

Considered: _____

WATER PERMIT NO. 1947-2

MAP No. same

Name of Applicant City of New Underwood

Post Office Address Box 278

Amount of Water Claimed 1.0 cfs Total Acres _____

Source of Water Supply Groundwater (Water reserved by F/U no. 1780-2)

Water to be used for MUN County Pennington

About 1/2 miles N of New Underwood.

PROOF OF PUBLICATION: Received let 11-6-85 Not Received _____

APPLICATION: Approved 12-4-85 Subject to _____

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

PRIORITY _____ Date Received 9-25-85 Fee \$325⁰⁰ Remarks fee

6-3-81 received 10-10-85

Corrected Application Received _____ Period of Annual Use Jan 1 to Dec 31

WATER QUALITY APPROVAL RECEIVED N.A. APPROVED/CONDITIONAL (Circle one)

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

Diversion Point SW4 NW4 sec 29 T2N-R11E

Land to be Irrigated _____

29					

Well Log: Driller _____ Licensed YES _____ NO _____

Depth of Well ~ 2825 REMARKS depth estimated by Thomas & Associates.

Type of Map Drawn PREPARED BY Thomas & Ass. Reviewed and the Number

assigned on 10-10-85 By Nevin C. Larson

No. 1947-2 Hydrologic Unit 10120111
 Map No. Same Basin Upper Cheyenne
 Newspaper Rapid City Journal Box 450

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

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

Type of Application: Check one or more of the following

New ☒ Vested Right ☐ Future Use ☐ Change Use ☐
☐ Amend Permit No. _____ with old priority date retained
 Change diversion point(s) ☐ Add diversion point(s) ☐ Other ☐ _____
☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____
☒ Construction to use water reserved by Future Use Permit No. 1780-2



- Name of Applicant City Of New Underwood Phone No. 754-6777/6767
 Post Office Address Box 278 - 501 S. "C" Ave. State SD 57761
(Street, RR or Box) Zip Code
- Amount of water claimed (c.f.s.) (1) CFS 450 gallons per minute
- Source of water supply _____
- Location of point of diversion See enclosed engr. study - proposed well site C

 _____ County Pennington
- Counties where water will be used Pennington
- Annual period during which water is to be used Jan. 1 thru Dec. 31
- 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)

See enclosed Preliminary engineering study - well site C

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 Pennington)^{ss}

I, I.L. Oliff, Mayor the applicant, certify that I have read the foregoing application, 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 I.L. Oliff - Mayorthis 20 day of Sept. 19 85

Meri J. Anderson
 Notary Public (or other qualified officer)

Subscribed and sworn to before me this

STATE OF SOUTH DAKOTA

My Commission Expires

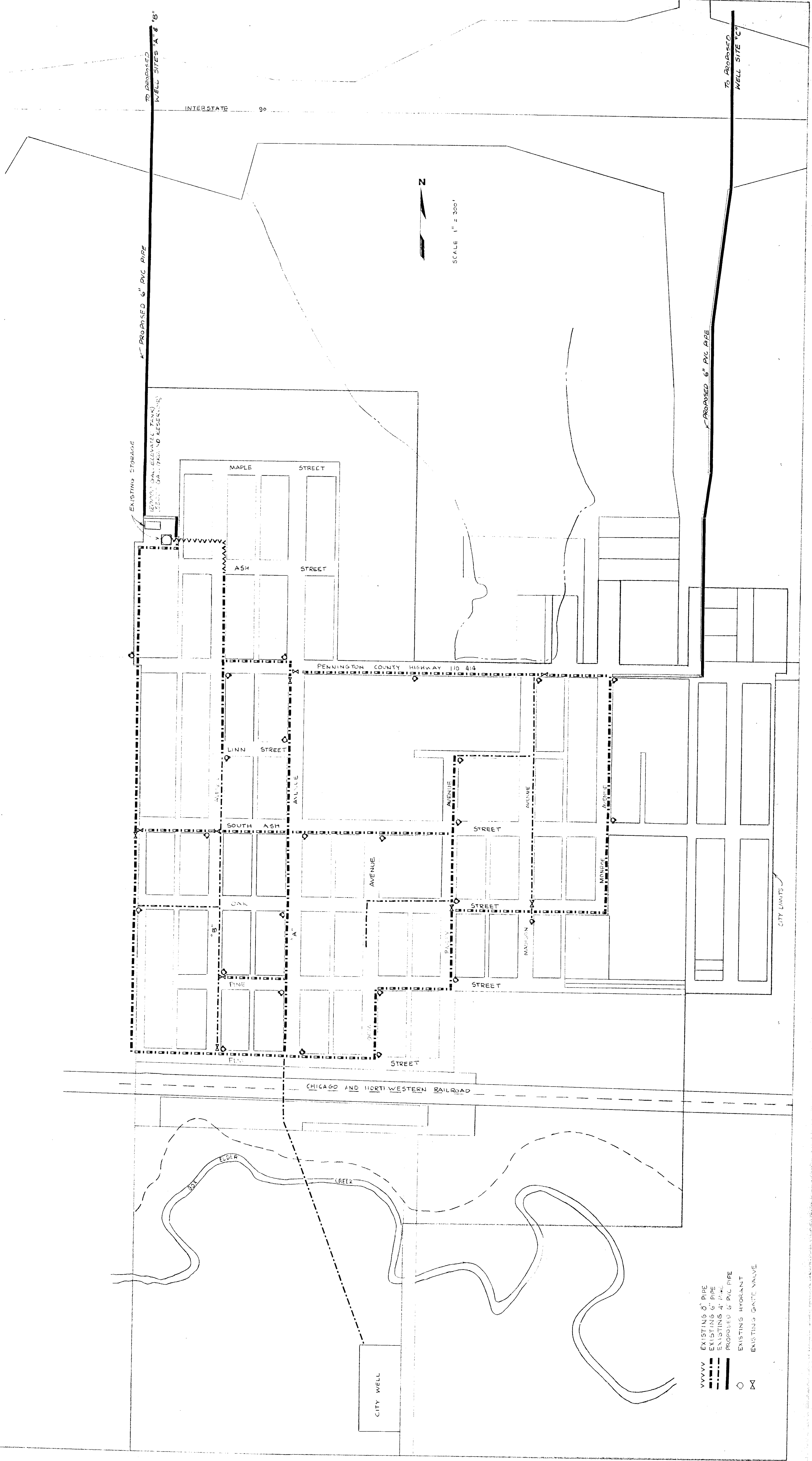
10.4.91

19472

NEW UNDERWOOD

WATER SUPPLY IMPROVEMENTS
&
EXISTING FACILITIES

1985



WATER PERMIT

The Water Management Board hereby approves Water Permit Application No. 1947-2
City of New Underwood Box 278, New Underwood
(Applicant) (Post Office Address)
South Dakota 57761 With the following qualifications.
(State) (Zip Code)

1. The construction of the proposed Inyan Kara Formation well shall include pressure grouting with cement (bottom to top) of the casing above the water producing formation and compliance with Board well construction rules, Chapter 74:02:04 which were effective September 29, 1985.
2. The well approved under this Permit may be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under this Permit, shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

Date of first receipt of application September 25, 1985.
Date of return to applicant for correction, amendments or changes required -, 19-.
Date of receipt of corrected application -, 19-. Approved December 4, 1985.

The Water Management Board hereby approves this Water Permit No. 1947-2 authorizing the construction of the water use system and the placing of water to beneficial use as stated in the Application and as qualified in the Water Permit approval, subject, however, to the following limitations and conditions:

1. The date from which applicant may claim right is June 3, 1981.
2. The equivalent of at least one-fifth of the specified work is to be completed on or before June 4, 1988.
3. The whole of said work is to be completed on or before December 4, 1990.
4. The limit of time from proof of beneficial use of water appropriated in accordance herewith is December 4, 1994.
5. The water appropriated shall be used for the purpose of municipal water supply.
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 unlawfully impaired by this appropriation.
7. The amount of the appropriation herein granted shall not exceed 1.0 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 to which water is actually and beneficially applied for municipal use on or before December 4, 1994; said water to be used during the following described annual period: January 1 to December 31.

WATER MANAGEMENT BOARD
By: John G. Bates
Chief Engineer
Division of Water Rights
Dept. of Water and Natural Resources
FEB 11 1986

Supplemental Information

(type or print in ink)

1. Well Information - Proposed construction

- a) Drill Hole Diameter 7" to 4" Depth Approx. 2,770
- b) Casing Type Steel pipe Diameter 7" to 4" Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack Thickness _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth of Water (ground surface to water level) _____
- g) Distance to nearest existing domestic well: (1) one mile
- On applicants property yes On property owned by others _____

2. Dugout Information Estimates

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

3. Water Storage Dams

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

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

b) Freeboard _____

c) Crest Width _____

Crest Length _____

d) Height _____

e) Outlet Dimensions:
Pipe diameter _____

Spillway width _____

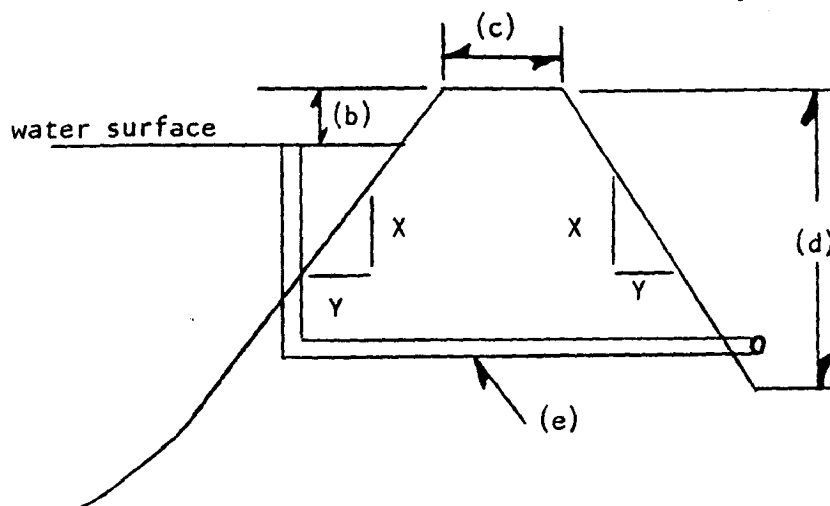
f) X & Y Slope
Upstream _____

Downstream _____

Surface Area of Impoundment _____

Storage _____ acre feet

Drainage area above dam _____



D. H. Cliff - Mayor
Signature of Applicant

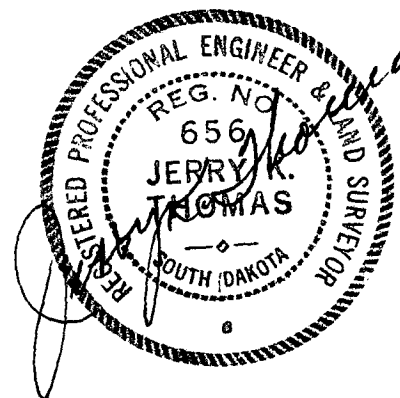
PRELIMINARY ENGINEERING STUDY

MUNICIPAL WATER SUPPLY
IMPROVEMENTS
FOR
CITY OF NEW UNDERWOOD
NEW UNDERWOOD, SOUTH DAKOTA

AUGUST 1985

Prepared By

THOMAS & ASSOCIATES
CONSULTING ENGINEERS
2222 JACKSON BOULEVARD
RAPID CITY, SOUTH DAKOTA



INTRODUCTION

The water needs of the City of New Underwood are currently served by one 155 GPM Fall River aquifer well supplying water to a 15,000 gallon elevated tank and a 32,000 gallon above ground storage reservoir. The static head of the well has steadily dropped in recent years and, if it continues, could make the City's only source of water useless within 10 years.

