

VARIANCE REQUEST
Iowa Department of Natural Resources

1. Date: October 15, 2002	13. Decision: <u>Approved</u>
2. Review Engineer: Larry Bryant	Date: <u>10/22/02</u>
3. Date Received: August 6, 2002	
4. Facility Name: City of Eagle Grove	14. Appeal:
5. County Number: 99 (Wright)	Date:
6. Program Area: CP (Wastewater Construction)	
7. Facility Type: C05 (Biological Treatment)	
8. Subject Area: 321 (Reliability)	
9. Rule Reference: 567-64.2(9)a	
10. Design Stds Ref: 14.5.2.3.4 (Final Clarifier Duplication)	
11. Consulting Engr: Kuehl & Payer Ltd.	
12. Variance Rule: 567-64.2(9)c	

15. Description of Variance Request:

There are two existing final clarifiers at the Eagle Grove WWTP. Upgrades are proposed including a new final clarifier. However, the proposed configuration would not meet the 75% reliability requirement of the Iowa Design Standards. A variance from IA 14.5.2.3.4 is requested to allow 70% reliability in lieu of the 75% reliability required the Design Standards. The receiving stream is the Boone River – Class B(LR). The facility is Reliability Class II and the Design Standards require Unit Process Reliability Criteria C.

16. Consulting Engineer's Justifications

To meet the 75% reliability requirement a 4th final clarifier would be necessary. There is not room at the plant site for a fourth clarifier. Operation of four final clarifiers would be cumbersome. The existing clarifiers will provide only 5 less reliability than that required by the Design Standards.

17. Department's Justifications

Recommend variance approval:

The engineer's argument of increased operational complexity with a 4th final clarifier does not justify a variance from the design standards. It is true, however, that there is currently no room available for placement of a 4th clarifier in the vicinity of the existing clarifiers. To add a 4th final clarifier, the City would need to locate the new units a significant distance from the existing final clarifiers with an associated increase in cost for land purchase and influent piping.

Equalization capacity at the plant is available and will be expanded as part of the second phase of improvements. It will be primarily dedicated to storage of wet-weather flows but could be made available for diversion of wastewater during a scheduled maintenance period if one of the clarifiers needs to be taken off-line. The current total storage available is approximately 5.6 days if flows to the final clarifiers are limited to 1,200 gpd/sq. ft. with the proposed 3rd clarifier off-line at the AWW design flow.

I have plotted 30-day values for clarifier loading vs. effluent TSS for data since January 1987. The existing final clarifiers have at times approached or exceeded the maximum peak hourly loading rate of 1,200 gpd/sq. ft. allowed by the Design Standards for 30 days or more and 15 average effluent TSS violations have occurred during the 186-month time period analyzed. However, no good correlation between the clarifier loading rate and effluent TSS was found (see attached graph). This may indicate that previous effluent TSS violations (and high TSS values in general) for this facility are more strongly linked to inadequate sludge storage (a need for additional sludge storage has been identified and is included as part of the proposed improvements) and/or operational factors other than the final clarifier loading rate.

Based on the above, approval is recommended on the basis that the proposed configuration will provide equivalent effectiveness while significantly reducing cost.

18. Precedents Used

Osage – Approved 7/2/98 → 50% reliability in lieu of 75% for two new final clarifiers. Rock excavation was required for construction of the clarifiers. A polishing pond was available following the final clarifiers. Stamford baffles were also included in the design of the new clarifiers.

Iowa Falls – Denied 10/2/95 → It was proposed to use two existing final clarifiers in the upgrading of the WWTP. The smaller of the two final clarifiers would only provide 36.6% reliability.

