

ChemScan® UV-6100 Process Analyzer

PROJECT REPORT AND DATA SUMMARY NITRATE AND PERCENT TRANSMITTANCE MONITORING DEMONSTRATION REPORT

City of Burbank, CA
Water Reclamation Plant
Burbank, CA

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Background

The City of Burbank Water Reclamation Plant is a 9.0 MGD biological treatment facility providing treated effluent for cooling water and irrigation uses through a city owned reclaimed water distribution system.

During 1994 and early 1995 a study was conducted by Montgomery-Watson, Pasadena, CA to evaluate the feasibility of using UV disinfection to replace gaseous chlorine at this facility.

ChemScan was asked to participate in this study by furnishing an on-line process analyzer that was capable of performing an automatic analysis of percent transmittance and also of nitrate at 15 minute intervals in treated secondary effluent.

Project Summary

A method was developed to convert absorbance intensity measurements by ChemScan at 253.7 nm into a percent transmittance value. Periodic grab samples were obtained by plant personnel and analyzed by a third party certified laboratory.

Some drift was noted in the on-line percent transmittance measurements. It was concluded that the drift was directly related to the time period between zero events, with the most accurate measurements occurring after a new (manual) zero and the least accurate immediately prior to a new (manual) zero. Zeroing is the use of a non-absorbing standard (deionized water) to measure and subsequently subtract the effects of fouling on the optical surfaces of the flow cell.

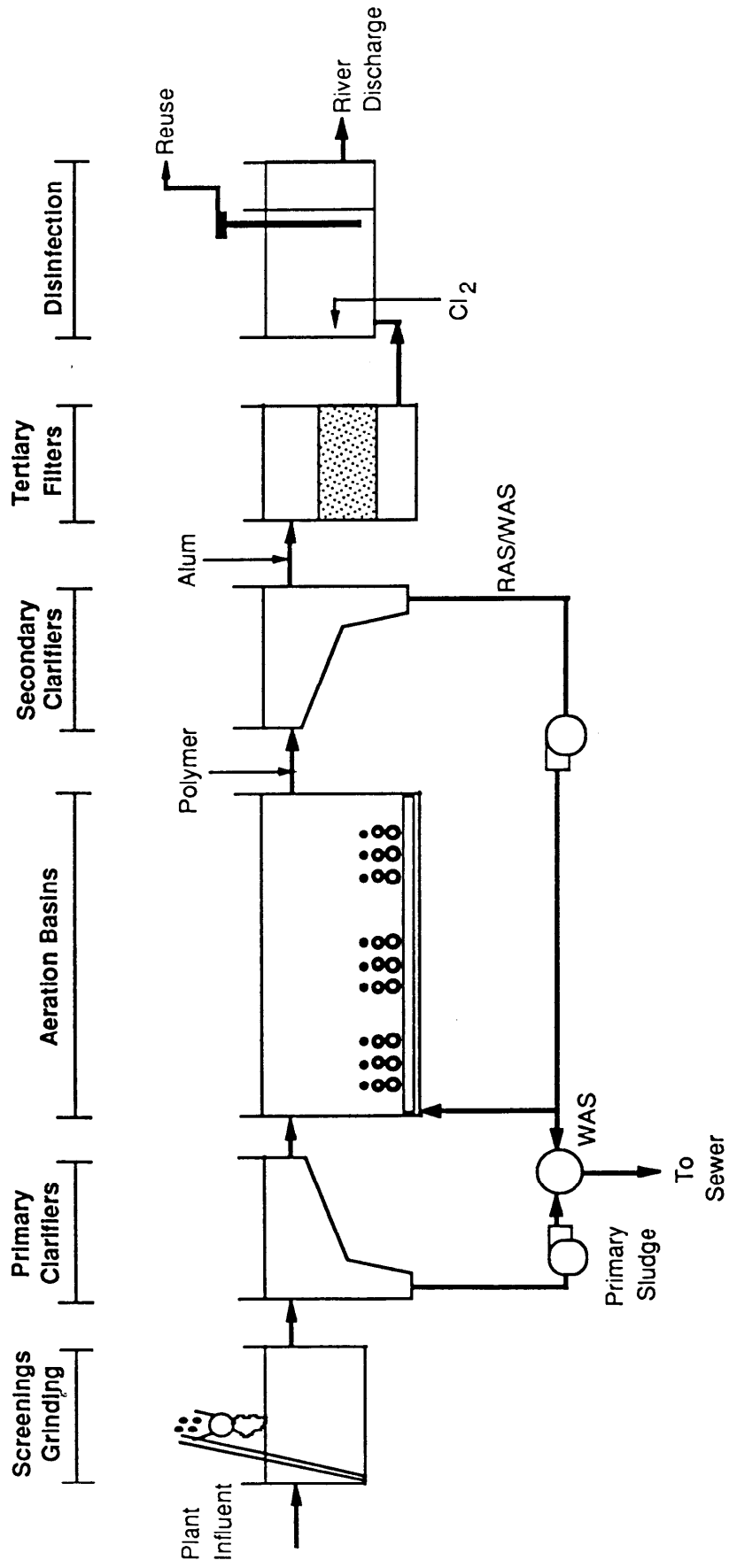
A newly developed automatic zeroing and clearing mechanism was installed, which resulted in a stable, reliable output for percent transmittance.

