Appendix N

MPCA Correspondence Regarding Pequot Lakes Spray Irrigation Field

Minnesota Pollution Control Agency
Brainerd Office

January 22, 2007

The Honorable Cathy Malecha
Mayor, City of Pequot Lakes
4638 County Road 11
Pequot Lakes, MN 56472-3385

RE: National Pollutant Discharge Elimination System Permit No. MN0021661
Permittee Name: Pequot Lakes Wastewater Treatment Facility

Dear Mayor Malecha:

Pursuant to our meeting on January 12, 2006, regarding the Pequot Lakes wastewater treatment facility and the Highway 371 Bypass, I had my staff hydrologist assess the current irrigation system. His assessment is enclosed with this letter. If you have any questions regarding the assessment, please contact Mr. Steven A. Stark at 218-828-6070.

Sincerely,

R Swenson

Ronald R. Swenson, Supervisor
Municipal Wastewater Unit
Brainerd Office
Municipal Division

RRS/SS:vms

Enclosure

cc: Tina Nolden, Wastewater Superintendent/Operator, Pequot Lakes
Tim Houle, Widseth, Smith, Nolting, Inc., Baxter

SF-00006-05(4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA

Office Memorandum

DATE: January 18, 2007

TO: Ron Swenson RS

FROM: Steve Stark

PHONE: 218/828-6070

SUBJECT: Wastewater Irrigation Facility – Pequot Lakes (MN0021661)

MPCA Brainerd staff met with representatives from the City of Pequot Lakes, the City's engineer and MnDOT staff on January 12. 2006. The purpose of the meeting was to discuss issues related to the possible reduction of irrigation acreage due to a planned highway by-pass project. As a result of this meeting, MPCA staff agreed to assess the current wastewater treatment system and recommend possible irrigation site modifications.

Background and Findings

- Operation of the current wastewater treatment facility was begun in the late-1980s. The current permit does not have any flow limits for influent or effluent (to the irrigation system). A previous permit had an effluent flow limit of 45 million gallons per year.

- Three center pivot irrigators apply effluent to the City's spray field. The two northern center pivots irrigate 27.73 acres each. The southern pivot irrigates 49.82 acres for a combined total of approximately 105.28 acres. There is 1.2 acres of overlap where the eastern pivots are adjacent to each other. This layout results in an actual area of 104.08 acres under irrigation.

- Over the past six years, the volume of effluent irrigated to the spray field has ranged from 21 to 34 million gallons per year. Assuming even application over the entire 104 acre spray field, the annual flow volumes would result in application rates ranging from 7.5 to 11.9 inches per year.

Year	Gallons per year (millions)	Annual Appl'n Rate (inches)
2001	22.293	7.9
2002	33.478	11.9
2003	22.251	7.9
2004	29.687	10.5
2005	21.221	7.5
2006	24.348	8.6

- The soils at the spray field consist of very permeable, well-drained soils that were developed in thick, glacial outwash sands and gravels.

- The crop at the spray field is alfalfa. The farmer harvests three crops per year.

Discussion

- It appears that the discontinuance of nitrogen fertilization, coupled with the change in crop at the spray site, has been successful in reducing groundwater nitrate levels. Even if the current cover crop did not remove any of the applied nitrogen, it is unlikely that groundwater nitrate concentrations would ever exceed the primary drinking water standard for nitrate-nitorgen (10 mg/l) given that the effluent concentrations for total nitrogen are generally less than 10 mg/l.

- The permeable, granular soils at the spray field have no difficulty accepting the current 8 to 12 inch per year application rate. As opposed to growing a row crop, soil permeability and infiltration rates are maintained by utilizing a vegetative cover crop. In addition, the perennial vegetative ground cover allows for a longer irrigation season compared to growing a row crop. As a consequence, a higher application rate could be utilized.

Conclusions and Recommendations

- It is highly unlikely that an increased irrigation rate will result in elevated groundwater nitrate concentrations. Even if the applied nitrogen was not absorbed by the crop, groundwater nitrate concentrations would not exceed the effluent total nitrogen concentration. Currently, the effluent total nitrogen concentrations are generally below the drinking water standard for nitrate-nitrogen (10 mg/l).

- Based on the above conclusion, it is recommended that a maximum application rate of 16 inches per year be allowed. Using this application rate and assuming an annual irrigation volume of 25.5 million gallons per year (past six-year average), a minimum of 59 acres are needed for irrigation.

- A 16-inch per acre per year application rate would provide approximately 33 pounds of nitrogen per acre per year based on the past five-year average of total nitrogen concentrations. Three crops of alfalfa hay can removed between 200 and 300 pounds of nitrogen per year from the soil.

- It is recommended that the permit be modified to no longer require groundwater monitoring at the spray field wells. Groundwater elevations should continue to be measured as a means of insuring that the wells are maintained for possible future use if the need should ever arise. Monitoring of the pond wells should continue to warn of any leakage problems.

- The City should contact the Natural Resources Conservation Service in Baxter (Michael Rockus, 218-829-5965) to request a soil survey of the current and potential future spray field sites.

Cc: Hershel Blasing
Robin Novotny