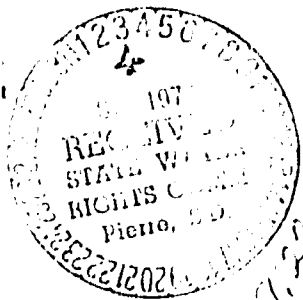


Water Right Number 3029-3

1. Considered 10-21 19 16
2. Name of Applicant Frederham Colony
3. Post Office Address Carpenter
4. Amount of water claimed 1.85
5. Source of water supply 75' deep well
6. Water to be used for irrigation
Acres to be irrigated 238
7. Water to be diverted and used in Clark County
about 9.1 Miles of Carpenter
8. Proof of Publication
Received 15F 10-27-76
Not received _____
9. Application
Approved _____
Subject to _____
Not approved _____
Action deferred _____
10. Remarks:

No. 3029-3Map No. 2353-3 Water Division No. 3 JAMES RIVER District _____
(Blanks to be filled by the Engineer for the W. R. C.)

APPLICATION FOR PERMIT

To Appropriately Water within the State of South Dakota

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

1. Name of Applicant Fordham Colony
 Postoffice address Casper, Wyo., State Wyo.
 If a corporation show date and place of incorporation _____

2. Method of accomplishing work (contract, employment of others, or by direct labor) _____

3. Name of diversion work Fordham Colony Irrigation No. 34. Amount of water claimed (cubic feet per second) 1.855. Source of water supply well

6. Location of point of diversion Sec 22 north 1/4 Sec 14 Township 13 Range 27 N 4°W, 2600 FEET FROM THE SE CORNER, SECTION 22, T115N, R50W County Clack

7. Annual period or periods during which water is to be used May 1 to Nov 18. Use to be made of water, (irrigation, industrial, municipal, commercial, recreation, etc.) Irrigation9. For irrigation use, Total number of acres to be irrigated 180.38

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

NE Land Description	No. Acres Irr.	SW Land Description	No. Acres Irr.
SW 1/4 22 - 115 - 57	40.0	SW 1/4 22 - 115 - 57	40.0
SE 1/4 22 - 115 - 57	40.0	SE 1/4 22 - 115 - 57	40.0
NW 1/4 22 - 115 - 57	40.0		
NE 1/4 22 - 115 - 57	40.0		

Attach sheet if more space is needed

10. Time required to complete construction of water supply system Five years. Additional time required to complete application of water to the proposed beneficial use Three years.

