

✓ 9-11-06

VARIANCE REQUEST

Iowa Department of Natural Resources

- 1. Date: April 4, 1996
- 2. Review Engineer: Bill Graham
- 3. Date Received: April 2, 1996
- 4. Facility Name: Sully WWTF
- 5. County Number: 50, Jasper
- 6. Program Area: CP (wastewater)
- 7. Facility Type : C05
- 8. Subject Area : 374
- 9. Rule Reference: 567-64.2(9)a
- 10. Design Stds Ref: 18B.5.1, Return Sludge Rate, ext. aer.
- 11. Consulting Engr: Shive-Hattery Engrs., Iowa city, Iowa
- 12. Variance Rule: 567-64.2(9)c

13. Decision: *Approved*
 Date: *4/10/96*

14. Appeal:
 Date:

15. Description of Variance Request:

The city has proposed using a proprietary activated sludge extended aeration treatment system called Biolac to meet permit ammonia limits. Design Standard 18B.5.1 requires that extended aeration return sludge rate be variable from 50 to 150 % of AWW design flow. The Biolac system proposed will have a return sludge rate of 50% of AWW flow. Because the Sully facility has 2 large equalization basins, flows to the plant never exceed 0.675 MGD, i.e., AWW, MWW, and PHWW plant flows are the same and there are no peaking flows above the AWW flow. There are no existing Biolac systems in Iowa.

16. Consulting Engineer's Justifications

Parkson Corporation, makers of Biolac systems, says that their standard design uses average annual flow as a design flow rather than AWW flow as required by the design standards and that this has worked on 150 installations in the US. Their technical argument centers on clarifier detention time. They argue that the hydraulic detention time decreases as the return sludge pumping rate is increased and that this decreased hydraulic detention time affects sludge settling negatively.

17. Department's Justifications

Recommend approval based on reasons other than those provided by Parkson. Parkson's claim that their approach has worked at 150 US installations is unsubstantiated and anecdotal. The data provided on three facilities, two in Indiana and one in Arkansas, is incomplete and design conditions do not appear to be similar to those in Sully. Parkson's argument about hydraulic detention time is based on a misunderstanding of return sludge flow, taking water from the bottom of a tank and putting it back in the top of the tank has no affect on hydraulic detention time. Hydraulic detention time is a function of plant flow only and is not influenced by RAS pumping. What is important to clarifier settling is the overflow rate based on peak hour plant flow, clarifier depth, and solids flux. Solids flux is controlled by MLSS concentration. MLSS concentration is controlled by RAS pumping rate.