Nitrate analysis also benefited from the use of frequent automatic zeroing and cleaning.

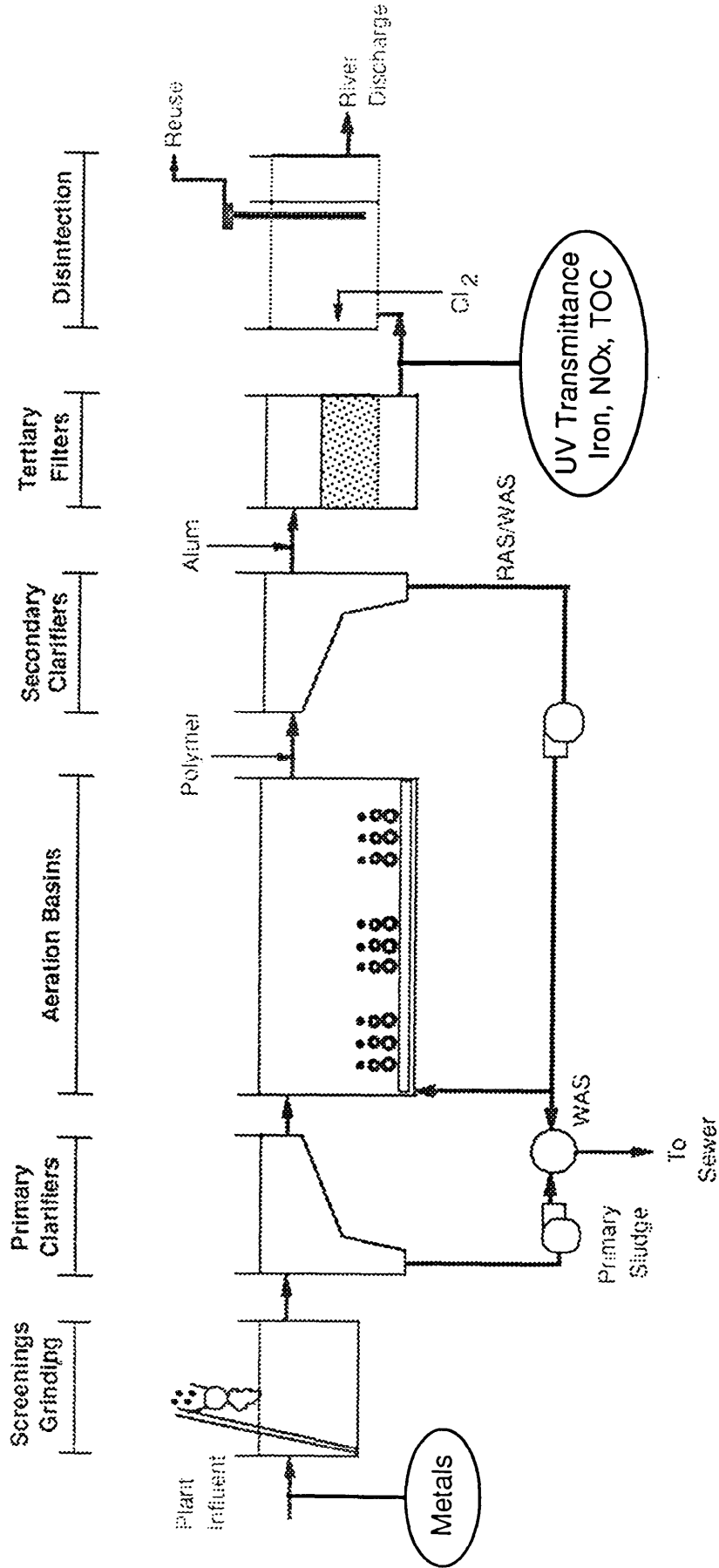
A draft of the Montgomery-Watson study report is attached. This information was presented by Montgomery-Watson at the WEF Specialty Conference entitled "Disinfecting Wastewater for Discharge and Reuse", March 18, 1995.

Montgomery-Watson noted that this study was "one of the first to monitor transmittance on an almost continuous basis." It was recommended that "at a minimum, every UV transmittance characterization study include continuous monitoring over some period of time in order to understand its variability."