11. Choice of newspaper for Notice of Intent to Appropriately Water publication Water Plainsman

12. Principal Features of the Proposed Water Supply System.

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

Well Pumping system

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

Pipeline

C. Works proposed to apply water to beneficial use.

Central Pivot Irrigation MachineEstimated Total Cost \$ 45,000

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

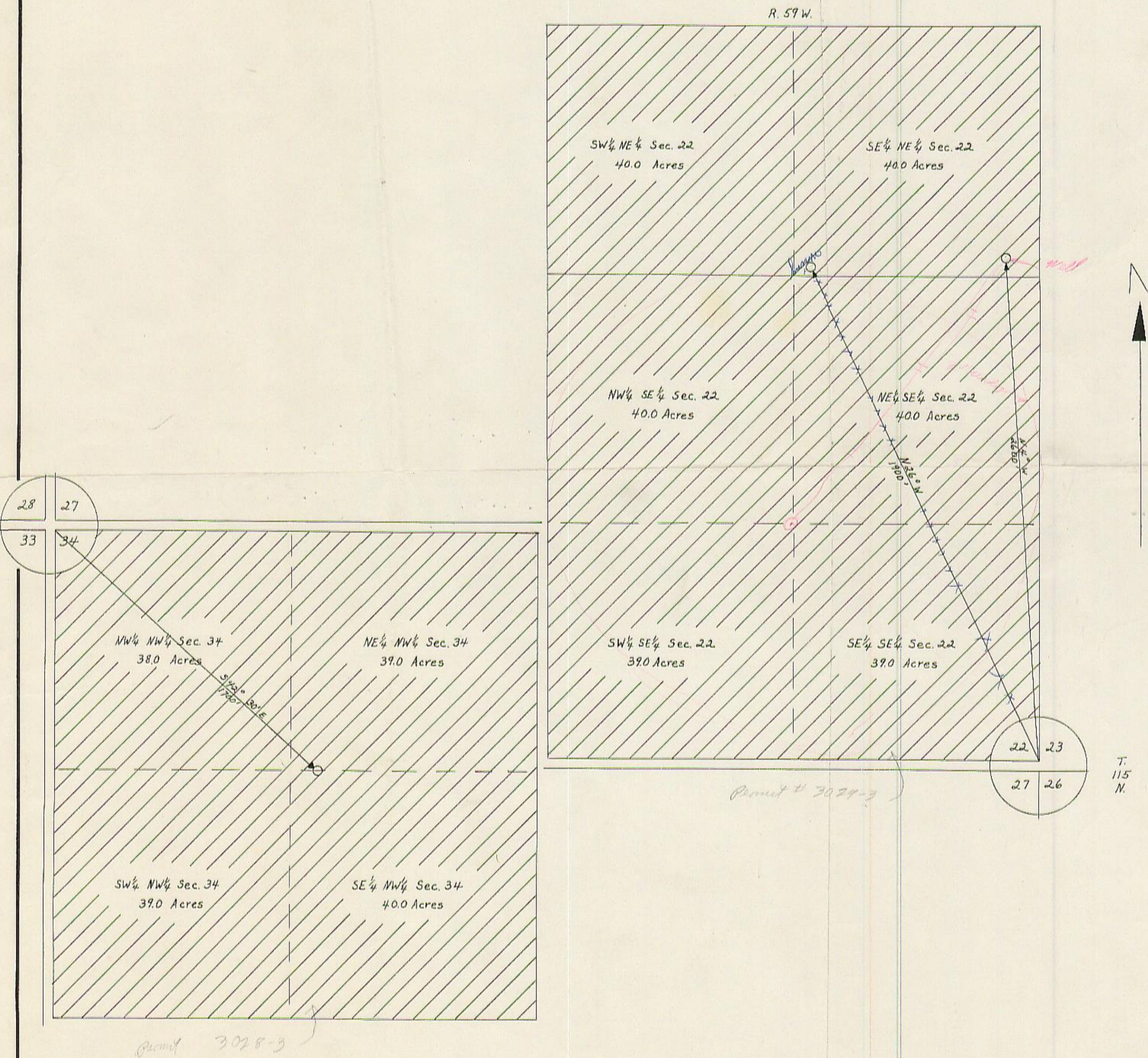
STATE OF SOUTH DAKOTA)

County of Brookings) ss.I, Joe D. Thompson, the applicant, certify that I have read the foregoing application and have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction.Signed Joe D. ThompsonSubscribed and sworn to before me this 10 day of August, 1976

Notary Public (Qualified Officer)

Notary Public, BROOKINGS CO., S. DAK.

My Comm. expires FEB. 21, 1981



(79 Acres) - E 1/2 SE 1/4 - Sec. 22 Are Now Owned By Sigurd Brenden
All Other Lands Described Are Owned By Fardham Colony

LOCATION OF LAND TO BE IRRIGATED				
LOCATION	SECTION	TOWNSHIP	RANGE	ACRES
SW 1/4 NE 1/4	22	115	59	40.0
SE 1/4 NE 1/4	22	115	59	40.0
NW 1/4 SE 1/4	22	115	59	40.0
NE 1/4 SE 1/4	22	115	59	40.0
SW 1/4 SE 1/4	22	115	59	39.0
SE 1/4 SE 1/4	22	115	59	39.0
NW 1/4 NW 1/4	34	115	59	38.0
NE 1/4 NW 1/4	34	115	59	39.0
SW 1/4 NW 1/4	34	115	59	39.0
SE 1/4 NW 1/4	34	115	59	40.0
TOTAL				394.0

Land To Be Irrigated
Pump Sites

Scale: 1" = 400'

SURVEYOR'S CERTIFICATE

I, Franklin L. Fite DO HEREBY CERTIFY THAT THIS MAP IDENTIFIES A REASONABLY ACCURATE RECORD OF THE LAND OF THE Fardham Colony, IRRIGATION PROJECT NO 2 AND HAS BEEN PREPARED BY:

SIGNATURE: Franklin L. Fite

TITLE: District Conservationist
Soil Conservation Service

SUBSCRIBED AND SWORN TO BEFORE ME THIS 2nd DAY OF Sept, 1976, A.D.

