

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

DEPARTMENT OF NATURAL RESOURCES  
JEFFREY R. VONK, DIRECTOR

September 18, 2006

The Honorable James Saylor, Mayor  
City of Sheffield  
P.O. Box 252  
313 E. Gilman  
Sheffield, Iowa 50475

Subject: **Variance Request from IA 14.5.2.3**  
Sheffield, Iowa  
Wastewater Treatment Facility (WWTF) Improvements  
Project No.: S2005-0280  
Loan No.: CS192298-01

Honorable Mayor Saylor:

The Iowa Department of Natural Resources in accordance with Subrule 567—64.2(9)c of the Iowa Administrative Code has approved your September 8, 2006 request for a variance from the Department Rule 567—64.2(9)b and Chapter 14.5.2.3 of the Iowa Wastewater Facilities Design Standards, which requires that aeration basins be constructed so that “a sufficient number of units of a size such that, with the largest unit out of service, the remaining units shall have a design load capacity of at least 50% of the total design loading to that unit operation.” 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 Sheffield.

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,



Wayne Farrand, P.E.  
Supervisor  
Wastewater Section

cc: WHKS, & Co.  
Field Office #2  
DNR SRF File

# VARIANCE REQUEST

## Iowa Department of Natural Resources

- |                      |                              |               |  |
|----------------------|------------------------------|---------------|--|
| 1. Date:             | September 18, 2006           | 13. Decision: |  |
| 2. Review Engineer:  | James A. Hallmark            | Date:         |  |
| 3. Date Received:    | September 13, 2006           |               |  |
| 4. Facility Name:    | City of Sheffield STP        | 14. Appeal:   |  |
| 5. County Number:    | Franklin (35)                | Date:         |  |
| 6. Program Area:     | CP (Wastewater Construction) |               |  |
| 7. Facility Type :   |                              |               |  |
| 8. Subject Area :    |                              |               |  |
| 9. Rule Reference:   | 567-64.2(9)a                 |               |  |
| 10. Design Stds Ref: | 14.5.2.3                     |               |  |
| 11. Consulting Engr: | WHKS & Co.                   |               |  |
| 12. Variance Rule:   | 567-64.2(9)c                 |               |  |

15. Description of Variance Request: The City of Sheffield is proposing improvements to their lagoon system. Improvements include constructing an earthen berm to divide one lagoon cell into two cells, providing an insulated cover over a portion of the divided cell and adding aeration equipment. The City is requesting that they be granted a variance from the 50% redundancy requirement for aeration basins. They are of the opinion that what they are providing is substantially equivalent.

### 16. Consulting Engineer's Justifications

1. There is a wide variation in flows between dry weather and wet weather conditions due to significant amounts of I/I. The approximate ratio of AWW to ADW is 5.1. Ratios for other facilities generally range from 2.0 to 3.0.
2. The proposed design includes a large settling cell with approximately 23 days of HRT at design flows. The size of this cell provides flexibility for the WWRF and additional retention time for increased BOD and ammonia removal.
3. The operating depth of the lagoon will be five feet. The operating depth can be increased to 6 feet while still maintaining a minimum of 2 feet of freeboard. In the event that the complete mix cell is taken out of service the operating depths of the remaining cells can be raised. This would result in approximately 7 days of additional storage. (excluding the CM cell).
4. Cells No. 2 and 3 would meet the design requirements for a conventional aerated lagoon with respect to aeration capacity and detention time if Cell No. 1 (the CM cell) were taken out of service for repair. Oxygen demands for BOD and ammonia removal is approximately 1,034 scfm, Cell two alone provides 1,116 scfm of air.
5. The proposed aeration system for Cell No. 1 is provided with redundancy, in the form of 3 blowers with a total of 150% of design capacity and individual air laterals with valves for isolation. The proposed design allows for retrievable diffusers and surface mixers to facilitate normal maintenance procedure without the need to lower the water level or take the cell out of service.
6. Current operating procedures have reduced the existing systems' treatment efficiency by cutting the lagoon's retention time by more than 50%. The lagoons have been operated at a depth of 2 feet. As a result of the reduced efficiency higher ammonia limits are observed in the effluent and most of these are



within 1-2 milligrams of effluent limits. Operating the facility at a depth of five feet could have eliminated these violations.

7. By granting a variance the City would experience a significant reduction in construction costs. The opinion of probable additional cost for including redundancy of Cell No. 1A is approximately \$202,000..

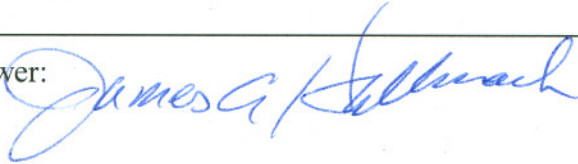
17. Department's Justifications

- Concurrence with the City's/ Engineers justification. However, item 6 is not proven it is just opinion.

18. Precedents Used

NONE

19. Staff Reviewer:



Date:

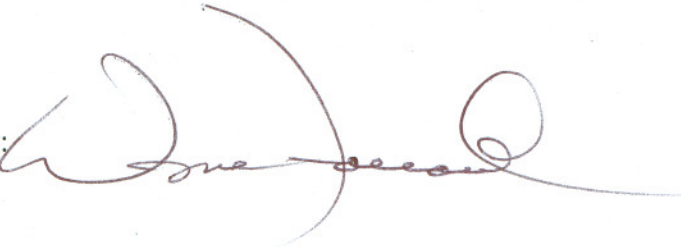
9/18/06

Date:

Date:

20. Supervisor:

21. Authorized by:



9/18/06