Pima County
Wastewater Management Department

System Wide Odor Control Plan
Final Report

FINAL – November 2007

GREELEY AND HANSEN

CH2MHILL

Pima County Wastewater Management Department

System Wide Odor Control Plan
Final Report

Prepared for:

Pima County Regional Wastewater Reclamation Department

Registered Professional Engineer (Civil)
CERTIFICATE NO.
44307
JERRY C.
BISH
Date Signed 12.10.07
ARIZONA, U.S.A.

November 2007

Prepared by:

Greeley and Hansen LLC
4400 East Broadway, Suite 600P
Tucson, AZ 85711
602-275-5595

TABLE OF CONTENTS

Table of Contents

Executive Summary 1
System Wide Odor Analysis 2
Short-Term and Near-Term Action Plan for Odor Reduction 2
Citizen's Involvement Program 3
Recommended Implementation Plan 3
Expected Level of Odor Reduction 3
Odor Control Plan Costs 4

Chapter 1 System Wide Odor Control Plan Overview 1-1
1.1 Purpose of Plan 1-2
1.2 System Wide Odor Analysis 1-2
1.3 Short and Near Term Action Plan 1-3
1.4 Community Involvement Program 1-4
1.5 Regulatory Odor Control Requirements 1-4
1.6 Odor Control Plan Costs 1-4

Chapter 2 System Wide Odor Analysis - Conveyance. 2-1
2.1 Conveyance System Odor Sampling and Testing 2-1
2.2 Laboratory Testing – Chemical Dosing 2-2
2.2.1 Bench-Testing Results 2-2
2.2.2 Cost 2-6
2.2.3 Bench-Testing Conclusions 2-7
2.3 Conveyance System Interceptor Model 2-7
2.3.1 INTERCEPTOR Model Overview 2-8
2.3.2 Model Input Parameters 2-8
2.3.3 Model Calibration 2-11
2.4 Model Results 2-12
2.4.1 Liquid Sulfide Concentrations 2-13
2.4.2 Vapor-Phase H_2S 2-13
2.4.3 Out-Gassing 2-16
2.4.4 Conveyance System Modeling Conclusions 2-16
2.5 CDU Analysis and INTERCEPTOR Modeling 2-18

Table of Contents

2.5.1 Mission CDU 2-21
2.5.2 18th Street CDU 2-23
2.5.3 Anita CDU 2-26
2.5.4 Anita to SCC 2-27
2.5.5 Anita to SCE 2-28
2.5.6 Tucson CDU 2-30
2.5.7 Tucson to SRWC 2-30
2.5.8 Tucson CDU to NRI 2-31
2.5.9 Prince CDU 2-32
2.5.10 Santa Cruz CDU 2-34
2.5.11 Wetmore CDU 2-36
2.6 Initial Conveyance System Observations 2-38
2.7 Design Practices Technical Information 2-41
2.7.1 Design Practices for Conveyance System 2-41

Chapter 3 System Wide Odor Analysis – Treatment Facilities 3-1

3.1 Treatment Plant Odor Sampling/Testing Summary 3-1
3.2 Odor Dispersion Model 3-4
3.3 BASTE Model 3-8
3.4 BASTE Modeling for PCWMD WWTP Facilities 3-9
3.4.1 Model Input Parameters 3-11
3.4.2 Model Output 3-15
3.5 Preliminary Basis of Design Values for 2030 Facility 3-18
3.6 BASTE Model - Summary, Conclusions and Recommendations 3-18
3.7 Design Practices Technical Information 3-19
3.7.1 Design Practices for Treatment Facilities 3-20

Chapter 4 Short and Near Term Action Plan 4-1

4.1 Conveyance System 4-1
4.1.1 Category 1 Actions 4-1
4.1.2 Category 2 Actions 4-1
4.1.3 Conveyance Systems Odor Control Improvement Results 4-5
4.2 Roger Road WWTP and Ina Road WPCF 4-9

Table of Contents

4.2.1 Category 1 Actions 4-9
4.2.2 Category 2 Actions 4-10
4.2.3 Treatment Systems Odor Control Improvement Results 4-10
4.3 Short and Near Term Actions for Green Valley WWTP 4-10

Chapter 5 Community Involvement Program 5-1
5.1 Citizens Involvement Committee 5-1
5.2 Public Open Houses 5-2

Chapter 6 Regulatory Odor Control Requirements 6-1
6.1 Current Air Quality Operating Permit Requirements 6-1
PART A: GENERAL PROVISIONS 6-1
PART B: SPECIFIC CONDITIONS 6-2
6.2 Future Setback Requirements 6-3
6.3 Comments and Conclusions 6-3

Chapter 7 Odor Abatement and Control Alternatives – Conveyance System 7-1
7.1 Current Odor Control Practices and Technologies 7-1
7.2 Proposed Odor Control Alternatives 7-1
7.2.1 Oxygen Injection 7-1
7.2.2 Magnesium Hydroxide Dosing 7-5
7.2.3 Expanded Sodium Hypochlorite Dosing 7-6
7.3 Odor Control Alternatives Summary Advantages and Disadvantages Summary 7-11
7.3.1 Oxygen Injection 7-11
7.3.2 Magnesium Hydroxide Dosing 7-12
7.3.3 Expanded Hypochlorite Dosing 7-12
7.4 Cost Comparison 7-12
7.5 Comprehensive Odor Control Alternatives Recommendations 7-13
7.6 Future and Historical Odor Complaint Recommendations 7-13
7.7 Miscellaneous Recommendations 7-14

Chapter 8 Odor Abatement and Control Alternatives – Treatment Facilities 8-1
8.1 Proposed Odor Control Alternatives 8-1
8.1.1 Single-Stage Packed Bed Chemical Scrubbers 8-1

Table of Contents

8.1.2 Multi-Stage Packed Bed Chemical Scrubbers 8-2
8.1.3 Multi-Stage Mist Type Chemical Scrubbers 8-3
8.1.4 Granular Activated Carbon (GAC)....8-4
8.1.5 Bio-towers 8-5
8.1.6 Open-Bed Biofilters 8-7
8.1.7 In-Vessel Biofilters 8-8
8.1.8 Ozone Contact Chambers....8-8
8.1.9 Impregnated Media Beds 8-9
8.1.10 Dispersion to Atmosphere (Untreated)....8-9
8.2 Advantages and Disadvantages of Odor Control Practices and Technologies 8-9
8.3 Recommendations on Odor Control Alternatives -Treatment Facilities....8-12

Chapter 9 Odor Control Plan Costs Implementation Schedule.... 9-1

9.1 Capital Costs....9-1
9.1.1 Conveyance System 9-1
9.2 Odor Control Proposal for the PCWMD Regional Optimization Master Plan 9-6
9.2.1 Odor Control for the New Water Reclamation Campus (WRC)....9-7
9.2.2 Headworks and Screenings Area....9-7
9.2.3 Aeration Tanks 9-7
9.2.4 Sludge Thickening Facilities....9-8
9.2.5 Costs Associated with Odor Improvements at the New WRC....9-8
9.2.6 Odor Control for Proposed Expansion to Ina Road Water Pollution Control Facility....9-9
9.3 Regional Treatment Facilities....9-14
9.3.1 Arivaca Junction Wastewater Treatment Facility 9-15
9.3.2 Avra Valley Wastewater Treatment Facility....9-15
9.3.3 Corona de Tucson Wastewater Treatment Facility 9-16
9.3.4 Green Valley Wastewater Treatment Facility 9-16
9.3.5 Marana Wastewater Treatment Facility....9-17
9.3.6 Mount Lemmon Wastewater Treatment Facility....9-17
9.3.7 Pima County Fairgrounds....9-18
9.3.8 Randolph Park Water Reclamation Facility....9-18
9.3.9 Rillito Vista Wastewater Treatment Facility 9-18
9.4 Operation and Maintenance Costs....9-19

Table of Contents

9.5 CIP Elements 9-22
9.6 Recommended Implementation Plan 9-24
9.7 Expected Level of Odor Reduction....9-27

Chapter 10 Odor Control Strategy/Plan –CIP and Facility Plan Coordination 10-1

10.1 Plan Strategy....10-1
10.2 Conveyance System Odor Control Strategy 10-1
10.2.1 Short Term 10-1
10.2.2 Long Term....10-2
10.3 Treatment System Odor Control Strategy 10-3
10.3.1 Short Term 10-3
10.3.2 Long Term....10-4
10.4 Odor Control Management....10-6

List of Tables

Table 2-1 Chemical Cost Calculation 2-7
Table 2-2 INTERCEPTOR Model Calibration Data 2-11
Table 2-3 Chemical Dosing System Summary 2-18
Table 2-4 Downstream Liquid and Vapor-Phase Sulfides 2-39
Table 3-1 Laboratory Testing by Location at Roger Road WWTP 3-2
Table 3-2 Laboratory Testing by Location at Ina Road WPCF 3-2
Table 3-3 Laboratory Testing by Location at Green Valley WWTP 3-4
Table 3-4 Field Sampling Data for Reduced Sulfur Compounds 3-8
Table 3-5 Global Parameter Values 3-11
Table 3-6 Key Input Data for the New WRC 3-12
Table 3-7 Key Input Data for BASTE Modeling of Ina Road WPCF 3-13
Table 3-8 BASTE Modeling Results for the New WRC 3-15
Table 3-9 BASTE Modeling Results for Ina Road WPCF 3-16
Table 3-10 Comparison of Modeling Results with Field Sample Data 3-16
Table 3-11 Preliminary Basis of Design Values for Hydrogen Sulfide and Other Reduced Sulfur Compounds 3-18
Table 4-1 Liquid Phase Sulfide Improvements 4-5
Table 7-1 Capital and Operating Costs 7-4
Table 7-2 Chemical Consumption in Additional CDUs 7-9
Table 8-1 Single-Stage or Multi-Stage Chemical Scrubbers 8-9
Table 8-2 Mist Type Chemical Scrubbers 8-10
Table 8-3 Granular Activated Carbon 8-10
Table 8-4 Bio-Towers 8-10
Table 8-5 Bio-Filters - Open Bed 8-11

Table of Contents

Table 8-6 Bio-Filters – In Vessel Type 8-11
Table 8-7 Ozone Contact Chamber 8-11
Table 8-8 Impregnated Media Beds 8-12
Table 8-9 Dispersion to Atmosphere 8-12
Table 9-1 Estimated Capital Costs For Future Hypochlorite Dosing Stations 9-1
Table 9-2 Costs for JOC Packages 9-6
Table 9-3 Costs for the New WRC Odor Control 9-8
Table 9-4 Existing Odor Control Facilities at the Ina Road WPCF 9-10
Table 9-5 Costs for Odor Control Improvements at Ina Road WPCF 9-12
Table 9-6 Costs for Odor Control Improvements at Ina Road WPCF 9-14
Table 9-7 Operation costs for long term odor control recommendations 9-19
Table 9-8 Present Worth Analysis of Recommended Long Term Odor Control Measures. 9-20
Table 9-9 O & M Costs for the Proposed New Water Reclamation Campus 9-21
Table 9-10 O & M Costs for Proposed Ina Road Water Pollution Control Facility 9-22
Table 9-11 Conveyance System CIP Elements 9-22
Table 9-12 New WRC CIP Elements 9-23
Table 9-13 Ina Road WPCF CIP Elements 9-23
Table 9-14 CIP Elements for Regional Treatment Facilities 9-24
Table 9-15 Status of Short and Near Term Action Items 9-25
Table 10-1 Conveyance System CIP Elements 10-3
Table 10-2 New WRC CIP Elements 10-4
Table 10-3 Ina Road WPCF CIP Elements 10-5
Table 10-4 CIP Elements for Regional Treatment Facilities 10-5

List of Figures

Figure 2-1 Liquid-Phase Sulfide and Vapor-Phase H_2S vs. NaOCl Dose Response Curves 2-3
Figure 2-2 Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Ferrous Chloride Dose Response Curves 2-4
Figure 2-3 Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Ferric Chloride Dose Response Curves 2-5
Figure 2-4 Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Peroxide Dose Response Curves 2-6
Figure 2-5 Interceptor Model Domain and Simulated Average Dry Weather Wastewater Flow 2-10
Figure 2-6 System Wide Liquid-Phase Sulfide Concentration Results 2-14
Figure 2-7 System Wide Vapor-Phase H_2S Concentration Results 2-15
Figure 2-8 System Wide Model-Predicted Out-Gassing Locations 2-17
Figure 2-9 Location Map of Chemical Dosing Systems 2-20
Figure 2-10 Mission Street CDU 2-21
Figure 2-11 INTERCEPTOR Model Results for Mission Street CDU 2-23
Figure 2-12 18th Street CDU 2-24
Figure 2-13 INTERCEPTOR Model Results for 18th Street CDU 2-25
Figure 2-14 Vapor-Phase Odalog Data Downstream of 18th Street CDU 2-26
Figure 2-15 Anita CDU 2-27
Figure 2-16 INTERCEPTOR Model Results for Anita to SCC 2-28

Table of Contents

Figure 2-17 INTERCEPTOR Model Results for Anita to SCE 2-29
Figure 2-18 Tucson CDU 2-30
Figure 2-19 INTERCEPTOR Model Results for Tucson CDU to SRWC 2-31
Figure 2-20 Prince CDU 2-33
Figure 2-21 INTERCEPTOR Model Results for Prince CDU to SRWC 2-34
Figure 2-22 Santa Cruz CDU 2-35
Figure 2-23 INTERCEPTOR Model Results for Santa Cruz CDU 2-36
Figure 2-24 Wetmore Bioxide™ CDU (Solar Powered) 2-37
Figure 2-25 Projected Chemical Performance for Wetmore CDU (Bioxide™) 2-38
Figure 3-1 Odor Dispersion Model – Roger Road WWTP Baseline Condition 3-5
Figure 3-2 Odor Dispersion Model – Control of All Roger Road WWTP Near Term Sources 3-5
Figure 3-3 Odor Dispersion Model – Ina Road WPCF Baseline Condition 3-6
Figure 3-4 Odor Dispersion Model – Control of Ina Road WPCF Short Term Sources 3-6
Figure 3-5 Odor Control Improvements Graph 3-7
Figure 3-6 Process Flow Diagram for the New WRC 3-10
Figure 3-7 Process Flow Diagram of Ina Road WPCF 3-11
Figure 4-1 System Wide Liquid Phase Sulfide Concentration Before Implementation of Short-Term Recommendations 4-3
Figure 4-2 System Wide Liquid Phase Sulfide Concentration after Implementation of Short-Term Recommendations 4-4
Figure 4-3 Downstream of the Anita CDU to SCC before Short Term Recommendations were Implemented 4-6
Figure 4-4 Downstream of the Anita CDU to SCC after Short Term Recommendations were Implemented 4-7
Figure 4-5 Downstream of the Wetmore CDU before Short Term Recommendations were Implemented 4-8
Figure 4-6 Downstream of the Wetmore CDU after Short Term Recommendations were Implemented 4-9
Figure 5-1 Odor Complaint Map – 2004-2006 5-3
Figure 5-2 Roger Road and Ina Road Facilities 5-4
Figure 7-1 System Wide Liquid Phase Sulfide Concentration with Oxygen 7-3
Figure 7-2 System Wide Vapor-Phase Hydrogen Sulfide Concentration with Magnesium Hydroxide 7-7
Figure 7-3 System Wide Liquid Phase Sulfide Concentration with Additional Hypochlorite CDUs 7-10
Figure 7-4 Cost Comparison of Evaluated Long Term Odor Control Options 7-13
Figure 8-1 Single Stage Packed Bed, Chemical Scrubber 8-2
Figure 8-2 Multi Stage Packed Bed, Chemical Scrubber 8-3
Figure 8-3 Mist Type Chemical Scrubber 8-4
Figure 8-4 Granulated Activated Carbon (GAC) 8-5
Figure 8-5 Bio-towers (Bio-Scrubber) 8-6
Figure 8-6 Bio-towers (Bio-Trickling Filter) 8-6
Figure 8-7 Biofilters (Open Bed) 8-7
Figure 8-8 In –Vessel Biofilters 8-8
Figure 10-1 Unified Odor Management Elements 10-7

Table of Contents

List of Appendices

Appendix A Interceptor System Maps
Appendix B Odor Analysis Laboratory Results
Appendix C Green Valley WWTP Odor Investigation Report
Appendix D Air Quality Operating Permits

EXECUTIVE SUMMARY

Executive Summary

Odor abatement and control is a major issue for the Pima County Wastewater Management Department (PCWMD) across all wastewater conveyance and treatment systems owned and operated by the County. The Department continuously faces the need to control unpleasant odors, primarily hydrogen sulfide, that is generated from the conveyance and treatment of sewage. PCWMD manages a sewer conveyance system that includes over 3,300 miles of sewer pipes, 66,000 manholes and 29 active lift stations. PCWMD operates two major wastewater treatment facilities and one sub-regional facility within the metropolitan area of Tucson, the Roger Road Wastewater Treatment Plant (WWTP), the Ina Road Water Pollution Control Facility (WPCF), and the Randolph Park Water Reclamation Facility (WRF). Additionally, PCWMD operates 8 smaller regional treatment facilities: Arivaca Junction, Green Valley, Corona de Tucson, Pima County Fairgrounds, Avra Valley, Mt. Lemmon, Rillito Vista, and Marana. However, it needs to be recognized that not all odors in the community are the responsibility of PCWMD. There are other odors sources, including privately owned and operated wastewater collection and pumping stations, which are not under the jurisdiction of PCWMD, that cause odor nuisances in the community.