Gerald A. Zubke
NOTARY PUBLIC

MY COMMISSION EXPIRES My Commission Expires Sept. 26, 1981

WATER RIGHT APPLICATION APPROVAL

WATER RIGHTS COMMISSION

hereby approves Water Right Application No. 3029-3

FORDHAM COLONY

(Applicant)

CARPENTER

(Post Office Address)

SOUTH DAKOTA 57322

(State)

With the following modifications:

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

Date of first receipt of application SEPTEMBER 3 19 76

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

Date of receipt of corrected application OCTOBER 4 19 76

Approved JANUARY 27 19 77, Recorded in Book 18 Page 297

WATER RIGHTS COMMISSION

WATER RIGHT PERMIT NO. 3029-3

The Water Resources Commission hereby grants and issues this Water Right Permit No. 3029-3 authorizing the construction of the water use system and the putting of water to beneficial use as stated in the Application and as modified in the Water Right Application approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is SEPTEMBER 3 19 76

2. The equivalent of at least one-fifth of the work above specified is to be completed on or before JULY 27 19 79

3. The whole of said work is to be completed on or before JANUARY 27 19 82

4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is JANUARY 27 19 85

5. The water appropriated shall be used for the purpose of IRRIGATION

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

7. The amount of the appropriation herein granted shall not exceed 1.85 cubic feet per second; neither shall it exceed the capacity of the above described water supply system, nor shall it exceed the amount of water needed for beneficial uses served, and if for the irrigation purposes said appropriation must be limited to not more than 3 acre feet per acre per year and be limited to not more than one-seventieth (1/70) of one cubic foot of water per second of time for each acre of land to which water is

actually and beneficially applied for irrigation on or before JANUARY 27 19 85; said water to be used during the following described annual period: MAY 1 - NOVEMBER 1

Witness my hand this 1ST day of AUGUST 19 77

WATER RIGHTS COMMISSION

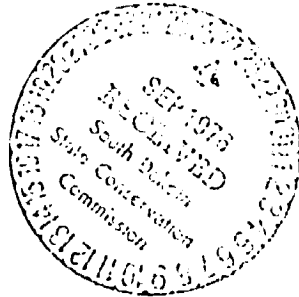
By:

John Hark
Chief Engineer, Executive Officer

Certificate of Construction Issued _____ 19 _____

Water License Issued _____ 19 _____

September 22, 1976



Fordham Colony
Carpenter, SD 57321

Dear Sir:

Your water sample (Lab. No. 76-1241) has been analyzed and the results are reported on the accompanying sheet, which is your copy to keep.

I am also enclosing a copy of AES pamphlet #13 for your use. The quality of your water for irrigation use is plotted approximately by means of the red cross in the chart on the outside back cover.

This water is marginal for use on the soils you intend to irrigate and should be considered for use only under the following conditions:

(1) It will be used no more than 3 times (preferably less) in any growing season.

(2) The soil will be completely filled with water so natural leaching can occur, by irrigating in the late fall just before freeze-up, at least one year out of 3.

(3) Water applications will be made each irrigation to completely re-wet the entire depleted soil within the rooting zone of the crop being grown. This may require 3-5 inches of water each irrigation with fine soils.

(4) If a salt problem or soil dispersion occurs, contact extension personnel or this office for management recommendations.

