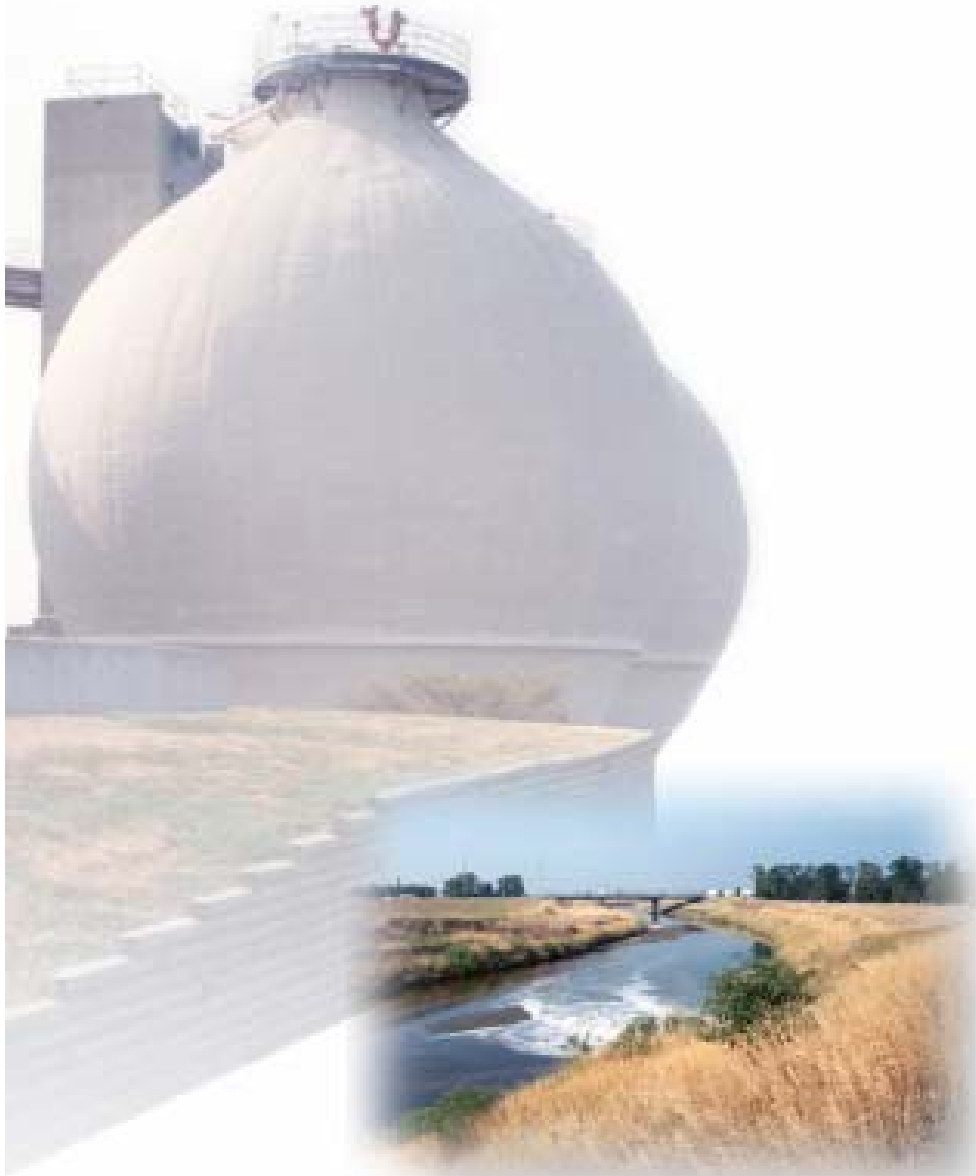


Lincoln Wastewater System



Lincoln Wastewater System

Sanitary Engineering

2005-2006 Annual Report

The Sanitary Engineering Section of Wastewater provides technical support services for the Wastewater and Solid Waste Divisions of the City of Lincoln. These services include laboratory analysis, regulatory compliance monitoring, industrial pre-treatment program management, operations and maintenance support, computer and SCADA support, and engineering services for the department. There are 20.5 FTEs in this section.

Laboratory

The laboratory provides analysis of industrial effluents, liquid dump-station samples, and treatment plant processes, injection site analysis, and Bluff Road Solid Waste Leachate analysis. These analyses are in support of meeting Federal Requirements and Nebraska Department of Environmental Quality permits. A total of 61,874 analysis were completed by nine laboratory staff personnel.

Industrial Pre-treatment and Collection System Monitoring

This Team monitors the effluent from 41 industries within Lincoln. Effluent samples are collected daily from industries on a predetermined schedule. 1,300 samples were collected in 2005-2006. Industrial treatment concerns are addressed and industrial operations are supported to enhance the operation of the industry and the wastewater system. The goal is to meet with each industry on a one on one basis at least once a year to discuss operational impacts on both entities.

Sanitary sewer flows are monitored on each drainage basin to determine infiltration and inflow of water into the system. These evaluations also determine design formulas for new sewers and determine capacities of existing sewers. This analysis also helps determine treatment requirements for additional city growth. 14,900 monitoring station days of hydraulic evaluations of sanitary sewers were completed.

Monitoring of hydrogen sulfide gas and pH conditions are done to reduce safety and corrosion issues on and in the collection system. 3,320 station days of gas and pH monitoring were completed. This section consists of six environmental specialists.

Technical and Engineering Support

This team provides engineering support to the Wastewater and Solid Waste Department. This includes collection system design and review, records keeping, CAD services, computer and program application support and safety and training coordination for the department. Support of the UNL Master Plan, the Lincoln Airport Authority Master Plan, and the Wastewater Facility Master Plan have been major projects in the past year. This area has also been involved with air and ground water studies for the Bluff Road Landfill and reviewing the performance and compliance of the Northeast Treatment Plant and Theresa Street Treatment Plant Nitrification Projects. The Utility Support Specialist has been instrumental in creating a basic template for all maps for the Water, Wastewater, and Watershed Management Departments. This support group consists of the Sanitary Engineer, Assistant Sanitary Engineer, Associate Engineer, Utility Engineering Specialist, Control System Support Specialist, and a .5 Safety/Training Coordinator shared with the Water Department.

Lincoln Wastewater System Wastewater Treatment Operation & Maintenance 2005-2006 Annual Report

The Operations & Maintenance sections within Wastewater Treatment provide reliable treatment of domestic, industrial, and commercial waste generated within the City of Lincoln which consists of 85.76 square miles and an estimated population of 241,700. The Theresa Street Wastewater Treatment Facility located at 2400 Theresa Street and the Northeast Wastewater Treatment facility located at 7000 North 70th Street treat an average combined wastewater flow of approximately 26 million gallons per day. 8.2 billion gallons of wastewater were treated in 2005-2006. There are currently a total of 38 full time employees within Wastewater Treatment.

Operations

Thirteen full-time certified Grade IV operators ensure that both treatment facilities are operating as intended and that both facilities are complying with regulated effluent limitations. Operational control and surveillance is greatly enhanced with a Supervisory Control and Data Acquisition (SCADA) system that allows for remote control and instantaneous plant status via an intra-City fiber optic network. Due to the development of this SCADA system, unattended plant operations during night time hours can occur at the Northeast facility and still provide for reliable operations leading to lower staffing requirements and savings to Lincoln customers.



Theresa Street WWTP

Maintenance Northeast WWTP

Maintenance staff (25) are involved in numerous disciplines: process equipment maintenance, electrical maintenance, control and instrumentation maintenance, records management, and materials and equipment procurements. Staff are positioned at each facility maintaining grounds, structures, and over 3,800 pieces of equipment that must be maintained and replaced in a timely manner to ensure reliable treatment operations. Besides the two plants, 14 sanitary sewer lift-stations and four storm water pumping-stations are operated and maintained by wastewater personnel.