Much of PCWMD's conveyance system and treatment facilities were constructed in an era when odor control was mostly accomplished by large buffer zones between the facilities and surrounding community and public areas. As these buffer zones have been shrinking (not only in Pima County, but throughout the country) odor complaints have risen dramatically and modern odor control design practices have been developed to reduce the potential to generate odors from conveyance and treatment systems.

With respect to the existing treatment facilities, most odor complaints have been focused on the Roger Road WWTP. This plant is over 50 years old, and lacks sufficient odor control on the headworks, primary clarifier, and bio-towers. While some odor control facilities have been incorporated at this facility, substantial odors are still generated and can at times be identified up to 7 miles away from the facility. At the Ina Road WPCF substantial odor control facilities have been installed but odors are still generated, although not to the extent experienced at the Roger Road WWTP. Odor control systems have also been installed in the conveyance system to control the release of odors. Most conveyance system odor control units were having a major impact on odor control, however the existing systems needed to be optimized and addition units added to provide effectively control odors in some localized areas.

The regional treatment plants have primarily relied on setbacks (buffer zones) and low residential densities for odor control. Increased growth has resulted in significant plant expansions and encroachment of developments on the buffer space around the plants. The combination of greater capacity and insufficient odor buffer zones has led to more odor complaints. Future process expansions will need to include suitable cost effective odor control measures to preempt potential odor complaints.

With the commencement of the system wide odor control evaluations, a number of improvements and several innovative and costs saving measures to control odor emissions have been identified and placed into service. The short-term and near-term improvements at the Roger Road WWTP have not eliminated all odors from the wastewater systems, but have significantly reduced the area of odor influence and the intensity of the odors to more reasonable and acceptable levels until future improvements can be implemented. Along with the short and near term odor control measures, a long range plan has been developed to install modern, cost effective odor control systems throughout the County owned and

operated systems to control nuisance odors that could impact the community near the wastewater facilities.

System Wide Odor Analysis

Results of the system wide odor analysis include:

- Mapping of the existing conveyance system to show the locations of potential odor release points is the system.
- Recommended adjustments and control improvements for the existing conveyance system odor control units to optimize odor control performance
- Recommended locations in the conveyance system for installation of additional odor control units
- Odor dispersion mapping at Roger Road WWTP and Ina Road WPCF to demonstrate extent of offsite odor impacts
- Predicted odor relief with additional recommended odor control measures at the plants

As a part of the system analysis effort, historic odor complaints were plotted on a regional map. Information from complaint history assisted in calibration of the odor evaluation tools to verify that baseline (and predicted) conditions was reflective of actual odor complaint experience.

From these efforts, several short-term and near-term actions were developed and implemented to mitigate the most severe odor emissions. Also, long-term odor control measures were developed for effective future control of odors from the wastewater infrastructure systems and facilities

Short-Term and Near-Term Action Plan for Odor Reduction

In the short-term or near-term a number of odor control improvements were identified that could be readily implemented with available capital resources. These include:

- Improvements to dosing rates and controls for existing conveyance system odor control units to increase overall system effectiveness
- Installation of new odor controls at two locations in the conveyance system to treat specifically identified emission sources
- Containment and treatment of odor emissions from the headworks, primary clarifiers, splitter structures, and Bio-towers at the Roger Road WWTP
- Making adjustments and alterations to operations of existing odor control scrubbers at both the Roger Road WWTP and the Ina Road WPCF to improve effective operation of installed systems

The schedule for completing the short-term and near-term actions was set for July 2007. All of the twenty-two (22) actions, except for one, were implemented prior to that date, making a significant improvement in reducing nuisance odor emissions. A number of the near-term actions used innovative systems to collect or contain, and treat the odors. These included low cost and low energy use vapor treatment units installed in the conveyance system, and low cost fabric membrane structure versus conventional “brick and mortar” structure at the plant headworks and the use of low cost plastic panels to cover the primary tanks versus aluminum domes to cover the primary clarifiers. A very economical

ductwork system was utilized to convey the odor laden air from the collection structures to the treatment system. These innovative approaches significantly reduced the costs for effective odor control systems. The long term odor control improvements were those which could not be reasonably implemented in a short time frame due to long design/construction time frames, requirement for CIP budgeting or those that will not be required until some future wastewater collection or treatment facilities are constructed. Specific long-term odor control improvements for future systems and conditions are delineated in the report.

Citizen's Involvement Program.

PCWMD stated a goal to have community involvement and buy-in to process and solutions for the System Wide Odor Control Plan. To facilitate this goal, PCWMD via the office of the Public Relations Officer, established a Citizens Involvement Committee (CIC). The mission Statement of the CIC was: *To support Pima County in their efforts to identify and implement short- and long-term solutions for the treatment, odor abatement, discharge and reuse of our community's wastewater by evaluating the benefits and impacts of proposed solutions on the community and making recommendations to the PCWMD and Board for implementation.*

During the course of the project, the CIC held five meetings with the Planning Team to provide community concerns to the Planning Team, as well as, to obtain briefings on the progress of the plan. In addition, two tours of odor control systems were conducted with the CIC. On the tour existing odor control systems and areas of odor control needs were visited. Moreover, two open houses were held locally for the general public to provide odor source information, and comment on the odor control progress and plans by PCWMD.

Recommended Implementation Plan

Odor control improvements recommended for short-term and near-term action were those identified as the most severe sources of odor emissions, which could be readily improved or corrected. The schedule for completing those actions was set for July 2007. All short-term and near-term actions were completed by July 30, 2007 except for one action at Roger Road WWTP - biotower reverse air flow and scrubber. This item was delayed due to Cultural Resources of Pima County discovery of the presence of archeological artifacts on the proposed site of the odor treatment scrubber. Issues relating to construction at this site have been resolved and construction of this project is being scheduled.

Long Term System Wide Odor Control Plan recommendations for the wastewater treatment plants are currently scheduled to be implemented along with other treatment plant upgrades and improvements as recommended in the Regional Optimization Master Plan over the next 9 years.

Long Term System Wide Odor Control Plan recommendations for the Conveyance System should be implemented as soon as capital improvements plan (CIP) budgets are available to fund these projects.

Expected Level of Odor Reduction

The short-term and near-term actions for the conveyance system are expected to significantly mitigate nuisance odor emissions under normal operation in the vicinity of those improvements. Long-term system wide odor control improvements for the conveyance system are expected to mitigate nuisance

odor emission under normal operation. However, as the conveyance system changes over time due to population growth there will be changes in the flow and wastewater characteristics within the system which will require additional odor control measures or adjustments. Odor control for the conveyance system requires on going monitoring process to insure proper effectiveness of existing odor control measures and that additional odor control is applied when appropriate and necessary.

The near-term odor control measures, when fully implemented, are expected to significantly reduce odor emissions from the existing Roger Road WWTP. However, because the existing Roger Road WWTP is planned to be decommissioned and replaced with a new Water Reclamation Campus by 2015, economic considerations dictated that near-term odor control measures would not be designed to fully capture and treat all odor emissions, but would treat odors to acceptable levels. Costs of full odor treatment would be over 4 times the costs of the innovative measures implemented to control odor emissions. The proposed new Water Reclamation Campus will include complete control from all sources of odor emissions and is expected to mitigate nuisance odor emissions under normal operation.

The short-term and near-term actions for the Ina Road WPCF are expected to mitigate nuisance odor emission from the existing plant under normal operation. The proposed improvements and expansion at the Ina Road WPCF will include complete control from all sources of odor emissions and is expected to mitigate nuisance odor emissions under normal operation.

The near term and long term odor control measures at the outlying regional wastewater facilities are expected to control odor emissions. The proposed expansions at the regional treatment facilities will include complete control from all sources of odor emissions. The regional facilities' conveyance systems will be provided with odor control units as appropriate and necessary.

Odor Control Plan Costs

Future conveyance system and wastewater treatment facilities Capital Improvement Plan (CIP) components in 2006 construction dollars are summarized in following **Table.**

Conveyance System and Treatment Facility CIP Components

Location	Total Cost $ (2006)
Conveyance System (odor control units) (1)	$660,000
New Water Reclamation Campus(2)	$11,000,000
Ina Road WPCF(2)	$20,800,000
Regional Treatment Facilities(3)	$7,100,000
Totals	**$39,560,000**

(1) Long Term System Wide Odor Control Plan recommendations for the Conveyance System should be implemented as soon as CIP budgets are available to fund these projects
(2) Capital cost of these odor control elements is included in the ROMP CIP Program
(3) Long Term System Wide Odor Control Plan recommendations for the Regional Treatment Facilities should be included in the CIP budgets for future upgrades and expansions

CHAPTER 1

System Wide Odor Control Plan Overview

Chapter 1 System Wide Odor Control Plan Overview

Pima County Wastewater Management Department (PCWMD) manages a sewer conveyance system that includes over 3,300 miles of sewer pipes, 66,000 manholes and 29 active lift stations. In addition, PCWMD operates two major wastewater treatment facilities and one sub-regional facility within the metropolitan area of Tucson, the Roger Road Wastewater Treatment Plant (Roger Road WWTP), the Ina Road Water Pollution Control Facility (Ina Road WPCF), and the Randolph Park Water Reclamation Facility (Randolph WRF). Further, PCWMD operates 8 smaller regional treatment facilities: Arivaca Junction, Green Valley, Corona de Tucson, Pima County Fairgrounds, Avra Valley, Mt. Lemmon, Rillito Vista, and Marana. Odor abatement and control across the entire system is a major issue that continually faces the department as many odiferous compounds, primarily hydrogen sulfide, are generated from the conveyance and treatment of sewage.

With respect to the sewer conveyance system within the metropolitan area, wastewater generally flows from southeast to the northwest. Because both major treatment plants are located on the northwest side of Tucson, wastewater travel time can exceed 24 hours. Most of the oxygen available within the wastewater is depleted along the way. In turn, any sulfates present are reduced to sulfides, and hydrogen sulfide, an odorous gas, is generated. The Department has currently installed 12 chemical dosing units (CDUs) within the sewer conveyance system from which various chemicals are added to the sewer conveyance system to minimize the generation and emission of hydrogen sulfide gas.

With continuing in-fill development and growth in the outlying regional areas seen recently, the remaining buffer zones between residential developments and the wastewater treatment facilities and the larger diameter sewer lines continue to be reduced. As this occurs, the number of odor complaints is likely to increase unless additional efforts are taken to mitigate this issue across the system. Therefore, it is critical that a comprehensive, system wide plan be in place for odor control strategies/efforts (technology, phasing, and cost) on the conveyance systems and treatment facilities for both existing and new facilities odor control systems.

With respect to the existing treatment facilities, most odor complaints are focused on the Roger Road WWTP. This plant is over 50 years old, and lacks sufficient odor control on the headworks, primary clarifier and bio-towers. While some odor control facilities have been incorporated at this facility, substantial odors are still generated. At the Ina Road WPCF substantial odor control facilities have been installed but odors are still generated, although not to the extent experienced at the Roger Road WWTP.

The regional treatment plants have primarily relied on setbacks and low residential densities for odor control. Increased growth has resulted in significant plant expansions and encroachment of developments on the buffer space around the plants. The combination of greater capacity and constrained sites will lead to more odor complaints unless future process expansions include suitable odor controls.

However, it needs to be recognized that not all odors in the community are the responsibility of PCWMD. There are other odors sources, including privately owned and operated wastewater collection and pumping stations, which are not under the jurisdiction of PCWMD, that cause odor nuisances in the community.

The system wide odor control plan strategies needs to be coordinated with the Regional Optimization Master Plan (formerly: "the Pima County Metropolitan Wastewater Treatment System Capacity Management, Nutrient Removal, Solids Handling / Treatment and CIP Development Study"), so that future facilities identified in the plan will include the appropriate odor control systems and technologies.

1.1 Purpose of Plan

This System Wide Odor Control Plan includes review of the investigations of past odor control work, present strategies, and various future options available to control odor within the sewer conveyance system and at the wastewater treatment facilities. It is critical that a baseline odor level development across all the sewer conveyance systems and around the treatment facilities be established prior to system enhancements. Baseline conditions were developed in the summer of 2006. Follow-up verification is continuing as more odor information is gathered and integrated into the base level information. Odor control within the sewer conveyance system focuses on the larger diameter lines, pump stations, associated force main discharges and siphon structures. Odor control at the treatment plants focuses on odor generation from the individual treatment processes.

A recommended plan is developed on an integrated system wide evaluation of odor generation and control. Instead of focusing on the sewer conveyance system or on the treatment plant, the entire system is integrated into a single odor control system. In other words, the recommendations address the need for the odor control for the sewer conveyance system that works in concert with the odor controls systems and technologies utilized in the treatment facilities. Additionally, recommendations for odor control within the sewer conveyance system are developed so as to not adversely impact treatment operations.

1.2 System Wide Odor Analysis

The system wide odor analysis begins with establishing baseline odor levels and identifying odor generating potential at various locations within the sewer conveyance system and at the treatment facilities.

Conveyance System

Baseline levels for odors related to the interceptor system include readings from a number of OdaLog Meters (for continuous monitoring of hydrogen sulfide), liquid stream (sewage) grab samples and off-gas air grab samples. Air flow readings were taken at specific manhole locations to determine "in gassing" or "out gassing" in the conveyance system.

Liquid Stream samples were analyzed for BOD, TSS, dissolved oxygen, dissolved and total sulfides, ORP, pH, and temperature. Off-gas samples were analyzed to determine levels of hydrogen sulfide and other odorous sulfur species concentration levels and for Volatile Organic Compound emission levels. Odor Panels were conducted on each off-gas grab sample to determine odor levels.

Hydrogen sulfide readings (OdaLog meters) were analyzed for concentration variances over a diurnal cycle and over a week period. This data was used to verify the results of the hydrogen sulfide production predictions generated from the system model.

Baseline sampling results were used as liquid sulfide calibration data to the INTERCEPTOR Model to establish baseline odor emissions throughout the conveyance system. With the baseline information different control strategies can be tested for use in the field to abate odors.

Treatment Facilities

Establishing baseline odor emission levels at Roger Road WWTP and Ina Road WPCF included baseline odor emission analysis at various points within the plants: headworks, flow splitter structures, primary clarifiers, digesters, aeration basins, gravity thickeners, and biosolids transfer station (at Ina Road WPCF).

Off-gas samples were analyzed to determine levels of hydrogen sulfide, other odorous sulfur species and for Volatile Organic Compound emission levels. The BASTE Model was used to predict future odor emissions from the recommended future wastewater treatment configuration at the Roger Road WWTP and for Ina Road WPCF as determined under the Regional Optimization Master Plan (ROMP). Off gas sample results were used for current emissions from each wastewater treatment plant and to confirm and calibrate the BASTE Model for the future configurations. An ISCST Dispersion Model was used to predict current baseline odor intensity impacts on the surrounding areas. With the baseline information different control strategies can be developed to reduce or abate odors being discharged from the facilities.

Design Practices Technical Information

Technical information is provided on good odor control engineering design principles and practices for reducing odor generation and releases from new conveyance systems and wastewater treatment works. These design principles provide a framework for allowing PCWMD to proactively assess odor potential prior to commencement of construction in order to mitigate future odor problems

1.3 Short and Near Term Action Plan

After collection and analysis of the initial odor data for the baseline developments, an action plan of short and near term activities was developed to reduce odors. The short and near term actions are those that could be quickly implemented without significant resources. There were short and near actions identified in both the conveyance system and treatment plants.

