NOTICE OF INTENT TO MODIFY A PERMIT AUTHORIZING THE USE OF WATER FOR GENERAL CROP IRRIGATION IN MONONA COUNTY, IOWA

Notice is hereby given that pursuant to Iowa Code Chapter 455B, there is now on file with the Iowa Department of Natural Resources, Water Supply Engineering Section, 6200 Park Ave. Suite 200, Des Moines, IA 50321, an application as described below.

Joyce E. Bentley Revocable Trust, Iowa DNR Log Number 34,184, requests to modify an existing water use permit (No. 10433), to withdraw water from two Missouri River alluvial wells, one located in the SE ¼ of the SW ¼ of Section 23, in the maximum quantity of 98 acre-feet per year, at a maximum rate of 1000 gallons per minute; and one located in the W ½ of Section 25, in the maximum quantity of 120 acre-feet per year, at a maximum rate of 850 gallons per minute, at a maximum of 16 hours per day; both within T83N, R46W, Monona County, Iowa, during the period April 1 to September 30 of each year for irrigation of up to 250 acres of general farm crops on land generally described as all of Section 26, the S ½ of Section 23, the W ½ of Section 25, and the SW ¼ of the SW ¼ of Section 24, all within T83N, R46W, Monona County, Iowa.

The modification requests to increase the number of Missouri River alluvial aquifer wells from one well to two wells, increase the maximum annual water allocation from 98 acre-feet per year (AFY) to 218 AFY, and increasing the maximum water withdrawal rate from 1,000 gallons per minute (GPM) to 1,850 GPM.

The Department has determined that this use of water conforms to the relevant criteria (Iowa Code Chapter 455B and Iowa Administrative Code 567) and recommends the permit be granted. A copy of the summary report for the application is available upon request to the Department at the address listed above. Comments on the report and on this use of water must be received by February 13, 2026, and should be addressed “ATTN: Erik Day” and should specify the applicants log number (Log Number 34,184).

IOWA DEPARTMENT OF NATURAL RESOURCES
WATER USE PERMIT SUMMARY REPORT

Applicant: Joyce E Bentley Revocable Trust
Joyce Bentley
23014 Filbert Ave
Onawa, IA 51040

Application Log No.: 34,184

Permit Request
The Joyce E Bentley Revocable trust requests to modify their water use permit (10433) to increase the number of Missouri River alluvial aquifer (alluvial aquifer) wells approved for use in the permit by one well: from one to two wells; increase the maximum pumping rate by 850 gallons per minute (GPM), to 1,850 GPM; and to increase the annual water allocation from 98 acre-feet per year (AFY) to 218 AFY; all from one distinct source: the Missouri River alluvial aquifer (two wells).

The public land survey system (PLSS) location of the two alluvial aquifer wells are generally described as:

- The SE ¼ of the SW ¼ of T83N, R46W, S23
- The W ½ of T83N, R46W, S25 (proposed well)

All wells are located in Monona County, Iowa.

The alluvial aquifer cumulative maximum pumping rate is 1,850 GPM from two wells.

The total annual allocation from the alluvial aquifer is 218 AFY. Water in this permit is used for irrigation of approximately 250 acres of general crops from April 1 to September 30 of each year on said land.

Beneficial Use
Water use for the permit, including the additional well, is for irrigation of general crops. Iowa Code 455B.266 identifies irrigation of general crops as a priority beneficial use.

Source Details
Only the Missouri Valley alluvial aquifer, hereby referred to as aquifer, will be detailed in this summary report, because this is the only source of water for the permit.