Sincerely yours,

L. O. Fine

L. O. Fine
Water Quality Lab

LOF:ckb

Enclosures

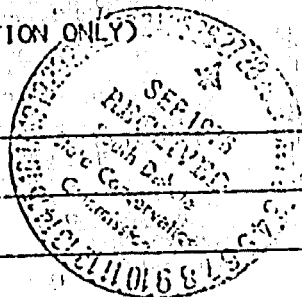
cc: State Conservation Commission

Green with water. Sample

3029-3

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

NAME Fordham Colony
ADDRESS Carpenter, South Dakota
COUNTY Clark



LEGAL DESCRIPTION

1. WELL LOCATION SE 4 NE 4 22
2. LOCATION OF AREA TO BE IRRIGATED SW 1/4 NE 1/4 22
NE 1/4 SE 1/4 22 Clark County

TYPE OF IRRIGATION

3. GRAVITY TOW LINE CENTER PIVOT X GUN
4. CROPS TO BE IRRIGATED Corn, Alfalfa

WATER QUALITY

5. SAMPLE NUMBER 76-1541
6. SALINITY (EC X 10⁶) 16.86 (high)
7. SODIUM (SAR) 1.59 (low)
8. RESIDUAL SODIUM CARBONATE (meq/l.) 0

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

SUBSCRIBED AND SWORN BEFORE ME THIS
DAY OF SEP 1976.

(FILE OR SEAL)

Notary Public, BRIDGEMAN CO., S. DAK.
My Commission Expires FEB. 24, 1981

APPLICANT'S SIGNATURE

Approval does not imply that this project can be carried out successfully in all circumstances. Individual management will, to a large degree, determine the relative success of this venture.

APPROVED/DISAPPROVED

(SOILS INFORMATION ON REVERSE SIDE)

3029-3

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

Submitted by: Forham Colony
 Address: Carleton, SD 57322

Date Rec'd: September 1, 1976
 Sample No.: 76-1241
 Location: 2 Coll-75'
Box 22, T 115N, R 59W

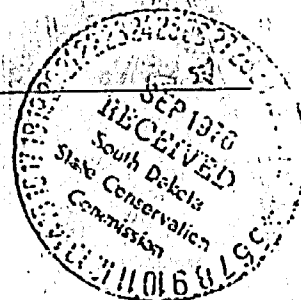
WATER ANALYSIS

Calcium (Ca)	200	ppm*	10.00	mc/l**
Magnesium (Mg)	70	ppm	5.74	mc/l
Sodium (Na)	122	ppm	5.31	mc/l
Potassium (K)	13	ppm	0.34	mc/l
Sulfate (SO ₄)	75.4	ppm	15.68	mc/l
Nitrate (as N)		ppm		mc/l
Chloride (Cl)	36	ppm	1.02	mc/l
Bicarbonate (HCO ₃)	346	ppm	5.68	mc/l
Carbonate (CO ₃)		ppm		mc/l
Iron (Fe)		ppm		mc/l
Fluoride (F)		ppm		mc/l
Hardness (EDTA as CaCO ₃)		ppm		g.p.g.***
Alkalinity (Methyl Orange)	284	ppm (as CaCO ₃)		
Alkalinity (Phenolphthalein)	0	ppm (as CaCO ₃)		
Electrical Conductivity	1636	micromhos per cm at 25° C.		
Sodium Adsorption Ratio	1.89			
Sodium	24.82	% of cations		
Residual sodium carbonate	0.00	mc/l		
pH	6.93			
Others:				

*ppm=parts per million
 **mc/l=millequivalents per liter

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

COMMENTS: Total cations 21.39 mc/l
 Total anions 22.39 mc/l



By: Shirley Litten

Service Performed	Amount Due
Irrigation analysis	\$8.00 PAID
Make checks payable to: Water Quality Laboratory	
Cut along dotted line and return the lower portion with payment	

Sample No. 76-1241

Amount Enclosed \$
 Signed

NOTICE OF WELL CONSTRUCTION

(1) WELL CONSTRUCTION

Mr. No 2

Location of well: _____ 1/4 _____ 1/4 _____ Section _____ Township _____ Range _____

Well owner _____ (Name) _____ (Address)

Date well drilling completed _____ Purpose of well _____ (domestic, irrigation, municipal, industrial, other)

WELL LOG

Layers, top to top in feet	Description of layer	Depth to top of water producing aquifer _____ ft.
0 - 20	yellow clay	Depth to static water level _____ ft.
20 - 26	blue clay	Name of producing aquifer (if known) _____
26 - 35	Sand with clay	Total depth of drill hole _____ ft.
35 - 45	Good sand	_____ to bottom of casing _____ ft.
45 - 55	Sand with clay	Casing information: In the space below show kind, size, weight, lengths per diameter, etc., for production casing and surface casing, if used.
55 - 75	Good sand	
		1 - 5.5 Solid Stainless 16" casing
		Screen information: In the space below show length of screen below bottom of casing, diameter and kind of screen or casing perforations.
		5.5 - 7.5 Screen 16" Stainless
		If a flowing well, flow of completed well _____ G.P.M.