Conveyance System

The conveyance system Interceptor model was used to identify of odor hotspots and potential improvements. The short and near term improvements included optimization of existing liquid and gas phase treatment systems in the conveyance system and the installation of new gas phase treatment systems..

Treatment Plants

Once the treatment plants were modeled to establish baseline conditions, odor hotspots and potential areas of improvement were identified. Short term and near term actions that could be quickly implemented and thereby reduce odors emanating from the wastewater treatment plants were developed and included house keeping improvements, odor control facilities modifications and construction of semi-permanent odor controls on the headworks and primary treatment facilities.

1.4 Community Involvement Program

A citizen's involvement committee (CIC) was formed from a pool of interested and responsible individuals. The CIC were selected to provide a conduit of information to and from the community. Five meetings were provided to receive comments and concerns from the community, educate the CIC on odor control issues in order to have them support the results of the plan, and receive comments on the various elements of the project plan.

The community involvement program activities consist of the public meetings and the formation of a citizen's involvement committee (CIC). Two public meetings were held during the course of the plan development. Early in the project the first public meeting addressed the scope and approach of the odor investigations, and was designed to solicit concerns from the community. The second public meeting reviewed odor control plan recommendations, along with results and actions for additional odor control improvements within the County's wastewater operations.

Site tours of the treatment facilities with the CIC were conducted at the Roger Road WWTP and Ina Road WPCF to review the overall facility operations and the existing odor control systems. After the short and near term actions were implemented, a second round of site tours were conducted at the wastewater treatment facility and the intersection of .of Prince Road and Interstate I-10 in the conveyance system.

1.5 Regulatory Odor Control Requirements

A comprehensive review of environmental regulations was conducted to determine that the entire system (conveyance system and treatment facilities) is in compliance with applicable current and foreseeable local and state odor control standards.

1.6 Odor Control Plan Costs

Planning level costing for the recommended odor control plan was developed. Planning level costing was provided for:

- Short and Near Term Odor Control Improvements
- Conveyance System Odor Control Improvements
- Ina Road WPCF Odor Control Improvements
- New Water Reclamation Campus (WRC) Odor Control Improvements
- Regional Treatment Plants Odor Control Improvements

Each of the elements is divided into multiple sub-elements that comprise the whole program. Capital costs are prepared on a sub-element basis with costs based on 2006 construction costs. Each sub-element includes costs for administration, engineering design, construction and startup. Over the next 10 years the total capital costs in 2006 construction dollars for new odor control systems and facilities for County owned and operated wastewater facilities will be nearly $40 million.

The following chapters of this report will detailed the investigations, analyses, approaches, findings, and recommendations for odor control systems and strategies for use at each of PCWMD owned and operated facilities.

CHAPTER 2

System Wide Odor Analysis - Conveyance

Chapter 2 System Wide Odor Analysis - Conveyance.

The methods and approach to establish the baseline odor levels and odor generating potential along the major trunks and branches of the wastewater conveyance system are summarized in this chapter.

2.1 Conveyance System Odor Sampling and Testing

A comprehensive program was implemented to evaluate the Pima County metropolitan area wastewater collection system in terms of odor generation. The system was surveyed along each major interceptor in the metropolitan service areas. Potential odor causing elements within the conveyance system network were investigated. Chemical dosing units (CDUs) were evaluated for dosing effectiveness and sulfide control. Vapor phase and liquid-phase odor samples were collected throughout the network for use in determining CDU effectiveness and to use as model calibration data. Laboratory testing was completed to evaluate the potential effectiveness of various liquid-phase treatment methods.

Odor control experts surveyed the PCWMD wastewater conveyance system in September 2006. Each CDU was visited to gain an understanding of equipment and operation. Historical records and previous studies were reviewed. Current known odor sources were visited including the Alameda siphon inlet, Santa Cruz siphon inlet, Prince & Interstate I-10 intersection manhole, diversion structures and several peripheral lift stations. Structure drawings were evaluated to gain an understanding of the odor generating mechanisms for problematic structures. This survey formed the basis for the approach taken during the rest of the evaluation.

Bench-scale testing was carried out to determine the most effective liquid-phase treatment option. Hydrogen peroxide, sodium hypochlorite, ferrous chloride, and ferric chloride were tested. Bench-scale testing confirmed that sodium hypochlorite is the most cost effective chemical for use in the PCWMD conveyance system.

Liquid and gas-phase odor and wastewater parameter samples were collected from 40 locations within the collection system. These locations were selected in order to characterize the overall conveyance system wastewater characteristics, CDU effectiveness and sulfide generation within the network. Sample results were used to calibrate the INTERCEPTOR model.

The INTERCEPTOR model was used to predict sulfide generation throughout the sewer network based on sampling at selected locations. Liquid sulfide and headspace H_2S concentrations throughout the entire modeled system were predicted. Additionally, ventilation out gassing locations were predicted by the model. Follow-up ventilation sampling of twenty out-gassing locations was completed to verify model results and to identify areas in most need of vapor-phase treatment. The INTERCEPTOR model was then used to simulate changes to the CDU dose rates in order to improve chemical consumption and reduce sulfide concentrations.

The system survey, sample results, analysis of historical data, INTERCEPTOR model results and analysis of the system operation provided the basis for a suite of short and long term recommendations to mitigate odors within the collection system.

2.2 Laboratory Testing – Chemical Dosing

In order to screen the effectiveness of various liquid phase treatment chemicals, bench-scale testing was conducted on wastewater samples collected from the conveyance system. Bench-scale chemical jar testing was completed using various chemicals including: sodium hypochlorite, hydrogen peroxide, ferrous chloride and ferric chloride to confirm the findings from past studies and current chemical dosing strategies. This effort provided an understanding of the relative effectiveness of the current practices and ensured that opportunities for improvement with different chemical dosing strategies were not overlooked.

Each major class of liquid phase treatment technology was included in the bench-scale testing. Two strong oxidants were tested, hydrogen peroxide and sodium hypochlorite; and two metal salts were tested ferrous and ferric chloride. Nitrate salts were not tested, because this technology acts on the sewer biofilm and cannot be effectively tested in the laboratory.

In order to characterize the response of liquid-phase treatment chemicals on PCWMD wastewater, hydrogen peroxide (H_2O_2), sodium hypochlorite (NaOCl) and ferrous chloride ($FeCl_2$) were tested on two samples: one collected from the Canada del Oro (CDO) interceptor where wastewater is relatively fresh; and one collected upstream of the Tucson Boulevard interceptor chemical dosing unit, where wastewater is relatively old. Additionally, ferric chloride ($FeCl_3$) was tested on the Tucson Boulevard sample in order to compare a second iron salt.

A target sulfide concentration of 0.5 mg/L or less in the liquid stream was selected to compare the effectiveness of each chemical. This concentration is considered a reasonable target concentration for conveyance system odor control. Where possible, levels were driven down to 0.2 mg/L or below. The dose required to bring dissolved sulfides to 0.5 mg/L and below was calculated in terms of mass of chemical per mass of initial sulfide (sulfide mass before the reaction). This dose was used to estimate chemical costs in terms of cost per pound of sulfide removed.

Seven combinations of chemicals and wastewater were tested in a total of 29 experiments. These experiments provided a set of dose response curves showing the effective dose of each chemical for removing sulfide in two different wastewater samples.

2.2.1 Bench-Testing Results

Bench-scale testing results for hypochlorite, ferrous chloride, ferric chloride, and peroxide are presented in the figures below. In each plot, chemical dose is plotted on the horizontal axis in terms of mass of chemical added, such as sodium hypochlorite (NaOCl) added per mass of initial dissolved sulfide. On the left vertical axis final dissolved sulfide following the reaction is plotted. On the right vertical axis final headspace vapor-phase hydrogen sulfide (H_2S) concentration is plotted.

Hypochlorite results show that sodium hypochlorite brought the sulfide concentration down to near zero (below detection) at a dose of approximately 4 grams (g) NaOCl/gram (g) sulfide. A dose of 3 grams NaOCl/ grams sulfide, or 3 lbs/lb appears sufficient to reach a goal of 0.5 mg/L. The dose response was similar for both wastewater samples. These findings appear to agree with the dose range reported in earlier studies. Sodium hypochlorite (NaOCl) is capable of meeting both the 0.5 mg/L and 0.2 mg/L target values established in the previous 1997 study. Field data evaluation confirms that current dosing at

this rate is generally achieving the relatively low dissolved sulfide target values. **Figure 2-1** shows dose response of sodium hypochlorite (NaOCL for removing dissolved inorganic sulfide (left axis) and headspace vapor phase H_2S (right axis). A dose of <3 g NaOCL/g sulfide was sufficient to bring the liquid concentration in both samples to 0.5 mg/L and vapor-phase sulfide concentrations to below 5 ppmv.

Figure 2-1
Liquid-Phase Sulfide and Vapor-Phase H_2S vs. NaOCl Dose Response Curves

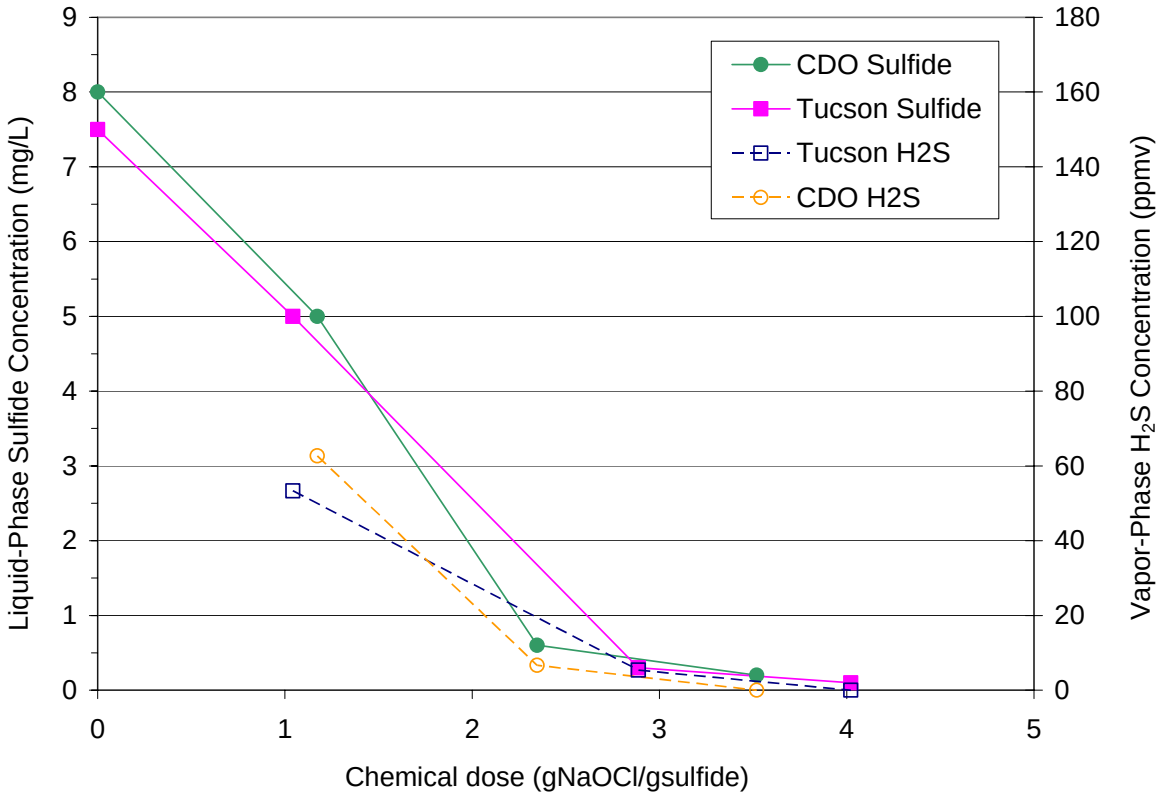


Figure 2-2 shows dose response of ferrous chloride ($FeCl_2$) for removing dissolved inorganic sulfide (left axis) and headspace vapor-phase H_2S (right axis). These results show that ferrous chloride did not bring the concentration to below detection. A dose of approximately 5 g $FeCl_2$/g sulfide was sufficient to bring the liquid concentration in both samples to 0.5 mg/L and vapor-phase sulfide concentrations to below 5 ppmv.

Figure 2-2
Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Ferrous Chloride Dose Response Curves

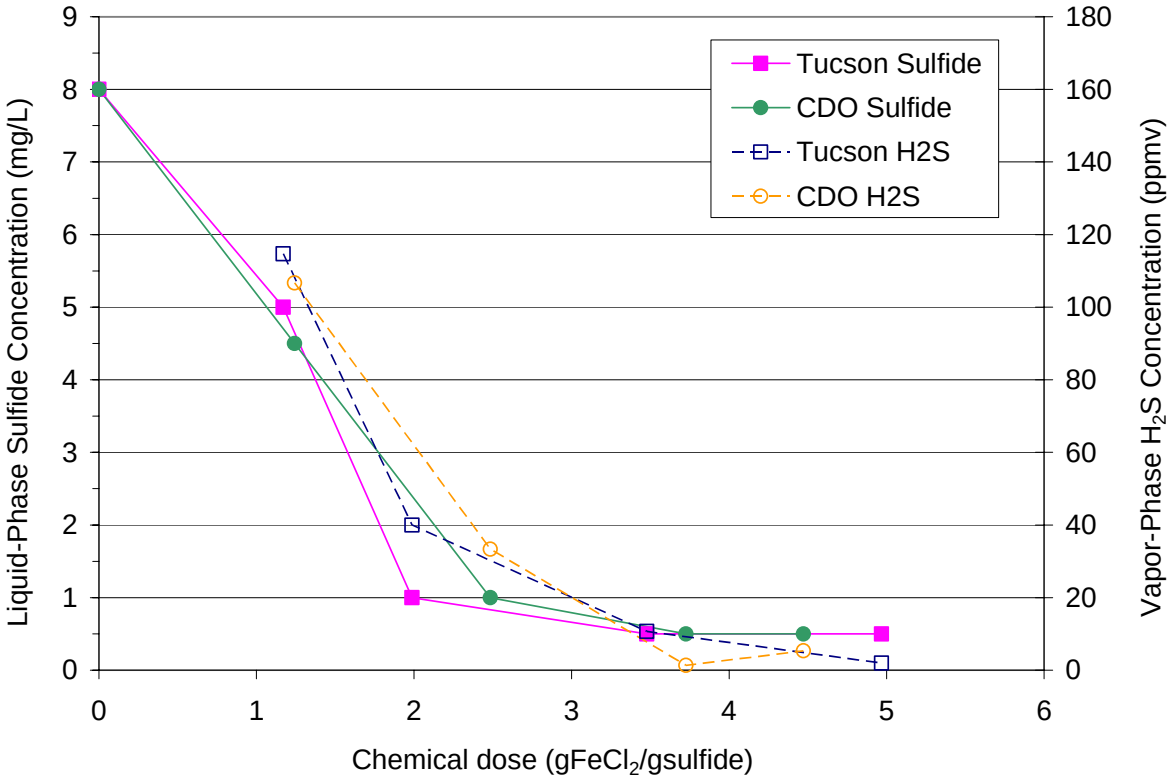


Figure 2-3 shows dose response of ferric chloride ($FeCl_3$) for removing dissolved inorganic sulfide (left axis) and headspace vapor-phase H_2S (right axis). These results show that ferric chloride works similarly to ferrous chloride with respect to dissolved sulfide. However, ferric chloride did not appear to control vapor-phase H_2S as efficiently. This may be due to lower pH caused by the ferric chloride solution. Greater amounts of ferric chloride solution in the small scale jar sample drive the pH down, which causes a larger fraction of H_2S to volatilize out of solution. A dose of approximately 7g $FeCl_3$/g sulfide brought the liquid concentration to 0.5 mg/L. Higher dosages however appear to be needed to get below the a 0.2 mg/L target. *It is noteworthy that reported field experience in the literature suggest that achieving lower sulfide levels with iron salts may be difficult, and that much higher dosing rates would be needed, e.g., in the range of 12 lbs/lb, or higher, to lower dissolved sulfides below 0.5 mg/L. Some studies suggest iron salts cannot effectively achieve low sulfide levels.*

Figure 2-3
Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Ferric Chloride Dose Response Curves