Northeast WWTP

Wastewater System Collection Annual Report 2005-2006

The Collection section performs all maintenance activities of the existing sanitary sewer collection system, manages all new sanitary trunk line capital improvement projects, and carries out one-call functions for sanitary sewer and storm sewer.

The sanitary sewer collection system is comprised of 978 miles of piping (August 2005), 16,500 manholes and various other components. There are approximately 25 miles of new piping and 400 new manholes added yearly to the collection system.

Maintenance activities

There are four main activities involved in the maintenance of the collection system. The first is line jetting. This is the process of introducing high pressure/velocity water hoses into the pipes to clean out accumulated grit, grease, soil, roots and other debris. Line jet cleaning is currently on a two-year frequency for most pipe line segments. Trouble spots are identified and cleaned more frequently, some as often as quarterly. The second maintenance activity is TV video inspection of the interior of the collection system. This is the process of inserting a TV camera into the pipe segments and recording the condition of the pipe. This information is used to determine what further maintenance/rehabilitation/replacement activity may be needed. Collection is currently on a 12-year cycle of TV video inspection, performing 80 miles annually. TV video inspection is also performed on all new sanitary sewer construction, approximately 20 miles a year, to check for quality of work. The third maintenance activity is sanitary sewer line and manhole repair. Collection performs approximately 66 line spot repairs, 140 manhole repairs, and 300' of line replacement annually. The fourth maintenance activity is root control in the sanitary sewer. It is the process of injecting a foaming chemical into the sanitary sewer to kill roots inside of the piping and inhibit their return growth. All these activities together keep the City's sanitary sewer collection system running as efficiently and backup free as possible.

CIP Management

Collection managed \$29,797,284 in CIP Projects for the 05/06 fiscal year. The CIP projects designed and constructed large diameter trunk lines in the Salt Creek, Upper SE Salt Creek, Beal Slough, and Stevens Creek drainage basins to serve growth areas. Other CIP projects are Oak Creek, Northeast Salt Creek, and Middle Creek. Also included in the CIP are rehabilitation projects for the existing system.

One Call

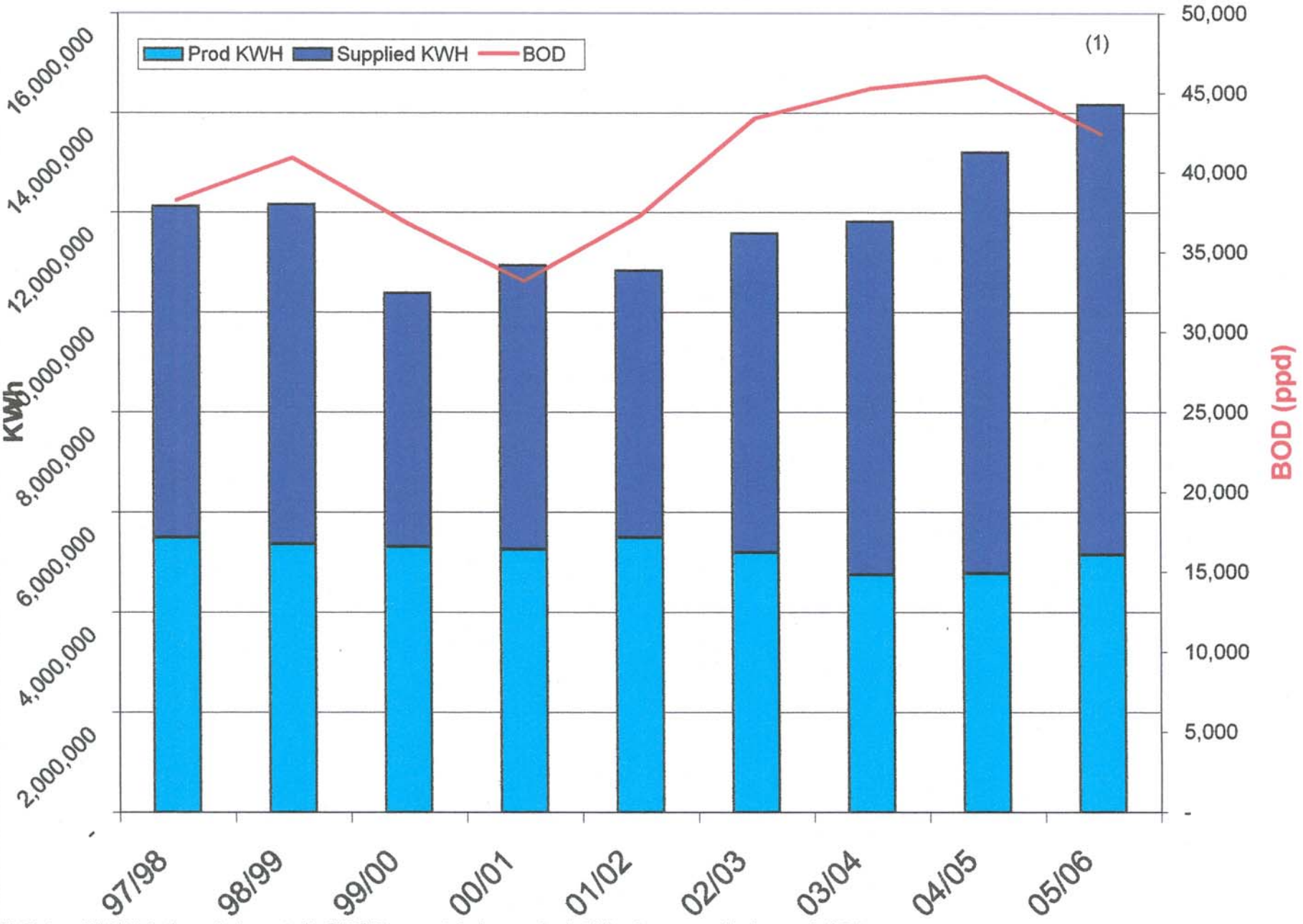
Collection responded to 6,700 requests for sanitary sewer and storm sewer locates. This involves reviewing maps of the area in question and either clearing the call (no facilities present) or going out into the field and physically marking facility locations.

Future Issues

While the miles of newly constructed sewer continue to increase on a yearly basis, personnel have not and have been reduced 6 employees over the last 25 years. This divergent trend is leading toward either additional personnel needing to be hired and capital outlay equipment purchased, or accepting a lesser level of maintenance activities, which may lead to more sanitary sewer backups and property damage claims against the City.