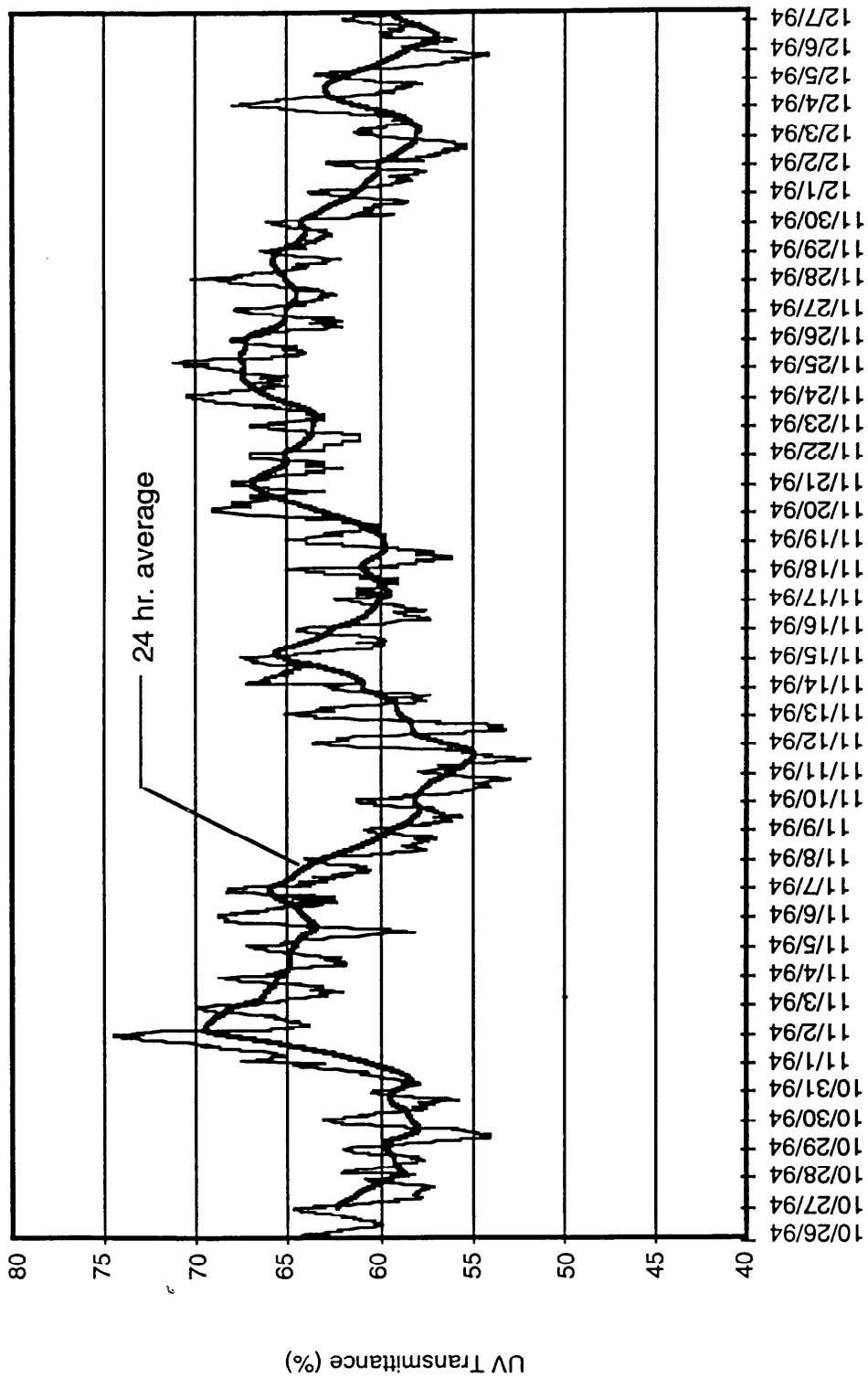
The ChemScan system is the only known system which can simultaneously monitor transmittance, (JTU) turbidity, iron and total oxidized nitrogen which