PERMIT HOLDER: City of Lennox, 220 S. Main St., Lennox SD 57039 (605) 647-2286.

**DIVERSION POINT LEGAL LOCATION: Well B - 100' N and 120' E of the SW corner Section 12 and well C - 145' S and 1850' E of the NW corner Section 12; all in T98N, R51W.**

### **WELL INFORMATION:**

- 1) Well Drilling Firm: Layne Western Company
- 2) No. of Wells 2
- 3) Depth(s) 636/576 feet
- 4) Well log is available yes

### **Casing:**

- 1) Diameter both 12 inches
- 2) Length 450/400 feet
- 3) Type both steel

### **Screen:**

- 1) Type both stainless steel
- 2) Length 170/160 feet
- 3) Static water level 153/132 feet

### **Pump:**

- 1) Make both submersible Goulds
- 2) Model both 6CLC
- 3) Size both 10"
- 4) Capacity 180/120 GPM (well capacity)

### **Motor:**

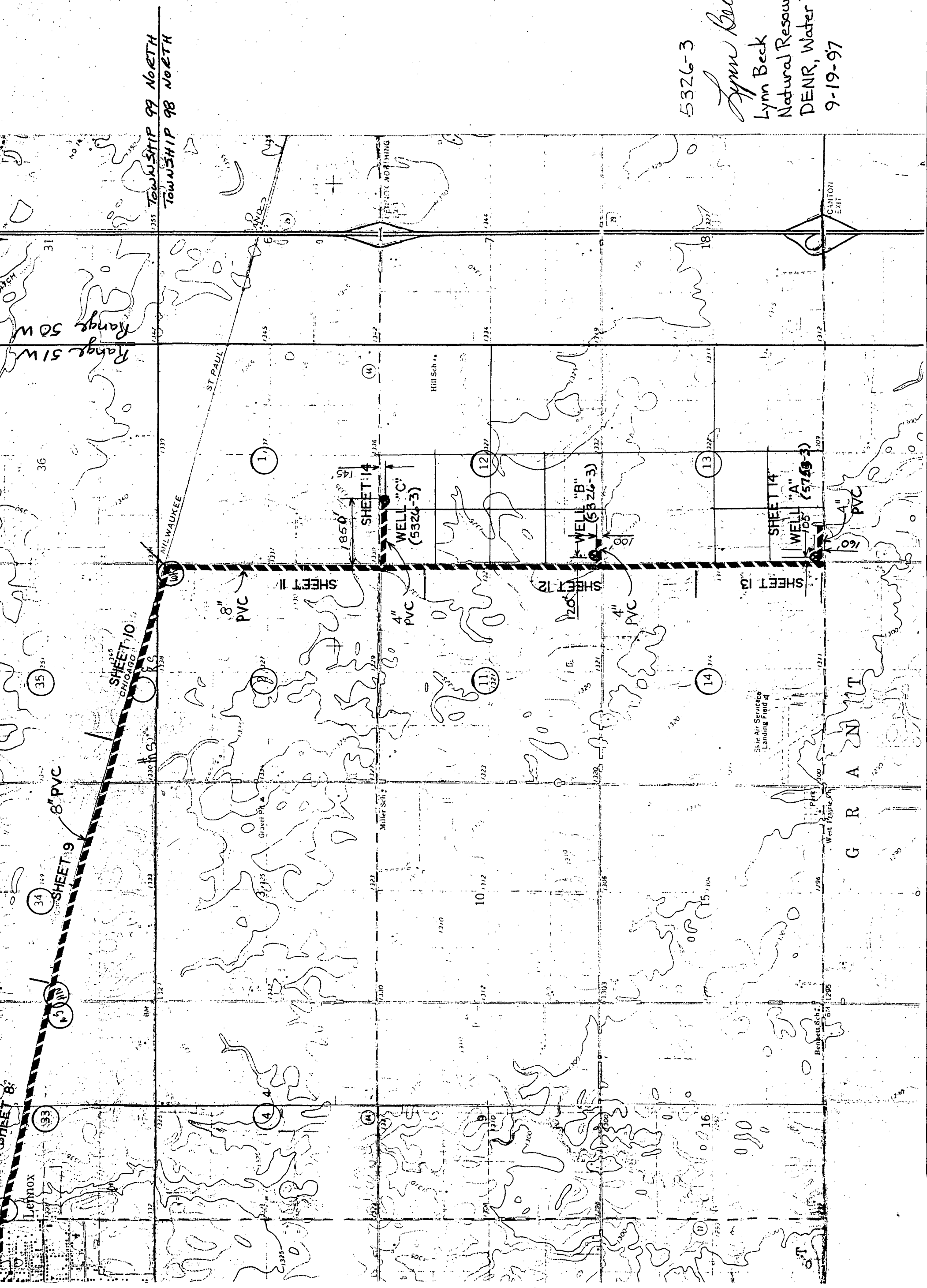
- 1) Make Hitachi/Franklin
- 2) Model No. #
- 3) Horsepower rating 40 each hp

