

DRAFT

**ENVIRONMENTAL IMPACT
STATEMENT**

**LINCOLN-PIPESTONE
RURAL WATER
Lake Benton, Minnesota**

Existing System North/Lyon County Phase
Northeast Phase Expansion



United States Department of Agriculture

RURAL UTILITIES SERVICE
(THE LEAD AGENCY)
and



U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 8
(A COOPERATING AGENCY)

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EXECUTIVE SUMMARY

This Environmental Impact Statement (EIS) is being prepared by the U. S. Department of Agriculture (USDA), Rural Utilities Service (RUS) in accordance with the procedural provisions of the National Environmental Policy Act (NEPA) of 1969. The purpose of the EIS is to evaluate the potential environmental impacts of a project proposal located in southwestern Minnesota. The proposal to which the Agency is responding to involves providing financial assistance for the development and expansion of a public rural water system. The applicant for this proposal is a public body named Lincoln-Pipestone Rural Water (LPRW) and whose main offices are located in Lake Benton, Minnesota. Specific project activities are and have included the development of groundwater sources and production well fields and the construction of water treatment facilities and water distribution networks. The counties in Minnesota affected by this proposal include Yellow Medicine, Lincoln, and Lyon Counties and Deuel County in South Dakota

LPRW is a political subdivision of the State of Minnesota. Under Minnesota statutes, LPRW was granted broad statutory powers to “do all things necessary to establish, construct, operate, and maintain a [rural water] system.” In addition, LPRW has been authorized to “construct, enlarge, improve, replace, repair, maintain, and operate any system determined to be necessary or convenient for the ... distribution of water in its jurisdiction.”

Some of the issues evaluated in this EIS date back to previous decisions made in funding one of the phases of a multi-phase system expansion project initiated by LPRW in 1991. Due to the reality of Congressional funding cycles, RUS and LPRW have administratively pursued LPRW’s requests for financial assistance of this expansion project in discrete fundable phases. As part of the last construction phase, known as the Existing System North/Lyon County (ESN/LC) Phase project, a water source was developed along with the construction of a Water Treatment Plant that was designed to provide potable water to the northern portion of LPRW’s service area (see Figure ES-1). The water source developed in this phase was the Burr Well Field. The Burr Well Field is located close to Burr, MN between Clear Lake, South Dakota and Canby, MN and is within ½ mile of the South Dakota - Minnesota state line. The water-bearing formations utilized at this well field underlie portions of both South Dakota and Minnesota.

**FIGURE ES-1 LINCOLN-PIPESTONE
RURAL WATER SYSTEM SERVICE
AREA AND CONSTRUCTION
PHASES**

Source: Dewild Grant Reckert and Associates

During construction of the Burr Well Field (started on April 19, 1993) and subsequent to its operations, public and regulatory concerns were raised and continue to be raised regarding potential environmental effects of groundwater appropriations from one of the water-bearing formations (called the Burr Unit) utilized by the well field. The second aquifer utilized at the Burr Well Field is called the Altamont aquifer. The Altamont is a deeper formation that appears to be hydraulically isolated from the Burr Unit.

Because of geologic factors and the topographic position of the Burr Unit in relation to ground surface elevations, groundwater discharges onto the land surface in both South Dakota and Minnesota as springs or seeps creating unique wetland features called patterned calcareous fens. In addition after performing geologic investigations in the area, the South Dakota Department of Environment and Natural Resources concluded that one of the lakes in the area, Lake Cochrane, was also receiving groundwater discharges from the Burr Unit aquifer.

Calcareous Fens in the study area are characterized by a partially mineralized peat mass through which a groundwater discharge (a "spring head") occurs throughout the peat mass. This peat mass is referred to as a fen dome and in most areas the domes are elevated 5-10 feet above the ground surface. Calcareous fens are listed as "Outstanding Resource Value Waters" in Minnesota's Rules 7050 and are protected under the Minnesota Wetland Conservation Act of 1991 (Minn. Stat. 103G).

