

✓ 9-8-06

17.3.4.3

## VARIANCE REQUEST

### Iowa Department of Natural Resources

1. Date: April 16, 2003  
 2. Review Engineer: Larry Bryant  
 3. Date Received: April 7, 2003  
 4. Facility Name: City of Jefferson  
 5. County Number: 37 (Greene)  
 6. Program Area: CP (Wastewater Construction)  
 7. Facility Type: C09 (Sludge Handling)  
 8. Subject Area: 366 (Sludge Holding Tank – Aeration & Mixing)  
 9. Rule Reference: 567-64.2(9)a  
 10. Design Stds Ref: 17.3.4.3 (Mixing and Air Requirements)  
 11. Consulting Engr: FOX Engineering Associates, Inc.  
 12. Variance Rule: 567-64.2(9)c

13. Decision: *Approved*  
 Date: *4/16/03*

14. Appeal:  
 Date:

#### 15. Description of Variance Request:

Design Standard 17.3.4.3 (Mixing and Air Requirements) requires that sludge holding tanks be designed for mixing by diffused air or mechanical aeration systems. For mechanical aeration systems, a minimum of 1.0 horsepower per 1,000 ft<sup>3</sup> of tank volume is required. In addition, the use of mechanical equipment is discouraged when freezing temperatures are normally expected.

The City of Jefferson is proposing to increase the capacity of an existing sludge storage tank (the existing tank has a circular center structure that will be removed) and replace the existing jet aeration mixing equipment with a new floating mechanical mixer that will provide approximately ½ horsepower per 1,000 ft<sup>3</sup> of tank volume.

#### 16. Consulting Engineer's Justifications

"The reason for this request is that in our experience, most sludge storage tanks in Iowa do not include additional aeration after adequate digestion and generally do not have any problems. We do not feel that the aeration is necessary, given the aerobic treatment that will precede it."

#### 17. Department's Justifications

##### **Recommend variance approval (with conditions):**

The purpose of 17.3.4.3 is to assure adequate mixing and oxygen transfer so that a uniform solids concentration and aerobic conditions are maintained in the storage tank, thereby allowing withdrawal of a uniform sludge and minimizing nuisance odor problems due to potential anaerobic conditions.

Minimum required dissolved oxygen levels for stabilized sludge in storage basins are significantly less than that required for aerobic digesters. In addition, precedents for similar approved variances do indicate that a rational approach for storage mixing requirements has been successful on previous projects. However, the proposed storage tank will be uncovered and surrounding residences and a City park are present within less than 1,000 feet of the structure (although minimum separation distances required by 567 IAC 64.2(3)a will be met since this is an existing structure). Therefore, approval is recommended with the following condition:

- The City shall obtain a construction permit and install aeration equipment meeting the requirements of IA 17.3.4.3 and/or a tank cover within 18 months of written notification if the Department determines that the proposed storage tank is causing any odor or other operational problems due to the design variance.

#### 18. Precedents Used

Clear Lake S.D. – Approved 7/10/96  
 Osage – Approved 12/18/98  
 Tama – Approved 4/6/93

Fort Madison – Approved 5/10/00  
 Nora Springs – Approved 4/2/99  
 Newton – Approved 4/2/02

Winterset – Approved 8/7/92  
 Cherokee – Approved 1/12/99  
 Corning – Approved 8/26/02

19. Staff Reviewer:

*[Signature]*

Date: 4/16/03

20. Supervisor:

*[Signature]*

Date: 4/16/03

21. Authorized by:

*[Signature]*

Date: 4/16/03