

ChemScan® UV-6100 Process Analyzer

PROJECT REPORT AND DATA SUMMARY
MULTIPLE PARAMETER WASTEWATER MONITORING
PERFORMANCE EVALUATION

City of Calgary
Bonnybrook Wastewater Treatment Plant
Calgary, Alberta, Canada

Published By:
Applied Spectrometry Associates, Inc.
W226 N555G Eastmound Drive
Waukesha, WI 53186

May 8, 1997

Introduction

The Bonnybrook Wastewater Treatment Plant is the oldest and largest of two facilities owned and operated by the City of Calgary. Originally built in 1932 and expanded in the 1950's, 1970's and in the early 1990's, the plant now has a capacity of 110 million gallons per day.

The Bonnybrook plant operates primary, secondary and tertiary treatment processes, including nitrogen and phosphorous removal and ammonia control. The plant also operates one of the largest ultraviolet disinfection facilities in North America.

Process Analyzer Evaluation

ChemScan was the low bidder on an open bid at Bonnybrook to detect four parameters (nitrate, ammonia, phosphate, % transmittance) at a specified accuracy at five sample points throughout the plant. Bid evaluation was based on ownership cost (capital cost, operating costs, maintenance costs) with the low bidder required to demonstrate that their system meets the accuracy requirement, operating cost and maintenance cost as bid. ASA bid a total of three systems for the five sample points.

The evaluation was at one of the five sample points, using a ChemScan system leased by the City of Calgary. The evaluation results show that accuracy for each parameter was much better than specified throughout the entire evaluation period. Operation and maintenance expense was shown to be less than the amounts estimated by ASA in the original bid. A purchase order for the evaluation system was received in February 1997 and a purchase order for the two additional systems was received in March 1997.