An Environmental Assessment was prepared for the ESN/LC Phase project by the Farmers Home Administration (FmHA) in accordance with its Environmental Policies and Procedures (7 CFR Part 1940-G). FmHA published a Finding of No Significant Impact for the project on February 7, 1992. Because of concerns raised regarding the Burr Well Field, the EA was amended to address these concerns by an agency newly created by a 1993 USDA reorganization, the Rural Development Administration (RDA). RDA published a draft copy of the amended EA for public review and comment on October 14, 1994. Upon receipt of the public comments, it was decided to prepare an EIS. During the time this decision was being made USDA again reorganized its programs and the RDA programs were combined with the utility programs of the Rural Electrification Administration to form a new agency -- the Rural Utilities Service.

RUS announced its intent to prepare an EIS and hold public scoping meetings in a Notice of Intent published in the *Federal Register* on June 8, 1995, and in public notices in the *Marshall Independent*, *Minneota Mascot*, *Canby News*, *Ivanhoe Times*, *RFD News*, *Clear Lake Courier*, and *Brookings Register*. Public meetings were held on July 18, 1995, in Canby, MN, and July 19, 1995, in Brookings, SD, for the purpose of describing the project and soliciting the public's comments about the issues to be considered in the EIS.

After considering comments received from federal and state agencies and the public at and following the scoping meetings, the Agency determined the significant issues that would be evaluated in the EIS and the range of alternatives, as required by NEPA, that could meet the purpose and need of the proposed action. It should be mentioned that the environmental impact analyses and discussion of alternatives presented in this EIS, particularly as they relate to the Burr Well Field, are being performed subsequent to the decision made on March 24, 1992 to fund LPRW's ESN/LC Phase proposal. This situation presents the Agency with a procedural dilemma as to the ultimate purpose of the analyses to be presented in this EIS. The dilemma is that NEPA, as a procedural law, requires consideration of the potential environmental impacts of a proposed action before a decision is made. Even though decisions have already been made and significant public funds committed to the development and construction of the ESN/LC Phase which includes the Burr Well Field and Water Treatment Plant, the Agency decided, based on information and evidence presented, that the letter and spirit of NEPA would be advanced by taking a "harder" look at the outstanding issues from the 1992 FmHA EA and the 1994 RDA amended EA. This was particularly relevant, because the Agency had on file an application from LPRW to complete the last phase of the original system expansion project -- the Northeast Phase Expansion. In addition, the Burr Well Field was originally designed and built to serve as a source of water for the Northeast Phase Expansion, two previous construction phases -- the ESN/LC Phase and the Yellow Medicine Phase -- and other areas within the northern portions of LPRW's service area.

It was determined that, because the activities of the two expansion phases (the ESN/LC and the Northeast Phase Expansion) were so completely interrelated and interdependent, separating the phases into two environmental impact analyses would circumvent the letter and spirit of NEPA, as stated in the Council on Environmental Quality's Procedures for Implementing the Procedural Provisions of the NEPA, 40 CFR § 1502.4, "Major Federal actions requiring the preparation of environmental impact statements". The regulation states: "Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." Therefore, the impact analyses for both phases are included in this EIS.

Therefore, the primary issues to be evaluated in the EIS include the outstanding concerns from the earlier 1992 EA, that is, the environmental effects on fens and Lake Cochrane (herein referred to as surface water resources) from groundwater appropriations at the Burr Well Field, and the potential environment impacts from the construction of the Northeast Phase Expansion proposal. The primary objective of the Northeast Phase Expansion proposal is to provide rural water service to rural residents (240 rural users) who have requested service and to the rural communities of Hazel Run and Echo, Minnesota. The proposal includes

the installation of 170 miles of 2- to 8-in pipelines, an elevated water storage tank near Minneota, and a booster station near Green Valley.

Another issue that was of particular interest to numerous commenters during the scoping phase of the EIS was whether providing higher quality potable water in areas where water quality has been historically poor would in and of itself promote an influx of large-scale animal confinement operations and/or the expansion of any existing operations. These commenters noted that an influx of large-scale animal confinement operations and the associated animal wastes that would be produced would potentially contaminate groundwater resources in an area that has already been affected by nitrate contamination, particularly if the waste-handling activities of these facilities were carelessly implemented or unregulated. This issue was analyzed in this EIS.