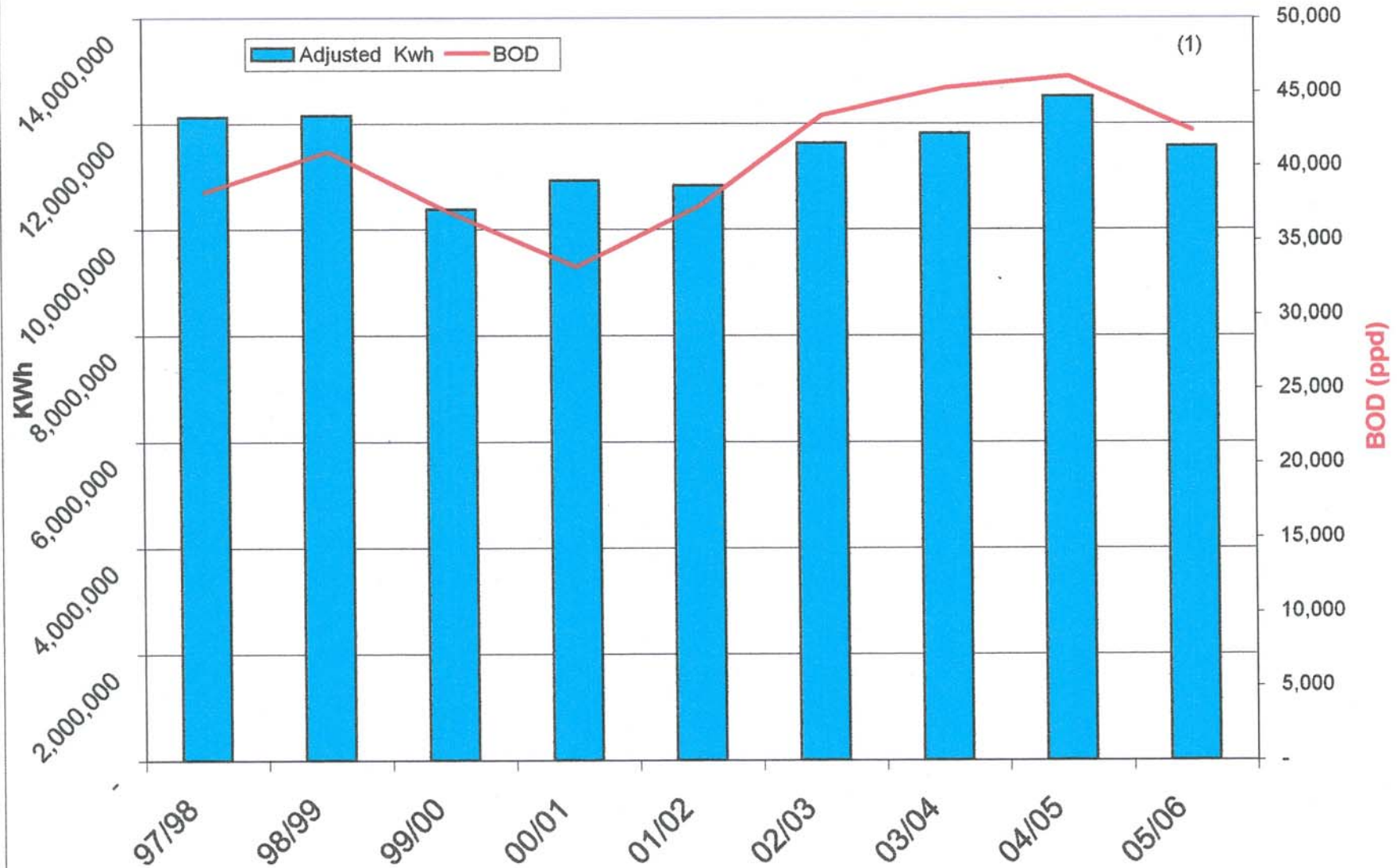


TSTP Electricity



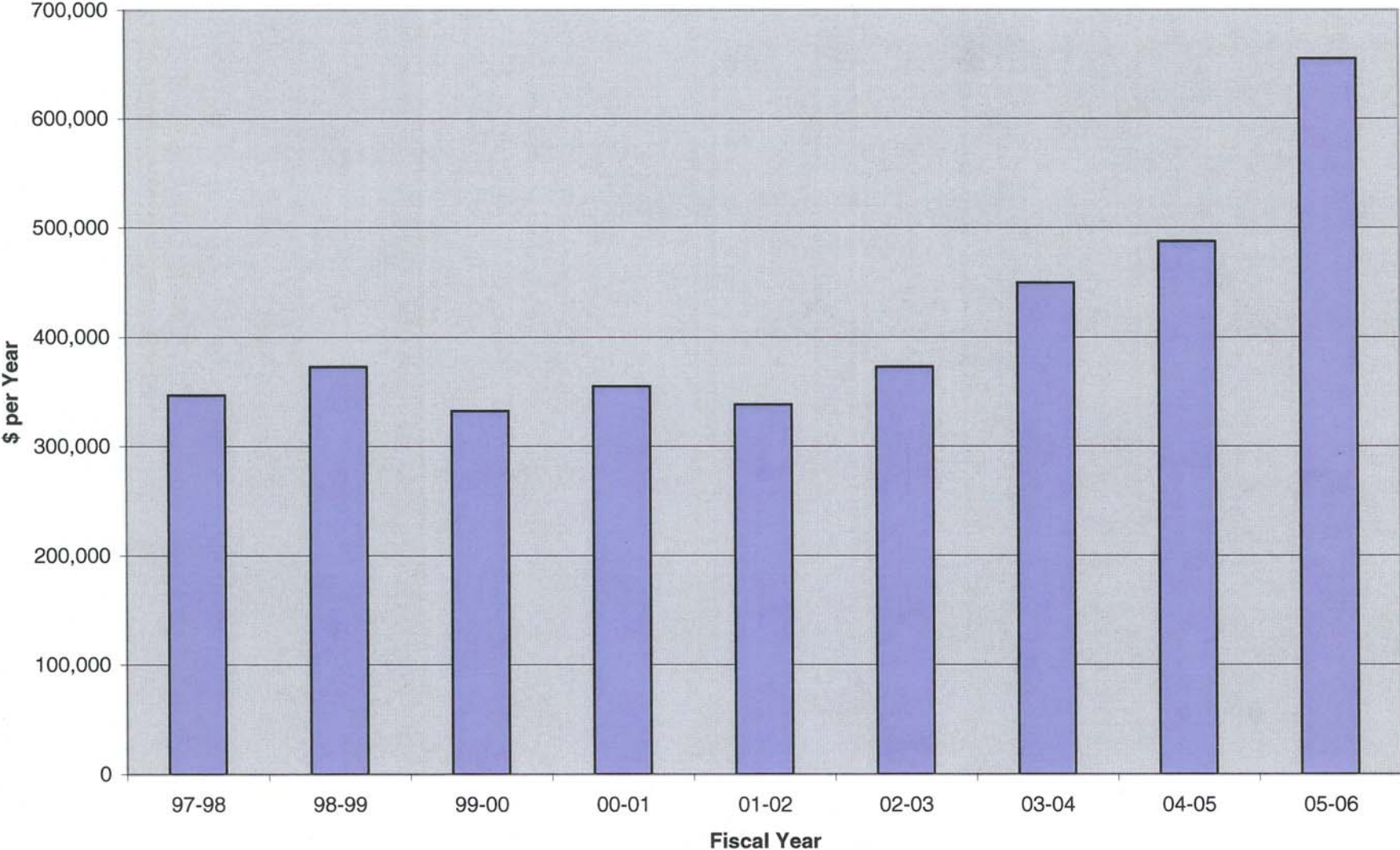
(1) Startup of UV disinfection and odor control in FY 05/06 accounts for increase in electricity w/o corresponding increase in BOD