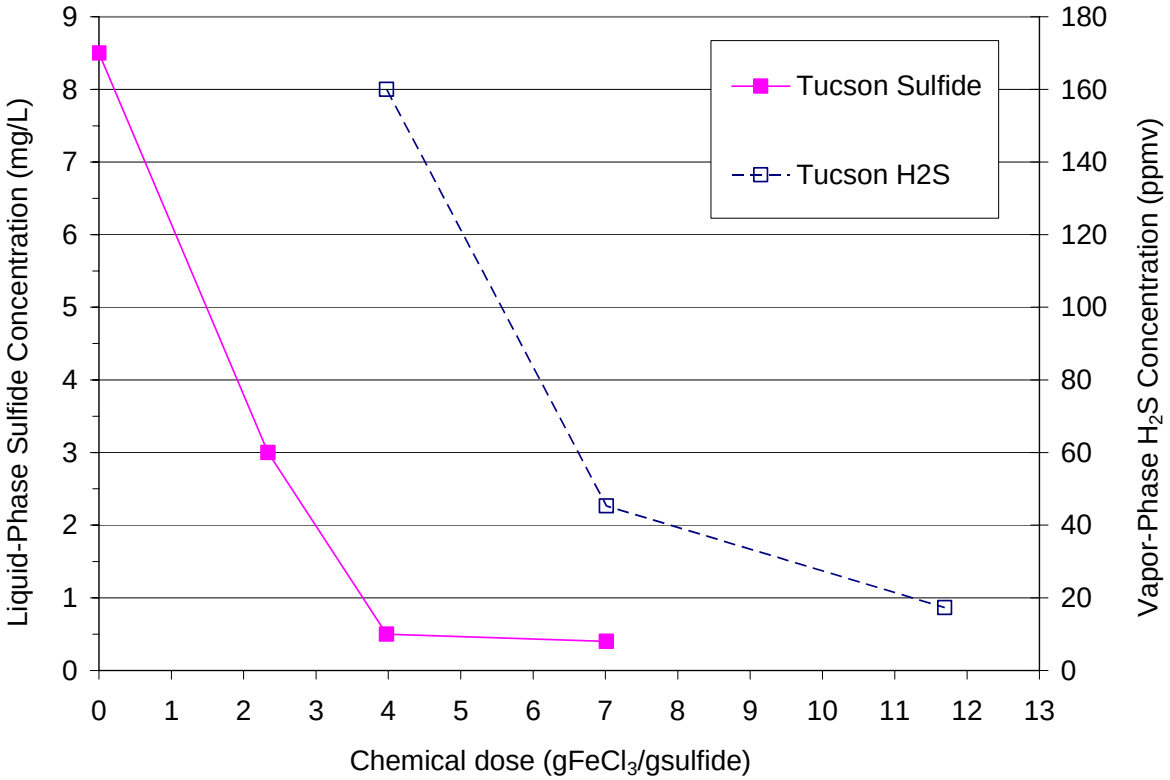
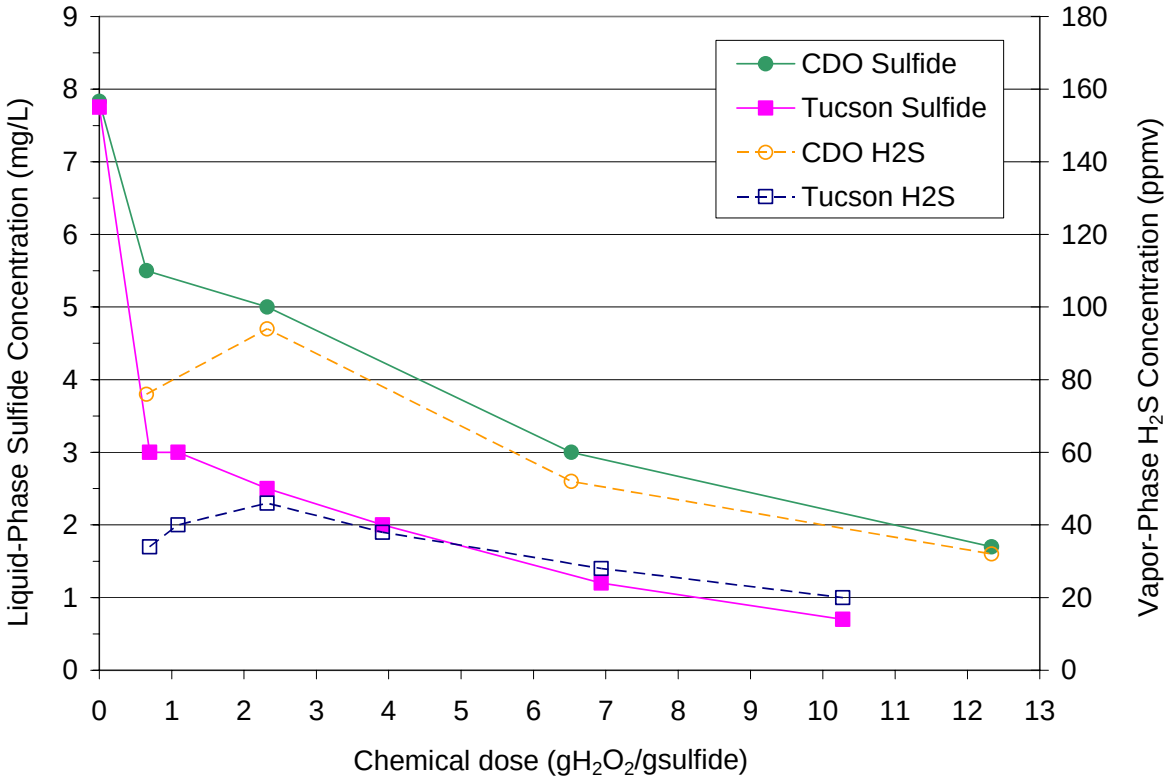


Figure 2-4 shows dose response of hydrogen peroxide (H_2O_2) for removing dissolved inorganic sulfide (left axis) and headspace vapor-phase H_2S (right axis). These results show that peroxide was very inefficient for removing dissolved sulfide from both wastewater samples especially the Canada del Oro (CDO) interceptor sample. Typically, a dose of between 1g and 4 g H_2O_2/g sulfide is sufficient to remove sulfide to below detection. However, even at three times the maximum expected effective dose, sulfide was not completely removed.

Figure 2-4
Liquid-Phase Sulfide and Vapor-Phase H_2S vs. Peroxide Dose Response Curves



2.2.2 Cost

Estimated cost for removing sulfide was calculated in terms of cost per pound ($/lb) of sulfide removed. Iron salts did not remove sulfide to below 0.5 mg/L whereas the sodium hypochlorite dose resulted in sulfide levels below 0.2 mg/L. Furthermore, iron salts are fairly specific to sulfide related odor control, while sodium hypochlorite provides a broader range of control for other non-H_2S odor compounds. The peroxide cost is substantially greater, and it appeared to be ineffective for removing sulfide. Based on the bench-scale jar testing results, ferrous iron and sodium hypochlorite were the most cost effective chemicals as illustrated in **Table 2-1**. Both cost approximately $3.20/lb of sulfide removed.

Table 2-1
Chemical Cost Calculation

Chemical	Dose (lb/lb sulfide)	Cost ($/gal)	Chemical Concentration (Weight Fraction)	Chemical Density (lb/gal)	Chemical Requirement (gal/lb Sulfide)	Chemical Cost ($/lb Sulfide)
Sodium hypochlorite (NaOCl)	4	$1.00	0.125	10	3.2	$3.20
Ferrous Chlorite $FeCl_2$	5	$2.39	0.32	11.6	1.08	$3.22
Hydrogen Peroxide H_2O_2	12	$3.00	0.5	10	2.40	$8.16
Ferric Chlorite $FeCl_3$	7	$2.83	0.38	12.1	0.87	$4.31

2.2.3 Bench-Testing Conclusions

Several useful conclusions are drawn from the bench-scale test results:

- Hypochlorite was the most effective chemical for removing sulfide.
- Hypochlorite is estimated to cost approximately $3.20 per pound of sulfide removed.
- Hypochlorite appeared to remove sulfides to below 0.2 mg/L at a dose of approximately 4 g/g.
- Ferrous chloride effectively removed sulfide down 0.5 mg/L at a dose of approximately 5 g/g (as $FeCl_2$), but could not reduce the sulfide concentrations any further.
- Ferric chloride removed sulfide to 0.5 mg/L at a dose of approximately 7g/g but could not reduce it any further. Residual vapor-phase H_2S was a little high but this may have been a side effect of the jar testing approach and related shifts in pH.
- At reasonable doses, peroxide did not effectively remove sulfides.

Based on bench-scale jar testing sodium hypochlorite is confirmed to be the most cost effective chemical for PCWMD. This validates the previous choice made by PCWMD. The remaining evaluation will compare full-scale field data on each of the main chemical dosing units (CDUs) with the jar test information.

2.3 Conveyance System Interceptor Model

The conveyance system model was constructed using physical pipe data for sewer pipes 21 inches and larger and many pipes 15 inches to 21 inches in diameter to provide a complete description (picture) of the operating system. Modeling focused on tributaries to the Roger Road WWTP and Ina Road WPCF. Wastewater flow rates were applied to the hydraulic model that uses the physical pipe model as the basis

for its development. Field measurements were taken to characterize wastewater parameters and headspace vapor-phase hydrogen sulfide (H_2S) concentrations. Calibrated model results were reported in terms of system wide dissolved sulfide concentrations, system wide headspace vapor-phase H_2S concentrations, system wide pressurized locations where sewer out-gassing is predicted to occur, and system wide vapor-phase H_2S emission locations.

2.3.1 INTERCEPTOR Model Overview

The computer-based INTERCEPTOR Model predicts transport, generation, and fate of hydrogen sulfide in wastewater conveyance systems. The INTERCEPTOR Model uses a mass balance approach with simultaneous solution of liquid and vapor-phase steady-state mass balances to represent several important reactions and processes, including:

- Liquid-phase generation of sulfides
- Temperature and BOD effects on sulfide generation
- Liquid-phase bulk transport of sulfides
- Liquid-phase natural oxidation of sulfides
- pH-dependent sulfide species distribution, i.e., H_2S and reduced sulfide forms (HS^- and S^{-2})
- Liquid–vapor mass transfer of H_2S
- Liquid drag induced natural ventilation rates
- Vapor-phase bulk transport of H_2S.

In addition, the INTERCEPTOR Model performs hydraulic calculations to determine wastewater depth of flow, wastewater cross-sectional area of flow, and wastewater velocity. These are calculated using pipe slope, diameter, pipe material and flow rate values. Headspace air flow data are calculated based on wastewater hydraulic data (i.e., velocity and cross-sectional flow area).

The INTERCEPTOR Model predicts liquid-phase sulfide concentrations and vapor-phase H_2S concentrations for each individual pipe section. Site-specific data are used as input (e.g., influent wastewater temperature, pH, BOD, and initial sulfides concentration). Additionally, available liquid and vapor-phase concentration data are used for calibration. Once calibrated, the model is used for a variety of evaluations including:

- Evaluating liquid chemical-based odor and corrosion control system alternatives
- Identifying odor release “hot spots”
- Predicting natural ventilation airflow rates
- Estimating liquid sulfide and vapor-phase hydrogen sulfide concentrations during various flow conditions.

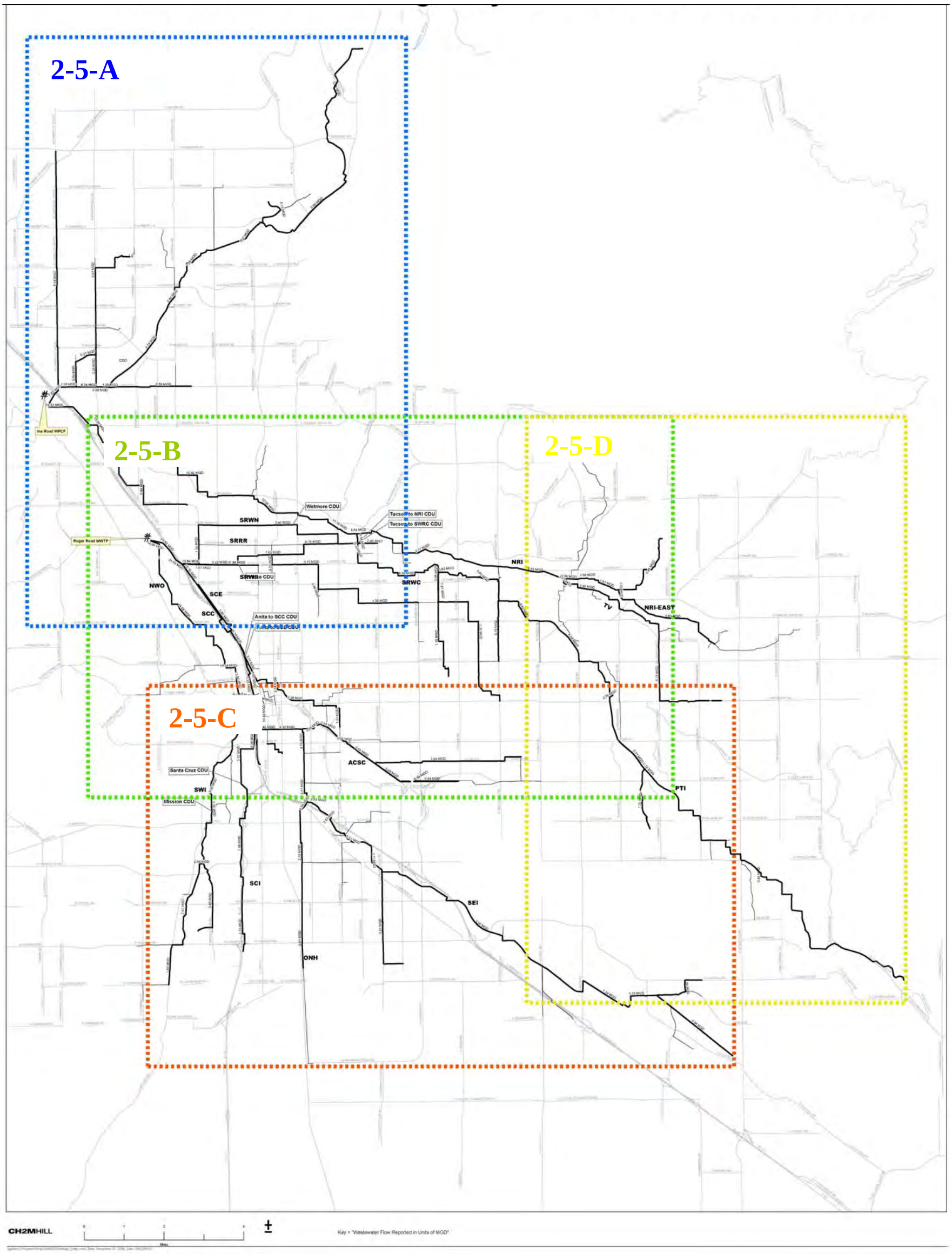
2.3.2 Model Input Parameters

The conveyance system model was constructed using geographic information system (GIS) information supplied by PCWMD to develop the collection system pipe network. The pipe network was then used as input into a dynamic hydraulic model and calibrated to average dry weather flow consistent with 2005 population density assignations and flow meter readings. Physical pipe data and hydraulic model data representing average flow rates were used to set up the INTERCEPTOR Model to simulate sulfide generation during average dry weather flow conditions.

A total of 2,900 pipes, representing 212 miles of sewer lines, were included in the model. Each pipe was specified in terms of length, diameter, slope and roughness. The key map of the model domain showing simulated average wastewater flows is provided as **Figure 2-5.**

Figure 2-5

Interceptor Model Domain and Simulated Average Dry Weather Wastewater Flow



For enlarged areas, see Appendix A

Labels on pipe segments show simulated average flow in million gallons per day (mgd). Most of the flow is conveyed by gravity. In addition to gravity sewers, hydraulic drops, and siphons are characterized in the model. Also, chemical dosing unit (CDU) locations are identified. A majority of the flow is carried to the two treatment plants via four main interceptor trunks: Canada Del Oro (CDO) interceptor to Ina Rd WPCF (7.6 mgd), North Rillito Interceptor (NRI) to Ina Rd WPCF (14.5 mgd), Santa Cruz Central (SCC) interceptor to Roger Road WWTP (24.9 mgd), and Northwest Outfall (NWO) interceptor to Roger Rd WWTP (14.9 mgd).

Representative wastewater parameters measured during September and October 2006 were assigned to each modeled sewer branch. Smaller branches were assigned the same parameter values as the interceptor into which they discharge. Average parameter values were used for branches where multiple samples were collected.

2.3.3 Model Calibration

Measured liquid sulfide, dissolved oxygen (DO) and average vapor-phase hydrogen sulfide (H_2S) concentrations were used to calibrate the INTERCEPTOR model. Sulfide generation, re-aeration, and vapor-phase H_2S generation were adjusted to measured sample data. Liquid sulfide, DO and vapor-phase H_2S values used to calibrate each sewer branch are listed in **Table 2-2**.