19. Staff Reviewer:

Date: 10/15/02

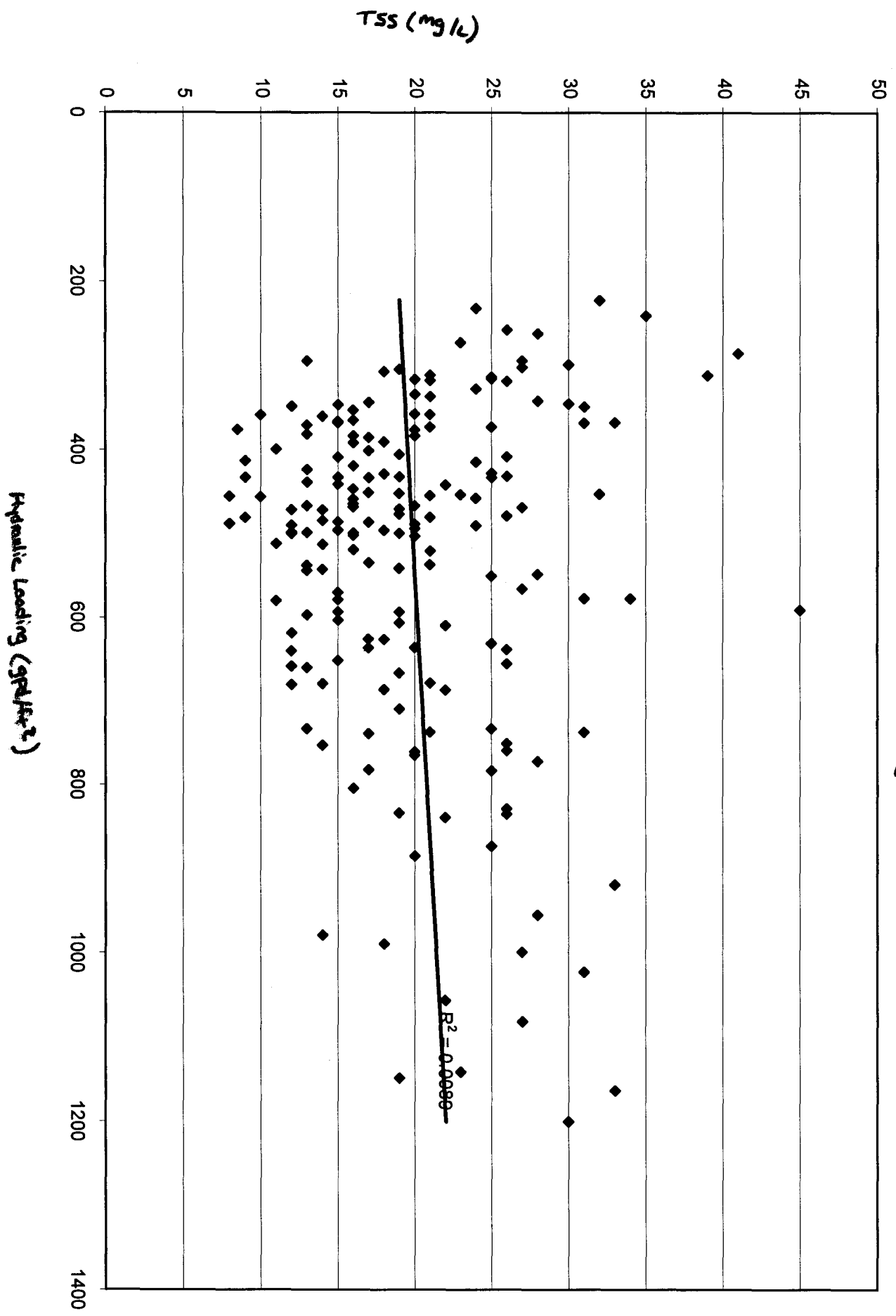
20. Supervisor:

Date: 10/15/02

21. Authorized by:

Date: 10/22/02

Jan 87-Aug 02 Effluent TSS
vs. Final Clarifier Loading



The 0.576 MGD value still seems reasonable to us based on the past three (3) years. We would agree to raising the design population to 3,800 as you suggest but leaving the combined industrial/commercial contribution at 0.200 MGD. The ADWF will then become:

Domestic – 3,800 @ 100 gpcd =	0.380 MGD
Industrial/Commercial -	0.200 MGD
ADWF	0.580 MGD

2. The City of Eagle Grove has discussed alternatives for reducing I/I in their system. They have contacted consultants regarding comprehensive proposals to conduct I/I investigations and will be making a decision on pursuing this later this year. As a minimum, Eagle Grove intends to continue looking for and fixing I/I sources as a part of routine maintenance. With this effort, the I/I problem will not increase and should, at a minimum offset any growth that does take place.
3. The PHWW flow will be influenced by the amount of I/I that can be removed from the system in the same manner as the AWW and the MWW flow factors. The City can now handle (on a firm pumping basis) 2.42 MGD through the main pumping station and 3.168 MGD through the bypass pumping station or 5.62 MGD. Since hourly flows are not recorded, it is unknown if this much has ever passed through the plant. However, the operator does report that two (2) raw waste and one (1) bypass pump have pumped together many times which would total the 5.62 MGD. We would suggest 5.62 MGD as the PHWWF, at least for Phase 1. If a 5.71 MGD PHWWF is necessary, raw waste pumps can be upgraded in Phase 2. In our opinion, it won't be necessary unless the interceptor to the plant is upgraded to allow more flow to the plant.

