U-SEARCH PROJECT INVENTORY
Project # 1029

Project Name: Waste Water Treatment at the University of Minnesota

Key Words: Pollution prevention, waste water treatment

Departments and Administrators: Facilities Management

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Course/Professor/Date: NRES 1010/ Issues in the Environment/ J. Anderson / Spring 1994

Distribution ___ Anyone ___ Those interested in topic ___ Do not distribute

Ideas to implement: None.

___ Well researched

___ Well documented sources

Comments: 7 pages. Unorganized report, presented in several different fonts, attempts to describe how waste water discharged by the University is treated.

Project initiated by: ___ Student(s) generated idea
___ Administrator

Name:

Department:

___ Suggested by U-SEARCH staff & assigned by professor

___ Suggested by U-SEARCH staff & chosen by student

Problem scope or research goal (as defined by student):

Provide information on the treatment, regulation, and pollutants of the University of Minnesota's waste water

Impact of the report ___ Project focus was for student's educational benefit only
___ No known changes occurred

___ Report generated and delivered to administrator(s)

___ Recommendations were or will be reviewed by administrator(s)

___ Results or findings could be used for future studies

___ Change occurred:
NRES 1010
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Group 14

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P) Describe how the University's waste water is treated. Explain how waste water treatment is regulated, which pollutants are monitored, and what pollutants have been found in the University's waste water. Describe efforts to control pollutants and reduce waste water contamination at the University.

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WASTE WATER TREATMENT AT
THE UNIVERSITY OF MINNESOTA
NRES 1010

May 27 1994

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INTRODUCTION

This report will provide information concerning the treatment of the University of Minnesota's waste water. It addresses how the University's waste water is regulated, which pollutants are monitored, and what pollutants have been found in the University's waste water. Efforts to control pollutants and reduce waste water contamination at the University will also be discussed.

Various authorities in the waste water field were consulted in relation to the above questions. In addition, research at the University of Minnesota's Walter Library was done to uncover the answers to these issues. The information gained in this report raises questions about the effectiveness of the University's waste water treatment procedures.
Helen Addie Interview

Helen Addie, the Minnesota Technical Support Manager, stated that the Minnesota Waste Control Commission monitors the University's waste water. Phosphorus, C.O.D.'s, suspended solids, and pH levels are monitored along with other pollutants. She mentioned that there was once a problem at the University with high levels of mercury, but the problem has since been corrected.

Roger Tan Interview

Roger Tan is employed by the Metropolitan Waste Control Commission. He also stated that the University's waste water is not independently monitored and that there is no on-site treatment at the University. The University's waste water is included within the cities of Minneapolis and St. Paul. Therefore, if there were pollutants found in the waste water monitored by the city of Minneapolis, it would be difficult to determine if it had originated in the University's waste water or from some other source. Tan mentioned, however, that the University hospital is monitored independently from the city of Minneapolis and the rest of the University. The hospital is responsible in monitoring its own C.O.D.'s, suspended solids, and pH levels in the water. As Helen Addie mentioned, Tan also stated, "a few years ago the University hospital detected mercury in its water." Tan then stated, "Since that time however, there has been no elevation of metals detected from year to year in the hospital's waste water."
Interview With Mr. Jackson

In general, the University of Minnesota does not regulate pollutants in the surface runoff water. The U of M is part of the Minneapolis municipal (an area of over 100,000 people) along with some of the northern suburbs. This area, as a whole, is given regulations by the NPDES (National Pollution Discharge Elimination System). Seven sites will be chosen, and they may or may not be located on the U of M campus (five sites are correctly marked, and none are on the U of M campus). The storm sewage runoff from the U of M goes into the Mississippi or nearby lakes. The NPDES writes the permit and lets the municipals know what to test for, and things they must improve on. The new proposal was to be given by February or March this year, but it has not happened yet.

