

2870-3

1. Considered 9-29, 1976
2. Name of Applicant ROBERT J. BORCHARD
3. Post Office Address MANSFIELD
4. Amount of water claimed 2.28
5. Source of water supply 108' WELL
6. Water to be used for IRRIGATION  
Acres to be irrigated 240
7. Water to be diverted and used in BROWN County  
about 2N 2 1/2 W miles of MANSFIELD
8. Proof of Publication Received 9-15-76  
Not Received \_\_\_\_\_
9. Application Approved \_\_\_\_\_  
Subject to \_\_\_\_\_  
Not Approved \_\_\_\_\_  
Action deferred \_\_\_\_\_
10. Remarks:

No. 2204-3Map No. 2204-3 Water Division No. 3 JAMES RIVER District  
(Blanks to be filled by the Engineer for the W. R. C.)

## APPLICATION FOR PERMIT

## To Appropriate Water within the State of South Dakota

(NOTE - Draw a line through items not applicable.)

1. Name of Applicant Robert J. Borchard  
 Postoffice address Mansfield, State South Dakota 57460  
 If a corporation show date and place of incorporation \_\_\_\_\_  
 2. Method of accomplishing work (contract, employment of others, or by direct labor) Contract  
 3. Name of diversion work Robert J. Borchard Unit #1  
 4. Amount of water claimed (cubic feet per second) 2.28  
 5. Source of water supply Ground Water 74  
 6. Location of point of diversion A POINT IN THE NW 1/4 SECTION 25,  
T12N, R65W  
 \_\_\_\_\_ County Brown  
 7. Annual period or periods during which water is to be used March - November  
 8. Use to be made of water. (Irrigation, industrial, municipal, commercial, recreation, etc.) Irrigation  
 9. For irrigation use, \_\_\_\_\_ Total number of acres to be irrigated 240

List below each forty-acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each.

| Land Description        | No. Acres Irr. | Land Description        | No. Acres Irr. |
|-------------------------|----------------|-------------------------|----------------|
| SW 1/4 SW 1/4 24-121-65 | 40             | SW 1/4 NW 1/4 25-121-65 | 40             |
| SE 1/4 SE 1/4 24-121-65 | 40             | SE 1/4 NW 1/4 25-121-65 | 40             |
| NW 1/4 NW 1/4 25-121-65 | 40             |                         |                |
| NE 1/4 NW 1/4 25-121-65 | 40             |                         |                |

Attach sheet if more space is needed

10. Time required to complete construction of water supply system 5 years. Additional time required to complete application of water to the proposed beneficial use 2 years.  
 11. Choice of newspaper for Notice of Intent to Appropriate Water publication Aberdeen American News, Aberdeen, S.D.  
 12. Principal Features of the Proposed Water Supply System.

A. Works proposed to divert water from its natural source.

Pump Bowl

B. Works proposed to transport water to place of use.

Main Line

C. Works proposed to apply water to beneficial use.

Center Pivot

Estimated Total Cost \$ \_\_\_\_\_

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map.  
 (See instructions concerning preparation.)

STATE OF SOUTH DAKOTA )

County of Brown )

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

Signed Robert J. Borchard  
 Subscribed and sworn to before me this 12th day of August, 1976

L. J. S. Smith  
 Notary Public (or other qualified officer)

## WATER RIGHT APPLICATION APPROVAL

The Water Rights Commission hereby approves Water Right Application No. 2870-3ROBERT J. BORCHARD  
(Applicant)MANSEFIELD  
(Post Office Address)SOUTH DAKOTA 57460  
(State)

With the following modifications:

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

Date of first receipt of application AUGUST 10, 19 76

Date of return to applicant for correction, amendments or changes required \_\_\_\_\_, 19 \_\_\_\_\_

Date of receipt of corrected application AUGUST 20, 19 76Approved NOVEMBER 18, 19 76, Recorded in Book 116 Page 21WATER RIGHT PERMIT NO. 2870-3

The Water Rights Commission hereby grants and issues this Water Right Permit No. 2870-3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as modified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is AUGUST 10, 19 76
2. The equivalent of at least one-fifth of the work above specified is to be completed on or before MAY 18, 19 79
3. The whole of said work is to be completed on or before NOVEMBER 18, 19 81
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is NOVEMBER 18, 19 83
5. The water appropriated shall be used for the purpose of IRRIGATION

6. The prior right of all persons who, by compliance with the laws of the State of South Dakota, have acquired a right to the use of water must not be injuriously affected by this appropriation.

7. The amount of the appropriation herein granted shall not exceed 2.28 cubic feet per second; neither shall it exceed the capacity of the above described water supply system, nor shall it exceed the amount of water needed for beneficial uses served, and if for the irrigation purposes said appropriation must be limited to not more than 3 acre feet per acre per year and be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is actually and beneficially applied for irrigation on or before NOVEMBER 18, 19 83; said water to be used during the following described annual period: MARCH - NOVEMBER

Witness my hand this 23<sup>RD</sup> day of NOVEMBER, 19 76

WATER RIGHTS COMMISSION

By:

John Hatch  
Chief Engineer, Executive OfficerCertificate of Construction Issued January 26, 19 79Water License Issued January 26, 19 79

PAGE NO. 1

NW 25-121-65

July 8, 1976

10

|Karl Osberg

JOB NAME

### LOCATION

DATE \_\_\_\_\_

RIG NO.

FOREMAN

[illegible]

12 Principal Features of the Proposed Water Supply System (continued)

D Well Information or Estimates

(1) Drill Hole, Diameter 12", Depth 108'

(2) Casing, Type Steel Diameter 12' Thickness 1/2"  
(wood, concrete, steel, etc)

(3) Perforated Screen

Type \_\_\_\_\_, Diameter \_\_\_\_\_, Length \_\_\_\_\_

(4) Gravel Pack, Thickness \_\_\_\_\_, Length of gravel pack \_\_\_\_\_

E Dugout Information or Estimates

(1) Surface dimensions \_\_\_\_\_, Depth \_\_\_\_\_

F Fill out for Either a Well or a Dugout.

(1) Water Bearing Materials (Please attach a copy to test well log if available.)

Character of Water bearing materials Water Sample - sent to State University -  
Test Well Information Available at Huron Drilling, Inc., Huron, South  
Dakota - Drill Log Inclosed.

Depth to top of water bearing material 88'

Depth to bottom of water bearing material 108'

Thickness of water bearing material \_\_\_\_\_

Depth to water (ground surface to water level) \_\_\_\_\_

(2) Distance to nearest existing household or livestock watering wells.

On same owner's property 320 rds. On property owned by others 240 rds.

G. Water Storage Dams.

If the proposed water use system contains one or more water storage dams, please show in the space below, the height, maximum water depth, surface area and storage capacity of each storage dam. The location of each water storage dam should be shown on the water right map.

Robert J. Burkhard  
Signature of Applicant

July 30, 1976

Mr. Robert J. Borchard  
Mansfield, SD 57460

Dear Mr. Borchard:

I am enclosing the original copy of the report of analysis on water sample #76-803. This is yours to keep. Also enclosed you will find a copy of our AES publication #13 describing soil and water quality and some problems that arise in irrigation. On the outside back cover is a chart with the quality of this water for irrigation uses designated approximately by means of the red cross. As you will see, it is fairly good water.

Accordingly, there should be no specific chemical problems arise from the use of this water on the soils you propose to irrigate, with this exception. Those delineations or areas marked 2F2F2 in the soil map are very likely Tetonka-or Tetonka-Dudley soils which could have a claypan and thus would hold water up. Irrigation would very likely cause a rapid rise in water table in these areas and miring problems or salt or ponding, or all three of these problems could occur. Thus, I recommend you avoid irrigating these areas in some manner or other.

A copy of this letter is going to the State Conservation Commission along with the water analysis and the WI-1 form.

The enclosed receipt is for your payment. Thank you.

Sincerely yours,

*L. O. Fine*

L. O. Fine  
Water Quality Lab

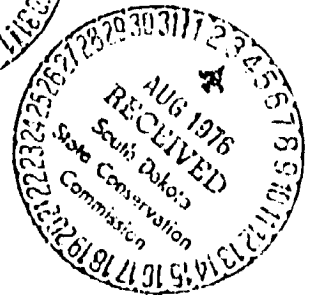
LOF:ckb

Enclosures

cc: State Conservation Commission

D. Pahl

Marvin DeHoogh, County Extension Agent





STATE CONSERVATION COMMISSION  
SUPPORTING INFORMATION  
FOR APPROPRIATION OF GROUND WATER IN ACCORDANCE  
WITH SDCL 46-6-3 AS AMENDED  
(THIS FORM REQUIRED FOR PROPOSED GROUND WATER IRRIGATION ONLY)

NAME ROBERT J. BORCHARD  
ADDRESS MANSFIELD S.DAK. 57450  
COUNTY BROWN

LEGAL DESCRIPTION

1. WELL LOCATION SE 1/4, S 1/2, T 2 N, R 12 W  
2. LOCATION OF AREA TO BE IRRIGATED SE 1/4, S 1/2, T 2 N, R 12 W

TYPE OF IRRIGATION

3. GRAVITY ☐ TOWLINE ☐ CENTER PIVOT ☒ GUN ☐  
4. CROPS TO BE IRRIGATED CORN - DLF

WATER QUALITY

5. SAMPLE NUMBER 76-808  
6. SALINITY (EC X 10<sup>6</sup>) 7.39 (medium)  
7. SODIUM (SAR) 1.77 (low)  
8. RESIDUAL SODIUM CARBONATE (meq/l.) 0

I do hereby certify that a chemical analysis of the ground water representative of that used to irrigate shall be acquired from South Dakota State University and: the soils information has been acquired from Conservation District, County Extension office or Soil Conservation Service.  
and:  
that the legal description for the location of the well and land to be irrigated is true and correct.

Robert J. Borchard  
APPLICANT'S SIGNATURE

SUBSCRIBED AND SWORN BEFORE ME THIS  
19 DAY OF July 1976.

