

VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date: June 18, 2003
2. Review Engineer: James A. Hallmark
3. Date Received: April 25, 2003
4. Facility Name: City of Walford STP
5. County Number: Benton (06)
6. Program Area: CP (Wastewater Construction)
7. Facility Type: C05 (Biological Treatment)
8. Subject Area: 320
9. Rule Reference: 567-64.2(9)a
10. Design Std Ref: 17.3.5.3
11. Consulting Engr: Hart-Frederick Consultants
12. Variance Rule: 567-64.2(9)c

13. Decision: *Approved*
Date: *6/25/03*

14. Appeal:
Date:

15. Description of Variance Request: The City of Walford is abandoning their existing 3 cell aerated lagoon treatment facility and constructing a new mechanical wastewater treatment facility. The city will convert one of the aeration cells into a sludge holding lagoon and has requested a variance to reduce the aeration requirements for mixing as required by IA 17.3.5.3.

16. Consulting Engineer's Justifications

- Aeration rate of approximately 1.24 cfm per 1,000 cubic feet will be achieved.
- The sludge should be well stabilized to reduce the odor.
- The entire volume of the sludge holding tank will not be utilized at plant start up. It is reasonable not to provide the required aeration rate until such time that is deemed necessary by the design engineer.
- Providing the required 20 cfm/1,000 cubic feet will increase the cost of the project by \$100,000.

17. Department's Justifications

- A condition on the construction permit will require that the mixing and aeration equipment will be installed if odors become a nuisance in the future.
- Solids will be stabilized prior to being placed in the lagoon.

18. Precedents Used

City of Sully, City of Maquoketa, City of Ames, City of Evansdale

19. Staff Reviewer: *[Signature]*

Date: *6/18/03*

20. Supervisor: *[Signature]*

Date: *6/25/03*

21. Authorized by: *[Signature]*

Date: *6/25/03*



April 25, 2003

Mr. Jim Hallmark
Iowa Department of Natural Resources
900 E. Grand Avenue
Henry A. Wallace Building
Des Moines, Iowa 50319

Re: Variance Application for Sludge Lagoon Aeration
Wastewater Treatment Project
Walford, Iowa

2003 APR 29 A 11:56
DEPT. OF
NATURAL RESOURCES

Dear Mr. Hallmark:

The intent of this letter is to submit pertinent information for your review and approval regarding the above referenced project.

As per our discussion in the previous letters and e-mails, it is the City's desire to modify the existing lagoon cell #3 for sludge holding. The proposed sludge lagoon volume will be approximately 1.0 million gallons, or 2.3 years sludge holding time at the plant design capacity (See attached revised site layout). Four 24" stainless steel coarse bubble diffusers will be installed in the proposed sludge lagoon. At the maximum aeration capacity of approximately 40 cfm per diffuser, an aeration rate of approximately 1.24 cfm per 1,000 cubic feet will be achieved, in lieu of the required "20 cfm per 1,000 cubic feet" IDNR Design Standards Chapter 17.3.5.3. The following is respectfully submitted as criteria/justification for the variance application of this installation.

1. The proposed aerobic digester will provide digester sludge age of 38 days at design loading and maximum MLSS concentration of 1.5%. Since the current BOD loading is only 37% of the design BOD loading, the digester sludge age will be 103 days at current plant flow. Assuming higher solid concentration would be achieved at a longer detention time, if 2.5% solids concentration can be achieved, then the two digesters will allow for 180 days sludge holding time. This will provide enough sludge storage volume for land application twice a year. In this case the sludge lagoon will be only used as backup sludge holding at the initial plant operation stage.
2. If the plant is to be designed to meet the 20cfm per 1,000 cubic feet aeration rate required by IDNR Design Standards, the 1 million gallon lagoon will need 2,674 cfm of air supply. At 8.0ft of water depth and 7.25 ft above the diffusers, this will require approximately two 60HP blowers with one for operation and one for redundancy.

Since the sludge lagoon capacity will not be fully utilized in the near future, it is reasonable not to provide the required aeration rate until such time that it is deemed necessary by the design engineer.

3. The design sludge age for the aerobic sludge digester should reduce approximately 40% of mixed liquor volatile suspended solids and provide adequate sludge stabilization to reduce the odor. Instead of providing 20cfm per 1,000 cubic feet aeration rate for complete mixing aerated lagoon operation, the sludge lagoon will operated as a facultative pond, the surface reaeration on the lagoon top layer will form an aerobic layer. This aerobic layer, or supernatant layer will serve to reduce the odor. The proposed four diffusers will provide minimum mixing requirement.
4. As we stated in the previous letter to IDNR on October 4, 2002, the sludge lagoon option will reduce the project cost estimated at \$190,000. However, if the 20cfm per 1,000 cubic feet aeration rate cannot be waived, the City have to spend approximately \$100,000 on the blowers, diffusers and additional housing for the equipment.

Based on the above information, it is the Engineer's recommendation and justification that a variance to be granted to waive the aeration rate requirement. If you should have any questions, please contact office.

Sincerely,



Michael W. Hart, P.E.

HART-FREDERICK CONSULTANTS P.C.

cc: City of Walford
HFC file



STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

June 18, 2003

Mayor Randy Bauer
City of Walford
120 5th Street N
P.O. Box 148
Walford, Iowa 52351

Subject: Variance Request from IA 17.3.5.3
Walford, Iowa
Wastewater Treatment Improvements
CS192223-01

Honorable Mayor Bauer:

The Iowa Department of Natural Resources in accordance with Subrule 567—64.2(9)c of the Iowa Administrative Code has approved your April 25, 2003 request for a variance from the Department Rule 567—64.2(9)b and Chapter 17.3.5.3 of the Iowa Wastewater Facilities Design Standards, which requires a minimum aeration rate for mixing of 20 cubic feet per minute (cfm) per 1,000 cubic feet of volume for sludge holding lagoons. Based on the documentation presented by the design engineer, it is the determination of this Department that satisfactory justification has been presented to warrant the granting of a variance to the City of Walford for reducing the aeration rate required for mixing to approximately 1.24 cfm per 1,000 cubic feet. However, in the future if the Department determines that the proposed facility is causing any odor or other operational problems due to the absence of aeration and mixing, the City shall obtain a construction permit and install aeration equipment as required by paragraph 17.3.5.3 of the Iowa Wastewater Facilities Design Standards within 18 months of written notification.

This decision is based on our review of justification presented to support the request and our concurrence that the resulting project will provide substantially equivalent effectiveness as would be provided by technical compliance with the design standard on this issue.

If you have any questions, please call Jim Hallmark at 515-281-7767.

Sincerely,

A handwritten signature in black ink, appearing to read "Jack Riessen", followed by a horizontal line.

Jack Riessen, P.E., Chief
Water Quality Bureau

cc: Hart-Frederick
Field Office #1
DNR File