The City is proposing to improve their system thus relieving some of the stress placed on the current well by drilling a new Lakota aquifer well. The proposed 125 GPM well will expand their supply, enhance their fire protection capabilities, and provide for population expansion.

I. BACKGROUND AND NEED

The water system presently serving the City of New Underwood does not adequately meet the demand. Several studies have been conducted in recent years in an effort to resolve the serious water needs of the area. The first of these options was a proposal to tap into the ETSI pipeline, for which a preliminary engineering report and feasibility study for the New Underwood/Viewfield Rural Water System was completed in 1982. Project supporters then consolidated local matching funds, secured a position on the State Water Plan, and testified in various lawsuits on behalf of the South Dakota Department of Water and Natural Resources. With the 1984 demise of the ETSI pipeline a second option, supported by the Black Hills Conservancy Sub-District, studied the feasibility of drilling a well into the Madison aquifer 2.5 miles north of the City to serve the New Underwood/Viewfield Rural Water System. The City's urgent needs and financial limitations have now prompted a third option, which is to drill a well into the Lakota aquifer that can be connected to the existing water system.

This report will address the following specific needs of the community and how they relate to the Lakota aquifer well option:

1. Additional pumping capacity of 300 GPM.
2. Fire protection.
3. Backup system for emergency use.
4. Better water quality.
5. Future population growth.

In addition, the report will also discuss the feasibility of four alternate Lakota aquifer well sites. Figure 1 (Appendix III), which follows the report, clearly identifies the area to be served as well as locates the alternate well locations and connecting pipelines. The need for water supply improvements will become apparent from the following description of the existing facilities and its associated problems.

II. DESCRIPTION OF EXISTING FACILITIES AND ASSOCIATED PROBLEMS

The existing water distribution system is gravity fed from an elevated 15,000 gallon storage tank located on the north edge of the City. Two booster pumps, controlled by level sensors, supply an additional 32,000 gallons of storage to the elevated tank from an above ground reservoir located at the same site. The existing water distribution system is shown on Figure 2 (Appendix III) and consists of 600 L.F. of 8" pipe, 21,150 L.F. of 6" pipe, and 7,650 L.F. of 4" pipe. The well pump, electrical connections, and fluoridation treatment units are housed in a concrete block building located south of New Underwood.

The source for the existing water system is a 40 year old well. It reaches 2,640 feet into the Fall River aquifer, which can produce a sustained withdrawal rate between 100-150 GPM. An

approximate drop of 75 feet in the static head, which has occurred at the well over the past 5 years, is evidence that the climatic and hydrologic conditions of the area can not provide recharge to balance the present withdrawal rate of 155 GPM. As a result, the present source is rapidly being depleted and should this drawdown rate continue, the well would be unavailable for use within 8 to 10 years. The pumping unit is also affected as it operates less efficiently against higher head.

In addition to the excessive pumping rate, the limited storage facilities available contribute to the stress placed on the aquifer and the pumping unit. During high demand periods the pump operates twenty-two (22) hours a day. Such nearly continuous pumping is undesirable as it increases the wear on the pumping unit beyond what would be considered normal. In addition, it also does not allow the aquifer to periodically recharge itself. These factors contribute to the high operating and maintenance costs, water rationing, and intermittent service experienced by the community in recent years.

To provide for public safety during a fire emergency, the National Board of Fire Underwriters recommends a pumping rate of 250 GPM, with 45 psi available at the hydrant, based on a 5 hour fire for communities with populations less than 2,500. The City's 47,000 gallon water supply would be exhausted in approximately three (3) hours at this rate. This situation has forced the City to develop fire contingency plans with Ellsworth Air Force Base and the Department of Game, Fish and Parks to insure public safety. These plans require that water be transported to the City of New Underwood. While New Underwood Dam is located nearby and provides for additional storage, the amount of water in the reservoir fluctuates and easy access can not always be guaranteed. Assistance from Ellsworth Air Force Base or Box Elder also involves a 20(+) minute travel delay for the initial response and would involve round trip times of up to one (1) hour for additional trips for water. In any fire fighting situation, the time it takes for initial response and to provide additional water is one of the most critical items. For these reasons, if for no other, the City needs to develop the resources necessary to respond as quickly as possible to prevent a potential disaster.

A part of the City's capital improvements program, a new fire truck which has a 750 GPM pumping capacity, was purchased in 1979. It is apparent that the supply in storage would be rapidly depleted in a major fire emergency. Once gone, the benefit of the new fire fighting equipment is lost as the existing pump can not provide 750 GPM. Although the combined capacity of the improved system would not reach 750 GPM, the additional pumping capacity gained from the development of a new source would decrease dependency upon storage, but just as importantly it would allow the City to make better use of its fire fighting potential.

The City's available storage consists of 47,000 gallons which would provide for only a thirteen (13) hour supply at the average daily demand rate of 3,585 gallons per hour. This limited storage also has adverse effects during periods of maintenance.

As the system exists, repairs to the well pump would require the sole water source to be shut down, whereby the community would lack a reserve supply for any extended emergency situation. This has contributed to the water rationing measures and intermittent service which New Underwood has experienced in recent years. The development of a new source would expand the capabilities of the system to allow for the supply of water even during periods of normal maintenance and repair.

The City also desires to provide its citizens with a source of better quality to replace a water supply that is high in iron, manganese, and calcium. The calcium concentration causes deposits to form throughout the distribution system resulting in reduced flows; a problem that adds to user inconvenience and increased maintenance costs. Unfortunately, this problem can not be resolved as the City does not possess the financial resources to obtain better quality water by drilling into the Madison aquifer. The proposed Lakota aquifer well will provide potable water of similar quality to that of the present source, requiring chlorination and fluoridation treatment to provide for the safety of public health.

Finally, the development of a new source is essential to the City's ability to attract and provide for new residents as the existing facilities do not allow for any growth. New Underwood has the opportunity to add between 50 and 100 new housing units as a direct result of the B-1 bomber program at Ellsworth Air Force Base. The City's close proximity to Rapid City and easy access to Interstate 90 are two additional factors that make New Underwood attractive to new residents. The water system improvement would also allow the City to expand the services it offers to tourists traveling through the Black Hills area.

III. PROPOSED WATER IMPROVEMENT

This proposal calls for drilling a well into the Lakota aquifer, pumping at a recommended sustained withdrawal rate of 125 GPM. This rate is less than the desired rate of 300 GPM, but as previously mentioned, financial limitations have restricted this proposal to consider the Lakota aquifer formation. From discussions with Dr. J. P. Gries, it is estimated that the depth of the well will be from 2,770 to 2,825 feet depending on the chosen site. His letter dated February 6, 1984 (Appendix I) describes characteristics of the water formations in the area. The construction of the well would include an 8" casing to a depth of 1,200 feet, to accommodate the pump, and 5" casing to the bottom of the well. Construction of a 14' x 22' building would house the pump, electrical connections and the chlorination/fluoridation treatment units to be provided for the system. An automated system using a phone line similar to the existing facilities would operate the pump. A 30 HP 6" deep well submersible pump would supply up to 155 GPM at a total dynamic head of 600 feet. A fenced one acre site should be provided for the new well site. The following pages of this section describe the four alternative well sites, their advantages and disadvantages, and estimated project costs.

PROPOSED WELL SITE "A"

Well Site "A" is located in the NE 1/4 of the NW 1/4 of Section 30, T2N, R11E at an elevation of approximately 2,940 feet. It is located north of Interstate 90 and east of New Underwood Dam on Department of Game, Fish and Parks property, and will require the construction of 3,650 L.F. of 6" PVC pipe to connect to the existing system. The proposed route will require Department of Transportation approval to pass under Interstate 90 through an 84" diameter conduit used to control the 100 year flood. From discussion with Mr. Charles Piper, Regional Manager, SDDOT, it appears that obtaining this permission will not present a major obstacle. It is proposed to suspend the water line above the flow line of the conduit for the 275 (+) L.F. under the interstate highway by anchoring the 10" roller hangers into the concrete pipe with epoxy. The line will continue south into the City where it can be connected to the existing system at the location of the City's storage tanks. This will require obtaining approximately 2,000 L.F. of easement (50 feet construction, 20 feet permanent) south of Interstate 90. It is not known for sure at this time how receptive the land owner would be to granting the necessary easement. Provisions for maintenance of and for improvements to the county road leading to New Underwood Dam will be required to obtain access to the site. This site will also require shaping and foundation preparation for the pumping station, due to the rolling topography.

ESTIMATED PROJECT COSTS

Well (1,200' of 8" casing, 1,610' of 5" casing)	
Total depth 2,810' @ \$55.00 per L.F.	154,550
Pump (30 HP 6" deep well submersible installed)	17,000
Pump House (framed construction and electrical connections)	15,000
Chlorination Unit	7,000
Fluoridation Unit	3,000
6" PVC Pipe (3,650 LF installed @ \$12.00/LF)	43,800
Miscellaneous Piping Costs:	
46 - 10" Roller Hangers (epoxy grouted)	
@ \$140.00 each	6,440
Two 6" Gate Valves with valve box	1,000
One 1-1/2" Air Relief Valve	400
Site Development	<u>20,000</u>
TOTAL CONSTRUCTION COSTS	268,190
Engineering, Legal, Administrative & Contingency (25% of Construction Cost)	67,110
Right-of-way, Easements: 2,000 L.F. @ 1.50/LF	<u>3,000</u>
TOTAL ESTIMATED PROJECT COSTS	\$ 338,300

PROPOSED WELL SITE "B"

Well Site "B" is located in the SW 1/4 of the NE 1/4 of Section 30, T2N, R11E at an elevation of approximately 2,900 feet. It is located north of Interstate 90 and east of New Underwood Dam on property adjacent to that of the Department of Game, Fish and Parks. A one acre parcel of land would have to be purchased to accommodate the pumping station. The site will require shaping and foundation preparation as it lies on mildly sloping ground. The water line route will require the construction of 2,700 L.F. of 6" PVC pipe. As for site "A", the water line will require Department of Transportation approval to pass under Interstate 90 through an 84" diameter conduit used to control the 100 year flood. The suggested method of construction using hangers to run the line underneath the interstate highway appears acceptable with the Department of Transportation. The line then will continue south of Interstate 90 into the City where it can be connected to the existing system at the location of the City's storage tanks. This will require approximately 2,000 L.F. of easement (50 feet construction, 20 feet permanent) south of the interstate highway. Provisions for maintenance of and for improvements to the county road leading to New Underwood Dam will be required to obtain access to the site. It is not known, at this time, how receptive the present landowner would be to the City's aquisition of a well site or pipeline easements.