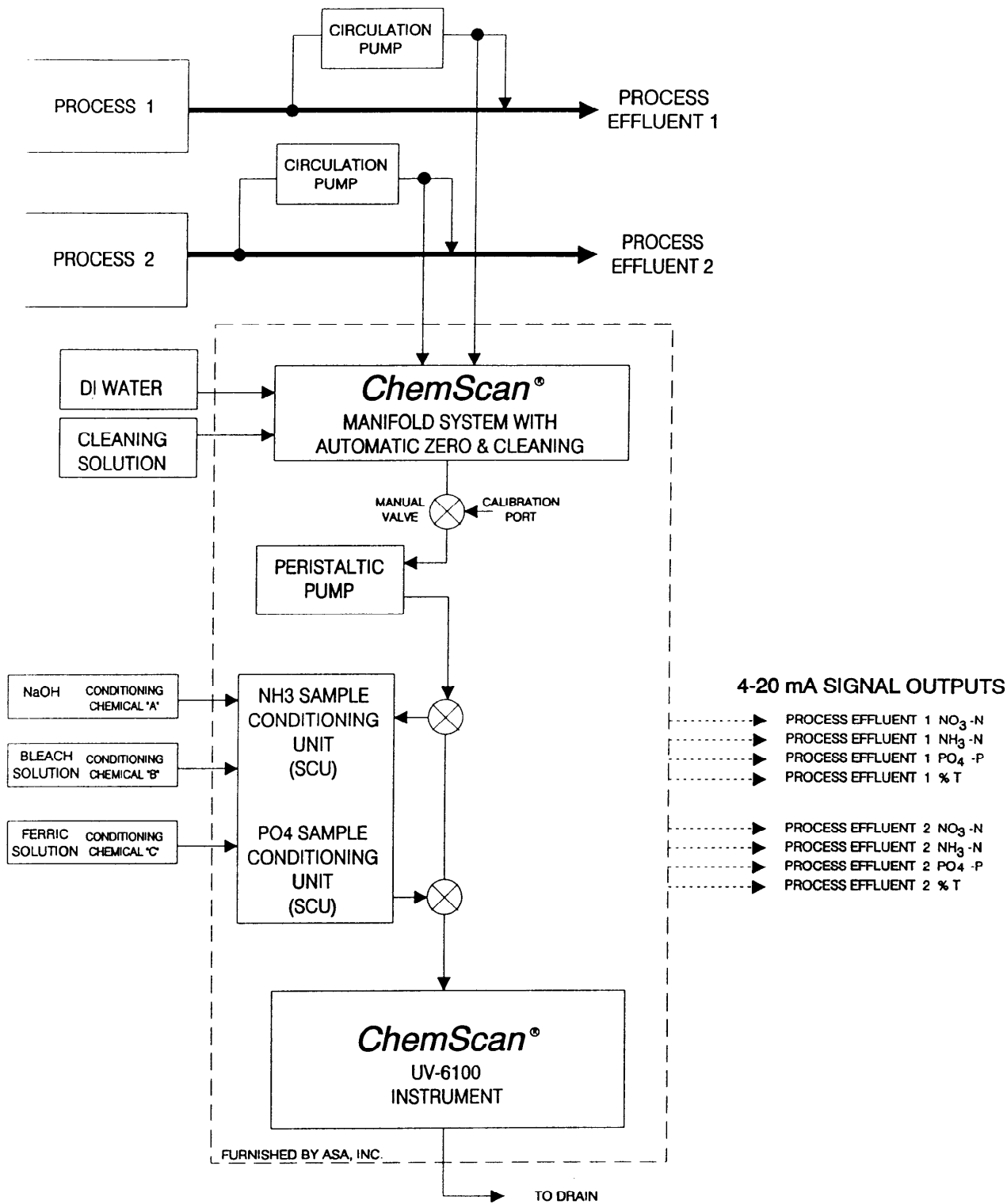
Attachments

Attachment 1 shows a functional block diagram for one of ChemScan Process Analyzer Systems used to monitor two sample points. Dedicated analog outputs are provided for each parameter at each sample point.

Attachment 2 shows the general arrangement of the ChemScan System including the UV-6100 Instrument, Analyzer Pump, Sample Conditioning Unit, Manifold Module and Mounting Stands.

Attachments 3, 4 and 5 show the evaluation results for a four month period comparing on-site laboratory analysis of grab samples with the ChemScan analyzer results for nitrate, ammonia and phosphate. ASA specifications show a $\pm 5\%$ accuracy for each of these parameters. Data for each parameter show the absolute error to be better than specified during each month of the evaluation and for the entire four month evaluation period as a whole.

This performance was achieved without recalibration of any of the parameters during the test period (although the operator did perform one slope and intercept adjustment during the period on the ammonia calibration).