TSTP Electricity

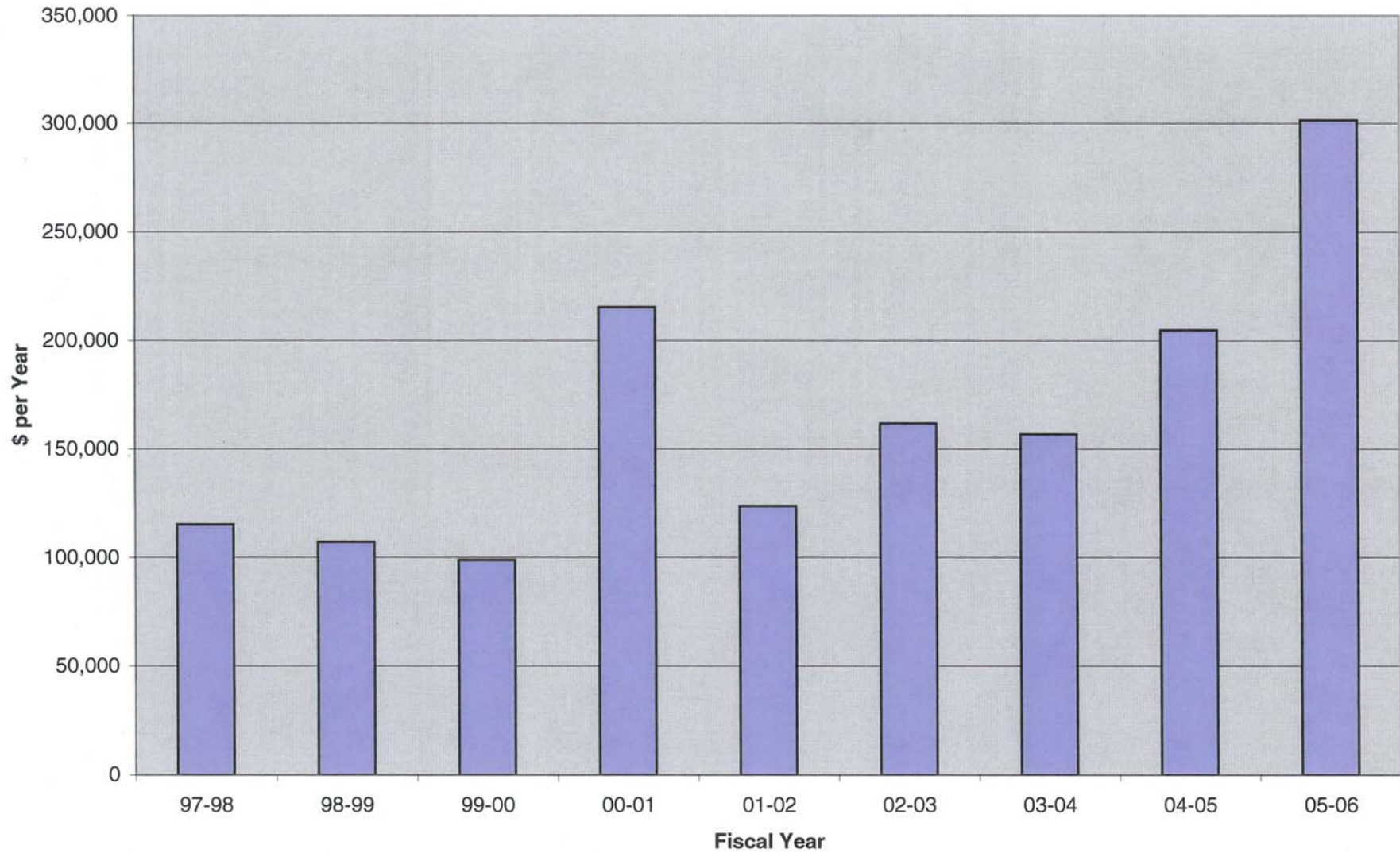


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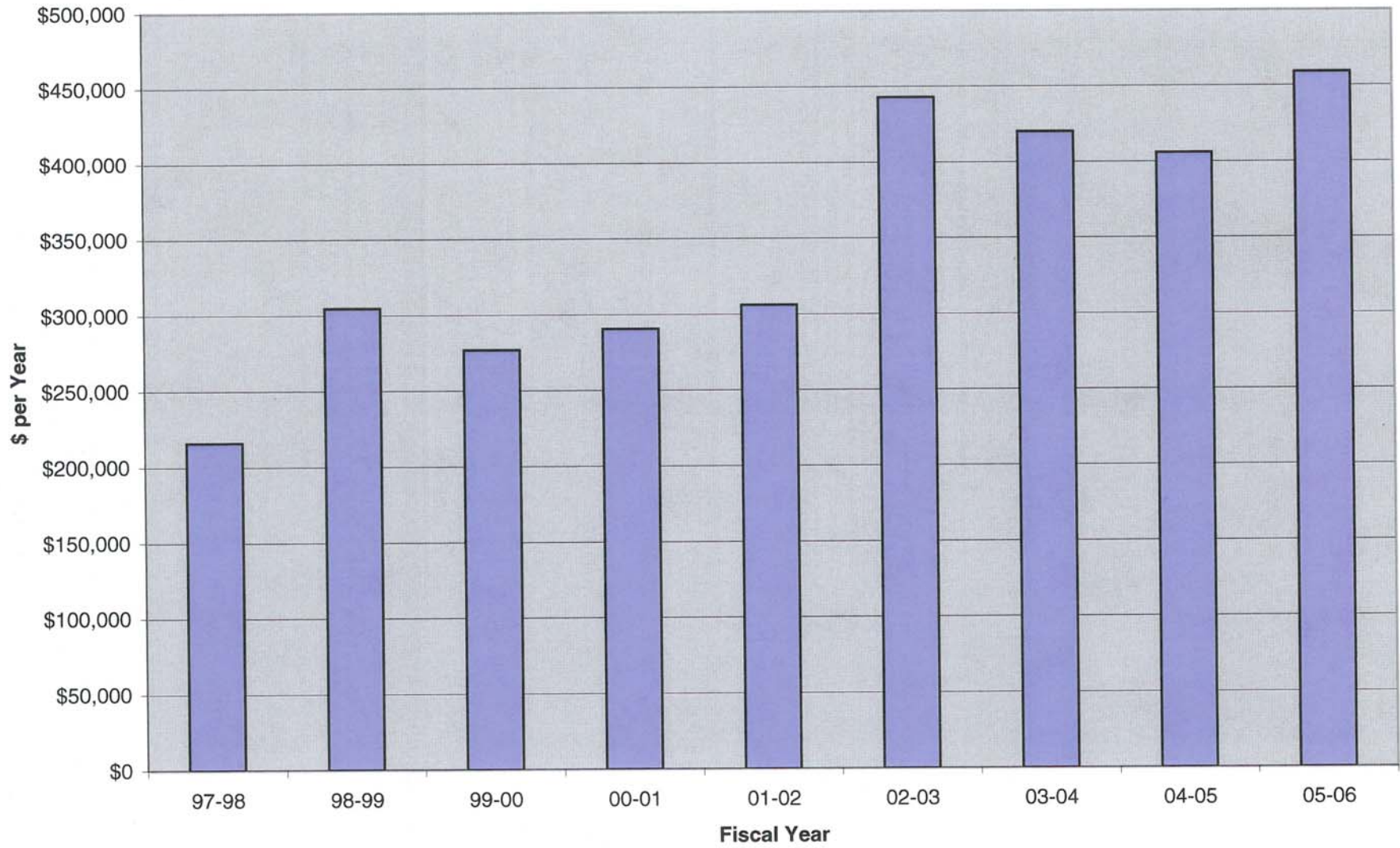
Combined Electricity Costs for both Facilities



