

DATE RECEIVED		FACILITY NAME	COUNTY NUMBER	PROGRAM AREA CODE	FACILITY TYPE CODE	SUBJECT AREA CODE
8/20/86		Orange City	87	CP	C05	300
RULE REFERENCE	DESIGN STANDARD REFERENCE	DECISION-- DATE--		APPEAL ACTION-- DATE--		
	18C.4.1.1	Denied 8/28/86				
ENGINEER		VARIANCE RULE				
Municipal Engineering		64.2(9)c				

15. DESCRIPTION OF VARIANCE REQUESTED: To use the average wet weather flow of 0.7 MGD to design a controlled discharge lagoon rather than the 1.0 MGD average flow for the wettest 180 consecutive days.

The design standards specify the average flow for the wettest 180 days.

8/28/86

Rule has not been varied from in past. No info on operation provide to show if violations would not occur. Flow data is limited and not of good quality. DUC

#### ENGINEERS JUSTIFICATION:

The consulting engineer feels that a controlled discharge lagoon designed using a flow of 0.7 MGD will be as effective as designing for a year 2006 design flow of 1.0 MGD because the sizing of the primary cell in each case will be based on the same organic loading, therefore, the same size. Also, the wettest 180 consecutive days does not correspond with the 180 day operating periods. The engineer states that the average wet weather flow from October 1 to April 1 is 0.55 MGD which does not correspond to the 180 day operating periods. From the 1985 flow data given, December 1 through June 1 average flow is 0.757 MGD.

The city is in the midst of a major street paving program and prior to paving a street, the sewer is cleaned, televised, and, if necessary, rehabilitated. By the time that project is completed, considerable reduction in average wet weather flow is anticipated.

The city council is split on the type of treatment facility wanted. At this point the majority want a controlled discharge lagoon if the variance can be obtained. Without the variance and a reduction in cost, the cost would be prohibitive. Some of the council and the city administrator feel an aerated lagoon would be too costly to operate when considering replacement cost. However, total cost of an aerated lagoon using the revised design standard has not been considered by the council at this time.

#### DEPARTMENT JUSTIFICATION:

The basis for the variance request is equivalent effectiveness. The flow during winter operation, December 1 to June 1, would still allow six months of storage. The storage from June 1 to December 1 would also be adequate to retain the flow 180 days. Although, in some years that may not be true. Even if flows can not be retained for a full six months into the late fall, it would still get through the dryer months and into the wet season. The design standards only state wettest 180 days and not the 180 day operation period. I feel that concept has merit.

The only thing unique in this proposal is the size of the proposed lagoon system. A design based on 1.0 MGD would require 108 acres of water surface and 0.7 MGD would require 80 acres of water surface. We estimate an aerated lagoon would require 7-10 acres of water surface.

The rules on variances no longer include cost. However, in this case I think cost should be mentioned because, no matter which way they go, cost are high:

			Total debt service and O&M cost/month	Less depreciation cost/month
CDL	1.0 MGD	W/o FHA	\$34.95	\$31.61
CDL	1.0 MGD	W/ FHA	33.53	30.19
CDL	0.7 MGD	W/o FHA	32.33	28.99
CDL	0.7 MGD	W/ FHA	30.91	27.57
AL		W/o FHA	27.90	24.56
AL		W/ FHA	27.19	23.85

I'm inclined to recommend granting the variance since the wettest 180 days overlaps the 180 day operating periods. (May want to consider revising design standards if 18C is revised again) On the other hand I feel it would be foolish for the city of Orand City to construct a controlled discharge lagoon when looking at cost, even with the variance. On the other hand, cost probably should not be our concern. I recommend we grant the variance.



# *The City Of Orange City*



## ORANGE CITY, IOWA

August 21, 1986

Iowa Department of Natural Resources  
Wallace State Office Building  
Des Moines, Iowa 50319

ATTN: Mr. Lavoy Haage, Chief  
Wastewater permits Branch

Re: Wastewater treatment facility  
Orange City, Iowa

Dear Mr. Haage:

On behalf of Mayor Dunlop, Council person Robert De Haan and Council person Arthur Hielkema, I wish to express my appreciation for the time given us at Wednesday's meeting, August 20, 1986.

The purpose of this letter is to place in writing, at your request, the comments that I had made on behalf of the city as it related to the city's earlier, as well as continuing efforts to reduce the volume of wastewater flows and by so doing show reasonable cause why a variance be granted without adversely affecting the final effluent of our newly proposed contact stabilization lagoon with controlled discharge.

Orange City is a rather progressive community and the city has taken the initiative in improving all aspects of city government's responsibility. Major improvement to our electric system, water system, parks, buildings, library, fire protection, airport and streets have been undertaken in prior years and continue to be a major concern to the governing Mayor and Council.

The responsibility we have to, not only our citizens, but to Iowa as a whole compelled us to begin improvements to our over-all wastewater facilities.

Less than five years ago we made modifications on our existing treatment facilities by a redesign of our final clarifier and associated recirculation pumps. The out fall line from the facility was relaid at a considerable cost to the city.

