18B.5.1

9-13-06

VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date: October 24, 1996
2. Review Engineer: Bill Graham
3. Date Received: October 16, 1996
4. Facility Name: Ankeny WWTP
5. County Number: 77, Polk
6. Program Area: CP (wastewater)
7. Facility Type : C05
8. Subject Area : 374, RAS pumping rate
9. Rule Reference: 567-64.2(9)a
10. Design Stds Ref: 18B.5.1
11. Consulting Engr: Veenstra and Kimm, WDM
12. Variance Rule: 567-64.2(9)c

13. **Decision:** Approved
Date: 10/26/96

14. **Appeal:**
Date:

15. Description of Variance Request:

Design standard 18B.5.1 requires a firm RAS pumping capacity of 25 to 100% of AWW flow. Proposed plant AWW flow is 8 MGD, or 5,560 gpm. Original design RAS pumping firm capacity was 1600 gpm.

16. Consulting Engineer's Justifications

The modifications to the plant will use the existing RAS and WAS pumping capacity which consists of five identical 800 gpm pumps, any of which can be used for RAS or WAS pumping. By modifying the valve settings, a combination of return sludge and wasting can be done at the same time. Wasting occurs only part time so that there are effectively three 800 gpm pumps providing firm capacity of 2400 gpm. The proposed improvements do not significantly increase the hydraulic capacity of the plant. The project adds aeration capacity and replaces two small clarifiers with one large one. Basic operation of the plant will remain unchanged. The firm capacity is 43% of AWW flow. Plant Staff have said that during normal flow periods the RAS rate has never exceeded 40% of AWW flow and during periods of wet weather flow RAS rate is well below 40%. The combination of equalization basin and first stage trickling filters results in stable operation of the activated sludge plant.

17. Department's Justifications

Recommend approval since process stability equivalent to that required in the design standard is provided by the first stage trickling filters at low flows and by the equalization basin at high wet weather flows. There are 8 years of operating history indicating that an RAS pumping rate above 40% AWW flow is unnecessary for this particular plant configuration. Having five identical pumps which can provide either RAS or WAS pumping provides for operational flexibility.

18. Precedents Used

Tama, which has an equalization basin.

19. Staff Reviewer: William Graham Date: 10-24-96
20. Supervisor: Date: 10/25/96
21. Authorized by: Darrell McAllister Date: 10/26/96

STATE OF IOWA
TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

October 28, 1996

Jolee Belzung, Director of Community Services
City of Ankeny
1605 N. Ankeny Blvd.
Ankeny, IA 50021-4199

SUBJECT: Bar Screen Room, Inside Door Variance
RAS Pumping Rate Variance

Dear Ms. Belzung:

The Iowa Department of Natural Resources has reviewed two variance requests for the City of Ankeny wastewater treatment plant improvements project.

Your request for a variance from Design Standard 15.2.1.1, *Screening Devices Located Indoors*, which requires that enclosed bar screen areas be separated from other building spaces, is approved. This approval is conditioned on the provision of a ventilation system in the pump station building designed to provide a higher pressure in the part of the building which opens to the screen room than is in the screen room and of backup power to the ventilation equipment.

Your request for a variance from Design Standard 18B.5.1, *Return Sludge Rate*, which requires a return sludge pumping rate of 25 to 100% of AWW flow, is approved. This approval is based on the provision of a large plant equalization basin, first stage trickling filters at normal flows, flexible existing RAS and WAS pumping capacity, and an 8 year operational history in which an RAS pumping rate above 40% of AWW flow has not been required.

Should you have any questions please call Bill Graham at (515) 281-5917.