L. B. Boman  
(TITLE OR SEAL)

Albert J. Stoffer  
APPROVED/DISAPPROVED

(SOILS INFORMATION ON REVERSE SIDE)

MAP

2M46  
2-1

2M46  
2-1

2M46  
2-1

2M46  
2-1

Sh. SW. 2-1  
121-65

NARRATIVE

2M46 2-1 - 121-65

2M46  
2-1

WILLIAMS LOAM

THIS SERIES CONSISTS OF DEEP, SLIGHTLY TO  
UNDULATING, WELL DRAINED LOAMY SOILS.

PERMEABILITY IS MODERATELY HIGH. WATER  
RETENTION IS HIGH. ORGANIC MATTER  
CONTENT IS MODERATE. FERTILITY IS GENERALLY  
MODERATE.

2M46  
2-1

POT HOLE S.

**REPORT OF ANALYSIS**  
**Water Quality Laboratory**  
**Water Resources Research Institute**  
**South Dakota State University**  
**Brookings, South Dakota 57006**

Submitted by: Robert Forehand  
 Address: Ensfield, SD 57560

Date Rec'd: July 13, 1976  
 Sample No. 76-808  
 Identification Well-  
511, Sec. 24, T 121N, R 65W

**WATER ANALYSIS**

|                                       |       |                             |      |           |
|---------------------------------------|-------|-----------------------------|------|-----------|
| Calcium (Ca)                          | 68    | ppm*                        | 3.40 | me/l**    |
| Magnesium (Mg)                        | 35    | ppm                         | 2.37 | me/l      |
| Sodium (Na)                           | 39    | ppm                         | 1.70 | me/l      |
| Potassium (K)                         | 14    | ppm                         | 0.56 | me/l      |
| Sulfate (SO <sub>4</sub> )            | 178   | ppm                         | 3.71 | me/l      |
| Nitrate (as N)                        |       | ppm                         |      | me/l      |
| Chloride (Cl)                         | 14    | ppm                         | 0.59 | me/l      |
| Bicarbonate (HCO <sub>3</sub> )       | 264   | ppm                         | 4.52 | me/l      |
| Carbonate (CO <sub>3</sub> )          |       | ppm                         |      | me/l      |
| Iron (Fe)                             |       | ppm                         |      | me/l      |
| Fluoride (F)                          |       | ppm                         |      | me/l      |
| Hardness (EDTA as CaCO <sub>3</sub> ) |       | ppm                         |      | g.p.g.*** |
| Alkalinity (Methyl Orange)            | 216   | ppm (as CaCO <sub>3</sub> ) |      |           |
| Alkalinity (Phenolphthalein)          | 0     | ppm (as CaCO <sub>3</sub> ) |      |           |
| Electrical Conductivity               | 739   | micromhos per cm at 25° C.  |      |           |
| Sodium Adsorption Ratio               | 1.77  |                             |      |           |
| Sodium                                | 20.40 | % of cations                |      |           |
| Residual sodium carbonate             | 0.00  | me/l                        |      |           |
| pH                                    | 7.99  |                             |      |           |

\*ppm=parts per million

\*\*me/l=millequivalents per liter

\*\*\*g.p.g.=grains per gallon

COMMENTS: Total cations 8.33 me/l  
 Total anions 8.42 me/l



By: Shirley Mitten

| Service Performed                                               | Amount Due         |
|-----------------------------------------------------------------|--------------------|
| Irrigation analysis                                             | 66.00 11.10        |
| Make checks payable to: Water Quality Laboratory                |                    |
| Cut along dotted line and return the lower portion with payment |                    |
| Sample No. <u>76-808</u>                                        | Amount Enclosed \$ |

Signed \_\_\_\_\_

WATER LICENSE NO. 2870-3

(1) WHEREAS, On the 10th day of August A. D. 1976 Robert J. Borchard

made Water Right Application No. 2870-3 for a permit to use 2.28 cubic feet per second of the waters of groundwater (one well) County of Brown, State of South Dakota, for irrigation

purposes; and (2) WHEREAS, On the 18th day of November A. D. 1976 Permit No. 2870-3, with a date of priority of August 10, 1976 was issued to said applicant for the diversion of said water, and provided for the completion of construction of the water supply system therein described on or before the 18th day of November A. D. 1981 and for the application to beneficial use of said water on or before the 18th day of November A. D. 1983

and:

(3) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to completion of the construction of the water supply system and is entitled to divert 2.0 cubic feet per second of water for beneficial use and,

(4) WHEREAS, It is hereby certified that the applicant has complied with the provisions of the laws of the State of South Dakota relating to the application of water to beneficial use of the following extent,

| to irrigate portions of the following land all in T12iN-R65W |         |  | Acres |
|--------------------------------------------------------------|---------|--|-------|
| Section 24                                                   | SW¼ SW¼ |  | 33    |
|                                                              | SE¼ SW¼ |  | 33    |
| Section 25                                                   | NW¼ NW¼ |  | 38    |
|                                                              | NE¼ NW¼ |  | 38    |
|                                                              | SW¼ NW¼ |  | 33    |
|                                                              | SE¼ NW¼ |  | 33    |
| total                                                        |         |  | 208   |

(5) NOW, THEREFORE, By the virtue of the authority vested in us by the laws of the State of South Dakota, We hereby grant and confirm to Robert J. Borchard

\_\_\_\_\_ of Mansfield, SD  
the holder \_\_\_\_\_ and owner \_\_\_\_\_ of said permit No. 2870-3 a water right, dating from August 10, 1976  
\_\_\_\_\_ to use of 2.0 cubic feet per second of the waters

of groundwater (one well)  
in the County of Brown and State of South Dakota, or so much thereof as may be necessary for the  
purposes hereinbelow mentioned, to be diverted at a point 250 ft North and 60 ft East of the  
SW Corner of Section 24-T121N-R65W

and conduct to and upon portions of Sections 24 and 25-T121N-R65W more fully  
described on the face of this license.

for the purpose of irrigation

Subject to any limitations listed in Water Right Permit No. 2870-3 and subject to the laws of the State of South Dakota.

WITNESS, My hand and seal of our office at Pierre, South Dakota  
this 26th day of January 31 A. D.  
Nineteen Hundred and Seventy-nine

WATER RIGHTS COMMISSION

By:

John Hatch  
Chief Engineer, Executive Officer JOHN HATCH

Permit No. 2870-3

Water Diversion No. 3 James River Water District

CERTIFICATE OF CONSTRUCTION

This is to Certify, That Robert J. Borchard

\_\_\_\_\_ the holder \_\_\_\_\_ of  
Permit No. 2870-3, issued upon Application No. 2870-3, bearing date of priority of August 10,  
1976 authorizing the diversion of 2.28 cu. ft. per second of the waters of \_\_\_\_\_  
groundwater (one well) County of Brown, State of South Dakota at \_\_\_\_\_  
a point 250 ft North and 60 ft East of the SW Corner of  
Section 24-T121N-R65W  
\_\_\_\_\_, for irrigation

\_\_\_\_\_ purposes, has \_\_\_\_\_ complied with the provisions of the laws of the State of South Dakota relating to proof of  
completion of the works of diversion set out and described in said Permit; that said works are found in satisfactory  
condition for diverting and conveying to the place of intended use 2.0 cu. ft. per second of water.

Date January 26, 1979

By: WATER RIGHTS COMMISSION  
John Hatch  
JOHN HATCH, Chief Engineer

No. 2870-3Publish first publication, on or before September 16, 1976NOTICE  
INTENT TO APPROPRIATE WATER

Pierre, South Dakota 57501

August 23, 1976Notice is hereby given that Robert J. Borchardwhose post office address is Mansfield, South Dakota, has made an application in accordance with the provisions of the water laws of South Dakota for a permit to appropriate for beneficial use 2.28 cubic feet of water per second of time from the ground waterBorchard Unit #1

the point of diversion of which is to be located in the

Borchard A. called 9-9-76Division Unit 1000000000NW 1/4SW 1/4 SW 1/4called Wadley's Utility 1000000000of Section 25-24, Twp. 121N, Range 65W. Said water to be used for the purpose 200

of providing irrigation on the following described land:

NW 1/4, Section 25; 3 1/2 SW 1/4, Section 24, T121N, R65WThis application No. 2870-3 will be considered by the Water Rights Commission at their office at Pierre upon the 29th day of September, 1976, at 10:00 A. M. All interested persons may appear and be heard.