Sample data upstream and downstream of each chemical dosing unit (CDU) was used to account for chemical removal of sulfide. A chemical reaction rate was assigned to each CDU location.

Table 2-2
INTERCEPTOR Model Calibration Data

Manhole ID	Sample Location	DO (mg/L)	Average Dissolved sulfide (mg/L)	Average H_2S (ppm)
5310-05	CDO T1 Seg 1	1.6	0.0	0
9553-01	CDO-T7	2.6	0.04	3
1789-08	CDO-T3	3.3	0.0	0
1735-16	CDO-T4& T5	0.95	0.18	12
1735-06	CDO	1.6	0.0	7
1811-01A	North Rillito East	0.84	0.06	4.7
8706-04	Tanque Verde	0.85	0.16	3
9717-01A	24" side sewer to NRI	1.0	0.64	11
5117-05	NRI upstream of Diversion from	1.0	0.17	34
1703-02A	Downstream end of NRI	1.0	0.0	27
8964-12	Pantano upstream of Craycroft	0.85	0.0	0
4764-01	PTI-Columbus	0.87	0.68	7
9764-09	SRWC-Stone	2.3	0.0	0
9813-06	Downstream end of SRWS	1.1	0.47	117
1716-22	SRWC upstream of Tucson CDU	1.1	0.45	7

Manhole ID	Sample Location	DO (mg/L)	Average Dissolved sulfide (mg/L)	Average H_2S (ppm)
1716-OUT	Downstream of Tucson CDU to NRI	0.81	0.08	10
6268-11	Downstream of Tucson CDU to	1.1	0.0	6
5096-15	Upstream of Prince CDU	1.2	0.0	5
9718-07	Downstream of Prince CDU	2.1	0.02	55
9763-01	Upstream Wetmore CDU	3.8	0.16	5.5
9811-02	Downstream of Wetmore CDU	1.0	1.2	229
1749-01	Downstream end of NWO	0.98	1.8	28
5689-04	21" side sewer to NWO	1.5	0.8	30
1799-46	Upstream of Mission CDU	1.0	1.5	3
1799-03	Downstream of Mission CDU	2.2	0.0	1
9914-07	SCC	1.0	2.6	56
6677-19	Upstream of Anita CDU to SCC	1.0	0.40	66
4140-03	Downstream of Anita CDU to SCC	0.81	0.71	77
1299-12	Upstream of Anita CDU to SCE	0.97	0.54	76.9
8808-66	Upstream of Anita CDU to SCE	1.0	0.37	96
9877-02	Downstream of Anita CDU to SCE	0.80	0.38	21
7082-12	ASCE	1.3	0.0	12
7131-41	ASCE-Golflinks	1.19	0.0	4
50-11	Downstream of State Prison FM	1.6	0.68	27
4153-107	SCI-B	0.93	1.1	5
5758-36A	SEI-Old Nogales	0.66	0.30	8.6
8033-06	SEI upstream of Country Club	0.99	0.15	8
9917-06	Upstream of 18th CDU	0.78	0.12	22
9910-09	Downstream of 18th CDU	0.97	0.0	16
9918-30	Upstream of Santa Cruz CDU	0.66	0.33	12
9918-01A	Downstream of Santa Cruz CDU	1.1	0.43	6

2.4 Model Results

The Interceptor Model was used to predict liquid-phase sulfide generation, headspace vapor-phase H_2S concentration, manhole pressurization (out-gassing), and H_2S emissions based on model input data and calibration parameters discussed above. The following sections describe the predicted model results.

2.4.1 Liquid Sulfide Concentrations

Liquid sulfide generation was estimated for each pipe segment in the model. Liquid sulfide concentration results in the sewer network are presented in **Figure 2-6** as a key color coded map. Larger scale, color coded maps are provided in **Appendix A.** Pipes with low predicted sulfide concentrations (0 – 0.2 mg/L) are shown as blue segments. Pipes with moderate predicted sulfide concentrations (0.2 – 0.5 mg/L) are shown as green segments. Pipes with potentially problematic sulfide concentrations (0.5 to 1.0 mg/L) are shown as yellow segments. Sulfide "hot spots" (>1.0 mg/L) are shown as red segments. Field sampled sulfide concentrations are shown as numerical callouts (labels) at each sample location. Additionally, location of each CDU is identified and a table is provided showing reported dosing regime at the time calibration sample data were collected.

A number of observations are made from a review of the liquid sulfide map results:

- Low sulfide generation is predicted throughout the Canada Del Oro (CDO) interceptor network
- Low to moderate sulfide generation is predicted throughout the North Rillito Interceptor (NRI) network
- Low sulfide generation is predicted in Southeast Interceptor (SEI) and Aviation Corridor to Santa Cruz Central (ACSC) interceptor
- Hot spots occur in Southwest Interceptor (SWI) upstream of the Mission CDU; at the downstream ends of Santa Cruz Interceptor – West (SRW), Santa Cruz Interceptor – West North (SRWN), and Santa Cruz Central (SCC) interceptor; midway along the Pantano Interceptor (PTI); and directly upstream of the Alameda siphon
- Much of Northwest Outfall (NOW) interceptor has moderate to high predicted sulfide concentrations

In general, liquid sulfide is rather low with a few areas high enough to be problematic. Sulfide hot spots indicate areas that could benefit from augmented liquid-phase treatment. A subsequent section on CDU assessment will discuss performance of the chemical dosing units and impacts on sulfide levels in the conveyance system.

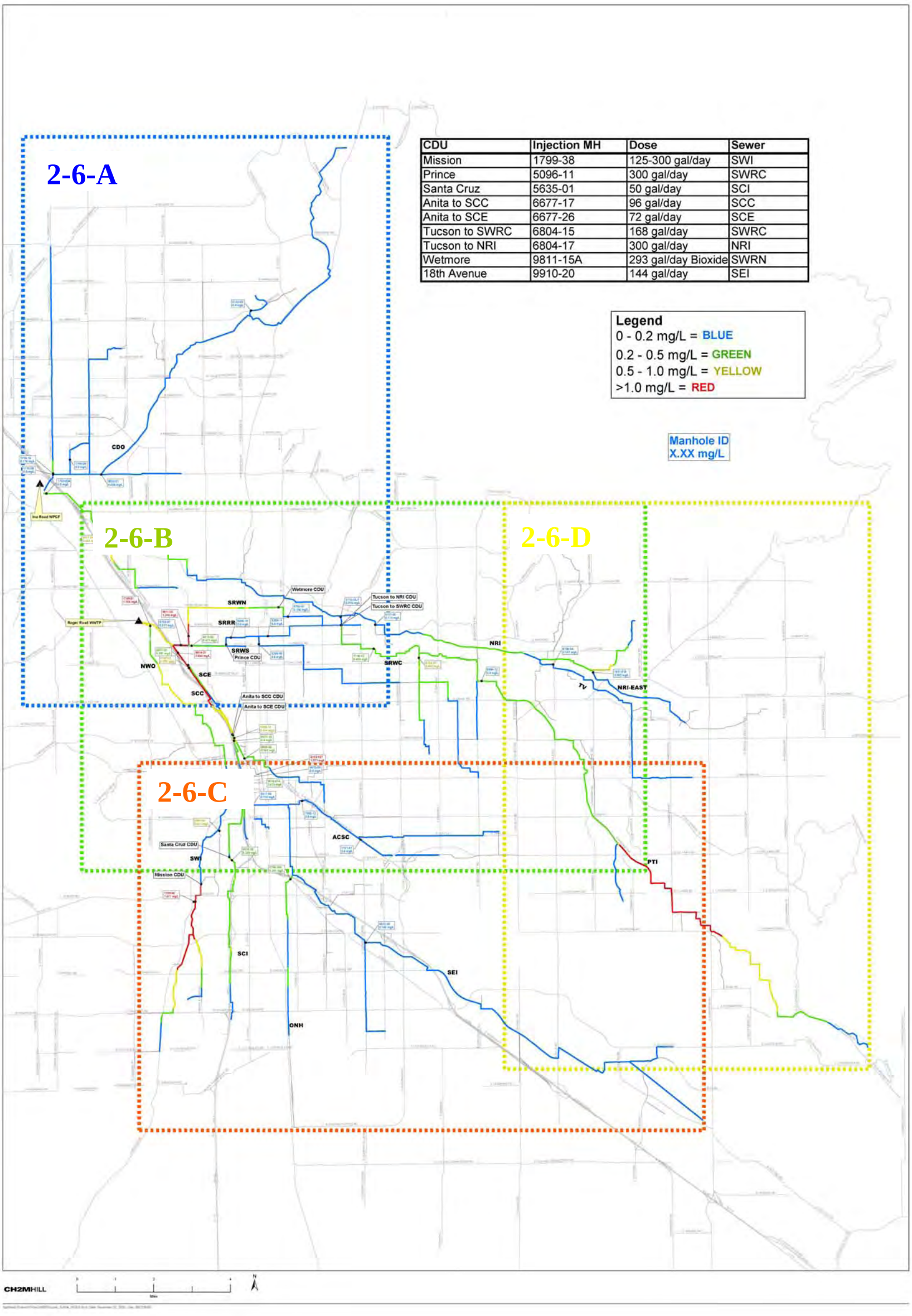
2.4.2 Vapor-Phase H_2S

While liquid sulfide concentration indicates the potential for odor problems to occur, headspace (area above the liquid level in the sewer) vapor-phase H_2S concentration is a more direct indicator of potential odor hot spots. Model predicted sewer headspace H_2S concentration for each pipe segment is shown on a color coded key map in **Figure 2-7**. Observations of the vapor-phase H_2S concentrations in the sewer system are:

- In general, vapor-phase H_2S hot spots occur in the same locations as liquid-phase sulfide hot spots.
- Unlike liquid sulfide, vapor-phase H_2S is predicted to be low in most of Northwest Outfall (NWO) interceptor.
- Moderate to high H_2S concentrations are predicted throughout the Pantano Interceptor (PTI) and North Rillito Interceptor (NRI).
- Low H_2S concentrations are predicted throughout most of the Canada Del Oro (CDO) interceptor network.

Figure 2-6

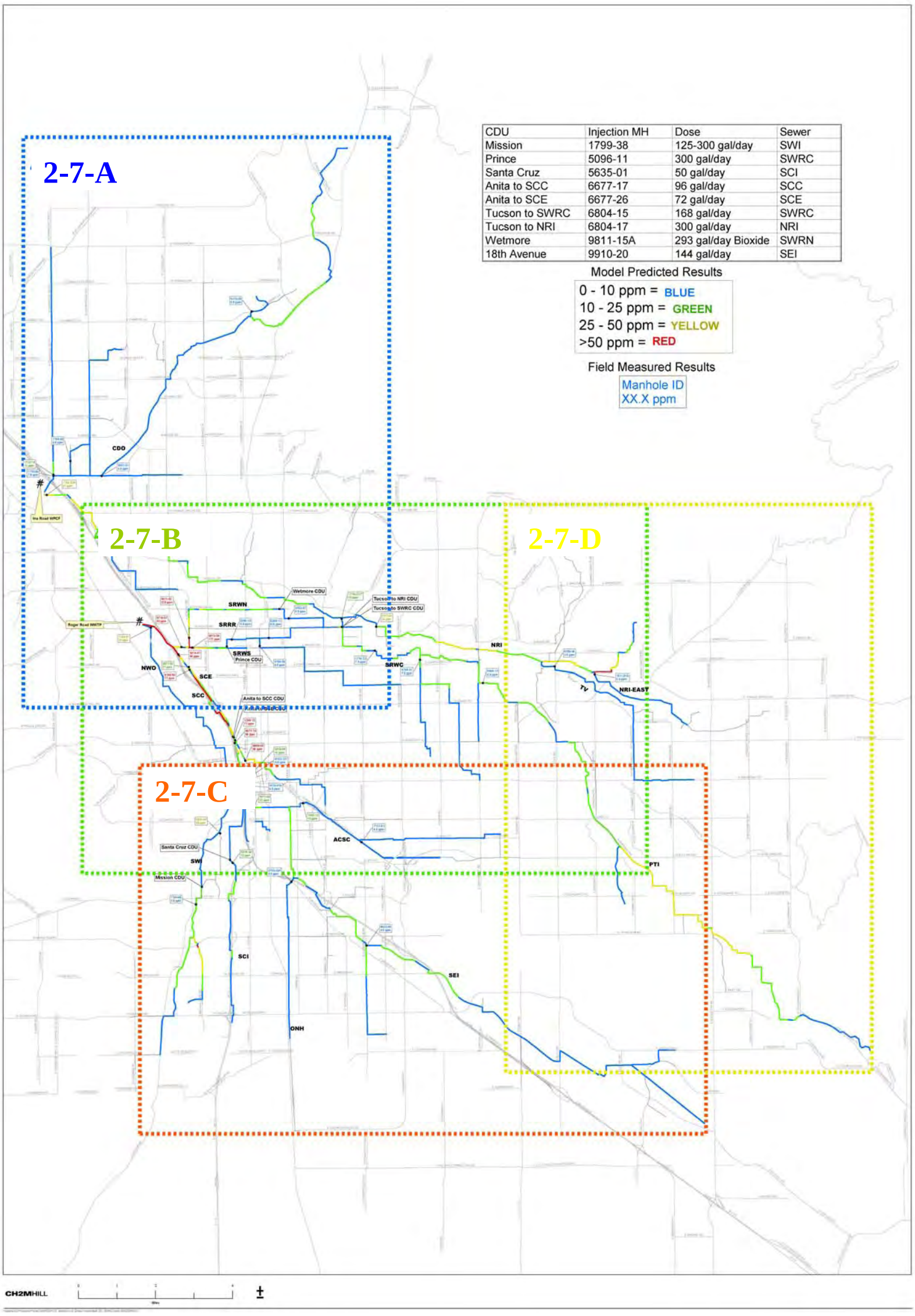
System Wide Liquid-Phase Sulfide Concentration Results



For enlarged areas, see Appendix A

Figure 2-7

System Wide Vapor-Phase H_2S Concentration Results



CDU	Injection MH	Dose	Sewer
Mission	1799-38	125-300 gal/day	SWI
Prince	5096-11	300 gal/day	SWRC
Santa Cruz	5635-01	50 gal/day	SCI
Anita to SCC	6677-17	96 gal/day	SCC
Anita to SCE	6677-26	72 gal/day	SCE
Tucson to SWRC	6804-15	168 gal/day	SWRC
Tucson to NRI	6804-17	300 gal/day	NRI
Wetmore	9811-15A	293 gal/day Bioxide	SWRN
18th Avenue	9910-20	144 gal/day	SEI

Model Predicted Results

0 - 10 ppm = BLUE
10 - 25 ppm = GREEN
25 - 50 ppm = YELLOW
>50 ppm = RED

Field Measured Results

Manhole ID
XX.X ppm

For enlarged areas, see Appendix A

2.4.3 Out-Gassing

The INTERCEPTOR Model calculates headspace air movement due to drag induced by flowing wastewater. This drag-induced air flow, called "natural ventilation," results in pressurized locations within sewer networks. Locations are prone to out-gassing where pipes with a lot of natural ventilation capacity discharge into pipes of lesser or no natural ventilation capacity (such as siphon inlets). **Figure 2-8** presents results of an outgassing analysis from the model with the severity of out-gassing (in terms of volumetric air flow) indicated by color code. These results are relevant because high headspace vapor-phase H_2S is not sufficient to cause an odor release, however, in combination with system pressurization, moderate to high H_2S concentrations can cause significant odor releases.

Two important observations are:

- Numerous locations are predicted to out-gas at a flow rate of up to 25 cfm.
- A number of areas are characterized by clusters of moderate to severe out-gassing manholes. These areas could potentially benefit from active ventilation and vapor-phase treatment. Several out-gassing locations could be placed under negative pressure with a single blower to prevent out-gassing. Such locations include the following:
  - NRI at Camino De la Tierra
  - NRI at Oracle Road
  - SRW at Romero Road
  - Downstream end of NWO (Entrance to Santa Cruz Siphon)
  - Diversion line from Tucson to NRI
  - SRW between Alvernon Way and Country Club Road
  - Downstream end of ACSC
  - Entrance to the Alameda siphon and Downtown reach of SCI
  - SCC at Grant Road
  - Junction of SCC and SRW (Prince Road and Interstate I-10)

Follow-up manhole out-gassing measurements at these locations served to identify the intersections of Prince and Interstate I-10, the Santa Cruz siphon inlet, and the Alameda siphon inlet as the three locations most in need of vapor-phase treatment.