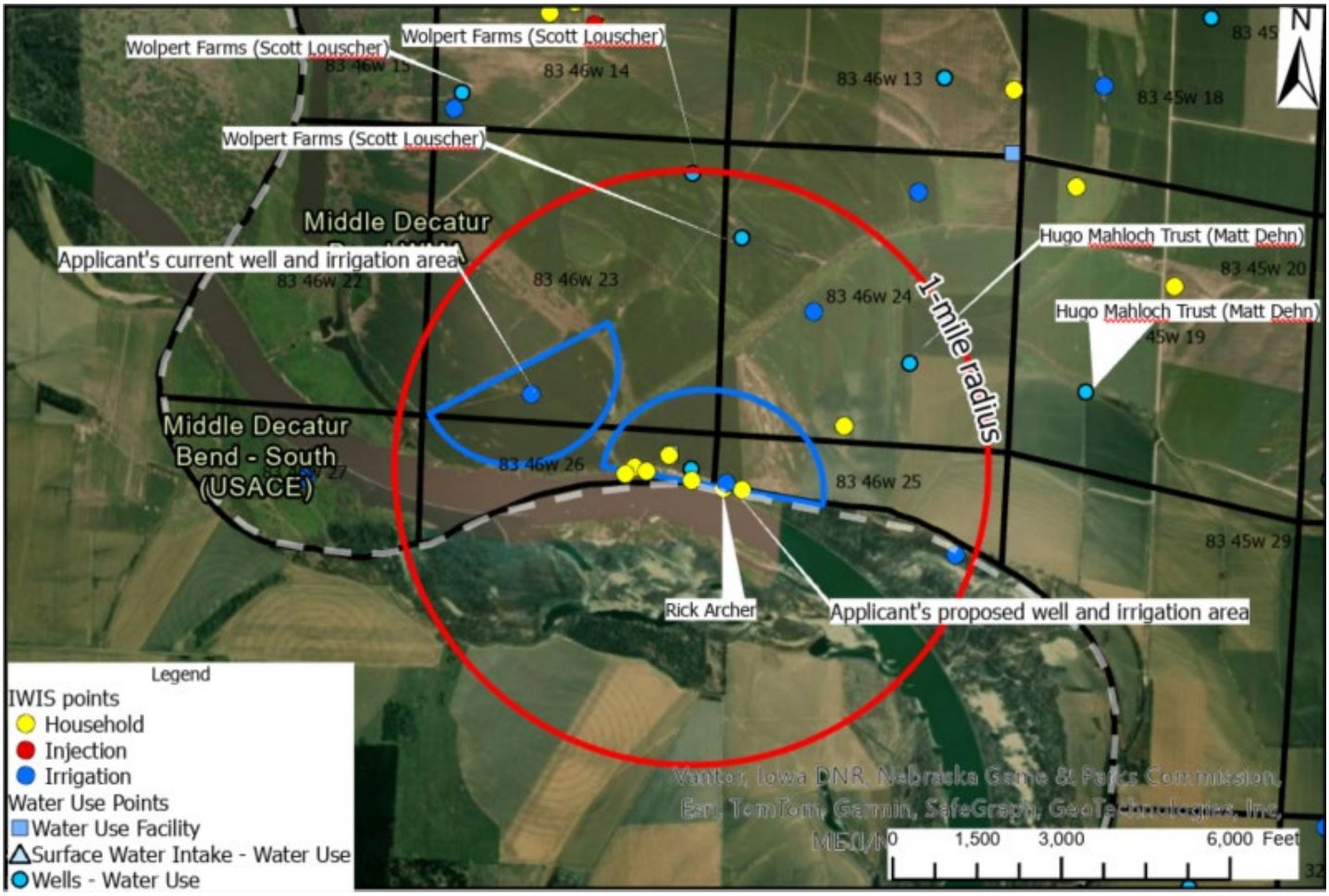
Based on available well records, the aquifer utilizes water stored in the pore space within sand and gravel that lies beneath approximately 15 feet of fine alluvial deposits of clay and silt, which overlies 85-100 feet of fine to course grained sand and gravel. Nearby irrigation and household wells utilizing the aquifer are generally between 89 and 110 feet deep. The aquifer is assumed to be unconfined. The aquifer is recharged by precipitation, baseflow, and by smaller streams feeding into the Missouri River. Driller's log from short pump tests performed during well construction indicate that pumping lowers the water level in the pumped wells by approximately 15% of the saturated thickness.

The aquifer at or near this location is not characterized by any reports, digital geospatial data, or publications known to the water use program. At the time of this report, the physical and chemical properties of the aquifer can only be estimated through compiling and summarizing area driller's logs.