Attach sheet if more space is needed

Name of Drilling Contractor

(2) PUMP INSTALLATION

Company name and size of pump _____ HP _____

Type of pump _____ Capacity of installed pump _____ G.P.M.

Depth of pump placement _____ ft., Date of pump installation _____

(3) WATER SURFACE MEASURING TUBE

On some wells an air-tight water surface measuring tube is required: See Section 46.4GB 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

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

D. Well Information or Estimates

- (1) Drill Hole, Diameter 30, Depth 7.5
- (2) Casing, Type stainless steel, Diameter 16, Thickness 10 Gauge
(wood, concrete, steel, etc)
- (3) Perforated Screen
Type stainless steel, Diameter 16, Length 3.5
- (4) Gravel Pack, Thickness 1.5, Length of gravel pack 7.5

E. Dugout Information or Estimates

- (1) Surface dimensions 1' A, Depth NA

F. Fill out for Either a Well or a Dugout.

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

Character of Water bearing materials 0-10 yellow clay
10-20 Blue clay
20-35 Sand with clay
35-45 Hard Sand
 Depth to top of water bearing material 45-55 Sand with clay
 Depth to bottom of water bearing material 55-75 Hard Sand
 Thickness of water bearing material _____
 Depth to water (ground surface to water level) 30

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

On same owner's property 3 rds. On property owned by others 2 rds.

G. Water Storage Dams.

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

James S. Long
Signature of Applicant

No. 3029-3

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County Beadle) ss.

I, Dorothy Murphy hereby

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

Water was taken from the Huron Daily Plainsman

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 Huron of Huron

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

October 11, 1976

October 18, 1976

Dorothy Murphy
(Signature)

Bookkeeper
(Title)

October 18, 1976

(Date Signed)

F.P. 10-11-76 L.P. 10-18-76
NOTICE OF INTENT TO
APPROPRIATE WATER
Pierre, South Dakota 57501
October 5, 1976
Notice is hereby given that For-
nham Colony, State of South Dakota,
address is Carpenter, South Dakota,
has made an application in ac-
cordance with the provisions of the
water laws of South Dakota for a
permit to appropriate for beneficial
use 1.85 cubic feet of water per
second of time from ground water
through the Forcham Colony No. 3,
the point of diversion of which is to
be located in the SE 1/4, NE 1/4 of
Section 22, Twp. 115N, Range 59W,
S12, NE1/4, Section 22, T115N, R19W.
Said water to be used for the purpose
of providing irrigation on portions of
the following described land: SE 1/4,
S12, NE1/4, Section 22, T115N, R19W.
This application No. 3029-3 will be
considered by the Water Rights
Commission at their office at Pierre
upon the 21st day of October, 1976,
at 1:00 p.m. All interested persons
may appear and be heard.
WATER RIGHTS COMMISSION
By Burton F. Jones
Water Rights Specialist
No. 573(adv.)



Form 6 - Notice of Intent to Appropriate Water

No. 3029-3

Publish first publication, on or before October 12, 1975

NOTICE
INTENT TO APPROPRIATE WATER

Pierre, South Dakota 57501

October 5, 1976

Notice is hereby given that Fordham Colony
whose post office address is Carpenter, South Dakota, has made an application in accordance
with the provisions of the water laws of South Dakota for a permit to appropriate for beneficial use
1.85 cubic feet of water per second of time from the ground water through the
Fordham Colony # 3, the point of diversion of which is to be located in the

SE $\frac{1}{4}$ NE $\frac{1}{4}$

of Section 22, Twp. 115N, Range 59W. Said water to be used for the purpose
of providing irrigation on the ^{portions of} following described land:

SE $\frac{1}{4}$, S $\frac{1}{4}$ NE $\frac{1}{4}$, Section 22, T115N, R59W

This application No. 3029-3 will be considered by the Water Rights Commission at their office at
Pierre upon the 21st day of October, 1976, at 1:00 P. M. All interested
persons may appear and be heard.

