MONITORING FOR LAND APPLICATION OF WASTEWATER

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Abstract. In order to ensure adequate performance and warn of potential ground water contamination, land application systems must be monitored. The monitoring system for the Lake George Village Sewage Treatment Plant land application system is described, including suction lysimeters, observation wells and tracer studies.

1. Introduction

The 1972 amendments to the Water Pollution Control Act (PL92-500) indicated that land application of wastewaters should be considered as an alternative to conventional means of wastewater treatment. However, very little attention was paid to this portion of the regulation until EPA Director, Douglas Costle issued a memo on October 3, 1977 [1] reaffirming EPA’s stand that land application must be considered as an alternative in wastewater treatment. This was further substantiated by the Clean Water Act of 1977 (PL95-217) in which it was stated that innovative and alternative methods of wastewater treatment must be considered in all plans for treatment facilities before approval or funding for any proposed system could be made. Land application was considered to be one of the acceptable innovative or alternative treatment methods. Not only did the law encourage the consideration of innovative and alternative methods, it promised a bonus of 10% additional funding for all treatment facilities which would incorporate such treatment methods. Thus, it became worthwhile for the design engineer to consider the feasibility of such a treatment system in the design of any wastewater treatment facility.

Land application of wastewater is normally considered to take one of three forms: (1) irrigation, in which the partially treated wastewater is applied to the soil during the growing season in order to enhance crop production, but not to recharge ground water; (2) overland flow, in which treatment is afforded by flowing settled wastewater overland through the vegetated area with no infiltration into the soil, and (3) rapid infiltration, which involves the spreading of the partially treated effluent onto beds containing coarse sand which allows the liquid to infiltrate the soil and percolate to the ground water, thereby recharging the ground water. To a certain degree the use of septic tanks may also be considered a method of land application of wastewater, albeit subsurface application. Since in a normal system the effluent from a septic tank is distributed into the soil where its flow pattern is generally unknown, it may be assumed that it probably percolates through the soil to mix with the ground water. The studies described herein relate primarily to the rapid infiltration technique of
land application, but they also have application to septic tank systems in which the water applied to the distribution system ultimately reaches a ground water course.

One of the prime concerns is what happens to the liquid effluent after it enters the ground? It is difficult to follow the flow of liquids through the soil, but the possible contamination of any ground water supplies due to the soluble materials carried through the soil in the liquid phase is an important area for investigation. In order to identify any possible contamination before it interferes with any subsequent use of the ground water, a monitoring system must be established. This monitoring system must be able to identify the liquid being applied as well as sample it for analysis to determine the quality of the water. It is such a system which is described herein.

2. Background

The Lake George Village Sewage Treatment Plant has been providing land application by the rapid infiltration technique of the secondary treated effluent of wastes