Proposed Improvements

4. Your assumptions are correct. However, it is known that two (2) raw waste pumps have pumped together and when they do, they produce 2.42 MGD. The plant has handled this flow but it is above the accepted design flow numbers for primary clarifiers. The PHWW capability of the primary clarifiers is 2.89 MGD (at 1,500 gpd/sf) so, in our opinion, the limitation of 2.0 MGD at PHWWF should not be used. The plant operator reports that all three (3) pumps have operated in the past which yields a flow of 3.024 MGD. This has occurred rarely and only for a limited time period.
5. It appears that there is not much choice but to use the AWWF of 2.41 MGD as the design capacity of the mechanical plant. We will proceed on that basis.
6. To reach 2.41 MGD AWWF at the 75% reliability requirement will require that we build a fourth final clarifier. We cannot satisfy the 75% reliability with the largest unit out of service regardless of how big we make the new clarifier. There is not room at the plant site for a fourth clarifier. Plus operating four (4) final clarifiers would be cumbersome.

12
10-3-04

Can a variance be issued to either allow 70% of AWWF at 1,200 gpm/sf or 75% at an increased design factor – 1,279 gpm/sf would be required to satisfy the 75% reliability requirement with the two (2) existing units.

Collection System Bypasses

7. The City understands the consequences of the two (2) bypass pump stations. It is hoped that these stations can be eliminated in the future if the I/I removal efforts are successful. It is well known in Eagle Grove that the existing sewer system was originally designed to drain the town as well as convey wastewater. We discussed this during our last visit. The City has been attempting to correct this and will continue as money is available.

Project Scheduling

8. To reach a 2.41 AWWF value, the final clarifier issue will need to be resolved; a BOD reduction will need to be assumed in the primary clarifiers and the preliminary treatment area will need to be completely renovated and rebuilt. In addition, a larger equalization basin will need to be constructed – although not as big. We would request that some of these improvements be included in a phase 1 project that would be allowed to proceed as soon as possible and enlarging the preliminary treatment area and constructing a larger equalization storage basin be allowed to proceed as a phase 2 project after completion of Phase 1 and further monitoring of flows. In phase 1, we would construct the new final clarifier with the size to be determined after review of item 6 above. In addition, we would proceed with construction of the third RBC chain and the sludge handling facilities with calculations submitted that would verify compatibility with 2.41 MGD AWWF. Phase 2 would then include reconstruction of the preliminary treatment area with improved grit removal, solids screening which would improve primary clarifier performance, and larger flow metering facilities. Phase 2 would also include enlarged equalization if still necessary. Scheduling of the two (2) phases would be suggested as follows:

Complete Phase I Design and Proceed to Bids	September, 2002
Monitor Flows and Remove I/I as Discovered	September, 2002 – September, 2004
Construction Period – Phase 1	November, 2002 – November, 2003
Final Decisions on Phase 2 Design Values	January, 2005
Design Period for Phase 2	February, 2005 – May, 2005
Construction Period – Phase 2	August, 2005 – August 2006



Eagle Grove 01 SRF
LWB

STATE OF IOWA

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

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

October 16, 2002

City of Eagle Grove
210 E. Broadway Street
Eagle Grove, IA 50533-0165

Attn: Bryan Heiar, City Administrator

RE: Variance Request
Eagle Grove WWTP - Phase I Improvements

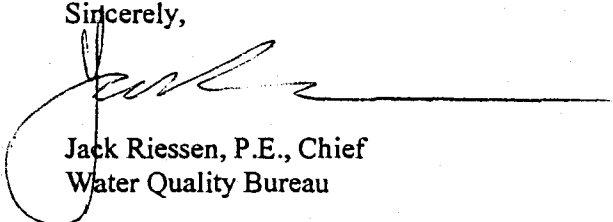
Dear Mr. Heiar:

The Iowa Department of Natural Resources, in accordance with subrule 567 IAC 64.2(9), has reviewed the variance requested on behalf of the City by Kuehl & Payer, Ltd. in their letter to the Department dated August 6, 2002. A variance from the Iowa Wastewater Facilities Design Standards Section 14.5.2.3.4 to allow 70% final clarifier reliability for the proposed project in lieu of the 75% reliability required by the design standards is approved.

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

If there are any questions, please contact Larry Bryant at 515/281-8847.

Sincerely,



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

c: Neal Kuehl, P.E./Kuehl & Payer, Ltd.
Field Office 2