Several driller's logs for wells utilizing the aquifer are available from the Iowa Geological Survey's Geological Sampling (GeoSam) database. GeoSam well number 33687 (Wolpert Farms), located approximately 4000 feet north of the applicant's proposed well, was drilled in 1989 for irrigation, at a depth of 100 feet. The drillers log indicates a static water level of 18 feet below ground surface (BGS) and a pumping water level of 35 ft BGS when pumping at 1500 gallons per minute (GPM) for one hour. GeoSam well number 64366 (Hugo Mahloch Trust), located approximately 4000 feet northeast, was drilled in 2007 at a depth of 106 feet BGS. The drillers log indicates a static water level of 15 feet below

ground surface (BGS) and a pumping water level of 30 ft BGS when pumping at 1000 gallons per minute (GPM) for one hour.

The nearest pump test data for the aquifer is from 2017 for a public water supply well (Thurman number 2) for the City of Thurman (GeoSam number 88886), located approximately 90 miles south. The pump test data indicated a transmissivity of 4320 square feet per day (ft^2/day) and a hydraulic conductivity of 57.5 feet per day (ft/day), indicating high water availability. However, this pump test had a maximum rate of 122 GPM, approximately 14 percent of the applicants proposed rate. It is likely that the alluvial aquifer properties at the applicant's location are similar.



Map 1. *Map of applicant's wells and nearby wells assumed to be screened in the Missouri Valley alluvial aquifer. Well data is derived from the Department's Iowa Well Information System (IWIS) database and Water Allocation Compliance Online Permitting (WACOP) database.*

Historic Water Use

The applicant's permit was approved in November 2022, and they have only irrigated for one season during the last three years, with a total use of 56.34 AFY reported in 2023. Their single source of water is the aquifer.

Nearby Wells and Potential Interference

There are two other permitted water users within a one-mile radius. Those permitted users have a total of five wells (Table 1) that utilize the aquifer, all for irrigation. There is one other irrigation well in the Iowa Well Information System (IWIS) database, but it is not a permitted use well. The nearest wells are all located approximately 4000 feet north (Wolpert Farms (Scott Louscher)), northeast (Hugo Hahloch (Matt Dehn)), and east (Rick Archer – not a permitted use

well). The five water use wells are allocated a combined total of 1630 AFY and a combined rate of 6900 GPM. The applicant's total proposed allocation is 218 AFY and 2400 GPM.

Table 1. Permitted use wells and private wells (non-permitted use) within 1 miles, including the Applicant's current well and proposed well, showing depths, annual allocation in acre-feet/year (AFY), and rate in gallons per minute (GPM).

Owner	Permit #	Status	Desc. Or Well #	Facility Type	Depth (ft)	Static Water Level (ft)	Pumping Water Level (ft)	Water Level Measurement Date	Annual Allocation and Rate
Hugo Mahloch H Trust (Matt Dehn)	4039	Active	Well #1	Irrigation Well	119	19	30	5/30/2024	585 AFY/2400 GPM
Hugo Mahloch H Trust (Matt Dehn)	4039	Active	Well #2	Irrigation Well	119	20	30	5/30/2024	
Wolpert Farms Partnership (Scott Louscher)	1756	Active	Aquifer	Irrigation Well	100	18	Not available	9/1/2022	1045 AFY/4500 GPM
Wolpert Farms Partnership (Scott Louscher)	1756	Active	Aquifer	Irrigation Well	100	17	Not available	9/1/2022	
Wolpert Farms Partnership (Scott Louscher)	1756	Active	Aquifer	Irrigation Well	100	19	Not available	9/1/2022	
Joyce Bentley Revocable Trust	10433	Active	Greeks	Irrigation Well	113	12.25	Not available	6/4/2024	218 AFY/2400 GPM
Joyce E Bentley Revocable Trust	65428	Proposed	2242772	Irrigation Well		Not available	Not available	Not available	
Tom Shook	None	Active Water Test	2157422	Household Well	100	Not available	Not available	Not available	Not applicable
Gilbert Hedges	None	Active Water Test	2203373	Household Well	100	Not available	Not available	Not available	Not applicable
Gilbert Hedges	16213	Active Logged	2098645	Household Well	105	17	25	3/26/2004	Not applicable
John Greuniesen	29041	Expired	2137768	Household Well		Not available	Not available	Not available	Not applicable
Rick Archer	26670	Active Completed	2130265	Irrigation Well	106	15	30	8/10/2007	Not available
Matt Sorenson	33299	Active Completed	2150602	Household Well	110	16	20	10/15/2010	Not applicable
Kenneth Burgess	45093	Active Completed	2183022	Household Well	80	16	17	7/10/2015	Not applicable
Rick Archer	45091	Active Completed	2183020	Household Well	85	18	19	7/10/2015	Not applicable
Tom Hill	55990	Active Completed	2215225	Household Well	80	10	10	5/10/2021	Not applicable