WATER RIGHTS COMMISSION

By:

BURTON F. JONES  
Water Rights Specialist

BFJ/bw

cc:

Re Robert J. Borchard, Mansfield, S.D. 57460

Form 8 - Proof of Publication - Notice of  
Intent to Appropriate Water

No. 2870-3

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA )  
                                  ) ss.  
County Brown                  )

I, Dianne Brenden hereby  
certify that the annexed printed copy of Notice of Intent to Appropriate  
Water was taken from the Aberdeen American News

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 Aberdeen of \_\_\_\_\_

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

September 7, 1976

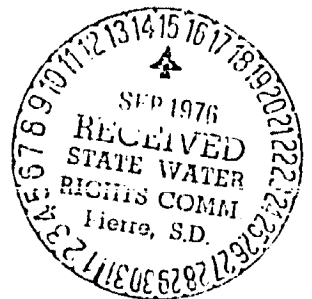
September 14, 1976

Dianne Brenden  
(Signature)

Principal Clerk  
(Title)

September 14, 1976  
(Date Signed)

(No. 688- Sept. 7-14-21)  
NOTICE  
INTENT TO APPROPRIATE WATER  
Notice is hereby given that Robert J.  
Borchard whose post office address is  
Mansfield, South Dakota, has made an  
application in accordance with the  
provisions of the water laws of South  
Dakota for a permit to appropriate for  
beneficial use 2.28 cubic feet of water per  
second of time from ground water  
through the Borchard Unit No. 1, the  
point of diversion of which is to be  
located in the NW¼ NW¼ of Section 25,  
Twp. 121N, Range 65W. Said water to be  
used for the purpose of providing  
irrigation on portions of the following  
described land: NW¼, Section 25, 5½  
SW¼, Section 24, T121N, R65W.  
This application No. 2870-3 will be  
considered by the Water Rights Com-  
mission at their office at Pierre upon the  
29th day of September, 1976, at 10:00  
A.M. All interested persons may appear  
and be heard.  
WATER RIGHTS COMMISSION  
By: BURTON F. JONES  
Water Rights Specialist



No. 2870-3Publish first publication, on or before September 16, 1976NOTICE  
INTENT TO APPROPRIATE WATER

Pierre, South Dakota 57501

August 23, 1976Notice is hereby given that Robert J. Borchardwhose post office address is Mansfield, South Dakota, has made an application in accordance with the provisions of the water laws of South Dakota for a permit to appropriate for beneficial use ground water2.28 cubic feet of water per second of time from the the through theBorchard Unit #1, the point of diversion of which is to be located in the NW 1/4 NW 1/4 SW 1/4 SW 1/4of Section 25 24, Twp. 121N, Range 65W. Said water to be used for the purpose

of providing irrigation on the following described land:

NW 1/4, Section 25; S 1/2 SW 1/4, Section 24, T121N, R65WThis application No. 2870-3 will be considered by the Water Rights Commission at their office atPierre upon the 29th day of September, 1976, at 10:00 A. M. All interested persons may appear and be heard.

WATER RIGHTS COMMISSION

By:

Burton F. Jones  
BURTON F. JONES  
Water Rights Specialist

BFJ/Lw

cc:

Re Robert J. Borchard, Mansfield, S.D. 57460

September 30, 1976

Carl Osberg  
Huron Drilling  
Huron, South Dakota 57350

Dear Carl:

This letter follows our telephone conversation of yesterday in which we discussed the pumping of high capacity irrigation wells and the corresponding effect on ground water levels at some distance from the center of pumpage.

In order to demonstrate clearly the effect of long term pumping, we have prepared distance drawdown graphs which show the drawdown which would be caused by an irrigation well pumped at a rate of 1,000 gpm. Copies of these graphs are enclosed with this letter.

In preparing this information, we have assumed aquifer coefficients which are very likely typical of the middle James aquifer based upon pumping tests information you supplied. The coefficients used in preparing our data include a storage coefficient value of .0005 and a transmissivity value of 90,000 gallons per day per foot. (In actual fact, the aquifer in question probably has a higher transmissivity than 90,000 which means that the actual drawdown values would be even less than those shown on the enclosed graphs.)

One of the lines on the graph shows drawdowns which would be expected after one day of continuous pumping at 1,000 gpm. The other line shows drawdown values after 30 days of continuous pumping.

As you can see, after 30 days of continuous pumping, the cone of influence extends to a distance of about 40,000 ft or 7-1/2 miles from the pumped well. Also, you can see that at a distance of 5,000 ft from the pumped well (about one mile) the drawdown after 30 days of continuous pumping is slightly greater than 5 ft.



Universal Oil Products Company

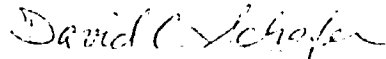
Carl Osberg  
Huron Drilling  
September 30, 1976

- 2 -

I should mention that the theory which is used in generating graphs such as these assumes that the aquifer is infinite in areal extent. Although that condition can obviously never be met in practice, the aquifer in question is sufficiently large that the errors resulting from this theoretical assumption are reasonably small.

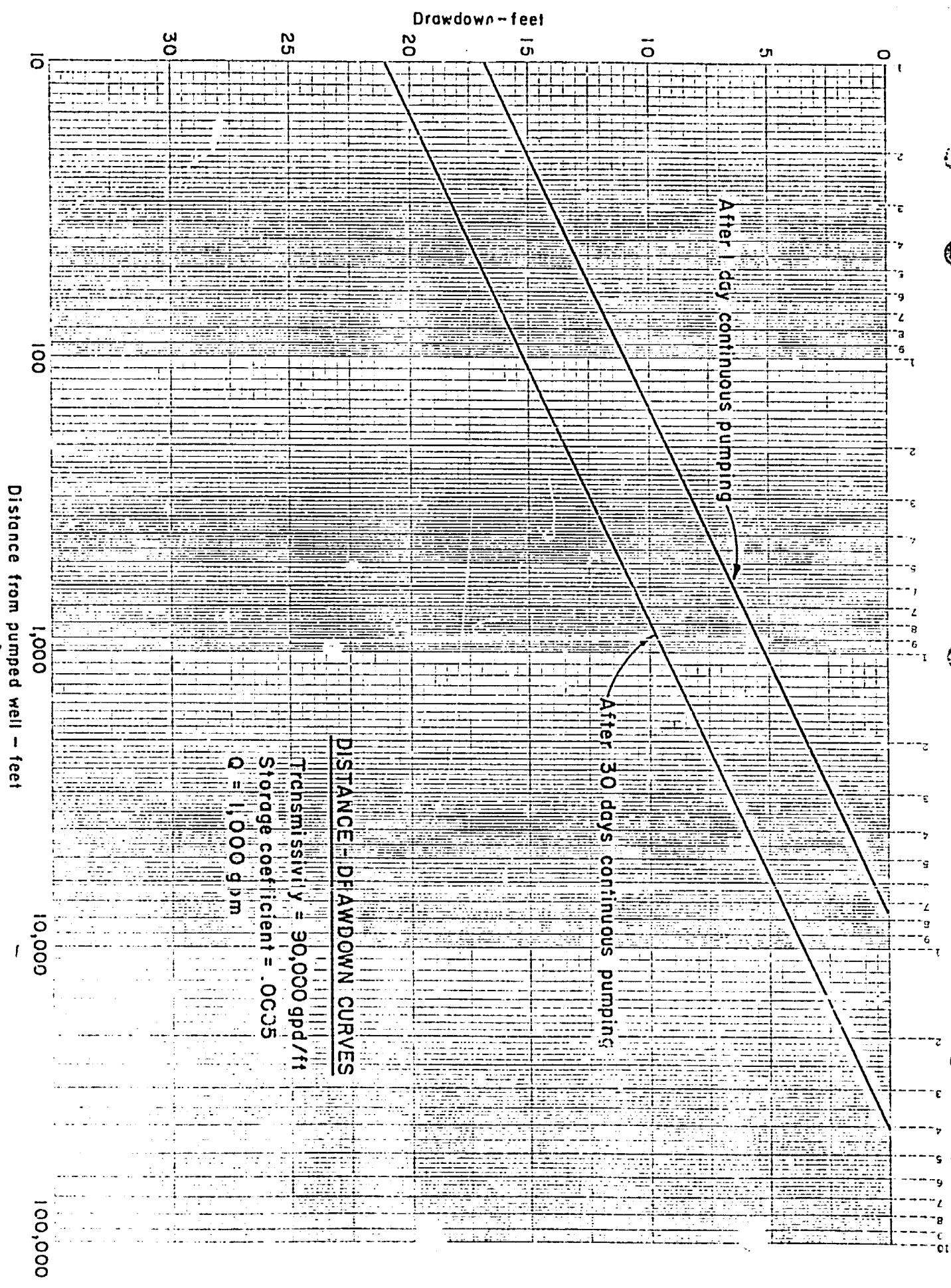
Carl, after studying and reviewing the enclosed graphs, if you have any further questions about them, please call me.

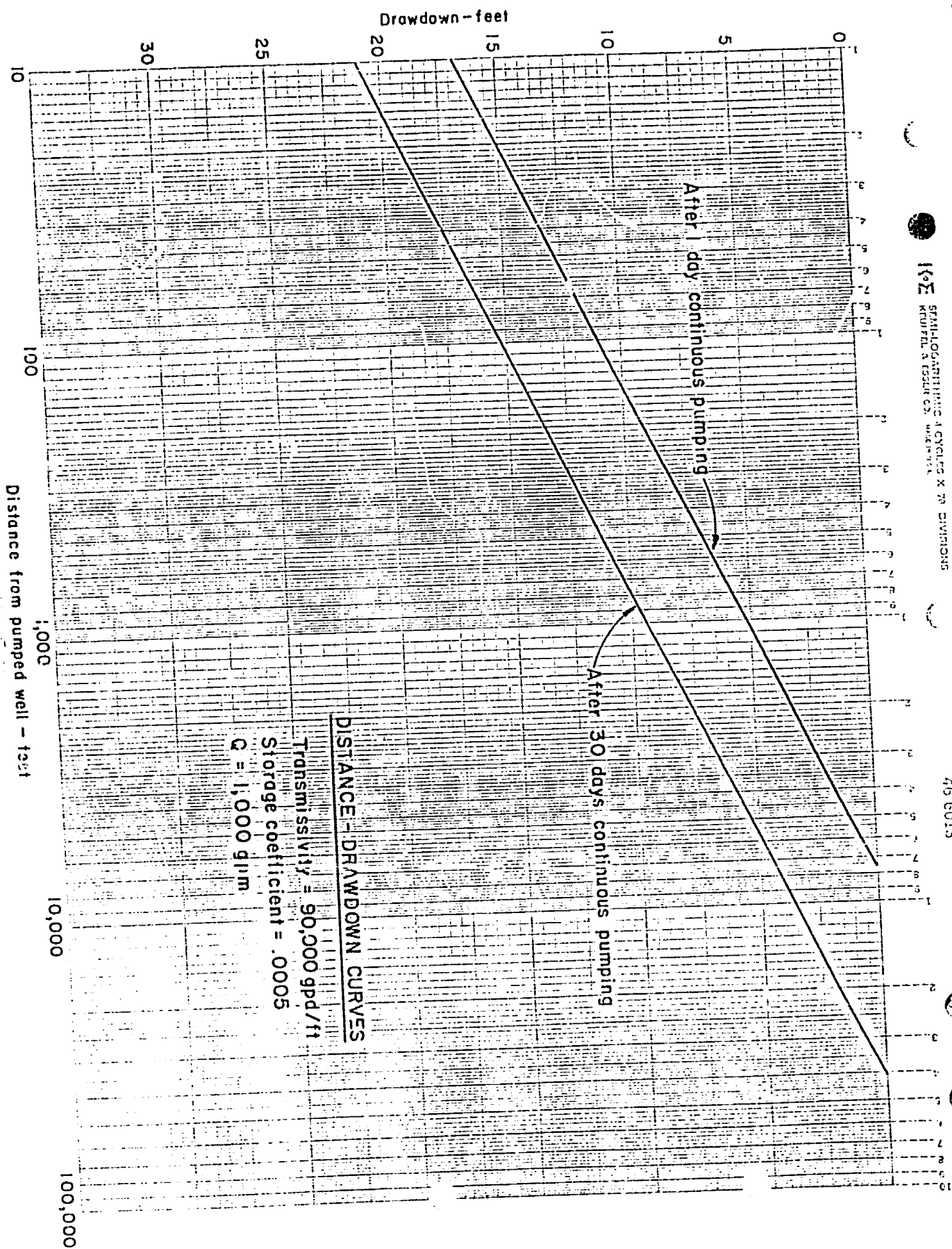
Very truly yours,



David C. Schafer  
Regional Sales Manager  
Hydrologist

DCS:DM





# Charted Here Minute

100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500

90'

