

Considered: _____

WATER PERMIT NO. VR - 5400-3

HAP No. _____

of Applicant L.G. Everist, Inc.

Office Address P.O. Box 829, Sioux Falls, SD 57117

Amount of Water Claimed 12.25 cfs Total Acres —

Source of Water Supply surface / groundwater (quarry)

Water to be used for dewatering quarry County Minnehaha

About — miles — of Oell Rapids

PROOF OF PUBLICATION: Received _____ Not Received _____

APPLICATION: Approved _____ Subject to _____

F.F. & C.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY _____ Date Received 1/29/90 Fee \$15⁰⁰ Remarks quarry is

1954 dewatered with discharge to Big Sioux River

Corrected Application Received _____ Period of Annual Use J

WATER QUALITY APPROVAL RECEIVED NA APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES — NO — REMARKS _____

Diversion Point 2080 ft South, 1200 ft East of

center of Sect 10 T104N

R 49W

Land to be Irrigated NA

		10			
		⊗			

Well Log: Driller NA Licensed YES — NO —

Depth of Well NA REMARKS _____

of Map Topo PREPARED BY George Spencer Reviewed and the Number

dated on March 15, 1990 By Eric Gronlund

No. VR5400-3 Hydrologic Unit 10170203
 Map No. _____ Basin Big Sioux River
 Newspaper Dell Rapids Tribune (w) Box 99 57022

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. _____ N/A

☐ Construction to use water reserved by Future Use Permit No. _____ N/A

1. Name of Applicant L.G. Everist, Inc. Phone No. 605-334-5000

Post Office Address P.O. Box 829 Sioux Falls State S.D. 57117
(Street, RR or Box) (City) Zip Code

2. Amount of water claimed (c.f.s.) 12.25 c.f.s. (5,500) GPM

3. Source of water supply surface water/ground water

4. Location of point of diversion A point 2,080 ft south & 1,200 ft east of the
center of Section 10, 49W, 104N, Minnehaha County, South Dakota

County Minnehaha

5. Counties where water will be used Minnehaha

6. Annual period during which water is to be used ~~year around~~ January 1 - December 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)

quarry dewatering. Water is also diverted from the quarry for aggregate washing and dust control. Water is recycled after initial use for aggregate washing.

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

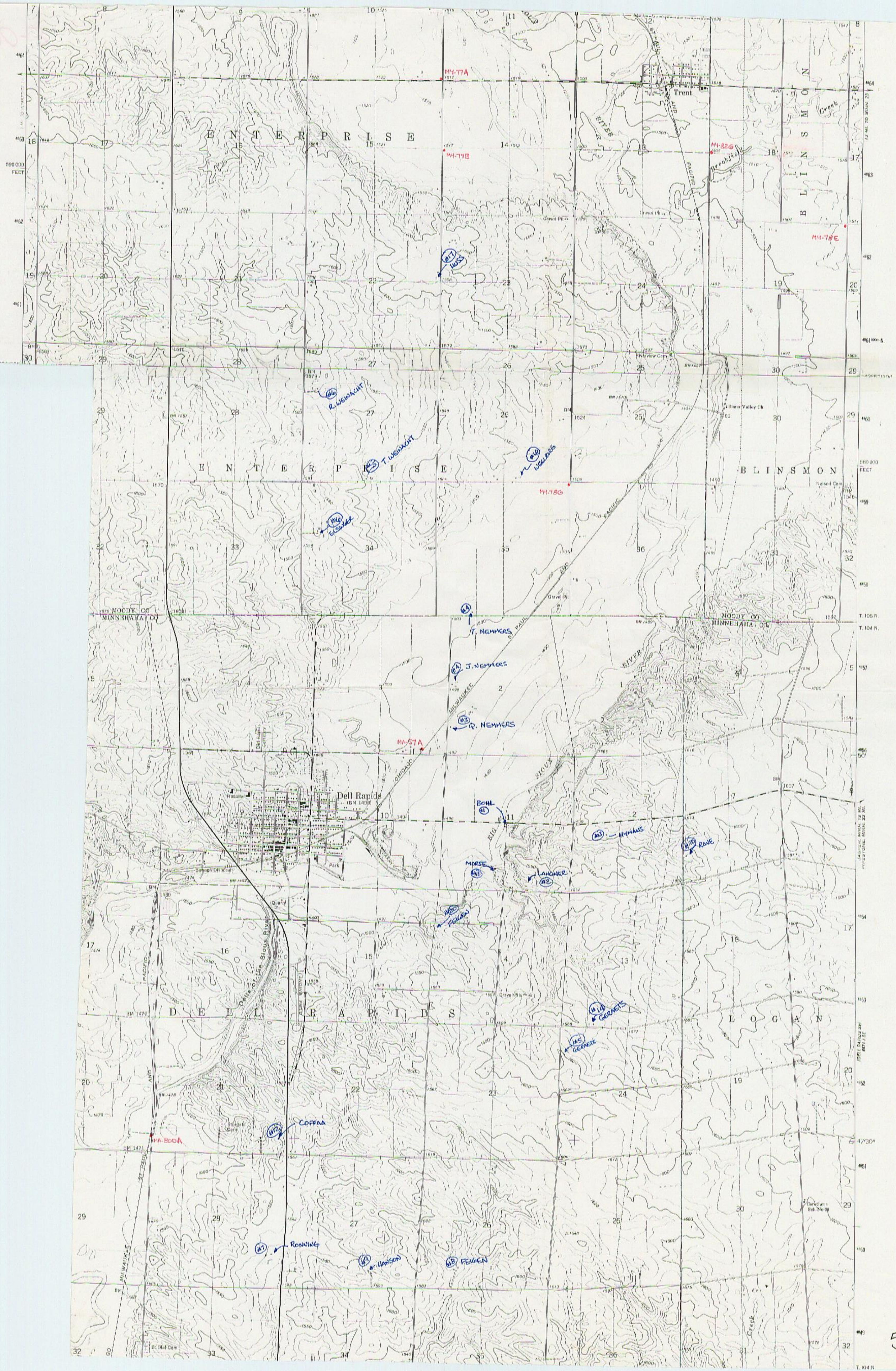
STATE OF SOUTH DAKOTA)
 County of Minnehaha)^{SS}

I, Thomas Everist for L.G. Everist, Inc. 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 Thomas Everist

Subscribed and sworn to before me this 25th day of January 1990

Sheldon J. Herda
 Notary Public



K

5400-3

SOUTH DAKOTA

VESTED WATER RIGHT NO. 5400-3

Date of Receipt of Claim January 29, 1990.

Date of Validation December 5, 1990.

The Water Management Board validated Vested Water Right Claim No. 5400-3 for L.G. Everist, Inc., P.O. Box 829, Sioux Falls, SD 57117 with the following limitations, conditions and qualifications:

1. Vested Water Right No. 5400-3 validates a vested water right claim to appropriate 12.25 cubic feet of water per second (cfs) from a quarry with a priority date of January 1, 1954. The point of diversion is located at a point 2080 feet south and 1200 feet east of the center of Section 10-T104N-R49W. The water is to be discharged to the Big Sioux River in the SW1/4 SE1/4 of Section 10 T104N-R49W.
2. The appropriated water is used for dewatering the quarry and may not exceed the amount of water needed for beneficial use for industrial purposes.
3. The water is to be used during the following annual period:
January 1 - December 31.
4. The priority date of the Vested Water Right is: January 1, 1954.
5. The water use system has been constructed and water has been applied to beneficial use.
6. Water Rights obtained in compliance with the laws of the State of South Dakota must not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. That L.G. Everist, Inc. report to the Chief Engineer annually the amount of water pumped each year.
2. That, within a reasonable time as set by the Chief Engineer, the applicant install a reasonable number of observation wells as determined by the Chief Engineer, to monitor water levels in the Sioux Quartzite, and the Big Sioux-Moody and Howard Aquifers and that periodic water level measurements be made and reported to the Chief Engineer. The location of the wells will be established by the Chief Engineer.

WATER MANAGEMENT BOARD

By: _____

John Hatch
Chief Engineer

Division of Water Rights

Dept. of Water and Natural Resources

MAR 27 1991

date

Affidavit of Water Use

No. _____

(Type or Print in Ink)

Note: This Form is supplemental to Form 2 and is to be used when an affidavit pertaining to construction and water use already constructed is needed, primarily with vested right claims.

**Affidavit Of Construction Of Water Use System
And Application Of Water To Beneficial Use**

Name of Applicant (Same as Form 2) L.G. Everist, Inc.

Post Office Address P.O. Box 829 Sioux Falls, SD 57117
(Street, RR or Box) (State) (Zip Code)

A. Notice of Appropriation _____ Date of Posting _____

Date of recording _____ Recording date _____
Where Book Page

B. Date of start of construction of water supply system Approx. 1930C. Date that water was first applied to beneficial use Approx. 1930D. Name of owner of original water supply system L.G. Everist, Inc.E. Amount of water originally applied to beneficial use minimal 1930 to 5500 GPM 1954F. Present Use of Water - Amount of water now being used Dewatering Quarry & 5500 GPMDate that this water was first used Approx. 1930G. Chronological History of Water Use Continuous since early 30's

Attach to this Form 2B any copies of notices, postings, filings, publications, affidavits, or other records that apply. You may also attach any written statement by you, or by others, that you deem pertinent.

State of South Dakota)

County of Middleton)
SS

I, Thomas Everist For L.G. Everist, Inc. the applicant, certify that I have read the foregoing
(print or type)
 and that the matters therein stated are true.

Signed _____

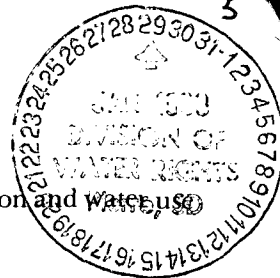
Subscribed and sworn to before me January 25, 1990

Notary Public or other qualified officer

I, the undersigned do hereby certify that I know about the water use system described above, that I have read the foregoing, and that the matters therein stated are true.

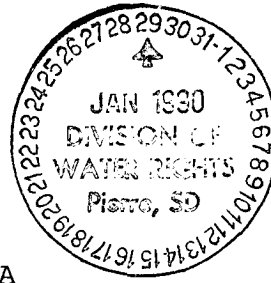
Date Fields 1-25 19 90
(Print name)

T.S. Everist, Sr. 1-25 19 90
(Print name)



Supplemental Information

(type or print in ink)



1. Well Information - Proposed construction

- a) Drill Hole Diameter N/A Depth 140'
- b) Casing Type N/A Diameter N/A Thickness N/A
- c) Screen Type N/A Diameter N/A Thickness N/A
- d) Gravel Pack Thickness N/A Length of Gravel Pack N/A
- e) Depth to Top of Water Bearing Material N/A
- f) Depth to Water (ground surface to water level) N/A
- g) Distance to nearest existing domestic well:
- On applicants property 1,700' On property owned by others 3,000'

2. Dugout Information Estimates

- a) Surface Dimensions 80 acres Depth 140'
- b) Depth to water (ground surface to water level) 140'

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 _____

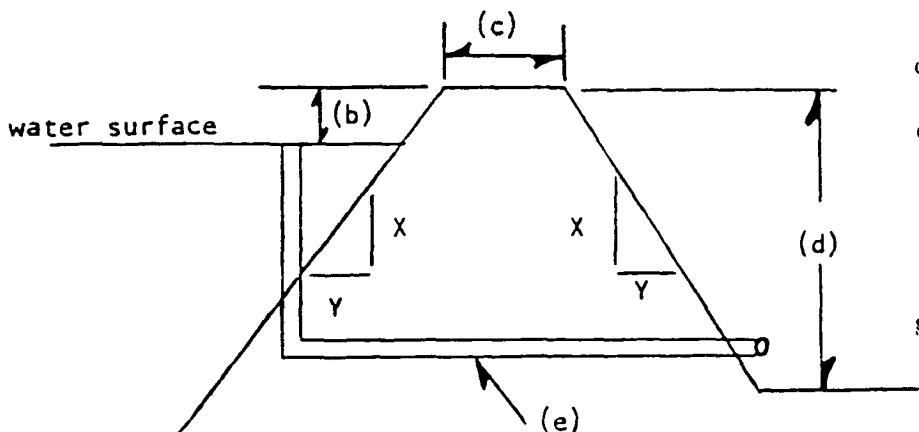
g) X & Y Slope
Upstream _____

Downstream _____

Surface Area of Impoundment _____

Storage _____ acre feet

Drainage area above dam _____



[Signature]
Signature of Applicant

RECEIPT

Division of Water Rights

South Dakota Department of Water and Natural Resources

412063

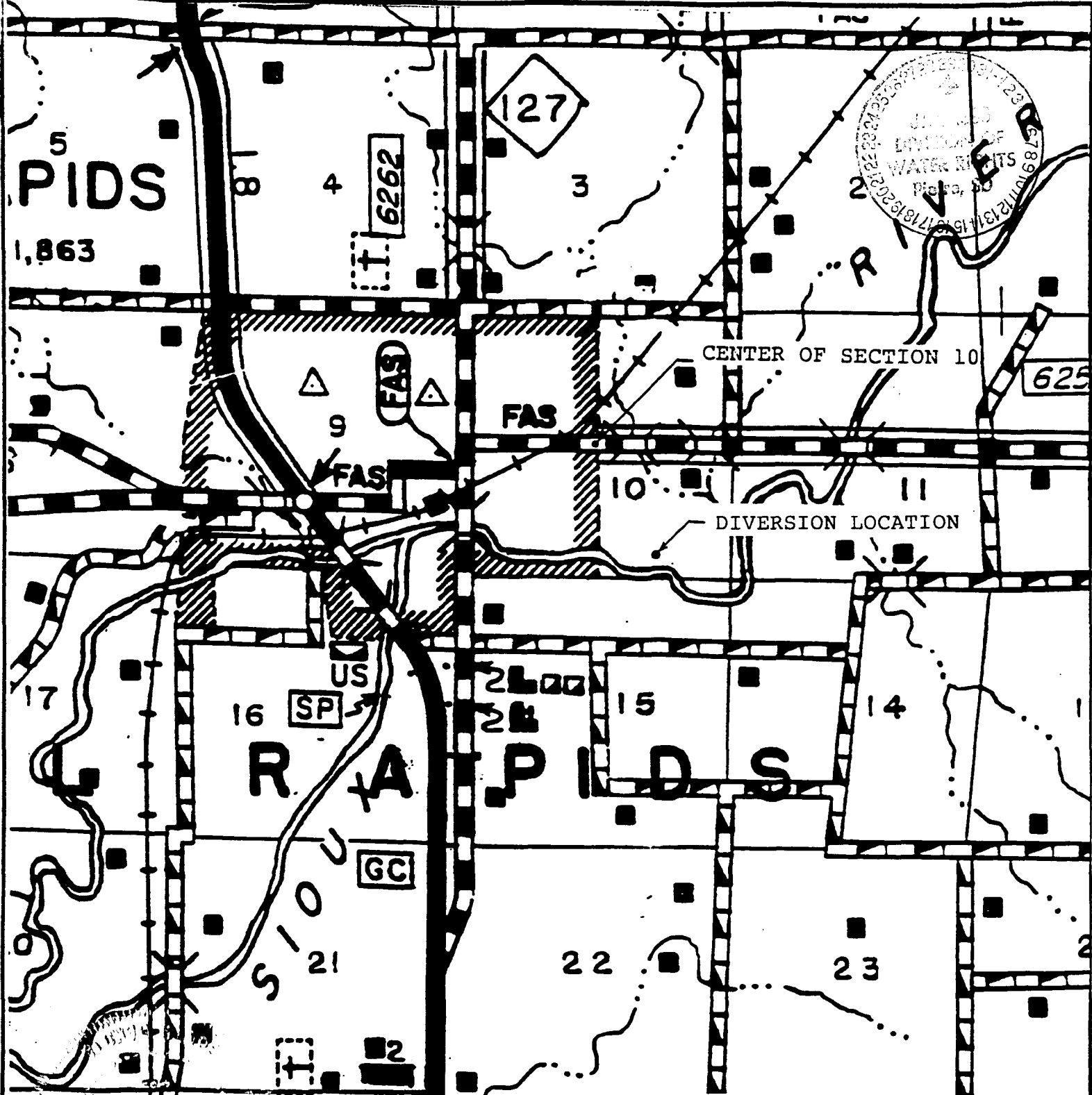
Pierre, January 29, 1990

RECEIVED OF L.G. Everist, 313 S. Phillips, Sioux Falls, SD 57117-0829

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

Fee for Application for Permit No. <u>5400-3</u> to Appropriate Water, to construct works and to put water to beneficial use	15000
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	15 00

By John Hatch
Chief Engineer



DIVERSION LOCATION
A POINT 2,080 FT. SOUTH
& 1,200 FT. EAST OF
THE CENTER OF SEC. 10
49 W 104 N, MINN CO, S.D.

George E. Spencer
PE #1668 S.D.
GEORGE E SPENCER

VR-5400-3

DR. BY K.O.
CHK. BY G.S.
DATE 1-10-90
SCALE 1"=0"

L. G. EVERIST, INC.
SIOUX FALLS, S. DAK.

DWG. NO.

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

January 25, 1990

Ron Duvall
Water Rights Division
Joe Foss Building
Pierre, South Dakota 57501

RE: L.G. Everist, Inc. Vested Water Right Claim
for the Dell Rapids Quarry



Dear Ron:

Enclosed find application and filing fee for L.G. Everist, Inc.'s vested rights claim for our Dell Rapids quarry site in Section 10, Township 104N, Range 49W. Documents verifying our pumping capacity at Dell Rapids prior to February 28, 1955 are also attached.

Our equipment records from the early 50's indicate that we had the following four pumps installed in our Dell Rapids quarry, with the stated gallons per minute capacity at the working head of 120 feet.

<u>LGE Code #</u>	<u>Description</u>	<u>GPM</u>
13003	10" x 12" Dayton-Dowd	2,500
13007	10" x 12" Dayton-Dowd	2,500
13021	Fairbanks Morse Turbine	250
13031	Fairbanks Morse Turbine	250
	Total	5,500

Copies of our equipment asset records, as well as other supporting documents, such as dated letters and appropriate pump curves are attached to further substantiate the presence and capacity of the Dell Rapids pumps prior to February, 1955.

We trust you find this application complete.

Very truly yours,
L.G. EVERIST, INC.

Thomas Everist
President

TE:ce
Enclosures

DESCRIPTION Pump - Dayton-Dowd - Cent.

10" x 12"

PLANT

CODE 13003

VENDOR

P. O.

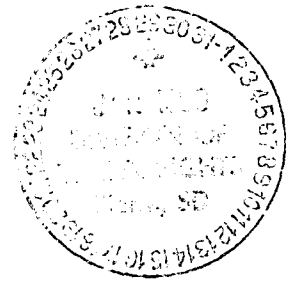
DATE

COST

SPECIFICATIONS

Fresh Water Pump

POWER CODE
25713 OFF 10/69
25713 ON 10/69



LENGTH
TYPE

43"

WIDTH
STYLE

34"

HEIGHT
MODEL

38"

Schl

WEIGHT
SERIAL

31130

DESCRIPTION

Pump - Dayton-Dowd

10" x 12"

PLANT

CODE 13003

DESCRIPTION

Pump - Dayton - Dowd

10" x 12"

PLANT

CODE 13007

VENDOR

P. O.

DATE

3/54

COST

SPECIFICATIONS

D13000 - S/N 452496 - D-13000 48-2496 removed 4/56 to

DELL RAPIDS LONEYARD. CODED- 15691 Size pump 8A-16

8 NB RITS D-210 20' Suction w/4gate Flopper Foot Valve

7/11/60

Powered by 15692 4/60

Order parts from Peerless Pump Division Box 5014 Sta A Indianapolis Ind.

2 1/2" Bearings grease type installed 330's machine shop 3/90 1/61

Removed from 11051

4/68 BAKER Electric 342 wear ring casting - pack 1/9 Sleeves

New wear rings

LENGTH

WIDTH

HEIGHT

WEIGHT

TYPE

STYLE

MODEL

SERIAL

8A16

39553

DESCRIPTION

Pump - Dayton - Dowd

10" x 12"

PLANT

CODE 13007

13003

**FOOD MACHINERY
AND CHEMICAL
CORPORATION**

PEERLESS PUMP DIVISION

DIVISION GENERAL OFFICE: LOS ANGELES 31, CALIFORNIA

2005 NORTHWESTERN AVENUE
INDIANAPOLIS, INDIANA

April 17, 1953

L. G. Everist, Incorporated
Paulton Building
Sioux Falls, South Dakota

Attention: Mr. C. E. Foss

Reference: Parts List for Dayton-Dowd 10 x 12 CSLH
Pump Serial No. 31130
Our File No. 31837

Gentlemen:

We are attaching three copies of our drawing No. A-155-386,
which show the parts of the above subject pump. The 10 x 12
CSLH has now been replaced by a pump in our "A" line.

We will be very happy to quote you on replacement parts for
this pumping unit.

Very truly yours,

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corp.

J. C. Jervis
J. C. Jervis,

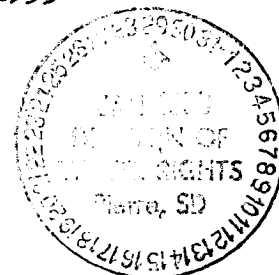
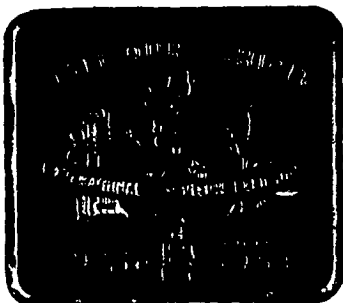
Sales Department - District 2

JCJ:bj
Attachments

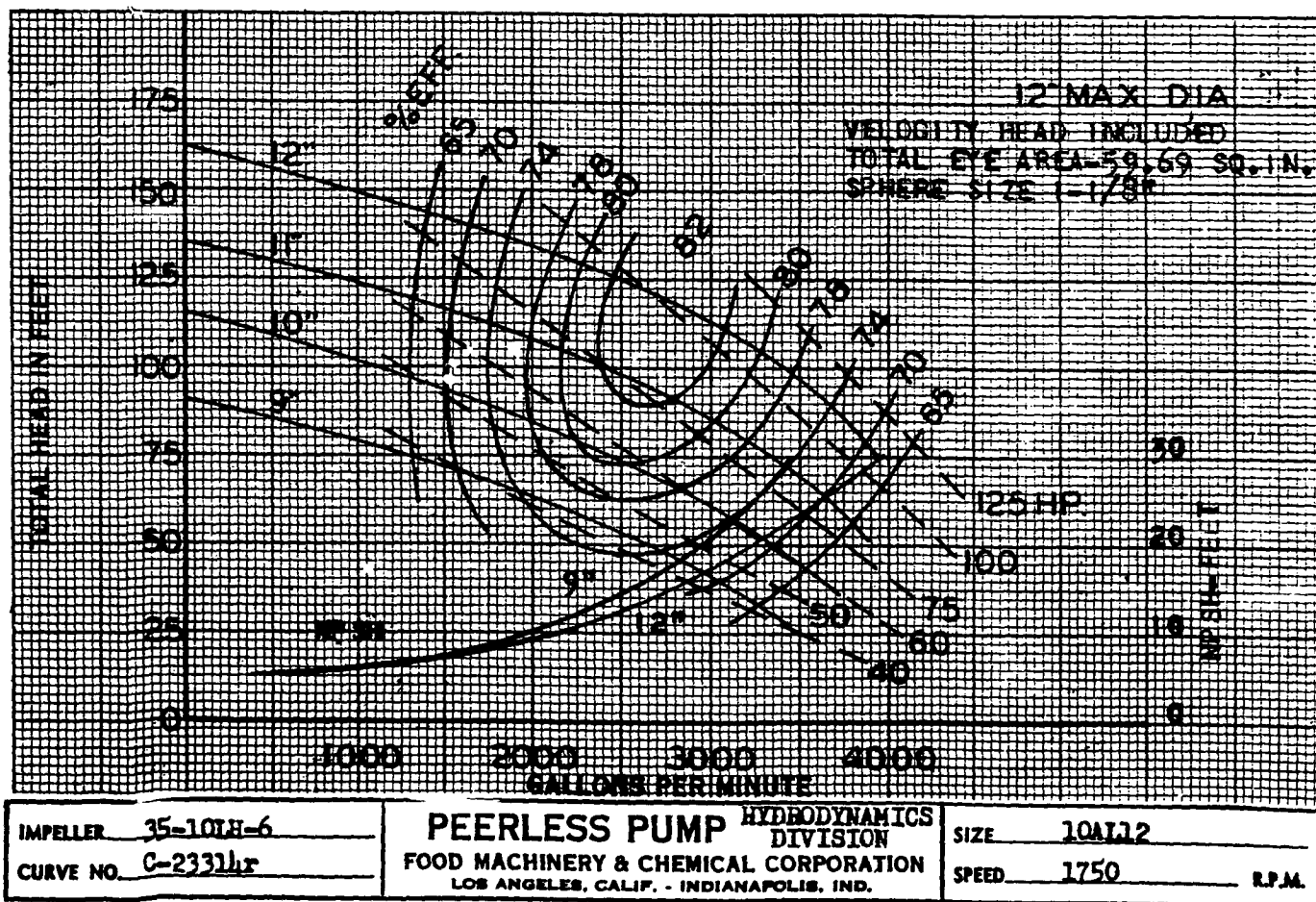
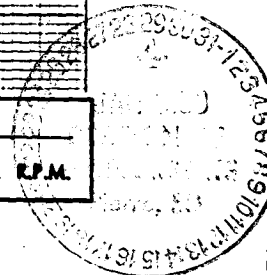
2500 @ 125

WA59661

Jim Dittmer



1200



DESCRIPTION

Pump - Fairbanks-Morse

8"

PLANT

CODE

13021

VENDOR

P. O.

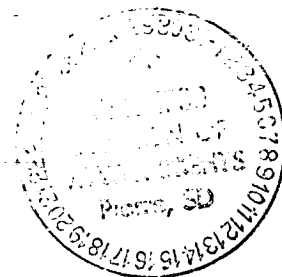
DATE

/45

COST

SPECIFICATIONS

Turbine - 5 Stage - 25 H.P. - Motor Code #15640



LENGTH 21 1/2"

WIDTH 21 1/2"

HEIGHT 46 1/4"

WEIGHT

TYPE

STYLE

MODEL

3010

SERIAL

SD 2760

DESCRIPTION

Pump - Fairbanks-Morse

8"

PLANT

CODE

13021

DESCRIPTION

Pump - Fairbanks-Morse

PLANT

CODE

13031

VENDOR

P. O.

DATE

7/52

COST

1780

SPECIFICATIONS

Pamona 30 HP

Converted to 6 stage 120' 250 gpm @ 120'

USE 1 3/16" shaft.

LENGTH

WIDTH

HEIGHT

WEIGHT 1150

TYPE

STYLE

MODEL

AN 2554

SERIAL

F130257

DESCRIPTION

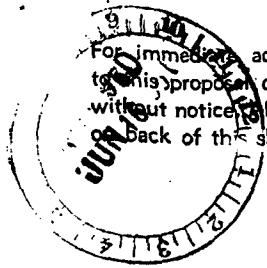
Pump - Fairbanks-Morse

PLANT

CODE

13031

Advise
Bell
at 5/69



CRANE CO.

OF MINNESOTA

326 E. Eighth St.

Sioux Falls, S. D.

Phone — 3123-3124

QUOTATION

No 9148

June 15, 1950

The Everist Co.
Paulton Bldg.
Sioux Falls, S. Dak.
Attn: Bill Everist

Dear Sir: Sometime ago you made inquiry for a price on another pump similar to the one that you have in the quarry at Dell Rapids and it took quite a little while to get complete information but we are now in a position to give you a quotation on this material.

13021
The pump you have in operation had a capacity of 500 gallons per minute with a total overaall head of 160', operated with a 25 H.P., 220 volt, 3 phase, 60 cycle, 1800 RPM motor, 10' of discharge column of a size 6", 1 1/2" shafting with 5 stage, 10" M.A. bowls with B type impellers and 6" galv. basket strainer. This job complete f.o.b. Dell Rapids, S. Dak. would carry a cost to you of \$1233.60.

We are not quoting on starting equipment as on the original pump you furnished your own starting equipment as your price on this from the electric jobbers would be identical with what we would pay.

Estimated delivery on this equipment at the present time is 4 weeks.

If you still feel that you that you are in need of this equipment we would appr your giving this price your consideration and we would appreciate your letting us know one way or the other so that we may close our files on this project.

Yours truly,

CRANE CO.

BY

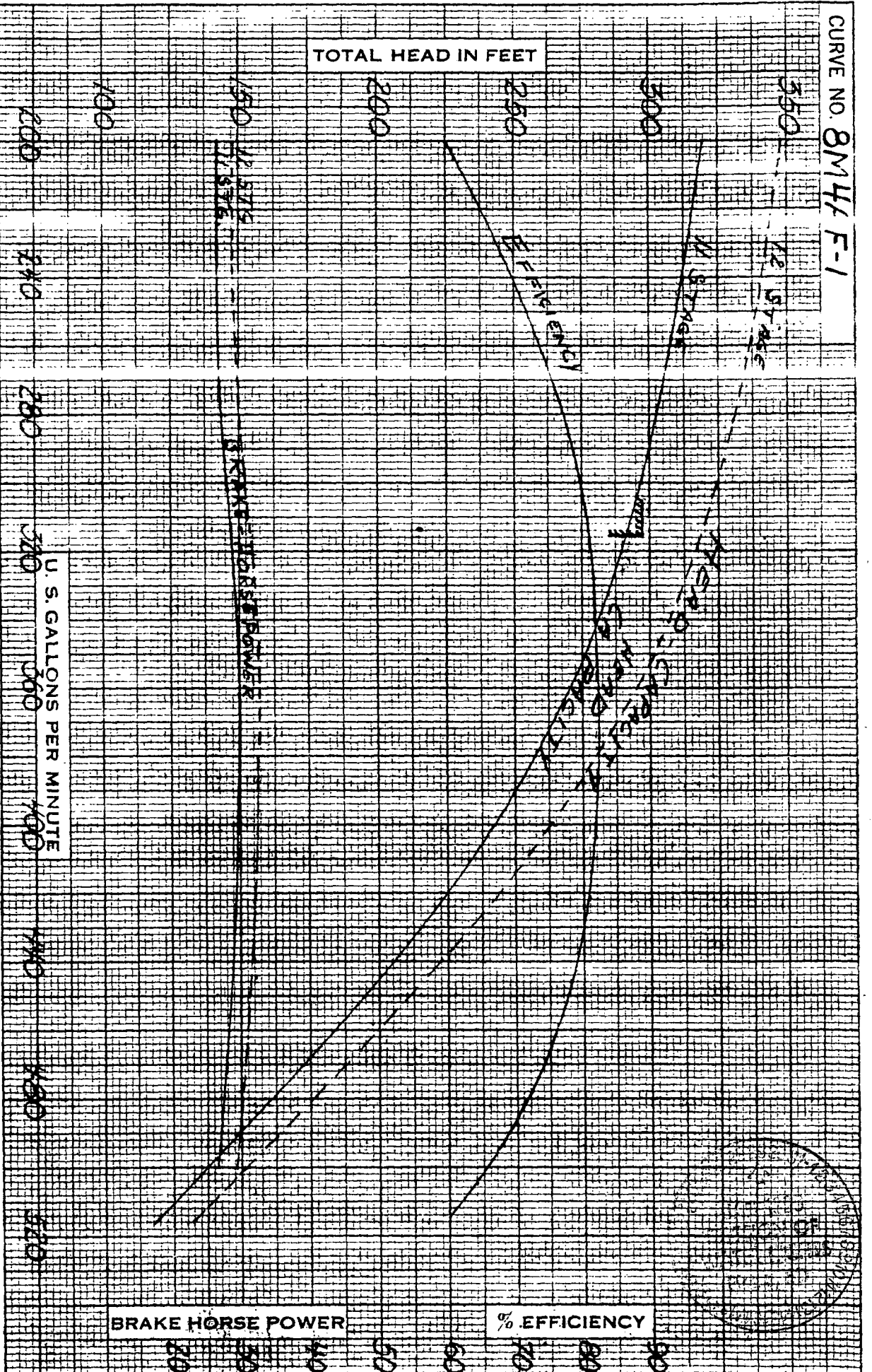
Frank E. Hart
Frank E. Hart,
Assistant Manager

FEH:lg

4 weeks
4/10
W/10



CURVE NO. 8M44 F-1



The pump is guaranteed for the set of conditions specified, other points on the curve are approximate. Capacity, head and efficiency guaranteed are contingent on the pump being furnished with the specific amount of clear, fresh non-aerated water at a temperature or not to exceed 85 degrees Fahrenheit.

For: L. G. EVERIST, INC.

FAIRBANKS MORSE & CO.

CHICAGO 5, ILLINOIS

DELL RAPIDS, S. DAK. QUARRY

PERFORMANCE

11 STAGE 3 FIG. 6977

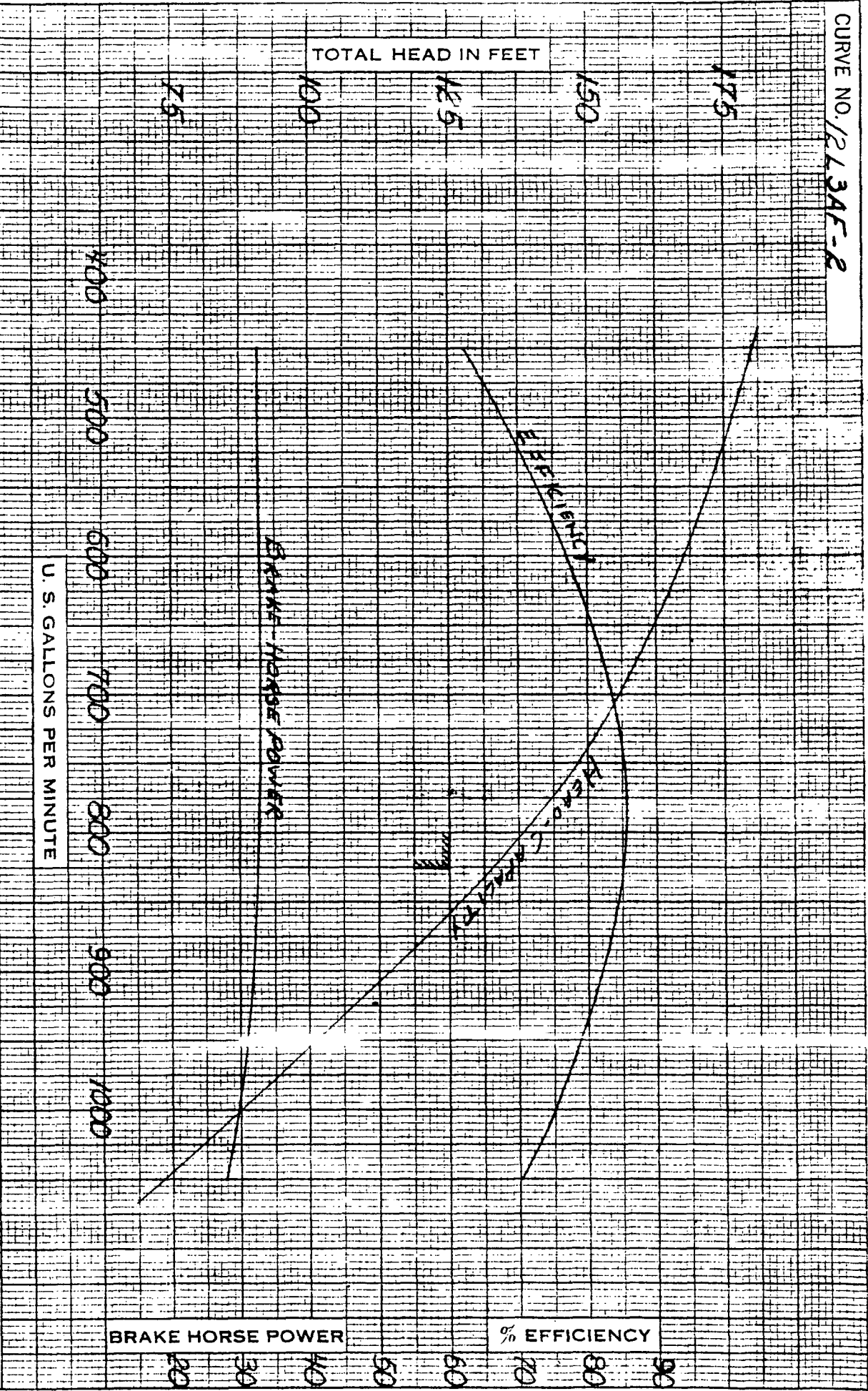
PUMP OPERATED AT 1760 R. P. M.

BRANCH ORDER NO. 1760

FACTORY ORDER NO. 6-26-50

DATE 6-26-50 J.K. USTRUCK, E.E.

CURVE NO. 12L34F-2



The pump is guaranteed for the set of conditions specified, other points on the curve are approximate. Capacity, head and efficiency guarantees are contingent on the pump being furnished with the specified amount of clear, fresh non-aerated water at a temperature of not to exceed 85 degrees Fahrenheit.

For: **L. G. EVERIST, INC.**
FAIRBANKS MORSE & CO.
 CHICAGO 5, ILLINOIS

PERFORMANCE
 3 STAGE 12" FIG. 6977
 PUMP OPERATED AT 1760 R.P.M.
 BRANCH ORDER NO. Proposal of 6-26-50
 FACTORY ORDER NO.
 DATE 6-26-50 J.K. USTRUCK, F.E.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
DENVER PLACE
999 18TH STREET, SUITE 500
DENVER, COLORADO 80202-2405

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended,
(33 U.S.C. §1251 et seq; the "Act"),

L. G. Everist, Inc.

is authorized to discharge from its wastewater treatment facility located on
the eastern edge of Dell Rapids (SE1/4 and the E1/2 of SW1/4, Section 10,
T.104N, R49W),

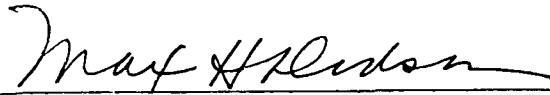
to the Big Sioux River

in accordance with discharge point(s), effluent limitations, monitoring
requirements and other conditions set forth herein. Authorization for
discharge is limited to those outfalls specifically listed in the permit.

This permit shall become effective March 1, 1989.

This permit and the authorization to discharge shall expire at midnight,
December 31, 1993.

Signed this 16th day of February 1989.



Authorized Permitting Official

Max H. Dodson
Director
Water Management Division
Title

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I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Definitions.

1. The "30-day (and monthly) average," other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.
2. The "7-day (and weekly) average," other than for fecal coliform bacteria and total coliform bacteria, is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for fecal coliform bacteria and total coliform bacteria. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains the Saturday.
3. "Daily Maximum" ("Daily Max.") is the maximum value allowable in any single sample or instantaneous measurement.
4. "Composite samples" shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:
 - a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;
 - b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

A. Definitions (Continued)

- c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,
 - d. Continuous collection of sample, with sample collection rate proportional to flow rate.
- 5. A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.
 - 6. An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.
 - 7. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
 - 8. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.
 - 9. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
 - 10. "Director" means Director of the United States Environmental Protection Agency's Water Management Division.
 - 11. "EPA" means the United States Environmental Protection Agency.
 - 12. "Sewage Sludge" is any solid, semi-solid or liquid residue that contains materials removed from domestic sewage during treatment. Sewage sludge includes, but is not limited to, primary and secondary solids and sewage sludge products.

B. Description of Discharge Points

The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under an NPDES permit is a violation of the Clean Water Act and could subject the person(s) responsible for such discharge to penalties under Section 309 of the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from the first learning of an unauthorized discharge could subject such person to criminal penalties as provided under the Clean Water Act.

OutfallSerial NumberDescription of Discharge Point

001

Discharge from 2 settling ponds

002

Discharges dewatering noncontact process water

C. Specific Limitations and Self-Monitoring Requirements

1. Effluent Limitations and Monitoring Requirements

During the period beginning immediately and lasting through the term of the permit, the permittee is authorized to discharge from outfalls 001 and 002.

Such discharges shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristics</u>		<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
		<u>30-Day Avg. a/</u>	<u>Daily Max. a/</u>	<u>Measurement Frequency</u>	<u>Sample Type a/</u>
Flow, mgd	b/	N/A	N/A	Monthly	Instantaneous
Total Suspended Solids	mg/L	25	45	Monthly	Grab

The concentration of oil and grease shall not exceed 10 mg/L in any grab sample, nor shall there be a visible sheen or floating oil in the discharge. Each discharge shall be visually examined at least daily for the presence of a visible sheen or floating oil and the results recorded. If a sheen and/or floating oil is observed, a sample will be taken and analyzed by an approved method and the appropriate corrective measures shall be taken as soon as practical.

The pH of the discharge shall not be less than 6.5 nor greater than 8.3 in any sample and shall be monitored monthly by a grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the individual discharge pipes (001 and 002) to the Big Sioux River prior to mixing with the receiving waters

a/ See Definitions, Part I.A. for definition of terms.

b/ Flow rates may be determined by use of a flume or weir, estimated from pump discharge curves, or determined by another acceptable method.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

- A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Sludge samples shall be collected at a location representative of the quality of sludge immediately prior to use-disposal practice.
- B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. See Part I.C. for any applicable sludge monitoring procedures.
- C. Penalties for Tampering. The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both.
- D. Reporting of Monitoring Results. Effluent monitoring results obtained during the previous 6 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due July 28, 1989. If no discharge occurs during the reporting period, "no discharge" shall be reported. Until further notice, sludge monitoring results may be reported in the testing laboratory's normal format (there is no EPA standard form at this time), but should be on letter size pages. Whole effluent toxicity (biomonitoring) results must be reported on the most recent version of EPA Region VIII's Guidance For Whole Effluent Reporting. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part IV), and submitted to the Director, Water Management Division and the State water pollution control agency at the following addresses:

original to: United States Environmental Protection Agency
Region VIII
Denver Place
999 18th Street, Suite 500
Denver, Colorado 80202-2405

Attention: Water Management Division
Compliance Branch (8WM-C)

copy to: South Dakota Department of
Water and Natural Resources
Division of Water Management
Office of Water Quality
Joe Foss Building
Pierre, South Dakota 57501

- E. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.
- F. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.
- G. Records Contents. Records of monitoring information shall include:
1. The date, exact place, and time of sampling or measurements;
 2. The initials or name(s) of the individual(s) who performed the sampling or measurements;
 3. The date(s) analyses were performed;
 4. The time analyses was initiated;
 5. The initials or name(s) of individual(s) who performed the analyses;
 6. References and written procedures, when available, for the analytical techniques or methods used; and,
 7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results:
- H. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this NPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting.

1. The permittee shall report any noncompliance which may seriously endanger health or the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the EPA, Region VIII, Emergency Response Branch at (303) 293-1788 and the State of South Dakota at (605) 773-3231.
2. The following occurrences of noncompliance shall be reported by telephone to the EPA, Region VIII, Compliance Branch at (303) 293-1589 by the first workday (8:00 a.m. - 4:30 p.m. Mountain Time) following the day the permittee became aware of the circumstances:
 - a. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G., Bypass of Treatment Facilities.);
 - b. Any upset which exceeds any effluent limitation in the permit (See Part III.H., Upset Conditions.); or,
 - c. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit to be reported within 24 hours.
3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
 - a. A description of the noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times;
 - c. The estimated time noncompliance is expected to continue if it has not been corrected; and,
 - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Compliance Branch, Water Management Division, Denver, Colorado, by phone, (303) 293-1589.
5. Reports shall be submitted to the addresses in Part II.D., Reporting of Monitoring Results.

- J. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.D. are submitted. The reports shall contain the information listed in Part II.I.2.

K. Inspection and Entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

- A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Director advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

- B. Penalties for Violations of Permit Conditions. The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed \$25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing Sections 301, 302, 306, 307, or 308 of the Act is subject to a fine of not less than \$5,000, nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or both. Except as provided in permit conditions on Part III.G., Bypass of Treatment Facilities and Part III.H., Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

- C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

- D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

- E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

- F. Removed Substances. Collected screenings, grit, solids, sludges, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digester supernatant and filter backwash shall not be directly blended with or enter either the final plant discharge and/or waters of the United States.
- G. Bypass of Treatment Facilities:
1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. and 3. of this section.
 2. Notice:
 - a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 60 days before the date of the bypass.
 - b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I., Twenty-four Hour Reporting.
 3. Prohibition of bypass.
 - a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:
 - (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,
 - (3) The permittee submitted notices as required under paragraph 2. of this section.
 - b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review (i.e., Permittees will have the opportunity for a judicial determination on any claim of upset only in an enforcement action brought for noncompliance with technology-based permit effluent limitations).
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - b. The permitted facility was at the time being properly operated;
 - c. The permittee submitted notice of the upset as required under Part II.I., Twenty-four Hour Notice of Noncompliance Reporting; and,
 - d. The permittee complied with any remedial measures required under Part III.D., Duty to Mitigate.
3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

- I. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. One hundred micrograms per liter (100 ug/L);
 - b. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,
 - d. The level established by the Director in accordance with 40 CFR 122.44(f).
2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. Five hundred micrograms per liter (500 ug/L);
 - b. One milligram per liter (1 mg/L) for antimony;
 - c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or,
 - d. The level established by the Director in accordance with 40 CFR 122.44(f).

IV. GENERAL REQUIREMENTS

- A. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
 1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as determined in 40 CFR 122.29(b);
 2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under Part IV.A.1.; or,
 3. There are any planned substantial changes to its existing sewage sludge facilities, the manner of its operation, or to current sewage sludge management practices of storage and disposal. The permittee shall give the Director notice of any planned changes at least 30 days prior to their implementation.
- B. Anticipated Noncompliance. The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- C. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- D. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.
- E. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- F. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:
 - a. For a corporation: by a responsible corporate officer;
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively;
 - c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.
2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described above and submitted to the Director, and,
 - b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
3. Changes to authorization. If an authorization under paragraph IV.G.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.G.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for

G. Signatory Requirements (Continued)

gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- H. Penalties for Falsification of Reports. The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both.
- I. Availability of Reports. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Director. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.
- J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.
- K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.
- L. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
- M. Transfers. This permit may be automatically transferred to a new permittee if:
1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;
 2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

M. Transfers (Continued)

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2. above.

N. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

O. Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.
2. Wasteload Allocation: A wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.
3. Water Quality Management Plan: A revision to the current water quality management plan is approved and adopted which calls for different effluent limitations than contained in this permit.
4. Sewage Sludge: There have been substantial changes (or such changes are planned) in sewage sludge use or disposal practices; applicable management practices or numerical limitations for pollutants in sludge have been promulgated which are more stringent than the requirements in this permit; and/or it has been determined that the permittee's sewage sludge use or disposal practices do not comply with existing applicable state or federal regulations.