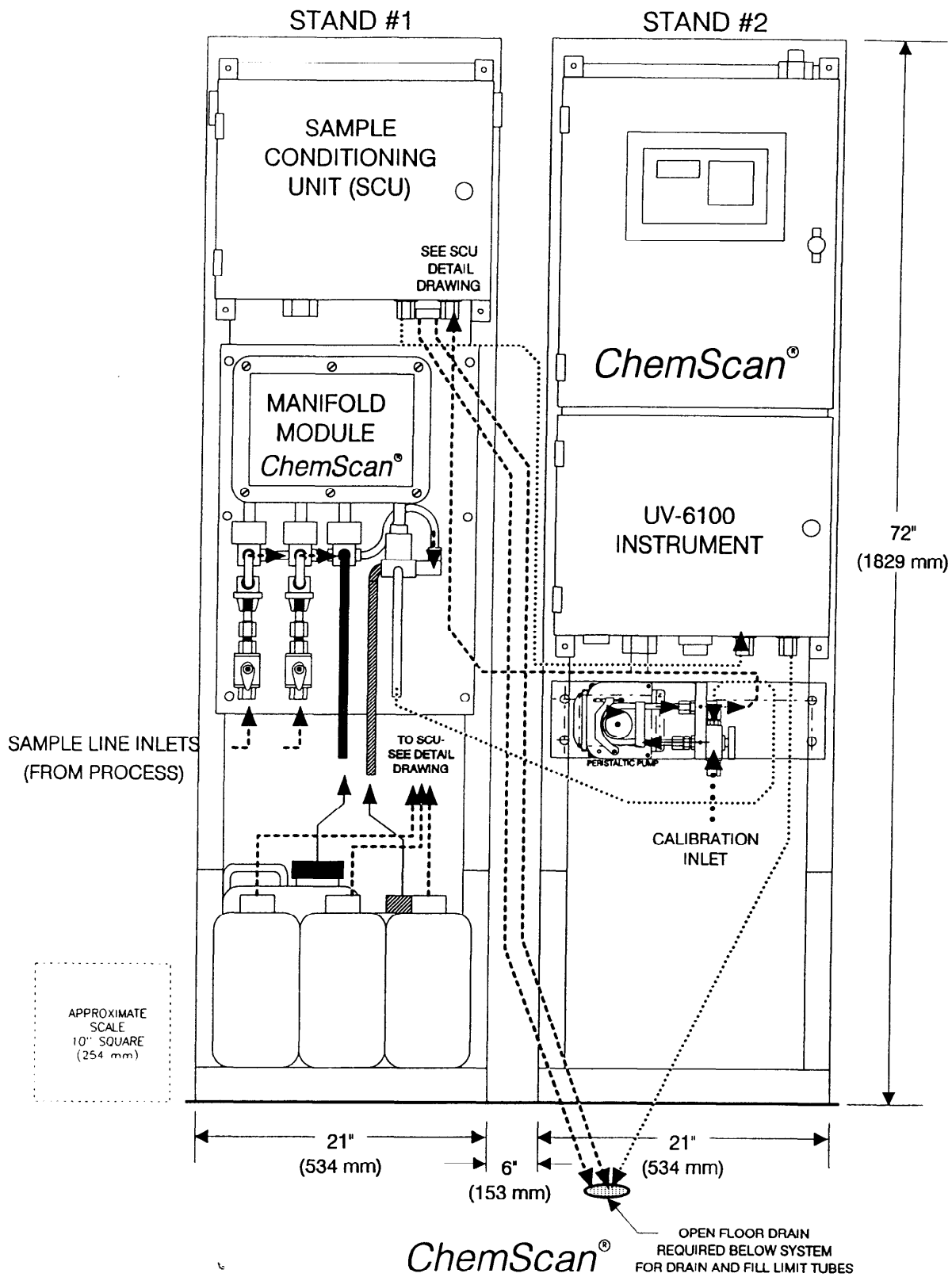


Functional Block Diagram
Process Monitoring System

Bonnybrook WWTP
Calgary, Alberta Canada