were found to be among the variable affecting UV disinfection efficiency.



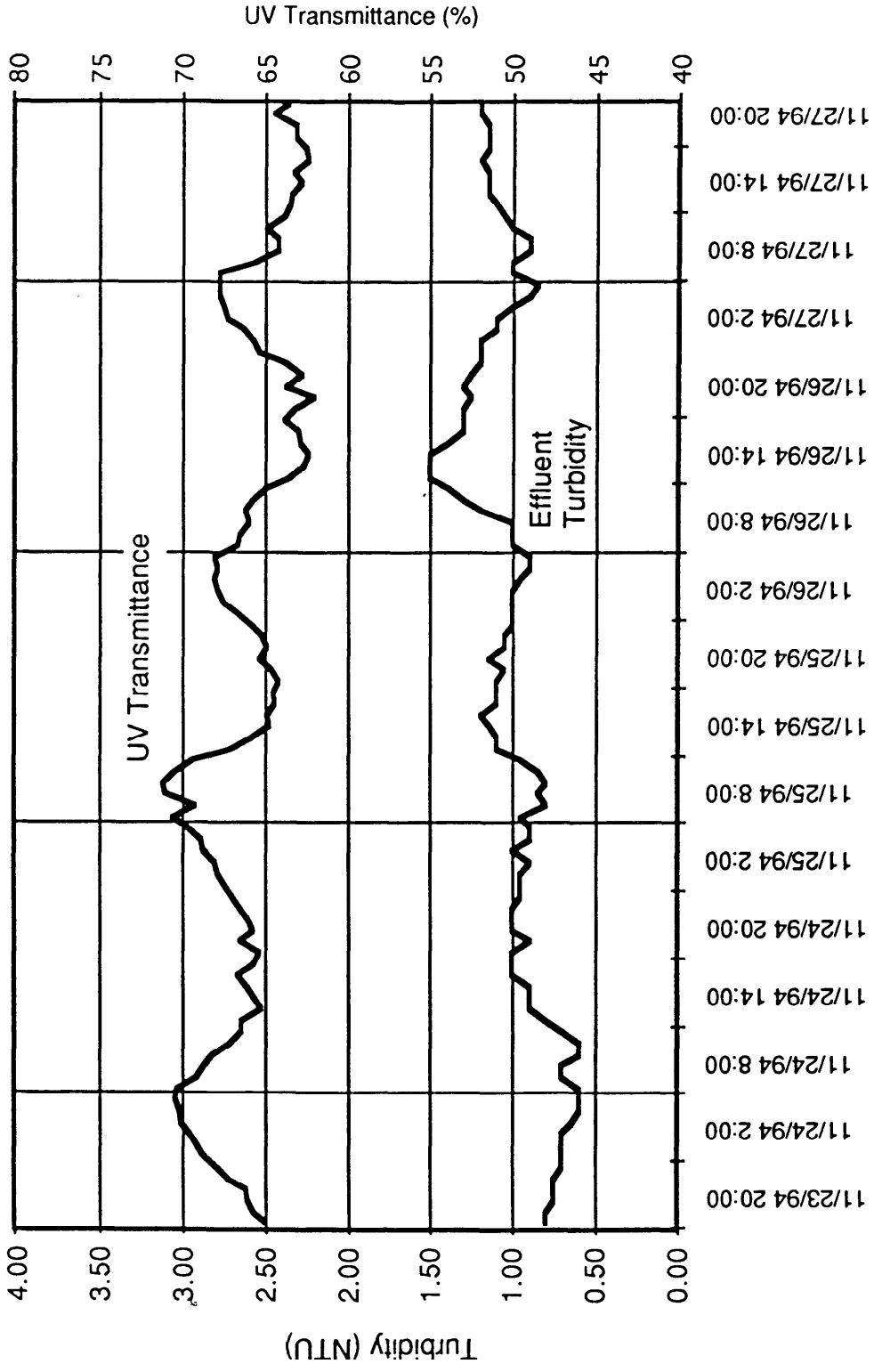
Burbank Water Reclamation Plant Simplified Process Schematic
Figure 1