ESTIMATED PROJECT COST

Well (1,200' of 8" casing, 1,570' of 5" casing)	
Total depth 2,770' @ \$55.00 per LF	152,350
Pump (30 HP 6" deep well submersible installed)	17,000
Pump House (framed construction and electrical connections)	15,000
Chlorination Unit	7,000
Fluoridation Unit	3,000
6" PVC Pipe (2,700 LF installed @ \$12.00/LF)	32,400
Miscellaneous Piping Costs:	
46 - 10" Roller Hangers (epoxy grouted)	
@ \$140.00 each	6,440
Two 6" Gate Valves with valve box	1,000
One 1-1/2" Air Relief Valve	400
Site Development	<u>20,000</u>
TOTAL CONSTRUCTION COSTS	254,590
Engineering, Legal, Administrative & Contingency (25% of Construction Cost)	63,710
Right-of-way, Easements, Land Acquisition	
1 acre parcel @	1,500
2,000 LF @ \$1.50/LF	<u>3,000</u>
	<u>4,500</u>
TOTAL ESTIMATED PROJECT COSTS	\$ 322,800

PROPOSED WELL SITE "C"

Well Site "C" is located in the SW 1/4 of the NW 1/4 of Section 29, T2N, R11E at an elevation of approximately 2,955 feet. It is north of Interstate 90 and east of Viewfield Road near the exit ramp on privately owned property. It will require the construction of 3,700 L.F. of 6" PVC pipe to connect the proposed water line to the existing system on the south side of Pennington County Highway 414 at the corner of Monroe Avenue. Special construction requirements include Department of Transportation approval to bore the eastbound entrance and westbound exit ramps to Interstate 90 and to attach the water line to the overpass structure. Where the water line passes over the interstate highway, 400 (+) L.F. of insulation and heat tracing will be required to keep the line from freezing during the winter months. As with the previous alternatives, obtaining permission from the Department of Transportation does not appear to pose a major problem. The proposed route continues south along the east right-of-way of Viewfield road without any major obstacles until Pennington County Highway 414 is encountered, where an open cut will be required to connect to the existing 6" line. The present landowner of the proposed Site "C" has expressed an interest in the system expansion and communicated to the City, his willingness to donate a 4.0 acre site to accommodate the proposed well house and future storage reservoir. Other advantages of this location are minimal site development, easy access, and an elevation to provide adequate gravity flow from future storage facilities.

ESTIMATED PROJECT COSTS

Well (1,200' of 8" casing, 1,625' of 4" casing) Total depth 2,825' @ \$55.00/LF	155,375
Pump (30 HP 6" deep well submersible installed)	17,000
Pump House (framed construction and electrical connections)	15,000
Chlorination Unit	7,000
Fluoridation Unit	3,000
6" PVC Pipe (3,700 LF installed @ \$12.00/LF)	44,400
Miscellaneous Piping Costs:	
400 (+) LF of 1-1/2" insulation @ \$10.00/LF	4,000
400 (+) LF of heat trace @ \$17.00/LF	6,800
Two 50 (+) LF of boring under ramps @ \$20.00/LF	2,000
Two 6" Gate Valves with valve boxes	1,000
One 1-1/2" Air Relief Valve	400
44 - 10" Roller Hangers (epoxy grouted) @ \$140.00 each	6,160
Asphalt pavement repair 50 ton @ 25.00/ton	1,250
Site Development	5,000
TOTAL CONSTRUCTION COSTS	268,385
Engineering, Legal, Administrative & Contingency (25% of Construction Cost)	68,015
Right-of-way, Easements, Land Acquisition - Donated	0
TOTAL ESTIMATED PROJECT COSTS	\$ 336,400

PROPOSED WELL SITE "D"

Well Site "D" is located in the SW 1/4 of the SE 1/4 of Section 30, T2N, R11E at an elevation of approximately 2,900 feet. This site is located on City property and is also the location of the City's elevated storage tank; therefore, very little site development will be required to connect to the existing system.

ESTIMATED PROJECT COST

Well (1,200' of 7" casing, 1,570' of 4" casing) Total depth 2,770' @ \$55.00/LF	152,350
Pump (30 HP 6" deep well submersible installed)	17,000
Pump House (framed construction and electrical connections)	15,000
Chlorination Unit	7,000
Fluoridation Unit	3,000
6" PVC Pipe (200 LF installed @ \$12.00/LF)	2,400
Miscellaneous Piping Costs:	
One 6" Gate Valve with valve box	500
One 1-1/2" Air Relief Valve	400
Site Development	<u>5,000</u>
TOTAL CONSTRUCTION COSTS	202,650
Engineering, Legal, Administrative & Contingency (25% of Construction Cost)	50,750
Right-of-way, Easements, Land Acquisition	<u>0</u>
TOTAL ESTIMATED PROJECT COSTS	\$ 253,400

SUMMARY OF ESTIMATED CONSTRUCTION COSTS:

<u>ITEM</u>	<u>ALTERNATIVES</u>			
	<u>"A"</u> <u>(GFP)</u>	<u>"B"</u> <u>(MATZ)</u>	<u>"C"</u> <u>(BOYDSTON)</u>	<u>"D"</u> <u>(CITY)</u>
Well	154,550	152,350	155,375	152,350
Pump	17,000	17,000	17,000	17,000
Pump House	15,000	15,000	15,000	15,000
Chlorination Unit	7,000	7,000	7,000	7,000
Fluoridation Unit	3,000	3,000	3,000	3,000
6" PVC Pipe	43,800	32,400	44,400	2,400
Misc. Piping Costs.	7,840	7,840	21,610	900
Site Development	<u>20,000</u>	<u>20,000</u>	<u>5,000</u>	<u>5,000</u>
Subtotal	268,190	254,590	268,385	202,650
25% Engineering Administrative & Contingency	67,110	63,710	68,015	50,750
Right-of-Way, Easements & Land Aquisition	<u>3,000</u>	<u>4,500</u>	<u>-</u>	<u>-</u>
TOTAL	338,300	322,800	336,400	253,400

IV. FISCAL CAPACITY

The budget for water utilities is obtained through water sales, appropriations, meter deposits, hook-up charges, and other miscellaneous charges. City residents are presently billed \$7.50 for the first 3,000 gallons of water usage and \$1.00 per thousand gallons thereafter. Non-municipal rates are \$9.00 for the first 3,000 gallons of water usage and \$1.25 per thousand gallons thereafter. A 20% rate increase scheduled for October, 1985 will raise City rates to \$9.00/\$1.25 and non-municipal to \$10.50/\$1.30. Based on 4,200 gallons per meter per month, water sales will account for approximately \$23,500 annually at the new rates. Water sales can be expected to increase as a result of increased pumping capacity, less intermittent service, and an increase in the number of users. A projected increase of 24% in demand, resulting from reduced downtime for maintenance and 10 new municipal units, will result in approximately \$1,500 of additional annual revenue from water sales. Other miscellaneous items, such as hook-up fees, appropriations, etc., would account for approximately \$1,000, making the projected total annual water revenue \$26,000. Tables I and II in Appendix II provide information about revenues and expenditures for the latest fiscal year.

ESTIMATED ANNUAL REVENUE

	Rates 1st 3,000 gal./ add'l 1,000 gal	No.of Meters	Monthly Average	Annual Amount
<u>Present Water Sales:</u>				
Municipal *	\$9.00/\$1.25	182	1,911.00	22,932
Non-Municipal *	\$10.50/\$1.30	4	48.24	579
TOTAL PRESENT REVENUE			1,959.24	23,511
<u>Projected Increase:</u>				
Municipal *	\$9.00/\$1.25	10	105.00	1,260
Reduced Down Time for Maintenance: (1% (+) of present revenue)				229
TOTAL INCREASE IN REVENUE				1,489
Other: (Hook-up fees, appropriations, etc.)				1,000
TOTAL ESTIMATED REVENUE				26,000

* Based on 4,200 gallons per meter per month

Annual expenditures for operation and maintenance can be expected to increase. The increase in pumping capacity will be reflected in the cost for treatment supplies and materials which can be expected to increase by nearly 50 percent. The additional cost of operating two pumps will also be a contributing factor to the increase in annual expenditures. This will be offset somewhat as the pumps will operate more efficiently and require less maintenance. The following is a summary of estimated annual operation and maintenance costs for the improved system at 1985 prices.

ESTIMATED ANNUAL O&M COSTS

Well Pump #1 (Electricity, pump, piping, etc.)	2,000
Well Pump #2 (Electricity, pump, piping, etc.)	3,500
Booster Pump #1	2,000
Booster Pump #2	200
Reservoir Pump Bldg. (Electricity)	1,000
Water Alarm	300
Propane	1,000
Purification:	
Professional fees	100
Repair and Maintenance	200
Supplies and Materials	600
Distribution:	
Repair and Maintenance	1,000
Supplies and Materials	900
Refunds and Reimbursements	300
Administration:	
Salary and Wages	9,000
OASI	635
Professional Fees	200
Supplies and Materials	600
Travel and Conference	600
TOTAL ESTIMATED ANNUAL O&M COSTS	\$ 24,135

The proposed water improvement would benefit an existing population of 517, whose average annual household income is \$11,173. According to the 1980 census, 147 of 182 households were below the \$18,000 taxable income level. As defined for Pennington County this places 80% of the household beneficiaries in the low-moderate income category.

Despite the economic characteristics of the community it has made considerable effort to resolve the problems of its water system. Since 1979, capital improvements have included construction of a new reservoir pump building, new well cable, motor saver replacement, water main improvements, distribution line replacements, fluoridation and electrical system improvements, water line replacement (4" to 6") in two blocks, and engineering/planning efforts. Other community projects include the purchase of a new fire truck, sewage lagoon expansion, lift station improvements,

new police car, new garbage truck and dumpsters, and a flood control project. The combined expenditures of all previously mentioned capital improvements totalled nearly \$232,400. Water improvements alone amounted to \$60,000 of the \$232,400 or 26 percent of the expenditures for the various projects. These expenditures are substantial for a city such as New Underwood.

Financing alternatives investigated for the proposed facilities include:

1. HUD Community Development Block Grant Funds
2. FMHA Loan
3. Black Hills Conservancy Subdistrict Grant (Previously received)
4. Local Reserve Funds for Water Improvements
5. Local In-kind from land and right-of-way donations ¹

The following pages of this section outline preliminary financing plans for the four alternatives using these sources.

¹ Local in-kind funds have been accounted for in the project cost estimates.

FINANCE PLAN FOR ALTERNATIVE "A"

<u>Financing Source</u>	<u>Amount</u>	<u>% of Total</u>	<u>Annual Amortization</u>
CDBG (46% w/150,000 max.)	150,000	44	-
FmHA Loan	171,300	51	15,300
Black Hills Conservancy Subdistrict	5,000	1	-
Local Cash	12,000	4	-
Local In-kind	-	-	-
TOTAL	338,300	100	15,300

Annual Expenses:	
Amortization (40 years @ 8.625%)*	15,300
O, M & R	<u>24,135</u>
TOTAL ANNUAL EXPENSES	\$ 39,435
 TOTAL ANNUAL REVENUE	 \$ 26,000

FINANCE PLAN FOR ALTERNATIVE "B"

<u>Financing Source</u>	<u>Amount</u>	<u>% of Total</u>	<u>Annual Amortization</u>
CDBG (46% w/150,000 max.)	148,488	46	-
FmHA Loan	157,312	48	14,050
Black Hills Conservancy Subdistrict	5,000	2	-
Local Cash	12,000	4	-
Local In-kind	-	-	-
TOTAL	322,800	100	14,050

Annual Expenses:	
Amortization (40 years @ 8.625%)*	14,050
O, M & R	<u>24,135</u>
TOTAL ANNUAL EXPENSES	\$ 38,185
 TOTAL ANNUAL REVENUE:	 \$ 26,000

* Amortization based on a semi-annual payment.