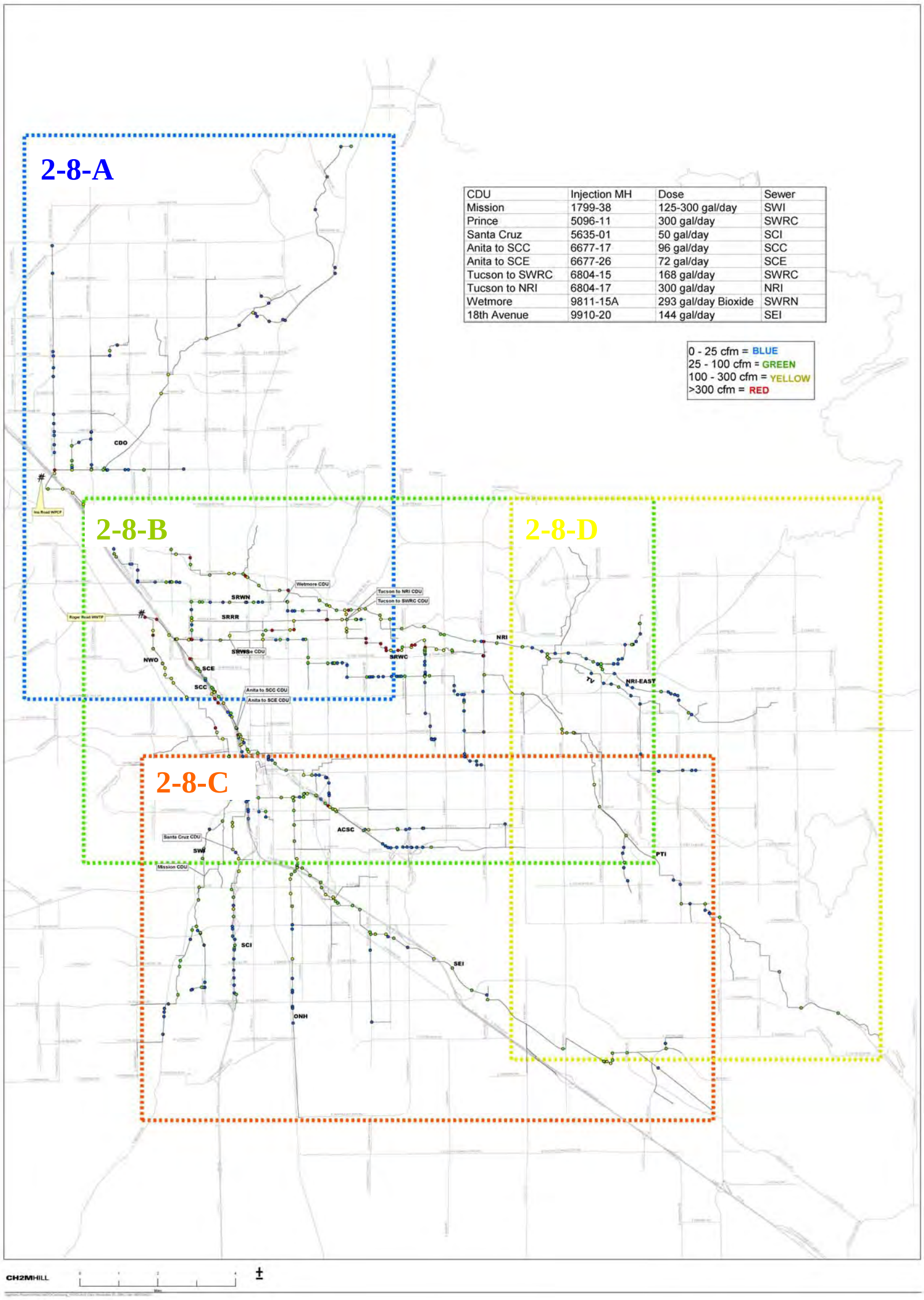
2.4.4 Conveyance System Modeling Conclusions

Findings from the INTERCEPTOR modeling are summarized:

- Model predicted liquid sulfide is relatively low, ranging from zero to 2.64 mg/L, throughout the system. Approximately 21 miles of sewer line is predicted to exceed 0.5 mg/L under average conditions.
- Model predicted vapor-phase H_2S varied from zero to 230 ppm throughout the model domain. Some reaches had high vapor-phase H_2S but moderate to low liquid sulfide.
- Model results indicated numerous possible out-gassing locations resulting from wastewater drag induced headspace pressurization.
- Based on follow-up ventilation measurements the inlet to Santa Cruz siphon, sewer junction near Prince and Interstate I-10, and Alameda siphon inlet are recommended for vapor-phase treatment.

Figure 2-8

System Wide Model-Predicted Out-Gassing Locations



2.5 CDU Analysis and INTERCEPTOR Modeling

In total there are 10 chemical dosing stations that impact 12 reaches of the conveyance system. **Table 2-3** provides a summary of these stations: where they are located, what chemical is being dosed, reported dosing rates, and portions of the downstream conveyance system that is being treated. Locations of the dosing stations are shown in **Figure 2-9**. These units provide treatment for a conveyance system that includes over 1,500 miles of sewer mains, ranging from 4 to 78 inches in diameter and delivers flow to the treatment plants from as far away as 24 miles. The treatment plants include the Roger Road WWTP (41 mgd) and the Ina Road WPCF (22 mgd). The location map of chemical dosing systems shows that most of the conveyance system feeds into the Roger Road WWTP.

Table 2-3
Chemical Dosing System Summary

Chemical Feed Unit Name	Type(1)	Chemical	Reported Dosing Rate (gal/day)	Address	Feed Manhole(2)	Interceptor	Downstream Wastewater Facility
Tucson	CDU	Sodium Hypochlorite	300	4001 N. Tucson Blvd.	6804-17	North Rillito (NR)	Ina Rd.
			108		6804-15	South Rillito West Central (SRWC)	Roger Rd.
Prince	CDU	Sodium Hypochlorite	300	900 W. Prince Rd.	5096-11	South Rillito West Central (SRWC)	Roger
Anita	CDU	Sodium Hypochlorite	96	1246 N. Anita Ave.	6677-17	Santa Cruz Central (SCC)	Roger
			72		6677-26	Santa Cruz East (SCE)	Roger
18th	CDU	Sodium Hypochlorite	144	590 W. 18th St.	9910-20	Southeast (SEI)	Roger
Mission Street	CDU	Sodium Hypochlorite	125 to 300	3931 S. Mission Rd.	5689-36	Southwest (SWI)	Roger
Wetmore	Temporary CDU	Bioxide	200	640 E. Wetmore	4173-02	South Rillito West North (SRWN)	Roger
Santa Cruz	Temporary CDU	Sodium Hypochlorite	50	2600 S. Santa Cruz Lane	5635-01	Santa Cruz (SCI)	Roger
Rancho del Lago (RDL) #1	PS	Sodium Hypochlorite	51	10000 S. Monthan Ranch Road	4450-01	Southeast (SEI)	Roger
State Prison	PS	Magnesium Hydroxide	35	10000 S. Wilmot Road	50-11	Southeast (SEI)	Roger

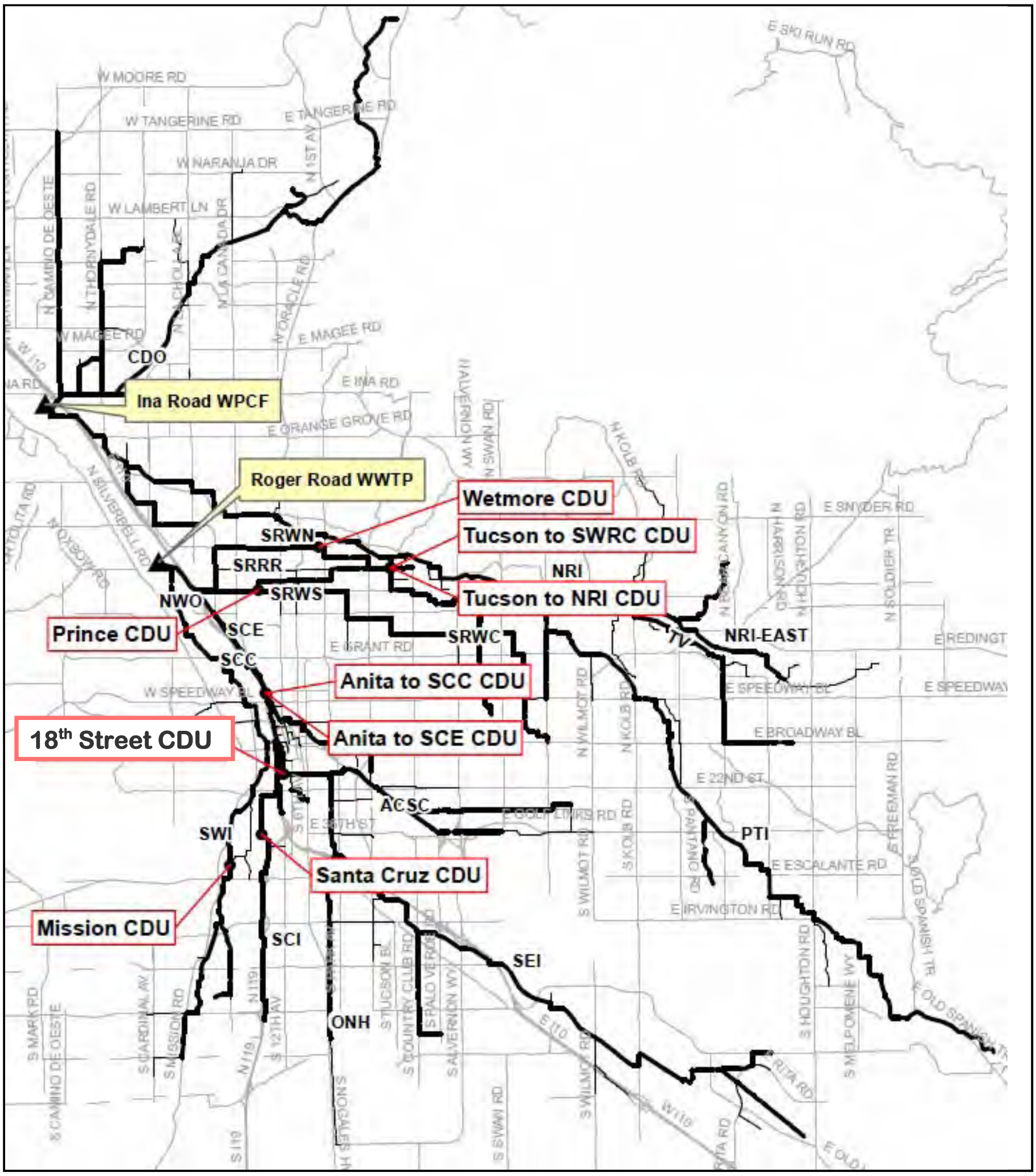
Chemical Feed Unit Name	Type(1)	Chemical	Reported Dosing Rate (gal/day)	Address	Feed Manhole(2)	Interceptor	Downstream Wastewater Facility
Federal Prison	PS	Magnesium Hydroxide	Disabled	8901 S. Wilmot Road	50-23	Southeast (SEI)	Roger

(1) **CDU** = Chemical Dosing Unit (on a slab with power)
Temporary CDU = Feed site with either no permanent power or solar power
PS = pump station, with power and chemical metering pumps

(2) All pump station manholes listed are actually force main (FM) discharge manholes; chemical is fed into the pump station wet well and enters the conveyance system at the FM discharge

THIS SPACE LEFT BLANK INTENTIONALLY

Figure 2-9
Location Map of Chemical Dosing Systems



Six of the chemical dosing units are relatively large systems dedicated to treating large gravity sewers. These systems use containerized package dosing stations utilizing sodium hypochlorite for sulfide control. These include the Tucson CDU, the Prince CDU, the Anita CDU, the 18th Street CDU, and the Mission CDU. The Wetmore CDU is a large CDU, but is not a containerized system. It treats a major interceptor line using calcium nitrate (Bioxide ™).

Several smaller CDUs feed sodium hypochlorite in the conveyance system including the remote Santa Cruz, Rancho Del Lago, and Silverado CDUs. Magnesium hydroxide (Thioguard™) can be fed at two Prison Pump Stations (State and Federal), although currently the Federal Prison CDU is not in service.

The focus of this evaluation is on the large CDUs and each is discussed separately below.

2.5.1 Mission CDU

The Mission Street CDU is shown in **Figure 2-10**. The Mission Street CDU is located on the South West Interceptor (SWI) and treats flow received by the Roger Road WWTP. The chemical treatment system is one of the self contained units with two chemical metering pumps providing sodium hypochlorite dosing. This CDU discharges into a 3,300 ft long, 15-inch gravity sewer. The 15-inch line discharges into an interceptor, which is a 30-inch line flowing at approximately 3.4 mgd. Sodium hypochlorite dosing ranges from 125 to 300 gallons per day.

Figure 2-10
Mission Street CDU

Upstream and downstream sampling was completed in August 2006. Grab sample liquid-phase data (adjusted to an average value based on diurnal cycles) was taken while Odalog vapor-phase H_2S monitors were deployed. The Odalog data tracks H_2S values minute-by-minute and includes diurnal effects. This evaluation indicated that the upstream average liquid-phase dissolved sulfides were 1.5 mg/L and the downstream were below detection (reported as zero). Vapor-phase H_2S upstream concentrations

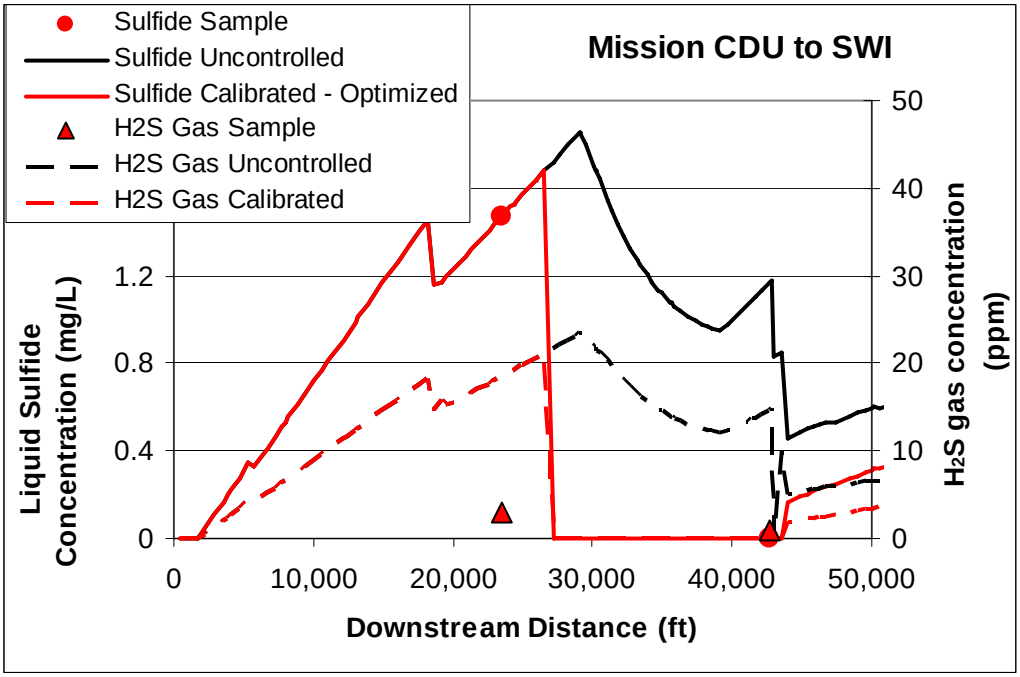
averaged 3.0 parts per million by volume (ppmv) with a downstream average of 1.0 ppmv. Odalog data indicated daily upstream peaks in the range of 5 to 10 ppmv with downstream peaks generally below 5.0 ppmv. At face value this indicates the conveyance system at this location is not heavily loaded with sulfides and that the CDU is relatively effective.

Sampling locations were not immediately upstream and downstream of the CDU. As such, sulfide generation effects and side stream impacts should be considered in order to project a more accurate understanding of the effectiveness of this CDU. This was accomplished using the INTERCEPTOR Model. The model was calibrated to match the liquid phase data. Calibration was accomplished by modeling actual physical system and average flow data with a chemical reaction rate adjusted to simulate the impact of chemical treatment. Once calibrated, the INTERCEPTOR model closely matched the liquid-phase data and provided a projection of vapor-phase values that could be compared to observed vapor-phase values.