**DISTRIBUTION LINES OR CANALS: Mainline to town.**

- 1) Type PVC 2) Size 4 3) Length 2075 feet
- 1) Type PVC 2) Size 8 3) Length 32,600 feet

**PERMIT QUALIFICATIONS AND REGULATIONS:**

- 1) Special qualifications to permit being abided by yes
- 2) All structures, wells and lands on map yes



TOWNSHIP 99 NORTH  
TOWNSHIP 98 NORTH

5326-3

*Lynn Beck*

Lynn Beck

Natural Resources Engineer  
DENR, Water Rights Program

9-19-97

5326-3

# STATE OF SOUTH DAKOTA

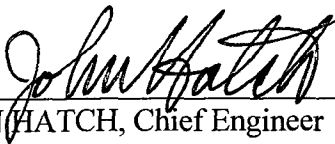
## WATER LICENSE NO. 5326-3

(1) The City of Lennox, 220 S Main St., Lennox SD 57039 made Application No. 5326-3, March 31, 1989 for a water permit to divert 0.62 cubic feet of water per second (232 acre-feet annually) from groundwater (four wells), Lincoln County, South Dakota for municipal use purposes. Permit No. 5326-3, with a priority date of March 31, 1989 was approved December 7, 1989 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before December 7, 1994 and for the application to beneficial use of said water on or before December 7, 1998.

(2) It is certified that the applicant has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 0.62 cubic feet of water per second (232 acre-feet annually) for beneficial use. The location of the diversion points are: Well B - 100 feet north and 120 feet east (SW 1/4 SW 1/4) from the SW corner Section 12; and Well C - 145 feet south and 1,850 feet east (NE 1/4 NW 1/4) from the NW corner Section 12; all in T98N-R51W.

(3) The applicant has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

(4) Pursuant to South Dakota Water Law 46-5-30.1 the City of Lennox, 220 S Main St, Lennox SD 57039 the holder and/or owner of Water Permit No. 5326-3 is issued a license to appropriate water, the right to use 0.62 cubic feet of water per second (232 acre-feet annually) from groundwater (two wells) with a priority date of March 31, 1989 from the location specified in (2) of this license, for the purpose of municipal use. This license is subject to any limitations or qualifications listed in Water Permit No. 5326-3 and subject to South Dakota State Law.



JOHN HATCH, Chief Engineer  
Water Rights Program  
Department of Environment and Natural Resources

APR 23 1998

date





**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE SOUTH DAKOTA 57501-3181

APR 23 1998

5080-3  
5326-3  
5753-3

Roger Almond, City Utilities Superintendent  
City of Lennox  
220 S. Main Street  
Lennox, SD 57039

Dear Mr. Almond:

Enclosed are Water License Nos. 5080-3, 5326-3 and 5753-3. These are the final water right documents completing your process of obtaining a Water Right. Enclosed are Receipt Nos. 415512, 415513 and 415514 in the amount of \$50.00 each which you paid for the investigation and issuance of the Water Licenses.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the wells authorized by Water Right Nos. 5080-3, 5326-3 and 5753-3, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

As long as you use the water beneficially, as stated in the Water Licenses, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Very truly yours,

JOHN HATCH, Chief Engineer  
Water Rights Program  
(605) 773-3352

ks  
enclosures

## NOTICE OF TRANSFER OF OWNERSHIP

For assistance call (605) 773-3352

RECEIVED

AUG 02 2018

WATER RIGHTS  
PROGRAM

Mail to: PMB 2020  
DENR - Water Rights Program  
523 E Capitol Ave  
Pierre, SD 57501-3182

Water Right/Permit No. 5326-3Date: July 24, 2018I/We request that Water Right/Permit No. 5326-3 formerly owned by:City of Lennox

be transferred to:

New Owner Name: South Lincoln Rural Water System, IncAddress: 28647 472nd AvenueCity, State, Zip Beresford SD 57004 Telephone No. 605-777-9905

Title to the following described land(s)/property has been transferred as described above:

Lennox Well Lot "B" of Gedstad Addition, a subdivision of the SW1/4 of Section Twelve (12), Township Ninety-eight (98) North, Range Fifty-one (51) West of the 5th P.M., Lincoln County, South Dakota, according to the recorded plat thereof.

- ☒ I understand that the validity of Water Right/Permit No. 5326-3 has not been determined by this transfer action. If I have any questions on validity, I understand that only the Water Management Board has the authority to determine if a water right/permit is valid (see note below.)