FINANCE PLAN FOR ALTERNATIVE "C"

<u>Financing Source</u>	<u>Amount</u>	<u>% of Total</u>	<u>Annual Amortization</u>
CDBG (46% w/150,000 max.)	150,000	45	-
FmHA Loan	169,400	50	15,130
Black Hills Conservancy Subdistrict	5,000	1	-
Local Cash	12,000	4	-
Local In-kind	-	-	-
TOTAL	336,400	100	15,130

Annual Expenses:			
Amortization (40 years @ 8.625%)*			15,130
O, M & R			<u>24,135</u>
TOTAL ANNUAL EXPENSES			\$ 39,265
TOTAL ANNUAL REVENUE			\$ 26,000

FINANCE PLAN FOR ALTERNATIVE "D"

<u>Financing Source</u>	<u>Amount</u>	<u>% of Total</u>	<u>Annual Amortization</u>
CDBG (46% w/150,000 max.)	116,564	46	-
FmHA Loan	119,836	47	10,700
Black Hills Conservancy Subdistrict	5,000	2	-
Local Cash	12,000	5	-
Local In-kind	-	-	-
TOTAL	253,400	100	10,700

Annual Expenses:			
Amortization (40 years @ 8.625%) *			10,700
O, M & R			<u>24,135</u>
TOTAL ANNUAL EXPENSES			\$ 34,835
TOTAL ANNUAL REVENUE:			\$ 26,000

* Amortization based on a semi-annual payment.

It is clear, that under these plans, total annual water expenditures are much greater than total annual water revenues. As the annual operation and maintenance costs are approximately equal to the annual water revenues, these plans indicate that the community will be extremely burdened by a large loan. For example, to finance the least expensive alternative, proposed Site "D", the minimum monthly rates \$9.00 (municipal) and \$10.50 (non-municipal) for the existing 186 units would have to be increased by 37 percent to minimum monthly charges of \$12.30 (municipal) and \$14.35 (non-municipal). Such an increase in rates would be drastic and would burden the majority of users. Less affordable water would result in less water sales, partially offsetting the rate increase. This plan could also be financed if 58 new municipal units (@ \$9.00/\$1.25) were immediately added to the water system, but census information indicates that the population can not be projected to grow this rapidly in a single year.

V. RECOMMENDATION AND CONCLUSION

As financial capacity is the primary consideration, it is recommended that proposed Site "D", being the least expensive to construct and finance, be developed. The proposed site is also desirable for its physical location. The land is already owned by the City and has been developed for the existing storage facilities, therefore access to the site already exists and minimal site development will be required to provide for the new pump station. Finally this alternative eliminates the need for special construction and maintenance considerations of the other proposed sites. For these reasons, proposed Site "D" is the most feasible.

This finance plan calls for several changes to the existing billing schedule. Although other alternatives are possible, it is recommended that the following rates be applied to finance the water improvement project; municipal rates at \$9.00 for the first 1,000 gallons, \$1.40 for each additional 1,000 gallons and non-municipal rates at \$10.50 for the first 1,000 gallons, \$1.45 for each additional 1,000 gallons. This decreases the minimum service from 3,000 gallons to 1,000 gallons and increases the approved rates for additional service by 12 percent. This approach was chosen to allow minimum service charges to remain affordable to all users, yet to increase additional service charges to generate the revenue to finance the project. It allows for approximately \$1,160 or 3.5 percent of the proposed annual income to be set aside annually for the sole purpose of water improvements. This is somewhat less than the 10 percent required by the FmHA, but improves significantly over the present budget. It should be considered that these rates will place even more stress on residents that already suffer from high tax burden; New Underwood ranking 73 out of 310 communities of comparable size.

TOTAL ANNUAL REVENUE
(Proposed Rate Schedule)

	Rates 1st 1,000 gal./ add'l 1,000 gal	No.of Meters	Monthly Average	Annual Amount
<u>Present Water Sales:</u>				
Municipal *	\$ 9.00/\$1.40	182	2,453.36	29,440
Non-Municipal *	\$10.50/\$1.45	4	60.56	727
PROJECTED REVENUE			<u>2,513.92</u>	<u>30,167</u>
<u>Projected Increase:</u>				
Municipal *	\$ 9.00/\$1.40	10	134.80	1,618
Reduced Down Time for Maintenance: (3 days = 1% of present revenue)				<u>258</u>
TOTAL INCREASE IN REVENUE				1,876
Other: (Hook-up fees, appropriations, etc.)				<u><u>1,000</u></u>
TOTAL ESTIMATED REVENUE				33,043

* Based on 4,200 gallons per meter per month

In conclusion, the need for the proposed system is in no way related to community or individual neglect, but resulted from declining aquifer levels related to the area's climate and hydrologic conditions. The financial limitations (Appendix II) of the proposed well will not lead to improved quality, this would require drilling a deep well into the Madison aquifer; but the proposed water improvements will benefit the community by increasing pumping capacity, relieving stress on the existing pumping unit, lower maintenance costs, improve fire fighting capacity, and provide for a backup system during emergency situations and maintenance periods. Residents will suffer less inconvenience, water rationing and intermittent service by making the system more dependable. This water improvement proposal is necessary to resolve the urgent needs of the community. In addition, the funding assistance requested will clearly serve those persons who are classified low-moderate income by the Department of Housing and Urban Development definition, and who without this assistance could not afford to make these urgently needed improvements.

APPENDIX I

DESCRIPTION OF WATER FORMATIONS

JOHN PAUL GRIES

Consulting Geologist
238 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

February 6, 1984

Mr. Eryan Shorten
6th District Council
306 E. St. Joe
Rapid City, SD 57701

Dear Mr. Shorten:

In light of the uncertainty over the West River Pipeline, Mayor Lynn Oliff of New Underwood has asked me to furnish you with a prognosis for a new deep well to be located on high ground about 2½ miles north of New Underwood. The elevation will be approximately 3050 feet. Three aquifers must be considered.

The Fall River-Lakota sands are the ones utilized by the existing well. North of town, the depth to the top of the Fall River will be approximately 2700 feet. The static level will have about the same sealevel elevation as in your existing well, and the quality should be comparable. It is unusual for a Lakota sand well to produce more than 100 to 150 GPM over the long haul.

The Minnelusa formation, which is an excellent aquifer around the Black Hills, will be encountered at roughly 4100 feet. No satisfactory Minnelusa wells are known so far out from the Black Hills outcrop area. It was impossible to develop a Minnelusa well at the Rapid City Airbase in 1941. The sands were tightly cemented with gypsum, and the little water that was recovered approached the mineral content of seawater. I think you can rule it out completely at New Underwood.

The top of the Madison is projected to lie at a depth of 4770 feet north of New Underwood. The limestone will be at least 500 feet thick; generally most of the water is encountered in the upper 200 feet. Yields of the Madison generally range between 250 and 500 GPM, though wells are on record which yield both more than less than the above range. Low yield wells can often be stimulated by acid-fracturing. The quality will likely be similar or a little harder than in the new well at Box Elder. Temperature as pumped may be close to 125°F. There is some uncertainty as to the static level; I'm estimating it at 500 feet below the surface. Pumping level might be as much as 500 feet lower, necessitating a large diameter casing to 1000 or even 1200 feet.

I will be pleased to try to answer any further questions.

Sincerely

J. P. Gries
Professor Emeritus

APPENDIX II

FISCAL YEAR 1984 REVENUE

FISCAL YEAR 1984 EXPENDITURES

1980 CENSUS INFORMATION

TABLE 1. REVENUE

	ACTUAL 1984	ESTIMATED 1985	1-1-85 thru 5-30-85
Court Fines & Costs			
Water Penalties	317.50	250.00	
Miscellaneous rev.			
Interest earned			
Meter Deposit CD's	403.91	300.00	
General Fund savings	910.67	400.00	
Rentals	338.67	0	
Jaycees lights-propane	119.05	1,100.00	
Rodeo Grounds			
Sale of Surplus Property		1,000.00	
Other - WRCR, Golden West	2,910.41	1,500.00	
1. MISCELLANEOUS	4,872.21	4,300.00	
Trust & Agency			
QASI	2,354.72	2,300.00	
Health Ins.			
Fed. Withholding Tax	2,010.40	3,000.00	
2. TRUST & AGENCY	4,365.12	5,300.00	
3. GENERAL REVENUE	88,575.94	78,655.00	
Water			
Water Sales	25,012.70	21,500.00	9,683.50
1984 Appropriations		565.00	0
Meter Deposits	960.00	150.00	500.00
Meter Deposit Savings	53.51	30.00	25.89
Other (hook ups)	300.00	75.00	5,225.00
4. WATER	26,326.21	22,721.00	15,434.39
Sewer Lagoon Grant			
Sewer Charges	14,730.00	14,300.00	
Other (hook ups)	375.00	125.00	
5. SEWER	15,105.00	14,425.00	
Water & Sewer Savings	1,181.07	600.00	
6. WATER & SEWER REVENUE	42,612.28	37,746.00	
7. MEANS OF FINANCE	170,639.97	116,411.00	

SANITATION
Wages & Salary
OASD
Professional fees

ACTUAL
1984

3,229.42
484.24
18.56

ESTIMATED
1985

3,500.00
500.00

1-1-85 thru 5-30-85

TOTAL SANITATION

3,512.32

4,000.00

SEWAGE COLLECTION & DIS.
Repair & Maintenance
Supplies & Materials

27.58
0

200.00
50.00

TOTAL SEWAGE COLLECTION & DISPOSAL

27.99

250.00

SEWER LIFT STATION
Professional fees
Repair & Maintenance
Supplies & Materials
Electric

0
1,081.88
1,413.07
466.34

100.00
300.00
150.00
500.00

TOTAL SEWER LIFT STATION

2,961.29

1,050.00

TOTAL SEWER

6,501.59

5,300.00

WATER
Power & Pumping
Elec. Pump #1
Elec. Pump #2
Elec. Tank Bldg.
Water Alarm
Propane

2,048.35
2,453.15
150.32
1,106.08
268.20
604.55

5,000.00
2,000.00
200.00
1,000.00
300.00
1,000.00

0
882.32
62.50
476.19
111.75
396.35

TOTAL POWER & PUMPING

6,678.69

9,500.00

1,929.11

PURIFICATION
Professional fees
Repair & Maintenance
Supplies & Materials

27.00
10.00
209.35

100.00
100.00
400.00

27.00
0
9.40

TOTAL PURIFICATION

246.35

600.00

36.40

TABLE 2: EXPENDITURES

	ACTUAL 1984	ESTIMATED 1985	1-1-85 thru 5-30-85
DISTRIBUTION			
Rentals	0		
Repair & Maintenance	1,555.43	300.00	355.00
Supplies & Materials	846.50	300.00	1,046.62
Refunds & Reimbursements	335.90	300.00	38.50
TOTAL DISTRIBUTION	2,737.83	1,200.00	1,440.12
ADMINISTRATION & GEN.			
Salary & Wages	7,330.48	9,000.00	3,674.04
OS&I	1,183.36	1,250.00	602.83
Professional fees	52.66	300.00	0
Supplies & Materials	743.77	400.00	558.75
Travel & Conference	426.21	600.00	163.00
TOTAL ADMINISTRATION & GENERAL	9,744.48	11,450.00	4,998.62
TOTAL WATER	19,407.35	22,750.00	
REVENUE SHARING			
Financial Administration	0	25.00	
Public Safety	574.50	1,500.00	
Public Works	5,093.29	5,755.00	
Library	0	0	
TOTAL REVENUE SHARING	5,267.79	7,300.00	
TOTAL BUDGETED EXPENSE	126,634.63	110,170.00	