80'

70'

60'

50'

40'

30'

20'

10'

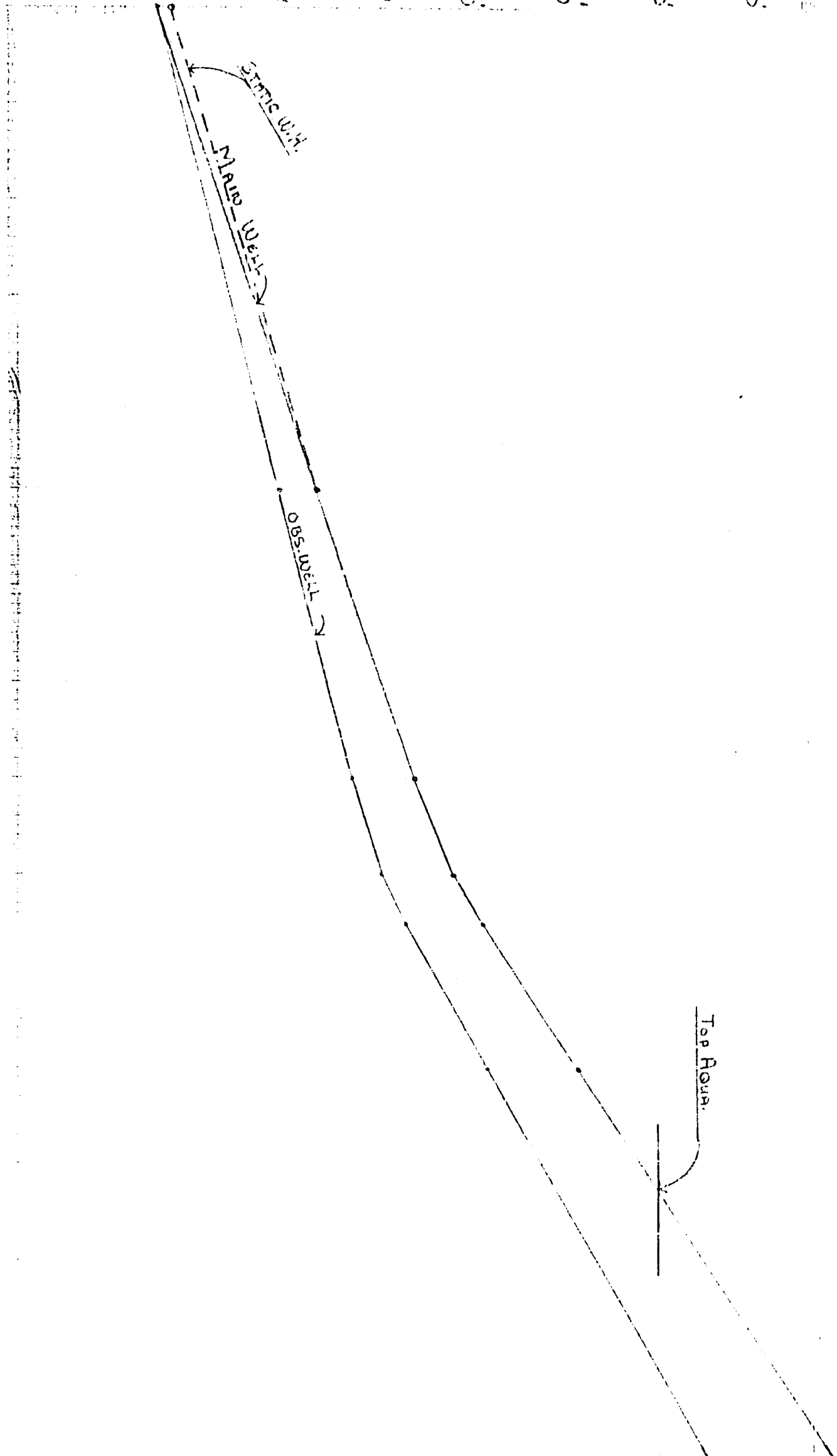
SIMPLE W.H.

MAIN WELL

OBS. WELL

Top House

Chart Depth : 120



# FIELD PUMPING TEST Water Level Data Elements

Well No. #1

Location: Robert J. Borchard

Date: Sept. 21, 1976

5" Orifice - 8" Pipe - 4" Test Hole - 15" Main

By: Wayne Pfeifer

| TIME OF MEASUREMENT | ELAPSED TIME - MINUTES | WATER LEVEL FEET | SETTLED POINT, INCHES | DIFF. LIV. OF PAPER INCHES | DEPTH OF WATER FEET | DIFF. POINT FEET | FLOW RATE GPM | REMARKS |
|---------------------|------------------------|------------------|-----------------------|----------------------------|---------------------|------------------|---------------|---------|
| 12:00               | 1 Hr. Rawhide          |                  | 29'6"                 |                            | 30'6"               |                  |               |         |
| 1:15                |                        |                  | 40'3"                 |                            | 43' 1/2"            |                  | 500           | Clear   |
| 1:30                |                        |                  | 41'3"                 |                            | 45'                 |                  | 500           | Clear   |
| 1:45                |                        |                  | 47'8"                 |                            | 54'                 |                  | 800           | Clear   |
| 2:00                |                        |                  | 48'8"                 |                            | 55'                 |                  | 800           | Clear   |
| 2:15                |                        |                  | 51'11"                |                            | 59'                 |                  | 900           | Clear   |
| 2:30                |                        |                  | 54'                   |                            | 62'                 |                  | 950           | Clear   |
| 2:45                |                        |                  | 54'11"                |                            | 62'9"               |                  | 950           | Clear   |
| 3:00                |                        |                  | 57'7"                 |                            | 66'1"               |                  | 1100          | Clear   |
| 3:15                |                        |                  | 61'6"                 |                            | 72'                 |                  | 1100          | Cloudy  |
| 3:30                |                        |                  | 62'3"                 |                            | 72'                 |                  | 1100          | Cloudy  |
| 4:30                |                        |                  | 61'                   |                            | 73'                 |                  | 1100          | Dirty   |
| 4:55                |                        |                  | 61'7"                 |                            | 73'                 |                  | 1100          | Cloudy  |
| 5:30                |                        |                  | 62'10"                |                            | 73'                 |                  | 1100          | Cloudy  |
| 6:00                |                        |                  | 64'                   |                            | 73'                 |                  | 1100          | Cloudy  |
| 6:30                |                        |                  | 64'10"                |                            | 73'                 |                  | 1100          | Cloudy  |
| 7:00                |                        |                  | 65'6"                 |                            | 73'                 |                  | 1100          | Clear   |
| 7:30                |                        |                  | 66'1"                 |                            | 73'                 |                  | 1100          | Clear   |
| 8:00                |                        |                  | 66'7"                 |                            | 73'                 |                  | 1100          | Clear   |
| 8:20                |                        |                  | 67'                   |                            | 73'                 |                  | 1100          | Clear   |
|                     |                        |                  | 1/2 Hr. recovery      |                            | 35'                 |                  |               |         |

14' from 4" Test Hole to 15" Main

# HURON DRILLING 'C. DRILLERS LOG

**PAGE NO.**

| Robert Borchard<br>JOB NAME |         | S.W. 1/4-24-121-65-Brown<br>LOCATIONCounty | 9/15/76<br>DATE                                                      | 14<br>RIG NO. | Russell<br>Rasmussen<br>FOREMAN |
|-----------------------------|---------|--------------------------------------------|----------------------------------------------------------------------|---------------|---------------------------------|
| Jt<br>No.                   | DEPTH   | TIME                                       | REMARKS                                                              |               |                                 |
|                             | 0-10    | 4:30                                       | Top soil, sandy yellow clay-Rocks.                                   |               |                                 |
|                             | 10-20   | 5:30                                       | 10-15 Sandy yellow clay, few rocks, 15-20 Fine yellow and blue sand. |               |                                 |
|                             | 20-30   | 6:00                                       | Fine yellow and blue sand.                                           |               |                                 |
|                             | 30-40   | 6:30                                       | 30-37 Fine yellow and blue sand with traces of coal and blue clay    |               |                                 |
|                             |         |                                            | 37-40 Blue clay.                                                     |               |                                 |
|                             | 40-50   | 7:30                                       | Blue clay, traces of sand and gravel.                                |               |                                 |
|                             | 50-60   | 8:30                                       | Blue clay, traces of sand and gravel, some coal.                     |               |                                 |
|                             | 60-70   | 9:30                                       | Blue clay, traces of sand and gravel.                                |               |                                 |
|                             | 70-80   | 10:30                                      | 70-75 Blue clay traces of sand and gravel.                           |               |                                 |
|                             |         |                                            | 75-78 Fine blue sand and gravel with coal, 78-80 coal                |               |                                 |
|                             | 80-90   | 12:00                                      | 80-85 Very coarse sand and gravel, 85-90 fine blue sand              |               |                                 |
|                             | 90-100  | 2:30                                       | Very coarse sand some gravel.                                        |               |                                 |
|                             | 100-110 | 4:00                                       | Very coarse sand some gravel.                                        |               |                                 |
|                             | 110-120 | 5:45                                       | 110-115 very coarse sand some gravel.                                |               |                                 |
|                             |         |                                            | 115-120 Very coarse sand and gravel-Rocks                            |               |                                 |
|                             |         |                                            | 120-122 Coarse sand and gravel with blue clay                        |               |                                 |
|                             |         |                                            | TD-120 Ft.                                                           |               |                                 |
|                             |         |                                            | 40 Ft.-Stainless Steel Screen 100 Slot                               |               |                                 |
|                             |         |                                            | 80 Ft. PVC Plastic                                                   |               |                                 |
|                             |         |                                            | 30 Tons of Gravel                                                    |               |                                 |
|                             |         |                                            | 3 days                                                               |               |                                 |
|                             |         |                                            | Production Well                                                      |               |                                 |