You are requested to file this "Notice of Transfer" in the appropriate file with the Water Rights Program, as evidence of the change of ownership.

A fee of Fifty Dollars (\$50.00) is included to cover the filing fee as required by SDCL 46-2-13.

I, South Lincoln RW, by Thomas Rausch, GM, the new owner, certify that the above information is true and correct.

Thomas Rausch  
(signed by new owner)

**NOTE:** Water permits may be cancelled for nonconstruction after the five year construction period has expired. Once a water permit is developed and the water used, the permit becomes a right. A water right may be lost for three reasons:

1. Abandonment - no intent to use water and use is abandoned.
2. Forfeiture - no use of water for three year period without legal excuse.
3. For a third violation of a condition of a water permit/right.

## NOTICE OF TRANSFER OF OWNERSHIP

For assistance call (605) 773-3352

Mail to: PMB 2020  
DENR - Water Rights Program  
523 E Capitol Ave  
Pierre, SD 57501-3182

Water Right/Permit No. 5326-3Date: July 24, 2018I/We request that Water Right/Permit No. 5326-3 formerly owned by:City of Lennox be transferred to:New Owner Name: South Lincoln Rural Water System, IncAddress: 28647 472nd AvenueCity, State, Zip Beresford SD 57004 Telephone No. 605-777-9905

Title to the following described land(s)/property has been transferred as described above:

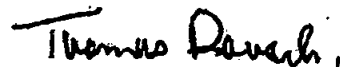
Lennox Well Lot "C" of Hill Addition, a subdivision of the East Half of the Northwest Quarter (E1/2NW1/4) of Section 12, Township 98 North, Range 51 West of the 5th P.M., Lincoln County, South Dakota according to the recorded plat thereof.

- ☒ I understand that the validity of Water Right/Permit No. 5326-3 has not been determined by this transfer action. If I have any questions on validity, I understand that only the Water Management Board has the authority to determine if a water right/permit is valid (see note below.)

You are requested to file this "Notice of Transfer" in the appropriate file with the Water Rights Program, as evidence of the change of ownership.

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I, South Lincoln RW, by Thomas Rausch, GM, the new owner, certify that the above information is true and correct.



(signed by new owner)

**NOTE:** Water permits may be cancelled for nonconstruction after the five year construction period has expired. Once a water permit is developed and the water used, the permit becomes a right. A water right may be lost for three reasons:

1. Abandonment - no intent to use water and use is abandoned.
2. Forfeiture - no use of water for three year period without legal excuse.
3. For a third violation of a condition of a water permit/right.

# RECEIPT

## WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date August 10, 2018

RECEIVED OF South Lincoln Rural Water System 28647 472nd Avenue Beresford SD 57004

The following amount in fees for services rendered as provided for by law:

|                                                                                                                |       |    |
|----------------------------------------------------------------------------------------------------------------|-------|----|
| Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use | 50    | 00 |
| Fee for Application for Permit No. _____ to Appropriate Water for Future use                                   |       |    |
| Fee to retain Future Use Permit No. _____ after period of seven years.                                         |       |    |
| Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____            |       |    |
| Fee for Filing Transfer Form <u>5326-3</u>                                                                     |       |    |
| Fee for _____                                                                                                  |       |    |
| Fee for Issuing New Well Driller's License No. _____ for C.Y. _____                                            |       |    |
| Fee for Renewal of Well Driller's License No. _____ for C.Y. _____                                             |       |    |
| Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____                                         | 50    | 00 |
| Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____                                      |       |    |
| (Any Other Work Provided by Law)                                                                               | TOTAL |    |

No. **08738**

By

Jeanne Goodman  
Chief Engineer  
Jm



DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

JOE FOSS BUILDING  
523 EAST CAPITOL  
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

August 10, 2018

South Lincoln Rural Water System Inc.  
c/o Thomas Rausch, Manager  
28647 472<sup>nd</sup> Ave  
Beresford SD 57004

Dear Mr. Rausch:

We have received the Transfer of Ownership forms for Water Right Nos. 5326-2, 5753-3 and 6778-3. The transfers have been completed and the water rights formerly listed in the name of the City of Lennox are now listed in the name of South Lincoln Rural Water System Inc. Enclosed are the receipts in the amount of \$50 each for filing the transfers.

As stated in your phone conversation with Eric Gronlund, enclosed are three applications to change the use from municipal to rural water system for each of the above listed water rights.

Please review each application for accuracy, sign and return. The application filing fee for each application will be \$100. You originally submitted a check for \$300. Each transfer required a \$50 fee (\$150 total for the three permits). The remainder (\$150) will be applied to the change of use applications. Please submit an additional \$150.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak  
Water Rights Program  
605 773-3352  
[karen.schlaak@state.sd.us](mailto:karen.schlaak@state.sd.us)

enclosures