Because all of the decisions and funding obligations have been made on the previous ESN/LC Phase project, the only decision facing the Agency at this time is whether or not to provide financial assistance to LPRW for the construction of the Northeast Phase Expansion proposal. All decisions regarding the issuance and disposition of the Water Appropriation Permit authorizing groundwater appropriations at the Burr Well Field are subject to the regulatory authority of the Minnesota Department of Natural Resources (MNDNR), Division of Water.

After the Agency made the decision to prepare an EIS, the Agency requested, pursuant to 40 CFR 1501.6, "Cooperating Agencies", that the U. S. Environmental Protection Agency (USEPA), Region 8 in Denver, CO, serve in the capacity of a cooperating agency. This request was made because of USEPA's specialized expertise in groundwater issues. USEPA agreed to the Agency's request, therefore, RUS is the lead agency for this action and was responsible for the preparation of the EIS, and, USEPA provided technical assistance to RUS through its role as a cooperating agency.

For purposes of this EIS, the proposed action to which the Agency is responding to and for which all of the environmental impacts of past and present actions were evaluated, is the application LPRW submitted to the Agency to fund the Northeast Phase Expansion. In addition to this application, LPRW submitted a Water Appropriation Permit application to the MNDNR to increase groundwater appropriation rates from the present 750 gallons per minute (gpm) and 400 million gallons per year (Mgpy) to 1,500 gpm/800 Mgpy. Both of these actions encompass what was termed the "proposed action."

In order to establish a clear purpose for the analyses presented in the EIS, the purpose and need of the proposed action needs to be properly defined. The overall purpose of this and previous actions by LPRW is to assist citizens in southwestern Minnesota in obtaining a consistent, reliable and safe supply of high-quality, affordable drinking water in an area that has difficulty in obtaining good quality drinking water. To achieve this purpose and meet the existing and

future projected needs of the Northeast Phase Expansion area and other parts of the system, LPRW needs a minimum of 1,349 Mgp. This need is defined within the context of LPRW's present well field configuration, the Holland, Verdi, and Burr Well Field.

Table ES-1 summarizes LPRW's present water source supply per well field. For primary and backup source areas for each well field see Figure ES-2.

Table ES-1

SUMMARY OF LPRW WATER SOURCE NEEDS AND ANNUAL APPROPRIATIONS

LPRW Source Needs	Annual Use, MGal		DNR Permitted Capacity Mgp	Total Water Pumped				
	Primary Area	Total Area		1993 Mgp	1994 Mgp	1995 Mgp	1996 Mgp	1997 Mgp
Verdi	500	892	683	403	403	425	424	383
Holland	306	346	500	172	244	287	333	355
Edgerton Well					0	0	0	0
Burr Wells Altamont Wells	492	628	400		9	145 27	215 2	274 55
Canby (Requires plant improvement)*	51	51	0					
Total Design Capacity	1,349	N.A.	1,583	574	656	884	975	1067

* Canby source refers to the needs of the Yellow Medicine Phase service area. LPRW and the City of Canby have previously served customers in this area.

Because the yields of the aquifers utilized at the Holland and Verdi Well Fields are reported by LPRW to be at or nearing safe capacity, the minimum annual needs from the Burr Well Field, as projected from an analysis of existing and long-term future needs, are approximately 628 Mgp. Present permitted amount is 400 Mgp; LPRW's permit application with the MNDNR is for 800 Mgp.

NEPA requires that when federal agencies are considering taking a federal action (in this case, whether or not to provide financial assistance) they must identify and assess the reasonable alternatives to that action that would avoid or minimize adverse environmental impacts. Taking into consideration all of the

input received from federal and state agencies and the public, the Agency evaluated in-depth the following alternatives to the proposed action. In addition, NEPA requires federal agencies to examine the effects on not taking any action - that is, the No-Action alternative. Table ES-2 outlines the alternatives evaluated in this EIS.