March 6, 1997

Attachment 1

© ASA, INC.
P# 5105
F# BNNYBR2
D# BDBBRK2
REV 970312



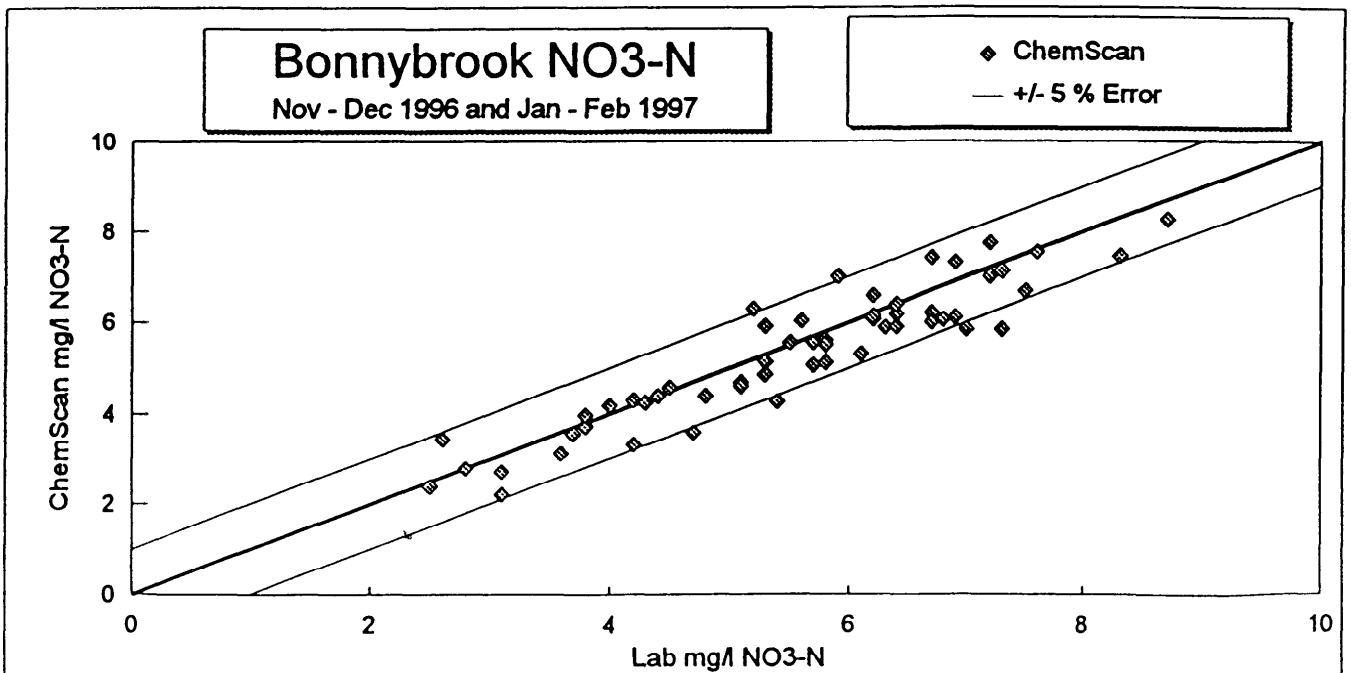