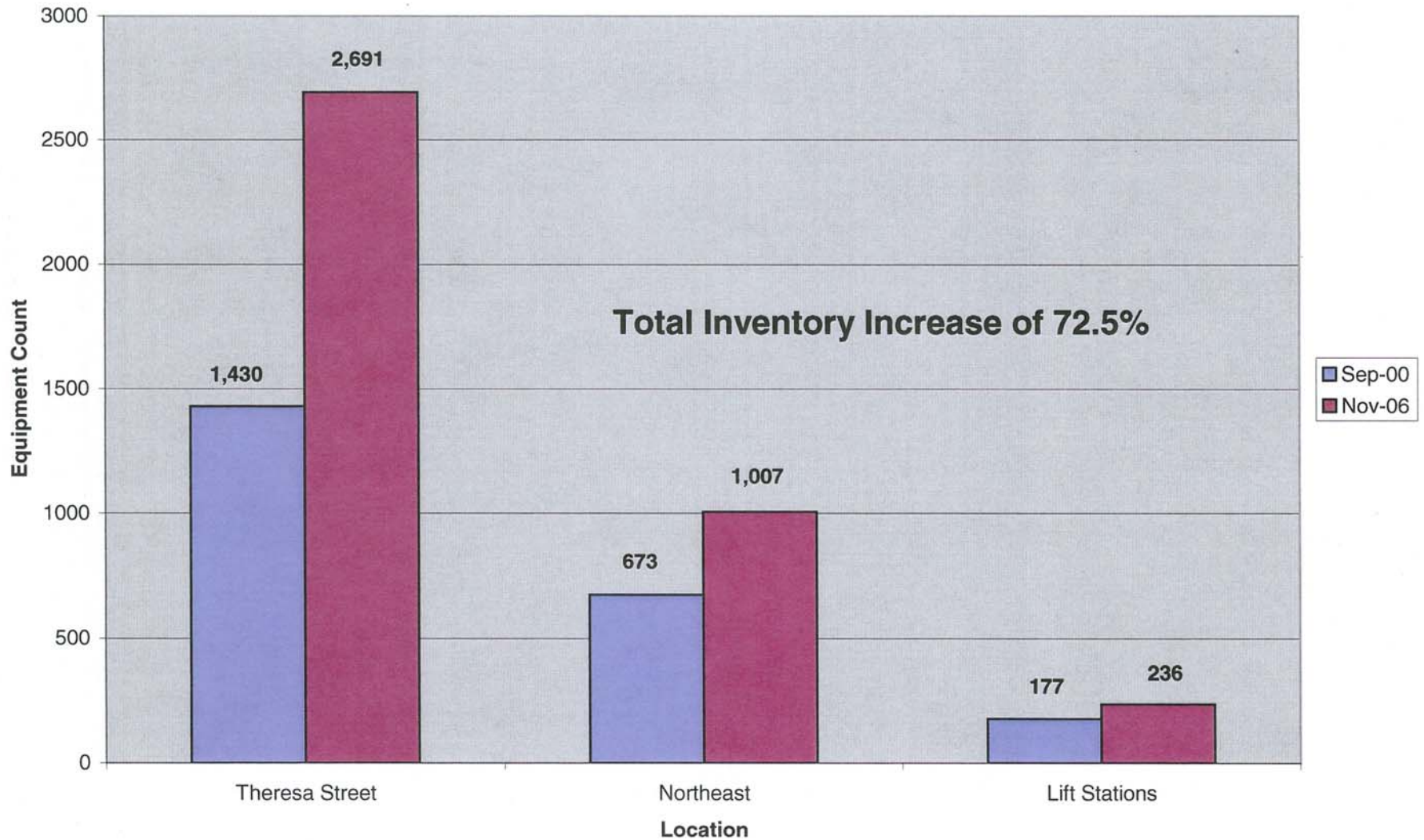
Natural Gas & Propane Costs for both Facilities