STATEMENT OF BASIS

Applicant : L. G. Everist, Inc.
Permit Number : SD-0000051
Contact Person : Mr. Harvey J. Schmidt, Secretary
Phone : (605) 334-5000
Permit Type : Minor Industrial Treatment
Facility-Renewal

Description

L. G. Everist, Inc. operates a quartzite quarry and processing plant which includes mining, crushing, screening, and washing quartzite to produce commercial aggregate. The company site is located on the eastern edge of Dell Rapids, South Dakota (SE 1/4 & E 1/2 of SW 1/4, Section 10, T104N, R49W).

Average daily production of aggregate is 2,000 tons. The plants "wet process" operation is seasonal, typically lasting from April 1 to November 30, (8 months a year). The plant also has the capability to produce aggregate which meets construction specifications by using a "dry" crushing and cleaning technique.

The facility has two discharges to the Big Sioux River: one resulting from wet-processing of quartzite aggregate and the other from the quarry dewatering activities. The wastewater treatment facility consists of an Eagle scalping tank which settles out and reclaims the larger solids and two 150 feet by 250 feet by 12 feet settling ponds which are designed for parallel operation. This is identified as Discharge 001. Discharge 002 is used to dewater noncontact process water from the quarry site to the Big Sioux River. The total combined maximum flow rate is 1 MGD.

Receiving Water

Both of these discharge points enter the Big Sioux River approximately 1/4 mile east of Dell Rapids. The Big Sioux River is classified by South Dakota Surface Water Quality Standards (SDSWQS) for the following beneficial uses:

- (1) Domestic water supply waters;
- (5) Warm water semipermanent fish life propagation;
- (7) Immersion recreation waters;
- (8) Limited contact recreation waters;
- (9) Wildlife propagation and stock watering waters; and
- (10) Irrigation waters.

Monitoring Date

L. G. Everist is required to submit yearly Discharge Monitoring Reports (DMRs). They have submitted these reports as required and the results are tabulated below:

<u>Date</u>	<u>TSS (mg/L)</u>	<u>pH(S.U.)</u>	<u>Oil & Grease *</u>
7/85-12/85	1	7.2-7.2	4
1/86-6/86	1	7.3-7.3	1
7/86-12/86	16	7.6-7.7	7
1/87-6/87	15	7.5-7.7	6

* These values were obtained by a visual estimation.

Effluent Limitations

The following effluent limitations are based on Best Professional Judgement (BPJ) of Best Practical Control Technology (BPT) and Best Conventional Technology (BCT). The more stringent pH limitation is based on the beneficial use of the Big Sioux River as classified in the SDSWQS.

1. The Total Suspended Solids shall not exceed 25 mg/L (30-day average) or 45 mg/L (daily maximum).
2. Oil and Grease shall not exceed 10 mg/L in any grab sample and shall be noted visually for a sheen on a daily basis.
3. The pH shall be greater than 6.5 units and less than 8.3 units in any single analysis and/or measurement.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts.

Monitoring Frequency

To insure that limitations set forth in the permit are being met, it is proposed that samples be taken as follows:

<u>Parameter</u>	<u>Frequency</u>	<u>Sample Type</u>
Flow	Monthly	Instantaneous
TSS	Monthly	Grab
pH	Monthly	Grab
Oil and Grease	Daily	Visual

Monitoring Reports

Discharge Monitoring Report (DMRs) must be submitted to this Office and EPA every 6 months, instead of every 12 months which is too long a period of time to adequately keep track of what is happening. Data from outfall 001 and 002 will be reported separately and identified by outfall number.

Permit Expiration

A five year permit is recommended.

Kent R. Woodmansey
Natural Resources Engineer
S.D. Dept. of Water
and Natural Resources
November 25, 1988 (Retyped EPA)

FCD:December 6, 1988:c:Brobst\Everist.SOB:jag



Prepared By:

**GEOTEK ENGINEERING
& TESTING SERVICES, INC.**
501 East 52nd Street North
Sioux Falls, South Dakota 57104
605/335-5512

COPY

Preliminary Hydrologic Budget Assessment
Everist Quarry
Dell Rapids, South Dakota
GeoTek #89-363





GEOTEK ENGINEERING
& TESTING SERVICES, INC.
501 East 52nd Street North
Sioux Falls, South Dakota 57104
605/335-5512

Ralph E. Lindner, P.E., and Garry Scholz, Principals

January 22, 1990

L.G. Everist Inc.
313 S. Phillips Avenue
PO Box 829
Sioux Falls, South Dakota 57117

Attn: Mr. Thomas Everist, President

Subj: Preliminary Hydrologic Budget Assessment
Everist Quarry
Dell Rapids, South Dakota
GeoTek #89-363

Dear Mr. Everist:

This correspondence presents the written report for the above referenced site. We are sending four copies of the report.

After you have reviewed this report, I would suggest that we meet to discuss it and then submit it to the South Dakota Department of Water and Natural Resources (DWRN). At that point, if you are interested, we are willing to help you pursue whatever permitting may be required for the quarry dewatering activities.

In some respects, this winter has been a good time to conduct this study because the dry conditions (lack of precipitation so far this winter) have helped to simplify measuring the water inflow and outflow to the quarry.

Please let us know if we may be of further assistance.

Sincerely,

Michael Meyer
Hydrogeologist
AIPG #7460, CGWP #287

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PRELIMINARY ASSESSMENT
HYDROLOGIC BUDGET
EVERIST QUARRY
DELL RAPIDS, SOUTH DAKOTA

GEOTEK 89-363

INTRODUCTION

Purpose and Scope

The South Dakota Department of Water and Natural Resources (DWNR) has requested the Everist Quarry at Dell Rapids to provide information as to how the dewatering activities of the quarry (pumping water from the quarry to the river) may be affecting the river and shallow groundwaters near the quarry.

DWNR has also indicated that a Water Right Permit is required for these dewatering activities. However, it is GeoTek's understanding that DWNR may allow "grandfathering" of a water right if the quarry can show that dewatering was occurring before 1955.

It is the purpose of this report to provide a preliminary assessment of the hydrologic budget for the Everist Quarry.

A "hydrologic budget" may be described as a compilation of the inflow and outflow of water from an area. Inflow components include precipitation, and river and groundwater seepage into the quarry, while outflow components include pumpage to the river from the quarry and evaporation.



The scope of this assessment was limited to:

1. Meeting with Everist personnel at the site to review available information and assess site conditions.
2. Conducting limited water sampling of the quarry and river for temperature and specific conductance.
3. Compiling and evaluating readily available published information on the hydrogeology and climate of the area.
4. Preparing a report presenting our data, conclusions and recommendations.

Authorization

GeoTek's involvement was verbally authorized on September 9, 1989 by Mr. Thomas Everist of L.G. Everist Inc., Sioux Falls.

SITE DESCRIPTION

The Everist Quarry occupies an area of about 5,856,000 feet² (0.21 mile²) along the Big Sioux River near Dell Rapids (Figures 1,2). The quarry blasts and crushes rock from the Sioux Quartzite for use as aggregate. This is a very hard, densely cemented rock which has very little natural permeability, except where it is fractured. The original quarry was only about 40' deep, but the present quarry has been deepened to more than 150' below the land surface (Figure 2).

Since the 1920's, the Everist Quarry at Dell Rapids has had to conduct dewatering activities to utilize the quarry. This water has been pumped into the nearby Big Sioux River (Figure 1).

In 1927, the quarry was known to rely upon four dewatering pumps with a combined capacity of 7000 gal/min (8.4 million/gal/day). In 1955, these pumps were replaced with three pumps with a combined capacity of 9200 gpm (13.2 mgd). This includes two 3400 gpm pumps and one 2400 gpm pump.

During the operating season from about March through November, the quarry uses one of the 3400 gpm pumps to pump water during the day from the pumping pond (sump) to the crushing plant. Some of this water returns directly to the sump area as surface water, while some of it is pumped to the settling pond where the fines can settle out. This water returns to the sump area as surface water and as seepage from the settling pond (Figure 2).

Apparently, water is usually not pumped to the river during the day when the quarry is in operation. However, at night water is pumped from the sump area to the river with the smaller 2400 gpm pump. During periods of heavy rains, all three pumps may be required to pump to the river to keep the quarry dewatered.

During the winter, from about December through February, the quarry operations cease and only the 2400 gpm pump is used to pump to the river (both day and night).

HYDROLOGIC BUDGET

The hydrologic budget of the quarry area may be expressed as an equation:

$$\underline{\text{INFLOW}} = \underline{\text{OUTFLOW}}$$

INFLOW includes precipitation (P), surface water runoff (R), groundwater (G) and river seepage (SW) into the quarry, and changes (plus or minus) in the amount of water stored in the quarry (+/-C).

OUTFLOW includes pumpage from the quarry to the river (Q) and evaporation (E).

As an equation this works out to:

$$\begin{aligned} \text{INFLOW} &= \text{OUTFLOW} \\ P + R + G + SW + /- C &= Q + E \end{aligned}$$

Winter Budget

Evaluation of the annual hydrologic budget of the quarry must take into account seasonal changes which can complicate the estimates. However, during the winter, monthly budget calculations become more simplified because precipitation and evaporation are greatly reduced. Furthermore, since the only pump in use during the winter pumps to the river, pumping records can be used to estimate the amount of water being pumped to the river.

Precipitation (P)

The average annual precipitation is about 24 inches/year (Attachment 3). During the winter, precipitation averages about 0.7 inches/month (0.05 ft/mo) for December through February (SCS, 1964). On a daily basis for each month (dividing 0.7 inch by 30 days) this is about 0.002 ft/day. Assuming 0.002 ft/day falls over the entire quarry area of about 5,856,000 ft², then about 11,712 ft³ (87,600 gal/day) of inflow could occur. This is 0.088 mgd.

Runoff (R)

During the winter, if little precipitation occurs, average surface water runoff will be virtually zero. The quarry is diked along one side and contains stockpiles along other portions. It appears unlikely for substantial surface runoff into the quarry to occur during the winter, especially when precipitation is minimal. Therefore, assume runoff is zero ($R = 0$).

Evaporation (E)

During the winter, especially when the ground is frozen, evaporation will be minimal. Walton (1970) estimated winter evaporation in Illinois to be about 0.3 inches per month. Assuming winter evaporation levels to be similar for South Dakota, dividing 0.3 inch/month by 30 days gives a daily precipitation of about 0.0008 ft/day. Assuming evaporation of snow and water from the entire area of the quarry of about 5,856,000 ft², then an outflow (loss) of about 4685 ft³ (35,042 gallons) will occur. This is 0.035 mgd.

Pumpage (Q)

The quarry has recently begun to keep pumpage records. Provided below are three selected 24 hour pumping periods when water was being pumped from the quarry to the river (Attachment 10).

November 23-24 pumping time 12.3 hours = 1.47 mgd

December 12-13 pumping time 11.7 hours = 1.40 mgd

December 27-28 pumping time 10.8 hours = 1.30 mgd

Further discussion on the pumpage is provided in Attachment 1. Based on this data, average daily pumpage to the river is 1.47 to 1.30 mgd. Note "mgd" is million gallons per day.

Storage Changes (C)

An important part of the hydrologic budget is any change in water storage which may occur over time in the quarry. As can be seen from the pumpage section, the volume of pumpage from the quarry to the river appears to be declining over time during the winter. The most likely explanation for this is slow drainage of water from the settling basin sediments in the quarry. As shown in Figure 2, the settling basin occupies a large area of the quarry (about 400,000 ft²). The sediments in the settling basin are estimated to be about 30' thick. During the operating season, the basin is filled to overflowing. However, during the winter, from about December through February, water is no longer pumped to the settling basin and the basin may be expected to gradually drain water back into the quarry as long as it is not in use. Assuming the basin sediments have a specific yield of about 20 percent (Todd, 1980), then the settling pond holds about 2,400,000 ft³ (about 18 million gallons) in storage.

The quarry stopped operation about November 23rd. During the month of December, the pumpage declined from 1.47 to 1.3 mgd which is a loss of 170,000 gallons in the daily pumping volume. Dividing this total by 30 days gives an average daily seepage rate loss of about 5,700 gal/day. That is, the rate of pumpage to the river is declining at a rate of about 5,700 gal/day.

Assuming the sediment basin to hold 18 millions gallons in storage then a loss of 170,000 gallons during December is less than one percent (0.009) of the total volume of water in storage. Therefore, it is reasonable to assume that seepage into the quarry will continue to occur at about the same rate during January and February when the quarry is shut down. Adding December, January and February together gives a total of 90 days. Multiplying 90 days by 5,700 gal/day equals 513,000 gallons of reduced daily pumpage which might be expected by the end of the winter as the draining water from the settling basin is pumped to the river. That is, the pumping rate to the river may be expected to decline over the winter from 1.47 mgd to about 0.96 mgd or less than one million gal/day.

Evaluation of the Hydrologic Budget

Taking the above information to calculate an average daily hydrologic budget for the quarry during the winter gives:

$$P + R + G + SW \quad +/-C = Q + E = 0$$

inserting the estimated values gives:

$$0.088\text{mgd} + 0 + G + SW + 0.0057\text{mgd} = 0.97\text{mgd} + 0.035\text{mgd}$$

This works out to:

$$G + SW = 0.91 \text{ mgd}$$

However, December, 1989 was an exceptionally cold month with very little precipitation. Therefore, it is reasonable to discount precipitation and evaporation during December, 1989 to be negligible. That is, groundwater inflow and/or seepage from the river must equal the rate of pumpage to the river of about one million gal/day.

Evaluation of River Seepage

As shown in Figures 1 and 2, the Big Sioux River is located within about 200' of the quarry pit. The quarry walls are about 150 deep and yet visual examination of the quarry walls along the river show little evidence of significant inflows. Although the river has normal seasonal low flows in the Dell Rapids area, it has never been known to go dry (Attachment 1). Based on available information, there is no evidence that the river is losing substantial amounts of water to the quarry (Attachment 1).

During December, 1989, the river near the quarry and selected sites in the quarry were tested for both specific conductance (a measure of dissolved solids) and for temperature. As shown in Table 5, this limited data indicates the river to have substantial chemical differences compared to the water in the quarry. Had the river been the major contributor of water to the quarry, greater similarities in both specific conductance and temperature might be expected. It should be noted here that during the winter, the river will be receiving most of it's inflow from groundwater recharge and, therefore, chemical differences between the river and quarry may be expected to be reduced. This information does not exclude the possibility that some limited seepage from the river may be occurring.

Evaluation of Ground Water Seepage

If the river is not the major source of water which is pumped on a daily basis from the quarry during the winter, then it must be groundwater. This groundwater can come from three possible sources:

1. Alluvial sediments
2. Glacial sediments
3. Sioux Quartzite

The hydrogeology of the quarry area is discussed in Attachment 1. The Sioux Quartzite is typically known to be poorly permeable. In contrast, glacial and alluvial sediments are often much more permeable. Therefore, it is likely that the glacial and alluvial sediments are contributing most of the groundwater seepage to the quarry. Nevertheless, the large size of the quarry allows even very low rates of seepage from the quartzite to perhaps contribute substantially to the total volume of groundwater inflow to the quarry. There is insufficient data available at this time to determine what proportion of the groundwater inflow to the quarry is from alluvial/glacial sediments or from the Sioux Quartzite.

SDGS testholes and monitoring wells indicate very high groundwater levels occur near the quarry often within a few feet of the land surface (Attachments 1,2,8). Therefore, there does not appear to be evidence that the quarry is noticeably affecting local water levels.

Although an inflow of almost one mgd may appear to be large, when divided by the wall area of the quarry, this works out to only about 0.2 to 2.0 gal/day/ft² which is a quite low rate of permeability (Attachment 1).

CONCLUSIONS

1. Based upon a review of the limited data available, the dewatering activities of the quarry appear to having little noticeable hydrologic impact upon either the river or local groundwater levels.
2. The overall hydrologic impact of the quarry to the area may actually be beneficial. Reasons for this include:
 - A. The quarry acts as a "catch-basin" for heavy rains and then pumps the water to the river at a more gradual rate (i.e, reducing peak surface flows and helping to minimizing flooding).
 - B. During seasonal low flows and droughts, the quarry pumping provides additional flow to the river. In an indirect way, during droughts, this is probably helping to provide water to the City of Sioux Falls which relies upon the river (and the groundwater recharge from the river).

3. With respect to dewatering of the quarry before 1955, it appears likely that much of the ground water inflow to the quarry is coming from the more permeable shallow glacial and alluvial sediments overlying the quartzite. Since the quarry was about 40' deep in the 1920's and required dewatering then, it is reasonable to assume that much of the dewatering required now was also required before 1955.
4. A hydrologic budget estimate for the quarry indicates about one million gallons per day of ground water is pumped from the quarry to the river. Limited information indicates that this ground water is probably largely derived from glacial and alluvial sediments and the Sioux Quartzite.

RECOMMENDATIONS

1. Continuous pumping records should be maintained for the quarry. Review of these records after one to two years will be helpful in further evaluating the hydrologic budget of the quarry. Calibration of the pumps to verify the accuracy of pumping rates is suggested.
2. Water quality sampling of both the river and the quarry may help to further determine if the river is contributing to the quarry inflow. This can range from testing only for temperature and specific conductance to sampling for many other parameters. (See Attachment 1)
3. Further assessment options include:
 - A. Installing monitoring wells and defining the flow system.
 - B. Measuring the flow of the river above and below the quarry.
 - C. Developing a hydrologic computer model for the quarry.

STANDARD OF CARE

The recommendations contained in this report represent our professional opinions. These opinions are based on information currently available and are arrived at in accordance with currently accepted hydrogeologic and engineering practices. Other than this, no warranty is implied or intended.

REMARKS

GeoTek Engineering and Testing Services appreciates the opportunity to have been of service to you. Please contact us if you have any questions or if we may be of further assistance.

Respectfully Submitted,

Michael Meyer

Michael Meyer
Hydrogeologist
CGWP #287, AIPG #7460

This report reviewed

by: *James S. Sells*
Vice President

TABLE 1

AVERAGE PRECIPITATION FREQUENCIES
DELL RAPIDS AREA, MINNEHAHA COUNTY, SOUTH DAKOTA

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average monthly ppt-inches	0.5	0.7	1.2	2.3	3.3	4.3	3.3	3.0	2.5	1.5	1.0	0.6
Number of days +0.5 inches	0.1	0.2	0.6	1.5	2.3	3.0	2.1	2.0	1.5	0.8	0.6	0.3
Number of days +1.0 inches	0.03	0.03	0.1	0.3	0.8	1.3	0.8	0.8	0.6	0.2	0.1	0.05
Number of days +2 inches	<0.01	<0.01	0.01	0.05	0.2	0.4	0.2	0.2	0.2	0.01	0.01	<0.01

This table derived from Spuhler, W. et.al., 1971, Climate of South Dakota - Agric. Expt. Stat., South Dakota State Univ., Bulletin 582 and from Miller, J., and Dredrick, R., 1966, Normal Monthly Number of Days with Precipitation of 0.5, 1.0, 2.0 and 4.0 inches or more in the Conterminous United States, NOAA ESSA Tech, Paper 57

Table 2. Mean Flow (cfs) in the Big Sioux River for
Indicated Periods of Time at Specified Stations
(Length of Record at Station is Shown)

Station	Watertown	Brookings	Dell Rapids	Skunk Creek	Sioux Falls	Brandon	Akron
Station Number	6479500	6480000	6481000	6481500	6482000	6482100	6485500
USGS Designation							
Period of Record	10/1945- 9/1965	8/1953- 9/1965	5/1948- 9/1965	6/1948- 9/1965	9/1943- 9/1960	7/1959- 9/1965	10/1928- 9/1965
January							
1-10	0.64	7.32	19.57	2.43	29.84	28.05	101.87
11-20	0.70	5.39	15.67	1.98	25.66	22.90	100.09
21-31	0.38	3.29	10.79	1.27	23.56	20.68	89.51
February							
1-10	0.72	4.15	14.78	6.16	30.84	23.76	147.11
11-20	1.22	8.77	30.53	18.53	117.48	30.30	328.26
21-28,29	2.30	38.10	51.56	19.61	287.28	88.16	764.47
March							
1-10	3.89	80.45	118.50	55.32	321.55	211.13	1,449.65
11-20	22.61	111.17	239.06	76.93	658.35	201.86	2,031.31
21-31	74.23	544.82	789.82	329.58	1,102.38	1,222.25	2,507.30
April							
1-10	127.50	763.32	2,102.89	365.24	1,821.11	3,442.86	3,987.77
11-20	175.75	345.43	938.20	121.83	1,158.50	1,367.30	1,901.35
21-30	116.38	219.67	531.50	83.54	788.78	541.81	1,196.51
May							
1-10	81.31	197.08	422.36	66.67	672.85	448.76	1,081.91
11-20	69.18	195.10	396.15	67.04	560.83	496.13	1,081.12
21-31	97.38	254.00	380.96	64.31	531.28	658.65	1,204.20
June							
1-10	69.63	269.86	353.24	52.01	501.96	580.25	1,435.50
11-20	66.02	326.53	547.46	150.48	871.48	620.76	1,739.88
21-30	63.99	216.60	395.06	104.35	663.24	456.25	1,526.15



Table 2 (cont).

Station	Watertown	Brookings	Dell Rapids	Skunk Creek	Sioux Falls	Brandon	Akron
Station Number	6479500	6480000	6481000	6481500	6482000	6482100	6485500
USGA Designation							
Period of Record	10/1945- 9/1965	8/1953- 9/1965	5/1948- 9/1965	6/1948- 9/1965	9/1943- 9/1960	7/1959- 9/1965	10/1928- 9/1965
July							
1-10	55.61	257.75	362.06	76.48	510.58	387.10	1,210.16
11-20	38.99	198.47	286.25	42.73	341.03	433.58	828.15
21-31	32.41	174.41	259.83	85.54	314.02	359.33	654.89
August							
1-10	30.38	220.99	240.06	39.52	245.57	380.37	701.42
11-20	25.66	115.59	172.04	40.19	220.61	180.91	535.61
21-31	12.40	73.64	160.73	22.40	194.52	133.98	443.73
September							
1-10	5.26	54.15	129.94	15.84	158.35	117.92	567.93
11-20	3.03	54.29	98.31	11.17	140.75	92.81	547.90
21-30	1.99	58.71	98.65	9.18	112.96	124.10	362.08
October							
1-10	1.95	34.00	78.93	9.22	108.59	84.68	273.12
11-20	3.37	30.45	63.28	6.73	104.31	69.66	254.39
21-31	3.33	29.57	58.42	7.53	86.51	60.00	219.15
November							
1-10	4.22	27.57	52.42	7.12	87.41	66.43	223.48
11-20	4.39	26.41	51.74	6.63	86.86	57.58	220.16
21-30	3.45	24.15	43.78	4.95	75.01	51.81	205.05
December							
1-10	3.23	20.33	39.32	5.64	65.25	50.83	177.71
11-20	1.81	11.23	27.20	3.91	54.07	36.08	142.13
21-31	1.39	9.23	22.97	3.11	41.25	30.56	127.20

This table from Rakness, K., 1970, Analysis of the Flow Variation of the Big Sioux River, unpublished Master of Science Thesis, South Dakota State University, Brookings

Table 3.

Example of Seasonal Temperature and Specific
Conductance Variations in the Big Sioux River
at the USGS gaging station near Dell Rapids

BIG SIOUX RIVER BASIN

06481000 BIG SIOUX RIVER NEAR DELL RAPIDS, S. DAK.--Continued

TEMPERATURE (DEG. C) OF WATER WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975
(ONCE-DAILY)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.0	11.0	---	0.0	0.0	0.0	0.0	12.0	21.0	30.0	25.0	---
2	11.0	10.0	---	0.0	0.0	---	1.0	11.0	22.0	31.0	29.0	23.0
3	15.5	---	---	0.0	0.0	---	1.0	16.5	20.0	32.0	30.0	25.0
4	15.5	5.5	---	0.0	0.0	0.0	2.0	17.0	21.0	32.0	30.0	22.0
5	---	8.0	---	0.0	0.0	0.0	3.5	---	---	28.0	28.0	23.0
6	10.0	8.0	---	0.0	0.0	0.0	---	---	22.0	30.0	26.0	---
7	15.5	9.0	---	0.0	0.0	0.0	4.5	18.5	25.5	32.0	28.0	22.0
8	15.0	---	---	0.0	0.0	0.0	2.0	15.5	---	28.0	29.0	22.0
9	15.5	9.0	---	0.0	0.0	0.0	1.0	19.0	18.0	28.0	32.0	25.0
10	14.5	---	1.0	0.0	0.0	0.0	3.5	19.0	19.0	26.5	---	29.0
11	15.5	3.5	1.0	0.0	0.0	0.0	2.0	---	16.5	25.5	29.0	17.0
12	---	3.5	1.0	0.0	0.0	0.0	4.5	20.0	22.0	24.0	30.0	15.0
13	11.0	1.0	---	0.0	0.0	0.0	---	20.0	22.0	26.0	26.0	13.0
14	10.0	1.0	---	0.0	0.0	0.0	4.5	20.0	21.0	26.5	---	18.0
15	12.0	4.5	---	0.0	0.0	0.0	---	22.0	22.0	29.0	27.0	19.0
16	15.5	5.5	---	0.0	0.0	---	3.5	22.0	21.0	30.0	28.0	20.0
17	16.5	9.0	0.0	0.0	0.0	1.0	5.0	23.5	24.0	---	---	18.0
18	14.5	4.5	1.0	0.0	0.0	2.5	3.5	25.5	---	24.0	23.0	17.0
19	14.5	8.0	1.0	0.0	0.0	3.5	---	25.5	26.0	29.0	28.0	---
20	12.0	5.5	1.0	0.0	0.0	3.5	---	26.5	26.5	30.0	28.0	---
21	15.5	5.5	0.0	0.0	0.0	4.5	---	25.5	26.5	27.0	26.0	15.0
22	14.5	4.5	1.0	0.0	0.0	4.5	---	25.5	26.5	30.0	26.0	19.0
23	15.5	3.5	---	0.0	0.0	2.5	---	---	28.0	27.0	29.0	14.0
24	15.5	3.5	---	0.0	0.0	---	10.0	21.0	26.5	28.0	29.0	18.0
25	15.0	0.0	---	0.0	0.0	---	10.5	24.5	29.0	29.0	25.0	17.0
26	14.5	2.5	0.0	0.0	0.0	---	---	21.0	28.0	29.0	24.0	20.0
27	13.5	3.5	1.0	0.0	0.0	---	---	21.0	---	32.0	27.0	15.0
28	15.5	---	1.0	0.0	0.0	---	---	21.0	29.0	30.0	24.0	---
29	---	---	1.0	0.0	---	---	---	22.0	29.0	32.0	26.0	18.0
30	13.5	---	1.0	0.0	---	---	10.0	21.0	27.0	30.0	24.0	12.0
31	---	---	0.0	0.0	---	---	---	20.0	---	29.0	27.0	---
MONTH	14.0	5.5	---	0.0	0.0	---	---	20.5	24.0	29.0	27.5	19.0

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C): WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975
(ONCE-DAILY)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1020	970	950	1200	1330	1260	700	720	840	860	760	820
2	1000	980	970	1200	1370	1250	750	830	850	860	860	840
3	1000	980	980	1180	1350	1250	700	830	880	880	770	850
4	1000	980	1000	1160	1340	1240	700	840	850	870	765	860
5	1000	980	1000	1120	1400	1230	650	800	850	880	720	850
6	1020	970	1050	1260	1350	1230	600	800	840	870	780	850
7	1040	950	1080	1270	1340	1200	520	810	860	870	800	860
8	1030	950	1120	1250	1340	1110	520	845	850	850	800	870
9	1000	940	1150	1200	1330	1220	380	865	850	870	810	870
10	1020	940	1180	1250	1320	1160	330	880	860	860	810	870
11	1020	920	1060	1300	1320	1190	355	850	850	860	820	860
12	1020	920	950	1300	1340	1220	360	880	850	870	820	880
13	1030	930	1000	1300	1300	1120	380	845	820	850	850	900
14	1030	970	1000	1320	1320	1210	390	910	800	860	850	870
15	1050	940	1020	1320	1320	1190	450	900	760	870	860	880
16	1050	940	1050	1300	1330	900	480	905	760	880	870	880
17	1030	950	1100	1280	1340	820	420	920	740	880	850	900
18	1030	950	1150	1300	1320	680	530	920	750	880	820	890
19	1020	940	1150	1300	1320	810	500	930	730	880	850	890
20	1010	980	1120	1320	1360	880	510	920	740	880	850	400
21	1000	1000	1130	1300	1350	900	520	925	740	890	820	890
22	990	980	1140	1330	1330	900	500	930	760	900	750	880
23	970	960	1160	1360	1330	900	500	900	790	880	810	880
24	970	970	1180	1400	1330	850	520	930	790	890	840	870
25	960	970	1200	1350	1330	850	570	940	810	910	840	870
26	950	930	1210	1350	1220	900	500	940	820	880	820	860
27	950	970	1190	1370	1340	950	500	935	830	890	840	840
28	940	960	1200	1370	1320	850	550	925	840	870	820	850
29	930	950	1220	1380	---	900	600	915	835	850	790	840
30	920	950	1250	1350	---	800	600	900	840	850	790	850
31	950	---	1250	1330	---	750	---	890	---	860	800	---
MONTH	998	959	1100	1290	1330	1020	520	882	813	873	814	851

from USGS, 1976, Water Resources Data for South Dakota 1975

Table 4.

Example of Water Level Variation in a
Monitoring Well Near Dell Rapids

(see Figure 4 for well location - #102)

Minnehaha County -- continued

Observation well 102 (104-49-3ddc). South Dakota Water
Resources Commission observation well S-22. Diameter 1½
inches, depth 21 feet. Land surface altitude 1,496.7 feet.

<u>Date</u>	<u>Water level</u>	<u>Date</u>	<u>Water level</u>	<u>Date</u>	<u>Water level</u>
8-29-57	6.0	2-26-64	8.35	3-30-66	7.04
11- 5-57	6.9	3-16-64	7.97	5- 3-66	6.27
3-11-58	7.3	4-17-64	6.16	6- 2-66	6.94
7-21-58	7.8	5-14-64	6.10	6-28-66	7.70
11-29-58	8.8	6-16-64	7.57	7-14-66	8.23
3-12-59	8.8	7-23-64	8.39	8-25-66	8.80
7-14-59	8.7	8-28-64	8.74	10- 4-66	8.88
11-18-59	9.1	9-17-64	9.73	11- 9-66	8.55
5- 4-60	6.8	10-21-64	9.91 L	12-12-66	8.67
7- 8-60	6.9	11-24-64	8.97	1-26-67	8.88
11- 1-60	7.6	12-30-64	9.03	2-25-67	8.95
3- 7-61	7.3	1-28-65	9.10	3-22-67	8.42
7-12-61	6.8	2-26-65	9.12	4-25-67	7.48
11- 2-61	7.6	3-31-65	8.41		
7- -62	4.9 H	4-30-65	7.51		
11- -62	7.0	5-20-65	5.10		
3- -63	7.6	7- 7-65	5.52		
6-18-63	6.82	7-30-65	7.03		
7-11-63	7.65	8-30-65	8.05		
8-13-63	7.70	9-30-65	7.14		
9-16-63	8.29	10-29-65	7.14		
10-25-63	7.97	11-23-65	7.34		
11-19-63	8.11	12-29-65	7.30		
12-18-63	8.12	1-25-66	7.45		
1-24-64	8.22	2-25-66	7.40		

This table from Ellis, M. and Adolphson, D., 1969
Basic Hydrologic Data, For a Part of the Big Sioux
Drainage Basin, Eastern South Dakota, SDGS Water
Resources Report no.5



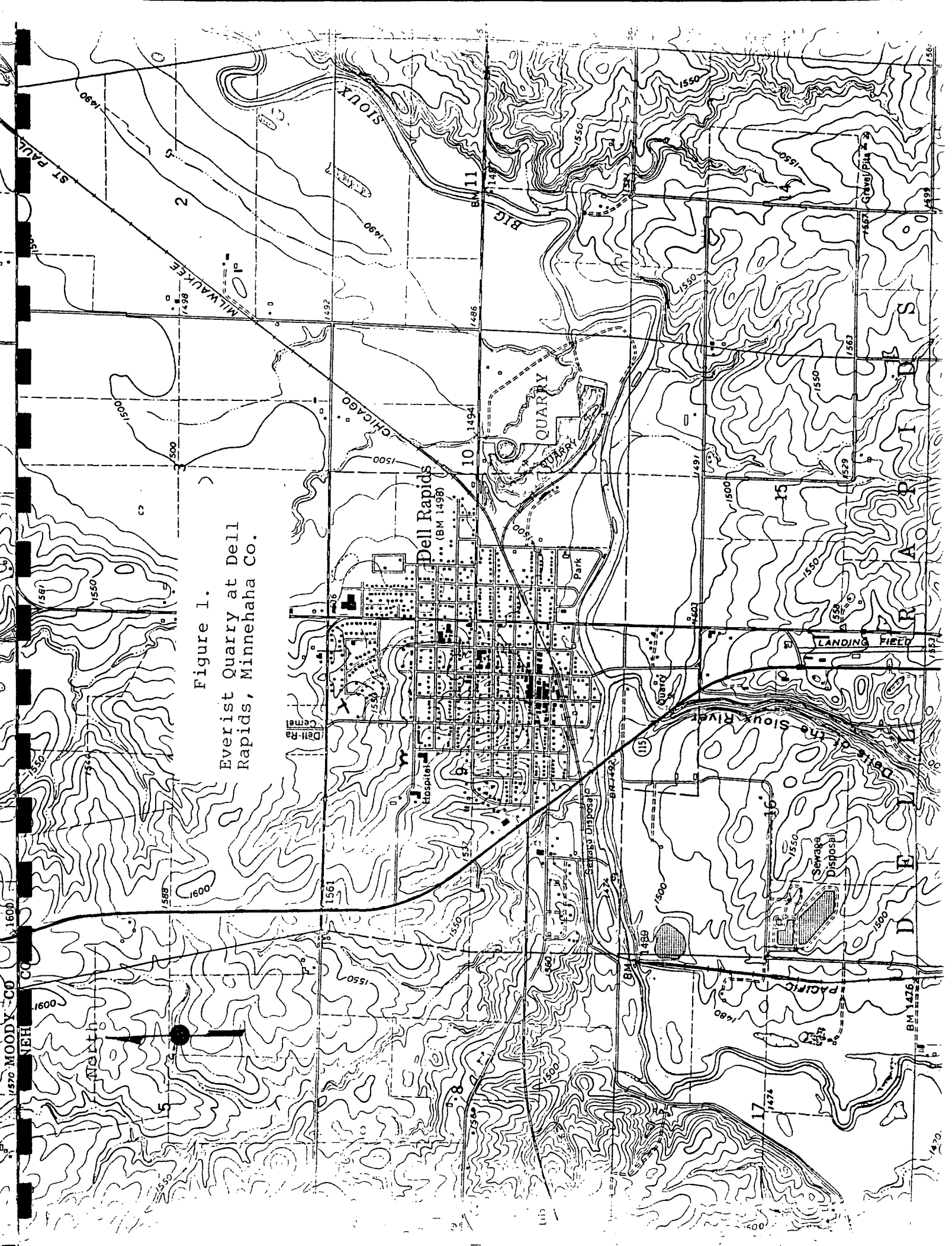


Figure 1.
Everist Quarry at Dell
Rapids, Minnehaha Co.

North



Scale
1" = 400'

Visible surface
water inflow

Approximate areal extent of
fines - storage pile

SETTLING
BASIN

Discharge
pipe

crushing plant

pipeline from sump to plant
pump to river

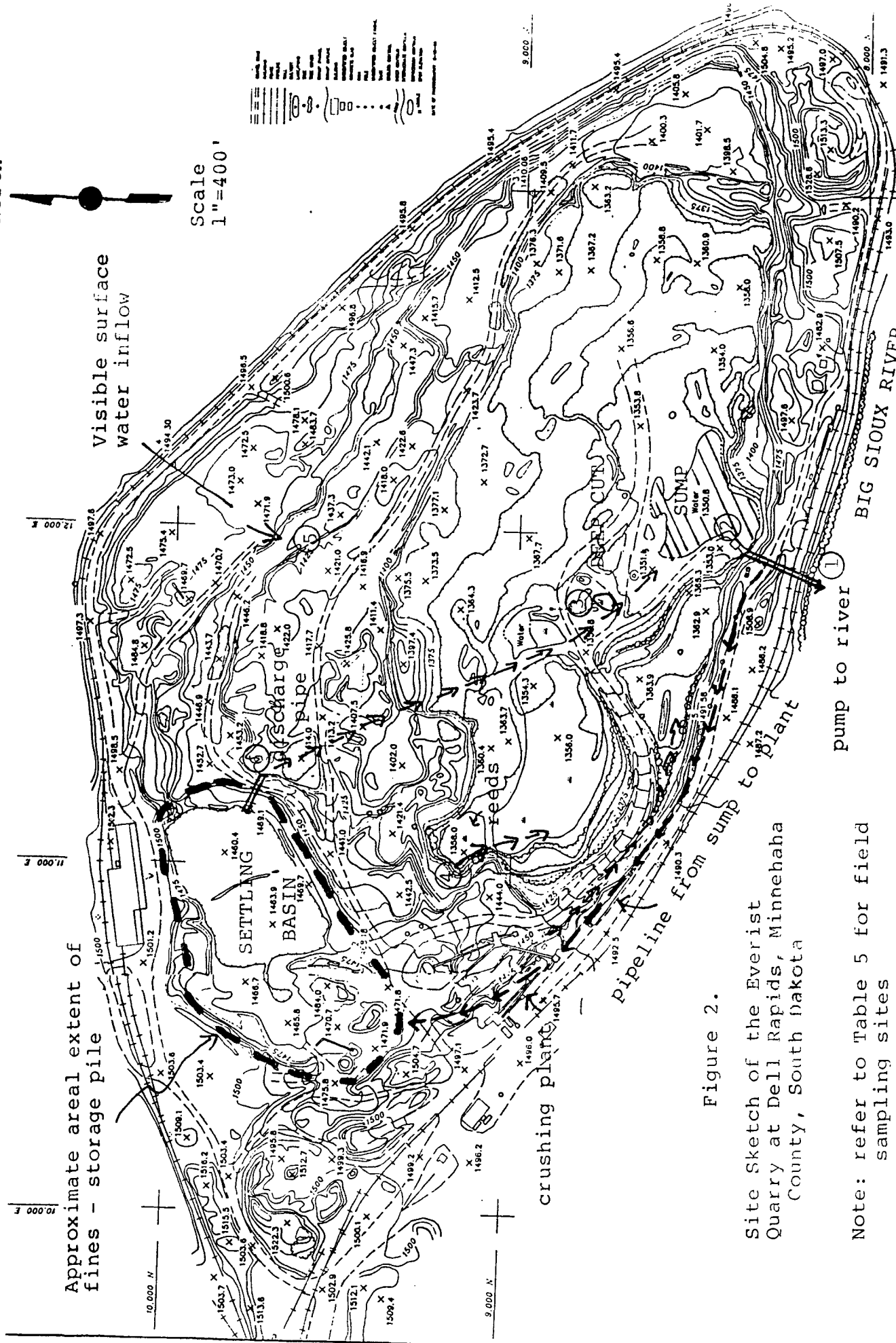
Note: refer to Table 5 for field
sampling sites

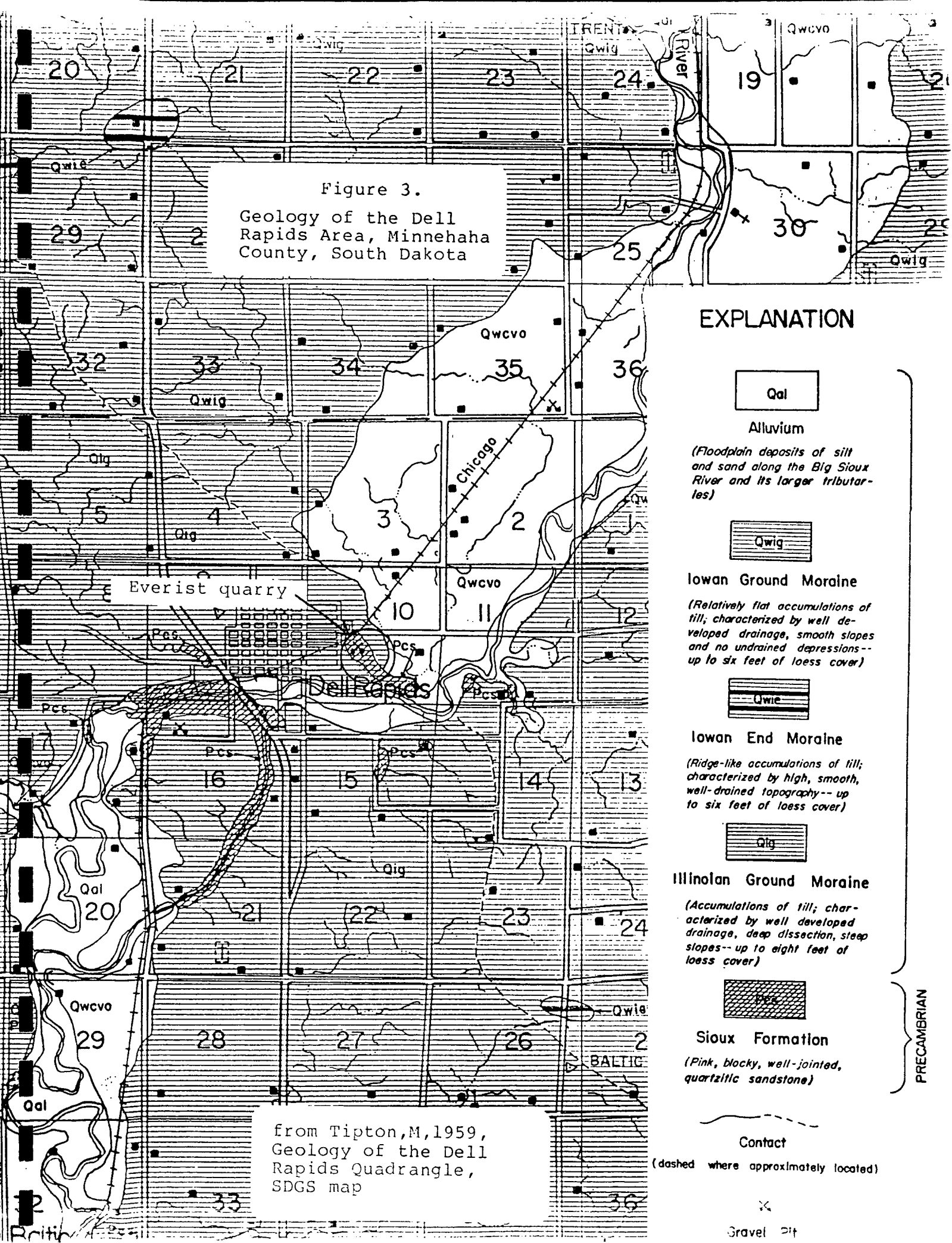
Figure 2.