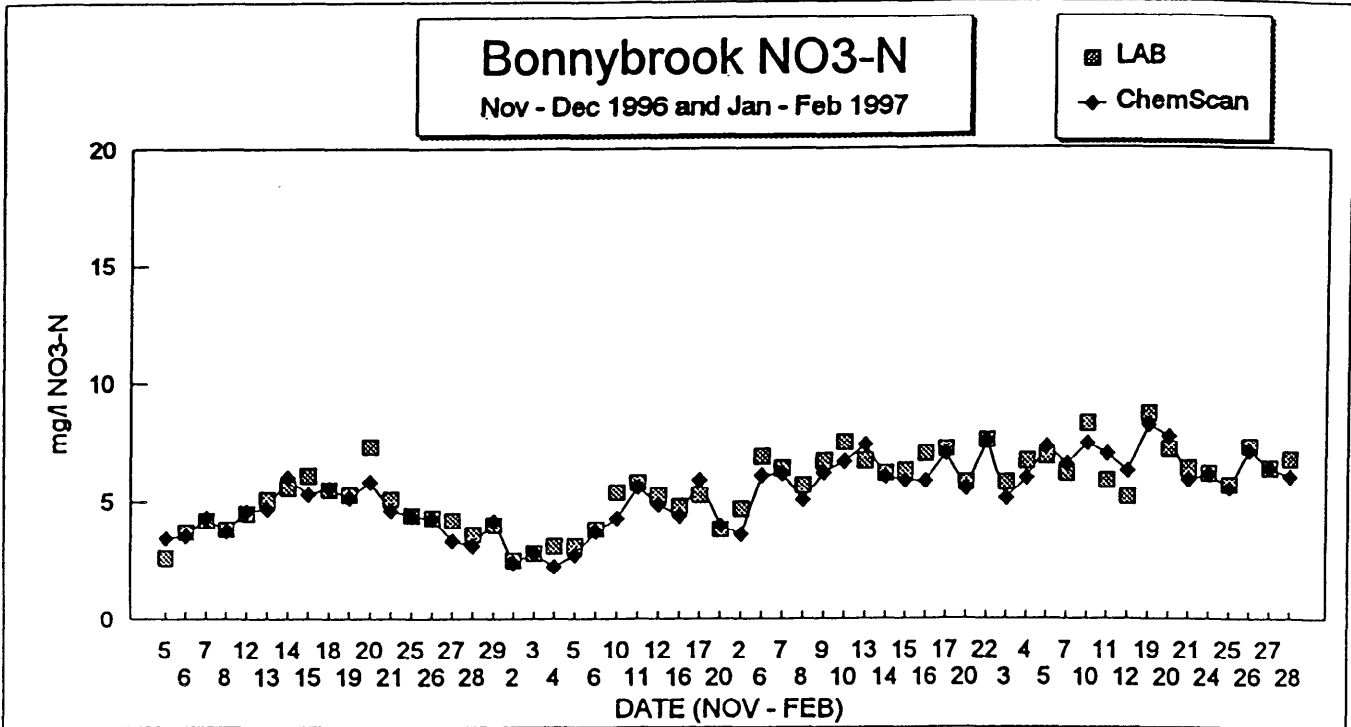
ChemScan®
 System Installation Diagram - Plumbing Overall View
 -Typical Mounting Configuration -