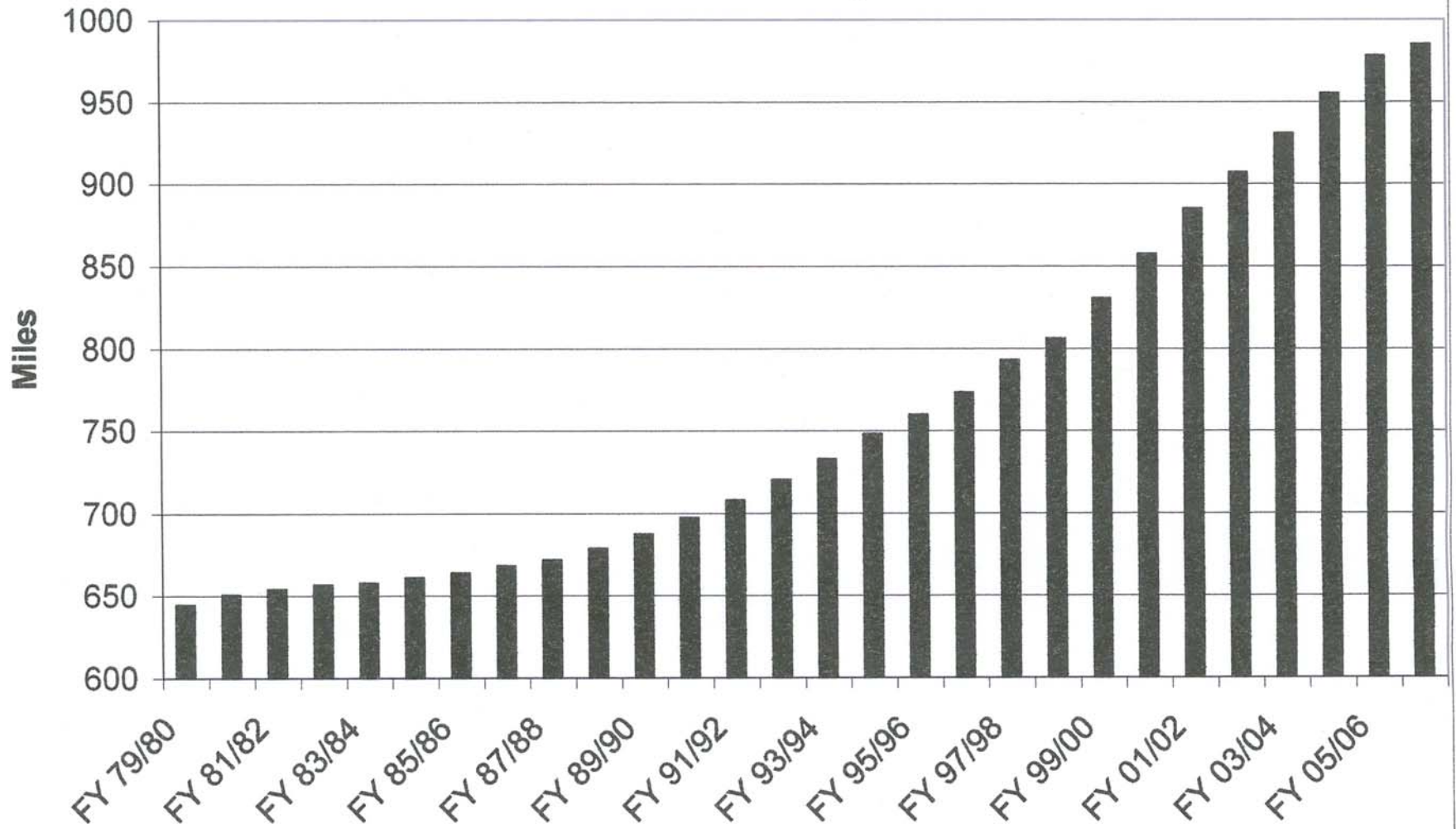
Chemical Costs for both Facilities



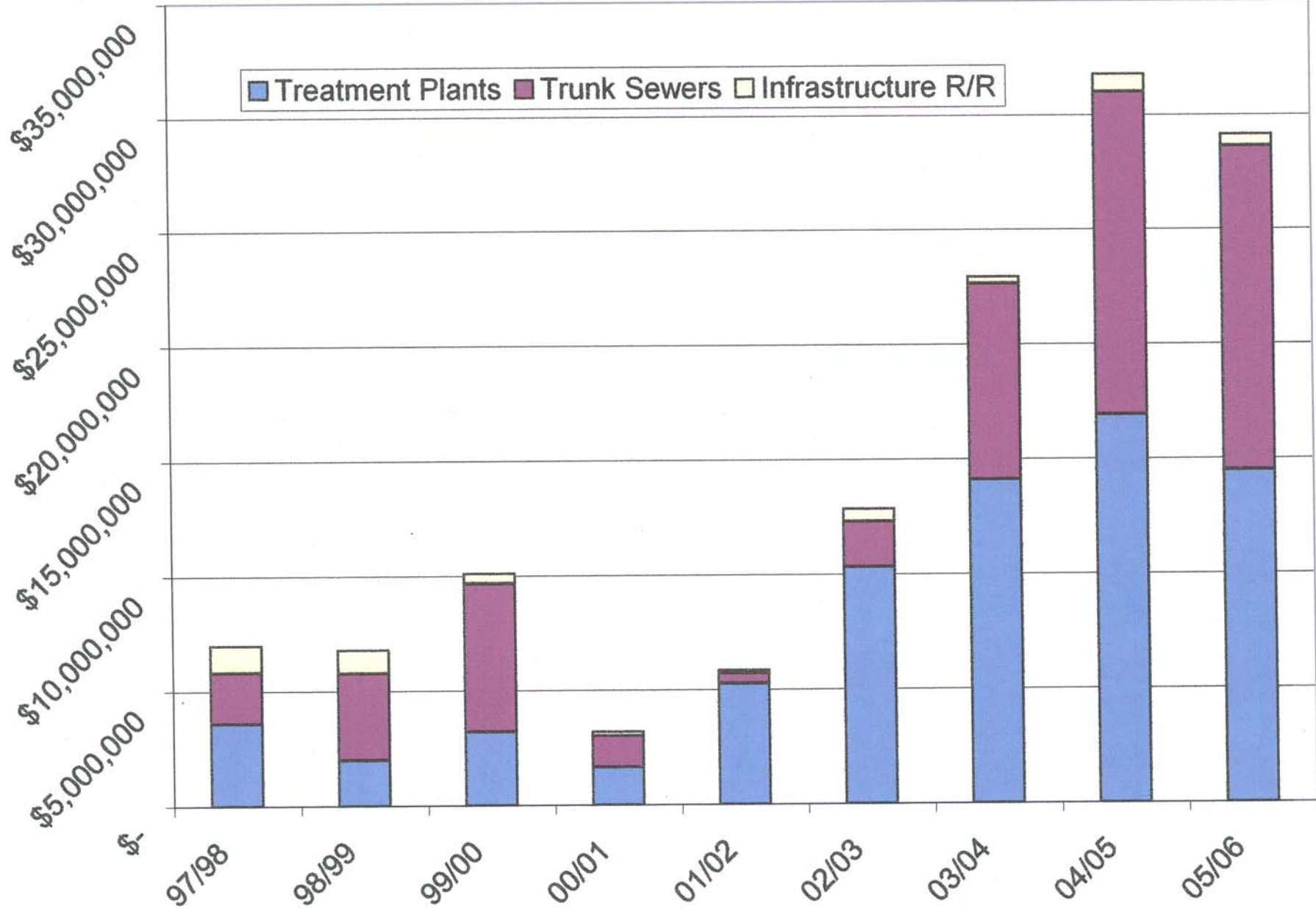
Increase in Equipment Inventory due to Capital Improvements



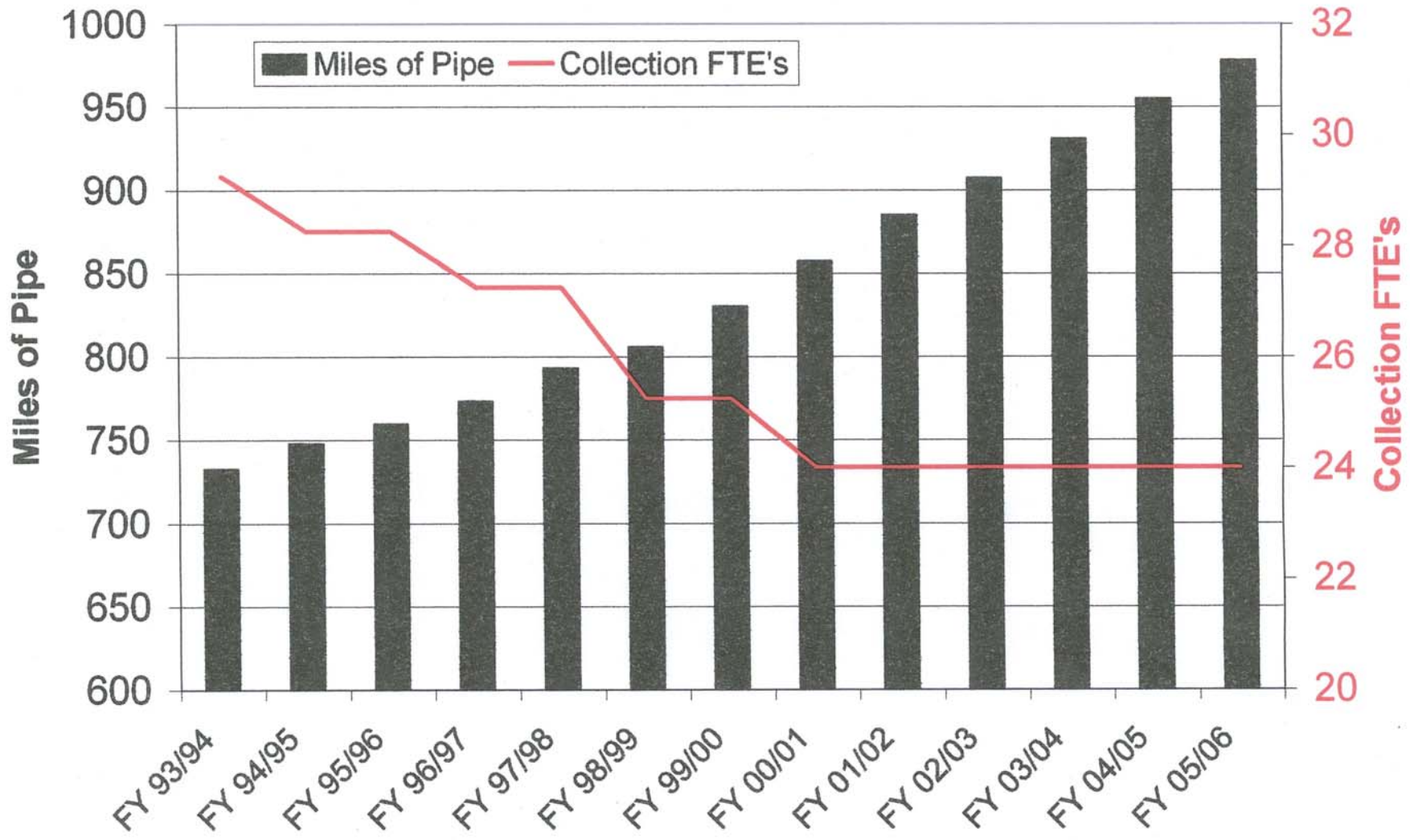
Wastewater Collection System Total Miles of Sewer by Year