WATER RIGHTS COMMISSION

By:

BURTON F. JONES
Water Rights Specialist

BFJ/bw

cc: Fordham Colony, Carpenter, S. D. 57322



3028-3 & 3029-3

Department of Natural Resource Development

WATER RIGHTS COMMISSION

Joe Foss Building, Pierre, South Dakota 57501

Phone 605/224-3151

January 21, 1977

Zack Wollman
Fordham Colony
Carpenter, South Dakota 57322

Gentlemen:

Your deferred Applications No. 3028-3 and 3029-3 will be reconsidered by the Water Rights Commission during their January 25-27, 1977 meeting, at 10:30 A.M., January 27. A copy of the "Report on Fordham Colony Water Right Applications Nos. 3028-3 and No. 2029-3", is enclosed for your information. Any comments concerning this application can be presented at this hearing.

The Commission will be meeting in the South Dakota Education Association Auditorium, 411 East Capitol, Pierre, South Dakota.

Please advise if you have any questions concerning the hearing.

Sincerely,

JOHN HATCH, Chief Engineer
Water Rights Commission

JH/bw

cc: Royal Gamber, Carpenter, S.D.
Richard Grann, Carpenter, S.D.
Robert Madsen, Carpenter, S.D.
Wallace Wicks, Carpenter, S.D.
Vernon Opsahl, Carpenter, S.D. 57322

Report on
Fordham Colony Water Right Applications
No. 3028-3 and No. 3029-3
January 19, 1977

The Water Rights Commission deferred action at the October 21, 1976, meeting on the Fordham Colony Applications No. 3028-3 and No. 3029-3 pending an investigation by the Commission Staff. An investigation was conducted January 13 and 17, 1977; the irrigation well authorized by Permit No. 2417-3 in Section 27 was also pumped for 96 hours during this period.

Persons Contacted

Richard Grann, Robert Madsen, Wallace Wicks, Royal Gamber, Vernon Opsahl and Amos Woliman and other Fordham Colony personnel were contacted during the investigation and test pumping.

The following tables list the Fordham Colony Applications and permit, observation well and nearby domestic well information. Locations are shown on the attachment.

Applications and Permit

<u>Number</u>	<u>Location</u>	<u>CFS</u>	<u>Acres</u>	<u>Well Depth</u>	<u>Depth to Aquifer</u>	<u>Status</u>
2417-3	Sec. 27 T115-R59	4.45	312	1 well 110'	30'	Approved 11-13-75
3028-3	Sec. 34 T115-R59	1.85	130	1 well 85'	50'	Deferred 10-21-76
3029-3	Sec. 22 T115-R59	1.85	238	1 well 75'	55'	Deferred 10-21-76

Observation Well Information

<u>Number</u>	<u>Location</u>	<u>Depth</u>	<u>Depth to Aquifer</u>	
CK-76M	NE Corner Sec. 9 T114-R59	65.0'	37'	There is a 5' layer of sand and gravel at 37'-42' & 18' of gravel at 44'-62'.
CK-76N	NW Corner Sec. 22 T114-R59	78.7'	57' (21' of gravel)	There is a 10' layer of gravel at 18'-28' & 1' layer of gravel at 30'-31'.

Observation wells CK-76I, CK-76J and CK-76O shown on the map are not affected by Fordham Colony irrigation pumping.

Nearby Domestic Well Information

<u>Name</u>	<u>Location</u>	<u>Depth</u>	<u>Depth to Aquifer</u>	<u>Reported normal Water Level</u>	<u>Other Information</u>
Royal Gamber	Sec. 1	48.3'		13.8'	
Richard Grann	Sec. 3	60'	37' (from CK-76M)		4" well cleaned 1976
Robert Madsen	Sec. 9	46'	37' (from CK-76M)	17.5'	Dug 1955 to 33' deepened to 46' 1976
Wallace Wicks	Sec. 15	36.2'	between 37' to 57'	32.0'	Well may be silted or partially filled in.
Vernon Opsahl	Sec. 21	42'	57' from CK-76N		Well may be silted or partially filled in.