Site Sketch of the Everist
Quarry at Dell Rapids, Minnehaha
County, South Dakota

BIG SIOUX RIVER

DELL RAPIDS QUARRY
COMPILED BY J. H. HARRIS, JR.
FROM U.S. GEOLOGICAL SURVEY
MAP NO. 10000 F





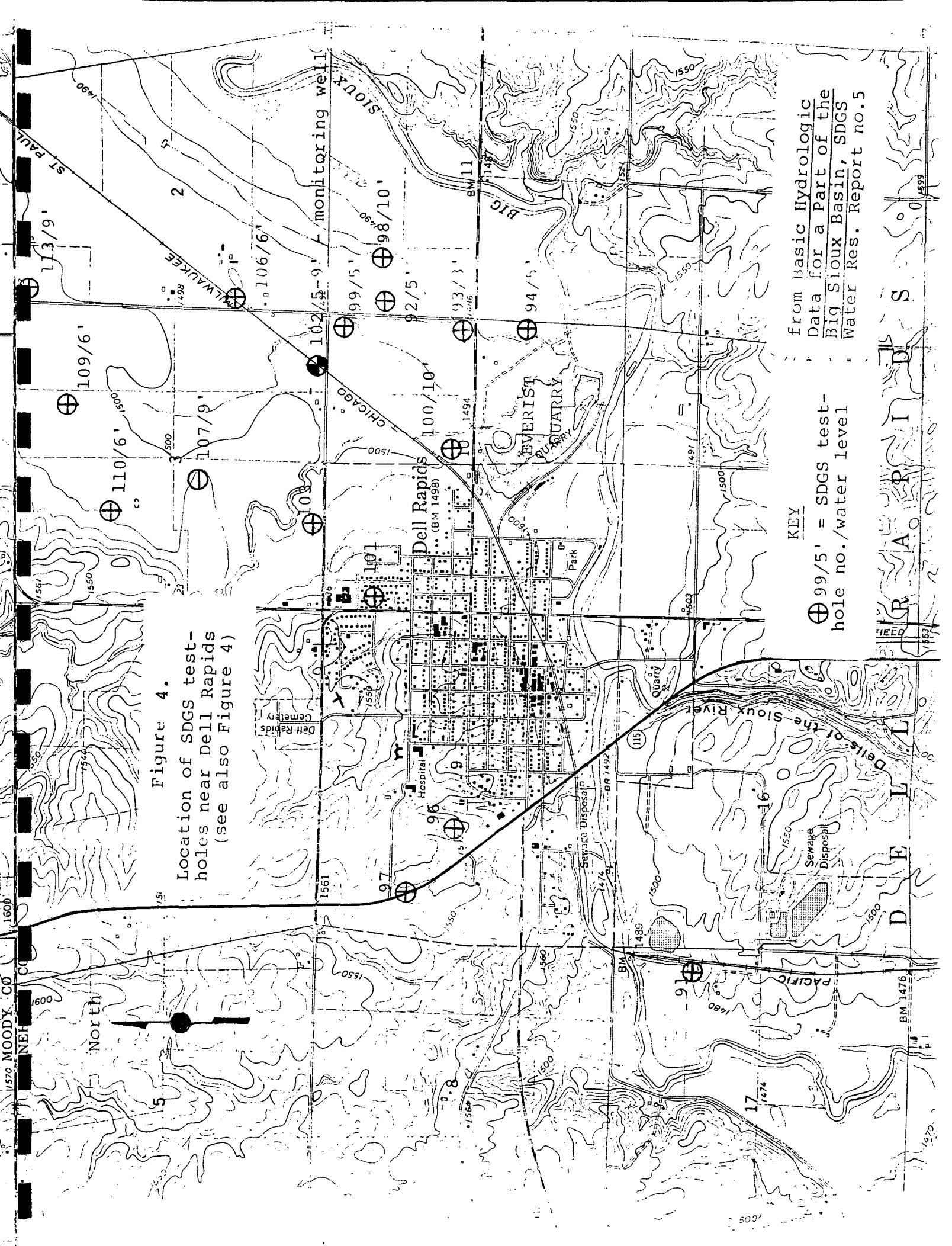


TABLE 5
FIELD TEMPERATURE AND CONDUCTANCE
SELECTED SAMPLING POINTS
EVERIST QUARRY
DELL RAPIDS, SOUTH DAKOTA

Sampling Site	Date	Conductance umho/cm	Temp C
1. Big Sioux River near pumps (ice)	12/04	610	3.0
	12/17	1080	3.5
2. Sump area (in water about 10' deep)	12/04	700	4.5
	12/27	790	4.9
3. Deep cut (in water about 15' deep)	12/04	800	6.5
	12/27	820	4.5
4. Base of stockpile (reeds)	12/04	750	7.0
	12/17	790	4.9
5. N wall surface flow benched area (ice)	12/04	1100	1.0
	12/17	1400	1.5
6. Discharge pipe settling basin (3gpm) Puddle (no flow)	12/04	140	1.5
	12/17	110	1.5

Note: Refer to Figure 2 for sampling locations



vertical scale
1' = 40'
no horizontal
scale

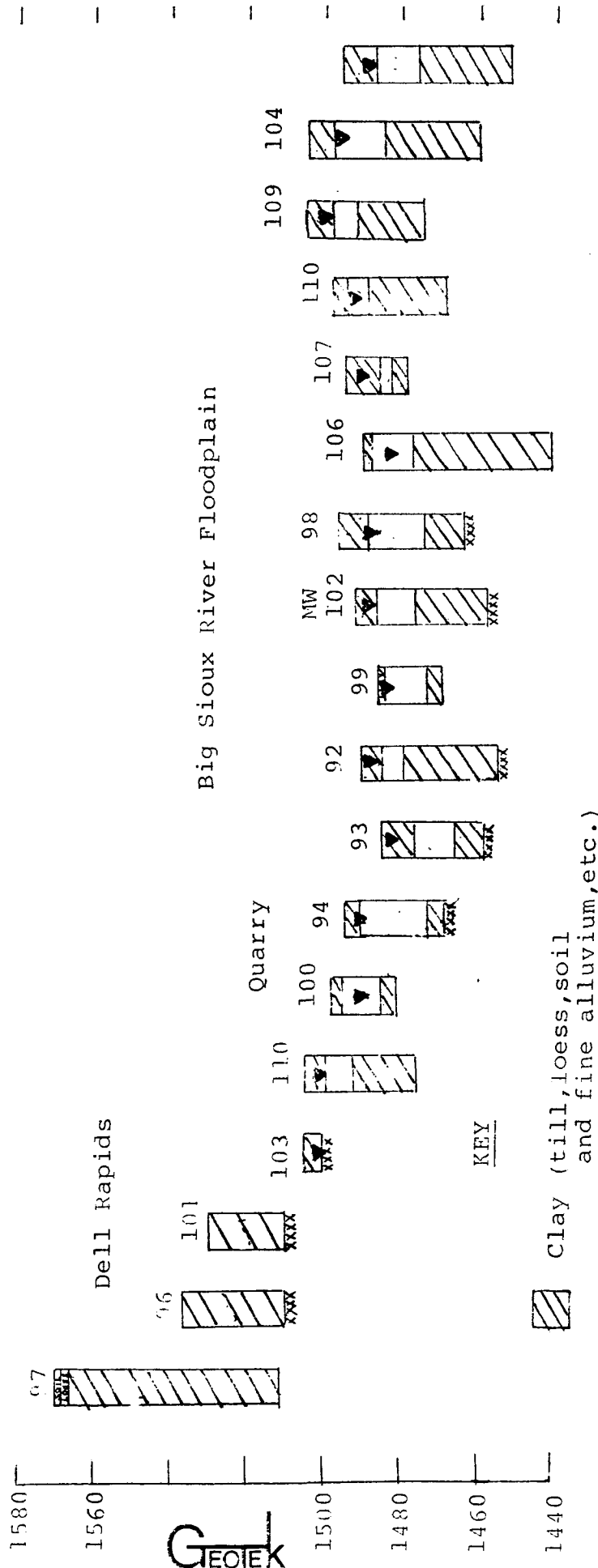
Figure 5.

Hydrogeologic Cross-Section in the Vicinity of
the Everist Quarry Near Dell Rapids

WEST

EAST

Geologic Cross-Section Based on SDGS Testholes
See Figure 3 for testhole locations



This figure derived from SDGS testhole data from Ellis, M. and Adolphson, D., 1969, Basic Hydrologic Data, For A Part of the Big Sioux Drainage Basin, SDGS Water Resources Report no. 5

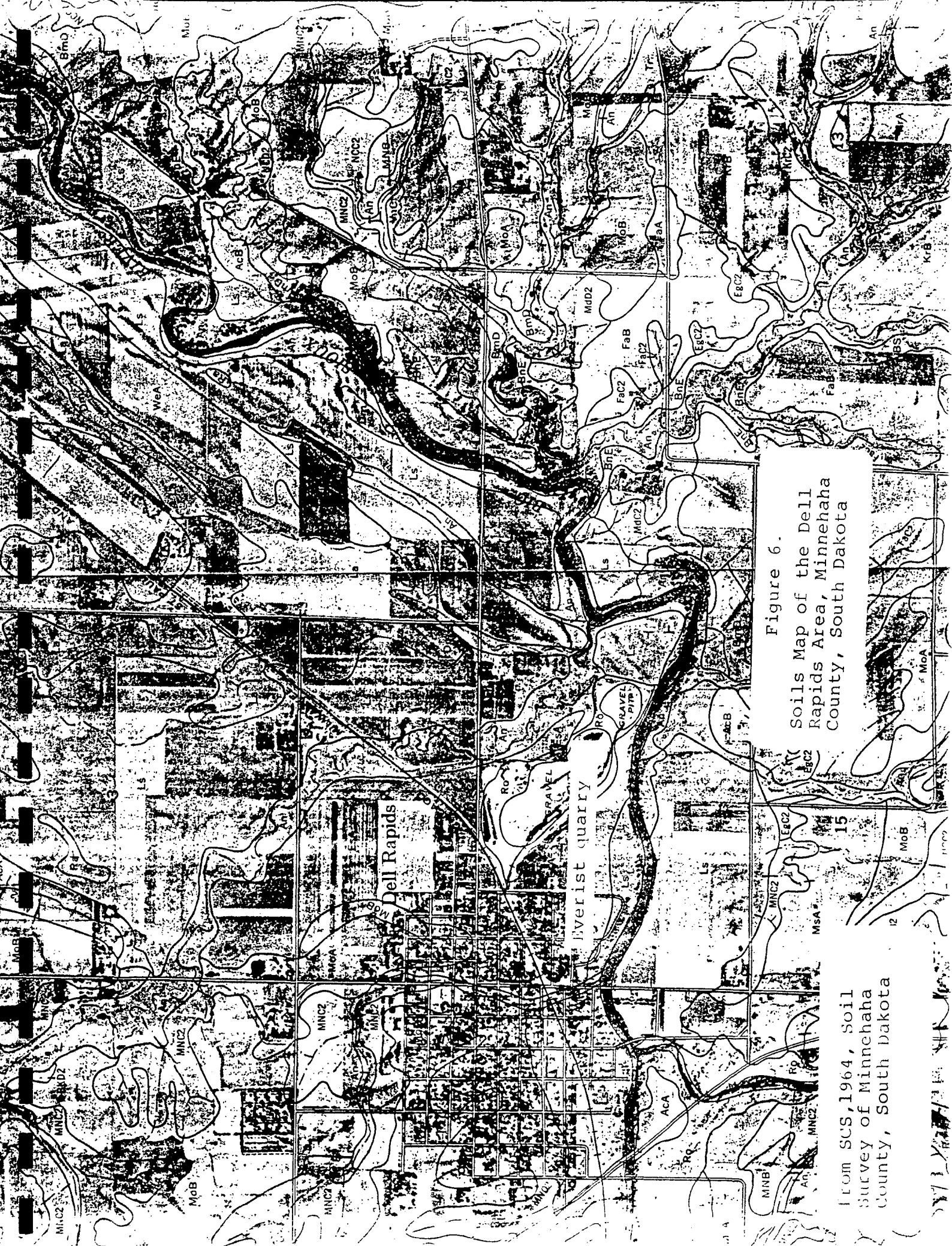


Figure 6.
Soils Map of the Dell
Rapids Area, Minnehaha
County, South Dakota

from SCS, 1964, Soil
Survey of Minnehaha
County, South Dakota

Location of USGS Big
Sioux River gaging
station near Dell Rapids

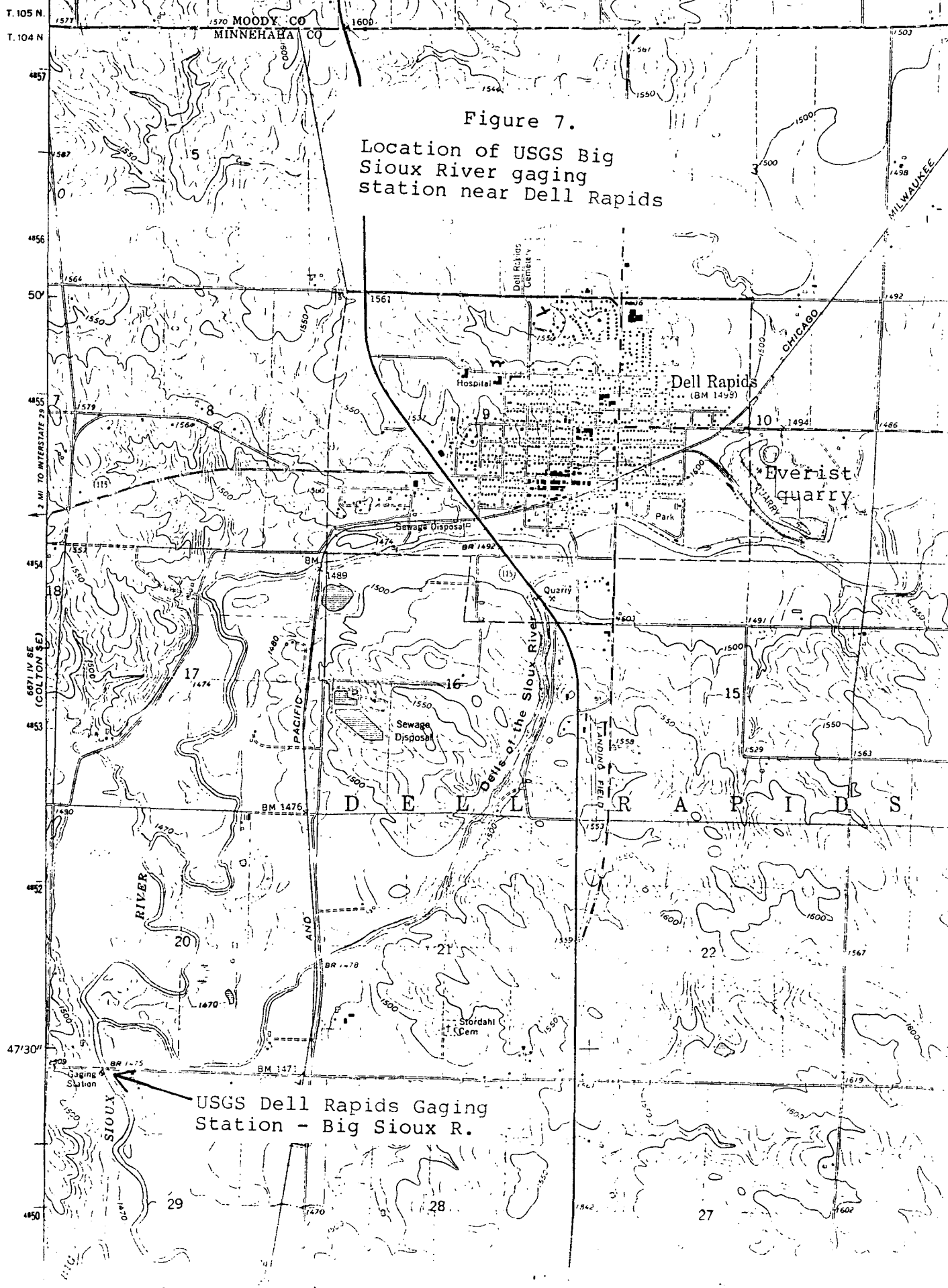
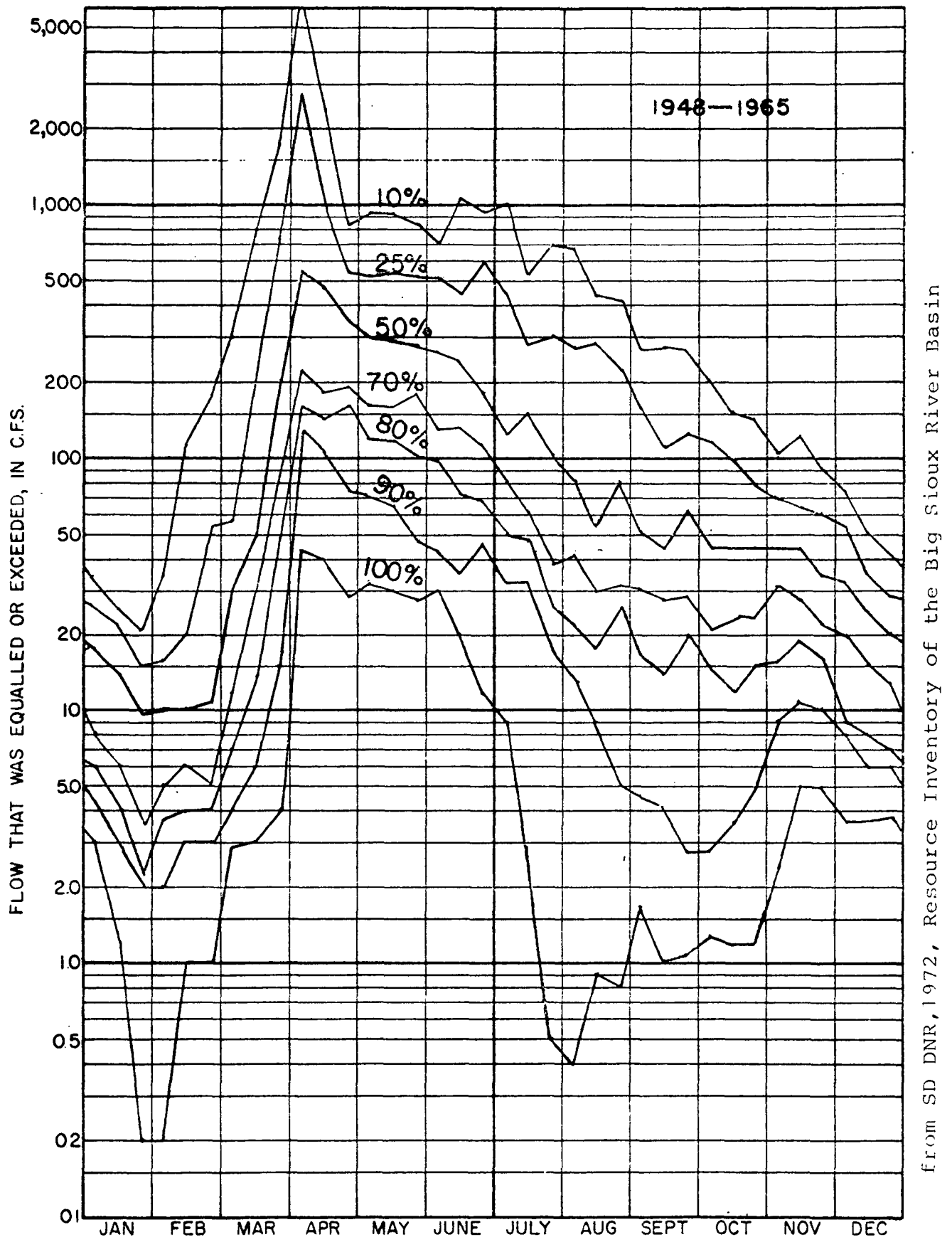


Figure 8.

Flow Duration Data for the Big Sioux River at Dell Rapids



from SD DNR, 1972, Resource Inventory of the Big Sioux River Basin

Figure 21. Flow Duration for Indicated Periods of the Year for the Big Sioux River near Dell Rapids

ATTACHMENT 1

Preliminary Assessment



ATTACHMENT 1

PRELIMINARY ASSESSMENT HYDROLOGIC BUDGET EVERIST QUARRY DELL RAPIDS, SOUTH DAKOTA

COMPILATION OF BACKGROUND INFORMATION AND DISCUSSION

LOCATION

The Everist Quarry is located on the southwest side of Dell Rapids in the SE 1/4, Section 10, T104N, R49W (Figure 1). As shown on Figure 2, the quarry is actually larger than is shown on Figure 1 which was derived from a topographic map taken in 1962. Since 1962, the quarry has been expanded to the west.

GEOLOGY

The quarry is located in an outcrop of the Sioux Quartzite (Figure 3). Quartzite is a PreCambrian age orthoquartzite. It may be described as a pinkish, very hard, well indurated rock composed largely of fine silica sands which have been extensively cemented by secondary silification (Baldwin, 1949). In eastern South Dakota, the Sioux Quartzite is estimated to be a few thousand feet thick (Steece, F., 1964).

Where erosion has not occurred, the Sioux Quartzite may be overlain by Cretaceous age sandstones and shales. Otherwise, the quartzite is often overlain by glacial drift and alluvial sediments (SCS, 1964).

As shown on Figures 1 and 2, the quarry is located at a sharp bend along the north edge of the Big Sioux River (Tipton, 1959). The quarry occurs within the Big Sioux River floodplain. Where the quartzite does not occur in or near the quarry, it is presumably overlain by thin alluvial sediments and perhaps some outwash as well.



The sharp bend to the south of the quarry and sudden pinching (narrowing) of the Big Sioux River floodplain may be related to the presence of the Sioux Quartzite which deflected glacial ice sheets around the more resistant quartzite.

Figure 5 provides an east-west geologic cross-section through the Dell Rapids area based on SDGS testholes (Figure 4, Attachment 2). The eastern hillside is underlain by thick deposits of glacial till (sandy clay). Near the quarry, the Sioux Quartzite is within a few feet of the land surface. To the west of the quarry, relatively thin deposits of sands and gravels appear to overlie glacial till.

The soils map of this area (SCS, 1964) shows an intermittent creek along the west side of the quarry (Figure 6). Based on the local topography (the creek's floodplain), it may be expected to be underlain by a number of feet of alluvial sediments (Figure 5). Since the aerial photo of the soils map was taken (<1964), the quarry appears to have extended into the area of these alluvial sediments (Figures 1,2,6).

SOILS

According to the Soil Survey of Minnehaha County, South Dakota (SCS, 1964, sheet 7), soils in the immediate area of the quarry include Rockland (Ro), LaPrairie silt loam (Ls), Estelline silt loam (EsA), and Alluvial land (An). Rockland soils are thin sediments in areas where the Sioux Quartzite outcrops or is very close to the land surface. LaPrairie soils are silt loams formed in alluvium. Estelline soils are silt loams overlying sands and gravels and often occur on stream terraces. Alluvial land is deposited in narrow valleys in drainageways and can vary from loam to silty clay loam.

CLIMATE

The hydrologic budget of the Dell Rapids area, including both surface water and groundwater, is largely dependent upon the seasonal variations in precipitation and temperature. Since South Dakota is located in the mid-continent, this area is subject to seasonal extremes of hot summers and cold winters (Hodge, 1960).

The Minnehaha County area receives about 24" to 25" of precipitation per year (Attachment 3). About 75% (about 18" to 19") of this occurs between April and September (SCS, 1964). Precipitation tends to be most frequent in the late Spring and Summer, with the least frequent precipitation occurring during the winter (SCS, 1964). The precipitation tends to occur from showers and thunder showers which are often intense, but usually short. Precipitation in excess of 0.1" occurs about fifty days per year. The average frequency of heavier precipitation events is provided on Table 1. A maximum rainfall of about 4.0" in 24 hours has been recorded for the general area (Jennings, 1963). Generally speaking, precipitation events of less than 0.1" will have little noticeable affect on groundwater recharge or surface water run-off while rains in excess of 2" (in 24 hours) often cause temporary flooding problems.

How well that precipitation can contribute to groundwater recharge and surface water run-off is dependent upon seasonal variations in temperature, plant transpiration needs and soil moisture. During the warmer months, considerable evaporation can occur. Average annual lake evaporation for the area is estimated to be about 36" per year (Spuhler et.al., 1971). Plant transpiration needs (crops, etc.) often require several inches of water per year (Todd, 1970). During the growing season, soil moisture is typically depleted by evapotranspiration needs.

In general, recharge to groundwater and run-off to surface water is highest in the spring when the rains are heavier. During the summer, evapotranspiration needs reduce groundwater recharge and surface run-off considerably. In the fall, if the soil moisture has not been too greatly depleted, some groundwater recharge and surface run-off can occur, although rains are less frequent than in the spring. During the winter, the ground freezes from about November through March and thus, prevents groundwater recharge (SCS, 1964).

It should be emphasized that there can be great variability in climatic changes from year to year and droughts and flooding can occur as well as the normal seasonal patterns.

SURFACE WATER

The average annual runoff in this area is about 1.0 inch/year (Gebert et.al.,1987). This runoff, together with groundwater recharge, provides water to the Big Sioux River and associated tributaries(SD DWNr,1985). The USGS maintains a gaging station just south of Dell Rapids on the Big Sioux River (Figure 7). This station has been in use since 1948 (Dornbush,1974). Table 2 (Rakness,1970) and Figure 8 (SD DNR,1972) provide information on the average flow within the river (Attachments 4,5). The average flow (50%) varies from about 10 cfs in the winter to 500 cfs in the spring (Figure 8). Typical low flows during the winter average about 10-30 cfs (Table 2). Although flow within the Big Sioux River at Dell Rapids has never been recorded to be zero, during the winter the flow can decrease substantially. Drought periods can also reduce flow within the river. For example, Koch (1983) notes that during a drought period the Big Sioux River at Dell Rapids had streamflow of less than 23 cubic feet per second (cfs) for 270 consecutive days from June 1976 to March 1977. Note: 1 cfs = 646,323 gal/day = 449 gpm.

As shown in Figure 8, peak flows tend to occur during the spring. This is also when flooding is most likely to occur. For example, on June 23, 1984, a peak flow of 17,400 cfs was recorded at the Dell Rapids station (Hoffman,et.al.,1986). It is GeoTek's understanding that this flood inundated the quarry. It may be worth noting that the USGS has calculated peaks flows of about 22,800 cfs to be expected to occur about once in every 25 years (Hoffman,et.al.,1986). Additional information on peak flows at this station are provided in Attachment 5.

With respect to water quality, the USGS has kept water quality records at the Dell Rapids gaging station since 1967. As shown in Table 3 the river shows considerable variability in specific conductance (a measure of dissolved solids) and in temperature. The magnitude of the specific conductance is inversely proportional to the volume of flow in the river (SD DWNr,1985). That is, during the winter low flows, the river becomes more mineralized (and colder) while during the heavier spring flows, the river becomes less mineralized. This is presumably because less mineralized surface runoff and precipitation contribute to the spring flows while only groundwater contributes to the low winter flows. Other parameters such as chloride and nitrate also demonstrate this seasonal variability in the river (Attachment 7).

GROUNDWATER

As mentioned in the geology section, the quarry occurs in the Sioux Quartzite and is bounded by glacial and alluvial deposits including the Big Sioux River floodplain. The USGS considers the Sioux Quartzite to be relatively impermeable in the Dell Rapids area (Koch, 1982, p. 5). However, the Sioux Quartzite is known to yield small amounts of water to wells through fractures in some areas of the State (SD DNR, 1972).

The Big Sioux River floodplain is underlain by the sands and gravels of the Big Sioux Aquifer. The aquifer appears to narrow and become thinner near the Dell Rapids area, but usually contains about 20' to 40' of saturated sands and gravels (Koch, 1982; SD DWR, 1986).

The SDGS estimates an average annual recharge to the Big Sioux Aquifer of about 3" per year (Hedges, et.al, 1983). The USGS and SD DWR estimate the average permeability of the Big Sioux Aquifer sands and gravels to be about 200 to 400 $\text{ft}^3/\text{ft}^2/\text{day}$ (1500-3000 gpd/ft^2).

The water levels tend to rise and fall in the aquifer in response to precipitation (Koch, 1982). SDGS testholes in the general area (Figure 4), as well as water level data from an observation well in the SE 1/4 of Section 03, about a half mile north of the quarry, indicate the water table is quite high in the general area of the quarry being within about 5' to 10' of the land surface (Figure 5, Table 4, Attachment 8).

The direction of the groundwater flow within the Big Sioux Aquifer is usually toward the Big Sioux River and in the downgradient direction of the River.

Based upon available information for eastern South Dakota (Meyer, 1983), the water quality of the Sioux Quartzite is usually fairly good, although it is rather hard, somewhat mineralized and may sometimes have elevated levels of radionuclides (Attachment 9). The water quality of the Big Sioux aquifer is usually less mineralized and of better quality (Attachment 9). With respect to water quality differences, the Sioux Quartzite tends to have much higher sodium and sulfate levels than the Big Sioux aquifer. There may also be significant differences in the levels of other parameters.

DESCRIPTION OF QUARRY

The quarry was apparently started in the 1920's and has been used continuously to the present. The original quarry was apparently about 40' deep, whereas the present quarry is about 150' deep (Figure 2). It is the understanding of GeoTek that beginning in 1927, the quarry used four pumps with a combined capacity of 7000 gpm (8.4 mgd) to pump water from the quarry to dewater it and to wash the crushed rock.

In 1955, three new pumps were installed. This included two 3400 gpm pumps and one 2400 gpm pump. This is a combined capacity of 9200 gpm (13.2 mgd). One of the 3400 gpm pumps is normally used during daily operation of the quarry to pump water from a deep area of the quarry referred to as the sump to the crushing plant. This water is pumped through a pipeline from the sump to the crushing plant. From there, the water is run into a settling basin to allow the fines to settle out. At the settling basin, the water returns as surface runoff to the sump area. In addition to this flow, some water also returns to the sump directly from the crushing plant (Figure 2).

Pumping records are very limited for the quarry but apparently one of the 3400 gpm pumps is typically used during the day while the plant is in operation. During the day, no water is pumped from the river to the plant. At night, the smaller 2400 gpm pump will pump to the river. In October, 1989, during the daily operation of the plant (3400 gpm pump in use), flow through the discharge pipe at the settling basin was measured to be approximately 1500 gpm (one time measurement). It should be noted that, when the plant is in use, in addition to the flow through the settling pond discharge pipe, return flow to the quarry also occurs from leaks in the piping from the pumps to the plant, and from return flows directly from the plant to the sump area (Figure 2).

The settling pond is believed to contain a thickness of about 20' to 30' of fines. Leakage of water from the bottom and sides of this settling basin is believed to occur in addition to that through the discharge pipe.

The quarry was flooded by the Big Sioux River in ~~1984~~ (Attachment 6). After that incident, a large dike was constructed along the west side of the quarry (Figure 2). Everist personnel note that during heavy rains that all three pumps must be used to pump to the river to keep the quarry pumps from being flooded.

The quarry plant is apparently shut down during the winter from about December 15 through March 15. During this time, the smaller 2400 gpm is apparently used to pump water to the river (using a float setting). On December 4, 1989, flow through the discharge pipe at the settling basin was measured to be about 3 gpm. On December 27, 1989, the discharge pipe was observed to have no flow.

On December 4, 1989, a brief visual inspection of the quarry was made. Although the 150' deep quarry sidewalls are within about 200' of the river, these sidewalls showed little evidence of seepage except under areas where the piping from the pumps appeared to leak. Flowing water was noted at the northwest base of the settling basin (reed area) and in the surface water pathways from the settling basin to the sump area. In the middle northern portion of the quarry, a flow of surface water (roughly estimated to be more than 25 gpm) was observed to be flowing into the quarry from a benched area which included areas of standing water (Figure 2).

On December 4 and 27, 1989, a YSI Model 33 meter was used to measure conductance and temperature of water in the quarry and the river (Table 5). Based on this limited data, the water in the settling basin discharge pipe appeared to be snowmelt (very little mineralization) while the water running into the north side of the quarry (benched area) appears to be groundwater (much more mineralized). Both the river and quarry samples showed an increase in mineralization from the December 4th sampling compared to the December 27th sampling (Table 5). This may indicate an increasing contribution of groundwater, to both the river and the quarry.

HYDROLOGIC BUDGET CONSIDERATIONS

The flow of water into and out of the quarry may be considered to be it's hydrologic budget. Provided below is a listing of some of the parameters to consider in the hydrologic budget:

<u>INFLOW</u>	<u>OUTFLOW</u>
Precipitation	Evapotranspiration
Surface runoff	Pumpage to river
Pumpage from sump area to plant includes: - leakage from pumping pipes - discharge from settling basin - discharge from plant to sump - leakage from settling basin	Washed product removed
Groundwater seepage from: - Glacial deposits - Alluvial deposits - Sioux Quartzite - River seepage	

Quarry Area

Using a manual planimeter the entire quarry property was measured to cover an area of about 134.4 acres ($=5856400 \text{ ft}^2 = 0.21 \text{ mi}^2$). The settling basin area was measured to cover an area of about 8.2 acres ($=360,000 \text{ ft}^2$).

Precipitation versus Pumpage

Average annual precipitation is about 24" per year. Assuming the entire area of the quarry is covered then, $2 \text{ ft} \times \text{area of quarry } (5856400 \text{ ft}^2) = 11712800 \text{ ft}^3/\text{yr} = 87.5 \text{ million gal/yr (mgal/yr)}$. Taking the last pumping measurement of the quarry on December 27, 1989 of 1.3 mgd, then the quarry will pump at least 474.5 mgal/yr ($1.3 \times 365 = 474.5$). Since the quarry must often use all the pumps to the river during heavy rains, this means the actual total annual pumpage to the river is probably considerably in excess of 500 mgal/yr. That is, even if the quarry receives the entire amount of precipitation, this is still considerably less than the amount pumped to the river. Therefore, it is apparent that the quarry must be receiving one or more other sources of water in

addition to the precipitation.

Precipitation

During the winter, precipitation averages about 0.7 inch/month for December through February (SCS, 1964). On a daily basis for each month this works out to about 0.002 ft/day. Assuming 0.002 ft/day falls over the entire quarry area of about 5,856,000 ft², then about 11,712 ft³ (0.088 mgd) of input to the quarry per day might occur.

Evaporation

The average annual lake evaporation in eastern South Dakota is about 36 inches/year. The settling basin is normally filled with water and has an approximate area of about 360,000 ft². It is more difficult to estimate how much of the rest of the quarry has areas of standing water (including wetlands and vegetated areas. If the sump and deep cut areas and wetland areas are included, an approximate estimate would be about 100,000 ft². Adding that to the 360,000' is about 460,000' or, about 500,000 ft² of area exposed to evaporation almost continually. Converting this to cubic feet is 1,500,000 ft³ (11.22 mgal/yr) of evaporation loss per year.

During the winter, especially when the ground is frozen, evaporation will be minimal. Walton (1970) estimated winter evaporation in Illinois to be about 0.3 inch/month. Assuming this estimate applies to South Dakota, this works out to about 0.008 ft/day of evaporation. Assuming evaporation of snow and water to occur over the entire area of the quarry of about 5,856,000 ft², then an outflow (loss) of about 4685 ft³ (0.035 mgd) will occur.

Surface Runoff

The quarry area is diked and has large stockpiles along portions of its boundaries. The main pit will of course catch any direct precipitation. Therefore, the potential for runoff onto the site appears to be minimal.

During the winter, when little precipitation occurs, runoff may be expected to be approximately zero on a daily basis.

Settling Pond

As shown on Figure 2, there is a large settling pond located along the northwest side of the quarry. This settling basin is estimated to contain a thickness of about 30' of fine grained sediments derived from the crushing and washing of the rock. This pond is roughly 400' wide by about 1000' long.

The pond is normally filled to overflowing with water during the operating season (spring through fall). Therefore, assuming a saturated thickness of 30' and a specific yield of about 20 percent for silt to fine sand (Todd, 1980) then these sediments hold about 18 million gallons of water ($30 \times 400 \times 1000 \times 0.2 = 2,400,000 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 = 17,952,000$).

As discussed in the following pumpage section, there appears to be a drainage of about 5600 gal/day from these sediments (based on December, 1989 pumping data). To completely drain these sediments would require about 3000 days (8.2 years). However, these sediments can probably only drain very much during the winter when the quarry is not in operation.

Pumpage to the River

The quarry has recently begun to keep continuous records of the time the pump to the river is in use (Attachment 10). Although this is a 2400 gpm pump, it is believed to have lost some efficiency over time and is now estimated to be pumping about 2000 gpm (verbal communication Mr. Dale Barnhart, Everist quarry).

GeoTek was informed that the quarry stopped their normal quarry pumping operation for the winter and began pumping only to the river using the 2400 gpm pump.

The normal pumping of the quarry operation was stopped on about November 23, 1989. Selected measurements over 24 hour periods show the following:

November 23-24 pumping time 12.3 hours = 1.47 mgd

December 12-13 pumping time 11.7 hours = 1.40 mgd

December 27-28 pumping time 10.8 hours = 1.30 mgd

These estimates assume a pumping rate of 2000 gpm. As can be seen, there appears to be a decline in the rate of pumpage. The decrease in daily pumping time from 1.47 to 1.30 mgd out to a net decline in pumpage over the month of December of about 170,000 gal/day. This works out to a loss of about 5,700 gal/day. This loss is likely related to slow drainage of water from the material in the settling pond. The settling basin may be expected to continue to drain as long as the quarry is not in operation because no water is being pumped into the basin. Assuming this rate of loss to continue over the winter, then this loss is likely to continue through January and February as well. Assuming seepage from the settling basin occurs for 90 days (December-February) then the rate of pumpage will decline by the end of February by about 513,000 gal/day. That is, assuming this trend to continue over the winter, then the pumping rate to the river may decline from 1.47 mgd to 0.93 mgd ($1.47 - 0.51 = 0.96$ mgd).

That is, assuming no precipitation input to the quarry, and that the settling pond sediments are allowing drainage of about 5600 gal/day to occur, then subtracting this drainage from the total pumpage to the river should give an estimate of the total inflow to the quarry from those sources other than precipitation.

Hydrologic budget estimate for the winter

During the winter, estimation of the hydrologic budget can be simplified because factors such as precipitation, evaporation will be minimized. Furthermore, normal operational pumping in the quarry (recycling of water) will not be occurring. Since the only pumping going on will be to the river, it is easier to define the hydrologic budget during the winter.

As a hydrologic budget equation this would be:

$$\text{INFLOW} = \text{OUTFLOW}$$

(P) Precipitation	(Q) Pumpage
(R) Runoff	(E) Evaporation
(G) Groundwater seepage	
(SW) River seepage	
(C) Storage changes (seepage from settling basin)	

Or, written as an equation on a daily basis,

$$P + R + G + SW + C = Q + E = 0$$

Assumptions:

Pumpage to River = 0.96 mgd (for end of February)
Precipitation = 0.088 mgd
Evaporation = 0.035
Runoff = 0
Seepage from Settling Pond = 0.0057 mgd

On a daily basis, the seepage rate of 0.0057 mgd is less than one percent (0.006) of the pumpage rate (0.96 mgd). Furthermore, during December, 1989 the weather was exceptionally cold and there was very little precipitation. Therefore, precipitation, evaporation and the seepage from the settling pond can be approximated to be near zero on a daily basis for December, 1989.

$$0 (P) + 0 (R) + G + SW + 0 (C) = 0.96 \text{ mgd } (Q) + 0$$

$$\text{Or, } G + SW = 0.96 \text{ mgd}$$

In other words, after subtracting out climatic variables and stored seepage from the settling pond, the quarry appears to be receiving an inflow of groundwater of about one mgd.

Ground Water and River Seepage

Based on the limited data available, there appears to be an inflow of groundwater into the quarry of about one mgd. This groundwater may be coming from a number of sources including:

Glacial/alluvial sediments
Sioux Quartzite
River seepage

Assuming that the walls of the quarry are the source of the groundwater inflow (seepage), an estimate can be made of the permeability of the quarry using Darcy's law (Todd, 1980) where:

$$\text{discharge (Q)} = \frac{\text{permeability (K)} \times \text{discharge area (A)}}{\text{hydraulic gradient (I)}}$$

$$\text{That is: } Q = KIA$$

Since we know Q and A then $Q/A = KI$. As shown on Figure 2, the sidewalls of the quarry are about 150' deep. Multiplying this by the approximate length of the quarry pit (about 5200') gives an area of about 780,000 ft². Then, one dividing one mgd (1,000,000 mgd/7.48 = 133,690 ft³) by the area (133,690 ft³/day by 780,000 ft²) equals 0.17 ft/day. That is $Q/A = KI = 0.17 \text{ ft/day}$. The normal hydraulic gradient in alluvial aquifers is about 0.001 (about 5 ft/mile). However, at a quarry wall, the hydraulic gradient may approach 1.0 (1 ft/1 ft).

Assume gradient (I) = 1.0 then K = 0.17 ft/day
Assume gradient (I) = 0.1 then K = 1.7 ft/day

Therefore, assuming a steep hydraulic gradient at the quarry walls of 0.1 to 1.0, then the permeability of the quarry walls (ignoring the bottom) would be between about 0.17 ft/day (1.3 gpd/ft) to 170 ft/day (1272 gpd/ft²). Since the hydraulic gradient is probably fairly steep, the lower values are probably more accurate (i.e., about 0.17-17.0 ft/day).

These values are characteristic of silt and silty sand or, in other words, are not very permeable (Freeze and Cherry, 1979). Compare this estimate to the typical permeability of the Big Sioux Aquifer sands and gravels of about 400 ft/day (Koch, 1982).

Because they are probably more permeable than the Sioux Quartzite, it is likely that the alluvial and glacial sediments are contributing the majority of the seepage to the quarry (?). However, the Sioux Quartzite is also probably contributing some seepage. As for the river, because the quarry walls so close to the river are dry, it would appear, based on visual observations, that the river is not contributing significantly to the quarry inflow (?). However, the river may be contributing some seepage to the quarry. There is insufficient data at this time to provide further analysis.

CONCLUSIONS

1. Ground water levels appear to be quite high (within 5' to 10') of the land surface near the quarry based upon available information. That is, there is no evidence that the quarry is adversely impacting shallow groundwater in the general vicinity of the quarry.
2. Based upon the limited information available, there is no evidence that the river has been adversely impacted by the quarry. Based upon visual observations, there appears to be little seepage from the river in the quarry. The USGS gaging station downgradient from the quarry has never gone dry even during drought periods.
3. The settling pond appear to be allowing slow drainage of water from it's sediments into the quarry during the winter when the quarry is not in operation. This appears to be about 5,600 gal/day (based only on December, 1989 data).
4. After subtracting climatic input (precipitation, etc) and the seepage from the settling pond, there appears to be a net inflow of groundwater into the quarry of about one mgd.
5. The overall hydrologic impact to the environment of the quarry dewatering appears to be minimal. Pumping to the river from the quarry may, in fact, be beneficial.

During heavy rains, the quarry serves as a temporary storage basin to dampen peak runoff flows and to reduce flooding. During periods of low flow in the river, the quarry provides a steady source of inflow to the river.

RECOMMENDATIONS

1. Continuous pumping records should be maintained. After a periods of one year, the pumping records can be reviewed and compared to climatic factors (such as precipitation and river flow).
2. The pumping rates in the pumps should be checked and verified.
3. It may be useful to maintain precipitation gages at the quarry.
4. Water quality sampling of both the river and quarry is recommended on a monthly basis for about one year. This could include temperature, specific conductance, and the common ions, especially sodium, chloride, and sulfate. Sampling for nitrate and ammonia and perhaps organic chemicals may also be useful as well. Such information may help to determine the source of the groundwater.
5. If further hydrologic assessment of the quarry is desired, the following are offered as options:
 - A. Measure the flow in the river both above and below the river at the same time a few times during the year, especially during periods of low flow (but not when frozen).
 - B. Install monitoring wells in the settling basin sediments and in the alluvial/glacial sediments near the quarry. The wells could be sampled for both water levels and water quality.
 - C. Using information from above, construct a hydrogeologic computer model of the quarry and the immediate area.

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ATTACHMENT 2

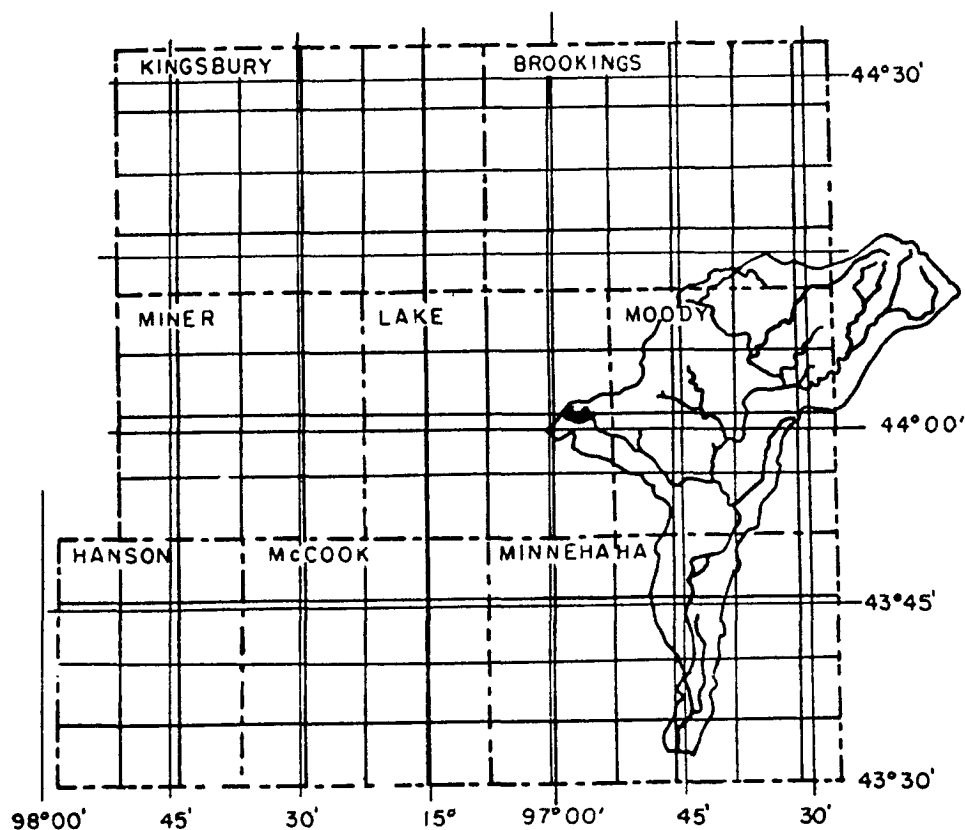
SDGS Testholes Near Dell Rapids



GEOTEK ENGINEERING & TESTING SERVICES, INC.