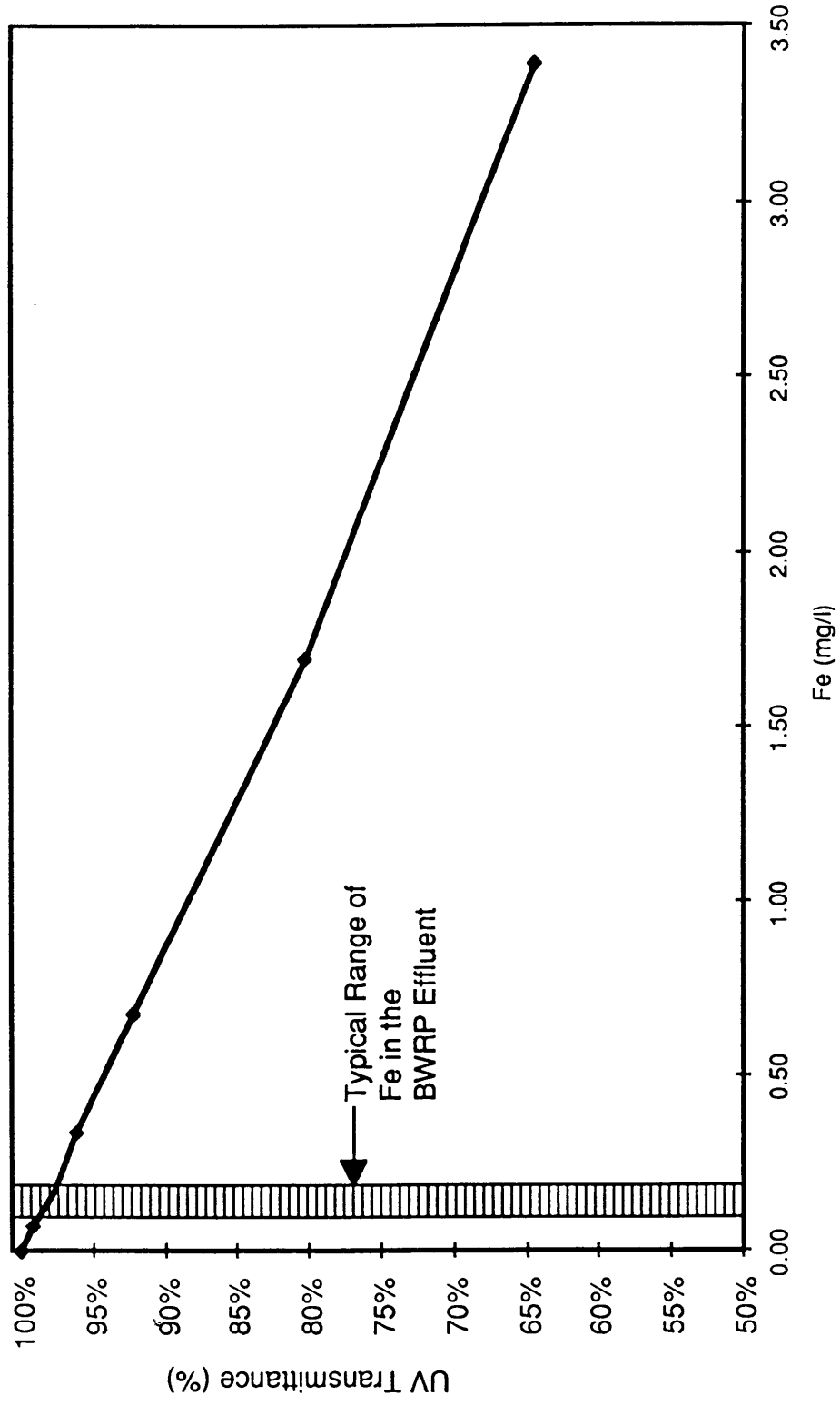
Sampling Locations
Figure 2



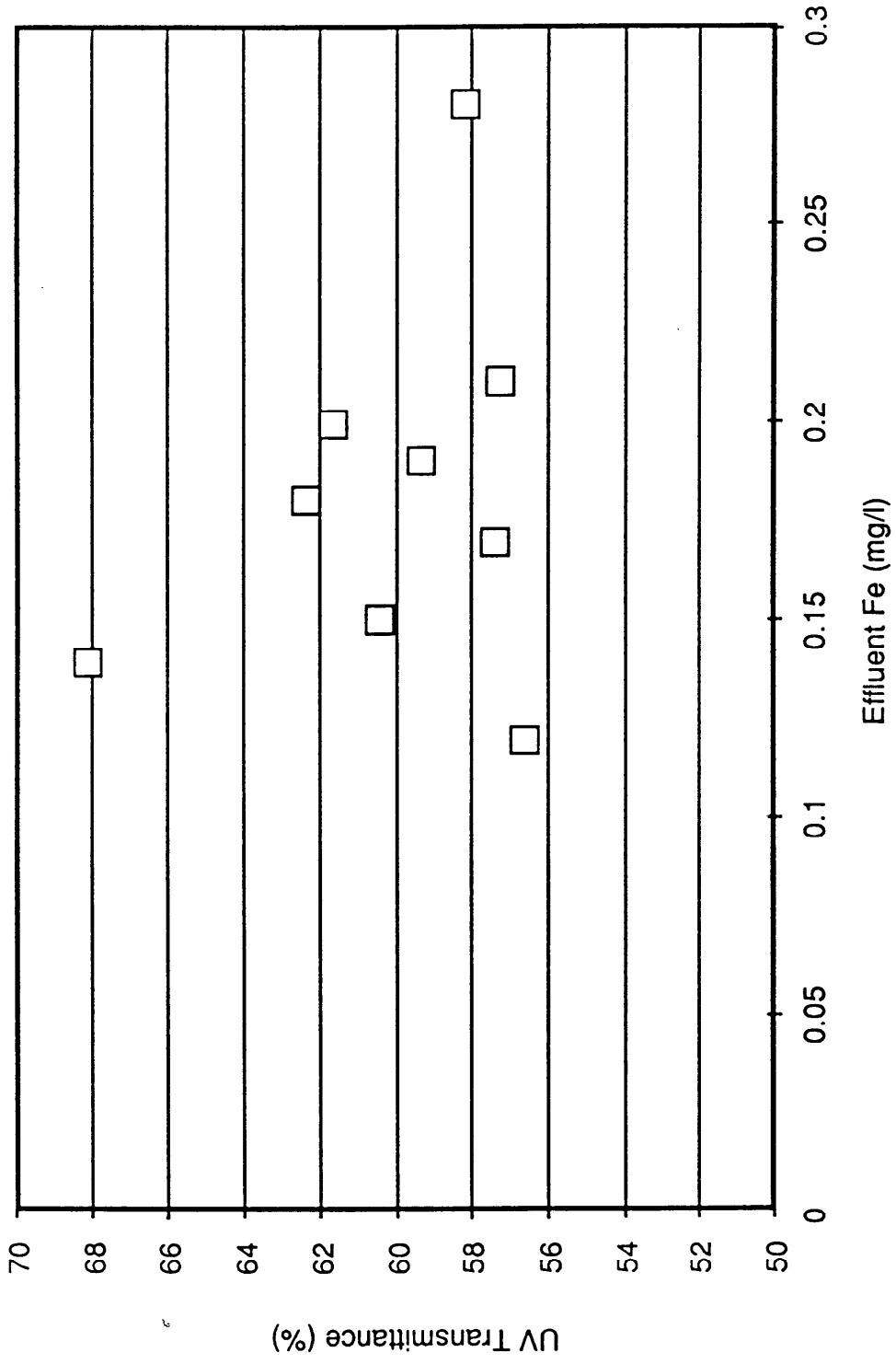
UV-254 Transmittance Data (10/26 - 12/7)
Figure 3



