6
IMPLEMENTATION OF AN ODOUR AND CORROSION CONTROL PILOT PROGRAM

The Transportation and Works Committee recommends the adoption of the recommendations contained in the following report, June 1, 2005, from the Commissioner of Transportation and Works:

1. RECOMMENDATIONS

It is recommended that:

1. Staff be authorized to conduct a full scale pilot program for odour control and corrosion control on the York Durham Sanitary System (YDSS) at Newmarket and Aurora Pumping Stations utilizing the PRI – IS ™ (Peroxide Regeneration Iron – Sulfide Control) system.

2. The Region enter into a contract with US Peroxide and/or its Canadian co - owners Trojan Technologies in respect of a trial pilot program in an amount of $68,000 pursuant to the sole source provisions of the Purchasing By-law.

3. The Commissioner of Transportation and Works be authorized to execute a contract subsequent to recommendation 2, subject to the prior review of Legal Services.

2. PURPOSE

The purpose of this report is to provide details on the Water and Wastewater branch strategy for odour and corrosion control, including background on the problem, and past and current initiatives. It also includes a recommendation for staff to continue to investigate suitability of a patented technology to the York Durham Sewer System (YDSS) and a recommendation of award of contract to US Peroxide and/or its Canadian co - owners Trojan Technologies, in an amount of $68,000 CAN for a trial pilot program. The pilot equipment will be installed at the Newmarket and Aurora Pumping Stations.

3. BACKGROUND

3.1 General

Odour generation in sewage infrastructure is a common occurrence and Regional facilities have and continue to experience problems at select facilities within the YDSS and at some of our local communities. Among the many potential odour sources hydrogen sulfide (H_2S) is a common and prevalent component.

The production and release of hydrogen sulfide gas in collecting systems is responsible for numerous odour complaints and consequent structural damage to the sewage infrastructure. Through biological and chemical processes, sulfate in wastewater is converted to sulfide and then to hydrogen sulphide (H_2S). Once formed in the liquid phase of the sewage, H_2S is readily released as a gas creating odours. Sewer systems operate like a long container with air being pulled in and pushed out with changes in flow and level. Because odours are created, a typical response is to seal the venting points (where air is allowed to be pushed or pulled in).

Another biological process converts released H_2S gas to sulfuric acid. Through a chemical process, sulfuric acid corrodes unprotected surfaces including ladders, grates and concrete structures and pipes. Sealing the venting points allows the H_2S to accumulate and accelerates the damage created by the formation of H_2S. In addition to the significant costs to repair the infrastructure, the rehabilitation and repair contracts can cause disruption to the community during construction especially considering much of the infrastructure is in built up areas, and places the operation of the sewage system at additional risk during construction.

3.2 Odour Control Initiatives and Methods

There are at least two approaches to controlling odour in the sewage systems; treat the odour at the point of release or treat the sewage to minimize or prevent the formation of odorous compounds.

Methods to control the formation of H_2S production in the sewer are based on oxidation of H_2S to elemental sulfide, which is inert and non odorous. Other techniques utilize aerobic bacteria to reduce fats, oils, and grease so there are limited conditions for anaerobic sulfide producing bacteria to form. Facilities to capture and treat the air are based on either chemical oxidation (scrubbers) or bacteriological (biofilters).

In 2000, a study report was initiated and issued in 2002 (MacViro – York Durham Sewage System Long Term Odour Control Strategy) to examine odour control strategies for the YDSS and recommended installation of facilities to capture and treat odorous air at the major pumping stations. Chemical odour scrubbing facilities have subsequently been built at Aurora Pumping Station and Black Creek Pumping Station. In 2002, oxidation techniques were reviewed at the Humber Pumping Station and oxygen injection (from liquid oxygen) was the method recommended for the Humber forcemain. A pilot project is currently being designed and installed for this purpose.

Oxygen injection is suitable under certain conditions such as Humber forcemain where the forcemain length is not excessive. For long systems such as the YDSS, this method may not be as effective or suitable. The PRI – SC^{TM} method utilizes iron salts (FeCl) at the upper reach in combination with hydrogen peroxide (H_2O_2) at downstream point to recapture the iron for further oxidation of H_2S.

The particular benefits that may be attributed to PRI – SC™ is in the application to the relatively long forcemains (5.5km and 6.8km) from Newmarket and Aurora pump stations and subsequent downstream benefits including potentially as far as the boundary meter at the York-Durham boundary.

3.3 Pilot Program

Through consultation with staff, US Peroxide has proposed a three-month trial program involving a turnkey installation with operation by US Peroxide. Regional obligations include provision of utilities (water, electricity, equipment stands), permit approvals, and access. Region staff would provide the operational license for the facilities as owners of the system. A monitoring program and report prepared by US Peroxide will be delivered at the end of the pilot.

As due diligence, the Region will conduct a separate monitoring program to verify the findings of the company.

4. ANALYSIS AND OPTIONS

The approach adopted from the 2000 report concentrated on treating the air at major emission points such as the pumping stations. While this approach has resulted in some benefit through reduction at specific locations, it has not provided protection of the entire system nor has it prevented damage to the sewer infrastructure. Additionally odour complaints continue to be received including at locations where odour scrubber facilities have been installed.

The use of the PRI – SC™ system if proven successful through the pilot, has the potential to protect the full length of the YDSS from Newmarket to the Duffin Creek WPCP. It may also be extended to include planned extensions of the YDSS to other local municipalities.

This technology may be the most suitable for the characteristics of the YDSS. Conducting the pilot will establish the benefits of the system at a reasonably low cost and enable the determination of the benefits to the system if applied at a full-scale operational level.

5. FINANCIAL IMPLICATIONS

Should the pilot be extended to run as a full system, estimated annual costs are in the order of $300,000 depending on many factors.

The annual cost of rehabilitation and repair works due to damage from H_2S formation is considerable. A project planned for the system on Yonge St. at King Road area is estimated to cost between $1M-$2M. Methods to conduct this work without interrupting

operation is being investigated but potentially construction could disrupt the community for 8 - 12 months during this project.

There are sufficient funds in the 2005 Transportation and Works budget for this pilot project.

6. LOCAL MUNICIPAL IMPACT

Proceeding with this project now will allow the pilot to be conducted through the late summer and early fall potentially providing benefit by reducing odour in the YDSS through the communities of Newmarket, Aurora, and Richmond Hill. Benefits may also occur through Markham as well.

7. CONCLUSION

Conducting this pilot will help to establish the suitability of this patented technology to provide reduction of odour and protection of corrosion of regional sewage infrastructure.

The Senior Management Group has reviewed this report.