SOUTH DAKOTA GEOLOGICAL SURVEY
and
SOUTH DAKOTA WATER RESOURCES COMMISSION
Water Resources Report No. 5

BASIC HYDROLOGIC DATA, FOR A PART OF
THE BIG SIOUX DRAINAGE BASIN
EASTERN SOUTH DAKOTA



by
Michael J. Ellis and Donald G. Adolphson
U. S. Geological Survey

Science Center
University of South Dakota
Vermillion, South Dakota
1969

R. 50 W.

T. 105
N.

T. 105
N.

T. 104
N.

T. 104
N.

43°45'

43°45'

T. 103
N.

T. 103
N.

T. 102
N.

T. 102
N.

T. 101
N.

T. 101
N.

96°37'30"

R. 49 W.

Everist quarry area

Numbers refer to
SDGS testholes

See also Figure 4
for testhole locations

GAGIN
STREAM



Minnehaha County -- continued

Test hole 89 (104-49-20bbc). Altitude, 1,477 feet (R). Depth to water 10 feet (reported summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	3	3
Clay, dark-brown.....	12	15
Clay, dark-brown, sandy.....	7	22
Rock?.....	2	24
Sand, medium to coarse, some clay.....	6	30
Clay, gray.....	15	45
Bedrock.....		45+

Test hole 90 (104-49-21bbb). Altitude, 1,480 feet (R). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	2	2
Clay.....	8	10
Bedrock.....		10+

Test hole 91 (104-49-17ada). Altitude, 1,495 feet (T). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Alluvium.....	4	4
Till, brownish-gray.....	4	8
Bedrock.....		8+

Test hole 92 (104-49-11bcc). Altitude, 1,486 feet (T). Depth to water 5.1 feet (measured October 18, 1965). Drilled by USGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil.....	2	2
Sand, medium to coarse, some gravel.....	8	10
Gravel, fine to medium, sandy.....	3	13
Clay.....	3½	16½

Minnehaha County -- continued

Test hole 93 (104-49-10add). Altitude, 1,490 feet (R). Depth to water 3 feet (reported summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil.....	2	2
Clay, gray, sandy.....	3	5
Sand, medium to coarse, some clay.....	6	11
Clay, tan, some pebbles (till).....	24	35
Bedrock.....		35+

Test hole 94 (104-49-10dab). Altitude, 1,485 feet (R). Depth to water 5 feet (reported summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	2	2
Clay, brown.....	3	5
Sand, brown, some clay.....	4	9
Gravel.....	1	10
Sand, coarse, some clay.....	6	16
Clay.....	5	21
Bedrock.....		21+

✓ Test hole 96 (104-49-9bdc). Altitude, 1,537 feet (T). Drilled by USGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil.....	1	1
Clay, brown, silty.....	26	27
Bedrock, quartzite.....		27+

✓ Test hole 97 (104-49-9bcb). Altitude, 1,570 feet (T). Drilled by USGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	2	2
Silt, buff.....	2	4
Clay, buff (till).....	65	69

Minnehaha County -- continued

Test hole 98 (104-49-11bbc). Altitude, 1,490 feet (R). Depth to water 10 feet (estimated summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	2	2
Sand, medium to coarse.....	11	13
Clay.....	36	49

Test hole 99 (104-49-10aaa). Altitude, 1,492 feet (R). Depth to water 5 feet (reported summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	3	3
Clay.....	2	5
Sand, brown, coarse, some clay.....	10	15
Clay.....	19	34
Bedrock.....		34+

Test hole 100 (104-49-10acc). Altitude, 1,495 feet (R). Depth to water 10 feet (reported summer of 1965). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Clay, brown.....	5	5
Sand, brown, clayey.....	10	15
Gravel, coarse.....	2	17
Clay.....	3	20
Bedrock.....		20+

Test hole 101 (104-49-10bbc). Altitude, 1,530 feet (R). Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Clay, brown.....	19	19
Bedrock.....		19+

Minnehaha County -- continued

Observation well 102 (104-49-3ddc). Altitude, 1,497 feet (L).
 Observation well S-22 of SDWRC. Drilled by SDWRC. Water
 levels given in table 2.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil.....	4	4
Clay, yellow.....	5	9
Sand, fine.....	9	18
Gravel.....	4	22
Clay, blue.....	10	32
Sioux Quartzite.....		32+

Test hole 103 (104-49-3cdc). Altitude, 1,505 feet (R).
 Drilled by SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Topsoil, black.....	1	1
Loess.....	3	4
Bedrock.....		4+

Test hole 104 (104-49-2dab). Altitude, 1,480 feet (R).
 Depth to water 7 feet (reported summer of 1965). Drilled by
 SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil.....	3	3
Sand, medium to coarse, some gravel.....	6	9
Hard rock.....	1	10
Sand, coarse.....	1	11
Clay.....	29	40

Test hole 105 (104-49-1bcc). Altitude, 1,488 feet (R).
 Depth to water 5 feet (reported summer of 1965). Drilled by
 SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, sandy.....	2	2
Sand, medium to coarse, some gravel.....	11	13
Clay, gray (till).....	16	29

Minnehaha County -- continued

✓ Test hole 106 (104-49-2cbc). Altitude, 1,495 feet (T).
Depth to water 6.6 feet (measured October 18, 1965). Drilled
by USGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	1	1
Sand, very fine to medium, silty.....	7	8
Gravel, fine to very coarse, sandy.....	3	11
Sand, medium to very coarse, some gravel.....	2	13
Clay.....	3½	16½

✓ Test hole 107 (104-49-3daa). Altitude, 1,498 feet (T).
Depth to water 9 feet (reported October 10, 1958). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Alluvium, tan, sandy and clayey.....	4	4
Sand, fine to medium.....	5	9
Gravel, very coarse.....	1	10
Clay, sandy.....	4	14
Clay, gray (till).....	15	29

✓ Test hole 108 (104-49-1bbc). Altitude, 1,488 feet (R).
Depth to water 7 feet (reported summer of 1965). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, dark-brown, sandy.....	2	2
Sand, medium to coarse, some gravel.....	15	17
Clay and pebbles (till).....	12	29

✓ Test hole 109 (104-49-3abd). Altitude, 1,505 feet (R).
Depth to water 10 feet (reported summer of 1965). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, dark-brown.....	2	2
Clay, brown.....	3	5
Sand, brown, coarse, clayey.....	5	10
Gravel, fine.....	1	11
Sand, coarse, some gravel.....	8	19
Clay (till).....	25	44

Minnehaha County -- continued

Test hole 110 (104-49-3bdb). Altitude, 1,505 feet (R).
Depth to water 6 feet (reported summer of 1965). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil, black.....	2	2
Clay.....	4	6
Gravel.....	7	13
Clay.....	16	29

Test hole 111 (104-49-1aab). Altitude, 1,485 feet (T).
Depth to water 19 feet (reported July 10, 1958). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Alluvium, black.....	9	9
Sand, medium to coarse.....	5	14
Sand, coarse.....	5	19
Clay, grayish-brown (till).....	15	34

Test hole 112 (104-49-1baa). Altitude, 1,485 feet (R).
Depth to water 10 feet (reported summer of 1965). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Clay, dark-brown, sandy.....	5	5
Sand, dark-brown, clayey.....	5	10
Gravel.....	2	12
Sand, medium to coarse.....	8	20
Clay, gray.....	20	40

Test hole 113 (104-49-2bbb). Altitude, 1,496 feet (T).
Depth to water 9 feet (reported July 10, 1958). Drilled by
SDGS.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Soil and alluvium.....	4	4
Clay, silty, sandy.....	5	9
Gravel, medium to coarse.....	5	14
Gravel, coarse.....	2	16
Very coarse material.....	2	18
Gravel, coarse.....	1	19
Sand, coarse.....	1	20
Clay, brownish-gray (till).....	24	44

ATTACHMENT 3

Climate in Minnehaha County - SCS



SOIL SURVEY MINNEHAHA COUNTY SOUTH DAKOTA



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION

General Nature of the County

This section is provided mainly for those who are not familiar with Minnehaha County. It consists of general information about the county, some statistics on agriculture, and detailed information about the climate.

Climate¹

The climate of Minnehaha County is continental. The summers are quite warm, and the winters are long and cold. Maximum precipitation occurs late in spring and in summer, and minimum precipitation is in winter. The weather changes frequently from day to day and from week to week. Air masses of different properties blow in and bring wide differences in temperature and other atmospheric conditions. Seasonal weather also varies widely from year to year, but there are times when hot weather in summer or very cold weather in winter lasts for several days or for more than a week. Listed in table 8 are temperature and precipitation data recorded at Sioux Falls.

Temperature

Temperature fluctuates frequently. Only a few times a year do extremes of temperature stay about the same for even a few days. Masses of cold air often move in rapidly and cause strong, gusty winds for several hours and a rapid fall in temperature. Late in fall, in winter, and early in spring, a cold front may lower the temperature from 20° to 30° F. within 24 hours or less.

The average daily temperature normally reaches its

¹ By A. B. PACK, State climatologist, U.S. Weather Bureau, Huron, South Dak.

minimum of about 15° during January. There is noticeable warming by late February, and by about April 10 the normal daily average is near 45°.

During the first 10 days of May the average daily temperature is about 55°, and by June 20, it is about 70°. The daily average remains about 70° until late in August, but a maximum temperature of 88° may occur about the middle of July. The temperature drops rather slowly from a normal daily average of about 68° early in September to near 50° by the middle of October. Cooling takes place more rapidly after about October 15, and the daily average is 32° by the middle of November. The normal daily maximum temperature for the county is about 12° above the daily average; the normal daily minimum temperature is about 12° below the daily average.

A temperature of 90° or higher occurs on an average of 25 to 30 days per year. More than half of these days are in July and in August. Cool summers may have 15 days or less with a temperature of 90° or higher, and especially hot summers may have 40 or more. A temperature of 90° or higher generally occurs as early as the second or third week in May and as late as the first or second week in September. Normally, temperatures reach 100° or higher on 2 or 3 days per year, usually between July 1 and the early part of August. The frequency of 100° temperature in Minnehaha County is appreciably less than it is in the central and western counties of the State.

A temperature of 0° or colder occurs on an average of 30 days per winter. When winters are mild, there may be as few as 10 days of 0° temperature, but in severe winters the number may exceed 40 days. A temperature of 0° or colder may be expected as early as the middle of November and as late as the middle of March.

TABLE 8.—Temperature and precipitation at Sioux Falls, Minnehaha County, South Dakota

Month	Temperature				Precipitation							
	Average daily maximum	Average daily minimum	7 years in 10		Average for the month	Maximum in the month	Minimum in the month	3 years in 10 will have		Average snowfall	Average number of days—	
			Monthly maximum will be equal to or higher than—	Monthly minimum will be equal to or lower than—				More than—	Less than—		Snow-fall is 1 inch or more—	Snow cover is 1 inch or more—
	° F.	° F.	° F.	° F.	Inches	Inches	Inches	Inches	Inches	Inches	Days	Days
January	24	4	43	—12	0.7	2.2	(1)	0.9	0.2	5.7	2	21
February	30	9	46	—10	.7	2.8	(1)	1.4	.5	8.4	2	18
March	42	22	62	4	1.4	3.4	0	1.9	1.0	13.0	3	18
April	59	34	78	21	2.4	6.0	0	2.9	1.3	2.4	1	2
May	71	45	86	33	3.4	9.4	0.1	4.4	1.9	(1)	0	0
June	80	56	92	44	4.3	8.4	.4	5.3	3.5	0	0	0
July	88	62	97	51	3.0	9.1	.3	3.3	2.3	0	0	0
August	85	60	95	48	3.3	9.3	.4	4.1	2.3	0	0	0
September	75	49	88	34	2.9	8.3	(1)	3.6	1.8	0	0	0
October	63	37	78	24	1.5	6.9	(1)	1.7	.4	.2	0	0
November	43	21	64	3	1.1	3.7	0	1.6	.5	4.9	2	6
December	29	9	46	—7	.7	3.0	(1)	.9	.3	6.1	2	18
Year ²	58	34			25.4	36.1	10.4	27.7	22.8	40.7	12	53

¹ Trace.

² Average yearly maximum and minimum daily temperatures; yearly average, maximum, and minimum precipitation; probable total precipitation 3 years in 10; yearly average snowfall and total days in year with an inch or more of snowfall or snow cover.

At least one day is likely to have a temperature as low as -20° every winter. On most days between December 15 and February 14 the highest daytime temperature does not exceed 32° .

The last day in spring on which a temperature of 32° or colder occurs is about May 7; the first day in fall is about October 1. Thus the average length of the freeze-free season is about 147 days. However, the length of freeze-free seasons varies from 100 to 200 days. In 7 years out of 10, this season ranges from 130 to 160 days. In most seasons the last freeze in spring occurs between April 25 and May 15, and the first freeze in fall between September 20 and October 10. Table 9 lists probabilities and the dates of the last damaging cold temperature in spring and the first in fall.

TABLE 9.—*Probability of last damaging cold temperature in spring and first in fall*

[All data from Sioux Falls, South Dak.]

Damaging temperature	Probability ¹		
	1 year in 10	2 years in 10	5 years in 10
Spring:			
16° F. after.....	April 11.....	April 3.....	March 27.
20° F. after.....	April 23.....	April 13.....	April 2.
24° F. after.....	May 1.....	April 24.....	April 13.
28° F. after.....	May 14.....	May 7.....	April 24.
32° F. after.....	May 23.....	May 16.....	May 8.
36° F. after.....	May 31.....	May 27.....	May 14.
Fall:			
16° F. before....	October 28....	November 2....	November 10.
20° F. before....	October 18....	October 22....	November 2.
24° F. before....	October 5....	October 12....	October 21.
28° F. before....	September 21..	September 27..	October 9.
32° F. before....	September 18..	September 22..	September 29.
36° F. before....	September 11..	September 16..	September 25.

¹ Probability that there will be temperatures of 16° F. or lower, 20° F. or lower, 24° F. or lower, 28° F. or lower, 32° F. or lower, 36° F. or lower in spring after date indicated, or in fall before date indicated.

Precipitation

From April through September, precipitation normally totals 18 to 19 inches, or about 75 percent of the amount annually expected. In 3 years out of 10, the total from April to September equals or exceeds 21 inches, and in 1 or 2 out of 10 years, the total is 15 inches or less. Normally, in the period from May through August, the expected rainfall amounts to about 14 inches, the greater part of which is likely to fall in the first half of the period. If distribution is good, this amount is ample for crop production, but in nearly every growing season there is one period or more of deficient rainfall.

The amount of precipitation received from October through March appears to be important for the growth of crops the following summer, but in this period only about 6 inches, or 25 percent, of the annual precipitation falls in Minnehaha County. A shortage of precipitation in fall, in winter, and early in spring lowers reserve moisture in the soil and endangers successful crop production the following summer, unless precipitation during the growing season is above normal and is well dis-

tributed. Conversely, if precipitation is near or above normal from October through March, the reserve of soil moisture counteracts the effect of subnormal or poorly distributed rainfall in the following growing season.

During the growing season, precipitation usually comes in showers and thundershowers of short duration rather than from storms that produce steady but less intense rainfall for a period of several hours to more than a day. Precipitation of 1 inch or more in 24 hours occurs once or more during the growing season, and precipitation in excess of 2 inches occurs once or twice in approximately 6 out of 10 growing seasons.

Table 10 shows the percentage of chance, or the number of chances in 100, of receiving a trace, none, or a measured amount of precipitation in a 1-week period. By referring to table 10, it can be seen that for the week beginning June 7, the chances of weekly precipitation totaling a trace, or less, are 8 in 100. In that week the chances of receiving 1 inch of precipitation, or more, are 44 in 100.

The percentage of chance for given amounts of precipitation by a 2-week period is presented in table 11, and for a 3-week period in table 12. Tables 11 and 12 are used the same way as is table 10.

In Minnehaha County the chances of receiving 1 inch of precipitation in 1 week are less than 10 out of 100 during March. The chances increase rapidly in April, and from late in April through May the chances for 1 inch of precipitation per week are 26 to 36 in 100. The percentage of chance for 1 inch of rain reaches its highest point of the year in June, which has a probability varying between 31 and 46 percent. The chances decline during the early part of July and from then to late in September the probability varies between 20 and 30 percent. The percentage of chance of about 1 inch of precipitation in 1 week decreases sharply through the early part of October and then decreases at a slow, steady rate to a minimum of about 1 chance in 100 during most of January. A similar seasonal trend is evident in the percentage of chance in any week for other amounts of measurable precipitation listed in table 10.

The percentage of chance for 1 inch of precipitation in 2 weeks or 3 weeks shows the same seasonal trend. For example, there is a rapid increase in April, a yearly maximum in June, a secondary peak in August and September, a sharp decrease in October, and a yearly minimum during winter. (See tables 11 and 12.)

A high temperature accompanied by little or no precipitation for a week or more is important in the production of crops in Minnehaha County. Under these conditions soil moisture is exhausted rapidly in the upper layers, and small grains, corn, and other crops are injured or their yields are reduced, especially if the content of moisture in the subsoil is low.

During the growing season in Minnehaha County, an average of four periods of 7 days may be expected in which the average temperature is 85° or higher and precipitation is 0.10 inch or less. A survey of weather records for 10 years showed that the number of such 7-day periods varied from at least one every growing season to as many as six in 2 years out of 10. In many years two of these 7-day periods of hot, dry weather are consecutive; that is, they last for 14 days. Occasionally they last for 21 days.

Weekly periods of hot, dry weather (average maximum temperature 85° or higher and total precipitation 0.10 inch or less) occur most commonly in the last half of July, and in 6 years out of 10, one of these weeks may be expected. Early in July and for each week in August the frequency of a week of hot, dry weather decreases to about 4 out of 10 years.

TABLE 10.—*Chance, in percent, of receiving stated amounts of precipitation during a 1-week period at Sioux Falls, South Dakota (2)*

Week beginning	Probability of receiving at least—						
	Trace or none	0.20 in.	0.60 in.	0.80 in.	1.00 in.	1.60 in.	2.00 in.
January 3.....	44	20	2	1	(¹)	0	0
January 10.....	50	27	6	3	1	0	0
January 17.....	37	18	2	1	(¹)	0	0
January 24.....	32	32	10	6	4	(¹)	0
January 31.....	33	37	13	8	5	1	(¹)
February 7.....	37	31	8	4	2	(¹)	0
February 14.....	39	34	13	8	5	1	(¹)
February 21.....	33	35	8	4	2	0	0
March 1.....	32	44	17	10	6	1	(¹)
March 8.....	37	35	13	8	5	1	(¹)
March 15.....	32	41	18	12	8	3	1
March 22.....	32	44	19	13	9	3	1
March 29.....	33	44	13	7	4	(¹)	0
April 5.....	20	56	30	22	16	6	3
April 12.....	37	49	28	21	16	7	4
April 19.....	11	66	43	36	29	17	12
April 26.....	15	70	44	34	26	12	7
May 3.....	11	71	44	34	27	13	8
May 10.....	11	68	44	35	28	15	10
May 17.....	9	73	46	36	29	14	9
May 24.....	19	70	51	43	36	22	15
May 31.....	8	78	52	42	34	18	12
June 7.....	8	85	63	53	44	24	16
June 14.....	8	77	52	42	35	19	13
June 21.....	6	85	64	55	46	28	20
June 28.....	9	74	48	39	31	16	10
July 5.....	17	72	49	40	32	17	11
July 12.....	20	66	40	31	23	10	6
July 19.....	20	63	38	29	23	11	6
July 26.....	19	61	40	33	27	15	11
August 2.....	9	72	45	36	29	15	9
August 9.....	11	69	46	38	31	18	12
August 16.....	13	68	39	29	22	9	5
August 23.....	20	61	39	32	26	14	9
August 30.....	22	54	30	23	17	8	5
September 6.....	17	69	46	37	30	16	10
September 13.....	24	63	43	35	29	16	11
September 20.....	26	57	35	28	22	11	7
September 27.....	33	46	25	19	14	6	4
October 4.....	24	49	28	21	17	8	5
October 11.....	39	40	19	13	9	3	2
October 18.....	45	33	16	11	8	3	2
October 25.....	46	37	17	11	8	2	1
November 1.....	43	37	17	2	8	3	1
November 8.....	35	41	20	14	10	4	2
November 15.....	54	31	15	11	8	3	1
November 22.....	41	31	12	7	5	1	(¹)
November 29.....	39	33	11	7	4	1	(¹)
December 6.....	46	24	6	3	2	0	0
December 13.....	45	23	4	2	1	0	0
December 20.....	50	25	9	5	3	1	(¹)
December 27.....	48	27	9	5	3	1	(¹)

TABLE 11.—*Chance, in percent, of receiving stated amounts of precipitation during a 2-week period at Sioux Falls, South Dakota (2)*

Week beginning	Probability of receiving at least—						
	Trace or none	0.20 in.	0.60 in.	1.00 in.	1.40 in.	2.00 in.	2.90 in.
January 3.....	24	44	12	3	1	0	0
January 17.....	15	46	17	6	2	1	0
January 31.....	19	56	26	12	5	2	(¹)
February 14.....	11	59	25	11	5	1	(¹)
March 1.....	13	63	33	17	9	3	(¹)
March 15.....	13	67	38	22	12	5	2
March 29.....	8	79	48	27	15	6	1
April 12.....	2	86	64	47	35	21	11
April 26.....	0	94	75	57	41	25	12
May 10.....	2	91	73	57	44	28	16
May 24.....	0	96	83	68	54	37	22
June 7.....	2	97	90	77	63	43	24
June 21.....	0	96	83	69	56	41	26
July 5.....	4	92	76	58	43	26	13
July 19.....	2	88	68	51	38	24	13
August 2.....	2	90	73	57	45	31	18
August 16.....	6	87	68	51	37	23	11
August 30.....	8	87	69	51	37	22	11
September 13.....	8	87	70	53	39	25	13
September 27.....	13	69	47	33	23	14	7
October 11.....	20	60	35	20	12	6	2
October 25.....	24	58	33	20	12	6	2
November 8.....	22	56	33	21	13	7	3
November 22.....	17	55	26	12	6	2	(¹)
December 6.....	19	44	13	4	1	(¹)	0
December 20.....	28	46	20	9	4	(¹)	0

¹ Chance less than 0.5, but greater than 0.

TABLE 12.—*Chance, in percent, of receiving stated amounts of precipitation during a 3-week period at Sioux Falls, South Dakota (2)*

Week beginning	Probability of receiving at least—						
	Trace or none	0.20 in.	0.60 in.	1.00 in.	2.00 in.	2.80 in.	4.00 in.
January 10.....	11	59	28	13	2	(¹)	0
January 31.....	6	71	40	22	5	1	(¹)
March 1.....	8	76	49	31	9	4	1
March 22.....	2	91	66	43	13	5	(¹)
April 12.....	2	97	87	74	41	24	10
May 3.....	0	98	89	77	48	30	14
May 24.....	0	100	98	93	69	48	24
June 14.....	0	99	95	87	63	45	26
July 5.....	2	95	84	71	43	27	13
July 26.....	0	97	87	75	48	33	17
August 16.....	2	96	84	69	37	21	8
September 6.....	4	95	89	78	48	29	12
September 27.....	6	82	61	45	21	11	4
October 18.....	8	74	47	30	10	4	1
November 8.....	9	71	45	29	10	4	1
November 29.....	11	65	30	13	6	1	0
December 20.....	17	61	28	12	1	(¹)	0

¹ Chance less than 0.5, but greater than 0.

¹ Chances less than 0.5, but greater than 0.

ATTACHMENT 4

Seasonal Flow for the Big Sioux River
at Dell Rapids



SEASONAL FLOW-DURATION
AND MEAN FLOW TABLES
FOR
SELECTED RIVERS AND STREAMS
IN SOUTH DAKOTA

James N. Dornbush
Professor of Civil Engineering
South Dakota State University
Brookings, South Dakota
1974

Report Available from and Prepared
for OWRR Project No. A-033-SDAK
Water Resources Institute
South Dakota State University
Brookings, South Dakota 57006

FLOW DURATION AND MEAN FLOW FOR THE BIG SIOUX RIVER
FOR INDICATED PERIODS OF THE YEAR

Station: Dell Rapids
Period of Record: 5/1948-9/1965
USGS Station No.: 64810

Time Period	Flow (cfs) That Was Equalled or Exceeded during Indicated Period of Record									MEAN FLOW(cfs)
	100% ^a	90%	80%	70%	60%	50%	25%	10%	MAX	
January										
1-10	3.0	4.4	6.0	8.0	11.0	18.0	27.0	35.0	70.0	19.5
11-20	1.2	2.2	4.0	6.0	10.0	14.0	22.5	26.0	60.0	15.6
21-31	0.2	2.0	2.3	3.6	6.0	9.0	15.0	21.0	45.0	10.7
February										
1-10	0.2	2.0	3.8	5.0	8.0	10.0	16.0	35.0	200.0	14.7
11-20	1.0	3.0	4.0	6.0	8.0	10.0	20.0	115.0	350.0	30.5
21-29	1.0	3.0	4.0	5.0	9.0	11.0	55.0	180.0	600.0	51.5
March										
1-10	2.8	4.0	7.0	12.0	18.0	30.0	58.0	300.0	1,500.0	118.5
11-20	3.0	6.0	14.0	30.0	40.0	50.0	300.0	800.0	2,650.0	239.0
21-31	4.0	15.0	50.0	95.0	130.0	209.0	730.0	1,750.0	15,900.0	789.8
April										
1-10	45.0	131.0	162.0	221.0	297.0	563.0	2,740.0	6,700.0	14,700.0	2,102.8
11-20	40.0	108.0	147.0	186.0	264.0	480.0	973.0	2,420.0	8,640.0	938.2
21-30	29.0	75.0	163.0	196.0	233.0	351.0	550.0	868.0	3,560.0	531.5
May										
1-10	32.0	72.0	121.0	167.0	203.0	300.0	534.0	943.0	2,690.0	422.4
11-20	30.0	66.0	120.0	161.0	195.0	296.0	539.0	946.0	1,340.0	306.2
21-31	25.0	48.0	101.0	182.0	230.0	289.0	533.0	855.0	1,530.0	301.0
June										
1-10	30.0	44.0	99.0	132.0	186.0	270.0	524.0	712.0	1,730.0	353.3
11-20	20.0	36.0	73.0	135.0	200.0	248.0	454.0	1,080.0	13,200.0	547.5
21-30	12.0	47.0	69.0	118.0	140.0	184.0	638.0	953.0	2,860.0	395.1
July										
1-10	9.0	32.0	50.0	82.0	98.0	128.0	457.0	1,010.0	2,910.0	362.1
11-20	2.9	32.0	48.0	62.0	77.0	152.0	289.0	526.0	2,930.0	286.3
21-31	0.5	18.0	27.0	39.0	47.0	102.0	304.0	704.0	1,850.0	259.8
August										
1-10	0.4	13.0	22.0	42.0	60.0	80.0	279.0	695.0	1,730.0	240.1
11-20	0.9	9.0	18.0	30.0	49.0	56.0	289.0	445.0	931.0	172.0
21-31	0.8	5.0	26.0	32.0	58.0	81.0	226.0	422.0	936.0	160.7
September										
1-10	1.7	4.6	17.0	31.0	41.0	52.0	160.0	275.0	971.0	129.9
11-20	1.0	1.1	14.0	28.0	42.0	45.0	113.0	279.0	538.0	98.3
21-30	1.1	2.3	20.0	29.0	40.0	63.0	128.0	273.0	470.0	98.7
October										
1-10	1.3	2.6	15.0	21.0	31.0	45.0	118.0	204.0	316.0	78.9
11-20	1.2	3.6	12.0	24.0	35.0	45.0	99.0	155.0	202.0	63.2
21-31	1.2	5.0	15.0	24.0	35.0	45.0	79.0	145.0	192.0	58.4
November										
1-10	2.4	9.0	16.0	32.0	39.0	45.0	70.0	105.0	170.0	52.4
11-20	5.0	11.0	19.0	28.0	36.0	45.0	66.0	125.0	175.0	51.7
21-30	5.0	10.0	16.0	22.0	32.0	35.0	61.0	90.0	150.0	43.7
December										
1-10	3.7	8.0	9.0	20.0	28.0	33.0	54.0	75.0	180.0	39.3
11-20	3.7	6.0	8.0	15.0	20.0	25.0	36.0	51.0	95.0	27.2
21-31	3.8	6.0	7.0	13.0	15.0	20.0	29.0	41.0	80.0	23.0

^a Equivalent to the minimum flow recorded

ATTACHMENT 5

Surface Flows of the Big Sioux River
at Dell Rapids



DEVELOPMENT COMPONENT
OF THE
SOUTH DAKOTA WATER PLAN
VOLUME II-B SECTION 2

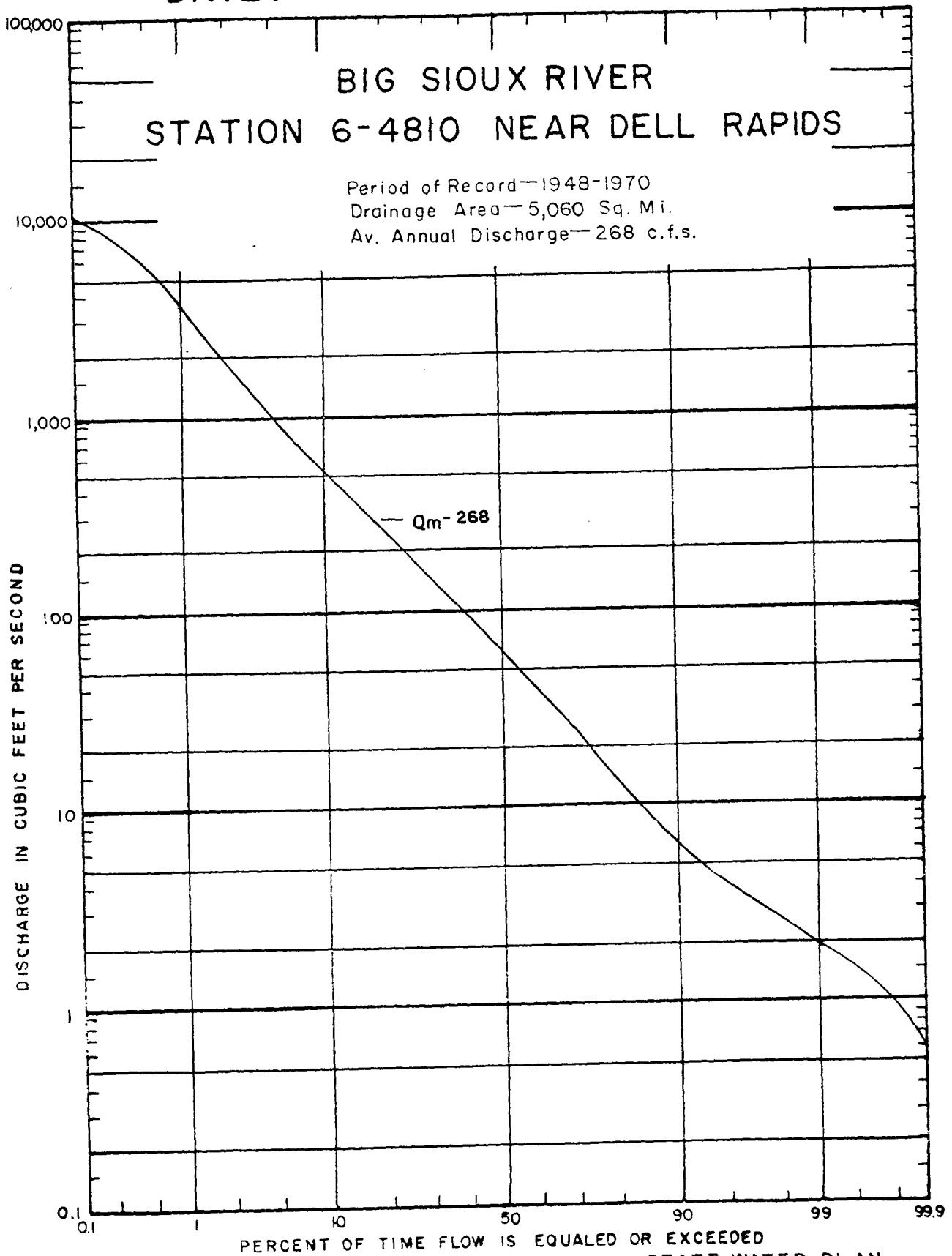
RESOURCE INVENTORY
OF THE
BIG SIOUX RIVER BASIN

Prepared by the
Division of Resource Management
Department of Natural Resource Development

November 1971
Final Draft June 1972
Reprint April 1978

FIGURE 9

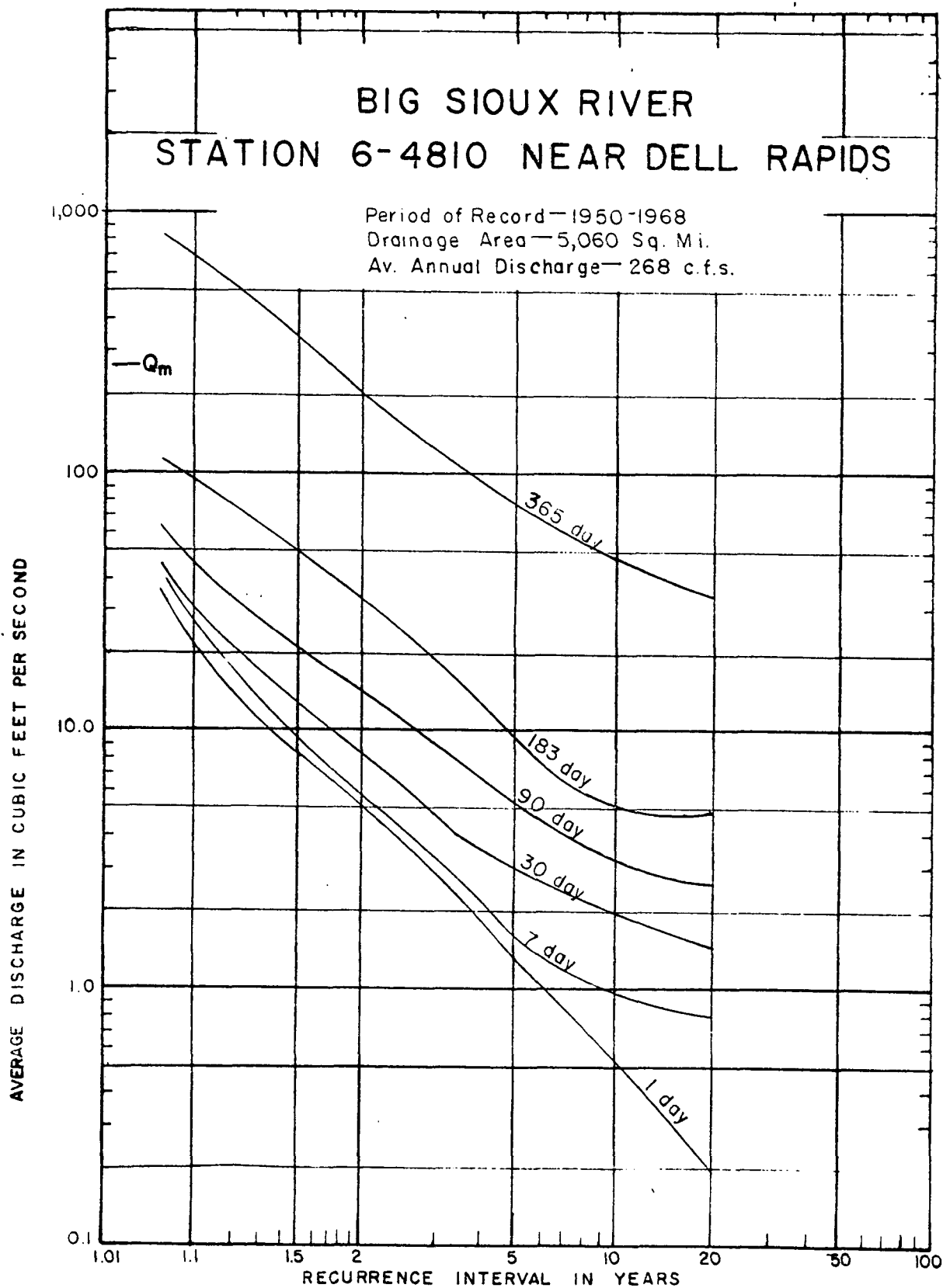
DAILY FLOW DURATION CURVE



Source: U.S. GEOLOGICAL SURVEY

SOUTH DAKOTA CONSERVANCY DISTRICT

FIGURE 15 LOW FLOW FREQUENCY CURVES



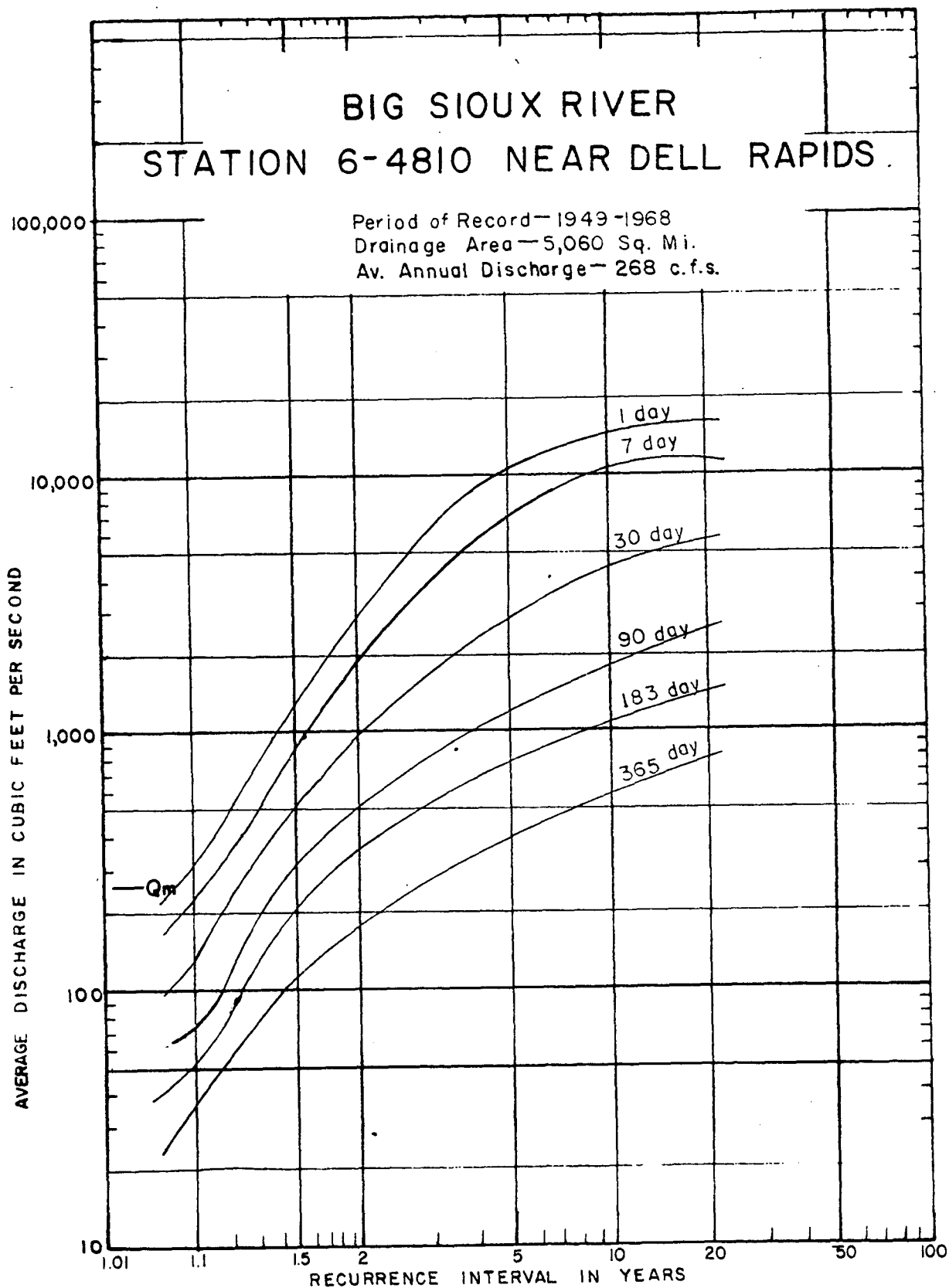
Source: U.S. GEOLOGICAL SURVEY

STATE WATER PLAN

SOUTH DAKOTA CONSERVANCY DISTRICT

FIGURE 27

HIGH FLOW FREQUENCY CURVES



Source: U.S. GEOLOGICAL SURVEY

STATE WATER PLAN

SOUTH DAKOTA CONSERVANCY DISTRICT

ATTACHMENT 6

Flood Information for the Big Sioux
River at Dell Rapids



ANALYSES OF FLOOD-FLOW FREQUENCY
FOR SELECTED GAGING STATIONS IN
SOUTH DAKOTA THROUGH SEPTEMBER 1985

By Eugene B. Hoffman, Mark E. Freese, and Douglas R. Winter

U.S. GEOLOGICAL SURVEY

Open-File Report 86-496

Prepared in cooperation with the
SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

Huron, South Dakota
1986



Table 1.--Magnitude and recurrence interval of instantaneous peak flow at selected gaging stations in South Dakota

Station no.	Station name	Period of analysis		Discharge, in cubic feet per second, for recurrence interval, in years, and annual exceedance probability, in percent									
		(water years)											
		Years:	Percent:	2	5	10	25	50	100	500			
				50	20	10	4	2	1	0.2			
06479200	BIG SIOUX R NEAR ORTLEY	1956-68	141	394	655	1,100	1,530	2,030	3,530				
06479240	BIG SIOUX R TRIB NO 2 NEAR SUMMIT	1956-73	8.9	25	41	68	94	125	216				
06479260	BIG SIOUX R TRIB NO 3 NEAR SUMMIT	1956-78	94	331	591	1,040	1,440	1,910	3,170				
06479350	SOO CR TRIB NEAR SOUTH SHORE	1970-79	44	129	222	388	552	754	1,400				
06479438	BIG SIOUX R NEAR WATERTOWN	1973-85	569	1,350	2,100	3,340	4,470	5,790	9,700				
06479515	WILLOW CR NEAR WATERTOWN	1972-85	612	1,510	2,370	3,820	5,170	6,750	11,500				
06479529	STRAY HORSE CR NEAR CASTLEWOOD	1969-85	832	2,310	3,910	6,790	9,660	13,200	24,800				
06479550	DOLPH CR TRIB NEAR LAKE NORDEN	1970-79	17	33	46	64	77	92	126				
06479640	HIDEWOOD CR NEAR ESTELLINE	1969-85	831	1,520	2,050	2,790	3,370	3,970	5,480				
06479750	PEG MUNKY RUN NEAR ESTELLINE	1956-80	258	793	1,340	2,240	3,060	3,980	6,480				
06479800	NORTH DEER CR NEAR ESTELLINE	1956-80	171	711	1,500	3,330	5,580	8,870	22,800				
06479810	NORTH DEER CR TRIB NEAR BROOKINGS	1969-79	24	80	147	274	406	575	1,140				
06479900	SIXMILE CR TRIB NEAR BROOKINGS	1956-76	114	450	874	1,700	2,560	3,640	7,120				
06479950	DEER CR NEAR BROOKINGS	1956-80	55	253	515	1,030	1,560	2,220	4,250				
06480000	BIG SIOUX R NEAR BROOKINGS	1954-85	2,240	6,430	10,800	18,300	25,400	33,900	59,100				
06480720	BACHELOR CR TRIB NEAR WENTWORTH	1969-79	12	34	56	92	125	162	267				
06481000	BIG SIOUX R NEAR DELL RAPIDS	1949-85	3,070	8,400	13,800	22,800	31,100	40,800	69,100				
06481500	SKUNK CR AT SIOUX FALLS	1949-85	1,360	4,360	7,760	14,000	20,300	28,100	52,800				
06482020	BIG SIOUX R AT NORTH CLIFF AVE AT SIOUX FALLS	1969-85	3,550	7,800	12,000	19,200	26,300	35,000	63,600				
06482600	WEST PIPESTONE CR TRIB NEAR GARRETSON	1969-79	134	433	745	1,260	1,720	2,230	3,610				
06482610	SPLIT ROCK CR AT CORSON	1966-85	2,320	5,310	8,170	12,900	17,400	22,700	38,800				
06482870	LITTLE BEAVER CR TRIB NEAR CANTON	1956-73	25	44	59	80	98	118	172				
06485550	W UNION CR NEAR ALCESTER	1969-79	380	924	1,430	2,220	2,920	3,700	5,870				

1/ Only that portion of the record which was regulated was used in flood-frequency analysis.

TABLE 180.-- STATION 06481000, BIG SIOUX R NEAR DELL RAPIDS SD

STATION LOCATOR		DRAINAGE AREA:		4483.00		SQ MI			
LAT.	LONG.	CONTRIBUTING							
434725 0964442		DRAINAGE AREA:		3004.00		SQ MI			
		GAGE DATUM:		1455.99		(NGVD)			
		BASE DISCHARGE:		1000.00		CFS			
NOTE: BLANKS INDICATE NO INFORMATION EXCEPT FOR DISCHARGE CODE AND GAGE-HEIGHT CODE COLUMNS									
WATER YEAR	DATE	PEAK DISCHARGE (CFS)	DISCHARGE CODES	GAGE HEIGHT (FT)	GAGE- HEIGHT CODES	MAX GAGE HEIGHT (FT)	DATE	GAGE- HEIGHT CODES	NUMBER OF PARTIAL PEAKS
1984	06/23/84	17400		15.20					3
	04/01/84	5800	9	13.71	1				
	04/15/84	6330		12.87					
1985	05/08/84	2050		8.86					5
	03/21/85	8600		13.57					
	10/24/84	2460		9.80					
	04/24/85	3780		11.42					
	05/31/85	2180		9.08					
	09/07/85	1050		6.65					
	09/17/85	1070		6.64					

ATTACHMENT 7

Example of Water Quality on the Big
Sioux River at Dell Rapids



GEOTEK ENGINEERING & TESTING SERVICES, INC.

Water Resources Data for South Dakota Water Year 1975



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT SD-75-1

**Prepared in cooperation with the State of South Dakota and
with other agencies**

06481000 BIG SIOUX RIVER NEAR DELL RAPIDS, S. DAK.--Continued

EXTREMES.--Continued

Period of record:

Dissolved solids (1967-68, 1970-73): Maximum, 876 mg/l Feb. 1-29, 1972; minimum, 172 mg/l Mar. 12-23, 1972.

Hardness (1967-68, 1970-73): Maximum, 650 mg/l Feb. 1-29, 1972; minimum, 120 mg/l Mar. 12-23, 1972.

Specific conductance (1967-70, 1973-75): Maximum daily, 1,400 micromhos Jan. 24, 1975; minimum daily, 138 micromhos Apr. 9, 1969.

Water temperatures (1967-71, 1974-75): Maximum, 33.5°C July 7, 12, 16, 20, 1974; minimum, freezing point on many days during winter period.

Sediment concentrations (1968-75): Maximum daily, 619 mg/l Apr. 19, 1974; minimum daily, 2 mg/l Feb. 5, 1970.

Sediment discharge (1968-75): Maximum daily, 40,600 tons Apr. 9, 1969; minimum daily, 0.12 tons Mar. 5, 1969, Feb. 5, 1970.