There are at least eight known drilled wells that are estimated to be using the same aquifer within a one-mile radius as the Applicant's proposed well (see map 1). These wells come from the IWIS database. The documented depth of these wells ranges from 80 to 110 feet depth, similar depths to the irrigation wells. The IWIS database only includes a small portion of wells drilled in Iowa. There are other households and buildings that could have wells screened in the same

aquifer. The mapped wells could be plugged or inactive. The nearest household well is approximately 250 feet south of the applicant's proposed well (IWIS well #2183020), and it is completed to a depth of 85 feet, with a static water level of 18 feet, and a pumping water level of 19 feet (at 10 gallons per minute for one hour) noted during construction in July 2015.

To estimate potential drawdown effect of the applicant's proposed use on nearby wells, the drawdown for the current well (Greeks) and the proposed well (Bernadine's) are analyzed.

Proposed Well (Bernadine's)
The nearest permitted use well is approximately 4,000 feet northeast (Hugo Mahloch Trust – Matt Dehn). Utilizing transmissivity and porosity values from the City of Thurman's well, (4320 ft^2/day) and (0.10), and assuming storativity is approximately equal to effective porosity, the calculated Theis estimates drawdown of less than 1/1000th of a foot from the applicant's proposed well (Bernadine's) for the nearest permitted use wells (Appendix A) when pumping 24 hours per day for consecutive days until the annual allocation is met. There is no anticipated interference with the nearest permitted use well.

The nearest household well is approximately 250 feet south, on Filbert Avenue (Rick Archer). The calculated Theis estimates drawdown of 12.70 feet, or approximately 19 percent of the total water column in the household well, and approximately 14 percent of the total saturated aquifer thickness (90 feet - Appendix A). There are at least six other household wells along Filbert Avenue. There is a potential for well interference with the nearest household well and other nearby household wells if the well is pumped continuously at the maximum rate until the maximum allocation is met (approximately 32 days) . This interference could have a negative effect on private well pump capacity, and could lead to water levels dropping below the pump setting.

In order to limit the effect of drawdown on the nearby wells, a Theis drawdown was revised to anticipate the drawdown if the applicant limited their pumping to 16 hours per day. The pump test from the City of Thurman showed complete recovery of static water levels within 30 minutes of turning the pump off, so if the applicant shut off their well for 8 hours each day, it is likely that the aquifer will fully recover to the static water level before the pump is turned on again. The calculated Theis estimates drawdown of 1.56 feet, or approximately 2 percent of the total water column, in the household well at 250 feet away when pumping for 16 hours. There is minimal anticipated well interference with the nearest household well when the pump is limited to 16 hours per day.

Existing Well (Greeks)
The Greeks well is approximately 5,200 feet away from the nearest permitted use well. The Greeks well utilizes the same maximum pumping rate (1,000 GPM), but a smaller total annual allocation (98 AFY). The calculated Theis estimates drawdown of less than 1/100th of a foot (Appendix A) when pumping 24 hours per day for consecutive days until the annual allocation is met. There is no anticipated interference with the the nearest permitted use well.

The nearest household well is approximately 2,150 feet southeast, on Filbert Avenue (John Greuniesen). The calculated Theis estimates drawdown of 0.04 feet (Appendix A) when pumping 24 hours per day for consecutive days until the annual allocation is met. There is no anticipated interference with the nearest household well.