Within the same time period a 1.7 million dollar project was completed to eliminate several older lines and lift stations, thus eliminating unwanted I and I.

During the fall of 1985 a 650,000 major sewer project was undertaken to eliminate a faulty system that was laid at depths of 25-30 feet.

Finally the city initiated a program of televising its entire sewer system preparatory to a continuing street improvement project. This televising is in its fourth year and as it had revealed defects in our system these were repaired, but the more critical matter of I and I were found and corrected by either replacement or internal grouting. Our latest report concerning this procedure was left with you on our Wednesday meeting.

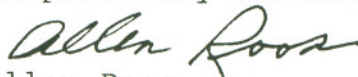
We are convinced that as we continue this program over the next several years, we will have reduced our AWW flows down to a point below 700,000 gpd. Therefore we feel a variance does not compromise the state's position but allows us to eliminate unnecessary capital expenditures which would create more of a hardship on our users.

Presently our outstanding debt on our sewer system along with the cost of entirely new facilities will put the citizens of Orange City on a sewer rate that would exceed 35.00/mo. The reports you will be receiving from our engineers and our financial advisor will set out the per connection costs more accurately.

In this unstable economic time we as a state and nation find ourselves, and without Federal and/or State grant funds available to us, the city is forced into a very difficult situation economically. We are mandated to comply; we receive no monetary assistance; we are making concerted efforts to improve our system; we feel fully justified in requesting a variance be granted so that we may proceed in a timely manner in meeting the effluent requirements as set forth.

We respectfully request that Orange City be given the variance requested and desperately needed.

Respectfully submitted,



Allen Roos  
City Manager

AR:lvh  
cc: Mayor  
City Council





**MUNICIPAL  
ENGINEERING  
CONSULTANTS, P.C.**

August 19, 1986

Box 220

Sergeant Bluff, Iowa 51054

Phone: (712) 943-5055 or 5056

Iowa Department of Natural Resources  
Wallace State Office Building  
Des Moines, IA 50319

ATTN: Mr. Lavoy Haage, Chief  
Wastewater Permits Branch

RE: Wastewater Treatment Facility  
Orange City, IA

We are asking for a variance of Chapter 18C, Wastewater Treatment Ponds (Lagoons), page 7, subparagraph 18C.4.1.1 Controlled Discharge Ponds.

For design of a waste stabilization lagoon with controlled discharge, we would like to use the average wet weather flow in lieu of the wettest 180 consecutive days of record (AWW-180 days).

For the year 2006 the wettest 180 consecutive days for the months of April through September have an average projected flow of 1,000,000 gpd; average wet weather flow for the total year would be 700,000 gpd; and the average wet weather flow for the months October through March would be 550,000 gpd. The projected BOD for the year 2006 is 1064 pounds.

This change of parameters will compensate for the extremely high peak flows during the spring, due to the high amount of infiltration.

Based on 1,000,000 gpd and 1064 lbs BOD

Primary Cell	42.6 Ac.
Volume	55,096,000 gal.
Detention	55 days
Secondary Cells	65.4 Ac.
Volume	125,000,000 gal.
Detention	125 days

Based on 700,000 gpd and 1064 lbs BOD

Primary Cell	42.6 Ac.
Volume	55,096,000 gal.
Detention	79 days
Secondary Cells	37.3 Ac.
Volume	70,904,000 gal.
Detention	101 days

<u>1985 Month</u>	<u>Average Flow MGD</u>	<u>Average BOD Mg/L</u>
January	0.507	139
February	0.465	208
March	0.496	176
April	1.212	94
May	1.345	39
June	0.735	74
July	0.465	112
August	0.431	139
September	0.784	94
October	0.781	108
November	0.561	118
December	0.518	161

The City of Orange City is currently undergoing a complete sewage system sealant program which has caused substantial flow reduction. The "Inflow Reduction Study" prepared by Sewer Line Services estimates a reduction of 105,000 gpd. This sealant program to reduce infiltration was completed after the flow analysis prepared by Municipal Engineering Consultants was completed. Also, the City has plans to

8/19/86

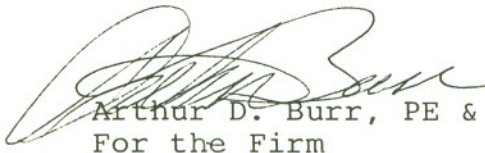
continue this sealant program until the infiltration has been reduced to an acceptable level.

The primary lagoon will have 90% removal with 25 to 30 days detention; according to "Determination of Stabilization Pond Retention Times", Deeds & Data. We are proposing 79 days detention in the primary alone, with an additional detention time available in the secondary lagoons. With this degree of treatment it is very clear that the discharge will be below 25 Mg/L CBOD.

It is our professional opinion that the 43 Acre primary and 37 Acre secondary cells will give treatment, for the City of Orange City's waste, equivalent to the 43 Acre primary and 65 Acre secondary cells. Therefore, we are looking forward to your approval of our request for variance.

We appreciate your consideration to expedite this request for a variance.

Sincerely,



Arthur D. Burr, PE & LS  
For the Firm

ADB/mn  
5211

cc: City of Orange City