REMARKS.--Maximum observed during water year: Dissolved solids, 916 mg/l Mar. 3; hardness, 620 mg/l Feb. 6.
 Minimum observed during water year: Dissolved solids, 298 mg/l Apr. 15; hardness, 290 mg/l Apr. 2.
 Sediment records good. Flow affected by ice Dec. 13 to Apr. 16. Miscellaneous samples of chemical data published for water years 1960-62, 1967.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975

DATE	DIS- SOLVED CHLO- RIDE (CL) (MG/L) (00940)	DIS- SOLVED FLUO- RIDE (F) (MG/L) (00950)	DIS- SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631)	TOTAL NITRITE PLUS NITRATE (N) (MG/L) (00630)	AMMONIA NITRO- GEN (N) (MG/L) (00610)	TOTAL KJEL- DAHL NITRO- GEN (N) (MG/L) (00625)	TOTAL ORGANIC NITRO- GEN (N) (MG/L) (00605)	TOTAL NITRO- GEN (N) (MG/L) (00600)	TOTAL NITRO- GEN (N03) (MG/L) (71887)	DIS- SOL- VED- PHOS- PHORUS (P) (MG/L) (00666)
OCT.										
02...	42	.4	.01	.04	.08	1.7	1.6	1.7	7.7	.24
NOV.										
04...	54	.3	.03	.03	.10	1.7	1.6	1.7	7.7	.04
19...	32	.3	.71	.88	.10	2.0	1.9	2.9	13	.05
DEC.										
03...	39	.3	1.4	1.4	.28	1.1	.82	2.5	11	.36
17...	--	--	--	.00	.41	.98	.57	.98	4.3	--
JAN.										
05...	32	.3	1.6	1.6	1.0	2.7	1.7	4.3	19	.17
09...	54	.4	1.1	2.2	.35	1.4	1.1	3.6	16	.34
FEB.										
06...	49	.3	1.4	1.8	1.6	2.0	.40	3.8	17	.36
MAR.										
03...	52	.4	1.6	1.6	1.9	2.6	.70	4.2	19	.49
20...	--	--	--	.00	1.8	1.9	.10	1.9	8.4	--
APR.										
02...	18	1.5	1.3	1.3	1.0	2.1	1.1	3.4	15	.44
15...	--	--	--	.91	.52	1.3	.78	2.2	9.8	--
MAY										
05...	19	.2	.25	.23	.14	1.3	1.2	1.5	6.8	.04
15...	--	--	--	.02	.01	1.4	1.4	1.4	6.3	--
JUNE										
02...	34	.2	.00	.01	.13	3.2	3.1	3.2	14	.01
16...	--	--	--	.01	.03	1.6	1.6	1.6	7.1	--
JULY										
01...	33	.4	.11	.11	.38	1.8	1.4	1.9	8.5	.18
11...	--	--	--	.04	.10	2.5	2.4	2.5	11	--
AUG.										
06...	29	.3	.02	.02	.03	2.5	2.5	2.5	11	.13
19...	--	--	--	.26	.07	1.6	1.5	1.9	8.2	--
SEP.										
04...	40	.3	.10	.10	.07	1.5	1.4	1.6	7.1	.14
15...	--	--	--	.08	.00	3.3	3.3	3.4	15	--

BIG SIOUX RIVER BASIN

06481000 BIG SIOUX RIVER NEAR DELL RAPIDS, S. DAK.--Continued

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975
(ONCE-DAILY)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1020	970	950	1200	1330	1260	700	720	840	860	760	820
2	1000	980	970	1200	1370	1250	750	830	850	860	860	840
3	1000	980	980	1180	1350	1250	700	830	880	880	770	850
4	1000	980	1000	1160	1340	1240	700	840	850	870	765	860
5	1000	980	1000	1120	1400	1230	650	800	850	880	720	850
6	1020	970	1050	1260	1350	1230	600	800	840	870	780	850
7	1040	950	1080	1270	1340	1200	520	810	860	870	800	860
8	1030	950	1120	1250	1340	1110	520	845	850	850	800	870
9	1000	940	1150	1200	1330	1220	380	865	850	870	810	870
10	1020	940	1180	1250	1320	1160	330	880	860	860	810	870
11	1020	920	1060	1300	1320	1190	355	850	850	860	820	860
12	1020	920	950	1300	1340	1220	360	880	850	870	820	880
13	1030	930	1000	1300	1300	1120	380	845	820	850	850	900
14	1030	970	1000	1320	1320	1210	390	910	800	860	850	870
15	1050	980	1020	1320	1320	1190	450	900	760	870	860	880
16	1050	940	1050	1300	1330	900	480	905	760	880	870	880
17	1030	950	1100	1280	1340	820	420	920	740	880	850	900
18	1030	950	1150	1300	1320	680	530	920	750	880	820	890
19	1020	940	1150	1300	1320	810	500	930	730	880	850	890
20	1010	980	1120	1320	1360	880	510	920	740	880	850	400
21	1000	1000	1130	1300	1350	900	520	925	740	890	820	890
22	990	980	1140	1330	1330	900	500	930	760	900	750	880
23	970	960	1160	1360	1330	900	500	900	790	880	810	880
24	970	970	1180	1400	1330	850	520	930	790	890	840	870
25	960	970	1200	1350	1330	850	570	940	810	910	840	870
26	950	930	1210	1350	1220	900	500	940	820	880	820	860
27	950	970	1190	1370	1340	950	500	935	830	890	840	840
28	940	960	1200	1370	1320	850	550	925	840	870	820	850
29	930	950	1220	1380	---	900	600	915	835	850	790	840
30	920	950	1250	1350	---	800	600	900	840	850	790	850
31	950	---	1250	1330	---	750	---	890	---	860	800	---
MONTH	998	959	1100	1290	1330	1020	520	882	813	873	814	851

BIG SIOUX RIVER BASIN

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06481000 BIG SIOUX RIVER NEAR DELL RAPIDS, S. DAK.--Continued

TEMPERATURE (DEG. C) OF WATER , WATER YEAR OCTOBER 1974 TO SEPTEMBER 1975
(ONCE-DAILY)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.0	11.0	---	0.0	0.0	0.0	0.0	12.0	21.0	30.0	25.0	---
2	11.0	10.0	---	0.0	0.0	---	1.0	11.0	22.0	31.0	29.0	23.0
3	15.5	---	---	0.0	0.0	---	1.0	16.5	20.0	32.0	30.0	25.0
4	15.5	5.5	---	0.0	0.0	0.0	2.0	17.0	21.0	32.0	30.0	22.0
5	---	8.0	---	0.0	0.0	0.0	3.5	---	---	28.0	28.0	23.0
6	10.0	8.0	---	0.0	0.0	0.0	---	---	22.0	30.0	26.0	---
7	15.5	9.0	---	0.0	0.0	0.0	4.5	18.5	25.5	32.0	28.0	22.0
8	15.0	---	---	0.0	0.0	0.0	2.0	15.5	---	28.0	29.0	22.0
9	15.5	9.0	---	0.0	0.0	0.0	1.0	19.0	18.0	28.0	32.0	25.0
10	14.5	---	1.0	0.0	0.0	0.0	3.5	19.0	19.0	26.5	---	29.0
11	15.5	3.5	1.0	0.0	0.0	0.0	2.0	---	16.5	25.5	29.0	17.0
12	---	3.5	1.0	0.0	0.0	0.0	4.5	20.0	22.0	24.0	30.0	15.0
13	11.0	1.0	---	0.0	0.0	0.0	---	20.0	22.0	26.0	26.0	13.0
14	10.0	1.0	---	0.0	0.0	0.0	4.5	20.0	21.0	26.5	---	18.0
15	12.0	4.5	---	0.0	0.0	0.0	---	22.0	22.0	29.0	27.0	19.0
16	15.5	5.5	---	0.0	0.0	---	3.5	22.0	21.0	30.0	28.0	20.0
17	16.5	9.0	0.0	0.0	0.0	1.0	5.0	23.5	24.0	---	---	18.0
18	14.5	4.5	1.0	0.0	0.0	2.5	3.5	25.5	---	26.0	23.0	17.0
19	14.5	8.0	1.0	0.0	0.0	3.5	---	25.5	26.0	29.0	28.0	---
20	12.0	5.5	1.0	0.0	0.0	3.5	---	26.5	26.5	30.0	28.0	---
21	15.5	5.5	0.0	0.0	0.0	4.5	---	25.5	26.5	27.0	26.0	15.0
22	14.5	4.5	1.0	0.0	0.0	4.5	---	25.5	26.5	30.0	26.0	19.0
23	15.5	3.5	---	0.0	0.0	2.5	---	---	28.0	27.0	29.0	18.0
24	15.5	3.5	---	0.0	0.0	---	10.0	21.0	26.5	28.0	29.0	18.0
25	15.0	0.0	---	0.0	0.0	---	10.5	24.5	29.0	29.0	25.0	17.0
26	14.5	2.5	0.0	0.0	0.0	---	---	21.0	28.0	29.0	24.0	20.0
27	13.5	3.5	1.0	0.0	0.0	---	---	21.0	---	32.0	27.0	15.0
28	15.5	---	1.0	0.0	0.0	---	---	21.0	29.0	30.0	24.0	---
29	---	---	1.0	0.0	---	---	---	22.0	29.0	32.0	26.0	18.0
30	13.5	---	1.0	0.0	---	---	10.0	21.0	27.0	30.0	24.0	12.0
31	---	---	0.0	0.0	---	---	---	20.0	---	29.0	27.0	---
MONTH	14.0	5.5	---	0.0	0.0	---	---	20.5	24.0	29.0	27.5	19.0

ATTACHMENT 8

Records of Water Levels - USGS



GEOTEK ENGINEERING & TESTING SERVICES, INC.

RECORDS OF WATER LEVELS IN UNCONSOLIDATED
DEPOSITS IN EASTERN SOUTH DAKOTA

By Wendell L. Bradford

U.S. GEOLOGICAL SURVEY

Open-File Report 81-924

Prepared in cooperation with the
South Dakota Department of Water
and Natural Resources and the
South Dakota Geological Survey



June 1981

MINNEHABA COUNTY -- CONTINUED

WELL 103N49W29ADC

SITE NUMBER 434120096440301 -- CONTIN

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 10, 1976	9.53	MAY 26, 1977	9.80	AUG 22, 1978	8.14	JAN 03, 1980	6.
MAY 22	8.41	JUN 21	9.95	SEP 25	8.56	FEB 06	7.
MAY 12	8.69	JUL 29	10.19	NOV 01	8.80	MAR 05	7.
JUN 09	9.33	AUG 31	10.22	30	8.85	27	7.
JUL 16	10.10	SEP 26	10.09	JAN 04, 1979	8.77	APR 14	6.
AUG 10	10.44	OCT 27	9.64	FEB 01	8.63	MAY 12	7.
SEP 16	10.77	NOV 25	9.18	MAY 07	8.52	JUL 02	6.
OCT 26	10.82	DEC 20	8.72	APR 04	4.96	SEP 03	8.
NOV 24	10.75	JAN 24, 1978	8.52	MAY 03	4.25	OCT 06	8.
DEC 28	10.60	FEB 15	8.40	31	5.15	NOV 05	9.
JAN 31, 1977	10.56	APR 03	5.79	JUL 11	6.01	DEC 09	9.
FEB 22	10.54	25	5.09	SEP 13	6.20		
MAR 29	8.85	MAY 25	5.45	OCT 19	7.25		
APR 28	9.35	JUL 07	6.99	NOV 14	6.52		

WELL 104N49W 30DC

SITE NUMBER 435000096412701

S-22

ALTITUDE OF LAND SURFACE 1496.7 FEET

RECORDS AVAILABLE 1957 TO CURRENT YEAR.

HIGHEST WATER LEVEL 5.98 FEET BELOW LAND SURFACE DATUM MAY 03, 1979.

LOWEST WATER LEVEL 10.64 FEET BELOW LAND SURFACE DATUM FEB 22, 1977.

WATER LEVELS 14 FEET BELOW LAND SURFACE DATUM.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
AUG 29, 1957	6.00	APR 30, 1965	7.15	OCT 10, 1968	8.06	OCT 12, 1972	8.
NOV 05	6.40	MAY 20	5.10	NOV 07	7.90	NOV 17	7.
MAR 11, 1958	7.50	JUL 07	5.52	DEC 11	7.97	DEC 14	7.
JUL 21	7.60	30	7.03	APR 01, 1969	7.39	MAR 20, 1973	5.
NOV 29	8.60	AUG 30	8.05	JUN 16	6.13	APR 13	5.
MAY 12, 1959	8.50	SEP 30	7.14	JUL 22	6.60	MAY 08	5.
JUL 14	8.70	OCT 29	7.14	SEP 15	8.18	JUN 14	6.
NOV 18	9.10	NOV 23	7.34	OCT 17	8.42	JUL 09	7.
MAY 04, 1960	8.80	DEC 29	7.30	NOV 25	8.37	AUG 09	8.
JUL 08	8.90	JAN 25, 1966	7.45	DEC 15	8.40	SEP 07	8.
NOV 01	7.60	FEB 25	7.40	JAN 14, 1970	8.49	OCT 10	8.
MAR 07, 1961	7.50	MAR 30	7.04	FEB 13	8.60	NOV 07	7.
JUL 12	6.09	MAY 03	6.27	MAR 16	7.92	DEC 07	7.
NOV 02	7.60	JUN 02	6.94	APR 16	6.56	JAN 16, 1974	8.
JUL 1962	4.90	26	7.70	MAY 19	6.41	FEB 26	7.
NOV 1963	7.00	JUL 14	5.23	JUN 23	6.43	MAR 26	7.
MAR 1963	7.60	AUG 25	6.80	JUL 20	6.52	APR 26	6.
JUN 16	6.82	OCT 04	8.88	AUG 19	8.20	MAY 24	6.
JUL 11	7.65	NOV 09	8.55	SEP 22	8.68	JUN 25	6.
AUG 15	7.70	DEC 12	8.67	OCT 30	8.26	JUL 29	8.
SEP 15	8.28	JAN 26, 1967	8.88	NOV 25	8.40	AUG 29	8.
OCT 25	7.47	FEB 25	8.95	JAN 20, 1971	8.50	SEP 23	8.
NOV 19	8.11	MAR 22	8.42	FEB 23	8.47	OCT 22	8.
DEC 18	8.12	APR 25	7.48	MAR 25	7.74	NOV 22	8.
JAN 24, 1964	8.22	MAY 23	7.69	APR 20	7.89	DEC 10	8.
FEB 26	8.35	JUL 19	7.90	MAY 18	7.62	JAN 14, 1975	8.
MAR 16	7.97	AUG 15	8.64	JUN 22	7.72	FEB 11	9.
APR 17	6.16	SEP 16	8.07	AUG 19	8.94	MAR 11	9.
MAY 14	6.10	NOV 13	9.16	SEP 22	9.40	APR 07	8.
JUN 16	7.57	DEC 05	9.24	OCT 14	9.20	MAY 15	8.
JUL 23	6.39	JAN 10, 1968	9.21	NOV 19	8.91	JUN 12	7.
AUG 28	8.74	FEB 08	9.23	JAN 19, 1972	8.74	JUL 18	7.
SEP 17	9.73	MAR 13	9.33	FEB 18	8.87	AUG 07	8.
OCT 21	9.91	APR 18	8.89	APR 17	7.42	SEP 05	8.
NOV 24	8.97	MAY 14	8.13	MAY 18	5.23	OCT 02	8.
DEC 30	9.03	JUN 19	8.26	JUN 20	5.38	NOV 03	8.
JAN 28, 1965	9.10	JUL 09	7.90	JUL 14	6.12	DEC 02	8.
FEB 26	9.12	AUG 08	8.08	AUG 14	7.07	JAN 20, 1976	8.
MAR 31	8.41	SEP 11	8.40	SEP 13	7.90	FEB 10	8.

MINNEHAHA COUNTY -- CONTINUED

WELL 104N49W 300C

SITE NUMBER 435000096412701 -- CONTINUED

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAR 22, 1976	7.40	APR 28, 1977	8.60	APR 25, 1978	4.14	MAY 31, 1979	4.81
MAY 12	7.42	MAY 26	8.84	MAY 25	5.35	JUL 11	6.09
JUN 09	7.93	JUN 21	9.07	JUL 06	7.12	SEP 13	4.20
JUL 16	8.57	JUL 29	9.24	AUG 22	6.86	OCT 19	6.11
AUG 04	8.83	AUG 31	9.09	SEP 25	7.06	NOV 14	4.61
SEP 16	9.39	SEP 20	9.15	NOV 01	7.69	JAN 03, 1980	5.06
OCT 26	9.58	OCT 27	8.59	30	7.82	FEB 06	6.51
NOV 24	9.62	NOV 23	7.65	JAN 04, 1979	7.99	MAR 05	6.82
DEC 28	9.59	DEC 20	7.52	FEB 01	8.22	27	6.40
JAN 31, 1977	9.65	JAN 24, 1978	8.07	MAR 07	8.30		
FEB 22	10.64	FEB 15	8.29	APR 04	4.05		
MAR 29	8.75	APR 03	5.89	MAY 03	3.98		

WELL 104N49W20CDD

SITE NUMBER 434726096442301

K14

ALTITUDE OF LAND SURFACE 1470.00 FEET

RECORDS AVAILABLE 1963 - 1973.

HIGHEST WATER LEVEL 6.46 FEET BELOW LAND SURFACE DATUM MAR 20, 1973.

LOWEST WATER LEVEL 12.07 FEET BELOW LAND SURFACE DATUM SEP 11, 1968.

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM.

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JUL 12, 1963	10.68	NOV 23, 1965	10.99	MAY 14, 1968	11.58	NOV 25, 1970	11.43
16	10.02	DEC 29	10.89	JUN 19	11.85	DEC 22	11.26
AUG 13	9.47	JAN 25, 1966	11.12	JUL 09	11.23	JAN 20, 1971	11.34
SEP 16	11.15	FEB 26	11.15	AUG 08	11.86	FEB 23	10.86
OCT 25	11.08	MAR 30	8.82	SEP 11	12.07	MAR 25	8.49
NOV 19	11.27	MAY 03	9.90	OCT 10	11.90	APR 20	10.12
DEC 18	11.44	JUN 02	10.46	NOV 07	11.05	MAY 18	10.55
JAN 23, 1964	11.56	28	10.96	DEC 11	11.33	JUN 22	10.86
FEB 27	11.60	JUL 14	11.38	FEB 26, 1969	11.24	AUG 19	11.59
MAR 17	10.97	AUG 25	11.63	APR 01	11.04	SEP 22	11.57
APR 16	9.88	OCT 04	11.64	MAY 23	7.21	OCT 19	11.87
JUN 17	10.87	NOV 09	11.45	JUN 18	8.89	NOV 19	11.57
JUL 23	11.41	DEC 12	11.66	JUL 22	9.48	DEC 15	11.40
AUG 28	11.76	JAN 26, 1967	11.79	AUG 05	10.00	JAN 19, 1972	11.50
SEP 18	11.85	FEB 25	11.77	SEP 15	10.98	FEB 18	11.60
OCT 21	11.90	MAR 22	10.27	OCT 17	11.03	APR 17	9.48
NOV 23	11.87	APR 25	10.43	NOV 25	11.15	MAY 18	6.99
DEC 30	11.93	MAY 23	10.90	DEC 15	11.22	JUN 20	6.54
JAN 28, 1965	11.97	JUN 13	10.98	JAN 14, 1970	11.26	JUL 14	7.88
FEB 26	11.89	JUL 19	10.24	FEB 13	11.35	AUG 14	8.42
MAR 31	9.63	AUG 15	11.29	MAR 16	8.80	SEP 13	9.50
APR 30	8.08	SEP 06	11.56	APR 16	9.33	OCT 12	9.98
MAY 20	10.56	OCT 13	11.90	MAY 19	9.14	NOV 17	10.27
JUL 07	8.75	DEC 05	11.94	JUN 23	8.02	DEC 14	10.46
30	10.25	JAN 10, 1968	11.98	JUL 20	10.50	FEB 14, 1973	10.78
AUG 31	11.20	FEB 08	11.85	AUG 19	10.96	MAR 20	6.46
SEP 30	11.22	MAR 13	11.87	SEP 22	11.40	APR 13	6.60
OCT 29	11.20	APR 18	11.83	OCT 30	11.36		

ATTACHMENT 9

Groundwater Quality of the Big Sioux
Aquifer and Sioux Quartzite



EVALUATION OF GROUND-WATER RESOURCES
EASTERN SOUTH DAKOTA AND UPPER BIG SIOUX RIVER
SOUTH DAKOTA AND IOWA

TASK 5: WATER QUALITY SUITABILITY BY AQUIFER FOR DRINKING,
IRRIGATION, LIVESTOCK WATERING AND INDUSTRIAL USE

DRAFT FINAL REPORT
APRIL, 1984

Prepared For:

Planning Division
U.S. Army Corps of Engineers
215 N. 17th Street
Omaha, Nebraska 68102

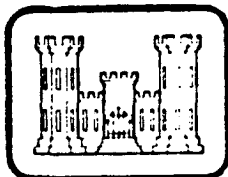
by

Michael Meyer

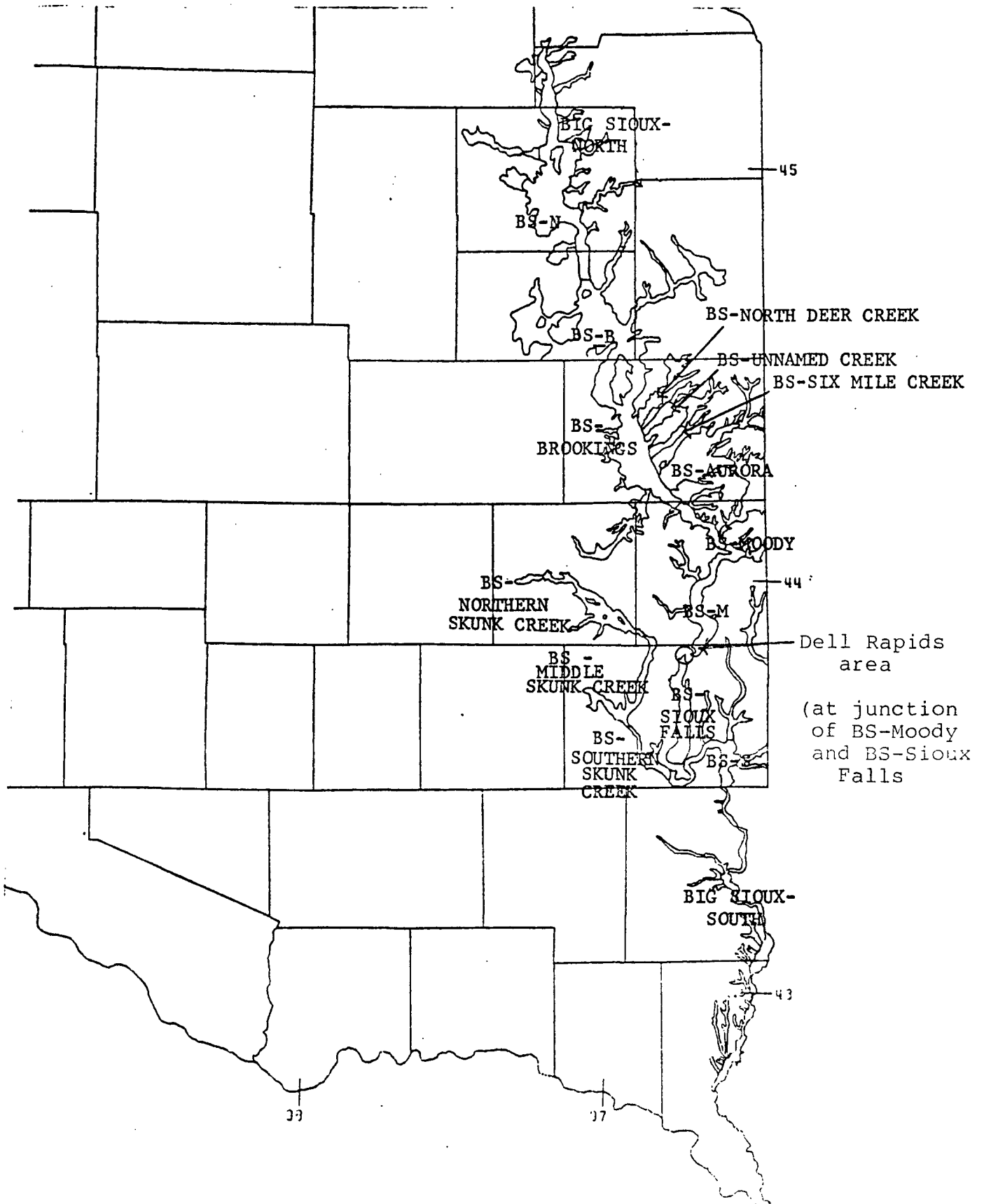
South Dakota Department of Water and Natural Resources
Foss Building, Pierre, South Dakota 57501

CONTRACT NO. DACW45-80-C-0185

Volume 1: Main Report (Two Volumes)



INDEX MAP 2 - BIG SIOUX AQUIFER (SURFICIAL)



BIG SIOUX - SIOUX FALLS AQUIFER (SURFICIAL GROUP)

PARAMETER	NUMBER OF SAMPLES LATEST (TOTAL)	MEAN	STANDARD DEVIATION	MEAN 95 PERCENT CONFIDENCE INTERVAL	MINIMUM	MAXIMUM
Depth of Well, Total (feet)	44	36.4	10.4	33-40	18	57
Specific Conductance (uhmos)	22 (32)	826.9	270.1	707-947	144	1239
pH (units)	29 (40)	7.7	0.4	7.5-7.8	7.0	8.5
Solids, Residue at 180°C (mg/l)	30 (51)	679.9	337.2	554-806	356	1970
Solids, Sum of Constituents (mg/l)	4 (6)	554.0	268.3	127-981	310	874
Hardness (mg/l as CaCO3)	41 (63)	472.2	219.0	404-540	168	1454.7
Hardness, Noncarbonate (mg/l as CaCO3)	38 (60)	257.7	442.8	117-399	0	2803
Calcium (mg/l)	41 (63)	119.5	57.8	102-137	36	363
Magnesium (mg/l)	41 (63)	42.2	20.1	36-48	16	133
Sodium (mg/l)	38 (60)	24.5	11.7	21-28	8	62
Sodium Adsorption Ratio (SAR)	38 (60)	0.5	0.2	0.4-0.6	0.2	1.3
Potassium (mg/l)	33 (55)	3.4	1.9	3-4	0	7
Bicarbonate (mg/l)	33 (54)	318.6	82.0	291-347	117	527
Carbonate (mg/l)	7 (10)	8.9	9.0	0.5-17.2	0	23
Sulfate (mg/l)	40 (62)	197.4	123.9	159-236	41	638
Chloride (mg/l)	41 (63)	22.0	26.6	14-30	2	139
Fluoride (mg/l)	23 (42)	0.4	0.2	0.4-0.5	0.2	0.8
Nitrogen, Nitrate Total (mg/l as N)	31 (55)	1.6	3.2	0.5-2.7	0	13
Boron, Dissolved (ug/l)	7 (11)	101.5	49.1	56-147	0.1	150
Iron, Total (ug/l)	28 (49)	1668.9	1586.1	1054-2284	0	5700
Manganese, Total (ug/l)	16 (35)	914.4	726.4	527-1301	70	3040
Selenium, Total (ug/l)	2 (6)	2.3	1.8	0-13	1.0	3.5
Arsenic, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Barium, Total (ug/l)	2 (6)	84.5	48.8	0-523	50	119
Cadmium, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Chromium, Total (ug/l)	2 (6)	3.3	2.5	0-25	1.5	5.0
Lead, Total (ug/l)	2 (6)	1.4	0.5	0-6	1.0	1.7
Mercury, Total (ug/l)	2 (6)	0.2	0.0	-	0.2	0.2
Silver, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Radium-226, Dissolved (pCi/l)	1 (2)	4.0	0.0	-	-	-
Uranium, Natural Total (ug/l)	- (1)	-	-	-	-	-
Gross Alpha, Total (ug/l as U)	1 (4)	1.4	-	-	-	-

BIG SIOUX - MOODY AQUIFER (SURFICIAL GROUP)

PARAMETER	NUMBER OF SAMPLES LATEST (TOTAL)	MEAN	STANDARD DEVIATION	MEAN 95 PERCENT CONFIDENCE INTERVAL	MINIMUM	MAXIMUM
Depth of Well, Total (feet)	72	30.0	12.5	27-33	12	75
Specific Conductance (uhmos)	49 (66)	975.8	417.3	859-1093	430	2367
pH (units)	64 (97)	7.6	0.4	7.5-7.6	6.9	8.3
Solids, Residue at 180°C (mg/l)	38 (88)	951.0	607.2	758-1144	252	2460
Solids, Sum of Constituents (mg/l)	4 (13)	590.8	154.2	346-836	444	764
Hardness (mg/l as CaCO ₃)	69 (120)	588.8	309.0	516-662	199	1506
Hardness, Noncarbonate (mg/l as CaCO ₃)	54 (104)	264.9	229.6	204-326	13	1190
Calcium (mg/l)	68 (119)	150.7	76.8	133-169	21	413
Magnesium (mg/l)	69 (120)	52.1	34.9	44-60	13	205
Sodium (mg/l)	61 (104)	31.7	41.3	21-42	4	252
Sodium Adsorption Ratio (SAR)	60 (103)	0.6	0.5	0.4-0.7	0.1	3.3
Potassium (mg/l)	54 (97)	5.0	4.1	4-6	1	20
Bicarbonate (mg/l)	48 (95)	320.7	89.5	295-346	183	608
Carbonate (mg/l)	5 (15)	3.8	6.1	0-11	0.0	14.0
Sulfate (mg/l)	66 (117)	325.2	297.2	254-397	25	1260
Chloride (mg/l)	68 (119)	21.4	23.5	16-27	2	112
Fluoride (mg/l)	18 (65)	0.4	0.2	0.4-0.5	0.1	0.8
Nitrogen, Nitrate Total (mg/l as N)	34 (83)	6.1	7.8	3.5-8.7	0.0	39.0
Boron, Dissolved (ug/l)	18 (29)	151.7	164.9	70-234	0	600
Iron, Total (ug/l)	38 (74)	632.9	1260.0	232-1034	0	4900
Manganese, Total (ug/l)	16 (46)	849.4	1905.2	0-1864	0	7100
Selenium, Total (ug/l)	2 (6)	3.1	3.0	0-30	1.0	5.2
Arsenic, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Barium, Total (ug/l)	2 (6)	97.5	48.8	0-536	63	132
Cadmium, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Chromium, Total (ug/l)	2 (6)	3.4	0.5	0-8	3.0	3.7
Lead, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Mercury, Total (ug/l)	2 (6)	0.2	0.0	-	0.2	0.2
Silver, Total (ug/l)	2 (6)	1.0	0.0	-	1.0	1.0
Radium-226, Dissolved (pCi/l)	1 (2)	0.3	-	-	-	-
Uranium, Natural Total (ug/l)	-	-	-	-	-	-
Gross Alpha, Total (ug/l as U)	2 (4)	2.9	2.3	0-23	1.3	4.5

Table 13. Water Quality Statistics By Aquifer Based on Latest Samples

SIOUX QUARTZITE AQUIFER (BEDROCK)

PARAMETER	NUMBER OF SAMPLES LATEST (TOTAL)	MEAN	STANDARD DEVIATION	MEAN 95 PERCENT CONFIDENCE INTERVAL	MINIMUM	MAXIMUM
Depth of Well, Total (feet)	78	289.0	135.0	259-319	60	645
Specific Conductance (uhmos)	24 (48)	1655.1	698.8	1360-1950	580	3130
pH (units)	42 (124)	7.4	0.3	7.3-7.5	7.0	8.2
Solids, Residue at 180°C (mg/l)	67 (196)	1514.7	722.4	1342-1688	320	3300
Solids, Sum of Constituents (mg/l)	1 (23)	998.0	-	-	-	-
Hardness (mg/l as CaCO ₃)	67 (197)	835.6	479.8	721-951	190	3000
Hardness, Noncarbonate (mg/l as CaCO ₃)	38 (157)	454.2	366.0	338-571	14	1400
Calcium (mg/l)	66 (193)	218.4	131.9	187-250	29	820
Magnesium (mg/l)	66 (194)	65.3	38.6	56-75	12	220
Sodium (mg/l)	55 (156)	124.5	113.4	95-154	9	420
Sodium Adsorption Ratio (SAR)	55 (155)	2.2	2.5	1.6-2.9	0.2	13.0
Potassium (mg/l)	38 (138)	10.3	5.7	9-12	2	20
Bicarbonate (mg/l)	38 (158)	389.1	88.2	361-417	185	603
Carbonate (mg/l)	-	-	-	-	-	-
Sulfate (mg/l)	67 (197)	712.7	439.7	607-818	0	1750
Chloride (mg/l)	67 (195)	28.4	34.1	20-37	0	145
Fluoride (mg/l)	48 (175)	0.8	0.7	0.6-0.9	0.2	3.2
Nitrogen, Nitrate Total (mg/l as N)	57 (179)	1.9	3.8	0.9-2.9	0.0	22.5
Boron, Dissolved (ug/l)	-	-	-	-	-	-
Iron, Total (ug/l)	65 (188)	3599.2	9232.0	1355-5844	0	55000
Manganese, Total (ug/l)	54 (158)	642.0	1140.5	338-946	0	7900
Selenium, Total (ug/l)	12 (30)	2.2	2.5	0.6-3.8	0.2	8.3
Arsenic, Total (ug/l)	9 (26)	1.3	0.5	1.0-1.7	1.0	2.3
Barium, Total (ug/l)	9 (26)	41.6	20.6	26-57	5.0	67.0
Cadmium, Total (ug/l)	9 (34)	1.8	2.3	0.0-3.6	1.0	8.0
Chromium, Total (ug/l)	9 (27)	2.8	3.0	0.5-5.2	1.0	10.0
Lead, Total (ug/l)	9 (27)	1.6	0.9	0.9-2.3	1.0	3.3
Mercury, Total (ug/l)	9 (27)	0.3	0.2	0.1-0.4	0.2	0.7
Silver, Total (ug/l)	9 (33)	1.3	1.0	0.6-2.1	1.0	4.0
Radium-226, Dissolved (pCi/l)	3 (9)	6.1	4.7	0.0-17.8	1.4	10.8
Uranium, Natural Total (ug/l)	3 (8)	8.2	8.9	0.0-30.3	3.0	18.5
Gross Alpha, Total (ug/l as U)	5 (21)	32.4	35.3	0.0-76.2	1.9	82.5

This figure from
SD DWR, 1985, The Big
Sioux Aquifer Water
Quality Study

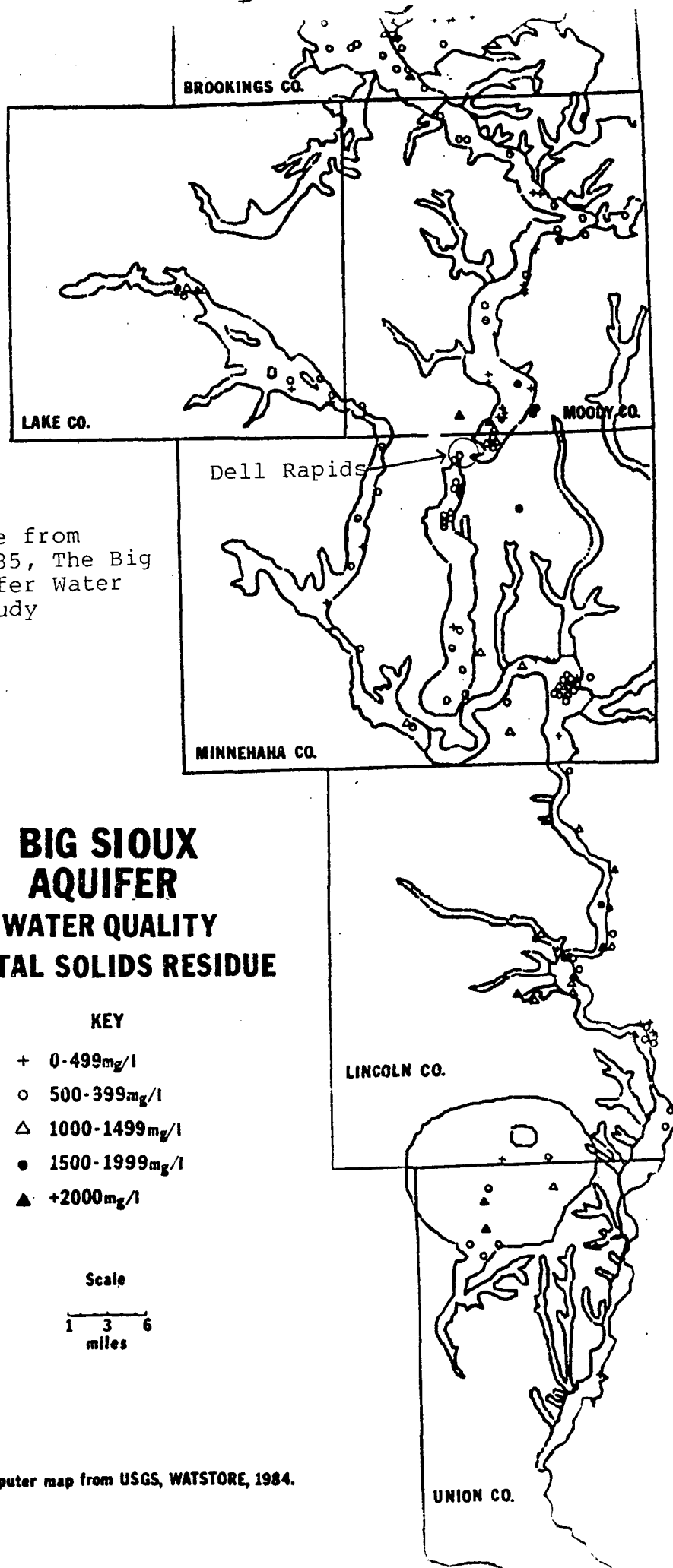
Fig 7.2-3 **BIG SIOUX
AQUIFER
WATER QUALITY
TOTAL SOLIDS RESIDUE**

KEY

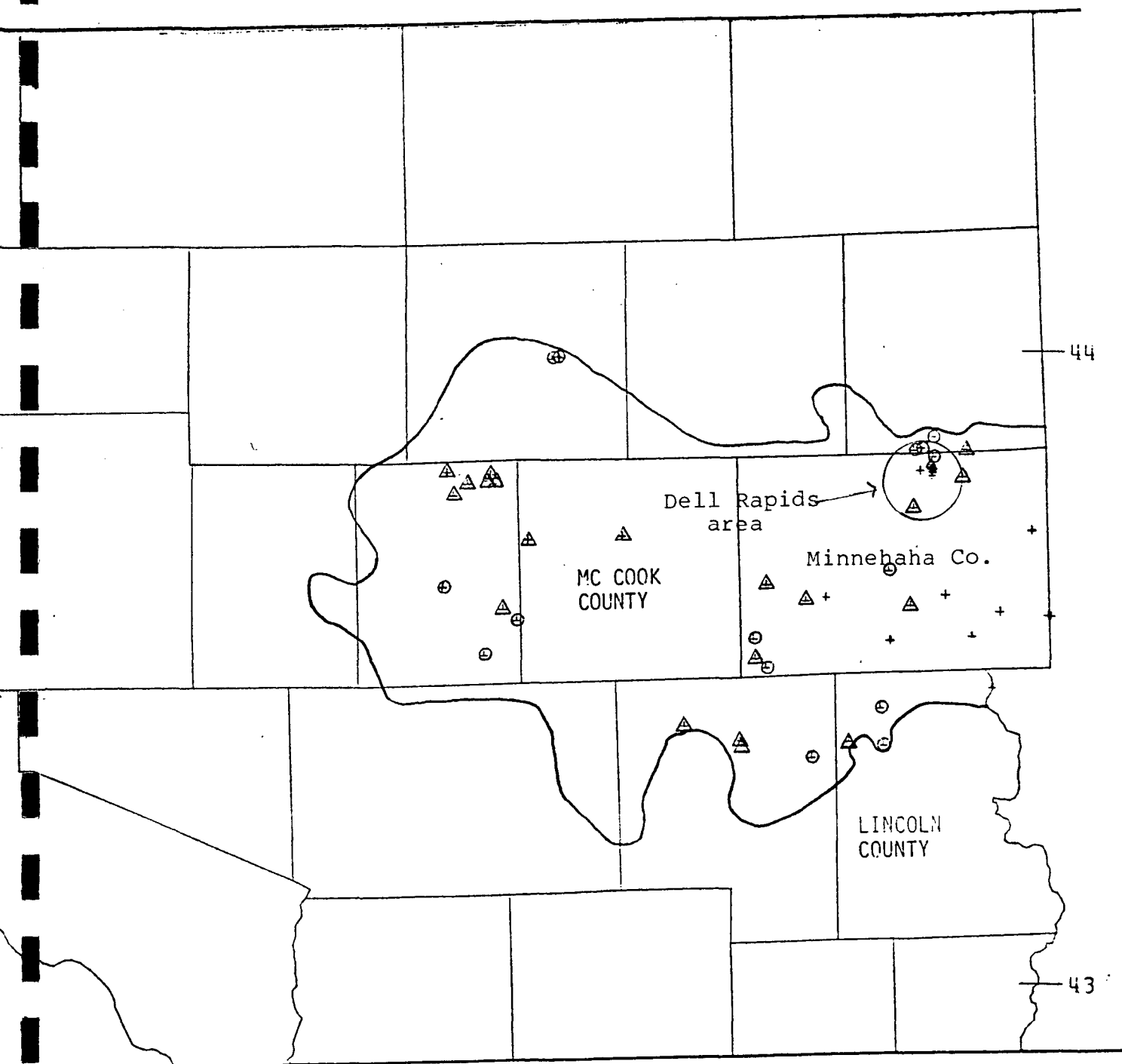
- + 0-499mg/l
- 500-399mg/l
- △ 1000-1499mg/l
- 1500-1999mg/l
- ▲ +2000mg/l

Scale

1 3 6
miles



Dissolved Solids Maps By Aquifer
SIOUX QUARTZITE AQUIFER (BEDROCK GROUP)



KEY

Total Dissolved Solids - Residue in mg/l

Less Than 1000 = +
1000 to 2000 = △
Greater Than 2000 = ⊕

ATTACHMENT 10

Pumping Data for Everist Quarry
at Dell Rapids



GEOTEK ENGINEERING & TESTING SERVICES, INC.

DELL RAPIDS DEWATERING

8-30-89 to 8-31-89

7:57 P.M. to 6:45 A.M.

7:58 - 12:57 Pumping

12:57 - 2:55 Off

2:55 - 6:10 Pumping

6:10 - 6:45 Off

495 minutes pumping @ 2300 g/p/m with 153 minutes off

9-2-89 to 9-3-89

9:00 A.M. to 10:30 A.M.

9:00 - 10:39 Pumping

10:39 - 12:47 Off

12:47 - 3:27 Pumping

3:27 - 5:42 Off

5:42 - 8:20 Pumping

8:20 - 10:36 Off

10:36 - 1:14 Pumping

1:14 - 3:22 Off

3:22 - 6:00 Pumping

6:00 - 8:05 Off

8:05 - 10:30 Pumping

878 minutes pumping @ 2300 g/p/m with 652 minutes off

3-21-86 to 3-22-86

3:13 P.M. to 9:35 A.M.

3:13 - 3:53 Pumping :45

3:58 - 4:38 Off :40

4:38 - 10:44 Pumping 6:06 366

10:44 - 11:09 Off :25

11:09 - 6:46 Pumping 7:37 457

6:46 - 7:11 Off :25

7:11 - 9:35 Pumping 2:24 144

1012 minutes pumping at 2300 g/p/m with 90 minutes off

DELL RAPIDS DEWATERING

10-21-89 to 10-22-89

8:32AM	-	3:41AM	Pumping	1149 minutes
3:41AM	-	6:01AM	Off	140 minutes
6:01AM	-	9:26AM	Pumping	205 minutes
9:26AM	-	11:49AM	Off	143 minutes
11:49AM	-	3:07PM	Pumping	198 minutes
3:07PM	-	3:35PM	Off(end of tape)	28 minutes

1552 minutes pumping at 2300 GPM with 311 minutes off

DELL RAPIDS DEWATERING

11-4-89 to 11-5-89

9:40AM	-	9:50AM	Pumping	10 minutes
9:50AM	-	1:04PM	Off	194 minutes
1:04PM	-	6:09PM	Pumping	305 minutes
6:09PM	-	9:19PM	Off	190 minutes
9:19PM	-	2:32AM	Pumping	313 minutes
2:32AM	-	5:45AM	Off	193 minutes
5:45AM	-	11:32AM	Pumping	347 minutes
11:32AM	-	2:26PM	Off	174 minutes
2:26PM	-	4:56PM	Pumping	146 minutes

1121 minutes pumping at 2300 GPM with 751 minutes off.

DELL RAPIDS DEWATERING

11-23-89 TO 11-24-89

11-23-89

8:20 A.M. TO 8:55 A.M.	OFF	35 Min.
8:55 A.M. TO 10:09 A.M.	PUMPING	74 Min.
10:09 A.M. TO 11:18 A.M.	OFF	69 Min.
11:18 A.M. TO 12:32 P.M.	PUMPING	74 Min.
12:32 P.M. TO 1:42 P.M.	OFF	70 Min.
1:42 P.M. TO 2:56 P.M.	PUMPING	74 Min.
2:56 P.M. TO 4:06 P.M.	OFF	70 Min.
4:06 P.M. TO 5:20 P.M.	PUMPING	74 Min.
5:20 P.M. TO 6:30 P.M.	OFF	70 Min.
6:30 P.M. TO 7:44 P.M.	PUMPING	74 Min.
7:44 P.M. TO 8:54 P.M.	OFF	70 Min.
8:54 P.M. TO 10:08 P.M.	PUMPING	74 Min.
10:08 P.M. TO 11:18 P.M.	OFF	70 Min.
11:18 P.M. TO 12:31 A.M.	PUMPING	73 Min.

11-24-89

12:31 A.M. TO 1:42 A.M.	OFF	71 Min.
1:42 A.M. TO 2:55 A.M.	PUMPING	73 Min.
2:55 A.M. TO 4:04 A.M.	OFF	69 Min.
4:04 A.M. TO 5:17 A.M.	PUMPING	73 Min.
5:17 A.M. TO 6:27 A.M.	OFF	70 Min.
6:27 A.M. TO 7:40 A.M.	PUMPING	73 Min.
7:40 A.M. TO 8:50 A.M.	OFF	70 Min.
8:50 A.M. TO 10:03 A.M.	PUMPING	73 Min.
10:03 A.M. TO 11:13 A.M.	OFF	70 Min.
11:13 A.M. TO 12:27 P.M.	PUMPING	74 Min.
12:27 P.M. TO 1:27 P.M.	OFF	70 Min.
1:37 P.M. TO 2:52 P.M.	PUMPING	75 Min.
2:52 P.M. TO 3:22 P.M.	OFF	30 Min.

= 736 min pump = 50 = 12.27 hr

5/472,000 gal/day

END OF TAPE

958 MINUTES PUMPING AT 2300 GPM

904 MINUTES OFF

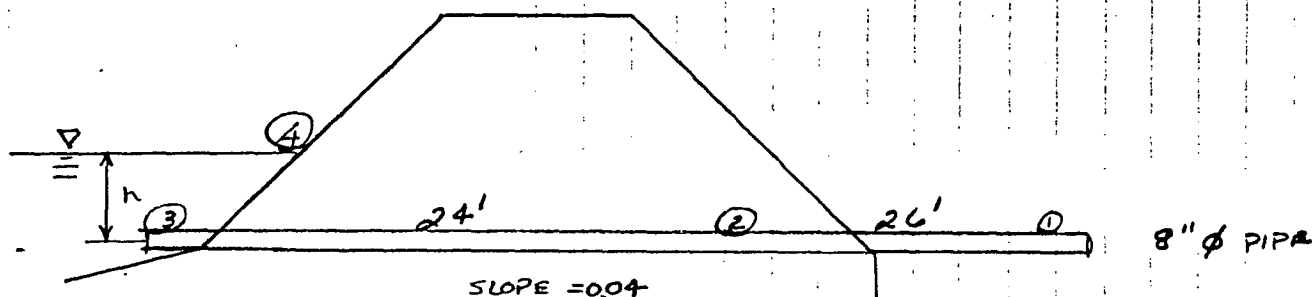
NO. 1 PUMP DEWATERING

9:40 AM 11-22-89 START HOUR METER

~ 2000' GPM

[illegible]

	#1 PUMP	#2 PUMP	#3 PUMP
MOTOR	LINCOLN	G. E. ENERGY SAVER	G. E. ENERGY SAVER
H.P.	100	200	200
R.P.M.	1770	1785	1785
AMPS		216	216
FRAME	404T	445T	445T
TYPE		KS	KS
POWER FACTOR		90.0	90.0
MAX. KVAR		36.9	36.4
MODEL #	3420-A1	5KS445SS209A	5KS445SS209A
SERIAL #	2876988	2A502025	UA271035
VOLTS	460	460	460
SERVICE FACTOR	1.0	1.15	1.15
PUMP	FAIRBANKS MORSE	FAIRBANKS MORSE	FAIRBANKS MORSE
SIZE	6	6	6
MODEL #	2823C	2824C	2824C
SERIAL #	K3R1-018610-0	K3T1-020366-0	N/A
GPM AT 140'	2400	3500	3500
AMPERAGE	115 ON CHART	205	200

SUBJ. DELL RAPIDS SETTLING POND DISCHARGEBY KEVIN OLIVERMEASURED h @ TIME OF PLANT RUNNING

$$HI = 100.00$$

$$R.R. = 7.13 \text{ @ POINT \#1}$$

$$R.R. = 6.17 \text{ @ POINT \#2}$$

$$R.R. = 4.21 \text{ @ POINT \#4} = \text{WATER ELEVATION}$$

$$\text{RISE} = .96/26 = .04 \text{ / ft}$$

$$\therefore \text{ELEVATION @ POINT 3} = 100.00 - 6.17 = 93.83$$

$$93.83 + 24(.04) = 94.72 \text{ TOP OF PIPE}$$

$$C \text{ OF PIPE} = 94.72 - .33 = 94.39$$

$$\text{WATER ELEVATION} = 100.00 - 4.21 = 95.79$$

$$h = 95.79 - 94.39 = 1.5'$$

$$Q = CA \sqrt{2gH}$$

$$.67(.33)^2(\pi) \sqrt{2(64.4)1.5} = 3.19 \text{ ft}^3/\text{sec}$$

$$(3.2 \text{ ft}^3/\text{sec}) \left(\frac{60 \text{ sec}}{\text{min}} \right) / .13368 \text{ ft}^3/\text{gal} = \underline{\underline{1430 \text{ gal/min}}}$$



Department of Water & Natural Resources

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

August 11, 1989

Daniel Kupee
L G Everist, Inc.
PO Box 9
Dell Rapids SD 57022

Dear Mr. Kupee:

I am writing in regard to the quarry operation near Dell Rapids. I need to determine if the quarry operation involves dewatering of the quarry pit.