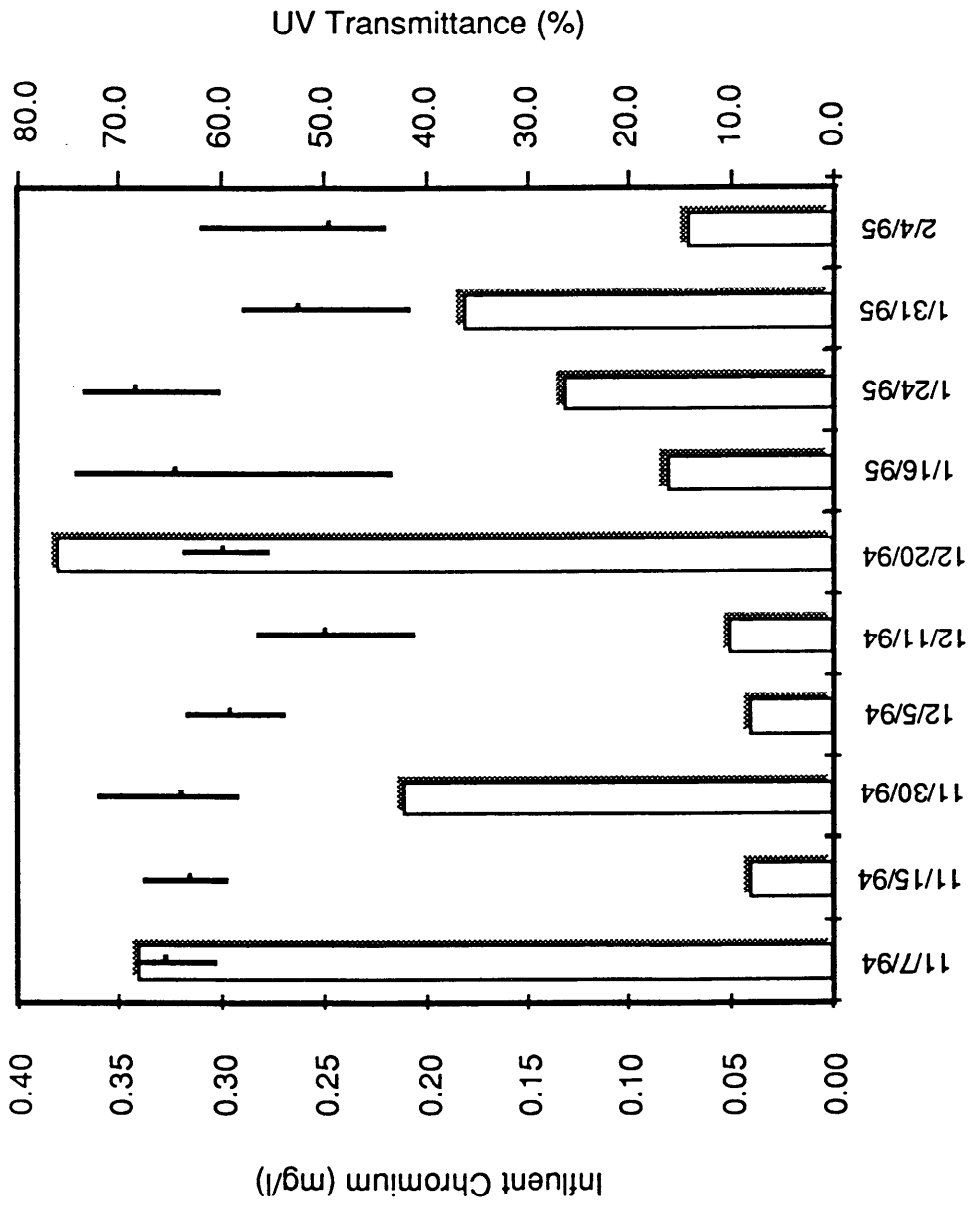
Impact of Turbidity on Transmittance
Figure 4