© ASA, INC.
P# 5105
F# BNNYBR2
D# BBPLMB2
REV. 970306

Attachment 2

ChemScan Analyzer NO3-N Data Bonnybrook AWWTP

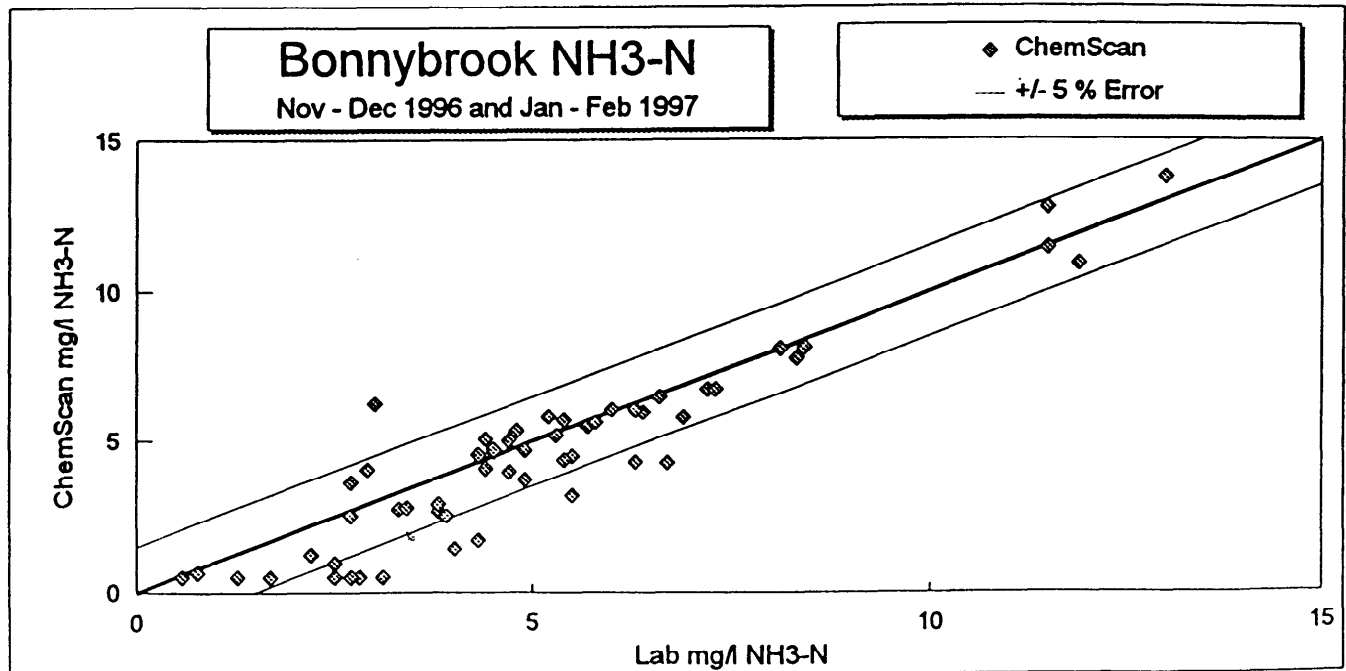
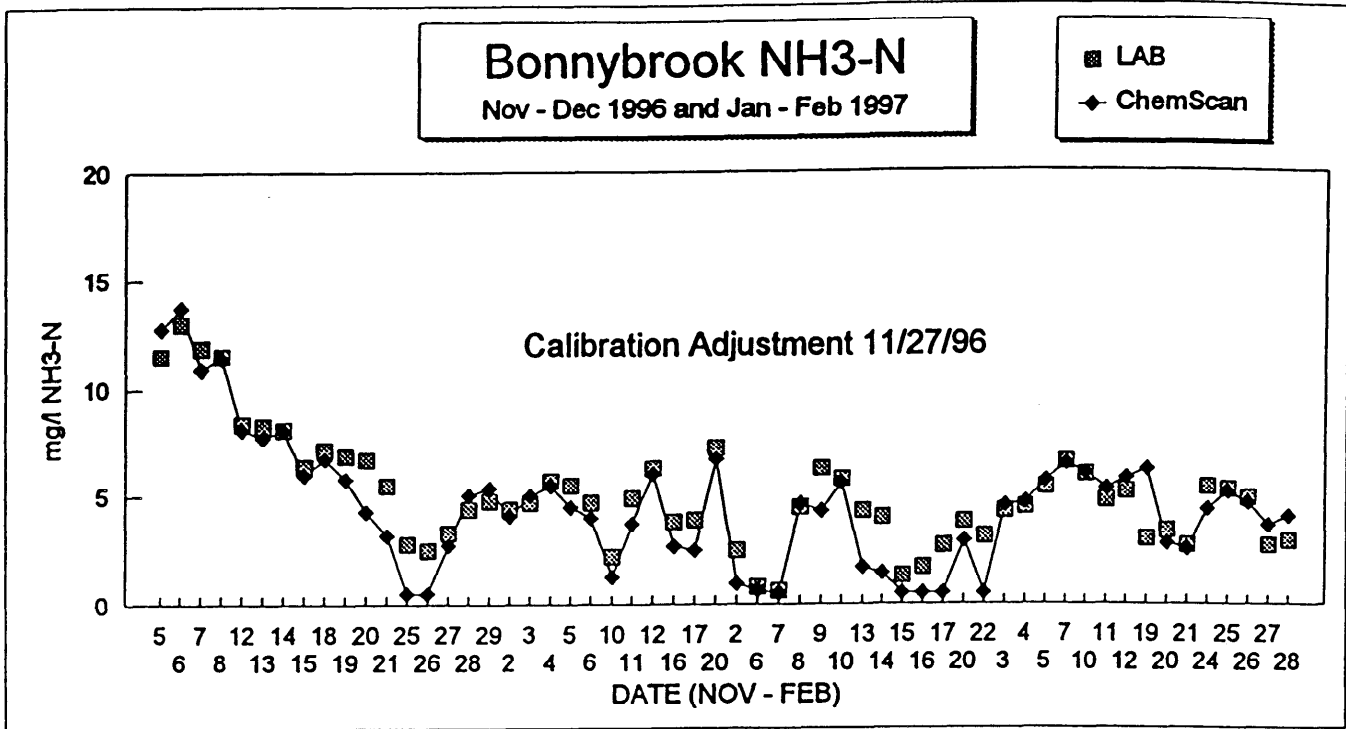
Nov. Average Absolute Error	2.0%
Dec. Average Absolute Error	1.3%
Jan. Average Absolute Error	1.8%
Feb. Average Absolute Error	1.6%
Total Average Absolute Error	1.7%