There is a total of five drainage discharges that are owned by the University (They are not monitored). There is one that the U of M monitors regularly. It is the one that discharges water from the sandstone water table that the Civil Mineral Engineering building is built into. The building was built down one foot into the water table, so it has to be continually drained. There are two pumps that pump the water out, and they go into the storm sewer after that. Recently, the ground water was contaminated with carcinogens (found on the EPA list). They were found to be coming north of the University though. Since that incident, they have been carefully monitored. A separate NPDES permit for discharge to monitor water regularly (this is the only quality testing done on discharged water on campus). The U of M specifically does not have to monitor, because they are part of
the Minneapolis municipal sector. There are three main contaminants found in the water. Hydrocarbons, which are from oil and gas that have been dropped on the roads and then washed, by rain, into the sewers. Nitrates, from fertilizers. Salt, sand and grit are the third pollutants. All of these can lower the oxygen concentration in the river, making it unsafe for fish. The PCA wants them to test everything but economically, that's not possible. Some of the pollutants that are evident that the University is not responsible for are mercury, and other pollutants that are found in the water. They are brought with the acid rain. There have been some regulations with fertilizers. Mr. Jackson believes that the best method for managing the water would be to street clean thoroughly in the spring (before the spring showers). Spring time is when the contaminants are the highest.

The sanitary issue is taken care of through the city. Some of the older buildings (before 1930) combine the sanitary and surface water into one. These are treated as sanitary waters and are sent through a treatment plant such as Pigs Eye. They use a tertiary system, that is, they do all the treatments for primary and secondary treatment. Then they add chlorine and other chemicals.
Regulation of Waste Water Treatment

Though the implementation of the National Pollution Discharge Elimination System (N.P.D.E.S) expected some time this year, the University’s storm sewer discharge into the Mississippi river will be monitored and regulated under E.P.A standards. The E.P.A’s primary concern with the N.P.D.E.S is to eliminate non-point sources of pollution which could eventually lead to a drastic reduction in both surface and ground water contamination.

The regulatory process encompasses four key areas of water quality which need to be monitored and treated if present at discharge points.

The National Interim Primary Water Regulations are based on health effects to humans and it is therefore mandatory for states to be in accordance with these federal M.C.L’s (maximum content levels). Primary standards protect public health to the extent feasible, using technology and treatment techniques which the E.P.A administration considers generally available. The priority of primary water regulations includes the monitoring of volatile synthetic organics, inorganic chemicals and microbiological contaminants, radioactive particles, and disinfectant by-products.
The second major concern of the E.P.A is trihalomethane regulation, given an M.C.L of 10 mg./L. Trihalomethanes are a group of chemicals, including chloroform, that have carcinogenic effects on humans, and unfortunately aren't removed with standard chlorine treatment.

Monitoring requirements for sodium content and corrosion characteristics make up the third area of E.P.A waste water regulation. Increased sodium levels have been correlated with increased hypertension, and other adverse health effects in humans. Corrosiveness of water on the other hand, acts as a releasing agent for heavy metals such as lead in distribution facilities and plumbing.

The fourth and most lax component of the E.P.A's program are the Secondary Water Regulations, under individual state discretion. Secondary regulations include odor, appearance, and the components that cause this and adversely effect the aesthetic quality of the water. Rather than just making the water cloudy, particulates that cause turbidity can protect pathogenic microorganisms from disinfecting agents.

Severities of discharge contaminants and the frequency of their occurrence are the two determinants of whether waste water is state of federally regulated. As of now, trihalomethanes and turbidity regulations are the largest challenges facing the E.P.A and water utilities.
CONCLUSION

The fact that there is no treatment facility for the University's waste water raises some concerns. Minneapolis storm water is regulated by the state and the University is one of the four sectors included in that regulation. The primary concern is storm runoff. The University has four or five discharge points in which runoff from the storm sewers goes directly into the Mississippi river without any prior treatment and only one of these points are monitored. Possible contaminants form the University include suspended solids, nitrates, hydrocarbons and lead. The University once had a problem with the Civil and Mineral Engineering building with contaminated ground water, it also once had a problem with high mercury levels, but since the problem has declined. Efforts to control the pollutants and reduce waste water contamination at the University were made by the University, City of Minneapolis and the Minnesota Department of Transportation, who combined to form a National Pollution Discharge Elimination System (NPDES), which requires a permit for areas that have high volume water use, also known as a "point source permit." Even though some regulation exists, there is still a great need for tighter restrictions with respect to sewer runoff at the University. Some authorities on this subject that were interviewed claim that there is not a problem with high levels of pollutants being discharged into the Mississippi, however, there is not enough regulation to insure this claim.
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