Sincerely,

Darrell McAllister, Chief
Water Quality Bureau

cc: Veenstra and Kimm, 3000 Westown Parkway, West Des Moines, IA 50266-1520
Field Office 5

WALLACE STATE OFFICE BUILDING / DES MOINES, IOWA 50319 / 515-281-5145 / TDD 515-242-5967 / FAX 515-281-8895

VEENSTRA & KIMM, INC.
3000 Westown Parkway • West Des Moines, Iowa 50266-1320
515-225-8000 • 515-225-7848(FAX) • 800-241-8000(WATS)

October 16, 1996

William Graham
Iowa Department of Natural Resources
Wallace State Office Building
900 East Grand Avenue
Des Moines, Iowa 50319

ANKENY, IOWA
1996 WASTEWATER FACILITY IMPROVEMENTS
CONTRACT 2 - SOUTHEAST WATER POLLUTION CONTROL PLANT
REQUEST FOR VARIANCES

This letter is in response to the October 9, 1996 correspondence concerning the review of the plans and specifications for the 1996 Wastewater Facility Improvements, Contract 2 - Southeast Water Pollution Control Plant project. Based on the October 9, 1996 correspondence two items have been identified which require variances from the Iowa Department of Natural Resources design standards. This letter is to set forth the request for the two variances which will be required based on the current design of the project.

The first variance is from Design Standard 15.2.1.1. The design standard requires when screening devices are located indoors they shall be separated from the rest of the building and provided with separate outside entrances. The new screen room in the plant pump station is provided with an outside access and an access door between the pump room and the screening room. The door between the screening room and pump room does not meet the requirements of Design Standard 15.2.1.1.

The Headworks Building for the Southeast Water Pollution Control Plant includes both a grit and screening room and a garage. When that building was designed in the mid-1980s the City of Ankeny requested the grit and screenings be handled and loaded in an indoor environment. To accommodate the request the Headworks Building was designed with a doorway opening between the explosionproof design in the screening room and the nonclassified space in the loading garage. Separation is maintained by the ventilation system. The ventilation system provides a negative pressure differential

between the nonclassified space and the classified space. With the pressure differential all air flow is from the nonclassified space to the classified space. The design of the Headworks Building was approved and the building has been operational for approximately 8 years. The City of Ankeny has experienced no difficulty with this type of design.

The request for a doorway between the pump room and screening room was made by the operating personnel of the City of Ankeny to provide access to the screening room in a manner similar to the operation of the Headworks Building. The door between the pump room and screening room in the pump station is a weatherstripped exterior door. It should also be noted there is a window between the pump room and the screening room. This window is the window on the exterior wall of the existing pump station building. In the Headworks Building the separation is by swinging doors with rubber sweeps. The isolation between the pump room and screening room is better in the plant pump station than the separator in the Headworks Building.

There were several reasons why a request for the ventilation separation system was incorporated in the project. First, the operating personnel believe access to the screening room from the pump station pump room provides for a more efficient operation. Second, the screen room includes a roll up door. A double door is necessary to move the pumps and motors from the pump station. If the double door between the pump room and screening room were closed, it would be necessary to construct a double door on the outside of the pump room. The City preferred not to install a double door on the north side of the building. Third, if the door between the pump room and screening room were sealed it would be necessary to install exterior a passage door in the screening room. Based on the space layout this passage door would need to be on the south side of the building. A passage door on the south side of the building would conflict with the relocation of the ventilation system equipment to the south side of the screening room. By utilizing the interior passageway between the two rooms the ventilation equipment could be located immediately adjacent to the south wall of the screenings room.

The electrical equipment in the pumping station is located in a separate room which is accessed from the pump room. The electrical equipment in the pump room would be that typically necessary for pump power connections and lighting. The electrical equipment in the pump room is not dissimilar to the electric equipment located in the garage part of the pump station.

The pump room in the existing Headworks Building was not classified at the time the building was designed and constructed. The screening addition is a classified space. All of the electrical equipment in the classified space is explosionproof.

The ventilation system in the plant pump station and the ventilation system in the Headworks Building are connected to the standby power system. The ventilation systems operate under both line power and standby power. This provides the ventilation differential between the pump room and screening room at all times.

The City of Ankeny has significant experience working with this type of ventilation system separation between the pump room and screening room. The City is familiar with the need to maintain the ventilation system to achieve the pressure differential.

The City of Ankeny believes the current design meets the needs of the operating personnel at the Southeast Water Pollution Control Plant. The City of Ankeny would request a variance from Design Standard 15.2.1.1 to allow the passage door between the pump room and screening room.

Design Standard 18.B.5.1 requires the return activated sludge pumping rate to be a firm capacity adjustable between 25% and 100% of the average wet weather flow. The average wet weather flow of the pumping station is 8 mgd, or 5,560 gpm. The design standard would require a return activated sludge pumping rate with a capacity of 5,560 gpm.