# DRILLING INC. DRILLERS LOG

PAGE NO. 1

Robert Borchard  
JOB NAME

SW 24-121-65-Brown  
LOCATION

8/16/76  
DATE

15  
RIG NO

Everett Lodmel  
FOREMAN

| JS | DEPTH   | TIME | REMARKS                                                             |
|----|---------|------|---------------------------------------------------------------------|
|    |         |      | Test Hole #1                                                        |
| 1  | 0-20    |      | 0-2 Topsoil, 2-15 Sandy Yellow Clay, 15-20 Yellow Gravel, Blue Clay |
| 2  | 20-35   |      | Fine Blue Sand w/Blue Clay Streaks                                  |
| 3  | 35-50   |      | 35-Blue Clay                                                        |
| 4  | 50-65   |      | Sandy Soft Blue Clay                                                |
| 5  | 65-80   |      | Soft Blue Clay & Sand Streaks                                       |
| 6  | 80-95   |      | Fine Blue Sand, Blue Clay Streaks                                   |
| 7  | 95-110  |      | 80-85 Blue Clay, 83-90 coarse Sand & Gravel, 90-95 Blue Clay        |
| 8  | 110-125 |      | Blue Clay                                                           |
| 9  | 125-140 | TD   | Blue Clay w/Gravel Streaks                                          |
|    |         |      | 125-128 Blue Clay, 128-140 Shale                                    |

|    |         |    |                                                                                                                                                  |
|----|---------|----|--------------------------------------------------------------------------------------------------------------------------------------------------|
|    |         |    | Test Hole #2 (Southwest)                                                                                                                         |
| 1  | 0-20    |    | 0-2 Topsoil, 2-10 Sandy Yellow Clay, 10-15 Sandy Yellow Clay, Traces of Blue Clay, 10-20 Yellow Clay, Traces of Blue Clay, Yellow Gravel Streaks |
| 2  | 20-35   |    | Very Fine Yellow & Blue Sand, Traces of Yellow Clay                                                                                              |
| 3  | 35-50   |    | Blue Clay, Small Sand & Gravel Streaks, Rock @45'                                                                                                |
| 4  | 50-65   |    | Blue Clay, Small Sand & Gravel Streaks                                                                                                           |
| 5  | 65-80   |    | Blue Clay w/Coarse Sand (77-80)                                                                                                                  |
| 6  | 80-95   |    | 80-87 Blue Clay, 88-95 Coarse Sand & Gravel, Small Clay Streaks                                                                                  |
| 7  | 95-110  |    | Traces of Coal, Poor Water Loss                                                                                                                  |
| 8  | 110-125 |    | Coarse Sand & Gravel, Coal, Fair Water Loss                                                                                                      |
| 9  | 125-140 |    | 110-118 Coarse Sand & Gravel, 112-125 Blue Clay                                                                                                  |
| 10 | 140-155 | TD | Blue Clay, Gravel Streaks                                                                                                                        |
|    |         |    | 140-150 Blue Clay, 150-155 Shale                                                                                                                 |

Bits: 1 Used 5" Retip, 1 Used 7 7/8" Retip

Cased 4" Plastic to 120'

40' Slotted Bottom

80' Blank

Pumped 100 GPM

2000 # Pea Rock

Waterhead - 30'

Test Holes

JCH

# FIELD PUMPING TEST Water Level Measure. 15

Well No. #1

Location: Myron Jeschke  
Date: 9/23/76

Wayne Pfeifer

| 5" Office 8" Pipe           |                              | 4"                     |                            | 15"                                   |                           | PUMP<br>DOSE<br>FEET | PUMP-<br>ING<br>RATE<br>GPM | REMARKS |
|-----------------------------|------------------------------|------------------------|----------------------------|---------------------------------------|---------------------------|----------------------|-----------------------------|---------|
| TIME OF<br>MEASURE-<br>MENT | ELAPSED<br>TIME -<br>MINUTES | WATER<br>LEVEL<br>FEET | SETTLED<br>PORT.<br>INCHES | WATER<br>LEVEL OF<br>PARKER<br>INCHES | DEPTH<br>OF WATER<br>FEET |                      |                             |         |
| 11:30                       | Start                        |                        | 32                         |                                       | 34                        |                      |                             |         |
| 11:45                       | 15                           |                        | 41"                        |                                       | 53'                       |                      | 1150                        | Clear   |
| 12:00                       | 15                           |                        | 42 1/2"                    |                                       | 35'                       |                      | 1150                        | Clear   |
| 12:15                       | 15                           |                        | 43"                        |                                       | 55 1/2'                   |                      | 1150                        | Clear   |
| 12:30                       | 15                           |                        | 43 1/2"                    |                                       | 56'                       |                      | 1150                        | Clear   |
| 12:45                       | 15                           |                        | 44"                        |                                       | 56 1/2'                   |                      | 1150                        | Clear   |
| 1:00                        | 15                           |                        | 44 1/2"                    |                                       | 57'                       |                      | 1150                        | Clear   |
| 1:30                        | 30                           |                        | 45"                        |                                       | 57 1/2'                   |                      | 1150                        | Clear   |
| 2:00                        | 45 1/2                       |                        | 45 1/2"                    |                                       | 58'                       |                      | 1150                        | Clear   |
| 2:30                        | 30                           |                        | 46"                        |                                       | 59'                       |                      | 1150                        | Clear   |
| 3:00                        | 30                           |                        | 47"                        |                                       | 59'                       |                      | 1150                        | Clear   |
| 3:30                        | 30                           |                        | 47"                        |                                       | 59 1/2'                   |                      | 1150                        | Clear   |
| 4:00                        | 30                           |                        | 47"                        |                                       | 60'                       |                      | 1150                        | Clear   |
| 4:30                        | 30                           |                        | 47 1/2"                    |                                       | 60'                       |                      | 1150                        | Clear   |
| 5:00                        | 30                           |                        | 48"                        |                                       | 60'                       |                      | 1150                        | Clear   |
| 5:30                        | 30                           |                        | 48"                        |                                       | 60' - 4"                  |                      | 1150                        | Clear   |
| 6:00 PM                     | 30                           |                        | 48"                        |                                       | 60' - 5 1/2"              |                      | 1150                        | Clear   |
| 10:00 AM                    |                              |                        | 51'                        |                                       | 63"                       |                      | 1150                        | Clear   |
|                             |                              |                        | 1/2 Hr. Recovery           |                                       | 71'                       |                      |                             |         |
|                             |                              |                        |                            |                                       |                           |                      |                             |         |
|                             |                              |                        |                            |                                       |                           |                      |                             |         |
|                             |                              |                        |                            |                                       |                           |                      |                             |         |

25 1/2 Ft. from the 4" Test Hole

PAGE NO.

SY-8-120-65-Spink  
LOCATION County

9/20/76  
DATE

14  
RIG NO.

Russell  
Rasmussen  
FOREMAN

| Jt<br>No. | DEPTH   | TIME   | REMARKS                                                                                                                                                                   |
|-----------|---------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | 0-10    | 11:30  | 0-4 Top soi, 4-10 Yellow clay, gravel small rocks.                                                                                                                        |
|           | 10-20   | 1:30   | Yellow clay, gravel, small rock, some blue clay.                                                                                                                          |
|           | 20-30   | 2:15   | Blue clay, w/traces of dark brown clay & gravel.                                                                                                                          |
|           | 30-40   | 3:15   | Blue clay, w/traces of gravel streaks and coal.                                                                                                                           |
|           | 40-50   | 4:00   | Blue clay, w/traces of gravel streaks and small rocks.                                                                                                                    |
|           | 50-60   | 4:30   | Blue clay, w/traces of gravel.                                                                                                                                            |
|           | 60-70   | 5:00   | Blue clay, some fine sand.                                                                                                                                                |
|           | 70-80   | 5:30   | 70-75 Blue clay, some fine sand, 75-80 fine sand w/coarse blue sand & coal.                                                                                               |
|           | 80-90   | 8:30   | Blue sand, some fine sand good streaks of coal                                                                                                                            |
|           | 90-100  | 9:00   | 90-95 Coal, fine sand, traces of blue clay.<br>95-100 Good Sand.                                                                                                          |
|           | 100-110 | 9:30   | 100-103 Good sand, 103-110 good coarse sand some gravel.                                                                                                                  |
|           | 110-120 | 10:30  | Good coarse sand more gravel.                                                                                                                                             |
|           | 120-130 | 11:00  | 120-122 Good coarse sand and gravel,-, 122-130 Fine sand and coal.                                                                                                        |
|           | 130-140 | 11:30  | 130-139 coal, fine sand some coarse sand and gravel<br>139-140 Coal some good sand                                                                                        |
|           | 140-150 | 12:30  | Coarse sand and gravel, small traces of blue clay.                                                                                                                        |
|           | 150-160 | 3:00   | Coarse sand and gravel, small traces of blue clay.                                                                                                                        |
|           | 160-170 | 4:00   | 160-165 Coarse sand and gravel small traces of blue clay.<br>165-170 Coarse sand , coal, some gravel traces, blue clay.                                                   |
|           | 170-174 | TD 172 | TD 172 170-172 Coarse sand, 172-174 Blue clay (Shale) W.H. 35 Ft.<br>40 Ft. Stainless steel screen<br>132 Ft. PVC Plastic Blank<br>3 loads of gravel<br>9/20/76---9/23/76 |
|           |         |        | <i>Production Well</i>                                                                                                                                                    |