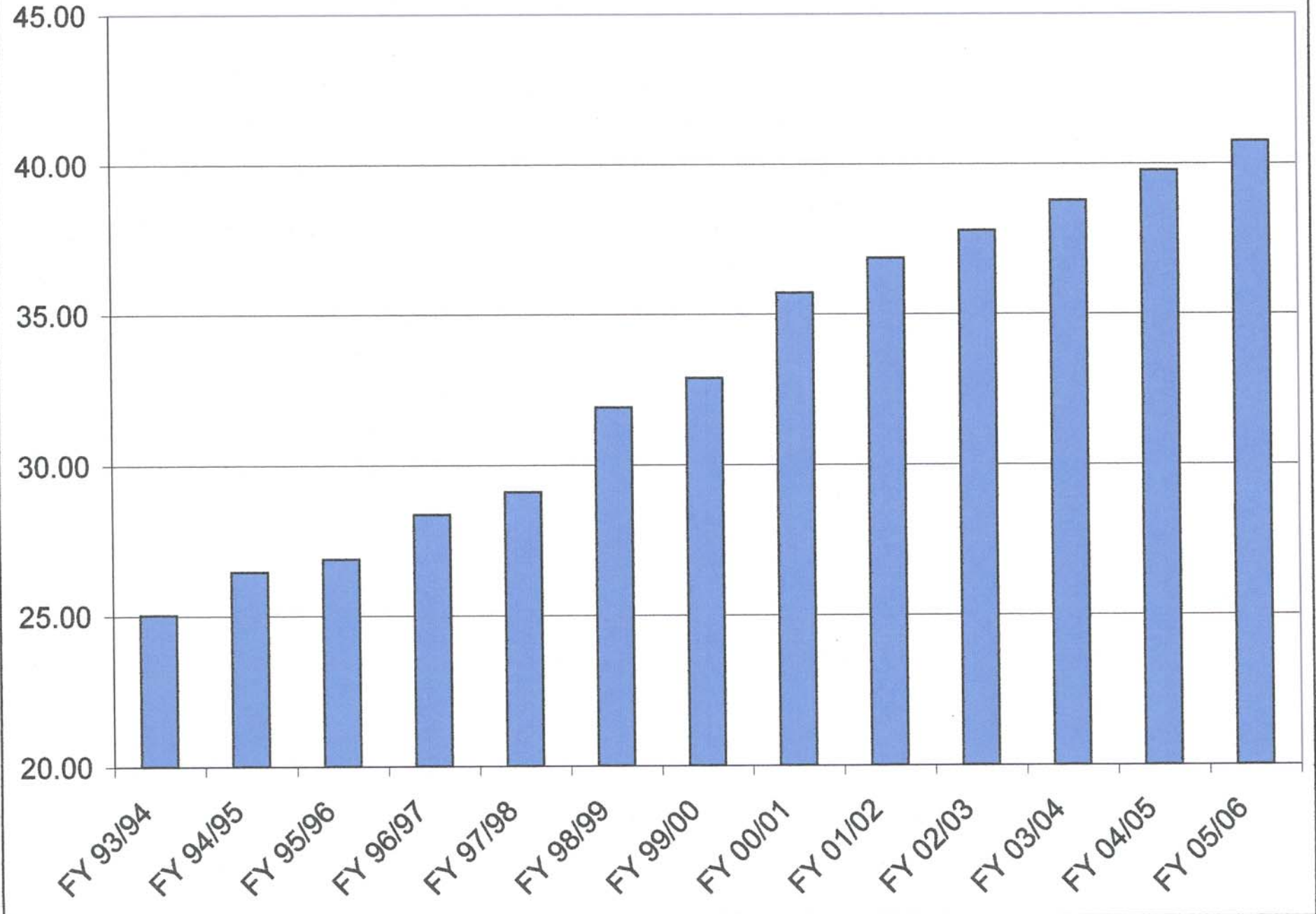
Capital Improvement Program

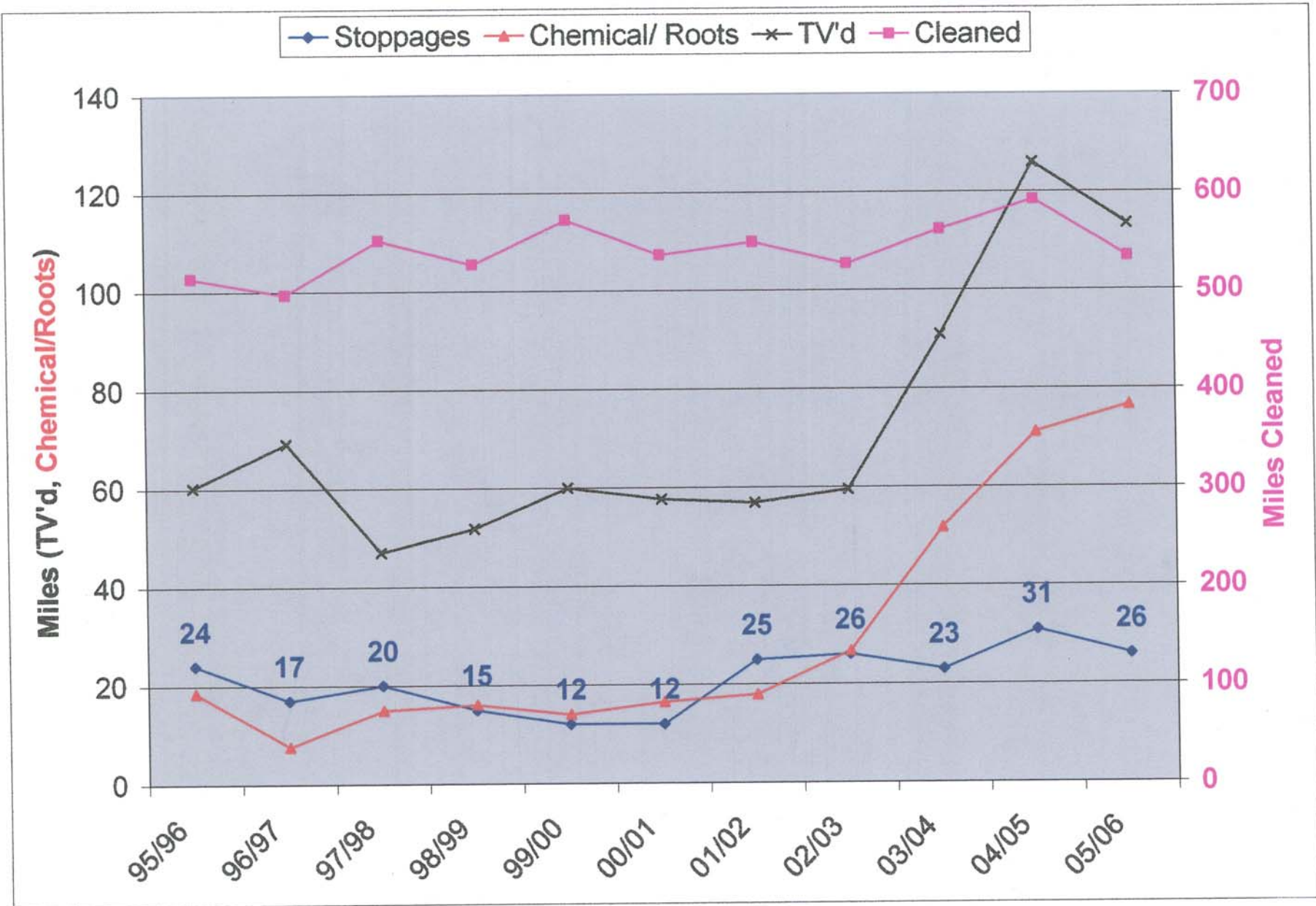


Wastewater Collection System Total Miles of Sewer by Year