Potential Interference Summary
The applicant's proposed use is not ancipated to have an effect on nearby permitted use wells. The applicant's proposed well could interfere with nearby household wells if it is pumped continuously until the maximum annual allocation is met. Due to the potential interference, the water use program stipulates that the applicant agrees to one of the following as a requirement for the permit application:

- The applicant must complete a minimum of a 24-hour pump test using the nearest household well as an observation well, or the nearest well available for observation, and submit the information to the water use program, or;

- The applicant agrees to pump the well at the maximum requested rate for a maximum of 16 hours per day

Aquifer Sustainability

The Alluvial aquifer appears to have steady water levels over the last 35 years based on static water levels in nearby constructed wells. GeoSam well number 33687, constructed in 1989 at a depth of 100 feet, had a static water level of 18 feet BGS, and a pumping water level of 35 feet BGS when pumped at 1000 GPM for an undocumented length of time. GeoSam well number 80638, constructed in 2015 at a depth of 80 feet, had a static water level of 16 feet BGS, and a pumping water level of 17 feet BGS, when pumped at 10 GPM for 1 hour. Wells constructed between those dates have similar static water levels. There are no sets of continuous water level measurements in any nearby wells for further analysis.

The applicants proposed use is not likely to have an impact on long-term water availability in the alluvial aquifer, with the exception of potential interference with nearby household wells during pumping for irrigation.

Findings

The applicant has demonstrated the ability and intent to use a reasonable quantity of water for beneficial purposes from the proposed well. The applicant has agreed to limit the pumping from the newly proposed well to a maximum of 16 hours a day in order to minimize well interference with nearby household wells. No evidence suggests the proposed use would:

- Waste water resources.
- Conflict with Iowa's comprehensive water resource plan.
- Interfere with pollution control laws.
- Directly harm public interests or property owners with prior or superior water use rights.

THEREFORE:

The requested water use conforms to Division III, Part 4, Chapter 455B of the Iowa Code and Chapter 50 of Part 567 of the Iowa Administrative Code. No adverse impacts are anticipated for nearby permitted use wells or nearby private wells. Subject to a public comment period, comments received, and modifications based on comments received, a permit shall be issued for a period of ten years.

Water Supply Engineering
Date: January 15, 2026

Appendix A.

Water-level drawdown produced by pumping withdrawal from an unconfined aquifer causes a reduction in the aquifer's saturated thickness and hence its transmissivity. A correction proposed by Jacob (Kruseman and de Ridder 1994) transforms drawdown measured in an unconfined aquifer to drawdown in an *equivalent nonleaky confined aquifer*:

$$s' = s - s^2/2b \quad (1)$$

where **s'** is drawdown in an equivalent nonleaky confined aquifer [L], **s** is drawdown in unconfined aquifer [L] and **b** is aquifer saturated thickness before pumping [L].

Drawdown in the equivalent nonleaky confined aquifer is computed with the Theis Equation (Theis 1935):

$$s' = \frac{Q}{4\pi T}\mathrm{w}(u) \quad (2)$$

$$\mathrm{w}(u) = -0.5772 - \ln(u) + u - \frac{u^2}{2 \cdot 2!} + \frac{u^3}{3 \cdot 3!} - \frac{u^4}{4 \cdot 4!} + \cdots \quad (3)$$

$$u = \frac{r^2 S}{4Tt} \quad (4)$$

where **Q** is pumping rate [L³/T], **r** is radial distance from pumping well to observation well [L], **S** is storativity in equivalent nonleaky confined aquifer [-], **T** is transmissivity in equivalent nonleaky confined aquifer [L²/T] and **t** is elapsed time since start of pumping [T].