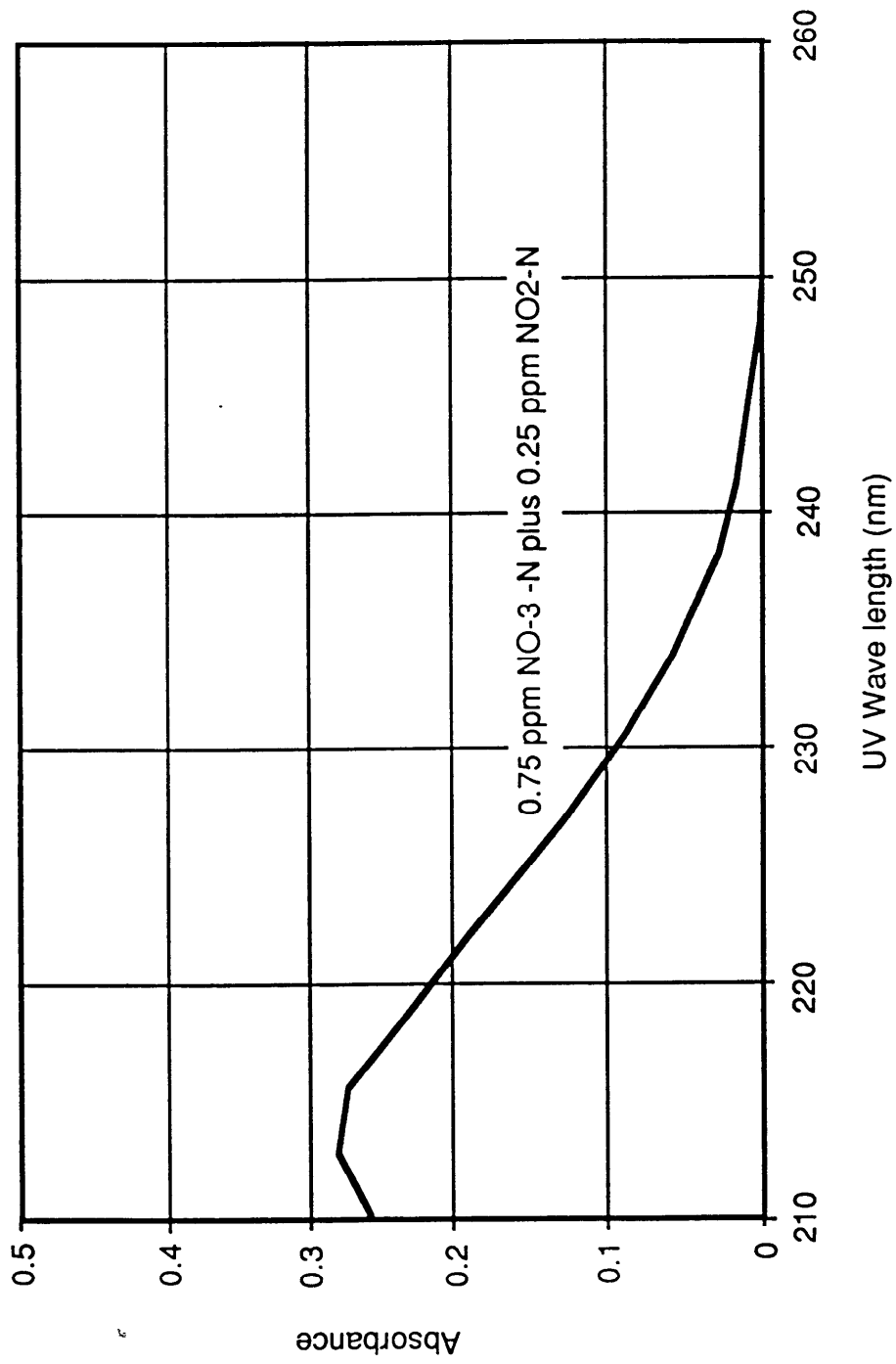
Impact of Iron on UV Transmittance in Distilled Water
Figure 5



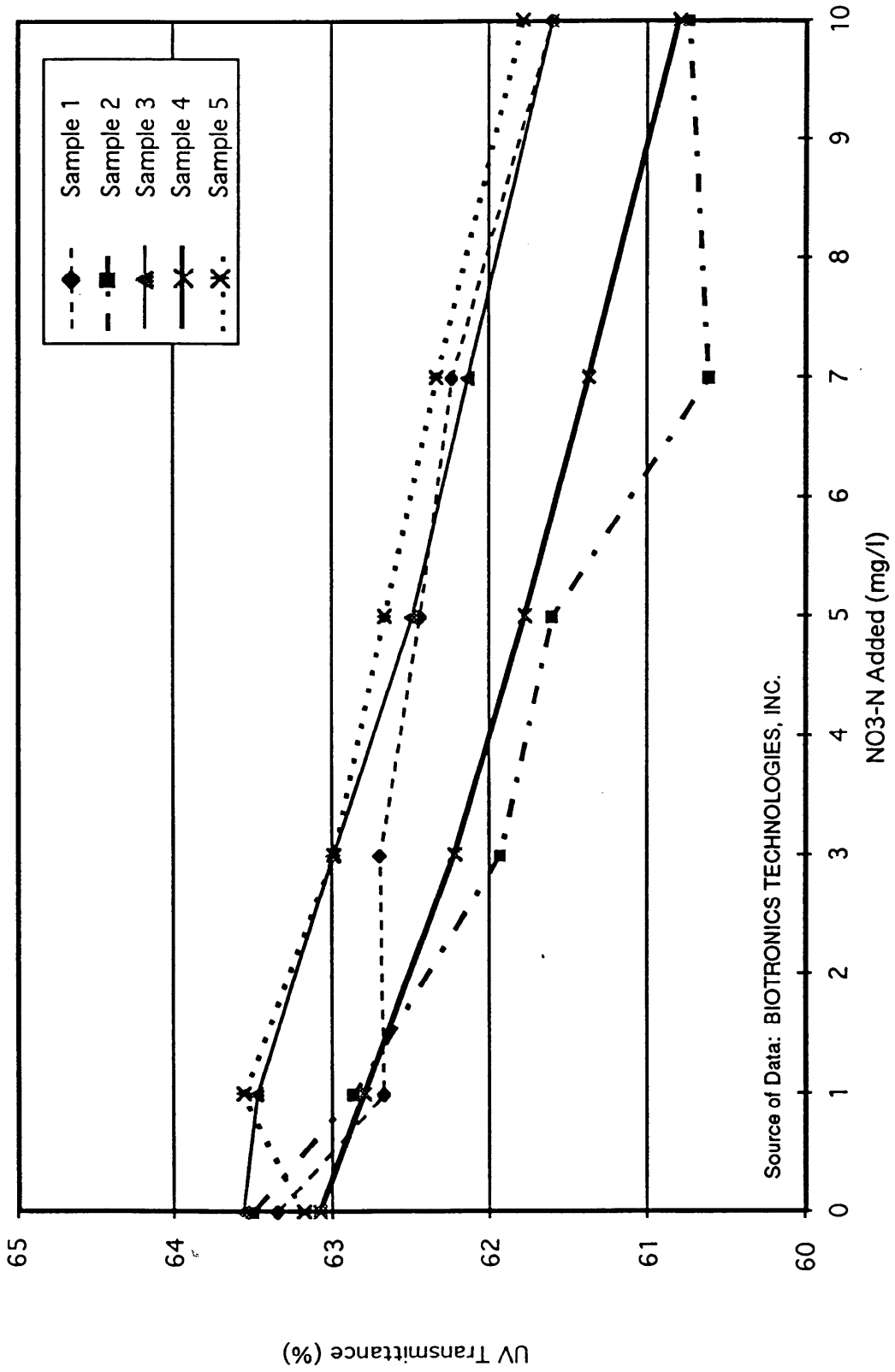
Transmittance vs. Iron in Filtered Effluent
Figure 6