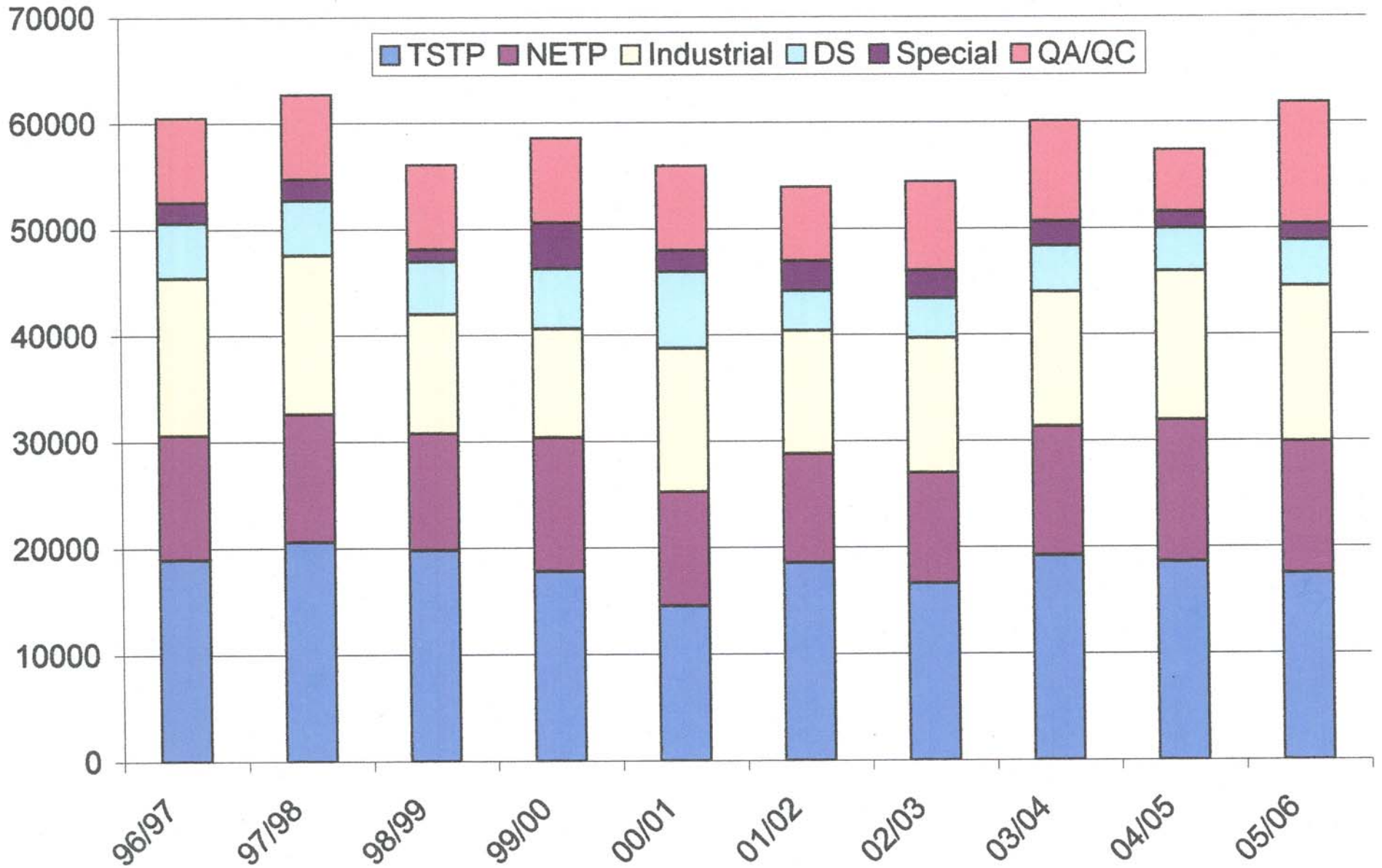


Miles of Pipe per FTE

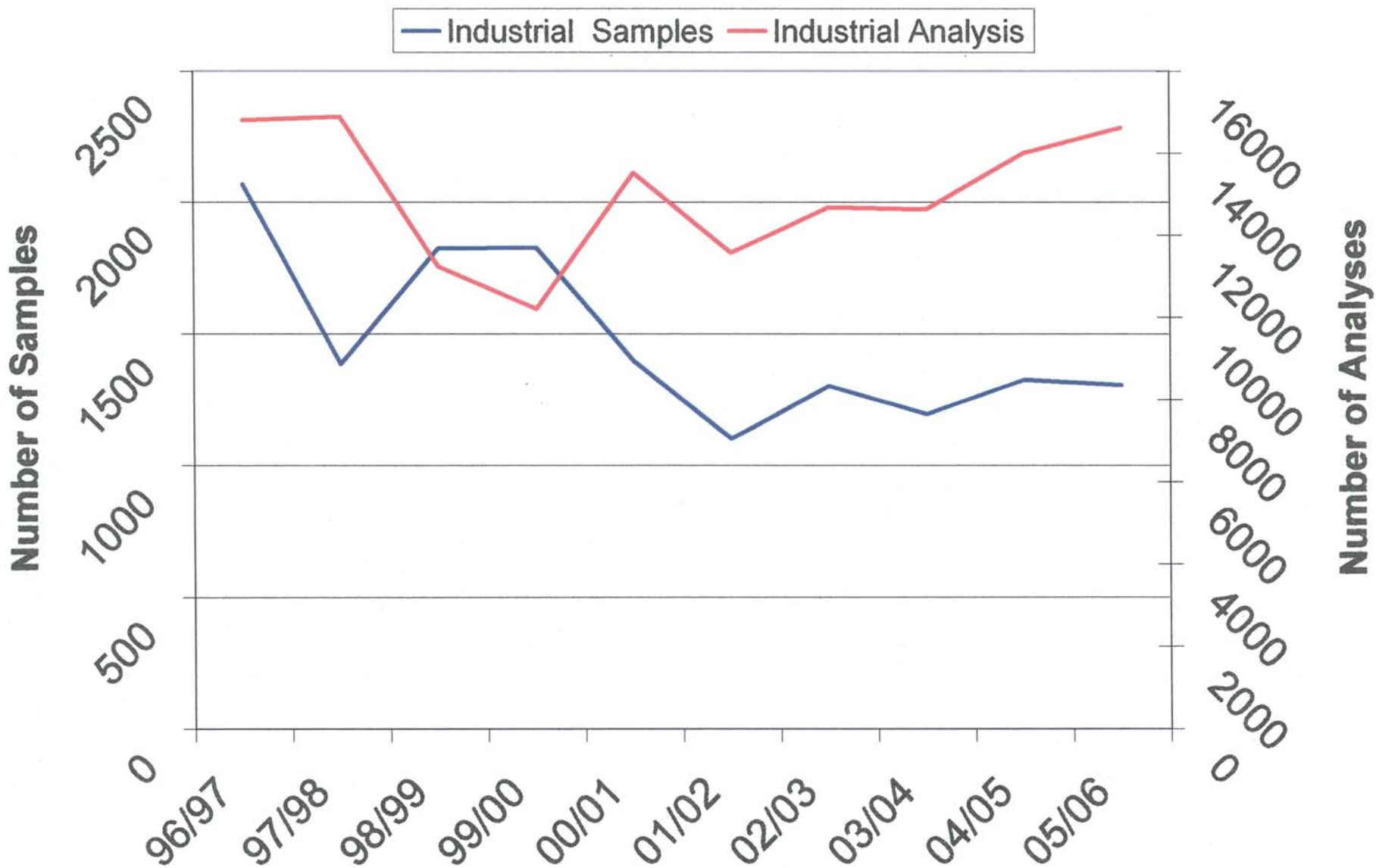




Laboratory Analysis



Industrial Monitoring



Flow Monitoring Program