A water permit is needed pursuant to SDCL 46-1-15, 46-5-9 and 46-5-10 if the quarry is being dewatered. A vested right claim may be filed for any dewatering activities predating February 28, 1955; however, a new permit needs to be approved for any increase in diversion rate or change of water source after February 28, 1955. Enclosed is a set of application forms to make a vested right claim and/or to apply for a new permit.

Please respond as soon as possible about any quarry dewatering activities and contact me if you have any questions.

Sincerely,

Ron Duvall
Natural Resources Engineer
605 773-3352

enc.



August 25, 1989

Jay Van Den Top
L.G. Everist, Inc.
313 Phillips Ave.
Sioux Falls, S.D. 57117

Dear Sir:

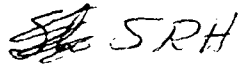
It has been brought to the Exploration & Mining Program's attention that L.G. Everist, Inc. is mining deeper at the Dell Rapids site. While this is not against the operating and reclamation standards governing the extraction of construction aggregate, SDCL 45-6-67(5) states "Any disturbance to the prevailing hydrologic balance of the affected land and of water in surface and groundwater systems both during and after the pit operation and during reclamation shall be minimized. Operations shall be conducted to protect all waters from pollution by siltation, waste, debris and toxic fluids or materials."

A quick check with other permit programs within the department indicated that while Everist has an NPDES permit to discharge into the Big Sioux River there is no water right permit to dewater the quarry. A discussion with Ron Duvall of the Division of Water Rights indicated that they recently sent a letter to Daniel Kuper (of L.G. Everist) explaining that a water right permit was required and that an application was to be filled out and submitted by August 31.

Any water withdrawals without this permit are violations of both water right laws and the construction aggregate mining license and leaves L.G. Everist's license to mine open to revocation.

If you have any questions please contact our office.

Sincerely,

A handwritten signature in dark ink, appearing to read "SRH" with a stylized initial "S" that loops around the "R".

Sheldon Hamann
Natural Resources Analyst
Exploration and Mining Program
Telephone: (605) 773-4201

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

RECEIVED
AUG 31 1989

EXPLORATION AND
MINING PROGRAM
August 30, 1989

Sheldon Hamann
Natural Resources Analyst
Exploration and Mining Program
South Dakota Department of Water and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Sheldon:

I am in receipt of your letter of August 25, 1989 to our Jay Van Den Top regarding our lack of a Water Right Permit for dewatering our quarry at Dell Rapids. I want you to know that we first became aware of this in an August 11, 1989 letter to Dan Kuper from Ron Duvall. I have been in contact with Del Brosz of your department discussing the procedures and timelines involved in cleaning up this oversight. The first mention of an August 31 deadline is in your letter of August 25. Neither the August 11th letter to Dan Kuper nor my conversation with Del Brosz on August 25 indicated that deadline. In fact, we are operating on the premise that there is a Water Management Meeting on December 6th & 7th for which we intend to have met all of the notification requirements and application deadlines so as to be on their agenda at that time.

You reference SDCL 45-6-67(5) relating to minimizing any disturbance to the prevailing hydrologic balance. In the 52 year history of L.G. Everist's operations at this site, I want to assure you that we have dilligently complied with the intent of this statute even before it was written, and will continue to comply with it in the future.

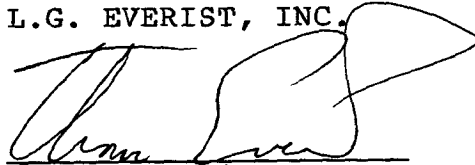
Frankly, it never occurred to us that the existing discharge permit was not inclusive as to the right to dewater the quarry. We acknowledge that we may have misinterpreted the situation, and desire to comply with all the applicable permitting requirements. We do desire that our application be complete as to your requirements, as well as to our present and future requirements, and as such we'll need more time than the current remaining two days to comply with your application submittal request.

Page 2
Sheldon Hamann
August 29, 1989

RECEIVED
AUG 31 1989
EXPLORATION AND
MINING PROGRAM

We appreciate your department bringing this permitting oversight to our attention, and want to reassure you of our desire to cooperate with you, and resolve this matter to the satisfaction of both parties in as timely a manner as possible.

Yours very truly,
L.G. EVERIST, INC.

A handwritten signature in black ink, appearing to read 'Thomas Everist', written over a horizontal line.

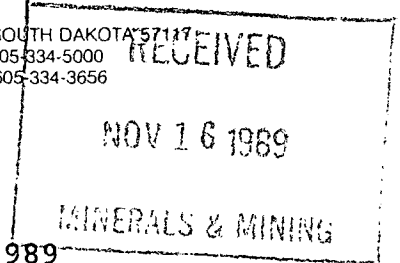
Thomas Everist,
President

TE:ce

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656



November 15, 1989

Sheldon Hamann
Natural Resources Analyst
Exploration and Mining Program
South Dakota Department of Water and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

RE: Dell Rapids Quarry Water Right Permit

Dear Sheldon:

In regards to our water right permit for dewatering Dell Rapids Quarry, I have hired Mike Myer of Geotek Engineering and Testing Services, Inc. to research and analyze the quarry hydrology. From his recommendations, we will be monitoring our pumps and running recharge tests this winter. According to Mike, this additional monitoring and testing should be done to insure some degree of accuracy in the hydrologic analysis. This appears to be the best and easiest way to complete your requirements per your application for a water rights permit.

As soon as we develop a more complete picture of the hydrology, we will be in a position to back up our water right request with some hard data. For what its worth, preliminary results indicate that the current draw from the Trent aquifer is rather minimal.

If this procedure is not satisfactory to you, please advise.
Thank you.

Very truly yours,
L.G. EVERIST, INC.

Thomas Everist,
President

TE:ce



Department of Water & Natural Resources

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

December 4, 1989

Thomas Everist, President
L G Everist, Inc.
PO Box 829
Sioux Falls SD 57117

Dear Mr. Everist:

I am writing in response to your letter to Sheldon Hamann dated November 15, 1989, regarding the need for a water permit for the Dell Rapids quarry. The quarry can claim a vested right for any dewatering activity prior to February 28, 1955. This dewatering activity is historical and should not need to be determined by an analysis of the quarry hydrology. Therefore, enclosed is a notice to file a vested water right claim within 90 days.

Any increase in diversion rate from February 28, 1955 to the present is not an authorized diversion and requires approval of a new water permit pursuant to SDCL 46-1-15, 46-5-9 and 46-5-10. The quarry hydrology analysis referred to in your letter dated November 15, 1989, may provide useful information to apply for a second water permit for any future quarry expansion.

Please contact Ron Duvall, staff engineer, if you have any questions.

Very truly yours,

A handwritten signature in black 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



Department of Water & Natural Resources

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

December 4, 1989

NOTICE

TO: Thomas Everist, President
L G Everist, Inc.
PO Box 829
Sioux Falls SD 57117

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

SUBJECT: Mandatory Requirement to File a Vested Water Right
Claim

This notice is in regard to dewatering activities at the Dell Rapids quarry site adjacent to the Big Sioux River in section 10-T104N-R49W. Dewatering activities occurring prior to February 28, 1955 qualify for a vested right claim if the dewatering activities have been on a continuous basis pursuant to SDCL 46-5-37. A new permit needs to be approved for any increase in dewatering after February 28, 1955.

Pursuant to SDCL 46-5-49 and/or 46-6-2, the Chief Engineer may require a person to file a vested water right claim within 90 days. Any claim filed after 90 days will be considered a new application and will receive a priority date when the application is received in this office. Therefore, this notice is to inform you to file a vested water right claim within 90 days from the date of this notice. Enclosed are application forms with instruction sheets to claim a vested right and if needed, to apply for a new permit for any increase in diversion since February 28, 1955.

CERTIFICATION

I hereby certify that on December 4, 1989 I have personally deposited with the U.S. Mail postage a prepaid envelope containing a Notice of Mandatory Requirement to File a Vested Water Right Claim addressed to Thomas Everist as stated on the notice.

Haren Schlaak

KAREN SCHLAAK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 11th day of December, 1989.

John Walsh
Notary Public



RECOMMENDATION OF CHIEF ENGINEER FOR VALIDATION OF VESTED WATER
RIGHT APPLICATION NO. 5400-3, L. G. Everist, Inc.

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 Validation of Vested Water Right Application No. 5400-3, L. G. Everist, Inc., 313 South Phillips, Box 829, Sioux Falls SD.

The Chief Engineer is recommending DEFERRAL of Application No. 5400-3 to allow additional time for review of the application.

A handwritten signature in cursive script, appearing to read "John Hatch", followed by a small flourish.

JOHN HATCH, Chief Engineer
March 29, 1990

Conversation or File Documentation

NAME OF PERSON OR FILE: DAN KUPER (PLANT SUPER)
ADDRESS: L. G. EVERIST, INC. DELL RAPIDS SD COUNTY MINNEAPOLIS
DATE: APRIL 3, 1990 TELEPHONE 428-5419
RE: VESTED RIGHT APPLICATION No 3400-3

COMMENTS:

MR KUPER SHOWED ME THE QUARRY SET UP INCLUDING PUMP STATION.
THE LOCATION OF THE POINT OF DIVERSION IS THE SAME AS THAT GIVEN ON THE APPLICATION.
THREE PUMPS AT THE DIVERSION POINT, SET UP ON A FLOAT TO PUMP INTERMITTENTLY,
CAN BE PUMPED 24 HRS/DAY IF NEEDED. ONE PUMP $Q_{max} = 2000$ gpm, TWO PUMPS
 $Q_{max} = 3500$ gpm/PUMP. ONE 3500 gpm PUMP IS A STANDBY PUMP, WATER IS
PUMPED EITHER TO THE BIG SIOUX RIVER (TOTAL LIFT $\approx 120'$), WHICH IS ≈ 100 YDS AWAY,
OR TO THE PROCESSING PLANT ^(LIFT $\approx 120'$) WHERE IT IS RECYCLED. KUPER SAID HE ONLY
REMEMBERS PUMPING AT MAX CAPACITY (5500 gpm) ONCE, THAT WAS AFTER A
HEAVY RAIN. KUPER SHOWED ME PUMPING RECORDS WHICH INDICATED METER READINGS
OF 163,392,000 - 79,656,000 gallons = 83,736,000 gal BETWEEN 1/22/90 AND 4/2/90
THE HOUR METER READINGS ^{ARE} FROM 1/22/90 663.8 HRS, 4/2/90 1361.1 HRS
SO TOTAL RUNNING TIME = 697.3 HRS. RECORDS REPORT PUMPING TIME OF 43.3% $\rightarrow$ 45.2%
OF THE TIME. DAILY AVE PUMPING RECORDS RANGE FROM 48,500 cgl $\rightarrow$ 55,929 gcl.
TOTAL OF 163,392,000 gals PUMPED SINCE 1/22/89.
PUMPS & MOTORS AT PUMP SITE AGREE WITH ENCLOSED SHEET

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: Ken Bunker

	#1 PUMP	#2 PUMP	#3 PUMP
MOTOR	LINCOLN	G. E. ENERGY SAVER	G. E. ENERGY SAVER
H.P.	100	200	200
R.P.M.	1770	1785	1785
AMPS		216	216
FRAME	404T	445T	445T
TYPE		KS	KS
POWER FACTOR		90.0	90.0
MAX. KVAR		36.9	36.4
MODEL #	3420-A1	5KS445SS209A	5KS445SS209A
SERIAL #	2876988	2A502025	UA271035
VOLTS	460	460	460
SERVICE FACTOR	1.0	1.15	1.15
PUMP	FAIRBANKS MORSE	FAIRBANKS MORSE	FAIRBANKS MORSE
SIZE	6	6	6
MODEL #	2823C	2824C	2824C
SERIAL #	K3R1-018610-0	K3T1-020366-0	N/A
GPM AT 140'	2400	3500	3500
AMPERAGE	115 ON CHART	205	200

Conversation or File Documentation

NAME OF PERSON OR FILE: ROGER AND TERRY WEICHERT
ADDRESS: RR 1, Box 35 DELL RAPIDS SD (TERRY'S) COUNTY MOODY
DATE: APRIL 3, 1990 TELEPHONE _____
RE: L.G. EVERIST'S VESTED RIGHT APPLICATION #5400-3

COMMENTS:

TERRY RUNS A FARM LOCATED T105N-R49W, SEC 27 cddcl, ROGER FARMS AT 105N49W27bccc
BOTH WERE CONCERNED ABOUT POSSIBLE ADVERSE IMPACTS ON THEIR DOMESTIC
WELLS FROM QUARRY DEWATERING.

I INFORMED THEM THAT K.R. APP. #5400-3 IS AN APPLICATION TO
VALIDATE A VESTED RIGHT WITH A 1954 PRIORITY DATE. I INFORMED THEM
THE VESTED RIGHT WOULD NOT BE VALID IF THERE WERE THREE CONSECUTIVE YEARS OF
NONUSE OF THE SYSTEM, OR THE SYSTEM ISN'T THE SAME NOW AS 1954 THE
K.R. WOULD ONLY BE VALID TO THE EXTENT WATER WAS USED IN 1954.

THE WEICHERTS WERE CONCERNED THAT L.G. EVERIST, INC. WOULD DEEPEN THE QUARRY,
PUMP MORE WATER, AND "DRY UP" THEIR WELLS.

I INFORMED THEM OF SDCL 46-6-24. WE ALSO DEBUSHED THE AREA
GEOHYDROLOGY AND WHY I THOUGHT THEY WOULD NEVER SEE A PROBLEM.

MEETING LASTED FROM 12:00 NOON UNTIL 1:45, THE GENTLEMEN ~~SEA~~ DID
NOT TRUST L.G. EVERIST, INC. AT ALL. I PROMISED THEM A HYDROGRAPH FROM
WATER RIGHTS OBS WELL MY78B. I GET THE IMPRESSION IF THIS WERE A NEW PERMIT APP.
THEY WOULD FIGHT THE "PUBLIC INTEREST" OF IT.

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: KEN BUNKER



Department of Water & Natural Resources

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

April 17, 1990

Dell Rapids Tribune
Box 99
Dell Rapids SD 57022

Dear Sir:

Enclosed is a Notice of Hearing to Validate Vested Right Application No. 5400-3 to be published twice. Please publish the notice on or before April 26, 1990 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 L. G. Everist, Inc., 313 S Phillips, Box 829, Sioux Falls SD 57117.

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,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: ATTN: Eric Gronlund
 Water Rights Division
 523 E Capitol
 Pierre SD 57501-3181

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Validate A Vested Right Application which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper

SOUTH Dakota Department of
Water & Natural Resources

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

April 17, 1990

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

Thomas Everist
L. G. Everist, Inc.
Box 829
Sioux Falls SD 57117

Dear Mr. Everist:

Your Application No. 5400-3 for a vested water right claim has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of your claim has been sent to the Publisher of the Dell Rapids Tribune printed at Dell Rapids SD. For your information, the recommendation of the Chief Engineer is enclosed. Please review the notice 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 hearing to validate a vested right 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,

Eric Gronlund

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

Instruction to Newspaper - Publish first Notice on or before April 26, 1990 with 2nd publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING To Validate
Vested Water Right Application No. 5400-3 to Appropriate Water

Notice is given that L. G. Everist, Inc., 313 S Phillips, Box 829, Sioux Falls SD 57117 has filed an application to validate a vested water right claim to appropriate 12.25 cubic feet of water per second from a quarry with a priority date of 1954. The point of diversion is located at a point 2,080 feet south and 1,200 feet east of the center of Section 10-T104N-R49W. The water is to be discharged to the Big Sioux River in the SW 1/4 SE 1/4 of Section 10-T104N-R49W. The water is for industrial use by the quarry.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends DEFERRAL of Vested Water Right Application No. 5400-3 to allow additional time for review of the application. This application will be considered by the Water Management Board in the Pelican Room, Ramkota Inn, Hwy 212, Watertown SD on May 23, 1990 at 10:00 am. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve validation, 2) approve the validation with qualifications, 3) defer or 4) deny validation of the 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 May 11, 1990. 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 May 11, 1990.

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, 46-2A-18; 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, 46-5-49; 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 and 74:02:01:19 thru 74:02:01:22.

Conversation or File Documentation

NAME OF PERSON OR FILE: L.G. Everist

ADDRESS: _____ COUNTY _____

DATE: 4/20/90 TELEPHONE _____

RE: _____

COMMENTS:

Mr. Everist called to discuss their application for a vested right claim. They need more time to clear up the issue ^{on} the volume of water they use on a ~~yearly~~ yearly basis (continuous use) and the water that is recycled through the plant. Mr. Everist decided not to pursue this claim at the May mtg. but instead to clear up these issues and take it before the board in July.

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 Houlond

Conversation or File Documentation

NAME OF PERSON OR FILE: LOWELL RONNING AND WAYNE COFFA
ADDRESS: RR2, Box 218 DELL RAPIDS COUNTY MINNEAPOLIS
DATE: APRIL 3, 1990 TELEPHONE 428-3606
RE: L.G. EVERIST'S VESTED RIGHT APPLICATION #5400-3

COMMENTS:

RONNING HAS A FARM LOCATED AT T104N-R49W, SEC 28 dadd, COFFA HAS A WELL SUPPLYING
FOUR HOUSES LOCATED AT T104N-R49W, SEC 28 dadd, BOTH WERE CONCERNED ABOUT POSSIBLE ADVERSE IMPACTS
ON DOMESTIC WELLS IN THE AREA FROM L.G. EVERIST QUARRY DEWATERING.

I INFORMED THEM THAT V.R.^{APP} #5400-3 IS AN APPLICATION TO VALIDATE A VESTED RIGHT WITH A
1954 PRIORITY DATE, AND THIS WAS NOT AN APPLICATION TO INCREASE DIVERSION RATE. I ALSO INFORMED
THEM THAT THE VESTED RIGHT WOULD NOT BE VALID IF: a) THERE WERE THREE CONSECUTIVE YEARS
OF NONUSE OF THE SYSTEM; OR b) IF THE SYSTEM ISN'T THE SAME NOW AS 1954, THE V.R. WOULD
ONLY BE VALID TO THE EXTENT WATER WAS USED IN 1954.

THE GENTLEMEN WERE CONCERNED THAT L.G. EVERIST, INC. WOULD DEEPEN THE QUARRY, PUMP MORE
WATER, AND "DRY UP" THEIR WELLS. COFFA MADE CLAIMS THAT "EVERYTIME THE QUARRY WAS DEEPENED
DOMESTIC WELLS WENT DRY" HE TALKED ABOUT A LONGER WELL. COFFA IS
AN X- L.G. EVERIST EMPLOYEE USED TO BE MANAGER, DOESN'T TRUST EVERIST BUT DOESN'T
WANT THEM SHUT DOWN.

MEETING LASTED FROM 2:00pm - 4:00pm. I INFORMED THEM OF SDCL 46-6-24, WE
DISCUSSED THE AREA GEOLOGY AND HYDROLOGY, AND I TOLD THEM WHY I THOUGHT
THEY WOULDN'T HAVE A WELL INTERFERENCE PROBLEM.

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: KEV BUNGER

 **Department of
Water & Natural Resources**

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

March 15, 1990

L.G. Everist, Inc.
Thomas Everist
313 SO. Phillips
P.O. Box 829
Sioux Falls, SD 57117

RE: L.G. Everist, Inc. Vested Water Right Application for the
Dell Rapids Quarry

Dear Mr. Everist:

This is to inform you that the Division of Water Rights is proceeding with the processing of your vested water right claim. We are proceeding under a 1954 priority claim date for 5500 gpm.

This was obtained from the Affidavit of Water Use submitted with your application. Although the affidavit specifies the start of construction in the 1930's it does not specify an amount of water applied to beneficial use. If I have made any wrong assumptions, please let me know so that the appropriate changes can be made.

Also, your application fails to indicate where the water is to be discharged. Again, I assume discharge is to the Big Sioux River but will need this clarified before the application processing can be completed.

Feel free to contact me if you have any questions.

Sincerely,

Eric Gronlund
Natural Resources Engineer
Division of Water Rights
(605) 773-3352

Conversation or File Documentation

NAME OF PERSON OR FILE: L.G. EverestADDRESS: Box 829 Sioux Falls COUNTY MNDATE: 3/15/40 TELEPHONE 334-5000

RE: _____

COMMENTS:

Talk with Tom Everest, water is to be discharged to
the Big Sioux River. They will be responding to the
letter I sent.

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 OF PERSON OR FILE: L.G. Evervist

ADDRESS: Dell Rapids COUNTY _____

DATE: 3/27/90 TELEPHONE _____

RE: Dell Rapids quarry dewatering - vested claim

COMMENTS:

~~DD~~

Staff person from L.G. Everest called in regards to vested right claim. He confirmed my assumption that discharge was to the Big Sioux River and that the claim was for 5500 gpm with a 1954 claim date.

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 [Signature]



Department of Water & Natural Resources

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

May 9, 1990

Wayne Coffaa
RR 2, Box 234
Dell Rapids SD 57022

Dear Mr. Coffaa:

This letter is in regard to the petition submitted concerning Vested Water Right Application No. 5400-3 for L. G. Everist Inc. This application will not be considered by the Water Management Board at their May 23 & 24, 1990 meeting in Watertown due to the notice of hearing not being published. However, the petition you signed will make you a party of record when this application comes before the Water Management Board at a future date.

I will send you a send notice of hearing on Application No. 5400-3 when it is scheduled for a Water Management Board meeting. Also, the notice will be published for two consecutive weeks in the Dell Rapids Tribune.

If you have any questions, please feel free to contact me.

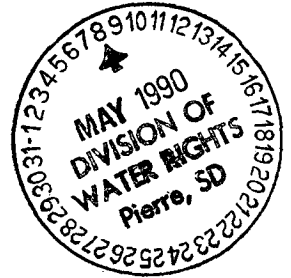
Sincerely,

A handwritten signature in cursive script that reads "Eric Gronlund".

Eric Gronlund
Natural Resource Engineer
Water Rights Division
(605) 773-3352

cc: Parties of Record
(see attached list)

May 3, 1990



Water Rights Division
Foss Building
523 E. Capitol
Pierre, South Dakota 57501

Dear Sir:

This petition is in response to the L. G. Everist Inc. application to Vested Water Rights Application No. 5400-3 to appropriate water.

We as home and landowners with water wells that are drilled in the quartz, that is below the ground or soil, are concerned that the dewatering at a much lower level, approximately 60 feet, by L. G. Everist Inc. quarry will lower or dry up the water level in these wells.

Sincerely,

Daniel Huss

R1 Box 20
Dell Rapids, S.D.

Arthur Davis

Dell Rapids, S.D. RR3-Box 315

David Kistemacher 57022

RR2 Box 220

Dell Rapids, S.D.

Terry Steinacker

RR1 Box 35

Dell Rapids, S.D.

Roger Winnacht

RR1 Box 31

Dell Rapids, S.D.

Bill Sangner

RR3 Box 317

Dell Rapids, S.D.

M. S. Morse

RR3 Box 318

Dell Rapids, S.D.

Wayne L. Coffea

Wayne L. Coffea
R.R. 2, Box 234
Dell Rapids, S. Dak.

Lowell G. Pomring

RR2 Box 218

Dell Rapids S.D.

Geleenacht

306-4th

Dell Rapids, S.D.

James E. Frazier

B. & B. 228

Dell Rapids S.D.

Roger T. Hanson

RR2 Box 229

Dell Rapids S.D. 57022

Russell Bohl
Dell Rapids S.D.
Box 3 RR3

Mrs Doug Mergen
R.R. 2 BOX 21
Dell Rapids S.D.

Brian Frey
Rt. 2 Box 20
Dell Rapids S.D.

Quentin Hemmer
Rt 3 Box 100
Dell Rapids S.D. 57022

Floyd Weelborg
Rt. 1 Box 11
Dell Rapids, S.D. 57022

Gerald Elvinger
RR1 #36
Dell Rapids S.D. 57022

Raphael Schwebach
route 3 box 316
Dell Rapids S.D.

Jane Hynson
R3 Box 4
Dell Rapids S.D.

Gary Gerats
Dell Rapids
Rt 3 Box 305

Lorne Gerats
Dell Rapids

Rt 3 Box 304

Thomas J. Hemmer
RR3 Box 97
DELL RAPIDS S.D. 57022

John R. Hemmer
Rt 3 Box 98
Dell Rapids S.D. 57022

NAME OF PERSON OR FILE: Tom Everist

ADDRESS: _____ COUNTY _____

DATE: 5/11/90 TELEPHONE _____

E: L G Everist 5400-3

COMMENTS:

Mr. Everist called in regards to the petition of opposition ~~to~~ on Applic. 5400-3. Mr. Everist is sending a letter to those petitioners and requesting them to let the depths of their wells be measured. He would like someone from DWR (Regional office or WR) to accompany them on these well measurements. I said I didn't have authority to commit staff time and this would have to be clear through John Hatch. Mr. Everist stated he would call John on May 14, 1990

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 Thonlund

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

May 14, 1990

Dear Petitioners:

We are in receipt of a copy of a petition that you have addressed to the Water Rights Division in Pierre, South Dakota regarding your concern for your water wells as they relate to L.G. Everist's current sinking cut efforts that will lower the quarry by approximately 60 feet.

We appreciate all of the petition signer's position of concern for the impact of our quarry deepening on their particular water wells. I want to reassure you that by state law, which we are well aware of, it is our responsibility to correct any well problems caused by ground water lowering that is a result of any operations that we are conducting. Each of you can rest assured that we take that responsibility seriously, and that any impacts that are our fault will be addressed.

On the other hand, it is our considered opinion based on extensive hydrologic studies, that our deepening of the quarry will in no way adversely impact anyone's well. Currently, we are not pumping from our sinking cut, nor have we for some months. In the near term however, we anticipate resuming pumping and working of that sinking cut project.

Prior to resumption of that pumping effort, we feel it would be comforting to all parties involved to record current well water depths. To accomplish this endeavor, Kevin Oliver of L.G. Everist, Inc. will contact each of you in the next week or two to secure your permission to come on to your property and measure your current well water depths. He will be accompanied by an employee of the South Dakota Department of Water and Natural Resources.

Assuming such an effort is agreeable to each of you, I would encourage you to schedule a time with Kevin when he calls, that would allow your presence at the time the measurements are made to satisfy you that the data was accurately obtained and recorded.

Again, it is our considered opinion after extensive studies that the impact of us pumping water from a lower elevation than currently going on, will in no way affect anyone's well. On the other hand, I can appreciate your concerns in this matter, and want to again reassure you that L.G. Everist, Inc. will

Page 2
Petitioners
May 14, 1990

make good any well situations that are adversely impacted by our operations.

L.G. Everist, Inc. has enjoyed a 60 plus year relationship with the citizens and economy of the Dell Rapids area, and want to reassure you that we will do our part to ensure a continuation of the harmonious relations that we have enjoyed for these 60 plus years.

Very truly yours,
L.G. EVERIST, INC.

Thomas Everist,
President

TE:ce

7
.. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

May 14, 1990



Ron Duvall
Department of Water and Natural Resources
Water Rights Division
Foss Building
Pierre, South Dakota 57501

RE: L.G. Everist, Inc. application for Vested Water Rights at
our Dell Rapids quarry, Application #5400-3

Dear Ron:

You have asked for supplementary information for the above
referenced vested water rights application.

In addition to the 5,500 gallons per minute pumping rate asked
for in the above application form, you have asked for
documentation of our prior to 1954 average pumping rate, as
well as what is the maximum annual water useage prior to 1954.

Our best information as to average water pumpage is 3,000
gallons per minute. Our best information for maximum water
pumpage is 8,000 acre feet per year which relates specifically
to the very wet year of 1952.

As we have been in continuous operation since the 1920's, with
alternating wet and dry years, the above figures meet the
uninterrupted use test of the vested rights statute.

I hope the above information satisfies your request. If we can
be of any further assistance in clarifying or expediting this
application, please contact us.

Yours very truly,
L.G. EVERIST, INC.

Thomas Everist,
President

TE:ce

Parties of Record for Water Permit Application No. 5400-3
L.G. Everist, Inc.
May 9, 1990

Thomas Everist, L. G. Everist, Inc.	PO Box 829	Sioux Falls SD	57117
Stuart Tiede, Attorney	310 S 1st Ave	Sioux Falls SD	57102
* Wayne Coffaa	RR 2, Box 234	Dell Rapids SD	57022
* Daniel Huss	RR 1, Box 20	Dell Rapids SD	57022
* Arthur Rave	RR 3, Box 315	Dell Rapids SD	57022
* David Kistenmacher	RR 2, Box 220	Dell Rapids SD	57022
* Terry Weinacht	RR 1, Box 35	Dell Rapids SD	57022
* Roger Weinacht	RR 1, Box 31	Dell Rapids SD	57022
* Bill Langner	RR 3, Box 317	Dell Rapids SD	57022
Martin Morse	RR 3, Box 318	Dell Rapids SD	57022
* Lowell Ronning	RR 2, Box 234	Dell Rapids SD	57022
* Joe Weinacht	306 E 9th	Dell Rapids SD	57002
Gary Geraets	RR 3, Box 305	Dell Rapids SD	57022
Irene Geraets	Rt 3, Box 304	Dell Rapids SD	57022
Thomas Nemmers	RR 3, Box 97	Dell Rapids SD	57022
John Nemmers	Rt 3, Box 98	Dell Rapids SD	57022
* James Fiegen	Rt 2, Box 278	Dell Rapids SD	57022
* Roger Hanson	RR 2, Box 229	Dell Rapids SD	57022
Russell Bohl	RR 3, Box 3	Dell Rapids SD	57022
Mrs. Doug Mergen	RR 2, Box 21	Dell Rapids SD	57022
Brian Fiegen	Rt 2, Box 20	Dell Rapids SD	57022
Quinton Nemmers	Rt 3, Box 100	Dell Rapids SD	57022
* Floyd Weelborg	RR 1, Box 11	Dell Rapids SD	57022
Floyd Weelborg	RR 1, Box 11	Dell Rapids SD	57022
Gerald Elsinger	RR 1, Box 36	Dell Rapids SD	57022
Raphael Schwebach	RR 3, Box 316	Dell Rapids SD	57022
James Hyman	RR 3, Box 4	Dell Rapids SD	57022

708 E 10th St

* NOTE - Petitioners also signing petition received September 18, 1990

Casper Rude
City of Dell Rapids

116 W. Elm
Box 10

Flandreau, SD 57028
Dell Rapids, SD 57022

Copy of my answer to L.G.
Everist's letter dated 5/14/90

Bill Langner

May 28, 1990

L.G. Everist, Inc.
313 S Phillips
P.O. Box 829
Sioux Falls, S.D. 57117



In reference to your letter dated 5/14/90 and phone call on 5/21/90. In the phone conversation we had concerning measuring my well water depth, that's fine come out and do it, but your responsible for any problems, however, like I told you. I have been doing some checking and asking questions and I was told that taking a static water level measurement will not tell very much, and that a draw down test would also be necessary. Also when you say that your pumping into the river will in no way affect anyone's well, that is untrue, that a cone of depression does take place.

Around 14 years ago, my well and others also went dry. At that time I contacted Pierre, had meetings with the County Commissioner, etc. They took a water sample from my well and said that it tested really close to the water that the quarry was pumping into the river. It cost me around \$3500 to drill down deeper and L.G. was not concerned then nor was the state of S.D. I think that they estimated then that around 1500 gallons of water were being pumped into the river each minute.

L.G. Everist indicated then that they didn't intend to go deeper but to go east. They said that the cost to bring the stone up to ground level was costly. How many times or how many feet have they went down since then?

You also stated in your letter that in your considered opinion, after extensive hydrologic studies, it would have no adverse impact on anyones wells. I was told that at Flandreau S.D. when a farmer near the town wells starts to irrigate and pumps almost 900 gallons a minute, the city wells go down.

I have been told that you are now pumping between 3000 and 5000 gallons a minute. When my son worked there you had just put in another big pump. Does the state know or check on how much you are pumping or do they call ahead and tell you they will be there to check things out and talk to you in a week or so?

When our Governor is concerned about the water being sent down the river from Pierre I hope he will also be concerned about the water that is being sent down the river from Dell Rapids. I think that it is really nice that he is concerned, we all should be. I have been told by a man that has drilled wells all his life that you cannot pump that much water 24 hrs. a day year after year and not affect the ground water in this area.

I received a packet from the Rural Water and they suggested we put water in a plastic bag they sent, holding around 2 qts., and put it in the toilet tank to save water. Let's say the quarry is pumping 40,000 gallons a minute into the river. That would be 8000 flushes to save what you are wasting in 1 minute. I think the City of Dell Rapids and the Minnehaha Community Water Corp. should take a good look at what is going on. I have rural water now so if my well goes dry again, I won't have to hire people to haul water again. However, there are many other things L.G. Everist is doing with there quarry operation.

I fixed my underground supply tanks many times. The neighbors to the east and west of me could not keep their tanks from leaking. The west neighbor put in a new one and it leaked. The plaster in our house has been fixed many times where the blast that L.G. sets off shakes everything and breaks the tanks also. You let the fluid you clean parts and motors with go into the hale and them pump it into the river. When my son worked there that was the way you got rid of it. The granite dust washes into the river and fills it so that it restricts the water flow. After the quarry filled with water a few years ago you built a dike. Now if we get high water it backs up into my land and other land east and north. Your trucks that haul granite use the roads much more than others.

You also stated in your letter that L.G. Everist Inc. has engaged 60 plus years here etc. I'll say that L.G. Everist has cost me a lot of money and time. New well, repairs, supply tanks, fighting weeds where the water backs up, repairing fences, and picking up debris left behind when the waters go back down. I cannot see where I have received much in return except a big headache. I was told before you cannot do anything about it; it's like a mouse fighting a lion. More and more each day I believe this is true. It is next to impossible for me to believe that L.G. Everist would ever take his checkbook and pay for drilling a well for anyone but himself.

Bill Langner
RR3 Box 317
Dell Rapids, S.D. 57022
(605) 428-3133

W.K. Larson

*Copies sent to
interested parties*



Department of Water & Natural Resources

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

July 10, 1990

Thomas Everist, President
L.G. Everist, Inc.
313 So. Phillips
P.O. Box 829
Sioux Falls, SD 57117

SUBJECT: L.G. Everist, Inc. Vested Water Right Application No.
5400-3, Dell Rapids Quarry

Dear Mr. Everist:

The Water Management Board will not hold a hearing on L.G. Everist's Vested Water Right Application No. 5400-3 for the Dell Rapids quarry at their July 25 & 26, 1990 meeting. As you will recall, the notice of hearing was not published for the May 23 & 24, 1990 meeting, however, interested parties did file a petition concerning this application. Staff from the Division of Water Rights are currently preparing a report on L.G. Everist's application.

A copy of the notice of hearing scheduling Application No. 5400-3 before the Water Management Board will be sent to the parties of record when the report and recommendations are finalized. This notice will also be published for two consecutive weeks in the Dell Rapids Tribune.

If you have any questions on the status of L.G. Everist's application, please feel free to contact Eric Gronlund of my staff.

Sincerely,


John Hatch
Chief Engineer
Water Rights Division
(605) 773-3352

cc: Parties of Record
(see attached list)

Summary Report of the May 29 and May 30, 1990
Investigation of Wells near L.G. Everist Quarry at Dell Rapids
July 20, 1990

The writer met with Kevin Oliver, L.G. Everist representative at the quarry. Mr. Oliver drove us around to visit the people who had signed the petition against L. G. Everist Vested Right Application No. 5400-3. A data sheet was filled out for each site visited and this, along with a map is included with this summary.

In general, it was apparent that most of the people we talked to had other problems than water with L.G. Everist. Blasting, dust and traffic were a few of the complaints voiced.

There are basically three aquifers used for water supplies in this area. The Big Sioux Moody, the Howard and the Sioux Quartzite. The people who had shallow wells completed into the Big Sioux Moody aquifer were not concerned about their wells. The one possible exception to this is Mr. Weelborg (#18); however, he is located 2 1/2 miles north of the quarry and the existing observation well record for the Big Sioux Moody aquifer indicates the aquifer is not affected by quarry operations. There is a second group of wells completed into the Howard aquifer (buried glacial outwash) which is under artesian conditions. Three well owners R. and T. Weinacht and Huss (#5, #6 and #17) were concerned that their wells would be affected by deepening the quarry. Existing data indicates the Howard aquifer lies directly upon the quartzite in portions of this area. The third group consists of well owners with quartzite wells, Morse (#11), Langner (#2), Hymans (#13), Rave (#10), Feigen (#20), Gereats (#14 and #15), Coffaa (#12), Ronning (#7), Hanson (#9) and Feigen (#8) are all south or east of the Big Sioux River. Of this group Langner, Morse and Feigen (#20) reported water problems which they thought were caused by the quarry in previous operations. Feigen (#20) reported he had problems with his well during the last month. Also, Feigen (#8) had deepened his well because of water problems a few years ago.

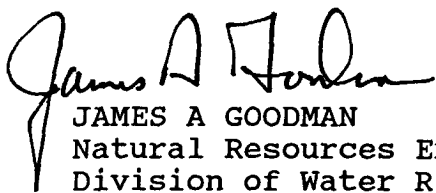
Many of these people are connected to the rural system. Some still use their wells and in a few instances the wells are the only water source.

Geohydrologically, the area is interesting. Shallow outwash (Big Sioux Moody aquifer) lies in the floodplain of the Big Sioux River and does lie directly on the quartzite in some areas. This aquifer is a good water source for many area wells. After viewing the quarry, it is apparent that very little water from the Big Sioux Moody aquifer or the Big Sioux River is coming into the quarry. The walls of the quarry are basically dry. The next aquifer of consequence is the buried Howard aquifer. Potentially the Howard could be in hydrologic communication with the quartzite. Deepening the quarry could affect the water levels in this aquifer, however, I do not believe this would seriously affect water availability from the Howard aquifer.

The Howard aquifer is a very large aquifer containing a lot of water in storage and deepening the quarry should not significantly alter the existing conditions. The third area aquifer is the quartzite. Most of the wells completed into the quartzite are south and east of the quarry with the Big Sioux River between the quarry and the wells. The river does flow over the quartzite and should be in hydraulic communication with the quartzite. All of the reported problems and most of the concerns are in this area. Pumping from the quarry could be affecting water levels in this area. Very little data is available to access this question and measuring water levels in those domestic wells will be difficult. At this time only Ronning (#7) is collecting water level data.

Conclusions and Recommendations

1. There is a need to measure water levels from the Sioux Quartzite in the area south and east of the quarry.
2. There are some existing observation wells completed during the county studies for Moody and Minnehaha counties. Some of these wells are completed in outwash lying on top of the quartzite. This can be investigated and those wells added to our monitoring network, if needed.
3. Dewatering of the quarry has undoubtedly affected water levels in the area. Some of the evidence is contradictory. In any event, present pumping should have caused the system to approach equilibrium because of the length of time pumping has been going on. Deepening the quarry, in theory, will affect this existing condition. However, it seems unlikely that the amount of water produced by the quarry will increase significantly; therefore, I would not expect much change in water levels except in the immediate vicinity of the quarry.
4. State law is very clear on this issue. If dewatering of an aquifer for a mining operation affects a well, then the mine operator is responsible (SDCL 46-6-24).



JAMES A GOODMAN
Natural Resources Engineer
Division of Water Rights

enclosures: map, data sheets, well logs

references: Moody County Study,
Minnehaha County Study (not published)

DATE: 29 MAY 90NAME OF PERSON RUSSELL BOHL TELEPHONE 428 -3302ADDRESS RR 2 BOX 229 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SEC 11 , T104N R49W [CAAA]

Comment or Complaint: _____

NO COMPLAINTS, SIGNED PETITION BECAUSE OF NEIGHBORSHE TALKED ABOUT DUST PROBLEMS, BLASTINGNEVER HAD ANY WELL OR WATER PROBLEMS

(When applicable, complete following)

Well location if different from above: WELL ON FLOODPLAIN ABOUT 150' EAST OF BIG SIOUX R.
WELL JUST EAST OF HOUSEDate well drilled: 1920(S) ? Well Driller SIOUX WELL DRILLING (?)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: [12' OF WATER IN WELL] Flow, if flowing _____Depth of well: 22' Can well be controlled? _____Pump setting: JET (UNKNOWN) Casing size: 36" , CONCRETEType of pump: JET Screen type: _____Can pump be lowered: _____ Casing material CONCRETEWhen pump last pulled, pump replaced or anything done to well 6 YEARS AGO - PUT IN NEW
FOOT VALVEPump Capacity 7-8 GPMPumping dirty or riley water now and has well ever pumped sand or dirty or riley water
in the past? _____Other: NEVER HAD ANY TROUBLE WITH WELL , USED TO HAVE SANDPOINTSBUT NO MORE - NOTHING BUT TROUBLE , DOESN'T THINK HE WILLHAVE WATER PROBLEMS IF QUARRY IS DEEPEMED.* WE DID NOT MEASURE WELL - IT IS SEALED -WELL COMPLETED IN BIG SIOUX AQUIFERNAME: JAG

(2)

Water Rights Division - DWNR
Complaint FormFile No. 5400-3 L.G. EVERIST

EL- 1520

DATE: 29 MAY 90NAME OF PERSON BILL LANGNER TELEPHONE 428-3133ADDRESS RR 3 BOX 317 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 11, T104N R49W [DCC]

Comment or Complaint: HE SAYS THERE IS NO DOUBT THAT PUMPING FROM
QUARRY AFFECTS HIS WELL, SAYS WELL WAS SAMPLED DURING STUDY (?)
BLASTING SHAKES EVERYTHING, BREAKS HIS SUPPLY TANK
LG WILL DO WHATEVER THEY WANT, THEY ARE BIG
HAD TO DRILL DEEPER BACK IN 70'S (1976) - BECAUSE OF QUARRY
HAS HAD RURAL WATER FOR 12 YEARS

(When applicable, complete following)

Well location if different from above: AT FARM - WELL 100' NORTH OF HOUSEDate well drilled: (?) DRILLED DEEPER IN 1976 Well Driller CAP RUDY (FLANDREAU)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: 40 TO 50' Flow, if flowing _____Depth of well: 400' Can well be controlled? _____Pump setting: NO IDEA Casing size: _____Type of pump: CYLINDAR Screen type: _____Can pump be lowered: PROBABLY Casing material _____When pump last pulled, pump replaced or anything done to well SOMEONE FROM COLTON COMES TO CHANGE LEATHERSPump Capacity ?

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: BILL CLAIMED WELL WAS CHECKED IN 70'S - WHEN HAVING TROUBLE BEFORE
WE COULD MEASURE WELL IF WE HAD TO - IT WOULD REQUIRE
GETTING ACCESS -

* DID NOT GET ANY MEASUREMENTS
WELL COMPLETED IN QUARTZITE

NAME: JAG

③

EL- 1445

DATE: 29 MAY 90

NAME OF PERSON QUENTIN NEMMERS TELEPHONE 428-3227

ADDRESS RT 3 BOX 100 DELL RAPIDS COUNTY MINNEHAHA

Location or Land Description: SECTION 2, T10N R49W [CCR]

Comment or Complaint: HAS DEEP WELL - 90' - FLOWING, WELL SOUTH OF PLACE
CASING RUSTED OUT - MAKES A MESS NOW - THINKS THIS WILL BE AFFECTED
ALSO HAS SHALLOW WELLS - NOT CONCERNED ABOUT SHALLOW WELLS
W/L'S CHANGE WITH RAINFALL - STILL GETTING ENOUGH WATER
HE IS HOOKED UP TO RWS
QUENTIN WANTED TO TALK ABOUT "DIKE" - CLAIMED THIS WILL
AGGRAVATE FLOODING PROBLEMS - MENTIONED DUAL LETTER (?)

(When applicable, complete following)

Well location if different from above: SHALLOW - NORTH OF HOUSE, DEEP - SOUTH OF BUILDINGS

Date well drilled: SHALLOW 1953, 1957, 1932 Well Driller LACEY - (SHALLOW), ?

Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)

Water Level: ? Flow, if flowing DEEP WELL YES

Depth of well: 14 TO 15' Can well be controlled? NO CONTROLS

Pump setting: _____ Casing size: 8 or 9"

Type of pump: JET PUMP Screen type: GALVANIZED

Can pump be lowered: _____ Casing material STEEL

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity 7-8 GPM

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: HE IS MORE CONCERNED ABOUT OTHERS IF ^{QUARRY} WELL GOES DEEPER -

SAYS DIKES CREATE MORE FLOODING - WORRIED ABOUT "CITY DAM"

THIS WAS HIS BIGGEST CONCERN - FLOODING PROBLEMS

* DID NOT MEASURE HIS WELL

SHALLOW - BIG SIOUX AQUIFER

DEEP - BURIGO GLACIAL

NAME: JAG

DATE: 29 MAY 90NAME OF PERSON JOHN NEMMERS TELEPHONE 428-3225ADDRESS RT 3 BOX 98 DELL RAPIDS COUNTY MINNEHANALocation or Land Description: T104N R49W SEC 2 [BCCC]Comment or Complaint: SIGNED PETITION BECAUSE OF NEIGHBORS CONCERNSIS NOT WORRIED ABOUT WATER SUPPLY FOR HIS WELLSHOOKE TO RWSTOM NEMMERS - 1/2 MILE NORTH, EL-1503, SANDPOINTS AT PLACE
ALSO HOOKE TO RWS.