**FIGURE ES-2 LPRW PRIMARY AND
BACKUP SERVICE AREAS FOR
EACH WELL FIELD**

Source: Dewild Grant and Reckert and Associates

Table ES-2

List of the Alternatives Considered

Alternative	Northeast Phase Expansion Status	Burr Well Field Status
Current Status	LPRW submitted application to RUS to fund construction of the Northeast Phase Expansion	LPRW is authorized under their current Water Appropriation Permit to appropriate groundwater at the rate of 750 gpm/400 Mgy. LPRW submitted an application to the MNDNR to increase groundwater appropriations 1,500 gpm/800 Mgy.
Proposed Action	Fund the Northeast Phase Expansion	Increase groundwater appropriations at the Burr Well Field to 1,500 gpm/800 Mgy.
Alternative 1	Fund the Northeast Phase Expansion	Discontinue use of Burr Well Field
Alternative 2	Fund the Northeast Phase Expansion	Discontinue use of Burr Well Field Supplement water needs from other sources: Adjacent Rural Water Systems Lewis and Clark System Altamont Aquifer Canby Aquifer Other Aquifers
Alternative 3	Fund the Northeast Phase Expansion	Maintain current appropriations at Burr Well Field
Alternative 4	Fund the Northeast Phase Expansion	Maintain current or reduce appropriations at Burr Well Field Fund and construct new well field and Water Treatment Plant in the Wood Lake area.
Alternative 5	Do not fund the Northeast Phase Expansion; Finance Point-of-Use systems in Northeast Phase Expansion area.	Maintain current appropriations at Burr Well Field
Alternative 6 – No Action Alternative	Do Not Fund the Northeast Phase Expansion	Maintain current appropriations at Burr Well Field

The alternative analyses were performed in two phases: the first phase determined reasonableness; and secondly, those alternatives determined to be reasonable were subjected to an in-depth economic analysis to determine the economic feasibility of each alternative.

Table ES-3 summarized the issues that were evaluated as part of the alternative analysis and conclusions drawn from the analyses.

**Table ES-3
SUMMARY OF ALTERNATIVE ANALYSES**

Alternative	Groundwater Source			Environmental Effects			
	Burr	Altamont	Other	Fens	Lake Cochranne	Biological	Comments
Proposed Action	Y	Y	N	PS	PS	N - FED PS-ST	At pumping at 1,500 gpm/800 Mgy there is a potential for significant adverse impacts to surface water resources, particularly during drought. Not enough data to predict impacts with certainty. User rates increase - 17%.
Alternative 1	N	N	N	N	N	N	LPRW unable to meet the needs of the system without third well field. Potential for significant adverse economic impacts for rural businesses.
Alternative 2	N	N	Y	N			Only source that would be feasible at this time would be the Altamont aquifer. At Burr Well Field the Altamont would be unable to sustain high levels of appropriations. Water from Altamont would require treatment, could use Burr Water Treatment Plant. Not enough information available to determine if Canby aquifer is large enough to be a significant source of water supply.
Lewis and Clark	N	N	Y	N	N	N	
Altamont	N	Y	Y	N	N	N	
Canby	N	N	Y	N	N	N	
Alternative 3	Y	Y	N	P	P	N-FED P-ST	At 750 gpm/400 gpm there is a potential for adverse impacts to surface water resources. Not enough data to predict impacts with certainty.
Alternative 4 Wood Lake Alt.	Y	Y	y	M	M	N-FED M-ST	At 750 gpm/400 Mgy there would be minimal potential for adverse impacts to surface water resources because a well field and treatment plant would be built decreasing reliance on Burr Well Field. Very expensive, user rate increases - 31%. MNDNR's preferred alternative.
Alternative 5	Y	Y	N	P	P	N-FED P-ST	At 750 gpm/400 Mgy there is a potential for adverse impacts to surface water resources. Not enough data to predict impacts with certainty. Point-of-use systems more expensive than rural water system and labor intensive.
Alternative 6 – No Action Alternative	Y	Y	N	P	P	N-FED P-ST	At 750 gpm/400 gpm there is a potential for adverse impacts to surface water resources. Not enough data to predict impacts with certainty. Users in Northeast Phase Expansion would not be served. User rate increases - 11%