# HURON DRILLING INC. DRILLERS LOG

PAGE NO. 1

Myron Jeschke  
JOB NAME

S $\frac{1}{2}$  8-120-65 Spink  
LOCATION

8/17/76  
DATE

15  
RIG NO

Everett Lodmel  
FOREMAN

| JL No. | DEPTH   | TIME | REMARKS                                                                     |
|--------|---------|------|-----------------------------------------------------------------------------|
|        |         |      | Test Hole #1 (110 Feet South-Little West of Hole Bonanza Dug-30' Gravel)    |
| 1      | 0-20    |      | 0-2 Topsoil, 2-15 Sandy Yellow Clay, 15-20 Sandy Blue Clay                  |
| 2      | 20-35   |      | Blue Clay                                                                   |
| 3      | 35-50   |      | Blue Clay & Sand Streaks                                                    |
| 4      | 50-65   |      | 50-53 Blue Clay, 53-60 Sand & Gravel, 60-65 Blue Clay, Sand Streaks         |
| 5      | 65-80   |      | 65-75 Blue Clay, 75-80 Blue Clay w/Sand Streaks                             |
| 6      | 80-95   |      | Fine Blue Sand w/Small Clay Streak (Coal)                                   |
| 7      | 95-110  |      | Fine & Medium Sand, Coal                                                    |
| 8      | 110-125 |      | Fine Sand, Traces of Blue Clay                                              |
| 9      | 125-140 | TD   | 125-127 Coarse Sand, 127-140 Blue Clay                                      |
|        |         |      | Test Hole #2                                                                |
| 1      | 0-20    |      | 0-2 Topsoil, 2-15 Sandy Yellow Clay, 15-20 Dark Brown Clay w/Gravel Streaks |
| 2      | 20-35   |      | Dark Brown, Blue Clay w/Sand Streaks (Yellow)                               |
| 3      | 35-50   |      | Blue Clay & Sand Streaks                                                    |
| 4      | 50-65   |      | 50-54 Blue Clay, 54-65 Sand & Gravel, Good Water Loss                       |
| 5      | 65-80   |      | 65-71 Blue Clay, 71-80 Fine Blue Sand & Blue Clay                           |
| 6      | 80-95   |      | Fine Blue Sand & Blue Clay                                                  |
| 7      | 95-110  |      | 95-105 Fine Blue Sand, 105-110 Coarse Sand & Coal Straks                    |
| 8      | 110-125 |      | Coarse Sand & Gravel, Coal, Good Water Loss (Coal)                          |
| 9      | 125-140 |      | 125-135 Coarse Sand & Gravel, 135-140 Fine & Medium Sand                    |
| 10     | 140-155 | TD   | Fine & Medium Sand w/Blue Clay                                              |
|        |         |      | Test Hole #3                                                                |
| 1      | 0-20    |      | 0-2 Topsoil, 2-15 Sandy Yellow Clay, 15-20 Blue Clay                        |
| 2      | 20-35   |      | Blue Clay, Small Sand Streaks                                               |
| 3      | 35-50   |      | 35-46 Blue Clay 46-48 Sand, 48-50 Blue Clay                                 |
| 4      | 50-65   |      | 50-63 Blue Clay, 63-65 Sand                                                 |
| 5      | 65-80   |      | Fine Blue Sand w/Clay                                                       |
| 6      | 80-95   |      | Fine Blue Sand, Traces of Blue Clay                                         |
| 7      | 95-110  |      | 95-105 Fine Blue Sand, 105-110 Sand & Gravel                                |
| 8      | 110-125 |      | Coarse Sand & Gravel, Coal, Good Water Loss                                 |
| 9      | 125-140 |      | Coarse Sand & Gravel                                                        |
| 10     | 140-155 |      | Coarse Sand & Gravel, 150-155 Clay & Gravel Streaks                         |
| 11     | 155-170 | TD   | 155-159 Blue Clay, 159-170 Shale                                            |
|        |         |      | Cased Hole #3 For Supply Well                                               |
|        |         |      | Cased to 154'                                                               |
|        |         |      | 40' Slotted Bottom, 114' Blank, 4" Plastic                                  |
|        |         |      | 2000# Pea Rock                                                              |
|        |         |      | 1-5" Retip Drag Bit                                                         |
|        |         |      | 1- Used 7 7/8" Bit                                                          |
|        |         |      | Pumped 100 GPM                                                              |
|        |         |      | Waterhead - 35'                                                             |

JCH

Stated by Bill Rieken Aberdeen SD  
ON Bob Borchard's Request for water  
permit. (2870-3)

I would like to testify today  
in support of Bob Borchard's application.  
I am Executive Secretary of Friends of  
Oake which is in support of the  
Oake Project. We also support any  
private irrigation development in  
the area.

I am not here today to testify  
on the adequacy or inadequacy of  
Mr Borchard's supply, but rather  
to dispel rumors that we are opposed  
to his application.

We feel that Mr Borchard  
will become an Ambassador of the  
Project if he is able to get his  
irrigation efforts operational. It  
will do the project much good to  
have more people irrigating within  
the project area.

Thank you for the opportunity  
to testify today

Bill Rieken  
Aberdeen S.DAK  
Ex. Sec. Friends of Oake



# Department of Natural Resource Development

## WATER RIGHTS COMMISSION

Joe Foss Building, Pierre, South Dakota 57501

Phone 605/224-3151

November 10, 1976

Larry Krause  
Mansfield, S.D. 57460

Lyle Bierman  
Mansfield, S.D. 57460

Re: 2867-3  
2870-3 ✓  
2964-3  
3031-3

Robert Borchard  
Mansfield, S.D. 57460

Aaron Bade  
Rt. 1  
Chelsea, S.D. 57431

Gentlemen:

Deferred Water Right Applications No. 2867-3, No. 2870-3, No. 2964-3 and No. 3031-3 will be reconsidered by the Water Rights Commission during their November 16, 17 and 18, 1976 meeting, at 9:00 a.m. November 18, 1976. A copy of the "Report on Water Rights Applications into Middle James Aquifer, Southwest Brown County and Northwest Spink County" is enclosed for your information. Any comments concerning these applications can be presented at this hearing.

The Commission will be meeting in the Marvin Hughitt Hotel Ballroom, Huron. Applications No. 3130-3, Otto Krause; No. 3171-3, Jerald J. & Dennis L. Kamen; and No. 3187-3, Boekelheide Farms will also be considered at 9:00 a.m., November 18, 1976 rather than the advertised 10:00 a.m. November 17, 1976 time. Please advise, if you have any questions concerning the hearings.

Very truly yours,

*John Hatch*  
John Hatch, Chief Engineer  
Water Rights Commission

JH/cb

cc: Otto Krause  
Jerald & Dennis Kamen  
Boekelheide Farms  
Arnold Ristau  
Marvin Ristau

Enclosures

REPORT ON  
WATER RIGHTS APPLICATIONS INTO MIDDLE JAMES AQUIFER, SOUTHWEST  
BROWN COUNTY AND NORTHWEST SPINK COUNTY  
NOVEMBER 3, 1976

The Water Rights Commission has considered five Water Rights Applications for the Middle James Aquifer in southwest Brown County and northwest Spink County. The applications were considered at either the September 29-30, 1976 or October 21-22, 1976 Commission Meetings. Three additional applications are advertised for the November 17-18, 1976 meeting. An investigation was conducted in the area October 26, 1976.

Applications

The following table lists the area Water Right Applications in the Middle James Aquifer. The actual project locations are shown on the Attachment.

| <u>Number</u> | <u>Name</u>                    | <u>Priority<br/>Date</u> | <u>CFS</u> | <u>Acres</u> | <u>Well<br/>Depth</u> | <u>Status</u>                                                 |
|---------------|--------------------------------|--------------------------|------------|--------------|-----------------------|---------------------------------------------------------------|
| 2894-3        | Myron Jeschke                  | 7-21-76                  | 2.20       | 160          | 140'                  | App. 9-29-76                                                  |
| 2867-3        | Larry Krause                   | 7-27-76                  | 9.07       | 635          | 151' &<br>165         | App. 4.0 cfs<br>Deferred<br>9-29-76                           |
| 2870-3        | Robert Borchard                | 8-10-76                  | 2.28       | 240          | 108'                  | 5.07 cfs<br>Deferred<br>9-29-76                               |
| 2964-3        | Lyle Bierman                   | 8-26-76                  | 2.30       | 290          | 138'                  | Deferred<br>9-29-76                                           |
| 3031-3        | Aaron Bade                     | 9-8-76                   | 4.00       | 290          | 140'                  | Deferred<br>9-29-76                                           |
| 3130-3        | Otto Krause                    | 10-27-76                 | 6.6        | 464          | 2-170'                | Deferred<br>10-21-76<br>Advertised<br>for November<br>meeting |
| 3171-3        | Jerald J. &<br>Dennis L. Kamen | 10-21-76                 | 4.2        | 295          | 200'                  | Advertised<br>for November<br>meeting                         |
| 3187-3        | Boekelheide Farms              | 10-25-76                 | 4.0        | 290          | 160'                  | Advertised<br>for November<br>meeting                         |

Geology of the Area

Bulletin 25, "Geology and Water Resources of Brown County, South Dakota Part II, Water Resources", dated 1976 describes three major aquifers in

Brown County -the Elm, the Middle James and Deep James Aquifers.