The modifications to the Southeast Water Pollution Control Plan will utilize the existing return activated sludge pumping facility located in the tower pump station. That facility was designed with three return sludge pumps and two waste sludge pumps. When the pumps were supplied during the construction of the project, five identical pumps were provided by the manufacturer at the same cost as the specified three larger and two smaller pumps. The City of Ankeny currently has a combination return activated sludge and waste sludge pumping station with five identical 800 gpm pumps. The piping in the sludge pumping facility is such that any of the pumps can be used for either wasting or returning sludge. By modifying the valve settings a combination of return sludge and wasting can be accomplished simultaneously. The City of Ankeny has never used more than one waste activated sludge pump. Wasting of sludge occurs only on a part time basis.

The City effectively has available four return activated sludge pumps. Each of the pumps has a capacity of 800 gpm. The effective firm capacity of the pumping station is 2,400 gpm, or 3.45 mgd.

The proposed improvements to the treatment plant would not significantly increase the hydraulic capacity of the treatment plant. The improvement project adds more aeration tank capacity and replaces two small clarifiers with one larger clarifier. The basic operation of the treatment plant will remain relatively unchanged after completion of the improvement project.

The operating staff has never returned sludge at a rate greater than 40% during normal flow periods. During wet weather flow periods the rate of return actually falls well below 40%.

The firm capacity of the pumping station using three of the identical pumps is approximately 43% of the AWW flow. The firm capacity of the pump station exceeds the historical operating parameters of the treatment plant. The combination of the equalization basin and first stage fixed media filters result in a relatively stable operation of the activated sludge plant. The operating personnel have operated the treatment plant with these return sludge rates for almost 8 years. The City of Ankeny, based on its experience at the Southeast Water Pollution Control Plant, believes the return activated sludge capacity is more than adequate to meet operational needs.

The City of Ankeny would request a variance from the design standard for the return activated sludge flow rate. The requested variance is to utilize a firm capacity of 43% of AWW flow. The firm capacity is based on three installed pumps and use of the fourth pump as a spare. The fourth pump is available because five identical pumps were provided in the pump station for combination return and waste activated sludge pumping.

If you have any questions or comments concerning the project, please contact us at 225-8000.

VEENSTRA & KIMM, INC.

H. R. Veenstra Jr.

115225
cc: Jolee Belzung, City of Ankeny

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VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date: October 24, 1996
2. Review Engineer: Bill Graham
3. Date Received: October 16, 1996
4. Facility Name: Ankeny WWTP
5. County Number: 77, Polk
6. Program Area: CP (wastewater)
7. Facility Type : C04
8. Subject Area : 329, bar screen
9. Rule Reference: 567-64.2(9)a
10. Design Stds Ref: 15.2.1.1
11. Consulting Engr: Veenstra and Kimm, WDM
12. Variance Rule: 567-64.2(9)c

13. **Decision:** Approved
Date: 10/24/96

14. **Appeal:**
Date:

15. Description of Variance Request:
Design standard 15.2.1.1 require that enclosed bar screen areas be separated from the rest of the pumping station building spaces, i.e., no doors are allowed between the screen space and other building spaces. The city has proposed enclosing an existing bar screen area while keeping an existing door between the screen room and the rest of the building.

16. Consulting Engineer's Justifications
The ventilation system of the pump station is designed to provide a slightly higher pressure in the part of the pump station building which opens to the screen room. The situation is almost identical to the arrangement in the plant headworks building where there are two more bar screens in an enclosed space which was built 8 years ago with a door between the screen room and grit handling equipment. The ventilation systems in both the pump station building and the headworks building are connected to the standby diesel electrical power system.

17. Department's Justifications
Recommend approval since the ventilation arrangement provides equivalent safety to the design standard requirement.

18. Precedents Used
The Ankeny headworks building has had the same arrangement for 8 years with no problems.

19. Staff Reviewer: William Graham — Date: 10-24-96
20. Supervisor: [signature] — Date: 10/25/96
21. Authorized by: [signature] — Date: 10/24/96