CENSUS OF POPULATION AND HOUSING, 1980--S

51. INCOME IN 1979
GEOGRAPHY: STATE: 46 SMSA:
COUNTRY: 103 MCD: 075 PLACE: 0990 TR

HOUSEHOLDS FAMILIES

WHITE

LESS THAN \$5,000 18

\$7,500 TL \$9,999

87	666,615	01	000,515
37	666,615	01	000,515

2	\$25,000	10	\$24,999
7	10	15	10

9	\$35,000	70	\$49,999
8	\$50,000	68	\$50,000

MEAN \$ 13265

54. FAMILIES WITH SPANISH ORIGIN

HOUSEHOLDER BY INCOME IN 1979

LESS THAN \$5,000 \$5,000 TO \$7,500

\$7,500 TO \$9,999

666,618 71 000,000

\$25,000 10 \$34,999

10	\$33,000	10	\$49,999	10	\$50,000
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
15	15	15	15	15	15
16	16	16	16	16	16
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84</					

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SECRET • INFORMATION SECURITY

IN REPLY TO

1401

961

211

487

NET RENTAL INCOME 25

16
08
PUBLIC ASSISTANCE

10-10-1964

103 MCD: 075 PLACE: 0900 TRA

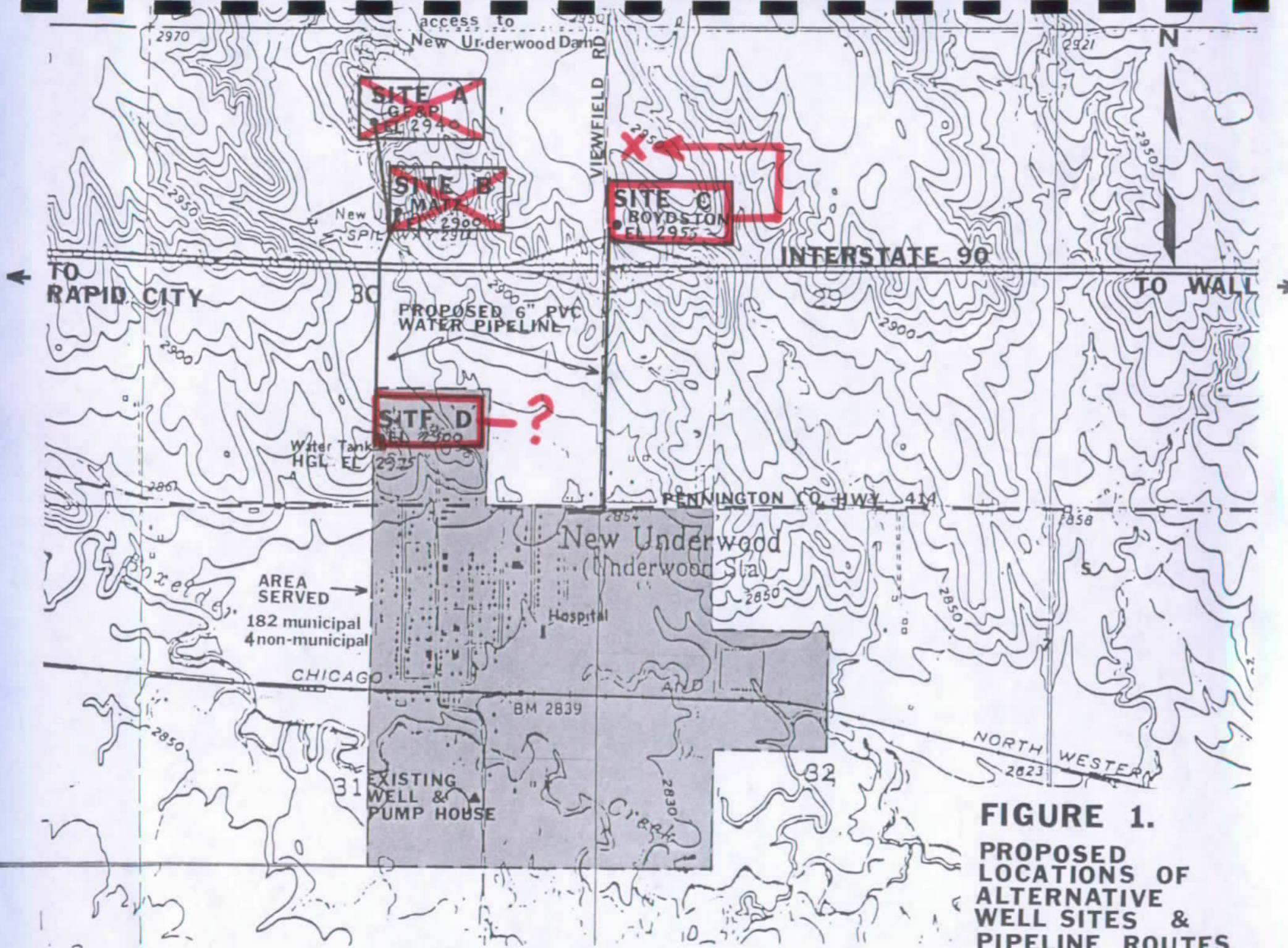
1. FAMILIES AND INDIVIDUAL HOUSEHOLDS

HOUSEHOLDS

APPENDIX III

PLAN OF PROPOSED FACILITIES

PLAN OF EXISTING FACILITIES



JOHN PAUL GRIES

Consulting Geologist

238 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

February 11, 1986*

Groundwater potential of Fall River-Lakota sandstone at New Underwood

Evaluation of the existing deep well. The well was drilled in 1961 to a total depth of 2691 feet as measured by the electric logger. The drilling contractor was William Rogers, Scottsbluff, Nebraska, a graduate geologist from the University of Nebraska.

13 3/8-inch surface casing was set to 90 feet. 8-inch ID casing was set from the surface to somewhat below 600 feet. The driller then drilled to total depth with a 7 7/8-inch bit. 5 1/2-inch casing was hung from about 2640 feet back up and telescoped inside the 8-inch to 600 feet. 120 feet of stainless screen or perforated casing extended from the bottom of the 5 1/2-inch casing to the depth of 2680 feet, the bottom of the completed well.

The producing zone is a clean, continuous sandstone extending from 2584 to 2664', lying in the position of the Fall River sandstone. It may be a composite of the Fall River and Lakota sandstones which are usually separated by a shale break. It is my recollection that Mr. Rogers drilled until he was certain that he had entered the underlying Morrison shale, and that he had penetrated all possible waterbearing sandstone.

The elevation of the original well is about 2840 feet above sealevel. It is erroneously given as 2930 feet (the elevation of the storage) on the electric log run in March 1961. It is to be noted also that the well is within the flood plain of Box Elder Creek.

Yield. The history of wells of the Rapid Valley Water Corp., the Fall River-Lakota wells at the Airbase, and the municipal wells at Wall indicate that wells into this aquifer settle down to a sustained yield which is roughly

* Supersedes report dated February 3, 1986.

JOHN PAUL GRIES

Consulting Geologist

238 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

60 to 65 percent of initial production. This drop takes place within a few months or a year or more after being placed in service. It seems to make little difference whether the well was completed by shot perforations through the casing or whether the well was screened and gravel packed. The characteristic drop in yield, then, seems more related to the character of the aquifer than to the method of well completion.

Rehabilitation? Because the drop in yield appears to be normal, I doubt if the well production would be appreciably improved by any kind of rehabilitation. It is possible that the bottom few feet of the well has backfilled with material entering with the water. This could be removed by blowing the well some time when the pump is out of the well. I'd hesitate to try to bail it clear from inside the fragile 4-inch stainless steel section. I would also be reluctant to try to clean the perforations by use of acid. The acid might remove enough of the natural calcium carbonate cement of the sandstone aquifer to start the movement of free sand into the well. Consequently, I recommend leaving the existing well alone, and plan to use it either for supplementary production or as a standby well after a new deep well is completed. Even though the pump can be lowered, ultimately to 600 feet, no change in pump setting is recommended at the present time.

Static level. The static level at the time the well was drilled is reported to have been 192 feet below land surface, or at + 2648 above sealevel after recovery from the original pumping test. This test reportedly gave a yield of 200 gpm with a drawdown of only 37 feet, for a specific capacity of 5.4 gpm per foot of drawdown. The following data have been taken from city and state files:

JOHN PAUL GRIES

Consulting Geologist

238 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

<u>Year</u>	<u>static</u>	<u>pumping level</u>	<u>pumping rate</u>	<u>sp. capacity</u>
1961	192	280 ft	200 gpm	5.4
1977	212	290	155	2.2
1981	295	323	155	5.5
1982	230	321	155	1.7
1984	255	350	155	1.6

The records above are erratic, particularly the 1981 data; suggesting either difficulty in obtaining true measurements, or fluctuations in the static level. New Underwood lies more than 20 miles east of the intake area for these sandstones, and such a wide fluctuation in water level seems unlikely.

The apparent drop of static level of 83 feet between the 1977 and 1981 measurements gave rise to the estimate in my letter to Mr. Oliff (6/25/82) that the static level might be dropping as much as 30 feet per year. However, subsequent measurements in 1982 and 1984 bring things back into focus. Between 1977 and 1984, the water level dropped only 43 feet, for an average annual drop of 7 feet per year. The drop between 1961 and 1984 is only 63 feet, or five feet per year. This is at about the same rate that the City of Wall is experiencing with their Lakota wells, and is no reason for concern since the pump setting may still be lowered another 250 feet as the pumping level drops.

Water quality. Two older analyses at hand indicate that changes in chemical quality with time are within the accuracy of the chemical analyses. The following are suggestive:

	<u>1961</u>	<u>1964</u>			
Iron	0.7	0.7	sulfate	158	165
manganese	0.1	0.2	chloride	4	4
magnesium	2.0	3.0	fluoride	0.7	0.8
calcium	10	11	nitrate	0	0
sodium	151	153	dissolved solids	481	490
potassium	4.7	4.2	hardness as CaCO ₃	33	41
bicarbonate	251	251	alkalinity as CaCO ₃	206	206
carbonate	-	-	pH	7.7	7.0

JOHN PAUL GRIES

Consulting Geologist
238 ST. CHARLES STREET
RAPID CITY, SOUTH DAKOTA

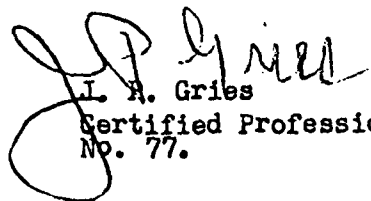
Proposed new well. The new well would be located slightly less than one mile north of the existing well, and at a surface elevation slightly more than 100 feet higher. Both wells will be drawing from the same aquifer, but the spacing is great enough so that the wells will have only minimal interference when both are in operation.

With the higher surface elevation, the static level is anticipated to lie about 350 feet below the land surface. Because the rock strata dip nearly due east, and the new well is north of the old one, the depth to the aquifer will be increased approximately by the difference in surface elevation, or about 110 feet. Drilling should continue until the Morrison shale is encountered and identified by a geologist to assure that all sandstones within the Fall River-Lakota aquifer have been penetrated.

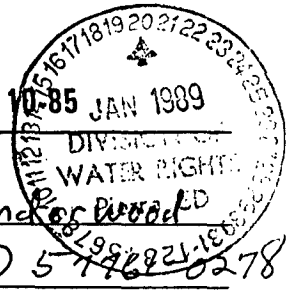
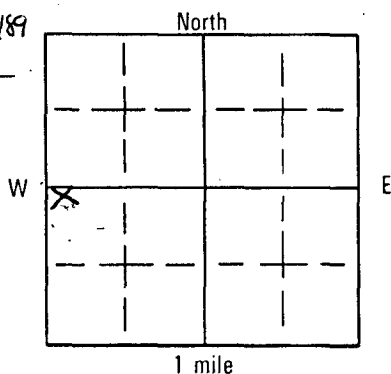
It is presumed that the water quality in the new well will be very similar to that in the existing well, and that patrons will notice no change in water quality or taste when the new well goes into the lines.