Attachment 3

ChemScan Analyzer NH3-N Data Bonnybrook AWWTP

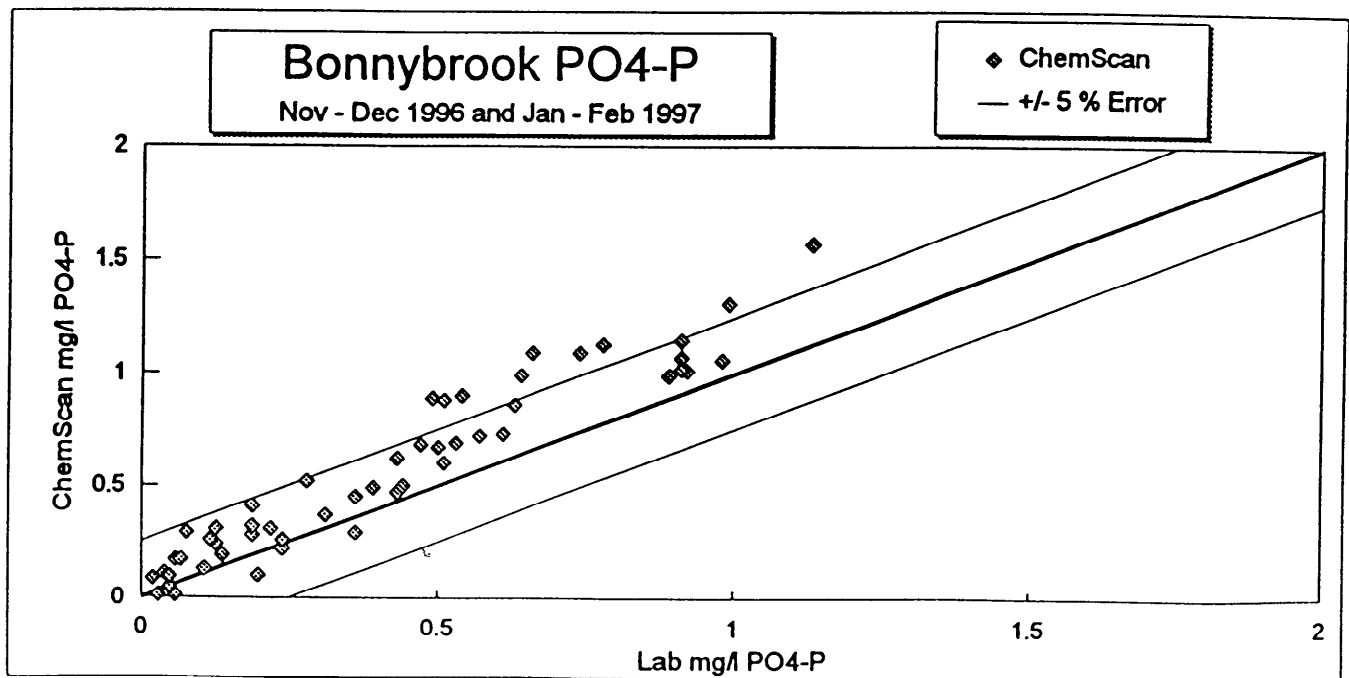
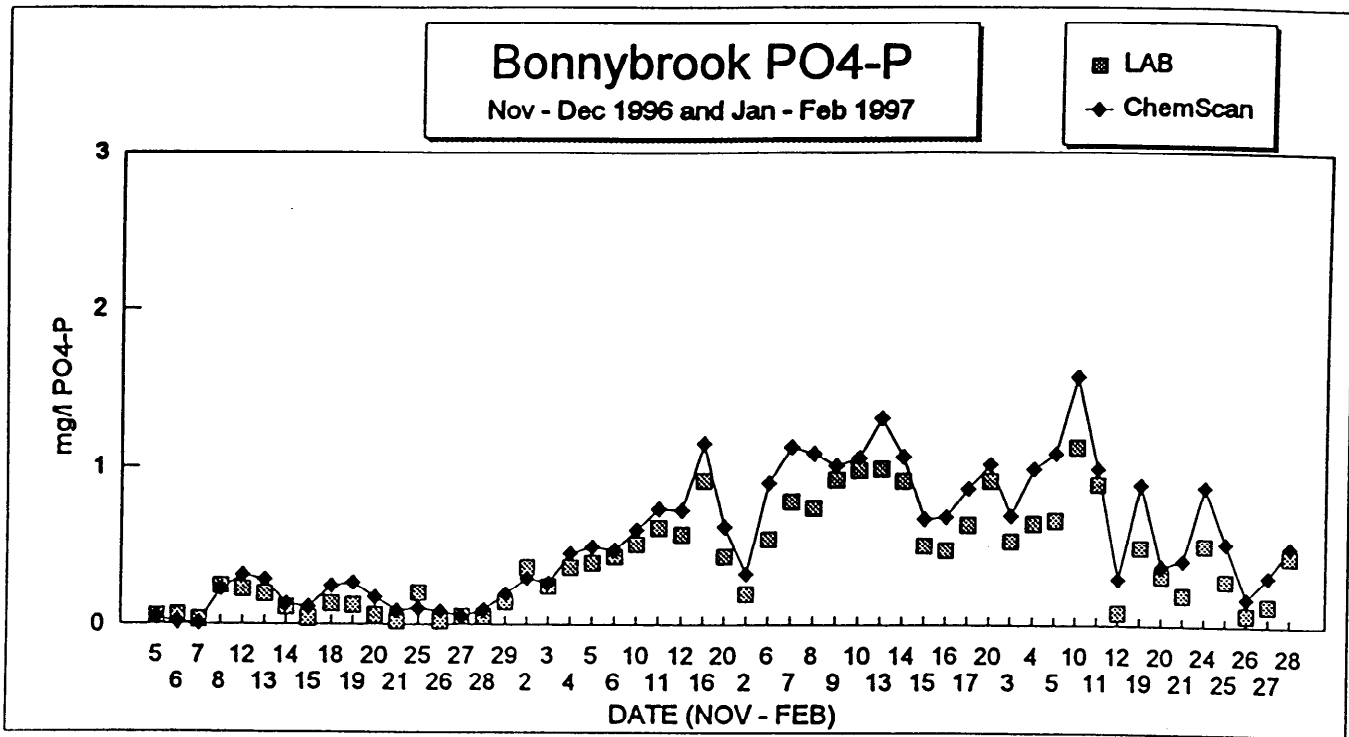
Nov. Average Absolute Error	3.3%
Dec. Average Absolute Error	2.5%
Jan. Average Absolute Error	4.4%
Feb. Average Absolute Error	2.5%
Total Average Absolute Error	3.0%



Attachment 4

ChemScan Analyzer PO4-P Data Bonnybrook AWWTP

Nov. Average Absolute Error	1.2%
Dec. Average Absolute Error	2.0%
Jan. Average Absolute Error	4.7%
Feb. Average Absolute Error	4.3%
Total Average Absolute Error	3.0%



Attachment 5