The Elm Aquifer, a shallow aquifer, underlies about 390 square miles in Brown County and is under water table conditions in some areas and artesian conditions in others. In the western part of the Elm, it is under artesian conditions. There are about 1,200,000 acre feet of water in the Elm Aquifer. Water movement is from the northwest to the southeast. The natural discharge from the aquifer is into the Elm River, Foot Creek, into the atmosphere by evapotranspiration, through recharge to the Middle James Aquifer and by eastward flow into the Lacustrine deposits underlying the Lake Dakota Plain.

The Middle James Aquifer underlies about 530 square miles in Brown County. Water in the aquifer is under artesian conditions and moves in general from the west to the east. The Middle James in Brown County contains about 1,400,000 acre feet of water in storage.

Recharge is from percolation of snowmelt and precipitation through overlying lake silt, outwash and till. The largest recharge is from the Elm Aquifer where it is in contact with the Middle James. Water levels in the Middle James Aquifer rise in the spring and early summer when recharge from precipitation and snowmelt is greater than discharge. Natural discharge is by percolation into the Deep James Aquifer and by eastward flow into the Lake Dakota sediments and into till.

The Middle James Aquifer extends south into Spink County; however, since the County study has not been started in Spink County, only limited information is available beyond the County line. In Marshall County, the Middle James Aquifer and the Deep James Aquifer merge to become a single aquifer, the James Aquifer. In Marshall County, the James Aquifer underlies about 220 square miles of area and contains about 1,500,000 acre feet of water. The James Aquifer also extends into North Dakota and Day County.

#### Persons Contacted

Mr. and Mrs. Arnold Ristau, Ivie Bierman and Robert Borchard were contacted the day of the investigation.

#### Discussion

Mr. and Mrs. Ristau had indicated concern at the September 29 meeting that shallow domestic wells in the Elm Aquifer and dugouts would be affected by pumping from the deeper Middle James Aquifer.

There are only three known existing domestic wells into the Middle James Aquifer in this area. One owned by Mr. Borchard, the other by Mr. Bierman and the third by Mr. Howard Nelson. Three additional domestic wells were reported as planned for the Middle James Aquifer. Water development from the Middle James Aquifer in this area is unique in that the three

existing domestic wells have all been drilled since 1972 following the discovery of the Middle James Aquifer by the Geological Survey. Consequently, all wells are adequate wells or required to be. An adequate well in the Middle James artesian aquifer is defined as a well in which the pump intake is placed or is capable of being placed, at least 20 feet below the top of the Middle James artesian aquifer formation, aquifer depth permitting. Other domestic wells in the area are into the shallow Elm Aquifer or else were drilled down to the deeper Dakota formation.

Since development of the Middle James Aquifer is relatively new, we do not have the situation experienced in many other artesian aquifers in the State with inadequate wells. The Commission staff has not located any older inadequate domestic wells in the Middle James Aquifer.

At the October Meeting, the possibility of conducting a pump test using Mr. Borchard's irrigation well was discussed. However, upon investigation, it was determined that such a pump test with available domestic wells used as observation wells would be of little value. Since the existing or planned domestic wells are required to be adequate, the domestic wells would continue to supply water even though the artesian head may fluctuate due to the irrigation pumping. The U. S. Geological Survey has observation wells in the area which can be used to monitor water levels. One observation well on the Brown and Spink County line, in the southwest corner of Section 34-T121N-R65W can be checked for draw down. The water level at the time of the investigation was 26.5 feet. This observation well will be used to monitor irrigation pumping effects. Mr. Marvin Ristan, who also protested the granting of the Krause application at the September meeting, indicated he was concerned that since the Middle James receives part of its recharge from the Elm Aquifer that pumping from the Middle James would tend to lower the water levels of the Elm Aquifer. The Elm Aquifer will also be monitored for any effects of irrigation pumping from the Middle James. The total amount of water that would be withdrawn by all applications in a 90 day continuous pumping season each year would be 6184 acre feet. Although the extent of the Middle James in Spink County is not known, there is a large amount of water stored in the Middle James Aquifer just in Brown County.

Since the known domestic wells into the James Aquifer are new since 1972 and required to be adequate wells, the staff believes there should be no reason that all pending applications should not be granted, including the deferred portion of the Krause application.

The staff believes that additional permits can be granted in the future; however, until there is more irrigation pumping experience from the aquifer, the staff is recommending for at least one year that future irrigation wells be spaced at least one mile from existing irrigation wells. The Middle James Aquifer is an untapped and rather extensive water resource.

Recommendations

Based upon the Brown County study, there is unappropriated water available and the commission staff recommends that all pending applications No. 2867-3, 2870-3, 2964-3, 3031-3, 3130-3, 3171-3 and 3187-3 be approved with the following qualification:

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

John Hatch  
Chief Engineer

| Attachment |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 19 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |
| 13         | 18 | 17 | 16 | 15 | 14 | 13 | 18 |
| 24         | 19 | 20 | 21 | 22 | 23 | 24 | 19 |
| 25         | 30 | 29 | 28 | 27 | 26 | 25 | 30 |
| 36         | 31 | 32 | 33 | 34 | 35 | 36 | 31 |
| 1          | 6  | 5  | 4  | 3  | 2  | 1  | 6  |
| 12         | 7  | 8  | 9  | 10 | 11 | 12 | 7  |

November 17, 1976

S. D. Dept. of Natural Resource Development  
Water Rights Commission

Dear Sirs;

Due to lack of information on what will happen to the Middle James and Elm aquifers, when they are pumped for irrigation, I feel that no new water permits should be given in New Hope township. At least not until one or two years of experience are behind us.

We also would like to state that your investigation is not up to date. Since then four new wells for domestic use were placed in the Middle James aquifer. I dug one of them and will totally rely on it for livestock use.

We would like to remind you that there have been a large number of test wells dug in this area recently. Most of them had little or no water in them. There is not unlimited water in the aquifer.

Since you saw fit to reduce # 2867-3 Larry Krause's permit from 9.07 cfs to 4 cfs, and to deny # 2870-3 Robert Borchard's permit at your previous meeting, I only think that this action should stand for a minimum of one year. Permit # 3130-3 for Otto Krause deeply concerns me. One of his well sites is within  $\frac{1}{2}$  mile of two of my surface water fed dugouts. The other is  $\frac{1}{2}$  mile from one and  $\frac{3}{4}$  mile from the other one. They are both only one mile from my new five inch well into the Middle James Aquifer. I have a third dugout just  $\frac{1}{2}$  mile from these wells and 1 mile from Mr. Borchard's. There are surface fed. The reason for my concern for the dugouts is that the U. S. Dept. of Interior water survey well dug at T 121N, R 65W, sect. 15 BBBB contains 50 feet of water, but it has a definite hydraulic connection between the Elm and Middle James Aquifers. Therefore any water table drawdown in that area will directly lower my dugouts. This year a three foot low ring of the water table would have drained them. This would make that piece of land

useless to me for cattle grazing, and  $\frac{1}{2}$  of it is untillable. It has one dugout  $\frac{1}{4}$  mile for Mr. Krause's well in the SW $\frac{1}{4}$  of the section.

Thank you for your consideration, and I hope you will not approve permit #3130-3 or the other two mentioned permits for at least one year. If after that time the existing permit does not cause problems, than we will reconsider our opposition. There should not be more than one given the first year, and then others added slowly after that. If all are granted, they may pump us and themselves dry.

Thank you for your consideration,  
Sincerely,

*Marion R. R. R.*

No. 2870-3



NOTICE OF COMPLETION OF WORKS AND/OR  
APPLICATION OF WATER TO BENEFICIAL USE

Post Office Manfield S.D.

Date 20 April 1977

TO: Water Rights Commission  
Joe Foss Building  
Pierre, South Dakota 57501

Dear Sirs:

This is to inform you that I have completed the construction of the water diversion system and/or that I have put the water to beneficial use to the maximum extent it is going to be used, not exceeding the amounts as specified in Water Right Permit No. 2870-3

Water Right Permit No. 2870-3 states that the diversion system is to be constructed by Nov 18, 1981 and that the water is to be put to beneficial use by Nov 18, 1983.

The diversion system was completed on Dec 20, 1976.  
Applying the water to beneficial use was completed on April 14, 1977.

You may schedule an inspection so that the Certificate of Construction and/or the Water License may be issued, thus completing my acquisition of a water right.

Robert J. Borchard  
(Signature)

2870-3 - Robert B. B. B.  
8-22-78 Well depth 120 ft. from top of  
Pit 28 ft. 185' total  
Pumping 700 gpm, 1000  
2500. gpm  
Engine. 60 hp. 100' total  
120 hp.

Bump Logue Board  
No 25672314  
12 Kb - 5.

C.P. Valley River 10 miles  
Case 132 Ac.

Permit No. 2870-3Water Division 3 James River Water DistrictREPORT OF EXAMINATION OF WORKS  
AND/OR APPLICATION OF WATER TO BENEFICIAL USE

TO: Water Resources Commission, State Office Building No. 2, Pierre, South Dakota 57501

I have this day made a thorough examination of the water use system constructed by Robert J Berchard of Mansfield, South Dakota 57460 holder of Permit No. 2870-3, hearing date of priority of August 10, 1976 authorizing the diversion of 2.28 cu. ft. per second of the waters of one Well for Irrigation purposes, in Brown County.

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

The Water Use System consists of,

## A. Works used to divert the water:

Engine - 504 Case Diesel, 6 cyl, 120 HP.  
Pump - Lagne Bowler No 35672314, 12 RL-5  
Pumping 900 gpm

## B. Works used to transport water to place of use,

2600 ft 8" dia PVC pipe. 6 ft underground.