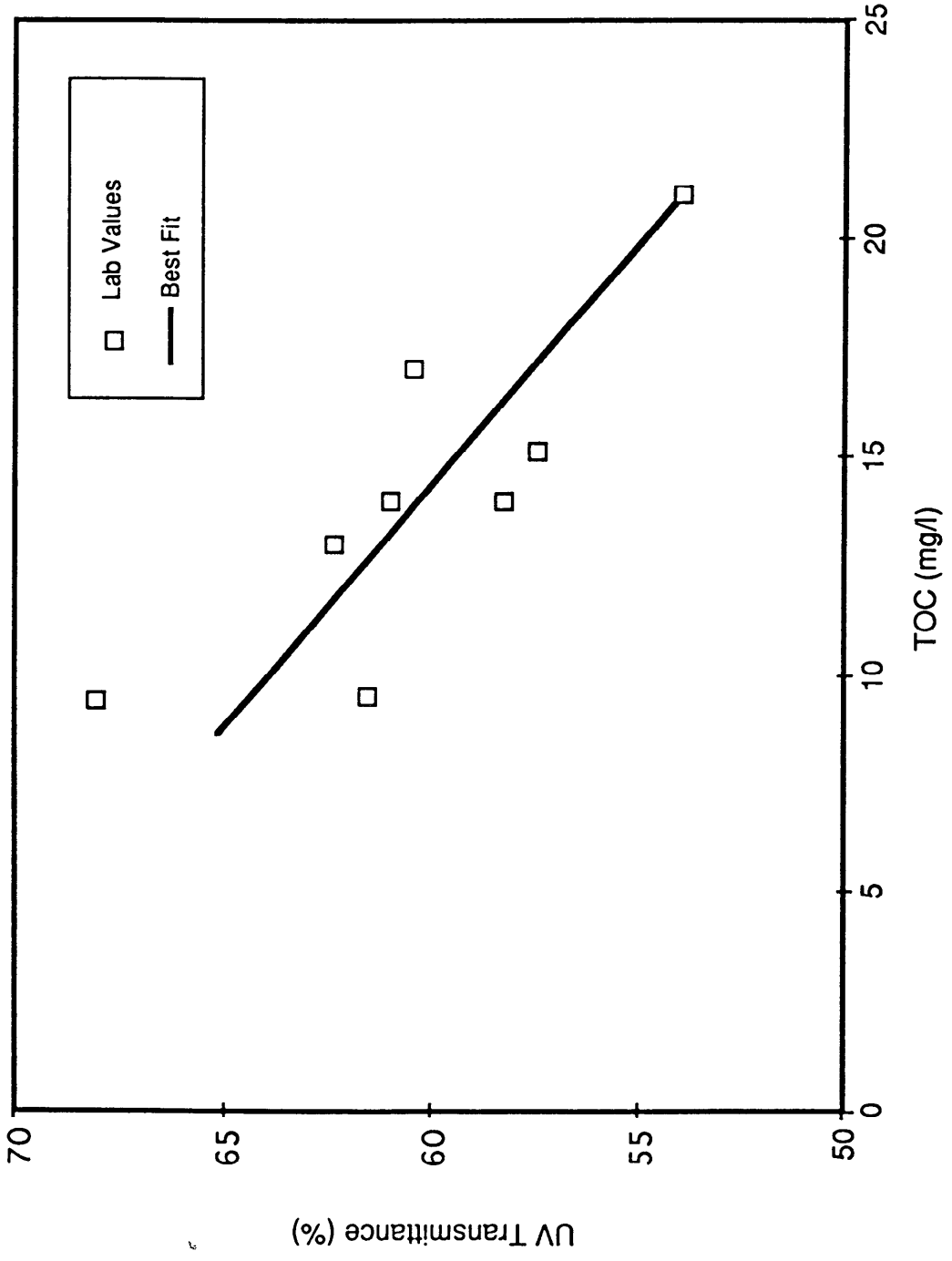
Impact of Influent Chromium on Effluent Transmittance
Figure 7



UV Absorption Spectrum for Nitrates
Figure 8



Impact of Nitrates on UV Transmittance in Final Effluent
Figure 9



Impact of Total Organic Carbon on Transmittance in Final Effluent
Figure 10