The existing well was properly constructed, and continues to give satisfactory service. However, it is 25 years old, and its future physical life cannot be predicted. I feel strongly that the town of New Underwood should not be dependent solely upon a 25-year old well located in the flood plain of Box Elder Creek. A second well should serve as the main source of supply, and the existing well should be used most of the time as a standby, either during a large fire, or when the pump in the new well should be out of service.

JPG/me


J. P. Gries
Certified Professional Geologist
No. 77.

SOUTH DAKOTA WATER WELL COMPLETION REPORT

Location NW 1/4 SW 1/4 Sec 29 Twp 2N Rg 11ECounty SW NW
Pennington
SB
1/24/89Please mark well
location with
an "X"Well Completion Date 4-12-88

PROPOSED USE:

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

Method of Drilling: Mud Rotary

CASING DATA:

☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
<u>23</u> LB/FT	<u>7</u> IN	<u>0</u> FT	<u>1183</u> FT	<u>9 7/8</u> IN
<u>15</u> LB/FT	<u>5 1/2</u> IN	<u>1183</u> FT	<u>2960</u> FT	<u>7 1/2</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUT:

Was the well grouted? ☒ YES ☐ NOTo what depth? 2960 FEETWhat is grouting material? CementIf cement, number of sacks? 600Describe grouting procedure pressure grouted
through casingWhat was grout weight? 16 LB/GALSCREEN: ☒ Perforated pipe ☐ Manufactured

Diameter _____ IN Length _____ FEET

Material _____

Slot Size 5/8" Set From 2687 Feet To 2713 Feet 2 shots/ft.Slot Size 5/8" Set From 2830 Feet To 285 Feet 1 shot/ft.Slot Size 5/8" Set From 2850 Feet To 2900 Feet 2 shots/ft.Other information perforated by 22.7 gram chargesWas a packer or seal used? ☐ YES ☒ NO

If so, what material? _____

Describe packer(s) and location? _____

Was well disinfected upon completion? ☒ YES ☐ NOExplain granular chlorine placed in wellBacteriological analysis ☐ YES ☒ NO

Laboratory sent to _____

Well Owner:

Name City of New UnderwoodAddress Box 278 NU, SD 57782-0278

Well Log:

Depth

Formation	From	To
gravel	0	30
Pierre Shale	30	1170
Nebraska chalk	1170	1410
Carlisle shale	1410	1800
Greenhorn Limestone	1800	1896
Belle Fourche Shale	1896	2406
Newcastle SS	2406	2448
Skull Creek Shale	2448	2688
Fall River & Lakota SS	2688	2960
Morrison	2960	

STATIC WATER LEVEL 345 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☐ OtherDescribe: Submersible pump test

Pumping Level Below Land Surface

458 ft. After 24 Hrs. pumped 200 GPM

_____ ft. After _____ Hrs. pumped _____ GPM

_____ ft. After _____ Hrs. pumped _____ GPM

REMARKS:

This well was drilled under license # 331

And this report is true and accurate.

Drilling firm Taylor Drilling Co.

Signature of License Representative:

Ralph Taylor

Signature of Well Owner:

Date 12/30/88

RECEIPT

Division of Water Rights

No 410212

South Dakota Department of Water and Natural Resources

Pierre, October 10, 1985

City of New Underwood, Box 278, New Underwood SD 57761

RECEIVED OF

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

Fee for Application for Permit No. <u>1947-2</u> to Appropriate Water, to construct works and to put water to beneficial use	325	00
Fee for Application for Permit No. _____ to Appropriate Water for Future Use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form		
Fee for Filing Extension Request		
Fee for Certified Copy of		
Fee for Print Copy of Map		
Fee for Certifying		
Fee for		
(Any Other Work Provided by Law)		
Total	325	00

By

Chief Engineer

JOHN HATCH

ks

February 15, 1985

MEMO TO: Dick Howard

FROM: Mark Steichen

SUBJECT: New Underwood A-95 review

This memo incorporates the responses from Water Rights and Drinking Water. New Underwood is, in essence, requesting a back-up well to their present well. The artesian head in the area has apparently dropped but has stabilized. This Department has no verification of either of these claims. The application claims a 90' drop over the last four years, but Mayor Oliff indicated this week that it has stabilized recently, thereby invalidating the application's claim that the city could run out of water in six to eight years.

Concerning quantity, the application states that three million gallons per month must be pumped during high usage periods. The application also states that the system operates 22 hours per day at 150 gpm which figures out to a yield of 6.5 million gallons per month. At this production rate, every person in New Underwood would be using 417 gal/c/d, more than twice the expected usage in South Dakota's small communities.

Present storage capacity is approximately 70,000 gallons. More than 100,000 gallons is recommended to meet design criteria for peak daily demands. In addition, any community growth or expansion into the rural area would require additional storage.

Water quality from the present source is excellent with iron and manganese levels slightly exceeding secondary standards. Other water quality claims are exaggerated in the application. Water quality from the Madison would probably be similar, however, violations of the radium standard and excessively hot water create potential treatment problems that aren't addressed in the application. Mr. Oliff indicated that they would decide on the production aquifer as the well was drilled and usable quantities could be determined.

The quantity of water from the Madison cannot be determined, but is likely to be a higher yielding well than the Lakota. Taking costs into consideration, another Lakota well would be the likely source.

Dick Howard
February 15, 1985
Page 2

We have no information on Phase II, the Viewfield rural water system. Putting the well 2 1/2 miles north of the city near the proposed new storage site makes economic sense if planning ahead for expansion into the rural area. It is the highest point in the area and could serve the rural area and the town from storage by gravity flow. If the well was put in town, the water would have to be pumped up the hill through the same length of pipe.

Many rural users in the area apparently have shallow wells susceptible to drought. This is hearsay and not verified by this Office.

In summary, additional water storage is justified for expansion. A new well is needed only as a back-up for emergencies and maintenance if, in fact, the present well can produce 150 gpm as reported. When the OBG grant request is received, we will be prepared to discuss our recommended modifications to their proposed project.

C21401HS.IN

March 7, 1985

City of New Underwood
PO Box 278
New Underwood, South Dakota 57761

ATTENTION: Mayor Lynn Oliff

Dear Mayor Oliff:

I have received information from the Office of Drinking Water that the City of New Underwood may be considering developing another well. The City currently has three water permits on file:

No. 649-2	.11 cfs	20 foot well
No. 660-2	1.00 cfs	2680 foot well (Inyan Kara)
No. 1780-2	1.00 cfs	Future Use from Inyan Kara

The water reserved for future use from the Inyan Kara formation is available for development by the City. However, if it is decided to drill a new well into this formation a water permit application will have to be filed. If you have any questions please contact this office.

Thank you,

Kevin C. Larson
Natural Resources Engineer

KCL:ms

Equal Opportunity Employer

Water Rights Division
605 773-3352

September 26, 1985

City of New Underwood
Mayor I.L. Oliff
Box 278
New Underwood SD 57761

Mayor Oliff:

Thank you for receipt of the water permit application for the proposed new well for the City. The filing fee for this application would be \$325.00. Upon receipt of the fee, we will continue processing the application.

Thank you,

KEVIN C LARSON
Natural Resources Engineer

KCL:ks

REPORT ON APPLICATION NO. 1947-2

CITY OF NEW UNDERWOOD

October 17, 1985

Application No. 1947-2 proposes to appropriate 1.0 cfs from an Inyan Kara well approximately 2825 feet deep, located in the SW 1/4 NW 1/4 Section 29, T2N, R11E. This permit is to utilize water reserved for future use by Permit No. 1780-2, for municipal purposes.

The early Cretaceous aged Inyan Kara Group which lies unconformably above the Morrison Formation is composed of the Lakota Formation and the younger Fall River Formation. The Lakota Formation is composed of a crossbedded channel-filled sandstone, shale, some localized limestone and thin conglomerate lenses. The Fall River Formation which rests unconformably above the Lakota, consists of a well-bedded fine grained sandstone and less abundant interbedded siltstone and claystone. Conformably overlying the Inyan Kara is an assemblage of Cretaceous rocks known as the Graneros Shale.

The Inyan Kara underlies 1,245,440 acres of Pennington County and contains an estimated 29,748,400 acre-feet of recoverable water in storage (Allan, 1984). Rahn (1979) reports a coefficient of transmissivity (T) for the aquifer of 2165 gpd/ft at Wall and 1333 gpd/ft at Box Elder. The porosity of the formation varies from 30 percent in the eastern part of the state to 12 percent in the extreme western portion of South Dakota. Although the aquifer characteristics in the New Underwood area have not been delineated, they can be assumed to be within the known values. Rahn (1979) reports an average specific capacity for the Inyan Kara aquifer of 3.2 gpm/ft and a thickness of 150 feet in the New Underwood area. There are no Water Rights Division observation wells in the Inyan Kara Formation near New Underwood to monitor water levels and very few domestic wells from which information can be obtained. The most recent water level recorded in the New Underwood area, from an Inyan Kara well was taken August 2, 1977 from a well measured by USGS located in Section 13, T2N, R12E. The water level was 584 feet below land surface or approximately 2476 feet msl. The static water level in the Inyan Kara at New Underwood should be approximately 300 feet below land surface.

The report for licensed Permit No. 660-2 for the City of New Underwood dated March 3, 1961 reported a static water level of 192 feet below land surface and 37 feet of drawdown at a discharge rate of 0.45 cfs. The validity of this information should be questioned.

Using the average specific capacity value, a discharge of 1.0 cfs should produce a drawdown of approximately 140 feet.

Review of Existing Permits

The only permit which appropriates water from the Inyan Kara in the New Underwood area is Permit No. 660-2 to the City of New Underwood which was licensed for 0.45 cfs for municipal use.

Permit No. 1780-2 reserves 1.00 cfs for future use from a well approximately 2650 feet deep with a diversion point located in Section 31, T2N, R11E. The permit was approved with the stipulation that at such time as definite plans are made, specific applications for all or any part of the water granted under this withdrawal must be submitted prior to construction of facilities.

Conclusions

1. Water in the Inyan Kara Aquifer has been reserved by Future Use Water Permit No. 1780-2 to be developed as requested by Permit No. 1947-2.
2. The water levels in the Inyan Kara wells of New Underwood could draw down significantly with the additional withdrawal. The well should be constructed in accordance with Section 74:02:04:30 of the Well Construction Standards and precautions should be taken to insure adequate well construction to facilitate lowering of the pumps.
3. Interference between the Inyan Kara wells of New Underwood could be a problem, and proper well spacing should be observed.
4. The stiputation for approval of Permit No. 660-2 has been met.
5. There are no known domestic wells in the Inyan Kara in the New Underwood area.



KENT BUHLER
Natural Resources Engineer

References

- Allan, J.C., Illes, D.L., Peters, A.K., Analysis of Ground Water and Streamflow Data, Western Dakotas Region of South Dakota, U.S. Army Corps of Engineers, 1984.
- Rahn, P.H., Ground Water Resources of Western SD, U.S. Army Corp of Engineers, 1979.
- Bradford, W.L. Water Levels in Bedrock Aquifers in South Dakota, U.S. Geological Survey, 1981.