## C. Works used to apply water to beneficial use.

Valley Center Pivot - 16 tower

The system is in the following condition: GoodThe point of diversion is located 250' North and 60' E of the SW Corner of Section 24, T121N R65WThe works are capable of diverting and conveying to the place of use 2.0 cu. ft. per second of water which is to be used for Irrigation

Water has been put to beneficial use to the maximum extent as follows:

In Section 24, T121N R65W S1/4 S1/4 - 33 Ac.  
SE 1/4 S1/4 - 33 Ac. In Section 25, T121N R65W  
N1/4 N1/4 - 38 Ac. NE 1/4 N1/4 - 38 Ac, S1/4 N1/4 - 33 Ac,  
SE 1/4 N1/4 - 33 Ac.

comprising a total of 208 acres of land.

Well: depth 120 ft  
Static 28 ft  
Pumping 900 gpm  
capacity est 2500 gpm

Date January 12, 1979  
Elroy J. Jernagst  
(Signature)

# RECEIPT

WATER RIGHTS COMMISSION

State of South Dakota

No 4 6712

PIERRE, January 18, 1929

RECEIVED OF Robert J. Borchard, Mansfield, SD 57460

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

|                                                                                                                |    |    |
|----------------------------------------------------------------------------------------------------------------|----|----|
| Fee for Application for Permit to Appropriate Water No. 2870-3 (examination, processing, recording and filing) |    |    |
| Fee for Inspecting Construction, and Issuing Cert. of Construction No. 2870-3                                  | 50 | 00 |
| Fee for Inspecting Beneficial Use, and Issuing Water License No. 2870-3                                        |    |    |
| Fee for Issuing Location Certificate-Dry Draw, No.                                                             |    |    |
| Fee for filling                                                                                                |    |    |
| Fee for certified copy of                                                                                      |    |    |
| Fee for Print copy of map                                                                                      |    |    |
| Fee for Certifying                                                                                             |    |    |
| Fee for (any other work as provided by law)                                                                    |    |    |
| TOTAL                                                                                                          | 50 | 00 |

WATER RIGHTS COMMISSION

By John Hatch  
Chief Engineer, Executive Officer

JOHN HATCH

gy

#2870-3

 **Department of  
Water & Natural Resources**

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

February 17, 1989

Robert J. Borchard  
RR 1, Box 103  
Mansfield, SD 57460

Dear Mr. Borchard:

On October 6, 1988, the Water Management Board adopted rules to implement a 1988 law for application of chemicals through irrigation systems. The rules establish equipment standards, performance standards and installation requirements for irrigation systems that apply chemicals (fertilizers, insecticides, or herbicides) with irrigation water.

You have indicated on your 1988 Water Management Board Irrigation Questionnaire that you do apply chemicals with irrigation water. A copy of the new rules for chemigation are enclosed for your information.

The new standards include:

- \* a check valve between the irrigation pump and the point of chemical injection;
- \* a vacuum relief valve on top of the pipeline between the irrigation pump and the irrigation pipeline check valve;
- \* a low-pressure drain on the bottom of the pipeline between the irrigation pump and the irrigation pipeline check valve;
- \* a chemical injection line check valve between the chemical injection pump and the point at which the chemical is injected into the irrigation line; a second check valve is required if the chemical injection pump is not a positive displacement pump;
- \* an interlock system which ensures that the chemical injection pump will stop whenever the irrigation pump stops;
- \* an inspection port between the irrigation pump and the check valve on the irrigation line;

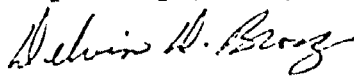


Each of these equipment requirements are discussed more thoroughly in Sections 74:02:09:05 through 74:02:09:10 of the enclosed rules. Appendix A contains diagrams of the arrangements of these anti-pollution devices.

The equipment must be installed according to the manufacturer's specifications, calibrated, and maintained in good working condition. All chemical product labels must be followed and warning signs must be posted. These rules also require reporting of all spills, accidents, and system malfunctions. A 24-hour telephone number is provided.

The chemigation rules contain notification and record keeping requirements. Prior to using chemigation, notification must be given to the Chief Engineer on the enclosed Form 1C. Information that must be provided in this notification includes the water permit or right number, the name, address, and telephone number of the water permit or right holder and of the system operator, and the legal description of the lands on which the system is located. A record of the name, quantity, dates and hours of each chemical applied must be provided to the Chief Engineer on Form 2C. A copy of this form is also enclosed for your information. It will be mailed with the annual irrigation questionnaire and must be returned with the questionnaire by the date specified. If you have any questions regarding these rules or need additional copies of the forms, please contact Susan Bcwar, Water Rights Engineer (605-773-3352).

Very truly yours,



*for* JOHN HATCH, Chief Engineer  
Water Rights Division



2870-3

**DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES**

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

JUL 2 1996

4681-3

Robert J. Borchard  
HC 75, Box 103  
Mansfield, SD 57460

Dear Mr. Borchard:

Enclosed is Water License No. 4681-3. This is the final water right document completing your process of obtaining a Water Right. Enclosed is Receipt No. 414947 in the amount of \$50.00 which you paid for the inspection and issuance of the Water License.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right No. 4681-3, 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 License, 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

gm  
enclosures

NOTE: The applicable portions of Water Right No. (2870-3) have been incorporated into this Water License No. 4681-3.

TRANSFIELD  
SD 57400

6

If you did not irrigate during 1980-check this box

**For Dept. use only**

2

☐ **No system**

| Type of Power            | No. acres irrigated | Total Energy used-1980 |
|--------------------------|---------------------|------------------------|
| 1. Electric              | _____               | _____ kwh              |
| 2. Gravity               | _____               | _____ gal              |
| 3. Gasoline              | _____               | _____ cf               |
| 4. Nat. Gas pipeline     | _____               | _____ gal              |
| 5. Diesel                | <u>2.13</u>         | <u>9000</u> gal        |
| 6. Propane               | _____               | _____ gal              |
| 7. Other                 | _____               | _____                  |
| Type of System:          |                     |                        |
| 1. Hand Moved Sprinklers | _____               | _____                  |
| 2. Portable booms        | _____               | _____ /                |
| 3. Center pivots (# of)  | _____               | _____                  |
| 4. Gated pipes           | _____               | _____                  |
| 5. Siderheel             | _____               | _____                  |
| 6. Towlines              | _____               | _____                  |
| 7. Gun type              | _____               | _____                  |
| 8. Hydromatic            | _____               | _____                  |
| 9. Siphons               | _____               | _____                  |
| 10. Flood                | _____               | _____                  |
| 11. Other                | _____               | _____                  |

| Month       | # days pumped | Average # hours per day | Average pump rate (gpm) | Acres of Crop Irrigated and Estimated Water Use |       |            |
|-------------|---------------|-------------------------|-------------------------|-------------------------------------------------|-------|------------|
|             |               |                         |                         | Crop                                            | Acres | Water Used |
| April       |               |                         |                         |                                                 |       |            |
| May         | 12            | 34                      | 900                     | ALF                                             | 50    | 47.73      |
| June        | 15            | 34                      | 900                     | ALF                                             | 50    | 59.66      |
| July        | 28            | 34                      | 900                     | CRN                                             | 133   | 111.36     |
| August      | 9             | 34                      | 900                     | CRN                                             | 133   | 31.82      |
| Sept.       |               |                         |                         |                                                 |       |            |
| Oct.        |               |                         |                         |                                                 |       |            |
| Other Month |               |                         |                         |                                                 |       |            |

|        |                               |
|--------|-------------------------------|
| Season | Static Water Level: beginning |
|--------|-------------------------------|

**Comments:**

Complete and return to: WATER MANAGEMENT BOARD  
Water Rights Division  
Joe Foss Building  
Pierre, SD 57501

Change or address change, if any:

please complete front and back.

The South Dakota Office of Energy has requested your cooperation in completing the following:

1979

| Type of Power        | No. Acres Irrigated | Total Energy Used |
|----------------------|---------------------|-------------------|
| 1. Electric          | _____               | _____ kwh         |
| 2. Gravity           | _____               | _____             |
| 3. Gasoline          | _____               | _____ gal         |
| 4. Nat. Gas pipeline | _____               | _____ cf          |
| 5. Diesel            | <u>240</u>          | <u>9000</u> gal   |
| 6. Propane           | _____               | _____ gal         |
| 7. Other             | _____               | _____             |

1978

| Type of Power        | No. Acres Irrigated | Total Energy Used |
|----------------------|---------------------|-------------------|
| 1. Electric          | _____               | _____ kwh         |
| 2. Gravity           | _____               | _____             |
| 3. Gasoline          | _____               | _____ gal         |
| 4. Nat. Gas pipeline | _____               | _____ cf          |
| 5. Diesel            | <u>240</u>          | <u>7000</u> gal   |
| 6. Propane           | _____               | _____ gal         |
| 7. Other             | _____               | _____ gal         |

- What is your on-farm storage capacity for gasoline 500 gallons  
diesel 11000 gallons
- What are your present plans for acres under irrigation for 1981?  
☒ an increase in acres  
☐ irrigate same acres  
☐ a decrease in acres
- A. Has your regular fuel supplier been able to meet your fuel needs for irrigation this past year?  
☒ yes  
☐ no  
 B. If no, were you able to buy from other sources?  
☐ yes  
☐ no
- Would you continue irrigating the same number of acres in 1981 if the price of fuel increased-  

|               |                                                  |
|---------------|--------------------------------------------------|
| 10% yes _____ | 20% yes _____                                    |
| no _____      | no _____                                         |
| 15% yes _____ | over 20% yes <input checked="" type="checkbox"/> |
| no _____      | no _____                                         |
- At what price for fuel would you cut back on irrigation activities? ??
- What is your best estimate of your fuel needs for irrigation in 1981, if we experience a  
 Dry summer: 12000 gallons.  
 Wet summer: 9000 gallons.

2870-3