The model was then used to simulate what would have occurred if no chemical dosing were occurring and, as such, provide improved understanding of the benefit of current dosing and the potential benefit of additional dosing. This provides an improved estimated comparison of what would have happened if no chemicals were being dosed compared to what was happening with chemicals. Included was consideration of sulfide formation and side stream flows that would have impacted the actual upstream and downstream sampling locations. It also provides insight as to the potential for further odor reduction by additional chemical dosing.

Figure 2-11 provides a plot showing INTERCEPTOR Model values along the conveyance system reach upstream and downstream of the Mission Street CDU and allows comparison of the liquid and vapor-phase data to the calibrated model and to model projections as though no chemicals were used and as though chemicals were optimized to maximize dissolved sulfide reduction.

Figure 2-11
INTERCEPTOR Model Results for Mission Street CDU



The model liquid-phase sulfide concentration results were calibrated to agree with the adjusted average field data points shown in red. Both indicate approximately 1.5 mg/L upstream and near zero downstream liquid-phase sulfides. In this instance, not all of the apparent benefit is due solely to chemical dosing. Just downstream of the CDU a hydraulic drop occurs that tends to re-aerate the flow. The oxygen in the air provides additional sulfide reduction. As such, the "uncontrolled" model projection line, shows additional drop in sulfides that is attributed to the re-aeration rather than chemical dosing. Therefore, the true credit for sulfide reduction due to the CDU is a drop from approximately 1.2 mg/L to near zero. Additionally, the fact that the "optimized" INTERCEPTOR line follows the calibrated line indicates that the CDU is already running in a near optimized mode, or that it may be somewhat overdosing.

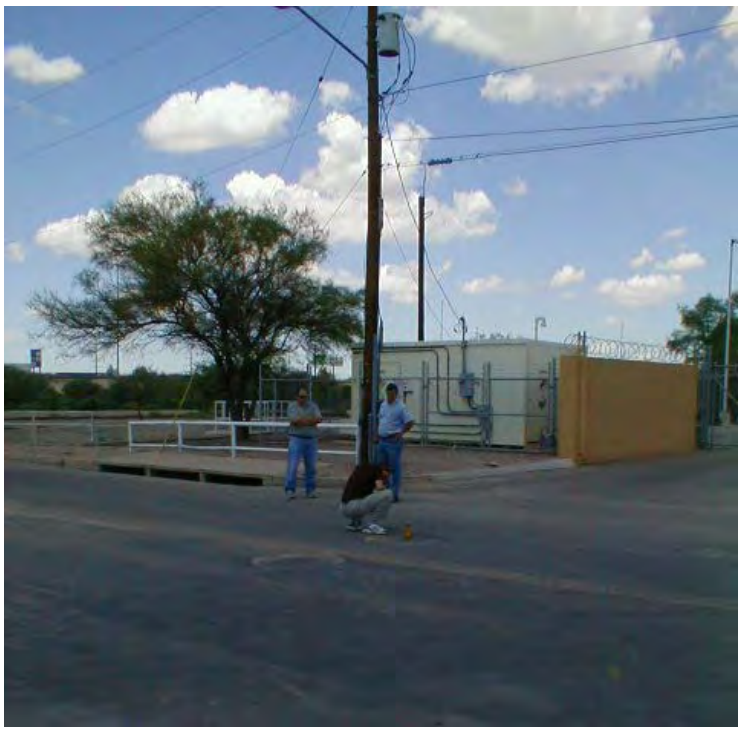
These projections were used to calculate the effective chemical dosing on a pounds-of-hypochlorite-per-pound-of-sulfide-removed basis. Since the dosing is reported over the range of 125 to 300 gallons of sodium hypochlorite per day this would equate to approximately 4 to 9 lbs of hypo per lb of sulfide removed. This appears to generally agree with the jar testing results and further suggests that overdosing may be occurring at this CDU.

2.5.2 18th Street CDU

The 18th Street CDU is shown in **Figure 2-12**. This CDU is located on the South East Interceptor (SEI) and treats flow received by the Roger Road WWTP. The chemical treatment system is a self contained unit with two chemical metering pumps (capacity of approximately 170 gallons per day, gpd, each)

providing sodium hypochlorite dosing. This CDU treats a 36-inch line flowing at approximately 10.4 mgd that flows into a 5-foot diameter line that heads north towards Roger Road. Reported sodium hypochlorite dose rates are 144 gallons per day (gpd).

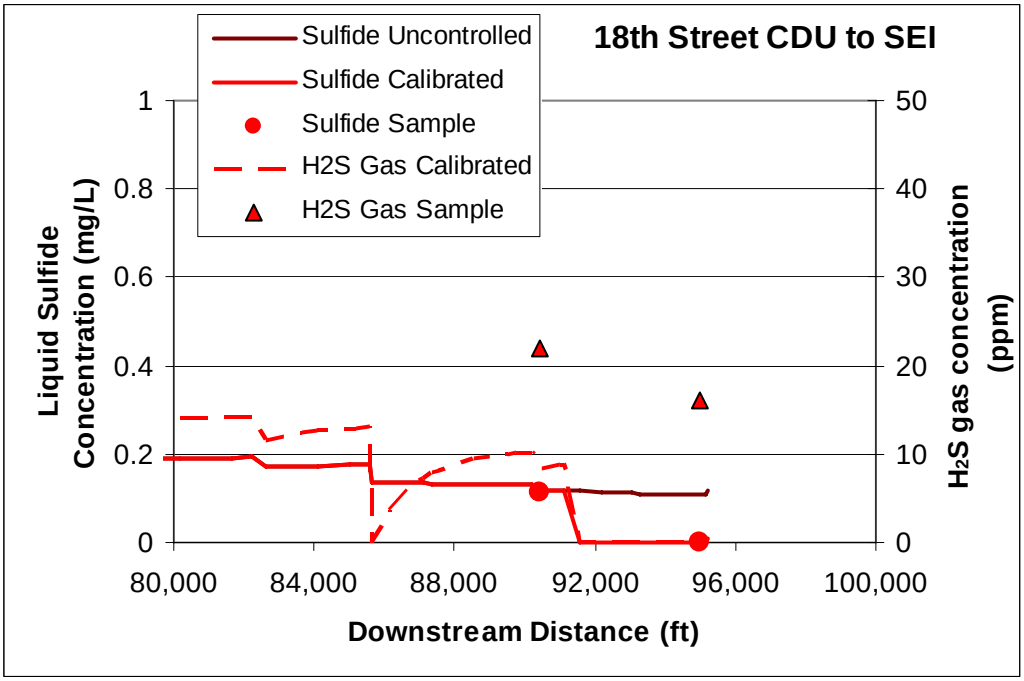
Figure 2-12
18th Street CDU



(In the street near the 18th Street CDU a manhole was exhausting vapor-phase H_2S in the range of 30 ppm.)

A similar analysis was completed on this CDU using the INTERCEPTOR Model. **Figure 2-13** shows the plot of actual and projected impacts just up and downstream of the CDU.

Figure 2-13
INTERCEPTOR Model Results for 18th Street CDU

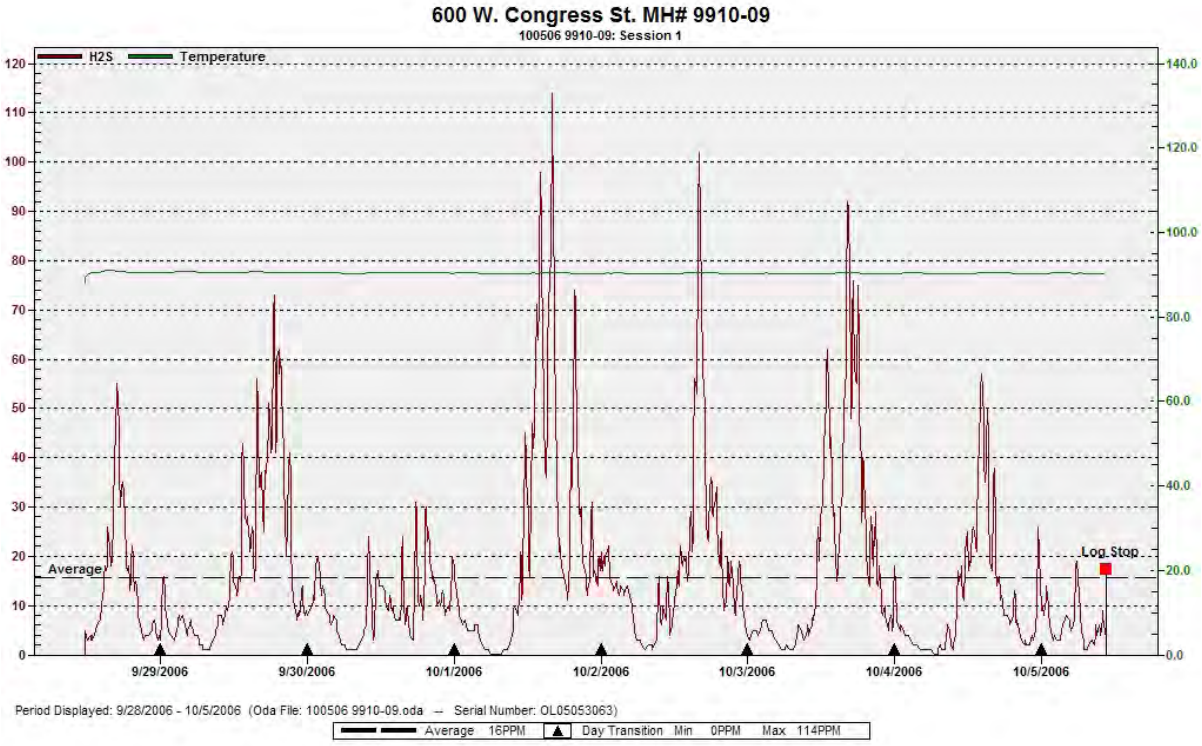


Analysis of the 18th Street CDU indicates that upstream and downstream liquid phase sulfides were relatively low. For the reported dosing rate of 144 gpd of sodium hypochlorite the resulting dose rate would have been equivalent to approximately 15 lbs of sodium hypochlorite per lb. of sulfide removed. This suggests overdosing at this station.

Despite the apparent low sulfide concentrations, the vapor-phase headspace values averaged 22 ppm upstream and 16 ppm at the downstream sampling locations. Daily peak values upstream ranged as high as 50 to 90 ppm. Downstream values were cyclic with elevated peaks occurring fairly consistently from noon to around 8 PM. The analysis was based on steady state average projections. **Figure 2-14** shows a plot of the Odalog vapor-phase H_2S concentration data downstream of the CDU. The two evaluations combined indicate that on average the CDU is overdosing and that it would be more effective to dose more heavily during the period of noon to 8 PM and less so at other times. This loading cycle may be the result of flow coming in from the distant ends of the SEI.

In summary, the evaluation for the 18th Street CDU suggest general overdosing and an optimization opportunity to more effectively use the sodium hypochlorite during peak loads. The evaluation also suggest that despite relatively low liquid-phase sulfide concentrations that vapor-phase H_2S remains high, and that vapor-phase treatment near an adjacent out-gassing manhole may be warranted.

Figure 2-14
Vapor-Phase Odalog Data Downstream of 18th Street CDU



2.5.3 Anita CDU

The Anita CDU is shown in **Figure 2-15**. This CDU is situated to dose flows in both the Santa Cruz Central (SCC) and Santa Cruz East (SCE) lines, both of which flow to the Roger Road WWTP. The chemical treatment system is a self contained unit with two 170 gpd chemical metering pumps providing sodium hypochlorite dosing. This CDU treats two 30-inch diameter lines flowing at approximately 6.4 and 3.2 mgd, respectively, for the SCC and SCE lines. Reported sodium hypochlorite dosing is 96 gpd for the SCC line and 72 gpd for the SCE line.

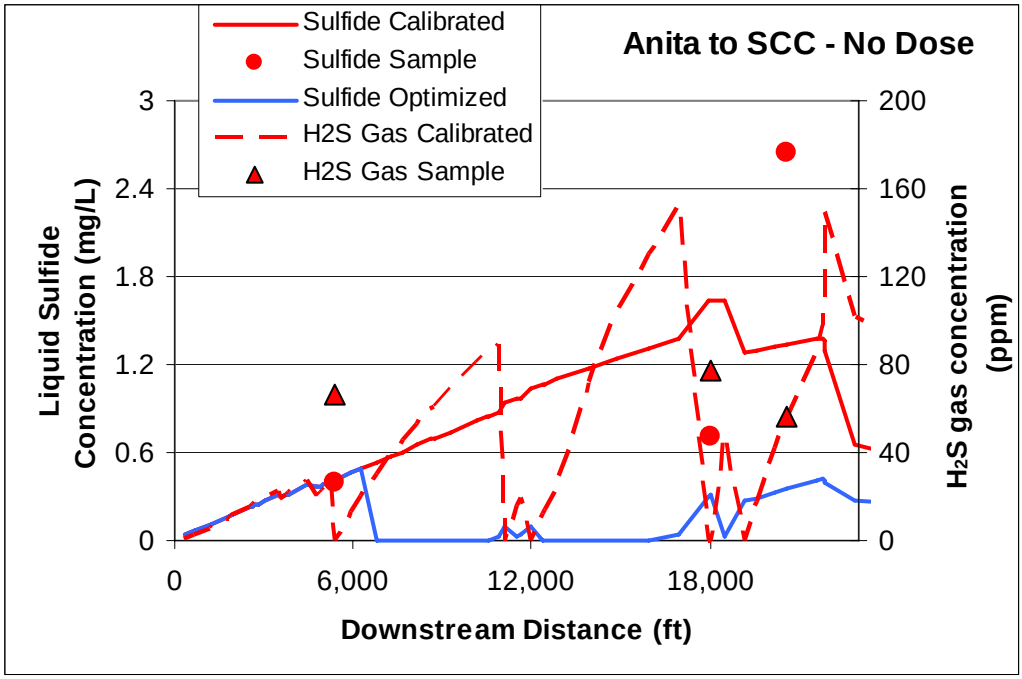
Figure 2-15
Anita CDU

2.5.4 Anita to SCC

Samples were taken at two downstream points for this CDU on the SCC line. The liquid-phase data for the two points appear to disagree somewhat, so the INTERCEPTOR Model was calibrated to split the difference and thereby average out the effect. Based on this approach the INTERCEPTOR evaluation indicates that the average liquid-phase sulfides go from approximately 0.4 mg/L upstream to approximately 1.5 downstream while vapor-phase H_2S goes from approximately 20 ppmv to near 80 ppmv. This change in liquid-phase occurs over a distance of approximately 2 miles. Headspace values predicted by INTERCEPTOR appear to fluctuate up and down along the pipe line. This is because INTERCEPTOR predicts hydraulic flow that surcharges the pipe and thereby restricts free airflow down the pipe. Whether this represents reality, or not, has not been confirmed. However, review of the Odalog H_2S concentration plots shows rapid variations in the headspace concentrations peaking into the range of 80 to 150 ppmv. These data appear reasonably consistent with the ranges predicted in the INTERCEPTOR plots.

Actual and projected impacts just upstream and downstream of the Anita SCC CDU are provided in **Figure 2-16**.

Figure 2-16
INTERCEPTOR Model Results for Anita to SCC



Further analysis of the Anita CDU for the SCC line indicates that if 4 lbs of sodium hypochlorite were assumed to be needed per pound of sulfide reduced that 350 gpd would be required rather than the 96 gpd normally reported. This assumes that the dosing effect could be carried over 2 miles downstream (which may be optimistic).