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT

APPLICATION NO. 1947-2, City of New Underwood

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Water Permit Application No. 1947-2, City of New Underwood, Box 278, New Underwood SD.

The Chief Engineer is recommending APPROVAL of Application No. 1947-2 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) in the public interest with the following qualifications:

1. The construction of the proposed Inyan Kara Formation well shall include pressure grouting with cement (bottom to top) of the casing above the water producing formation and compliance with Board well construction rules, Chapter 74:02:04 which were effective September 29, 1985.

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

See the attached report for additional information.

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

JOHN HATCH, Chief Engineer
October 18, 1985

No. 1947-2

Instruction to Newspaper - Publish first publication of the following Notice on or before October 28, 1985 with 2nd publication 1 week later. The applicant is responsible for payment.

NOTICE OF HEARING on Application No. 1947-2 to ~~Appropriate Water~~ ^{develop reserved}
and/or to Amend Water Permit or Water Right No. _____

Notice is hereby given that City of New Underwood whose mailing address is Box 278, New Underwood,, South Dakota has made an application for a permit

to construct works and place to beneficial use 1.0 cubic feet per second of water from one well approximately 2825 feet deep (Inyan Kara) located in the SW 1/4, Section 29, T2N-R11E appropriated and reserved by Future Use Water Permit No. 1780-2. The water will be used for municipal purposes.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends APPROVAL of Application No. 1947-2 because 1) unappropriated water is available, 2) will be no unlawful impairment of existing rights, 3) is beneficial use of water and 4) is in the public interest.

This application will be considered by the Water Management Board at Howard Johnson
Badlands Room, 2211 LCrosse, Rapid City, SD, December 4 19 85 at 10:00 am.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to make a determination on this application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the Applicant and the Chief Engineer by November 22, 1985. The petition may be informal, but it must include a statement describing the petitioners interest in the application, the reason for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-31; ~~(ground)~~ 46-6-3, 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14; ~~(future use)~~ 46-5-38 thru 46-5-40; ~~(transfer lands)~~ 46-5-30.4, 46-5-33 thru 46-5-35; ~~(10,000 AFA)~~ 46-5-20.1, 46-5-8.1; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15; ~~(future use)~~ 74:02:01:24 thru 74:02:01:25; ~~(10,000 AFA)~~ 74:02:01:15:02 thru 74:02:01:15:05.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNR, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by November 22, 1985.

STATE OF SOUTH DAKOTA)
) ss.
County _____)

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, DWNR, Joe Foss Bldg., Pierre, S.D., (605-773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or any person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by November 22, 1985.



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501

Water Rights Division
605 773-3352

1947-2

FEB 11 1986

City of New Underwood
Box 278
New Underwood, South Dakota 57761

Dear Sir:

Enclosed herewith is your Water Permit No. 1947-2 as approved by the Water Management Board authorizing you to construct your water diversion system and the water to beneficial use, not exceeding the limits as specified in said Water Permit No. 1947-2.

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

Very truly yours,

A handwritten signature in black ink, appearing to read "John Hatch".

JOHN HATCH, Chief Engineer
Water Rights Division

JH: ms

enclosure

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

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

WNR-809-5/83

New Underwood

1947-2

PUBLIC NOTIFICATION OF FmHA'S FINDING OF NO
SIGNIFICANT ENVIRONMENTAL IMPACT



The Farmers Home Administration (FmHA) has received an application for financial assistance from the City of New Underwood. The proposal consists of drilling a well into the Lakota Aquifer, pumping at a recommended sustained withdraw rate of 125 gallons per minute. The estimated depth of the well is from 2,770 feet to 2,825 feet. The construction of the well includes an eight inch casing to a depth of 1,200 feet, to accommodate the pumping and five inch casing to the bottom of the well. The project also includes the construction of a 14 foot by 22 foot building to house the pump, electrical connections and the chlorination/floridation treatment units. The location of the well and pump house is adjacent to the existing elevated storage reservoir within the city limits of New Underwood.

FmHA has assessed the potential environmental impacts of this proposed action and has determined that it will not significantly effect the quality of the human environment. Therefore, FmHA will not prepare an Environmental Impact Statement for this proposed project.

Any written comments regarding this determination should be provided within fifteen (15) days of this publication to Dexter H. Gunderson, State Director, Room 308, Federal Building, Huron, South Dakota 57350. FmHA will make no further decisions regarding this proposed action during this fifteen-day period. Request to review the FmHA Environmental Assessment upon which this determination is based or to receive a copy of it should be directed to the above address.

WATER RIGHTS DIVISION
(605) 773-3352

September 10, 1987

Mayor Lynn Oliff
City of New Underwood
Box 278
New Underwood, South Dakota 57761

Dear Mayor Oliff:

Enclosed is a copy of Water Permit No. 1947-2 for the City of New Underwood.

If you have any questions or need additional data, please contact us.

Sincerely,

Genny McMath
Natural Resources Analyst

GM:ms
Enc.

WATER RIGHTS DIVISION
(605) 773-3352

September 10, 1987

Mayor Lynn Oliff
City of New Underwood
Box 278
New Underwood, South Dakota 57761

Dear Mayor Oliff:

Enclosed is a copy of Water Permit No. 1947-2 for the City of New Underwood.

If you have any questions or need additional data, please contact us.

Sincerely,

Genny McMath
Natural Resources Analyst

GM:ms
Enc.



Department of Water & Natural Resources

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

January 23, 1989

Stuart Goldsmith, Mayor
City of New Underwood
Box 278
New Underwood SD 57761

Dear Mayor Goldsmith:

A well drillers report filed with this office by Taylor Drilling Co. indicates you have recently completed a new well. The well driller is required by South Dakota Codified Laws (SDCL 46-6-11) to file a well construction report within 30 days of completion.

The purpose of the enclosed "Summary of South Dakota Water Law and Water Right Information" is to provide general information and to inform you of the responsibilities you have incurred. Specifically:

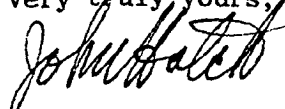
1. According to South Dakota Water Rights Law (SDCL 46-1-15, 46-5-9, 46-5-10), it is necessary to obtain a water permit to appropriate waters of this state. An exception to this requirement is for water used for domestic purposes. Domestic water uses that do not require a permit are listed under item 5 on the enclosed summary. Those activities that require permits are listed under item 7.
2. If your new well was drilled as a replacement well and if you do not plan to use the old well, the old well is considered abandoned and must be plugged pursuant to SDCL 46-6-27. Other abandoned wells must also be plugged.
3. If the old well is not to be abandoned, or will be used, the well must be sealed or capped at the surface pursuant to SDCL 46-6-27.

Based upon the information we have, you may need a water permit. Since we have no record of a water permit for this well, I am enclosing application forms and an instruction sheet for preparing a water right permit application.

Please complete the application and submit it with the required fee to the "Water Rights Division, Joe Foss Building, 523 E. Capitol, Pierre, SD 57501" by 45 days from the date of this letter.

If you have questions or need assistance contact Susan Bowar, Water Rights Division Engineer (605-773-3352).

Very truly yours,



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

cc: well driller

enclosure



Conversation or File Documentation

NAME OF PERSON OR FILE: City of New UnderwoodADDRESS: Box 278 57764 COUNTY PenningtonDATE: January 24, 1989 TELEPHONE 754-6777RE: 1/23/89 letter re well completion report received

COMMENTS:

Jerry Bloom (Public Works Director) called in response to the
letter he received concerning a well completion report
received & the need to get a permit for it. He explained
that the well was drilled under #1947-2. Upon reviewing
the file, 1947-2 authorized a well in the SW¹/₄ NW¹/₄
Section 29-T2N-R11E. to be constructed by 12/4/90.

The well completion report indicated the well to be in
the NW¹/₄ SW¹/₄, outside of the advertised area. The
city stated the report was wrong, i.e., the well is
located in the SW¹/₄ NW¹/₄. Taylor Drilling was contacted
and the mistake on the well completion report was
corrected.

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



DEPARTMENT OF WATER & NATURAL RESOURCES

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

January 9, 1991

Les Englund
Suite 102
Western Mutual Building
731 St Joe St
Rapid City, SD 57701

Dear Mr. Englund:

Enclosed, as requested, is a copy of Water Right No. 660-2,
Future Use Permit No. 1780-2 and Water Permit No. 1947-2.

If you have any questions, please contact me.

Sincerely,

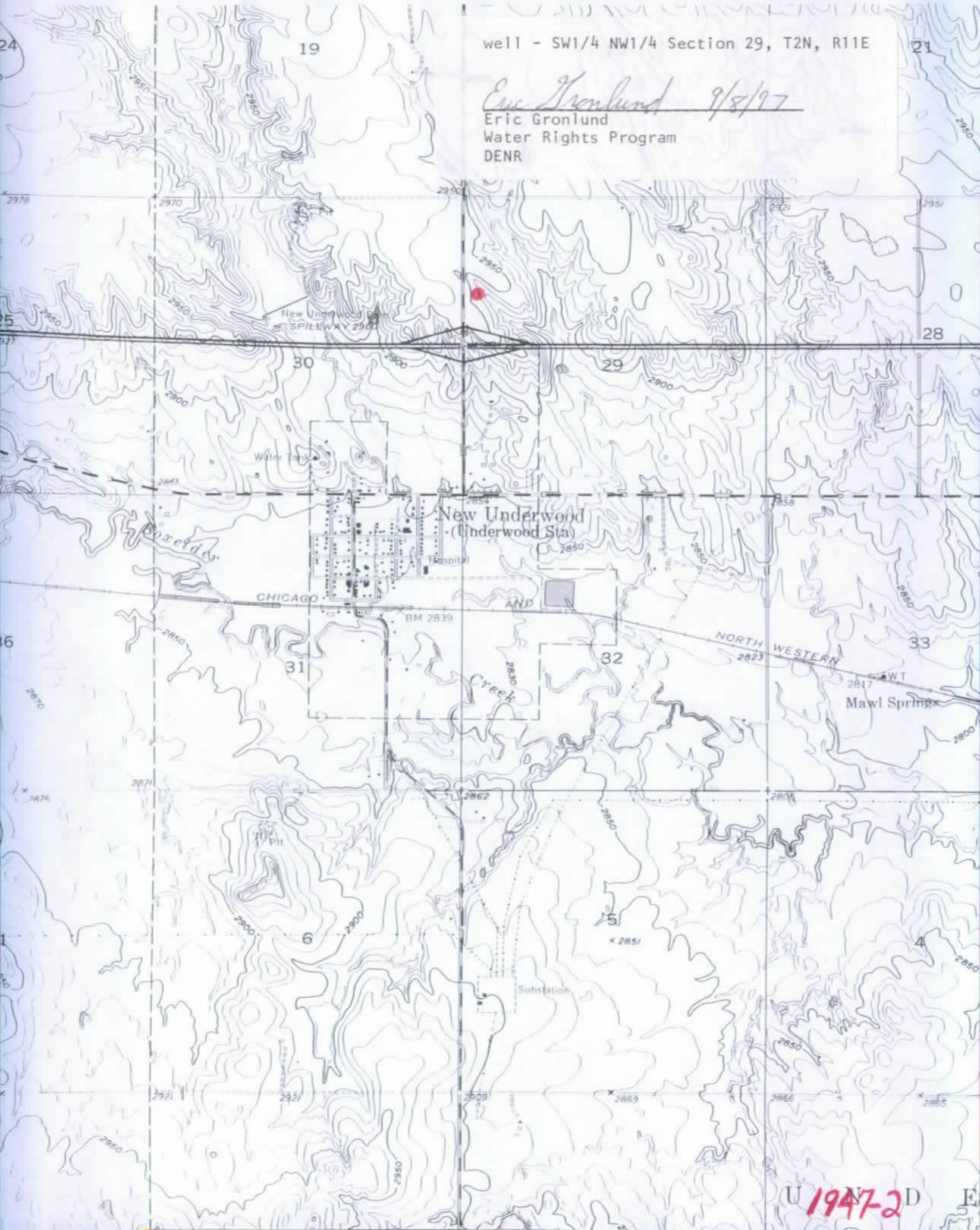
A handwritten signature in cursive script that reads "Genny McMath".