Y - Yes; N - No; M - Minimal Effects; P - Potential Effects; PS – Potentially Significant Effects; FED - Federal List for Threatened/Endangered Species; ST - State List of Threatened/Special Concern/Rare Species

The alternatives determined to be reasonable and selected for an in-depth economic analysis were the Proposed Action, Alternative 4 - Wood Lake aquifer, and Alternative 6 - No-Action alternative. In addition, the Agency has developed a Preferred Alternative and included that option in the economic evaluation. Table ES-4 provides a summary of total project costs for each of the selected alternatives and estimates the economic effect each alternative will have on system-wide user rates. These costs include all of the financial decisions currently under consideration by LPRW.

Table ES-4

**SUMMARY OF THE TOTAL PROJECT COSTS
FOR SELECTED ALTERNATIVES***

Alternative	Total Project Cost (\$000)	Cost/1,000 gallons (dollars)	Impact on User Rates (dollars) (Current rate \$1.35)	Percent User Rate Increase
No-Action Alternative	\$5,032	N.A.	\$1.49	10.5%
Proposed Action	\$9,362	\$1.69	\$1.57	16.6%
Preferred Alternative	\$10,782	\$1.95	\$1.63	20.6%
Wood Lake Alternative Option 1 – 500 gpm/140 Mgy	\$13,046	\$2.38	\$1.72	27.4%
Option 2 – 750 gpm/210 Mgy	\$14,225	\$2.56	\$1.77	31.1%

* Includes the consideration of all financial obligations and requirements (includes cost of Holland Water Treatment Plant upgrade for nitrate problems and overall debt burden) facing LPRW at the present time.

The critical issues addressed in the EIS related to what effect groundwater appropriations at the Burr Well Field have on surface water resources in the area surrounding the well field. Because of the uncertainty in determining the extent or magnitude of such effects, particularly in the long-term, the alternative analysis focussed on the source of LPRW's water supply for the northern portions of its service area. The most important factor explored was whether or not the existing or alternative sources of water could meet current and future needs of the citizens in this area and what environmental effects the utilization of each source would have on the area's environmental resources. Due to limited information concerning aquifers in this area of Minnesota, the only alternatives that were concluded to be reasonable as potential

sources of water included the Burr Unit, Altamont and Wood Lake aquifers. The Burr Unit and Altamont aquifer occur in the same general area but are hydraulically isolated from one another, the Altamont being the deeper aquifer of the two. The Wood Lake aquifer is located within the Northeast Phase Expansion area.

As the above table indicates, the Wood Lake Alternative, is the most expensive alternative, primarily because a new well field and water treatment plant would be required in order to utilize the water from this aquifer. The user rate increases for this option range from 27-31% depending on the size of the treatment plant constructed. This rate increase is projected to exceed the citizens' ability to pay and will increase LPRW's debt service burden beyond their financial capabilities. It is likely that if this alternative is the only one available to LPRW, the Northeast Phase Expansion will not be built.

If it is concluded that the Wood Lake Alternative is unfeasible for economic reasons, then the two remaining alternatives both propose to continue using the Burr Unit and Altamont aquifers. These alternatives propose to pump at either 1,500 gpm/800 Mgpy (Proposed Action) or 750 gpm/400 Mgpy (No-Action alternative). The user rate increases for each alternative are 17 to 11%, respectively.

Because the remaining alternatives propose to continue utilizing the Burr Unit and Altamont aquifers at the Burr Well Field, the environmental consequences of how each alternative could effect surface water resources of the area were examined. In an attempt to determine the extent and magnitude of potential effects, the Burr Unit and Altamont aquifers' relationship with surface water resources had to be evaluated.

As a result of detailed investigations of water chemistry, changes in hydraulic head during production pumping and pump tests, tritium content and age-dating of aquifer water and water being discharged at two of the area's fens that were monitored -- the Fairchild and Sioux Nation Fens -- it has been clearly demonstrated and established that a hydraulic connection exists between the Burr Unit and the fens. In addition, further evidence indicates that reductions in the potentiometric surface caused by pumping the Burr Unit at the Burr Well Field causes reciprocal responses in the hydraulic head measured in observation wells and piezometers installed in and adjacent to selected fens. No evidence of a similar hydraulic connection between the Altamont aquifer and the fens was observed.