1976 Well Measurement Date and 1977 Test Pumping

Complaints were first received concerning Fordham Colony irrigation pumping during June, 1976. An investigation was conducted in the area June 15, 17 & 18, 1976. The Colony irrigation well was shut off (54 hours) from June 16, 1976, until about 6:00 p.m. June 18, 1976. Area domestic wells were measured June 15, 17 & 18 without noticeable recovery. Observation wells were not available for measurement. Observation wells were drilled in the area this past fall.

Beginning January 13, 1977, at 2:05 p.m., the Colony irrigation well in Section 27 was test pumped at about 800 gpm for 96 hours until 2:05 p.m. January 17, 1977. Several wells in the area were measured before the test pumping started and January 17 before the pump was turned off. Well measurements since June, 1976, are listed in the following table.

Area Well Water Measurements

Wells Measured	6-15-76	6-17-76	6-18-76	November 1976	1-13-77	1-17-77	Change During Test Pumping
CK-76I (2.4)				11-30 20.4'	2:45pm 19.9'	11:20am 19.9'	0
CK-76J (1.5)				11-30 19.7'	2:35pm 10.9'	11:15am 11.1'	-0.2'
CK-76M (2.5)				11-29 18.6'	9:45am 17.6'	9:45am 21.3'	-3.7'
CK-76N (1.9)				11-29 30.5'	9:35am 29.8'	9:55am 30.7'	-0.9'
CK-76O (2.0)				11-29 7.6'	12:45pm 7.6'	9:30am 7.6'	0
Irrigation Well Sec. 22 No. 3029-3					10:30am 22.0'	1:45pm 26.5'	-4.5'
Irrigation Well Sec. 34					10:45am 23.0'	1:55pm 32.7'	-9.7'
New Irrigation Well Sec. 27 450' West of of pumping well					10:35am 24.2' & 3:05pm 29.8'	2:00pm 44.3'	-20.1'
Observation well Sec. 27, 20' from pumping well					1:55pm 30.5' & 3:12pm 38.2'	2:05pm 53.6'	-23.1'
Royal Gamber	13.8'	26.2'	15.1'		1:00pm 24.0' pumping	10:50am 21.9' no pumping since 3:00pm 1-16-77	
Richard Grann					1:40pm 24.0'	no reading 1/8 mile from CK-76M	
Robert Madsen	28.5'	28.5'	28.1'	11-10 25	11:00am 24.5'	10:30am 26.7'	-2.2'

Wallace	35.6'	35.6'	35.1'	11:30am	10:10am	
Wicks				34.0'	34.2'	
				pumping	not pumping	
Vernon	29.5'	31.95'	30.5'	11:45am	10:00am	-0.1'
Opsahl				28.4'	28.5'	
pasture well				not pumping	not pumping	

Only those domestic wells owned by persons protesting Applications No. 3028-3 and No. 3029-3 October 21, 1976, were measured; however, we would expect measurements in any other domestic wells affected by the pumping to be similar to those affected depending upon location and local aquifer characteristics.

Discussion

The test pumping affected observation wells and domestic wells up to five miles away from the irrigation well.

Since the aquifer is under artesian head conditions, such effects are to be expected. Delivery of water from an adequate well should not be influenced by fluctuations in the artesian head. An adequate artesian well in the area is a well in which the pump intake can be placed at least 20 feet down into the aquifer providing the aquifer is thick enough. An adequate well should be protected from irrigation pumping.

The area domestic wells measured apparently are inadequate or in need of maintenance. The Grann well may be adequate providing the pump is near the bottom of the well and providing the water level is comparable to the level measured in nearby observation well CK-76M. If the water level in the Grann well was several feet lower than CK-76M, then the problem could be within his well.

Mr. Gramber reported that he could not pump water from his well at 3:00 p.m. January 16, 1977. The water level measured the following day about 20 hours later with no pumping was 21.9 feet, about 8 feet below the normal nonpumping level of 14 feet. Before the pumping started, his pumping level was measured at 24.0'.

Measurements taken on the Gamber well in June indicate that the water level does return in his well when he is not pumping. When pumping, there is significant drawdown from his own pumping. The Staff believe the Colony pumping may affect his well, but the primary problem may be within his own well.