After computing **s'** with (2), the following equation for **s** is found from (1) by means of the quadratic formula:

$$s = b - b\sqrt{1 - 2s'/b} \quad (5)$$

Drawdown from the applicant's proposed well (Bernadine's) to nearest water use well (4,000 feet away)
Given input:

Aquifer transmissivity (T): 4320 ft²/day
Aquifer storativity (S): 0.10
Radial distance from well (r): 4000.00 ft
Time since pumping began (t): 31.94 days
Constant pumping rate (Q): 163,625 cubic feet per day (cfd)
Saturated Thickness (b): 90 ft

Given output:

Calculator Results

Transmissivity, T [L²/T]
4320
Storativity, S [-]
.10
Radial Distance, r [L]
4000
Time, t [T]
.67
Pumping Rate, Q [L³/T]
163625
Saturated Thickness, b [L]
90
u (= r²S/4Tt) [-]
138.197899391929
w(u) [-]
0.0000
Confined Drawdown, s' [L]
0.0000
Unconfined Drawdown, s [L]
0.0000

Drawdown from the applicant's proposed well (Bernadine's) to nearest household well (250 feet away)

Given input: **pumping 24 hrs per day until max allocation is met (conservative)**
Aquifer transmissivity (T): 4,320 ft²/day
Aquifer storativity (S): 0.10
Radial distance from well (r): 250.00 ft
Time since pumping began (t): 31.94 days
Constant pumping rate (Q): 163,625 cubic feet per day (cfd)
Saturated Thickness (b): 90 ft

Given output:

Calculator Results

Transmissivity, T [L²/T]
4320
Storativity, S [-]
.10
Radial Distance, r [L]
250
Time, t [T]
31.94
Pumping Rate, Q [L³/T]
163625
Saturated Thickness, b [L]
90
u (= r²S/4Tt) [-]
1.13240392866254E-02
w(u) [-]
3.9149
Confined Drawdown, s' [L]
11.7999
Unconfined Drawdown, s [L]
12.6953

Given input: **pumping 12 hrs per day (realistic)**
Aquifer transmissivity (T): 4,320 ft²/day
Aquifer storativity (S): 0.10
Radial distance from well (r): 250.00 ft
Time since pumping began (t): 0.67 days (16 hours)
Constant pumping rate (Q): 163,625 cubic feet per day (cfd)
Saturated Thickness (b): 90 ft

Given Output:

Calculator Results

Transmissivity, T [L²/T]
4320
Storativity, S [-]
.10
Radial Distance, r [L]
250
Time, t [T]
.67
Pumping Rate, Q [L³/T]
163625
Saturated Thickness, b [L]
90
u (= r²S/4Tt) [-]
0.539835544499724
w(u) [-]
0.5142
Confined Drawdown, s' [L]
1.5498
Unconfined Drawdown, s [L]
1.5634

Drawdown from the applicant's existing well (Greeks) to nearest household well (2,150 feet away)
Given input:
Aquifer transmissivity (T): 4320 ft²/day

Aquifer storativity (S): 0.10
Radial distance from well (r): 2150.00 ft
Time since pumping began (t): 22.17 days
Constant pumping rate (Q): 192,513 cubic feet per day (cfd)
Saturated Thickness (b): 90 ft

Given output:

Calculator Results

Transmissivity, T [L²/T]
4320
Storativity, S [-]
.10
Radial Distance, r [L]
2150
Time, t [T]
22.17
Pumping Rate, Q [L³/T]
163625
Saturated Thickness, b [L]
90
u (= r²S/4Tt) [-]
1.20661157887703
w(u) [-]
0.1568
Confined Drawdown, s' [L]
0.4725
Unconfined Drawdown, s [L]
0.4737

Source: http://www.aqtesolv.com/calculators/theis-equation-unconfined.asp

IOWA DEPARTMENT OF NATURAL RESOURCES

WATER USE PERMIT

Permit issued to:

Joyce E Bentley Revocable Trust
Joyce Bentley
23014 Filbert Ave
Onawa, IA 51040

Permit Number: 10433-M1

Effective: xxxx

Expires: xxxx

The Permittee is authorized to:

withdraw water from two Missouri River alluvial wells, one located in the SE ¼ of the SW ¼ of Section 23, in the maximum quantity of 98 acre-feet per year, at a maximum rate of 1000 gallons per minute; and one located in the W ½ of Section 25, in the maximum quantity of 120 acre-feet per year, at a maximum rate of 850 gallons per minute, at a maximum of 16 hours per day; both within T83N, R46W, Monona County, Iowa, during the period April 1 to September 30 of each year for irrigation of up to 250 acres of general farm crops on land generally described as all of Section 26, the S ½ of Section 23, the W ½ of Section 25, and the SW ¼ of the SW ¼ of Section 24, all within T83N, R46W, Monona County, Iowa.