Drawing conclusions based on limited information concerning Lake Cochrane was not as conclusive. However, based on the information that is available, the Agency has concluded that all lines of evidence indicate that it is likely Lake Cochrane is receiving a groundwater contribution to its water budget from both shallow and deeper (Burr Unit) aquifers. The information that would be necessary to quantify the overall percentage of groundwater contribution in relation to surface water inputs to Lake Cochrane's water budget and the percentage of the contribution from shallow aquifers versus the Burr Unit is incomplete and unavailable. The cost and technical difficulty of obtaining such

information for evaluating reasonably foreseeable impacts by the Agency has been determined to exorbitant and unreasonable.

Therefore, given that the evidence indicates that the Burr Unit is hydraulically connected to the fens and, most likely, to Lake Cochrane, determining the extent and magnitude of what effect groundwater appropriations from the Burr Unit could have on these resources is limited to the following information and conclusions:

Sustainable Yield of the Burr Unit

- Sustainable yield of the aquifer is unknown.
- Recharge mechanics are not clearly understood.
- All pump tests and monitoring completed to date have occurred during periods of high precipitation.

Significant Data Gaps/Uncertainties

- Long-term impacts to surface water resources from groundwater appropriations are unknown.
- Magnitude of existing or future impacts are not accurately known or understood.
- Recharge and discharge conditions for the Burr Unit are not well understood.
- Significant uncertainties related to the water budget and groundwater contributions or discharges from the Burr Unit to Lake Cochrane exist.
- The gathering of data on the effects of pumping from the Burr Unit on surface water resources is technically difficult, time consuming, and expensive.
- Determining the relationship between groundwater appropriations from the Burr Unit and natural-occurring climatic fluctuations and how these effects impact surface water resources in the area is not well understood or quantified.

Potential Impacts to Surface Water Resources of the Area.

- Pump tests have demonstrated that the Burr Unit is hydraulically connected to groundwater discharges at the fens.
- Multiple lines of evidence indicate that groundwater contributions or discharges from the Burr Unit to Lake Cochrane are likely.
- Pumping from the Burr Unit at the Burr Well Field reduces the potentiometric surface in the aquifer and would cause proportional reductions in discharges to fens and Lake Cochrane.
- The ecological integrity of a fen is sensitive to changes in groundwater flow.

Based on a systematic and objective evaluation of the environmental and economic issues related to the remaining alternatives, the Agency has concluded that the proposed action (to appropriate groundwater at 1,500 gpm/800 Mgy from the Burr Unit at the Burr Well Field) poses an unreasonable environmental risk to surface water resources in the area. Because of the uncertainty and potential for long-term environmental impacts on surface water resources in the area around the Burr Well Field, the Agency has concluded that pumping at the proposed appropriation rate under drought conditions is likely to cause significant adverse environmental impacts to these resources.

Conversely, in analyzing the information available, the Agency has concluded that through mitigation and a groundwater appropriation rate lower than the proposed action, adverse environmental effects could be avoided or minimized. Therefore, it could be feasible to continue using the Burr Well Field at certain appropriation rates without causing significant adverse environmental effects.

Attempting to establish an appropriation rate that could avoid or minimize adverse environment effects to the fens and Lake Cochrane is the major dilemma of the EIS. Because of limited baseline data and period of record, the only information that can be evaluated is data that has been collected since 1992. The entire time period since 1992 to the present has been dominated by a sustained period of relatively high precipitation. Therefore, these climatic conditions have prevented detailed observations of aquifer responses from pumping during a drought cycle or what effects current pumping has had on surface water resources. Because of this uncertainty and the reality of periodic and cyclic drought conditions, it is prudent to manage this aquifer system and withdrawals from it in a conservative manner.