Genny McMath
Natural Resources Analyst
(605) 773-3352

enclosures

well - SW1/4 NW1/4 Section 29, T2N, R11E

Eric Gronlund 9/8/97
Eric Gronlund
Water Rights Program
DENR



U 1947-2 D E

Permit No. 1947-2
Upper Cheyenne - Water District

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

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

I have this day, September 8, 1997, made a thorough examination of the water use system constructed by City of New Underwood, Jerry Bloom, Public Works Director of PO Box 278, New Underwood, SD 57761-0278 holder of Permit No. 1947-2, bearing the priority of June 3, 1981 authorizing the diversion of 1.0 cu. ft. per second of the waters of Inyan Kara Formation for municipal use purposes, in Pennington County.

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

A. Works used to divert the water:

40 Hp Mitsubishi pump/motor, 3 phase, 3400 rpm, Serial No. 06161B248 (obtained from city records)

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

distribution line to city's main

C. Works used to apply water to beneficial use:

city's water distribution lines

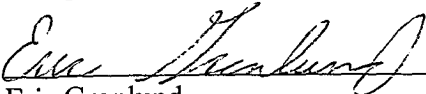
The system is in the following condition **good (well constructed in 1988)**. The point of diversion is located **SW1/4 NW1/4 Section 29, T2N, R11E (approximately 1716' south & 165' east from the NW corner of Section 29, T2N, R11E)**. The works are capable of diverting and conveying to the place the use of **0.41** cu. ft. per second of water (186 gpm) which is used for **municipal use**. Water has been put to beneficial use to the maximum extent as follows: **one well located in the SW1/4 NW1/4 Section 29, T2N, R11E** and the license should be issued for **0.41** cfs.

**** the undeveloped portion (0.59 cfs) will revert back to Future Use Permit No. 1780-2 in accordance with ARSD 74:02:01:26.01**

Applicable permit qualifications have been complied with: Yes

Exceptions to compliance are:

Date Report Completed: **October 14, 1997**



Eric Gronlund

Natural Resources Engineer, DENR, Water Rights Program

REPORT ON INSPECTION OF PERMIT NO. 1947-2

DATE OF INSPECTION: September 9, 1997

Other permit(s) associated with the project: none (city does have Water Right No. 660-2 which is active)

Contact Person & Address: Jerry Bloom, Public Works Director, PO Box 278, New Underwood, SD 57761-0278

DIVERSION POINT LEGAL LOCATION: SW1/4 NW1/4 Section 29, T2N, R11E (very near the quarter-quarter line between the SW1/4 NW1/4 and NW1/4 NW1/4)

WATER SUPPLY Source: Inyan Kara Formation

Well Information:

- | | |
|--------------------------------------|-------------------------------------|
| 1) Well Drilling Firm: <u>Taylor</u> | 2) No. of Wells <u>One</u> |
| 3) Depth(s) <u>2960</u> feet | 4) Well log is available <u>Yes</u> |

Casing:

- 1) Diameter 7" (0 - 1183') and 5 1/2" (1183' - 2960')
- 3) Type Steel

Screen:

- | | |
|---------------------------------------|---|
| 1) Type <u>perforated pipe</u> | 2) Length <u>see well completion report</u> |
| 3) Static water level <u>345 feet</u> | |

Pump:

- | | |
|-----------|-------------------|
| 1) Make | 2) Model |
| 3) Size # | 4) Capacity # GPM |

Pump records supplied by the city show a diversion rate of 186 gallons per minute

Motor:

- | | |
|-----------------------------------|-------------------------------|
| 1) Make <u>Mitsubishi</u> | 2) Serial No. <u>0161B248</u> |
| 3) Horsepower rating <u>40</u> hp | |

DISTRIBUTION LINES OR CANALS:

- 1) Type # 2) Size # inches 3) Length # feet

SYSTEM TYPE: Not Applicable

PERMIT QUALIFICATIONS AND REGULATIONS:

- 1) Special qualifications to permit being abided by Yes
- 2) All structures, wells and lands on map Yes
- 3) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period Not applicable

*** See the attached computer printout which was provided by the City of New Underwood. Well # 2 is the well authorized by Water Permit No. 1947-2 and Well No. 1 is authorized by Water Right No. 649-2

well # 2

New Well Drilled in 1988

2980 ft deep

22In 24 day's pumped 1,474,400 gallon's

Ran 132hrs at 186 gallon's per min Average 12, 593 ,166 per year

In 24 day period 132 hrs it ran 5.5 day's shut down 18.5 day's

This well has 40 hp Mitsubishi pump 3ph 3400 rpm 60 hz

Serial # 0161B248

600 ft of 4" drop pipe in well

Call Taylor drilling for service

Location: NW 1/4 NW 1/4 of Section 29

Well #1

This well is a back up only

We run it once Month just to exercise the pump

This well has a new moter and pump put in Dec. 1st 1993

It is a 30 hp Franklin submersible motor

Volt's 460/380 ph 3 kw 22 kz 60/50 Dia 6" p/n 236-616-9020

Contact Plumdone Co. in Rapid City for warranty & service

Drop pipe motor and pump is all 3" 24 section;s 20 lenght 480ft down

Both well #1 and #2 are insalled with Chlorine system;s

Contact Bob;s Chlorinator & pump Sale;s or

Hawkins Chemical Inc both in Rapid City

Location: NW 1/4 of SE 1/4 Section 31

In these two well's there were two Chemical pump's installed one in Dec. 1993 #1

One in 1994 these are both Stenner Chemical metering pump's

Model # 45MHP10 Serial # D- 6969-ki Amp's 1.7 Volt's 120 G.P.D. 12

PSI output 100 Bar 6.9

Contact Steve Barth with Dakota Chemical Co. for Service & Warranty 11-7-94 #2

Bus: 605 787- 6881 Home : 605- 343-6025 .

Well # 2 Replaced chemical feed hose in chemical feed pump Dec. 1995

Well #2 Replaced plastic line and cleaned calcium from line July 1996

HYDRANT TEST 1995

DONE BY ISO COMMERCIAL RISK SSERVICE INC.

We had over 750 gallons per minute for 20 min., 2 test done at 200 lbs. pressure and 250 lbs all were good.

Hydrant flows were good along with pressure. Static ran about 52 lbs. on hydrant.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

October 31, 1997

Jerry Bloom, Public Works Director
City of New Underwood
PO Box 278
New Underwood SD 57761-0278

Dear Mr. Bloom:

The investigation of New Underwood's water use system was conducted on September 8, 1997, by Eric Gronlund, staff engineer. The investigation included the extent of application of water to beneficial use, as developed under Water Permit No. 1947-2. Your final water right document, the Water License, can now be issued.

Statutes require that we charge a \$50.00 fee for the investigation and issuance of the Water License. Upon receipt of the \$50.00 fee from the city, we will begin processing the Water License.

Further review of our files indicate that New Underwood holds Future Use Water Permit No. 1780-2, with a June 3, 1981 priority date. This permit reserved 1.0 cubic feet of water per second (cfs) (450 gallons per minute) for future water supply needs for the city. Water Permit No. 1947-2, approved December 4, 1985, authorized the withdrawal of 1.0 cfs from the future use area authorized by No. 1780-2. This essentially left the future use permit with no water remaining in reserve.

Mr. Gronlund's investigation found that the City's system authorized by Permit No. 1947-2 capable of diverting 0.41 cfs (186 gpm), with 0.59 cfs (264 gpm) [the unused portion] reverting back to the future use permit. ($1.0 \text{ cfs} - 0.41 \text{ cfs} = 0.59 \text{ cfs}$). Our question is whether the City wants to retain the 0.59 cfs for appropriation in the future.

If so, the 0.59 cfs remaining in Future Use Permit No. 1780-2 is subject to review by the Water Management Board pursuant to SDCL 46-5-38.1. The purpose of this review is to determine if a reasonable need exists for retaining the permit. If the City does plan to retain the future use permit, then the response should outline a reasonable need for retaining the future use permit, including an estimate of future needs and any annual pumping records for the past three years.

October 31, 1997

Jerry Bloom, Public Works Director

Page 2

Notice will be given of the hearing time and place at a future date. A fee will be charged if the Board allows the permit to remain in effect after the hearing. The fee to be assessed will be dependent upon the amount of water allowed to remain in reserve.

Mr. Bloom, I realize this may be confusing. If you have any questions, please contact Eric Gronlund or myself.

Sincerely,

A handwritten signature in cursive script that reads "Karen Schlaak".

Karen Schlaak
Environmental Scientist
Water Rights Program
605 773-3352

RECEIPT

415527

Division of Water Rights

South Dakota Department of Environment and Natural Resources

Pierre, _____ November 10, 19 97

RECEIVED OF City of New Underwood, P.O. Box 278, New Underwood, SD 57761-0278

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

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use _____		
Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>1947-2</u>	50	00
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	50 00

By John Hatch (g)
Chief Engineer



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

NOV 19 1997

1947-2

City of New Underwood
%Barbara Nachtigall, Finance Officer
P.O. Box 278
New Underwood, SD 57761-0278

Dear Ms. Nachtigall:

Enclosed is Water License No. 1947-2. This is the final water right document completing your process of obtaining a Water Right. Enclosed is Receipt No. 415527 in the amount of \$50.00 which you paid for the investigation and issuance of the Water License.

For your information SDCL 46-6-27 requires that if the owner of an existing well, such as the well authorized by Water Right No. 1947-2, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

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

Very truly yours

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

ks
enclosures

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 1947-2

(1) The City of New Underwood, PO Box 278, New Underwood SD 57761-0278 made Application No. 1947-2, September 25, 1985 for a water permit to divert 1.0 cubic feet of water per second from groundwater (one well), Pennington County, South Dakota for municipal purposes. Permit No. 1947-2, with a priority date of June 3, 1981 (established by Future Use Permit No. 1780-2) was approved December 4, 1985 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before December 4, 1990 and for the application to beneficial use of said water on or before December 4, 1994.

(2) It is certified that the applicant has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 0.41 cubic feet of water per second for beneficial use. The location of the diversion point is 1,716 feet south and 165 feet east from the northwest corner of Section 29-T2N-R11E (SW 1/4 NW 1/4).

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

(4) Pursuant to South Dakota Water Law 46-5-30.1 the City of New Underwood, PO Box 278, New Underwood SD 57761-0278 the holder and/or owner of Water Permit No. 1947-2 is issued a license to appropriate water, the right to use 0.41 cubic feet of water per second from groundwater (one well) with a priority date of June 3, 1981 (established by Future Use Permit No. 1780-2) from the location specified in (2) of this license, for the purpose of municipal use. This license is subject to any limitations or qualifications listed in Water Permit No. 1947-2 and subject to South Dakota State Law.



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

NOV 19 1997

date