This authorization to withdraw water has been granted pursuant to the provisions of Part 4 of Division III of Chapter 455B, Code of Iowa, and Chapter 50, Part 567, Iowa Administrative Code, and is further subject to the general permit conditions within this permit.

Conditions of this permit may be appealed as provided in rule 567--50.8(3), Iowa Administrative Code. Appeal must be in writing and must be received at the Iowa Department of Natural Resources, Water Supply Engineering Section, 6200 Park Ave. Suite 200, Des Moines, Iowa 50321-1371 within thirty days of the date of the certification of the mailing of the permit.

FOR THE DIRECTOR:

By: _____ Date Executed: _____

cc: Permit File

CERTIFICATE OF MAILING

On the date shown below, a copy of the foregoing permit was mailed to the Permittee and to each person entitled to receive a copy as provided by rule 567--50.8(2), Iowa Administrative Code.

Certified by (initials): _____ Date: _____

GENERAL PERMIT CONDITIONS

1. Permittee shall maintain accurate and up-to-date records of monthly water use from each authorized source and submit them annually to the Department.

2. Permittee may be required to submit other information related to the regulation of this use of water as directed by the Department.

3. This Permit is issued pursuant to Iowa Code chapter 455B.265(1) to authorize the withdrawal and use of water by the permittee, subject to the terms contained herein and to the laws and rules of the Department that regulate the withdrawal and use of water. Issuance of this permit does not relieve the permittee of the responsibility to comply with applicable local, state and federal laws, ordinances, regulations or other legal requirements.

4. Permittee shall be responsible for notifying the Department when there are changes to any conditions and authorizations given in this permit, including additional water source(s), well(s), intake(s), an expansion of the facility, or any other listed condition.

5. Permittee shall construct, maintain, and monitor observation wells as directed by the Department to define the effects of Permittee's water withdrawals on groundwater resources or on other water users who might be affected by the withdrawals authorized herein.

6. Each well authorized as a source of water in this permit must be constructed to allow for accurate measurement of water levels.

7. Withdrawals from permitted wells may be made only after the Permittee has made the following information available to the Department: well location(s), well log(s), and results of yield tests. Required chip samples shall be submitted to the Iowa Geological Survey.

8. Prior to April 1 each year, the Permittee shall be responsible for accurately measuring the distance to water (static water level) in the permitted well(s). These records shall be submitted annually to the Department.

9. Permittee shall not apply fertilizers, pesticides or other materials through any irrigation system unless the system is equipped with an automatic check valve or comparable device, to prevent such materials from entering the source of irrigation water. Permittee shall conduct frequent inspections for the proper functioning of the check valve to prevent back siphoning of contaminants into the water source as required in Chapter 50.9(1)"e" of Part 567, Iowa Administrative Code.

10. Irrigation shall not be allowed on those areas with slopes greater than six (6) percent until a soil-conservation plan is prepared with the assistance of the Natural Resource Conservation Service. The plan shall be accompanied by the applicant's written statement, explaining how the plan and the operation of the irrigation system are compatible. After its submission, irrigation under this permit is contingent upon Permittee's compliance with the soil conservation plan.

11. Permittee must apply to renew this water use permit using the appropriate DNR form prior to the expiration date of the current permit version.

12. Permittee shall submit to the Department within 90 days of being notified by the Department or no later than the expiration date of this permit, whichever first occurs, a plan for implementing routine day-to-day water conservation measures and for implementing emergency water conservation measures during periods of water shortage. Until such a plan has been submitted to and approved by the Department, Permittee shall implement

those emergency water conservation measures determined to be necessary by the Department pursuant to Iowa Code Sections 455B.265 and 455B.266.

13. This permit supersedes Water Use Permit No. 10433.

CAVEAT

Permittee is advised that pursuant to Section 455B.271, Code of Iowa, the authority to withdraw water provided by this permit may be modified, canceled or suspended in case of any breach of the terms or conditions herein, in case of any violation of state law pertaining to the permit, or if found necessary to prevent substantial injury to private or public interests.