(When applicable, complete following)

Well location if different from above: AT HOUSEDate well drilled: 1950's Well Driller LACEYPurpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: ? Flow, if flowingDepth of well: ± 14' Can well be controlled?

Pump setting: Casing size:

Type of pump: Screen type:

Can pump be lowered: Casing material

When pump last pulled, pump replaced or anything done to well

Pump Capacity

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water
in the past?

Other:

* DID NOT MEASURE - NO NEEDOGS. WELLS IN DITCH - NORTH SIDE OF SECTION 2, T104N R49W

WELLS COMPLETED INTO BIG SIOUX AQUIFER

NAME: JAC

6-EL 1590

DATE: 29 MAY 90NAME OF PERSON RODGER TERRY WEINACHT TELEPHONE 428-5580ADDRESS RR 2 BOX 270 DELL RAPIDS COUNTY MOODYLocation or Land Description: SEC 27, T10S N R49W [CDDO]Comment or Complaint: NO ONE HOME AT TERRY'STALKED TO RODGER - SEC 27, T10S N R49W [BC]NEVER HAD ANY WELL PROBLEMS, WELL DUG INTO ROCK, HE IS SURE(?)HE IS CONCERNED DEEPENING QUARRY WILL AFFECT WATER LEVELSHE ISN'T SURE ABOUT WELL AT TERRY'S PLACEHE IS HOOKED TO RWS - USES WELL FOR MILKING OPERATION

RODGER'S WELL

(When applicable, complete following)

Well location if different from above: AT HOUSEDate well drilled: 1980's Well Driller CASPAR RUOYPurpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: (?) Flow, if flowing _____Depth of well: 220 TO 260' Can well be controlled? _____Pump setting: _____ Casing size: 2 SIZESType of pump: SUBMERSIBLE Screen type: UNKNOWNCan pump be lowered: _____ Casing material STEEL - 6" CHANGES

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: THE WAY HE DESCRIBED THE PUMP INSTALLATION THERE ISNO WAY TO GET INTO WELL TO MEASURE - PITLESS WITH SEALS -* DID NOT MEASURE WELL (EITHER ONE)

WELL COMPLETED INTO GLACIAL (HOWARD) AQUIFER

OWNER CLAIMS IT IS IN QUARTZITE

NAME: JAG

EL-1530

DATE: 29 MAY 90NAME OF PERSON LOWELL RONNING TELEPHONE 428-3810ADDRESS RR 2, BOX 218 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 28, T104N R49W [DA]

Comment or Complaint: CONCERNED ABOUT 60' EXTENSION OF QUARRY DEPTH
AND IF THAT WILL AFFECT HIS WELL - HE HAS AND WILL CONTINUE
MONTHLY MEASUREMENTS OF HIS WELL -

(When applicable, complete following)

Well location if different from above: SOUTH OF HOUSEDate well drilled: 1911 (?) Well Driller ?Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: (50') Flow, if flowingDepth of well: 150' Can well be controlled?Pump setting: ? Casing size: 8"Type of pump: SUBMERSIBLE Screen type: OPEN INTO QUARTZITECan pump be lowered: NOT AT BOTTOM Casing material STEEL

When pump last pulled, pump replaced or anything done to well

Pump Capacity 8-10 GPM, 1/2 HP

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: HAS PULGED PUMP - HAS NOT HAD ANY OTHER PROBLEMSW/LS ARE IN 50'-48' ~~AND~~ FOR LAST 8 MONTHSWELL IS IN PIT - MEASUREMENTS AT BOTTOM OF PIT -ADD ABOUT 5' FOR LAND SURFACE

WELL COMPLETED INTO SILTY QUARTZITE

NAME: JAG

DATE: 29 MAY 90NAME OF PERSON JAMES F GIGEN TELEPHONE 529- 5254ADDRESS RT 2 , BOX 278 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 26, T104N R44W [CC]Comment or Complaint: BASIC CONCERN - WORRIED ABOUT WATER SUPPLYHAD TO DEEPEN OLD WELL (150')AFTER GOING DEEPER DID NOT HAVE QUANTITY PROBLEM ANY MORE.NOT REALLY WORRIED ABOUT WELL NOW -

(When applicable, complete following)

Well location if different from above: AT HOUSEDate well drilled: 5-6 YEARS AGO
DEEPENED Well Driller PUTZKEPurpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: ± 50' Flow, if flowing _____Depth of well: 565' Can well be controlled? _____Pump setting: ? Casing size: 6 or 8"Type of pump: SUBMERSIBLE Screen type: OPEN HOLECan pump be lowered: YES Casing material STEEL

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity 8-10 GPM

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: PUMPS INTO SUPPLY TANK - 50' CLAY THEN QUARTZITEHAS A PITLESS UNIT - HARD TO GET INTO WELL, NO ACCESS* DID NOT MEASURE

WELL COMPLETED INTO SIOUX QUARTZITE

NAME: JAC

DATE: 29 MAY 90NAME OF PERSON ROGER HANSON TELEPHONE 529-5375ADDRESS RR 2 BOX 229 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 27 T104N R44W [DC]Comment or Complaint: CONCERNED ABOUT WHAT COULD HAPPEN TO WATER LEVELS -WELL IN PIT JUST NORTH OF HOUSECOULDN'T GET INTO WELL - VERY EASILY - COULD IF WE HAD TO?THIS IS HIS ONLY WATER SOURCE - NEEDS IT AS A SUPPLY -

(When applicable, complete following)

Well location if different from above: AT HOUSEDate well drilled: BEFORE 25 YEARS Well Driller PUTZKE WORKED ON IT.Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: (?) Flow, if flowingDepth of well: 150' Can well be controlled?Pump setting: Casing size: 4" PLASTIC INSIDE 6" STEELType of pump: CYLINDAR + PUMPJACK Screen type: OPEN HOLECan pump be lowered: ? Casing material

When pump last pulled, pump replaced or anything done to well

Pump Capacity 3 GPM (?)

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: WELL WAS RECASSED BY PUTZKE - HE IS SATISFIED
WITH WATER* DID NOT MEASUREWELL COMPLETED INTO SIOUX QUARTZITENAME: JAG

DATE: 29 MAY 90

NAME OF PERSON ART RAVE TELEPHONE 428-3414

ADDRESS RR 3 , BOX 315 DELL RAPIDS COUNTY MINNEHAHA

Location or Land Description: SECTION 7 , T104N R48W [CC]

Comment or Complaint: HE DIDN'T SIGN PETITION TO TAKE SIDES (?)

WOULD LIKE PROBLEM CHECKED OUT -

WELL IS COMPLETELY INTO ROCK -

DON'T USE WELL - WE COULD USE IT - MAYBE - TO MEASURE

WATER TO RWS

(When applicable, complete following)

Well location if different from above: SW OF HOUSE

Date well drilled: 60-70 YEARS AGO Well Driller ?

Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)

Water Level: _____ Flow, if flowing _____

Depth of well: UNKNOWN (175') Can well be controlled? _____

Pump setting: ? Casing size: 6" - 75' MAYBE

Type of pump: CYLINDAR Screen type: _____

Can pump be lowered: _____ Casing material STEEL

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: GOT RWS IN 1977 , ON MINNEHAHA RWS BOARD

COULDN'T GET INTO WELL WITHOUT PULLING MECHANISM OR

DRILLING HOLE

* DID NOT MEASURE WELL

WELL IN QUARTZITE (?)

NAME: JACO

DATE: 29 MAY 90NAME OF PERSON MARTIN MORSE TELEPHONE 428-3301ADDRESS RR 3 BOX 318 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 11, T104N R49W [CDD]Comment or Complaint: ABOUT 1 TO 1 1/2 MILE EAST OF QUARRY - CLOSESTBLASTING - CRACKS IN HOUSE, SAND + DIRT BLOWING AROUNDQUARRY HAS HISTORY OF DISEASES, HEALTH PROBLEMS FOR WORKERSWHAT CAN AN INDIVIDUAL DO AGAINST A BIG OUTFIT - WHAT CAN"LITTLE PEOPLE" DO -DOES NOT USE WELL - HOOKED TO RWS

(When applicable, complete following)

Well location if different from above: SE OF HOUSEDate well drilled: 1966 Well Driller ? (RUDY)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: ? Flow, if flowing _____Depth of well: 110' + [50' TO 60'] Can well be controlled? _____

Pump setting: _____ Casing size: _____

Type of pump: _____ Screen type: _____

Can pump be lowered: _____ Casing material _____

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: HAD WATER PROBLEM IN 1975 or 1976, WENT DEEPERHE WILL NOT LET US MEASURE WELL - DOES NOT WANT TO BE NUDGEDDID NOT WANT TO BOTHER WITH WATER* DID NOT MEASURE WELL

WELL IN SIOUX QUARTZITE

NAME: JAC

DATE: 29 MAY 90

NAME OF PERSON WAYNE COFFAA TELEPHONE 428-3606

ADDRESS RR 2, BOX 234 DEL RAPIDS COUNTY MINNEHAHA

Location or Land Description: SECTION 21, T104N R44W [DDA]

Comment or Complaint: CONCERNED OVER POTENTIAL WELL PROBLEMS DO TO
DEEPENING THE QUARRY - NEIGHBORING WELLS MAY GO DRY -
NEW CUT WOULD BE 20' BELOW BOTTOM OF HIS WELL - (?)
IN HIS OPINION, DIDN'T THINK QUARRY WILL AFFECT THEIR WELL -
IF NO PROBLEM, THEN FINE, WANTED TO REGISTER HIS CONCERN -

BOB BAUM SUPPLIED WELL INFO - BELOW (LIVES IN HOUSING AREA)

(When applicable, complete following)

Well location if different from above: EAST OF COFFAA'S HOUSE

Date well drilled: ? Well Driller VAN DER VOOST - COLTON - WORKS ON PUMP

Purpose of well: DOMESTIC, 4-5 HOUSES
(domestic, irrigation, municipal, other)

Water Level: 40 TO 60' (?) Flow, if flowing _____

Depth of well: 184' Can well be controlled? _____

Pump setting: 161 ± Casing size: 5 or 6"

Type of pump: SUBMERSIBLE Screen type: _____

Can pump be lowered: _____ Casing material STEEL

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: BOB BAUM - WATER TESTS ALWAYS GOOD - SAYS WATER IS GETTING
HARDER (?) CALLED CHRIS PEDERSON ADDITION
USES 650,000 GALLONS/YR ACCORDING TO METER RECORDS

* DID NOT MEASURE WELL - IT WAS SCALED
WELL IN QUARTZITE

NAME: JAG

EL-1550

Water Rights Division - DWNR
Complaint Form

File No. 5400-3 LG EVERIST

DATE: 30 MAY 90

NAME OF PERSON JAMES HYMAN'S (TED WALL) TELEPHONE 428-3886

ADDRESS RR 3, BOX 4 DELL RAPIDS COUNTY MINNEHAHA

Location or Land Description: SECTION 12, T104N R44W [CB]

Comment or Complaint: NEIGHBORS WANTED HIM TO SIGN UP

DIDN'T KNOW IF THERE WOULD BE A PROBLEM - DOESN'T WANT TO

CAUSE ANY TROUBLE -

WOULD LET U.S. MEASURE WELL IF WE WANT TO -

(When applicable, complete following)

Well location if different from above: SOUTH OF HOUSE IN A PIT, PLUG SEAL

Date well drilled: (?) MOVED ON PLACE IN 1972 Well Driller ?

Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)

Water Level: ABOUT 60' Flow, if flowing _____

Depth of well: 180' ± Can well be controlled? _____

Pump setting: 160' Casing size: 6"

Type of pump: SUBMERSIBLE Screen type: OPEN HOLE

Can pump be lowered: _____ Casing material STEEL

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity 6-8 GPM

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: PULLS PUMP OCCASIONALLY - NO WATER PROBLEMS BEFORE

WELL LOOKS LIKE IT WAS RELINED - COULDN'T MEASURE - GOT DOWN

ABOUT 50' AND HUNG UP ON SOMETHING - SOME KIND OF OBSTRUCTION

WELL IN QUARTZITE

NAME: JAG

DATE: 30 MAY 90NAME OF PERSON IRENE GERAETS TELEPHONE 428-3136ADDRESS RT 3, BOX 305 DELL RAPIDS COUNTY MINNEHAHALocation or Land Description: SECTION 13, T104N R49W [CCD]Comment or Complaint: DIDN'T SAY MUCH ABOUT WATERTALKED ABOUT BLASTING - SHAKE HOUSE, BLASTS OK LATELYHAS WORRIED ABOUT QUARRY AFFECTING WELL FOR YEARSHOOKED TO RWS

(When applicable, complete following)

Well location if different from above: JUST WEST OF HOUSEDate well drilled: ? WENT DEEPER (75)? Well Driller ? (CAP RUDY)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: ? Flow, if flowing ?Depth of well: ? Can well be controlled? ?Pump setting: ? Casing size: ?Type of pump: SUBMERSIBLE Screen type: ?Can pump be lowered: ? Casing material ?When pump last pulled, pump replaced or anything done to well ?Pump Capacity 6-8 GPMPumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? ?Other: USE WELL FOR EVERYTHING BUT HOUSESHE PREFERRED THAT WE NOT MEASURE OR MESS WITH THEWELL* DID NOT MEASURE OR LOOK AT IT

LIKELY IN QUARTZITE

NAME: JAG

EL -1600

DATE: 30 MAY 90

NAME OF PERSON GARY GARAETS TELEPHONE 428-3824

ADDRESS RR 3 , BOX 305 COUNTY MINNEHAHA

Location or Land Description: SECTION 24 T104NR49W [BBC]

Comment or Complaint: ANDERSON OR FEIGEN (PREVIOUS OWNERS)

HIS MOTHER REPORTED NO REAL WELL PROBLEMS

DOESN'T WANT US MESSING WITH WELL

(When applicable, complete following)

Well location if different from above: _____

Date well drilled: _____ Well Driller _____

Purpose of well: _____
(domestic, irrigation, municipal, other)

Water Level: _____ Flow, if flowing _____

Depth of well: 7 Can well be controlled? _____

Pump setting: _____ Casing size: _____

Type of pump: _____ Screen type: _____

Can pump be lowered: _____ Casing material _____

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: _____

* DID NOT MEASURE WELLS

LIKELY COMPLETED IN QUARTZITE

NAME: JAG

(16)

EL-1580

Water Rights Division - DWNR
Complaint Form5400-3
File No. LG EVERISTDATE: 30 MAY 90NAME OF PERSON GERAULD ELSINGER TELEPHONE 428-3523ADDRESS RR 1 BOX 36 COUNTY MOODYLocation or Land Description: SECTION 34, T105N R49W

Comment or Complaint: REASON HE SIGNED PETITION - NEIGHBORS WERE VERY
CONCERNED, SOME ONE NEEDS TO PAY CLOSE ATTENTION TO WHAT IS
GOING ON. WANTED TO KNOW IF PUMPING FROM QUARRY WILL HAVE
AN EFFECT ON QUARTZITE WELLS - WHAT ABOUT AREA W/L'S
HE DOES WELL WORK FOR LACEY.

(When applicable, complete following)

Well location if different from above: SOUTHEAST OF HOUSEDate well drilled: LATE 50'S Well Driller LAWRENCE LEE (?)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: MEASURED 57' ± Flow, if flowingDepth of well: 198' Can well be controlled?Pump setting: 120' Casing size: 6"Type of pump: SUBMERSIBLE Screen type:Can pump be lowered: PROBABLY Casing material STEEL

When pump last pulled, pump replaced or anything done to well

Pump Capacity 6-8 GPM (?)

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: OWNER IS SURE WELL COMPLETED IN SAND AND GRAVEL
NOT TO QUARTZITE, HE IS HOOKED TO RURAL WATER SYSTEM
W/L WAS MEASURED FROM TO P OF CASING WHICH IS LOCATED
IN A PIT 5-6' BLSD.

WELL COMPLETED INTO GLACIAL OUTWASH NAME: JAG

DATE: 30 MAY 90

NAME OF PERSON DAN HUSS TELEPHONE 428-3389

ADDRESS RT 1, BOX 20 DELL RAPIDS COUNTY MOODY

Location or Land Description: SE 1/4 SECTION 22, T10S N R49W

Comment or Complaint: NO WELL USE AT HOME SITE, USES RURAL WATER

WELL IS ABOUT 1/2 MILE NORTH IN NE 1/4

OLD WELL (UNDER WINDMILL) NEXT TO THE NEW WELL

- WELL LOG ON FILE - COMPLETED INTO OUTWASH (?)

ON TOP OF QUARTZITE

(When applicable, complete following)

Well location if different from above: SE 1/4 NE 1/4 22, T10S N R49W

Date well drilled: APRIL 90 Well Driller PUTZKE

Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)

Water Level: (?) ^{NEW WELL} REPORTED 140' Flow, if flowing

Depth of well: 225' Can well be controlled?

Pump setting: 180' ± Casing size:

Type of pump: SUBMERSIBLE Screen type:

Can pump be lowered: Casing material

When pump last pulled, pump replaced or anything done to well

Pump Capacity

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: MEASURED 72.7' BLSD IN OLD WELL

HE WOULD LET US MEASURE IF WE TALK TO HIM

ORG. WELL (COUNTY STUDY) NORTH OF HERE - NOT SURE WHY

W/LS IN OLD + NEW WELL ARE SO DIFFERENT - WELLS SUPPOSED TO BE SIMILAR (?)

WELL COMPLETED IN OUTWASH OR QUARTZITE NAME: JAG

4/82 WASH - ON SLOV QUARTZITE

DATE: 30 MAY 90

NAME OF PERSON FLOYD WHEELBORG TELEPHONE 428-3221

ADDRESS RT 1, BOX 11, DELL RAPIDS COUNTY MOODY

Location or Land Description: S¹/₂ SE¹/₄ SECTION 26, T10SN R49WComment or Complaint: THOUGHT SOMEONE SOUTH OF TOWN HAD WELL
PROBLEMS (BILL LANGWER) NEEDED TO GO DEEPER - HEARD OF
THIS -

LG IS BIG OPERATOR - CAN'T DO ANYTHING WITH THEM -

(When applicable, complete following)

Well location if different from above: WELL IS JUST EAST OF HOUSE

Date well drilled: SPRING 54 (?) Well Driller ?

Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)

Water Level: MEASURED 23' BLSD Flow, if flowing

Depth of well: 30' Can well be controlled?

Pump setting: Casing size: CONCRETE TILE 36"

Type of pump: NONE NOW Screen type: ?

Can pump be lowered: Casing material CONCRETE

When pump last pulled, pump replaced or anything done to well NEEDS A PUMP

Pump Capacity

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water
in the past?

Other: NOT USING WELL NOW, HOOKED TO RURAL WATER

NEVER HAD ANY PROBLEMS

WELL COMPLETED INTO BIG SLOVE - MOODY AQUIFER

NAME: JAG

DATE: 30 MAY 90NAME OF PERSON JOE WEINACHT TELEPHONE 428-5417ADDRESS 306 9th STREET DELL RAPIDS COUNTY MINNEHAHA

Location or Land Description: _____

Comment or Complaint: 2 BROTHERS ON THE FARMHAS CUSTOMERS IN AREA WHO ARE CONCERNEDHE DOES NOT HAVE A WELLTALKED ABOUT COMPLAINTS 14 OR 15 YEARS AGODIKE AROUND QUARRY - DISCHARGES INTO RIVER -FLOODING IN TOWN - OLD DAM ON RIVER (?)

(When applicable, complete following)

Well location if different from above: _____

Date well drilled: _____ Well Driller _____

Purpose of well: DOESN'T HAVE A WELL
(domestic, irrigation, municipal, other)

Water Level: _____ Flow, if flowing _____

Depth of well: _____ Can well be controlled? _____

Pump setting: _____ Casing size: _____

Type of pump: _____ Screen type: _____

Can pump be lowered: _____ Casing material _____

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? _____

Other: DON'T PUT BURDEN OF PROOF ON OWNER -NEED CONTROLS PUT ON QUARRYNOTICED PROBLEMS LAST TIME QUARRY WAS DEEPENED

HIS MAJOR CONCERNS 1) STREET PROBLEMS 2) PUMPING INTO RIVER (DISCHARGES) 3) SEDIMENT PROBLEMS IN RIVER

NAME: JAG

DATE: 30 MAY 90NAME OF PERSON BRIAN FEIGEN TELEPHONE 428-5763ADDRESS RT 2 BOX 20 DEER RAPIDS COUNTY MINNEHAHALocation or Land Description: BC SECTION 14, T104N R49WComment or Complaint: SAID THEY HAD WELL PROBLEMS IN THE LAST MONTH.WELL BELONGS TO FATHER - DOESN'T KNOW MUCH ABOUTWELL NEED TO TALK TO HIS FATHER -FOUND MELVIN AT CHEVY DEALER IN DEER RAPIDS - GOT WELL INFOLISTED BELOW FROM HIM -

(When applicable, complete following)

Well location if different from above: AT PLACE -Date well drilled: ? DEEPENED IN 45 OR 66 Well Driller ? (CAP RUDY)Purpose of well: DOMESTIC
(domestic, irrigation, municipal, other)Water Level: 90' ± ? DID NOT MEASURE WELL
Flow, if flowingDepth of well: ABOUT 200' Can well be controlled? Pump setting: 180' Casing size: Type of pump: Screen type: Can pump be lowered: Casing material When pump last pulled, pump replaced or anything done to well Pump Capacity Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past? Other: HOOKED TO RWS -BRIAN SIGNED PETITION BECAUSE NO ONE ELSE WAS HOME -MELVIN INDICATED THEY HAD PLENTY OF WATER TILL LAST YEARHAS WELL ON VACANT FARM - COULD MAYBE MEASURE THAT ONE
(SEC 14) ABOUT 1 1/2 MILE EAST - HASN'T BEEN USED FOR YEARS -NAME: JACWELL IN QUARTZITE - PROBABLY

DATE: 30 MAY 90

NAME OF PERSON MRS. DOUG Mergen TELEPHONE WORK 334-1982

ADDRESS IN DELL RAPIDS, LEFT MESSAGE W/ SISTER COUNTY MINNEAPOLIS

Location or Land Description: SEC 15 AA, T104N R44W

Comment or Complaint: NEVER GOT A HOLD OF HER - STOPPED AT HOME

IN TOWN - SHE WORKS IN SIOUX FALLS.

(When applicable, complete following)

Well location if different from above: _____

Date well drilled: _____ Well Driller _____

Purpose of well: _____
(domestic, irrigation, municipal, other)

Water Level: _____ Flow, if flowing _____

Depth of well: _____ Can well be controlled? _____

Pump setting: _____ Casing size: _____

Type of pump: _____ Screen type: _____

Can pump be lowered: _____ Casing material _____

When pump last pulled, pump replaced or anything done to well _____

Pump Capacity _____

Pumping dirty or riley water now and has well ever pumped sand or dirty or riley water in the past?

Other: _____

NAME: _____

SOUTH DAKOTA WATER WELL COMPLETION REPORT

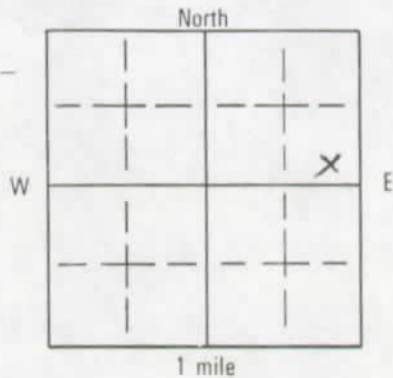
10-85

Location SE 1/4 NE 1/4 Sec 22 Twp 105 Rg 49

County

Moody

Please mark well location with an "X"

Well Completion Date 4-18-90

PROPOSED USE:

- ☒ Domestic ☐ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling:

Rotary

CASING DATA:

- ☐ Steel ☒ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
<u>200</u> LB/FT	<u>5</u> IN	<u>0</u> FT	<u>223</u> FT	<u>8 3/4</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUT:

Was the well grouted? ☒ YES ☐ NOTo what depth? 25' FEETWhat is grouting material? 22 sacksIf cement, number of sacks? Pump 1/2 of yard

Describe grouting procedure _____

What was grout weight? 1150 lbs LB/GALSCREEN: ☐ Perforated pipe ☐ ManufacturedDiameter 5 IN Length 13 FEETMaterial PlasticSlot Size 16 Set From 210 Feet To 223 Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Slot Size _____ Set From _____ Feet To _____ Feet

Other information _____

Was a packer or seal used? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

Was well disinfected upon completion? ☒ YES ☐ NOExplain 5 gallons of chlorine pumpBacteriological analysis ☐ YES ☐ NO

Laboratory sent to _____

Send sample jar to

Well Owner:

Name Dan Huss RR1, Box 120Address Dell Rapids

Well Log:

Depth

Formation

From

To

<u>Top Soil</u>	<u>0</u>	<u>2</u>
<u>yellow clay</u>	<u>2</u>	<u>115</u>
<u>brown "</u>	<u>115</u>	<u>136</u>
<u>blue "</u>	<u>136</u>	<u>210</u>
<u>fine brown sand</u>	<u>210</u>	<u>223</u>
<u>Granite</u>	<u>223'</u>	

STATIC WATER LEVEL 140 Feet

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

Can well be completely shut in? _____

WELL TEST DATA:

☒ Pumped☐ BailedDescribe: 15 gpm☐ Other

Pumping Level Below Land Surface

_____ ft. After _____ Hrs. pumped _____ GPM

_____ ft. After _____ Hrs. pumped _____ GPM

_____ ft. After _____ Hrs. pumped _____ GPM

REMARKS:

This well was drilled under license # 439

And this report is true and accurate

Drilling firm Dave Ruzza well Drilling

Signature of License Representative:

Dave Ruzza

Signature of Well Owner:

Date

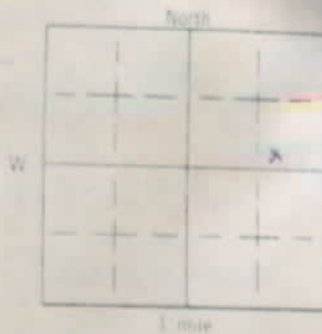


SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-85

E NE Sec 29 Twp 124N Rg 49W

Minnehaha



Indicate Mark well location with 'x'

Well Completion Date Sept 87

PROPOSED USE

- ☐ Domestic ☒ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling

forward rotary

PIPE DATA

- ☒ Steel ☐ Plastic ☐ Other

Other Describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
49.56 LB/FT	12 IN	0 FT	30 FT	20 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

CROUT

Was the well grouted? ☒ YES ☐ NO

To what depth? 0 to 11 FEET

What is grouting material? Cement.

If cement number of sacks? 18

Describe grouting procedure gravity feed with tremmie pipe

What was grout weight? 15 LB/GAL

☐ Perforated pipe ☒ Manufactured

Size 12 PS IN Length 12 FEET

Material Stainless Steel

Set Size 100 Set from 30 Feet To 42 Feet

Set Size Set from Feet To Feet

Set Size Set from Feet To Feet

Other Information

Is this well to be used? ☐ YES ☒ NO

Well Owner

Name Minnehaha Rural Water Corp.

Address RR 2 Shell Rapids

Well Log

Depth

Formation	From	To
top soil	0	2
silt	2	11
sand M	11	14
clay	14	15
sand F to M	15	44

STATIC WATER LEVEL 12'-4" Feet

If flowing closed in pressure PSI

GPM flow through inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other specify

Can well be completely shut in?

WELL TEST DATA

☒ Pumped

☐ Bailed

☐ Other

Describe Test pumped with gas driven line shaft turbine

Pumping Level Below Land Surface

24 ft After 12 Hrs pumped 300 GPM

ft After Hrs pumped GPM

ft After Hrs pumped GPM

REMARKS

Well # 9



This well was drilled under license # 129

And this report is true and accurate

Drilling by Ernie Shell

DATE MICROFILMED

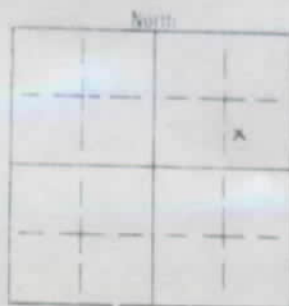
CAMERA OPERATOR

SOUTH DAKOTA WATER WELL COMPLETION REPORT

10-85

E NE Sec 29 Twp 104N Rq 49W

Minnehaha



Please mark well location with 'X'

Completion Date Sept 87

PROPOSED USE

☐ Domestic ☒ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling

forward rotary

CASING DATA

☒ Steel ☐ Plastic ☐ Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
49.56 LB/FT	12" IN	0 FT	36'-6" FT	20 IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUT

Was the well grouted? ☒ YES ☐ NO

To what depth? 0 to 11 FEET

What is grouting material? cement

If cement, number of sacks? 18

Describe grouting procedure gravity feed with tremie pipe

What was grout weight? 15 LB/GAL

Casing ☐ Perforated pipe ☒ Manufactured

Diameter 12" PS IN Length 14' FEET

Material Stainless Steel

Slot Size .100 Set from 36'-6" Feet To 50'-6" Feet

Slot Size Set from Feet To Feet

Slot Size Set from Feet To Feet

Other information

Was a packer or seal used? ☐ YES ☒ NO

What material?

Casing (depths) and location?

Well Owner

Name Minnehaha Rural Water Corp

Address RR 2 Hill Rapids

Well Log

Depth

Formation

From

To

Top soil

0

2

silt

2

11

sand F

11

21

sand M

21

53

quartzite

53

STATIC WATER LEVEL 14'-7" Feet

If flowing closed in pressure PSI

GPM flow through inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other, specify

Can well be completely shut in?

WELL TEST DATA

☒ Pumped☐ Bailed☐ Other

Describe

Test pumped with gas driven line shaft turbine

Pumping Level Below Land Surface

33 ft After 12 Hrs pumped 300 GPM

ft After Hrs pumped GPM

ft After Hrs pumped GPM

REMARKS Well # 8



This well was drilled under license # 129

And this report is true and accurate

Drilling firm Sevin Steel Drilling

Signature of Licensed Operator

D. J. Sevin

DATE PLACED IN FILE

CARRIER OPERATOR

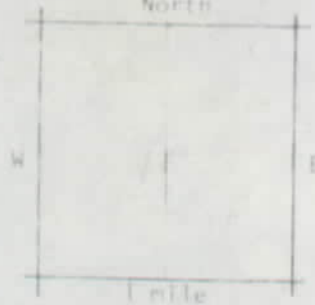
STATE OF SOUTH DAKOTA WELL DRILLERS REPORT

Location 6 24 Sec 1 Twp 1 Rg 1

County Butte

North

Please mark well location with an "X"



Well Completion Date 7-15-55

PROPOSED USE:

☒ Domestic ☐ Municipal ☐ Test Holes
☐ Irrigation ☒ Industrial ☐ Stock

Method of Drilling:

Probe Drilling

WELL CONSTRUCTION:

Diameter of hole 6 inches Depth 12 feet

Casing: ☐ Steel ☐ Plastic ☐ Other
Specify 12" Pk

Pipe Weight Diameter From To
____ lb/ft ____ inches ____ feet ____ feet
____ lb/ft ____ inches ____ feet ____ feet

Was a well screen used? ☐ Yes ☐ No

If Not Specify _____

Screen Type 4" 12" Pk Slot Size 20

Length 4' Diameter 12"

Was Casing left open end? ☐ Yes ☒ No

Was a Packer or seal used? ☐ Yes ☐ No

If so what material? _____

Was well gravel packed? ☒ Yes ☐ No

Was well grouted? ☐ Yes ☒ No

Describe grouting procedure _____

To what depth? _____ Feet

What was grouting material? _____

If cement, how many sacks? _____

Location of packer(s) and screen or perforated pipe _____

WAS WELL PLUGGED OR ABANDONED ☐ Yes ☐ No
If so how and with what material? _____

Well Owner:

Name _____

Address _____

Well Log:

Depth

Formation

From To

STATIC WATER LEVEL _____ Feet

IF flowing: closed in pressure _____ PSI

GPM Flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other; specify _____

Can well be completely shut off? _____

WELL TEST DATA:

☒ Pumped

☐ Bailed

☐ Other

Describe: _____

Pumping Level Below Land Surface

9 ft. After 2 Hrs. pumped 30 GPM

____ ft. After ____ Hrs. pumped ____ GPM

____ ft. After ____ Hrs. pumped ____ GPM

Remarks:

Good Clean Well -
Flow 1 PPM in 10
Plastic Packer

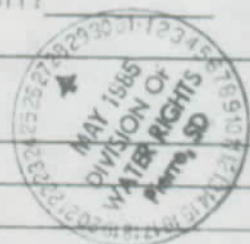
This well was drilled under license # _____

and this report is true and accurate.

Drilling Firm _____

Signed by _____

Date _____



DATE RECEIVED

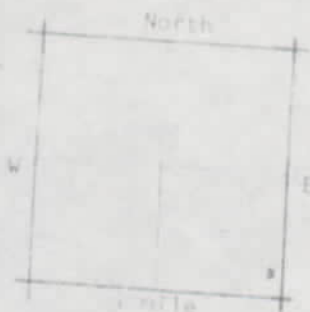
CAMERA OPERATOR

STATE OF SOUTH DAKOTA WELL DRILLERS REPORT

Location 1 Sec 2 Twp 1 Rd 1

County DeWitt

Please mark well location with an "X"



Well Completion Date 5-16-85

PROPOSED USE:

☒ Domestic ☐ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling:

WELL CONSTRUCTION:

Diameter of hole 4 inches Depth 125 feet

Casing: ☒ Steel ☐ Plastic ☐ Other
 Specify 4" x 10' galvanized steel

Pipe Weight Diameter From To
10 lb/ft 4 inches 0 feet 125 feet
10 lb/ft 4 inches 0 feet 125 feet

Was a well screen used? ☒ Yes ☐ No

If Not Specify none

Screen Type 4" x 10' galvanized steel Slot Size 1/8"

Length 125 Diameter 4"

Was Casing left open end? ☐ Yes ☒ No

Was a Packer or seal used? ☐ Yes ☒ No

If so what material? none

Was well gravel packed? ☒ Yes ☐ No

Was well grouted? ☒ Yes ☐ No

Describe grouting procedure grout 4" x 10' galvanized steel

To what depth? 125 Feet

What was grouting material? grout

If cement, how many sacks? none

Location of packer(s) and screen or perforated pipe 125'

WAS WELL PLUGGED OR ABANDONED / ☐ Yes ☒ No

If so how and with what material? none

Well Owner:

Name John Schmitt

Address 1111 1st St

Well Log:

Formation

Depth

From

To

STATIC WATER LEVEL 125 Feet

If flowing: closed in pressure 125 PSI

GPM flow 125 through 4" inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other

If other; specify none

Can well be completely shut off? yes

WELL TEST DATA:

☒ Pumped

☐ Bailed

☐ Other

Describe: none

Pumping Level Below Land Surface

125 ft. After 1 Hrs. pumped 125 GPM

125 ft. After 1 Hrs. pumped 125 GPM

125 ft. After 1 Hrs. pumped 125 GPM

Remarks:



This well was drilled under license # 123456789101112 and this report is true and accurate.

Drilling Firm John Schmitt

Signed by John Schmitt

Date 5-16-85

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Location of well: NE 1/4 NE 1/4 NE Section 32 Township 104 Range 47W
 Well owner Russ Johnson Baltic, South Dakota
(Name) (Address)
 Date well drilling completed 9-25-76 Purpose of well Domestic
(domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer
0-2	Topsoil
2-5	clay
5-6	cemented sand
6-14	Fine sand
14-19	clean sand
19-20	clay streak
20-22	red sand

Attach sheet if more space is needed

Depth to top of water producing aquifer 14' ft.
 Depth to static water level 14' ft.
 Name of producing aquifer (if known) 22'
 Total depth of drill hole 22' ft.
 Depth to bottom of casing 22' ft.

Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.

18' x 8" x 160-lbs per plastic pipe

Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.

5' x 8" x class 160 per. plastic pipe
slotted

If a flowing well, flow of completed well _____ G.P.M.

Ed A Lacey + Sons
 Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump McDonald Jet HP 1/2 hp
 Type of pump single pipe jet Capacity of installed pump _____ G.P.M.
 Depth of pump placement 18' ft., Date of pump installation _____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.408 of Chapter 46.4, MINIMUM WELL CONSTRUCTION STANDARDS.

Show exact vertical length of water surface measuring tube, when installed _____ ft., tube diameter _____, tube material _____.

 Name of Pump Installation Contractor

Signed By James J. Long Date 1-10-82

WELL DRILLERS REPORT
Division of Water Rights
Department of Water & Natural Resources

Well Owner:
Name Mingenehaka RWS
Address _____

A hand-drawn map of a 1-mile square area. The square is divided into four quadrants by a horizontal and vertical line. The quadrants are labeled: North (top-left), South (bottom-left), East (top-right), and West (bottom-right). Each quadrant contains a cross symbol. A small arrow points to the top-right quadrant. The bottom edge is labeled '1 mile'.

County Minnehaha
 Range 104 Sec. 29 Twp. 104 Rg. 49

Proposed Use: ☒ Domestic ☐ Municipal ☐ Test Holes
☐ Irrigation ☐ Industrial ☐ Stock

Method of Drilling: ☒ Forward Rotary ☒ Bored ☐ Jetted
☐ Reverse Rotary ☐ Cable ☐ Other

Diameter of Hole 10
Depth 100
Casing ☒ Steel ☐ Concrete
☐ Plastic ☐ Other
If other, specify _____

Was casing end left open Yes
 Was a well screen installed Yes
 Describe Well Screen
 Diameter 10" Material Stainless Steel
 Slot size 1/16"
 Was well gravel packed Yes
 Was well grouted Yes
 Was water sample taken Yes

Water Level Information:
Static water level 18' below land surface
If flowing: closed in pressure _____ PSI
rate of flow _____ GPM
Controlled by:
☒ Valve ☐ Reducers ☐ Other
If other; specify _____

☒ Pumped _____
☐ Bailed Describe: _____
☐ Other _____

Pumping Level Below Land Surface		ft. After		Hrs. pumped	GPM
_____	" "	_____	" "	_____	" "
_____	" "	_____	" "	_____	" "

[illegible]

Driller: F.H. H. & Son License NO. 111
Driller's or Firm's Name
P.O. Box 796, Treadwell, Alaska 99567
Address

Date _____

4-78

Water Level Information:
Static water level 7ⁱ below land surface
If flowing: closed in pressure _____ PSI
rate of low _____ GPM
Controlled by:
☒ Valve ☒ Reducers ☒ Other
If other; specify _____

Well Test Data:

☒ Pumped _____

☐ Bailed Describe: _____

☐ Other _____

Pumping Level Below Land Surface

_____ ft.	After	_____ Hrs.	pumped	_____ GPM
_____	" "	_____	" "	_____
_____	" "	_____	" "	_____

[illegible]

Method of Drilling: ☐ Forward Rotary ☒ Bored ☐ Jetted
☐ Reverse Rotary ☒ Cable ☐ Other

Date Completed: 7-2-80

Driller: Larry Well Drilling 111
Driller's or Firm's Name License NO.
Trent, So. Dak.
Address
Larry Well Drilling 9-6-80
Signed By Date

Remarks:

WELL DRILLERS REPORT
Division of Water Rights
Department of Water & Natural Resources

REPRODUCTIONS, REACTION 257/ ROL 1

Address Dell Rapids

North 9th St Sec. 21 Twp. 104-2 Rg. 19-40

☒ Domestic ☐ Municipal ☐ Test Holes
☒ Irrigation ☐ Industrial ☐ Stock

Method of Drilling: ☒ Forward Rotary ☒ Bored ☐ Jetted
☐ Reverse Rotary ☐ Cable ☐ Other

Diameter of Hole 8"
 Depth 18'
 Casing ☒ Steel ☒ Concrete
☒ Plastic ☐ Other
 If other, specify _____

Was casing end left open No
Was a well screen installed Yes
Describe Well Screen
Diameter 8 Material plastic
Slot size 1/8 inch
Was well gravel packed Yes
Was well grouted No
Was water sample taken Yes

Static water level 10 below land surface
If flowing: closed in pressure _____ PSI
rate of flow _____ GPM

Controlled by: ☒ Valve ☒ Reducers ☐ Other: _____

If other; specify _____

☒ Pumped
☐ Bailed Describe: _____
☐ Other _____

Pumping Level Below Land Surface				
ft. After		Hrs. pumped		GPd
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

[illegible]

(Use Back If Necessary)

Driller: Ed H. Logan, Son III
Driller's or Firm's Name License NO.
Box 796 Trenton, N.J. 57065
Address

Signed By Joan Riddle Date 11-2-81

Remarks :

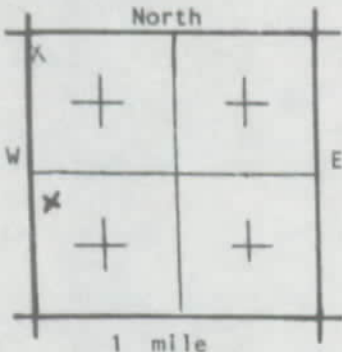
4-78

Address Dell Road, S.D.

Well Location:

North

Mark location
with an "X"



County Minnehaha

$N_{1/4}$ $N_{1/4}$ $N_{1/4}$ Sec. 20 Twp. 104-N Rg. 49-W

Proposed Use:

☒ Domestic	☐ Municipal	☐ Test Holes
☐ Irrigation	☐ Industrial	☐ Stock

Method of Drilling:

Method of Drilling: ☐ Forward Rotary ☒ Bored ☐ Jetted
☐ Reverse Rotary ☒ Cable ☐ Other

Well Construction:

Diameter of Hole 8"
Depth 9'
Casing ☐ Steel ☒ Concrete
☒ Plastic ☐ Other
If other, specify _____

Was casing end left open NO
Was a well screen installed Yes
Describe Well Screen
Diameter 8" Material plastic
Slot size _____
Was well gravel packed Yes
Was well grouted Yes
Was water sample taken Yes

Water Level Information:

Static water level 8' below land surface
If flowing: closed in pressure _____ PSI
rate of flow _____ GPM

Controlled by: ☒ Valve ☒ Reducers ☐ Other

If other; specify _____

Well Test Data:

☒ Pumped Carman Rupp
☐ Bailed Describe: _____
☐ Other _____

Pumping Level Below Land Surface		ft. After		Hrs. pumped		GPM
_____	11 11	_____	11 11	_____	11	11
_____	11 11	_____	11 11	_____	11	11

Well Log:

Depth

[illegible]

(Use Back if Necessary)

Date Completed: 8-29-78

Driller:

Driller's or Firm's Name Eck H. Long & Son License NO. 111

Trend, S.D. 57065
Address

Signed By Jana J. Long

12-5-78
Date

Remarks:



DRILLER'S LOG OF WELL

Location of Well: NE 1/4 SE 1/4 Section 10 Township 104 Range 49
 Well to be drilled for: Harli Weinacht 630 n Prairie St. St. Paul, MN
 (Name) (Address)
 Owner of land (if other than above) _____
 Date well drilling started May 21-56 finished May 24-56
 (Name) (Address)
 Purpose of well Domestic
 (domestic, irrigation, municipal, industrial, other)

Diameter
inches

Orange Peel Shovel Packed well
Dug 3' into Bottom
1/4" Pea Rock

Ground Surface Elevation: _____
 (If Available)

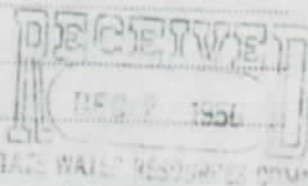
Kind and thickness of casing to be installed:

16 gauge galv. Helco Copper
steel spiral Seamed Pipe

Size of casing to be installed:

9' feet of 8" inches diameter
 _____ feet of _____ inches diameter
 _____ feet of _____ inches diameter

Type of seal between casing sizes:



Kind of perforated screen to be installed:

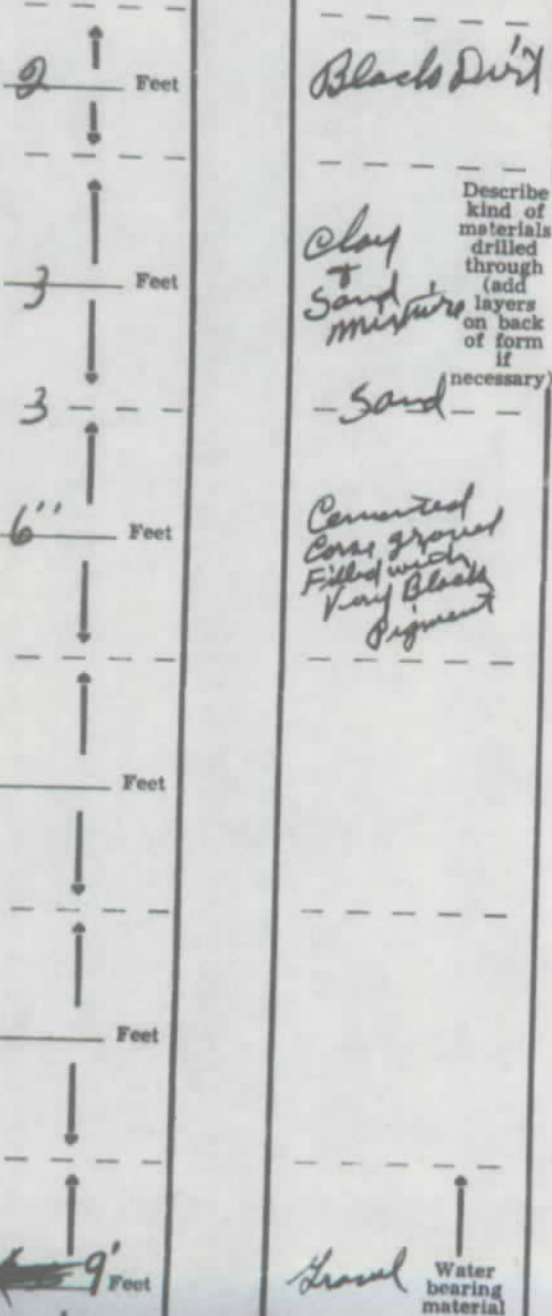
Material Cypress wood
 (steel, wood, concrete, etc.)

Size of screen:

Diameter 8 3/4" x 12 1/4" inches
 Length 3 feet
 Size openings 1/4 inches

Depth below ground surface to which water rises

in well 8' 2" feet.