Notwithstanding a lack of long-term data, taking into account current data sets and through consultations with state and federal agencies and experts in the field of hydrogeology, the Agency has concluded the following:

- There could be effects to Lake Cochrane from long-term pumping from the Burr Unit at the Burr Well Field. Based on data collected from the various pump tests and in consultation with experts in the field of hydrology and geology, it is the Agency' opinion that effects to Lake Cochrane from the continuation of pumping from wells screened in the Burr Unit at the Burr Well Field at the rate of 400-525 gpm would not have significant environmental impacts. That is not to say that Lake Cochrane could not be affected, but that in the range of 400 -525 gpm it is unlikely that any effects would have significant or catastrophic consequences. In addition, at these appropriation rates it would be extremely difficult to distinguish any impacts from reduced groundwater inputs into the lake from the biological effects of ongoing management practices or human influences at the lake.
- During all of the pump tests and production pumping for the last three years at current and maximum pumping rates of 400-525 gpm (1997 appropriations

from the Burr Unit equaled 274 million gallons for an average of 521 gallons per minute), the effects from pumping at the Burr Well Field at the fens, as represented by the Sioux Nation Fen, have been minor. At no time did the hydraulic head or water table elevations in the fens or potentiometric surface fall close to or below the surface elevations of the peat domes. Therefore, the Agency has concluded that as long as the hydraulic gradient remains above the surface elevation of the fen dome and the dome itself remains under saturated conditions it appears unlikely that appropriation rates between the range of 400 - 525 gpm will adversely affect the fens.

In order to avoid or minimize any adverse environmental effects to surface water resources, the Agency has developed mitigation measures it believes could be protective of surface water resources and at the same time support LPRW in its need to secure a reliable water supply for the northern portions of its service area. The mitigation measures listed below constitute the Agency's preferred alternative. It is estimated that if these mitigation measures are implemented, user rates for the overall system would increase approximately 21%. Although this rate increase is higher than the proposed action, LPRW concludes that its membership would be able to sustain this increase. The Agency believes that implementing the preferred alternative will help meet LPRW and its customers' long-term water supply needs, but yet be protective of the area's surface water resources.

The Agency's preferred alternative includes:

- Continue to maintain the Burr Well Field as a primary water source. The Agency supports reducing or limiting ground water appropriations at the Burr Well Field from **each** of the two aquifers -- the Burr Unit and Altamont aquifer -- to 400-525 gpm with a corresponding annual appropriation rate.
- Supplement existing wells at the Burr Well Field with a new well field in an area south-southeast of the current Burr Well Field. This new well field could utilize both the Burr Unit and Altamont aquifers in a configuration similar to that at the Burr Well Field. Water from the new wells could be transported to the Burr Water Treatment Plant for treatment and distribution to LPRW customers.
- The Agency recommends that the appropriation rates of the supplemental wells be similar to those permitted at the Burr Well Field or higher in the case of the Altamont aquifer. This configuration would give LPRW two well fields and enable it to continue utilizing the existing treatment capacity at the Burr Water Treatment Plant to meet the primary and secondary needs in the northern portion of its service area. This recommendation would likely "spread out" the effects or reductions in the potentiometric surface of the Burr Unit caused by production pumping, thus potentially avoiding or minimizing any adverse effects to surface water resources in the area.

- The Agency recommends that MNDNR establish, as part of its permitting requirements for LPRW, protocols and standard operating procedures for well field operations that are designed to minimize drawdowns in the potentiometric surface in the Burr Unit. These protocols could include regulating pumping rates and annual withdrawals for each well and aquifer.
- Formalize a water resource management plan that will continue to use existing monitoring points at ten locations and observation wells in the Burr Unit in Minnesota and South Dakota. This monitoring plan would enable LPRW and natural resource management agencies in both Minnesota and South Dakota to monitor and develop a long-term strategy for evaluating groundwater appropriations and their effects on surface water features in the area.

The Agency will condition approval on LPRW's application for financial assistance for the Northeast Phase Expansion and other associated costs on successful completion of the following terms. This approval is subject to LPRW's being able to obtain the appropriate water appropriation permit(s) from the MNDNR.