This can not be fully determined without a nearby observation well. The Staff hopes to install another observation well this spring if funding is available.

The Gamber well and the Madsen, Weeks and Opsahl wells are constructed using 24 inch diameter concrete tile. The Opsahl well has wood curbing at the bottom. Such construction is typical of many shallow wells in South Dakota. Water comes into such wells through the bottom or through joints in the tile or wood. Such wells may deliver adequate domestic water, but with age tend to become partially plugged at the bottom and at the joints. Under normal conditions and without fluctuations in the water level such wells provide many years of service. Such wells should be and are cleaned out periodically.

When the wells are located in aquifers with artesian head conditions such as in Clark County area, many of the older wells only penetrate the aquifer a few feet. Since there is artesian head the water rises in the well providing several feet of water. With no nearby high capacity wells such as irrigation or municipal pumping, the wells provide sufficient domestic supplies including livestock watering and lawn or garden watering. The artesian head tends to force the water into the well even though entry is restricted to the bottom and the joints which may become partially plugged in older wells.

When there is nearby irrigation pumping, then two situations exist. One, the water level (artesian head) drops and second, the pressure that forces water into the well is also reduced. The well suddenly may not deliver sufficient water, if the pump pumps water out faster than it can run into the well. A screened well that is in good condition may continue to deliver sufficient quantities of water if the pump is low enough even though the well may only be into the top few feet of the aquifer.

Should pumping be from only the top of an aquifer and allow only minor use of the water or should pumping be from the entire aquifer with greater use of the water? When pumping from the entire aquifer is allowed, then with artesian head conditions, fluctuations in the artesian head can be expected. Under such conditions, if anyone is to rely upon the aquifer as a dependable source of domestic water, then adequate wells are necessary.

As long as water levels return to basically the same level each year, taking into consideration weather conditions, the ground water is not being depleted. If the ground water was being depleted, this would be in violation of State Statutes and reduction or shutting off of irrigation pumping would be necessary.

The 1972 Legislature passed Legislation which does not require the artesian head of an aquifer to be protected on a continuous basis. Based upon the 1972 Legislation the Water Rights Commission determined at the July and November, 1976, meetings that it will not protect inadequate wells affected by nearby high capacity well pumping such as irrigation beyond July 1, 1977. The Commission has also said that permits will also be issued on a selected basis.

That is, in areas where inadequate wells are affected by irrigation pumping, not every application submitted will be approved immediately. Approval of permits is to be done on a gradual basis to allow inadequate well owners time to improve or replace their inadequate domestic wells.

There apparently is unappropriated water available in the Fordham Colony area for irrigation. However, use of the water for irrigation will result in nearby domestic wells being affected by irrigation pumping. When the domestic wells are inadequate, then the owner may have to lower his pump intake, deepen the well or even replace the well. An adequate well would be protected.

The Commission Staff believes the irrigation well in Section 22 can be approved. A second unauthorized irrigation well has been drilled about 450 feet from the authorized irrigation well in Section 27. This well should not be authorized if requested. Spacing of at least $\frac{1}{2}$ mile should be provided until better information is known. The irrigation well in Section 34 could be approved; however, the effects on nearby inadequate domestic wells will be more noticeable.

Recommendations

The Staff believes unappropriated water is available for both Applications No. 3028-3 and No. 3029-3; however, to allow inadequate domestic well owners time to improve or replace their domestic wells and to permit additional information on the aquifer to be obtained, the staff recommends that Application 3029-3 in Section 22 for 1.85 cfs from 1-75 foot well be approved with the qualification:

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

and that Application No. 3028-3 remain deferred.

JOHN HATCH, Chief Engineer
Water Rights Commission

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

Ch. 1912 1912-1913
C. P. J. 1912-1913

3029-3 Fordham Colony

8-24-78 Well 75 ft deep, 21 ft to water

Temperature 800 ppm C. P. J. 1912-1913

C. P. J. 1912-1913

Water 2.5 100 100 100 100

Min 2.5 100 100 100 100

for 100 100 100 100

100 100 100 100

NOT TO SCALE