17 1/2' Deep
Blue Clay Bottom
Pumped at Rate of 55 gal per 40 seconds

DRILLER'S LOG OF WELL

Location of Well: SW $\frac{1}{4}$, SW $\frac{1}{4}$, Section 2, Township 104, Range 49

Well to be drilled for: Joseph Nunez + Mary Rauder
(Name) (Address)

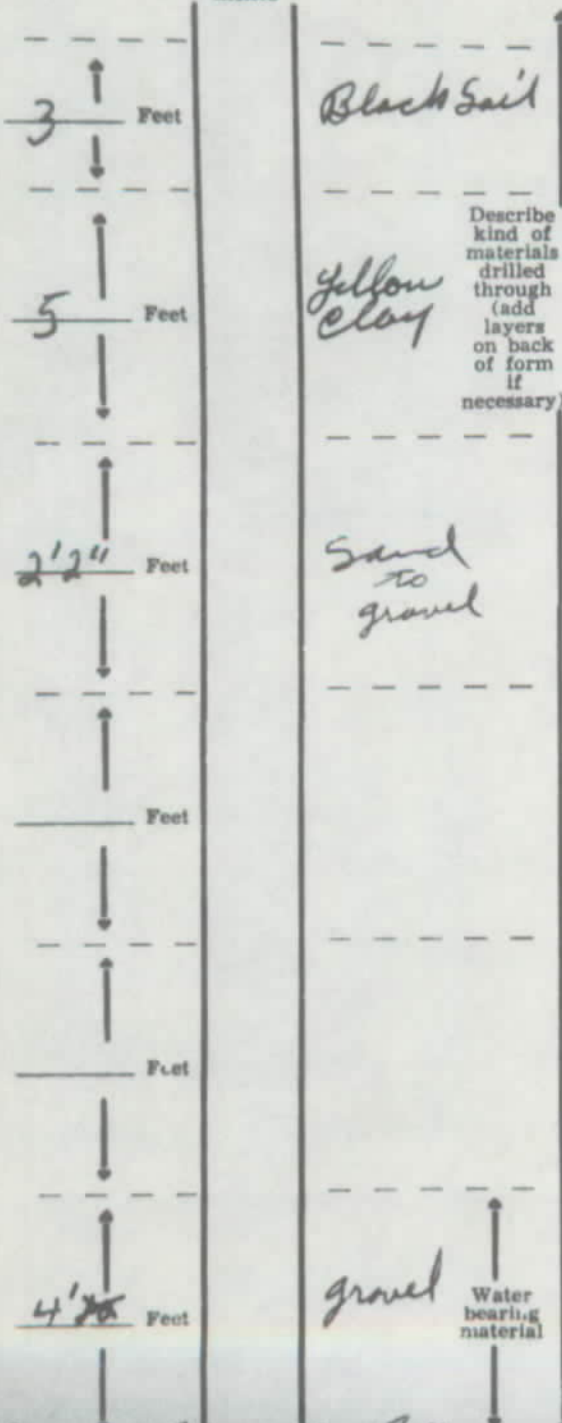
Owner of land (if other than above) (Name) (Address)

Date well drilling started May 28-54 finished May 29-54

Purpose of well Domestic
(domestic, irrigation, municipal, industrial, other)

Orange Red Gravel Packed well
Dug 3' Dia. to Bottom

Diameter
inches



Ground Surface Elevation: (If Available)

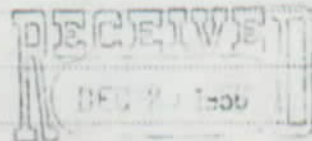
Kind and thickness of casing to be installed:

16 gauge galv Helcar capping
steel spiral casing 8" dia

Size of casing to be installed:

12 feet of 8" inches diameter
feet of inches diameter
feet of inches diameter

Type of seal between casing sizes:



Kind of perforated screen to be installed:

Material Cypress wood
(steel, wood, concrete, etc.)

Size of screen:

Diameter 8 3/4 x 12 00 inches
Length 3 feet
Size openings 1/4 inches

Depth below ground surface to which water rises

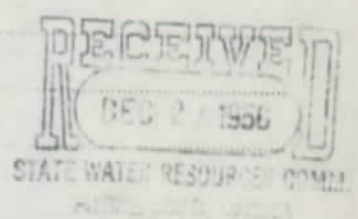
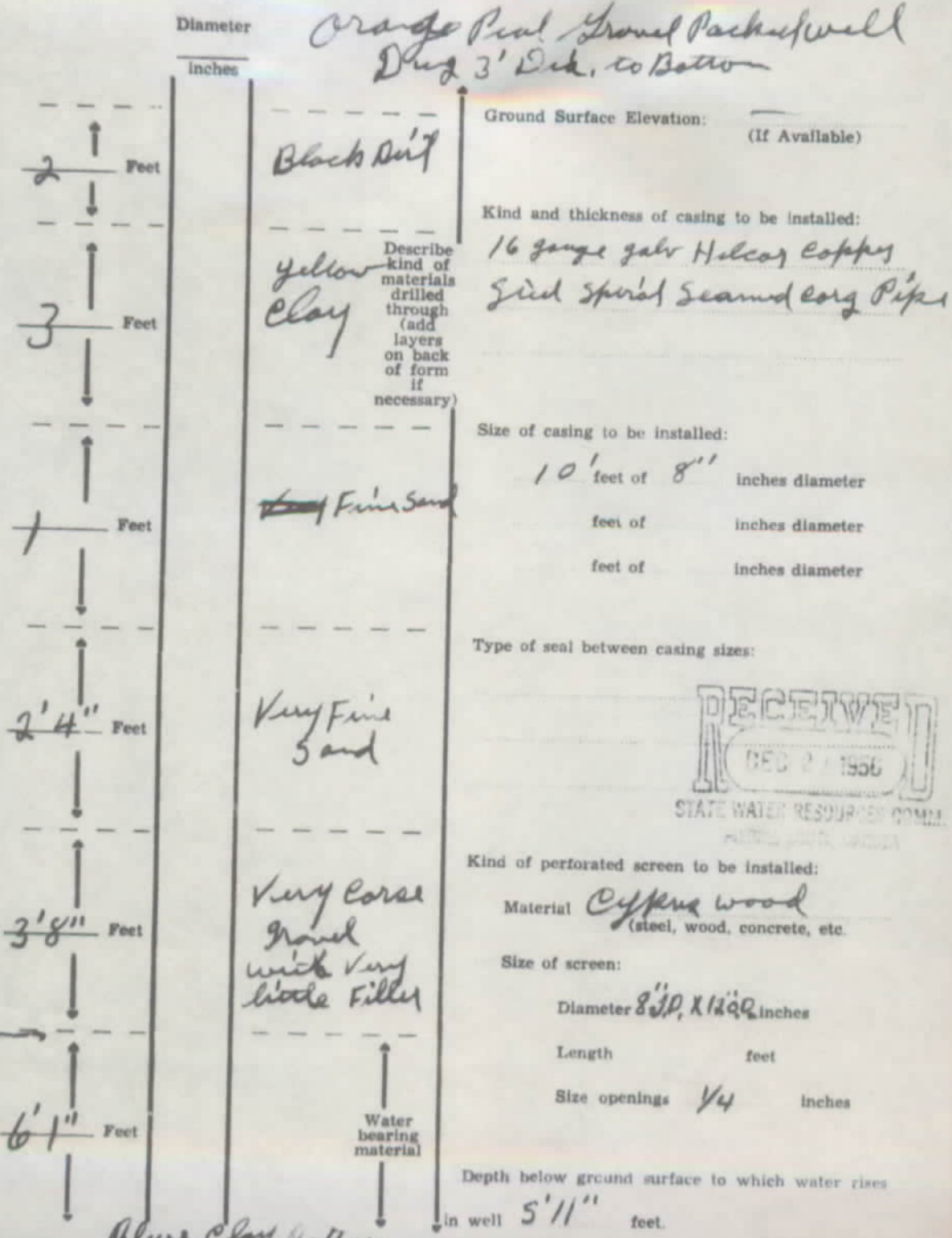
in well 9'2" feet.

14'2" Deep Blue clay Bottom
Pumped at rate of 1520 gal per hr.
and 21" Draw Down for 3 hr

DRILLER'S LOG OF WELL

Location of Well: *SW 1/4, NW 1/4, Section 2, Township 104, Range 49*
 Well to be drilled for: *John & Quinlan Nemmes*
 (Name) (Address)
 Owner of land (if other than above) _____
 Date well drilling started *May 30 - 56* (Name) finished *May 31 - 56* (Address)
 Purpose of well *Domestic*
 (domestic, irrigation, municipal, industrial, other)

Orange Peel Gravel Pack well
Dug 3' Dia. to Bottom



12' Deep
Blue Clay Bottom
Pumped at Rate of 3500 gal Per hr
with only 2' 8" Draw down

July 23, 1990

Department of Water & Natural Resources
Joe Foss Building
553 East Capitol
Pierre, S. D. 57501-3181



Dear Sirs:

Regarding - L.D. Everest, Inc. Wanted Water Right
Application No 5400-3, Dell Rapids Quarry.

I am on record to voice an opinion concerning
the effect the additional depth of the quarry will
have on existing wells.

I would also like to voice an opinion on
the environmental aspect of this venture.

Sincerely:

Quentin Memmes

Rt 3 Box 100

Dell Rapids, S.D. 57022

Report on
Water Permit Application No. 5400-3
L.G. Everist, Inc.
August 30, 1990

Application No. 5400-3 proposes validation of a vested right claim for 12.25 cubic feet of water per second (cfs) with a priority date of 1954. The point of diversion is located 2080 feet south and 1200 feet east of the center of Sec.10, T104N-R49W. The water is pumped to dewater the quarry and a portion of the water is used for industrial use by the quarry. Water that is not used by the quarry is discharged to the Big Sioux River in the SW 1/4 SE 1/4 Sec.10, T104N-R49W.

AQUIFER - Sioux Quartzite

Geology and Aquifer Characteristics

The Precambrian aged Sioux Quartzite consists primarily of massive, well cemented quartzite sand. The primary porosity and permeability (intergranular openings) of the Quartzite is limited, and ground water is obtained from the secondary porosity (joints, and fractures) of the rock. Movement of water to wells, or in this case the quarry, is dependent on the orientation and distribution of fractures at the wellbore, therefore the characteristics of the Sioux Quartzite are highly variable and site specific. Portions of the Sioux Quartzite are overlain by the glacial outwash deposits of the Big Sioux-Moody and the Howard Aquifers. The Big Sioux River flows across outcrops of the Sioux Quartzite in this area. The Sioux Quartzite is hydrologically connected to the Big Sioux-Moody Aquifer, the Howard Aquifer and the Big Sioux River. Recharge to the Quartzite is accomplished through infiltration of precipitation falling directly on the outcrop, leakage from the overlying aquifers, and streamflow losses from the Big Sioux River.

Special Considerations

Documentation is included with this application attesting to a pumping capacity of 12.25 cfs (5,500 gpm) since 1954. The duration of pumping and total amount of water pumped annually has been variable. Expansions of the quarry, laterally or vertically may result in longer pumping durations to dewater the quarry. Increased total annual withdrawals may have lowered water levels in the area. Present pumping should have caused the system to approach equilibrium because of the length of time pumping has been going on at this level. Theoretically, future expansions may increase the quarry's dewatering demands, thus lowering the water level in the vicinity of the quarry. Due to the hydrologic connection that exists between the Sioux Quartzite and the Howard and Big Sioux Aquifers; and the Big Sioux River; increasing the duration of pumping from the quarry is not expected to significantly lower ground water levels in the area.

If an unexpected decline of water levels does occur, SDCL 46-6-24 states:

"The failure of a well to meet standards established pursuant to SDCL 46-6-6.1 is not a defense in any action or proceeding regarding damage, loss of water production or quality, replacement cost or increased operating expenses incurred by a municipal or domestic use well located in a formation older than or stratigraphically lower than the green horn formation caused by any person using or withdrawing groundwater for mine dewatering in a formation older than or stratigraphically lower than the greenhorn formation."

Conclusions

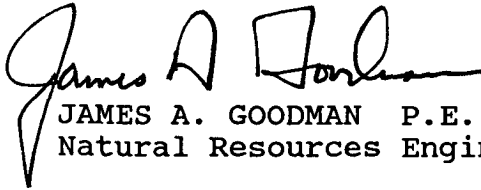
1. This application proposes validation of a vested right for diversion of 12.25 cfs with a priority date of 1954. Appropriations authorized by this Water Right would be from the Sioux Quartzite.
2. Documentation provided with this application attests to a 1954 priority date for this vested right.
3. Dewatering of the quarry over the years may have affected water levels in the vicinity of the quarry.
4. The Sioux Quartzite, Big Sioux Aquifer, Howard Aquifer, and Big Sioux River are hydrologically connected in this area.
5. The Division of Water Rights has received a petition in opposition to this vested right application. To date there are at least 26 parties of record including the applicant, for this application. Most of the concerns appears to be over issues extraneous to water availability, see enclosed supplemental report.
6. SDCL 46-6-24 states that if dewatering of a mine affects a well, the mine operator is responsible.
7. Potential exists for controversy concerning continued quarry dewatering and the effects on area wells. Monitoring wells completed, maintained, and measured by the applicant could be very useful in addressing this issue. If constructed, the location, well logs, maintenance records, and periodic water level readings of the applicant's observation well(s) should be kept on file with L.G. Everist.

8. Pumping records reflecting consumptive use of water from the quarry should be submitted to the Chief Engineer annually.



KEN BUHLER
Natural Resources Engineer

approved by:



JAMES A. GOODMAN P.E.
Natural Resources Engineer

RECOMMENDATION OF CHIEF ENGINEER FOR VALIDATION OF
VESTED WATER PERMIT APPLICATION NO. 5400-3, L.G. Everist, Inc.

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 Validation of Vested Water Right Application No. 5400-3, L.G., Everist, Inc., P.O. Box 829, Sioux Falls SD

The Chief Engineer is recommending VALIDATION of Application No. 5400-3 for 12.25 cfs because 1) water has been appropriated as described for Industrial use with a priority date of January 1, 1954, 2) the use has been developed without unlawful impairment of existing rights, 3) the use is a beneficial use and 4) it is in the public interest with the following qualification:

That L.G. Everist report to the Chief Engineer annually the amount of water pumped each year.

See report on application for additional information.



JOHN HATCH, Chief Engineer
August 31, 1990

NOTE: Since the potential exists for controversy concerning continued quarry dewatering and the effects on area wells, it is recommended that the applicant install observation wells to monitor water levels in the Sioux Quartzite, and the Big Sioux - Moody and Howard Aquifers and that periodic water level measurements be made.



Department of Water & Natural Resources

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

August 30, 1990

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

Thomas Everist
L.G. Everist
Box 829
Sioux Falls SD 57117

Dear Mr. Everist:

Vested Water Right Claim No. 5400-3 for industrial 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 Dell Rapids Tribune printed at Dell Rapids SD. For your information, a copy of the notice is enclosed. 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,

A handwritten signature in cursive script that reads "Eric Gronlund".

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures



Department of Water & Natural Resources

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

August 30, 1990

Dell Rapids Tribune
Box 99
Dell Rapids SD 57022

ATTN: Legal Publications:

Enclosed is a Notice of Hearing on Application No. 5400-3 to be published twice. Please publish the first notice on or before September 5, 1990 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 L.G. Everist, Box 829, Sioux Falls, SD 57117.

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,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

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

FIRST TRANSMITTAL NOTICE

TO: Eric Gronlund
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 September 5, 1990 with 2nd publication 7 days later. The applicant is responsible for payment.

NOTICE OF HEARING to Validate
Vested Water Right Application No. 5400-3 to Appropriate Water

Notice is given that L.G. Everist, Inc., P.O. Box 829, Sioux Falls SD 57117 has filed an application to validate a vested water right claim to appropriate 12.25 cubic feet of water per second (cfs) from a quarry with a priority date of 1954. The point of diversion is located at a point 2080 feet south and 1200 feet east of the center of Section 10-T104N-R49W. The water is to be discharged to the Big Sioux River in the SW1/4 SE1/4 of Section 10 T104N-R49W. The water is for industrial use by the quarry.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends VALIDATION of Vested Water Right Application No. 5400-3 for 12.25 cfs because 1) water has been appropriated as described for industrial use with a January 1, 1954 priority date, 2) the use has been developed without unlawful impairment of existing rights, 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 in the Community Room, Brule Co. Courthouse, 300 S. Courtland, Chamberlain, SD on October 3, 1990 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 September 21, 1990. 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 September 21, 1990.

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; 46-2A-18; 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; 46-5-49; 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; 72:02:01:19 thru 74:02:01:22.

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County Minnehaha) ss.

I, Marie Krueger

certify that the attached printed Notice was taken
from the Deer Rapids Tribune

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

September 5, 1990
September 12, 1990

Marie Krueger
(Signature)

Legal Dept. Manager
(Title)

9-12-1990
(Date Signed)

Cost of Printing: \$ 43.55

Notice/

**NOTICE OF HEARING
To Validate Vested
Water Right Application
No. 5400-3 to
Appropriate Water**

Notice is given that L.G. Everist, Inc., P.O. Box 829, Sioux Falls, SD 57117 has filed an application to validate a vested water right claim to appropriate 12.25 cubic feet of water per second (cfs) from a quarry with a priority date of 1954. The point of diversion is located at a point 2080 feet south and 1200 feet east of the center of Section 10-T104N-R49W. The water is to be discharged to the Big Sioux River in the SW1/4 SE1/4 of Section 10 T104N-R49W. The water is for industrial use by the quarry.

Pursuant to SDCL 46-2A-2, the Chief Engineer of the Water Rights Division recommends VALIDATION of Vested Water Right Application No. 5400-3 for 12.25 cfs because 1) water has been appropriated as described for industrial use with a January 1, 1954 priority date, 2) the use has been developed without unlawful impairment of existing rights, 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 in the Community Room, Brule Co. Courthouse, 300 S. Courtland, Chamberlain, SD on October 3, 1990 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 September 21, 1990. 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 September 21, 1990.

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; 46-2A-18; 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; 46-5-49; 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; 72:02:01:19 thru 74:02:01:22.
T-September 5, 12



Department of Water & Natural Resources

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

August 31, 1990

TO: L. G. Everist Vested Right Claim - Party of Record List
FROM: Eric Gronlund *EG*
SUBJECT: Notice of Hearing

Enclosed is the Notice of Hearing that is scheduled to be published in the Dell Rapids Tribune for L.G. Everist's Vested Right Claim for quarry dewatering. This claim is scheduled to be considered by the Water Management Board at 10:00 am in the Community Room, Brule Co. Courthouse, 300 S. Courtland, Chamberlain, SD.

If you have any questions regarding this notice, please feel free to contact this office.

enclosure

CERTIFICATION

I hereby certify that on August 31, 1990 I have personally deposited with the U.S. Mail postage paid envelopes containing a Notice of Hearing to Validate Vested Water Right Application No. 5400-3, L.G. Everist addressed as stated below:

Thomas Everist, L.G. Everist, Inc., P.O. Box 829, Sioux Falls, SD
57117

Stuart Tiede, Attorney, 310 S 1st Avenue, Sioux Falls, SD 57102

Wayne Coffaa, RR #2 Box 234, Dell Rapids, SD 57022

Daniel Huss, RR #1 Box 20, Dell Rapids, SD 57022

Arthur Rave, RR #3 Box 315, Dell Rapids, SD 57022

David Kistenmacher, RR #2 Box 220, Dell Rapids, SD 57022

Terry Weinacht, RR #1 Box 35, Dell Rapids, SD 57022

Roger Weinacht, RR #1 Box 31, Dell Rapids, SD 57022

Bill Langer, RR #3 Box 317, Dell Rapids, SD 57022

Martin Morse, RR #3 Box 318, Dell Rapids, SD 57022

Lowell Ronning, RR #2 Box 234, Dell Rapids, SD 57022

Joe Weinacht, 306 E. 9th, Dell Rapids, SD 57022

Gary Geraets, RR #3 Box 305, Dell Rapids, SD 57022

Irene Geraets, RR #3 Box 304, Dell Rapids, SD 57022

Thomas Nemmers, RR #3 Box 97, Dell Rapids, SD 57022

John Nemmers, RR #3 Box 98, Dell Rapids, SD 57022

James Fiegen, RR #2 Box 278, Dell Rapids, SD 57022

Roger Hanson, RR #2 Box 229, Dell Rapids, SD 57022

Russell Bohl, RR #3 Box 3, Dell Rapids, SD 57022

Mrs. Doug Mergen, 708 E 10th Street, Dell Rapids, SD 57022

Brian Fiegen, RR #2 Box 20, Dell Rapids, SD 57022

Quinton Nemmers, RR #3 JBox 100, Dell Rapids, SD 57022

Floyd Weelborg, RR #1 Box 11, Dell Rapids, SD 57022

Gerald Elsinger, RR #1 Box 36, Dell Rapids, SD 57022

Rapheal Schwebach, RR #3 Box 316, Dell Rapids, SD 57022

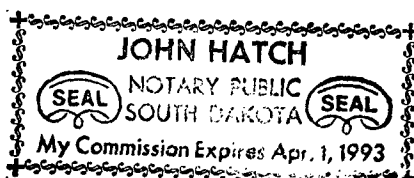
James Hyman, RR #3 Box 4, Dell Rapids, SD 57022

Marie R. Arken

MARIE R ARTHUR
Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 4th day of September, 1990.



John H. H. H.
Notary Public



Department of Water & Natural Resources

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

September 10, 1990

Thomas Everist
L.G. Everist
Box 829
Sioux Falls SD 57117-0829

Dear Mr. Everist:

Enclosed are the Report and Recommendation of the Chief Engineer for Water Permit Application No. 5400-3.

If you have any questions, please contact Eric Gronlund with our office.

Sincerely,

A handwritten signature in cursive script that reads "Marie R. Arthur".

MARIE R. ARTHUR
Secretary
Water Rights Division
605 773-3352

enclosure



Department of Water & Natural Resources

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

September 11, 1990

Thomas Everist
L.G. Everist
P.O. Box 829
Sioux Falls, SD 57117-0829

Dear Mr. Everist:

As per your request, enclosed is a copy of the Summary Report - Investigation of Wells near L.G. Everist Quarry at Dell Rapids.

The data sheets used in this report for each well investigated are somewhat erroneous in that they are called complaint forms. When in fact, in this investigation they are just data sheets used to describe that site specific well investigation. Also, I did not make copies of the well logs from this area because the copy quality makes them hardly legible and the data sheets already give the particulars of each well. If you still would like a copy of these well logs let me know.

If you have any questions or data needs, feel free to contact me.

Sincerely,

Eric Gronlund
Eric Gronlund
Water Rights Division
605773-3352

enc.



Sept. 15, 1990

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

L. G. Everist, Inc.
P. O. Box 829
Sioux Falls, SD 57117

Dear Sirs:

We, as interested persons, would like to participate in the hearings before the Board on October 3, 1990, in regard to the Vested Water Rights, Application # 5400-3 from L. G. Everist, Inc.

We as home and landowners with water wells that are drilled in the quartz, that is below the ground or soil, are concerned that the dewatering at a much lower level of approximately 60 feet by the L. G. Everist, Inc. quarry will lower or dry up the water levels in these wells.

Sincerely,

Wayne Coffey
RR 2 Box 234
Dell Rapids, S.D. 57022
Arthur & Dave Dell Rapids, S.D. 57022
RR 2 Box 715
W K Langner
RR 3 Box 317
Dell Rapids
S.D. 57022
Roger Weinacht
RR 1 Box 31
Dell Rapids, S.D. 57022
Terry Heimelt
RR 1 Box 35
Dell Rapids, S.D.
Roger F. Janson
RR 2 Box 279
Dell Rapids, S.D. 57022

Towell & Torring
RR 2 Box 218
Dell Rapids, S.D. 57022
W. Weinacht
306-9th ST.
Dell Rapids, S.D. 57022
James E. Jenson
RR 2 Box 229
Dell Rapids, S.D. 57022
David Kistemaker
RR 2 Box 220
Dell Rapids, S.D. 57022
Casper Rude
116 W Elm
Dell Rapids
S.D. 57022
by WKL

Floyd Weelborg
Rt. 1 Box 11
Dell Rapids, S.D. 57022

Daniel M. Huss
R 1 Box 20
Dell Rapids, So. Dak.



Department of Water & Natural Resources

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

September 19, 1990

Thomas Everist
L.G. Everist, Inc.
Box 829
Sioux Falls, SD 57117-0829

Dear Mr. Everist:

This letter is in reference to L.G. Everist's Vested Water Right Application No. 5400-3. This office received a petition (copy attached) September 18, 1990 from interested parties wishing to participate in the hearing before the Water Management Board. As you will recall, a petition was also received May 8, 1990 prior to the application being published. Persons signing either petition will be considered a party of record at the hearing.

The petition did not request a delay of the October 3, 1990 scheduled date for consideration of this application by the Water Management Board. The hearing is set for 10:00 am in the Community Room, Brule County Courthouse, 300 S Courtland, Chamberlain, SD. The agenda time is an estimate and may be delayed due to prior agenda items.

I will forward any additional petitions received by this office regarding your application. If you have any questions, please feel free to contact this office.

Sincerely,

Eric Gronlund
Water Rights Division
605 773-3352

enc.

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

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

September 20, 1990

Kevin Oliver
L.G. Everist, Inc.
P.O. Box 829
Sioux Falls, SD 57117

Dear Mr. Oliver:

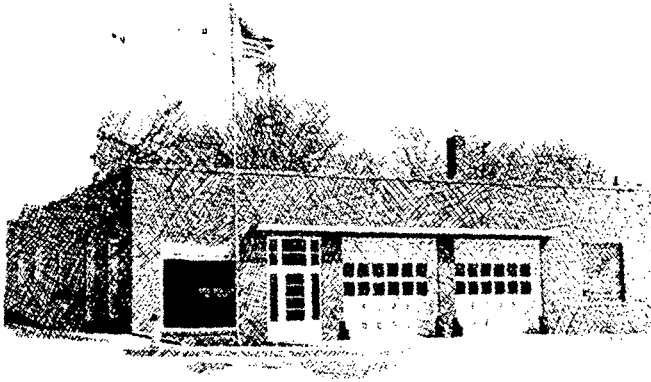
As per your conversation with Jim Goodman, I am forwarding you a copy of the "Summary Report of the May 29 and May 30, 1990 Investigation of Wells near L.G. Everist Quarry at Dell Rapids" including the data sheets.

If you have any additional questions, feel free to contact this office.

Sincerely,

Eric Gronlund
Water Rights Division
605 773-3352

enc.



MUNICIPAL FINANCE OFFICER

PHONE 428-3595

City of Dell Rapids

P. O. Box No. 10 * SOUTH DAKOTA 57022



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

Dear Sir,

Please accept this letter as a written petition per the Notice of Hearing to Validate Vested Water Rights Application No. 5400-3 to Appropriate Water.

Of interest to the City of Dell Rapids is the question of the quality of the water discharged into the Big Sioux River. The question raised by the area land owners concerning the impact on their wells is one that the City of Dell Rapids would leave with the geologists and hydrologists. However, it does raise a legitimate question of concern on the quality of the water discharge. It is well documented that the Big Sioux River recharges the Big Sioux Aquifer. The Minnehaha Rural Water Corporation obtains its water from this aquifer. They supply water to most of the county and a number of towns in the county including Dell Rapids.

Beneficial use of water (Item 3) and the public interest (Item 4) we believe, pertains to the quality of the discharge into the river. It is our understanding that oil and grease, and perhaps other fluids from the quarry operation do end up in the water that is pumped into the river. L.G. Everist is allowed to discharge this water following the limits set by their NPDES permit. The results of monthly tests taken by L.G. Everist show that the discharge has complied with the permit.

As you might be aware Minnehaha County has been working on an ordinance to protect ground water in the county. The establishment of a water source protection overlay district is intended to preserve the quality and quantity of area water resources. The amendment to the county zoning regulation prohibits certain uses which pose the greatest threat to ground water contamination and imposes reasonable and adequate safe guards on other uses which exhibit a potential to contaminate the groundwater.

We view this hearing as an opportunity to praise the aware-



MUNICIPAL FINANCE OFFICER

PHONE 428-3595

City of Dell Rapids

P. O. Box No. 10 * SOUTH DAKOTA 57022

ness level of all concerned. We raise this issue in a spirit of cooperation and with an understanding of the realities of quarry operations. Perhaps a review of present operations as they relate to the discharge would be useful. If some reasonable action were identified that would reduce the risk to groundwater then this review would benefit all concerned. Perhaps some small measures might improve containment features where fuels are stored.

Our community values its relationship to L. G. Everist. We believe this concern is one shared by L. G. Everist. The preservation of a most necessary resource is in the interest of all.

The mailing address for the City is:

City of Dell Rapids
Box 10
Dell Rapids, SD 57022

Thomas J. Earley
Mayor, City of Dell Rapids

cc: L. G. Everist



Department of Water & Natural Resources

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

September 21, 1990

Thomas Everist
L.G. Everist, Inc.
Box 829
Sioux Falls, SD 57117-0829

Dear Mr. Everist:

This letter is in reference to L.G. Everist's Vested Water Right Application No. 5400-3. This office received a petition from the City of Dell Rapids regarding your application. Enclosed is a copy of this petition.

If you have any questions, please feel free to contact this office.

Sincerely,

Eric Gronlund
Water Rights Division
605 773-3352

enc.



Department of Water & Natural Resources

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

October 5, 1990

NOTICE

TO: L. G. Everist, Inc.
PO Box 829
Sioux Falls SD 57117
and Parties of Record (see attached sheet)

FROM: John Hatch, Chief Engineer *John Hatch*
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 on approval of Water Permit Application No. 5400-3. The Board will consider the proposed Findings, Conclusions and Final Decision at 1:00 pm, December 5, 1990, Deerfield Room, Hilton Inn, 445 Mt. Rushmore Road, Rapid City 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 15, 1990. 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 26, 1990.

The public hearing was completed October 3, 1990. No additional testimony will be received on December 5, 1990.

cc: John Guhin, Deputy Attorney General
John Haak, Assistant Attorney General

CERTIFICATION

I hereby certify that on October 5, 1990 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice to Prepare Findings of Fact, Conclusions of Law and a Final Decision on Water Permit Application No. 5400-3 addressed as stated on the Parties of Record.

Karen Schlaak
KAREN SCHLAACK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 9th day of October, 1990.



John H. H. H.
Notary Public



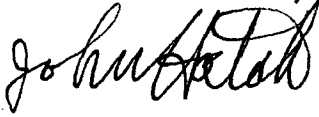
Department of Water & Natural Resources

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

December 7, 1990

NOTICE

TO: L. G. Everist, Inc.
P.O. Box 829
Sioux Falls, SD 57117
and Parties of Record (see attached sheet)

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

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 Water Permit Application No. 5400-3 which was considered at the October 3, 1990, 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.

cc: John Haak, Assistant Attorney General

STATE OF SOUTH DAKOTA

WATER MANAGEMENT BOARD

IN THE MATTER OF VESTED	)	FINDINGS OF FACT,
RIGHT APPLICATION	)	CONCLUSIONS OF LAW
NO. 5400-3-L.G. EVERIST	)	AND FINAL DECISIONS

FINDINGS OF FACT

I

This is an application seeking to validate a vested right claim for 12.25 cubic feet of water per second with a priority date of January 1, 1954. The use sought to be validated is the dewatering of a quarry, with a portion of that water to be validated for industrial uses. Water that is not so used is to be discharged to the Big Sioux River.

II

L.G. Everist, Inc. has had the capability of pumping 5500 gallons per minute to dewater the quarry (equivalent to 12.25 cfs) since 1954.

III

L.G. Everist, Inc. has not pumped continually at the rate of 5500 gallons per minute, but has pumped at lower rates unless the situation demanded. There has been no showing that L.G. Everist failed to use the full 5500 gallon per minute pumping rate claimed when it was necessary or practical to do so.

IV

The pumping of the quarry has been developed without unlawful impairment of existing rights.

V

In particular, the Board finds that there is no credible evidence that pumping from the quarry has affected domestic wells in the area. The majority of complaints as relating to domestic wells occurred in the 1970's. There have been few complaints within the past decade implying that the pumping, which has been continual throughout the entire period, did not cause the problems.

VI

Furthermore, the complaints set before the Board could not be tied by any scientific evidence to the pumping of the quarry. The only tie was speculative. Most of the problems with wells in the area appeared to be normal problems with wells in any area of the state or nation.

VII

The single well in the area which was monitored during the past year showed no fluctuation, even though L.G. Everist, Inc. pumped at 180-foot level for two weeks at a time during the time of monitoring.

VIII

The scientific evidence submitted to the Board indicates that the effect of the pumping of the quarry on domestic wells in the area is negligible, as is the effect of the pumping on the Big Sioux River.

IX

The use of water for dewatering of a quarry is a beneficial use, as is the use of certain of that water for industrial purposes.

X

L.G. Everist, Inc. now is in the process of lowering its quarry from 150 to 200 feet. The scientific evidence indicates that the lowering of the quarry will not have more than a negligible effect on domestic well owners or on the Big Sioux River.

CONCLUSIONS OF LAW

I

This Board has jurisdiction of this matter.

II

Water has been appropriated as described above with a priority date of January 1, 1954.

III

There has been no showing of a three-year interruption of this use of water without legal excuse so as to bring into play the forfeiture statutes.

IV

~~The use described has been developed without~~
unlawful impairment of existing rights.

V

The use of water for dewatering of a quarry is a beneficial use, as is the use of certain of that water for industrial purposes.

VI

The use described is in the public interest with the conditions as set out in the Final Decision.

VII

The Board concludes that neither SDCL 46-6-24 nor the decisions of the South Dakota Supreme Court, including Frazer v. Water Rights Commission, dictate or indicate that this vested water right should be denied; this is so because there is a lack of evidence showing harm to domestic wells in the area from the pumping.

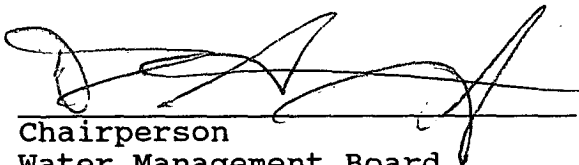
FINAL DECISION

The Application for Vested Right No. 5400-3 for 12.25 cfs is validated with the following conditions:

1. That L.G. Everist, Inc. report to the Chief Engineer annually the amount of water pumped each year.
2. That, within a reasonable time as set by the Chief Engineer, the applicant install a reasonable number of observation wells as determined by the Chief Engineer, to monitor water levels in the Sioux Quartzite, and the Big Sioux-Moody and Howard Aquifers and that periodic water level measurements be made and reported to the Chief Engineer. ~~The location of the wells will be established by the Chief Engineer.~~

Dated this 5th day of December, 1990.

BY THE BOARD:


Chairperson
Water Management Board

Parties of Record
Water Permit Application No. 5400-3
L. G. Everist, Inc.
Those Attending October 3, 1990 Hearing

Thomas Everist, L. G. Everist, Inc.	PO Box 829	Sioux Falls SD	57117
Wayne Coffaa	RR 2, Box 234	Dell Rapids SD	57022
Arthur Rave	RR 3, Box 315	Dell Rapids SD	57022
David Kistenmacher	RR 2, Box 220	Dell Rapids SD	57022
Terry Weinacht	RR 1, Box 35	Dell Rapids SD	57022
Bill Langner	RR 3, Box 317	Dell Rapids SD	57022
Lowell Ronning	RR 2, Box 234	Dell Rapids SD	57022
Joe Weinacht	306 E 9th	Dell Rapids SD	57002
Roger Hanson	RR 2, Box 229	Dell Rapids SD	57022
Dan Kuper	PO Box 9	Dell Rapids SD	57022
Larwence Allan	Dell Rapids SD 57022		
Kevin S Oliver	PO Box 829	Sioux Falls SD	57117
Casper Rude	116 West Elm Ave	Flandreau SD	57028

CERTIFICATION

I hereby certify that on December 10, 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 on Water Permit Application No. 5400-3 addressed as stated on the attached sheet.

Mare R. Smith

Marie R. Arthur
Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of December, 1990.



John H. Carr
Notary Public

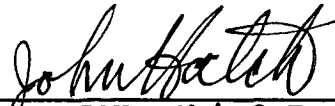
STATE OF SOUTH DAKOTA

VESTED RIGHT WATER LICENSE NO. 5400-3

(1) L. G. Everist, Inc. of PO Box 829, Sioux Falls, SD 57117-0829 made Application No. 5400-3, January 29, 1990 for validation of a vested right claim to appropriate 12.25 cubic feet of water per second from a quarry, Minnehaha County, South Dakota for industrial purposes. Vested Water Right No. 5400-3 was validated December 5, 1990 with a priority date of January 1, 1954. Construction of the described water supply system and application of water to beneficial use has been completed and complies with applicable provisions of South Dakota State Law.

(2) The applicant is entitled to divert 12.25 cubic feet of water per second for beneficial use. The location of the diversion point is at a point 2080 feet south and 1200 feet east of the center of section 10, T104N, R49W.

(3) Pursuant to Section 46-5-30.1 L. G. Everist, Inc. of PO Box 829, Sioux Falls, SD 57117-0829 the holder(s) and/or owner(s) of Vested Water Right No. 5400-3 is issued a license to appropriate 12.25 cubic feet of water per second from a quarry with a priority date of January 1, 1954 from the location specified in (2) of this license. The water is to be used for the purpose of industrial use. This license is subject to any limitations, conditions or qualifications listed in Vested Water Right No. 5400-3 and subject to South Dakota State Law.



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

MAR 27 1991



DEPARTMENT OF WATER & NATURAL RESOURCES

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

MAR 27 1991

5400-3

Thomas Everist
L.G. Everist, Inc.
PO Box 829
Sioux Falls, SD 57117

Dear Mr. Everist:

Enclosed are your Validated Vested Water Right and Water License No. 5400-3. 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.

Very truly yours,

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

enclosures

South Dakota

DEPARTMENT OF WATER & NATURAL RESOURCES

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

GREAT FACES. GREAT PLACES.

April 10, 1991

5400-3

Thomas Everist
L G Everist, Inc.
PO Box 829
Sioux Falls, SD 57117-0829

Dear Mr. Everist:

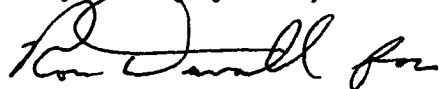
I am contacting you in regard to the status of a qualification specified in Vested Water Right No. 5400-3. Qualification No. 2 of the vested right, validated by the Water Management Board on December 5, 1990, reads as follows:

That, within a reasonable time as set by the Chief Engineer, the applicant install a reasonable number of observation wells as determined by the Chief Engineer, to monitor water levels in the Sioux Quartzite, and the Big Sioux-Moody and Howard Aquifers and that the periodic water level measurements be made and reported to the Chief Engineer. The location of the wells will be established by the Chief Engineer.

The above qualification requires that you install monitoring wells into the Sioux Quartzite. The Division of Water Rights is already monitoring wells into the other two formations.

Please contact Jim Goodman or Ken Buhler at (605) 773-3352 concerning the status of construction of any monitoring wells or if there are any problems or questions.

Very truly yours,



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

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

May 1, 1991



Ken Buhler
Division of Water Rights
Joe Foss Building
523 East Capitol Avenue
Pierre, South Dakota 57501

RE: Vested Water Rights Claim No. 5400-3, Qualification
No. 2, and letter dated April 10, 1991 from John Hatch,
Chief Engineer

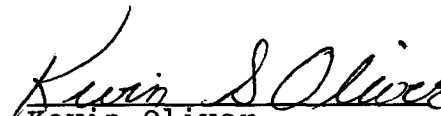
Dear Mr. Buhler:

In regards to Qualification No. 2 and our phone conversation on
April 11th, we propose to establish an observation well to be
located 1,000 feet north, 500 feet east of the center of
Section 10, T104N - R49W, Minnehaha County, South Dakota.

In the drilling of the well, we propose to encase the part of
the well that is above the Sioux Quartzite and drill into the
Sioux Quartzite to a depth just below the water level at our
quarry diversion location.

Please contact me on this proposal so that we can install an
observation well.

Very truly yours,
L.G. EVERIST, INC.


Kevin Oliver
Engineer

KO:ce

cc: Tom Everist
Dale Fields
Jay Van Den Top
Dan Kuper

South Dakota



GREAT FACES. GREAT PLACES.

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

May 14, 1991

5400-3

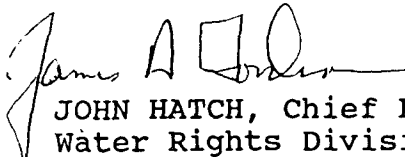
Kevin Oliver
L. G. Everist, Inc.
PO Box 829
Sioux Falls, SD 57117-0829

Dear Mr. Oliver:

I am writing in response to your May 1, 1991 letter regarding the location of an observation well to be completed into the Sioux Quartzite. Your proposal to complete an observation well 1,000 feet north and 500 feet east of the center of Section 10, T104N-R49W, is acceptable, and meets Qualification No. 2 on Vested Right No. 5400-3.

Please contact Jim Goodman or Ken Buhler at (605) 773-3352 if you have any problems or questions.

Very truly yours,

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

5400-3



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

January 7, 1992

Thomas Everist
L.G. Everist, Inc.
PO Box 829
Sioux Falls SD 57117

Dear Mr. Everist:

Pursuant to a qualification on Water Permit/Right No(s).
5400-3, we are requesting that the L.G. Everist, Inc.
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,

A handwritten signature in black ink, appearing to read "Ron Duvall", is written over a horizontal line.

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

L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656



January 20, 1992

Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

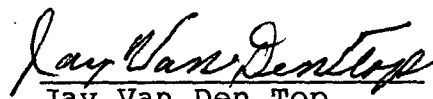
ATTENTION: Ron Duvall

Dear Mr. Duvall:

In reply to your letter of January 7, 1992, please be advised that the amount of water withdrawn for the year 1991 on our Water Permit/Right #5400-3 was 528,000,000 gallons.

I trust this is the information that you need. If you have any further questions, feel free to contact me.

Very truly yours,
L.G. EVERIST, INC.


Jay Van Den Top

JVDT:ce



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

December 23, 1992

Thomas Everist
L.G Everist, Inc.
PO Box 829
Sioux Falls SD 57117

Dear Mr. Everist:

Pursuant to a qualification on Water Permit/Right No(s). 5400-3, I am requesting that the L.G Everist, Inc. report the amount of water diverted under the permit(s) during 1992. Please respond by January 15, 1993.

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

Very truly yours,

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

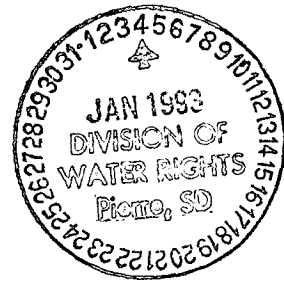
L. G. EVERIST, INC.



313 SO. PHILLIPS
P. O. BOX 829
SIOUX FALLS, SOUTH DAKOTA 57117
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656

5400-3

December 31, 1992



Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

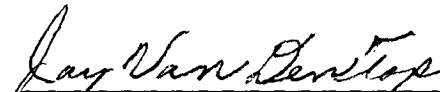
ATTENTION: Ron Duvall

Dear Mr. Duvall:

In reply to your letter of December 23, 1992, please be advised that the amount of water withdrawn for the year 1992 on our Water Permit/Right #5400-3 was 704,160,000 gallons.

I trust this is the information that you need. If you have any further questions, feel free to contact me.

Very truly yours,
L.G. EVERIST, INC.


Jay Van Den Top

JVDT:ce



5400-3

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

January 13, 1994

Thomas Everist
L.G. Everist, Inc.
PO Box 829
Sioux Falls, SD 57117

Dear Mr. Everist:

Pursuant to a qualification on Water Permit/Right Nos. 5400-3 & 5784-3, I am requesting that L.G. Everist, Inc. report the total amount of water diverted from each quarry 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

L.G. EVERIST, INC.



313 SO. PHILLIPS
P.O. BOX 5829
SIOUX FALLS, SOUTH DAKOTA 57117-5829
TELEPHONE 605-334-5000
TELECOPIER 605-334-3656



January 18, 1994

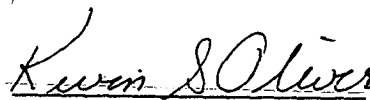
Ron Duvall, Natural Resources Engineer
Department of Environment and Natural Resources
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Mr. Duvall:

In reply to your letter of January 13, 1994, please be advised that the amount of water withdrawn for the year 1993 on our Water Permit/Right #5400-3- was 801,468,000 gallons. On Water Permit/Right #5784-3, there was no water withdrawn in 1993.

I trust this is the information that you needed. If you have any questions, please feel free to contact me.

Sincerely,
L.G. EVERIST, INC.


Kevin Oliver

KO:ce

cc: Dan Kuper
Jay Van Den Top
Dale Barnhart

WATER RIGHTS PROGRAM -- FILE DOCUMENTATION

NAME & ADDRESS: Chris Klein, QC & Regulatory Manager for L G Everist Inc

DATE: January 4, 2018

TELEPHONE: 605 929-4017

RE: address change for Permit/Right Nos. 5083-3, 5388-3, 5400-3, 5741-3, 5784-3 & 6402-3

COMMENTS:

Chris Klein w/L G Everist Inc sent an email to the Department indicating the corporate mailing address has changed.

See below:



CHRIS KLEIN, L.G. Everist, Inc. – QC & Regulatory Manager

350 S Main Ave, Suite 400, Sioux Falls, SD 57104

605.929.4017 || cmklein@lgeverist.com || www.lgeverist.com

SAFE...RELIABLE...PRODUCTIVE



L. G. EVERIST, INC.

RECEIVED

MAR 21 2018

WATER RIGHTS
PROGRAM

350 S. MAIN AVE., SUITE 400
SIOUX FALLS, SD 57104
605.334.5000
WWW.LGEVERIST.COM

3/19/2018

Eric Gronlund
SD DENR Water Rights Program
523 E Capitol Ave
Pierre, SD 57501-3182

RE: Amended Gallons Totals For Water Rights Permit 5400-3

Dear Mr. Gronlund:

Per our email correspondence on 03/19/2018, below are the amended gallons diverted from Water Rights Permit 5400-3 to include both total gallons discharged to the Big Sioux River and the total gallons diverted for construction aggregate processing:

<u>Year</u>	<u>Dewatering Gallons</u>	<u>Process Water Gallons</u>	<u>Total Gallons</u>
2009	610,112,172	157,320,000	767,432,172
2010	767,956,416	128,640,000	896,596,416
2011	739,870,608	137,160,000	877,030,608
2012	604,274,026	147,960,000	752,234,026
2013	534,766,259	125,760,000	660,526,259
2014	581,922,304	141,960,000	723,882,304
2015	555,642,192	133,200,000	688,842,192
2016	687,326,592	145,920,000	833,246,592
2017	667,508,864	200,520,000	868,028,864

As also discussed, gallons for both as well as an annual total will be reported going forward.

I trust this is the information you need. If you have any questions or need any further information, feel free to contact me at (605) 330-6570 or by email at cmklein@lgeverist.com.

Sincerely,

Chris Klein
L.G. Everist, Inc.

Cc: File