- Explore the development of a supplemental well field in the area south of the Burr Well Field determined by various geologic exploration efforts as containing aquifer materials that would be capable of supplying municipal quantities of water. The new well field should utilize both the Burr Unit and the Altamont aquifer providing for more reliance on the Altamont than it does at the Burr Well Field. Raw water from this well field should be transported to the existing Burr Water Treatment Plant to take advantage of the facility's existing water treatment capacity.
- LPRW shall formalize a water resource management plan with the MNDNR to establish monitoring procedures and protocols to evaluate the effects of pumping the Burr Unit on surface water resources in Minnesota. Included within this plan LPRW shall develop standard operating procedures to manage and implement groundwater appropriations from the Burr Unit at both the new well field and Burr Well Field to minimize drawdown of the potentiometric surface from production pumping.
- LPRW shall formalize an agreement with SDDENR to establish monitoring procedures and protocols to evaluate the effects of pumping the Burr Unit on surface water resources in South Dakota.

Provided these conditions are met and LPRW has formalized all the above with the appropriate regulatory authorities, the Agency is prepared to approve LPRW's application for construction of the Northeast Phase Expansion proposal subject to the availability of funding.

All direct construction related activities associated with the funding of the Northeast Phase Expansion by themselves will have no significant environmental impact. The environmental effects of constructing an elevated water storage tank near Minneota, booster stations near Minneota and Green Valley, and 170 miles of pipeline will be minimal consisting of temporary disturbances consistent with standard construction practices. All environmental impacts will be mitigated as is appropriate for these individual construction activities.

No historic or cultural resources or threatened and endangered species will be affected by the Northeast Phase Expansion action. Less than 2 acres of important farmland will be converted at the water storage and booster station sites. However, the majority of the land within the Northeast Phase Expansion area has been identified as important farmland, so the overall impact to this resource will be minimal.

The final issue explored in-depth in the EIS was whether providing higher quality potable water in areas where water quality has been historically poor would in and of itself promote an influx of new large-scale confined animal operations and/or the expansion of current operations. The study focussed on large-scale hog operations as they were the types of facilities most commonly brought out in scoping. The studied area included all of southwestern Minnesota south of the Minnesota River and the adjacent counties in South Dakota. The Agency's analyses indicated that the single most important factor in the siting of hog operations was the availability of land, and, second, was the proximity to a slaughterhouse. The supply of potable water appears to have no bearing on the expansion of large-scale hog farming.

For example, in counties such as Lincoln and Rock Counties, if availability of potable water was a significant factor in promoting an influx of large-scale hog operations, then as rural water became available it would be expected that the number of hog farms would have increased rather than declined as it did in these counties. While the number of farms did decline, it might also have been expected that there would have been no loss in total farm acreage and the average acreage per farm would have risen as farms consolidated into larger agri-business units. In addition, it would also be expected that the numbers of hogs and pigs would have risen sharply with continuous growth. None of this has occurred and, in fact, these and all counties in the study followed the same general trends that affected the entire pork industry nationwide.

These trends indicated that during the last 10-year period, the trend in 12 regional counties was that the hog and pig populations decreased during the first 5 years then increased for the second 5 years with the gains generally exceeding earlier losses. The trend of the decrease and then increase in the hog population in the study region mirrored the consumption of pork in the United States for the same period. It is interesting to note that the counties with the highest increases in hogs and pigs were Rock, Jackson, and Nobles Counties, the counties closest to the slaughtering facilities in Worthington, MN located in Nobles County. This fact does show that a more significant factor in the location of large-scale hog operations is the proximity to slaughterhouses. From these analyses the Agency concludes that 1) potable water

availability does not, therefore, appear to be a parameter that will by itself cause an increase in large-scale hog operations, and 2) continued expansion of LPRW will not cause an increase in the hog and/or pig population, nor an increase in hog and/or pig farms.

The Agency has concluded that the availability of potable water in the LPRW service area will have minimal effects on the socio-economic conditions in the study area, except for increasing the quality-of-life with regard to accessibility to a consistent, reliable source of good quality potable water and stabilizing the agricultural economy in the area by allowing farmers the option to diversify their operations should other market conditions warrant.