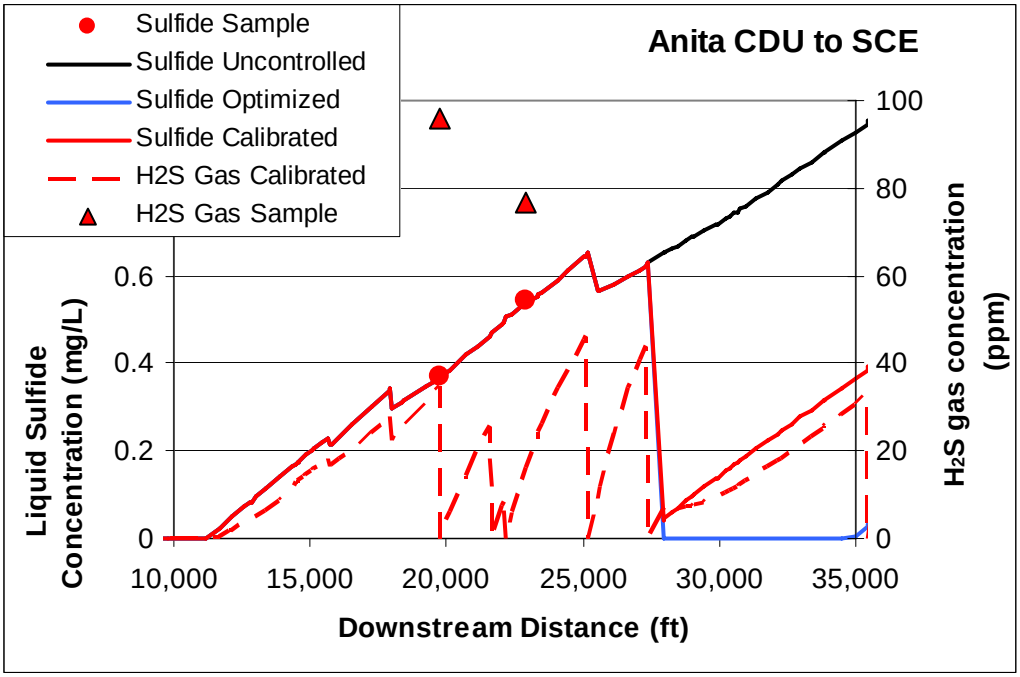
This may be a key observation in that the SCC and SCE lines run several miles without further chemical treatment before joining with other lines at Prince Road. These lines join near Prince Road and Interstate I-10 intersection and go directly into the Roger Road WWTP. This may indicate the need for higher dosing in this line or addition of another CDU downstream of the junction of SCE and SCC.

Review of the Odalog data suggests that dosing should be increased between 10 AM and 5 PM. This would require either installation of an adjustable speed pump, or a second SCC line lag dosing pump so that two pumps could be used to feed SCC during peak demand periods.

2.5.5 Anita to SCE

Anita CDU also feeds chemicals into the SCE line. The INTERCEPTOR evaluation of this dosing location and the upstream and downstream sections of the SCE line are shown in **Figure 2-17**.

Figure 2-17
INTERCEPTOR Model Results for Anita to SCE



This evaluation shows the calibrated INTERCEPTOR model agrees very closely to the liquid and vapor-phase concentrations from the average adjusted sampling data. Inlet liquid-phase levels for flows upstream of the CDU dosing point rise to approximately 0.6 mg/L. Downstream of the CDU, sulfides drop rapidly to below 0.1 mg/L. The reported dosing rate of 76 gpd, agrees with the jar testing of sodium hypochlorite of 4 lbs per lb of sulfide removed.

The INTERCEPTOR Model results indicate that dissolved sulfides begin to rise after the dosing station and approach 0.4 mg/L within approximately one mile downstream. Upstream Odalog data indicates headspace H_2S values averaging near 100 ppmv with afternoon peaks in the range of 100 to 200 ppmv. Review of the Odalog data at the downstream location indicates that headspace vapor-phase H_2S is reduced to an average of 21 ppmv with afternoon peaks in the range of 30 to 50 ppmv.

This CDU is clearly providing significant downstream benefit. Further evaluation suggests that downstream numbers could be further reduced by raising the dose level from 76 gpd to 116 gpd. Matching the dose rate to the diurnal sulfide load should further reduce some of the peak values downstream. Review of the Odalog data suggest that the higher dosing period should focus on the 11 AM to 2 AM timeframe. This could be implemented with a lag dosing pump.

2.5.6 Tucson CDU

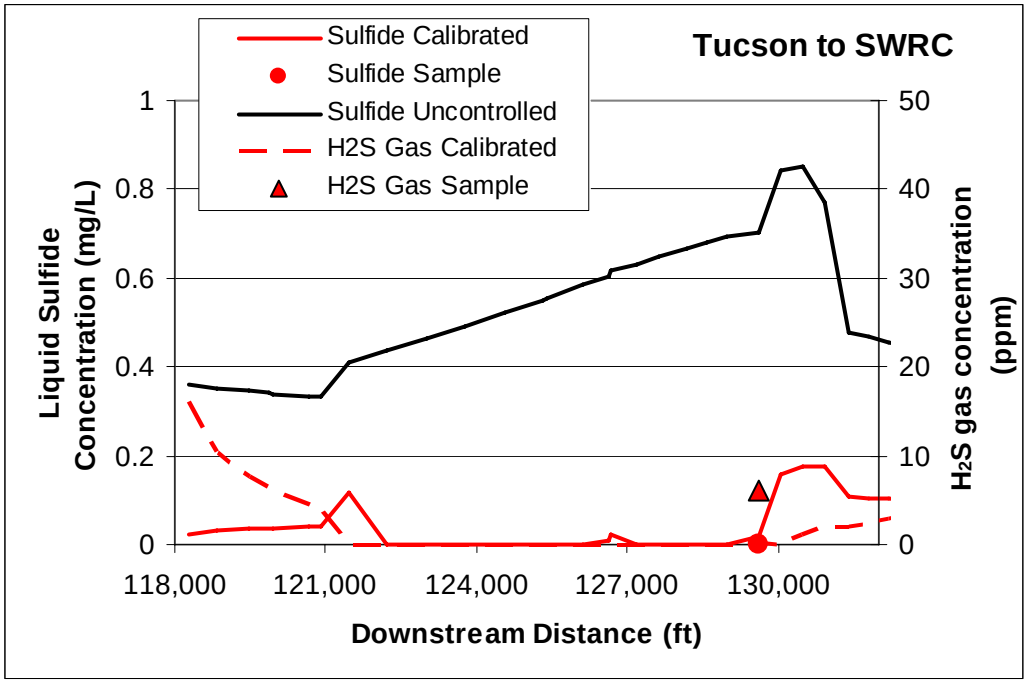
The Tucson CDU is shown on **Figure 2-18**. Like Anita, this CDU treats flow in two sewers. Reportedly 300 gpd are dosed to the North Rillito (NRI line) flowing towards the Ina Plant WPCF and 168 gpd into the South Rillito West Central (SRWC) line flowing towards the Roger Road WWTP.

Figure 2-18
Tucson CDU

2.5.7 Tucson to SRWC

The INTERCEPTOR Model evaluation for the Tucson CDU/SRWC line is shown in **Figure 2-19**. Two chemical metering pumps with a capacity of 170 gpd each are provided to dose this line.

Figure 2-19
INTERCEPTOR Model Results for Tucson CDU to SRWC



This evaluation shows that the Tucson CDU system is keeping liquid sulfides in the SWRC to very low levels. Further it shows that if the Tucson CDU were not dosing the SWRC, liquid-phase sulfides would be in the range of 0.8 mg/L. The estimated dosing ratio was 4.4 lbs hypo per lb sulfide, agrees with the jar testing results.

Analysis of the Odalog vapor-phase H_2S concentration data indicates that upstream headspace values averaged 7 ppmv with peaks ranging from 10 to 15 ppmv, while the downstream averaged 6 ppmv with intermittent peaks from 10 to 15 ppmv.

2.5.8 Tucson CDU to NRI

Tucson CDU also doses flow going towards the NRI line. One chemical metering pump is provided with 170 gpd capacity. Wastewater flow going to NRI consists of excess flow over a weir flow split device. INTERCEPTOR evaluation of this dosing point indicates very low liquid-phase sulfide values upstream and downstream of the CDU. Evaluation of the Odalog data indicates fluctuating vapor-phase H_2S concentrations averaging 10 ppm with peaks in the range of 10 to 30 ppm.

Vapor-phase peaks may be due to relatively low flow towards NRI under average conditions or “no flow” during low flow conditions coming into the flow splitter (all flow would be directed towards the SWRC).

Evaluation of the average dosing indicates approximately 27 lbs of hypo per lb of sulfide. This high dose rate (overdosing when compared to jar testing results) keeps the liquid-phase down but may not be able to

overcome storage volumes in the line leading to the downstream siphon. As such, when overflows begin stagnant wastewater within the siphon is displaced and there are spikes in the downstream headspace hydrogen sulfide concentrations.

It is concluded that the Tucson CDU is relatively lightly loaded and is effectively controlling the load to both downstream lines. The only exception to this is for the NRI line where short term vapor-phase peaks in the range of 10 to 30 ppmv occur.

2.5.9 Prince CDU

The Prince CDU is shown on **Figure 2-20**. This CDU treats the South Rillito West Central (SRWC) line. This flow is downstream of the line being treated by the Tucson CDU. The SRWC at this location is large (5.5 ft diameter) and typically carries approximately 12 mgd. The CDU reportedly doses approximately 300 gpd of sodium hypochlorite. The CDU is equipped with two 170 gpd capacity chemical metering pumps.

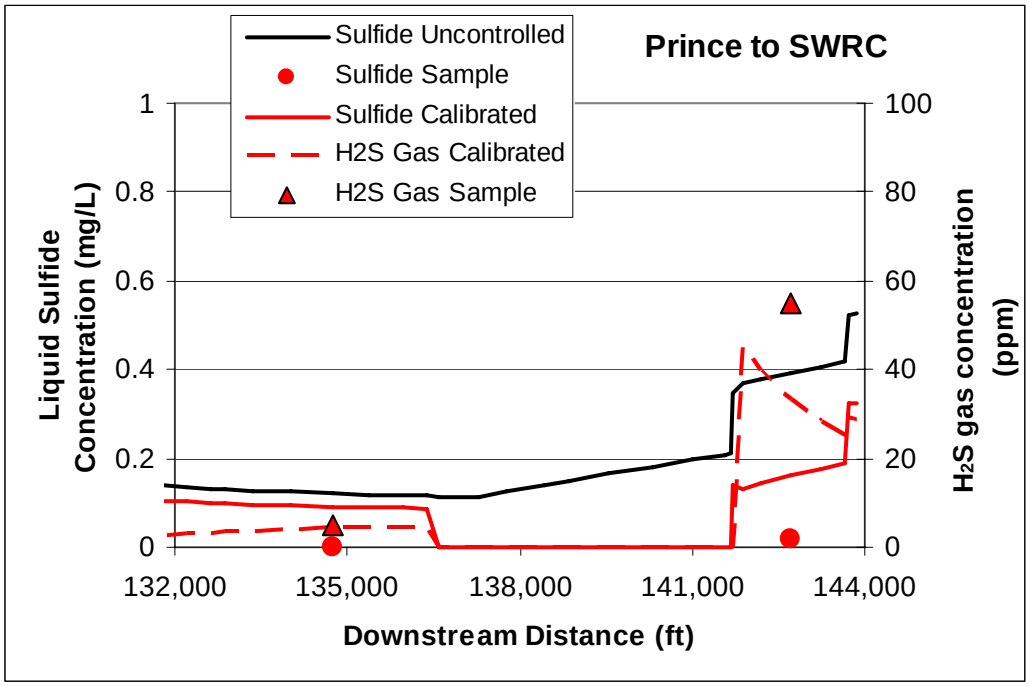
Review of the INTERCEPTOR Model evaluation shown on **Figure 2-21** shows that liquid-phase sulfides upstream and downstream of the Prince CDU are very low and are being impacted by upstream Tucson CDU dosing as well as the 300 gpd being dosed at Prince. In fact, the dosing ratio calculated for Prince indicates nearly 16 lbs of sodium hypochlorite per lb of sulfide removed (overdosing when compared to jar testing results). Despite the very low liquid-phase numbers, the headspace vapor-phase H_2S concentration levels detected by Odalog analysis are very high in Prince averaging 55 ppmv with regular daily peaks in the range of 80 to 100 ppmv. Further evaluation of the Odalog data shows that this heavily laden vapor-phase H_2S headspace air is very likely coming from the SRWS line which has an average headspace vapor-phase H_2S of 117 ppmv and peaks in the range of 150 to 300 ppmv. These data strongly suggest that the untreated SRWS line is introducing high concentrations of vapor-phase H_2S headspace air into the SRWC headspace and that this is the source of the headspace vapor-phase H_2S downstream of Prince.

This area would appear to be a strong opportunity to better use the Prince CDU by directing all or part of its chemical delivery into the SWRS. The SWRS is only carrying around 250,000 gpd of flow, which may not contribute greatly to the dissolved sulfides in 12 mgd flow in SWRC, but the headspace vapor-phase H_2S is conveyed from SWRS into SRWC downstream of Prince CDU is very high and can impact the SWRC headspace vapor-phase H_2S concentrations. Therefore, treating the low flow in the SWRS line might dramatically reduce the SRWC line headspace concentration and make much better use of the Prince CDU. While the 300 gpd dosed at the Prince CDU may have downstream beneficial effects as the flow approaches the Roger Road WWTP, it may be a better use of this CDU to also add chemical to the SWRS line.

Figure 2-20
Prince CDU

The figure below provides actual and projected impacts just upstream and downstream of the Prince CDU.

Figure 2-21
INTERCEPTOR Model Results for Prince CDU to SRWC



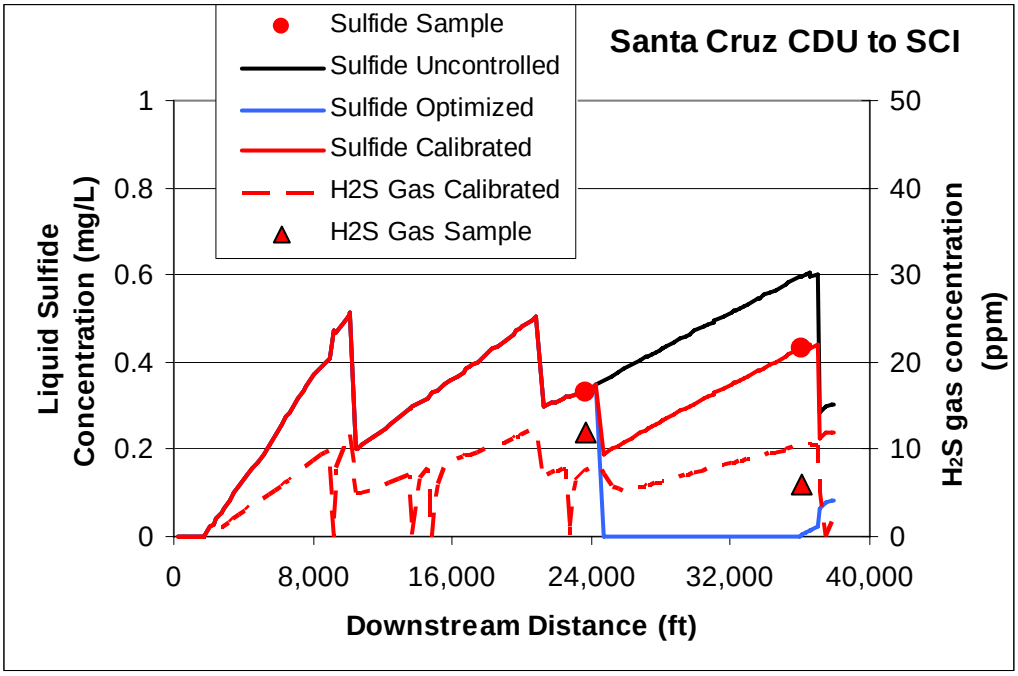
2.5.10 Santa Cruz CDU

The Santa Cruz CDU is not a self contained unit. It is two relatively small containers that inject sodium hypochlorite by gravity into the Santa Cruz Interceptor (SCI). **Figure 2-22** shows a photo of this remote installation.

Figure 2-22
Santa Cruz CDU

This station reportedly doses approximately 50 gpd into a 30-inch line carrying approximately 3.4 mgd average flow. **Figure 2-23** shows a plot of the projected liquid and vapor-phase concentrations upstream and downstream of this dosing location.

Figure 2-23
INTERCEPTOR Model Results for Santa Cruz CDU



Analysis of the Santa Cruz CDU suggests that on average the liquid-phase sulfides are below 0.5 mg/L coming into the station and are reduced to near 0.2 mg/L after dosing. The sulfide concentration quickly rises as flow proceeds 1 to 2 miles downstream. Review of the upstream and downstream Odalog data show that diurnal headspace concentrations repeatedly peak in the range of 10 to 20 ppmv for short periods in midday.

It is concluded that this dosing station is having limited effect on the liquid-phase concentrations, but it may be keeping downstream vapor-phase concentrations from approaching levels as high as 30 ppmv. Evaluation of the downstream Odalog plots suggest that upstream dosing might be more beneficial if focused between 10 AM and 8 PM.

2.5.11 Wetmore CDU

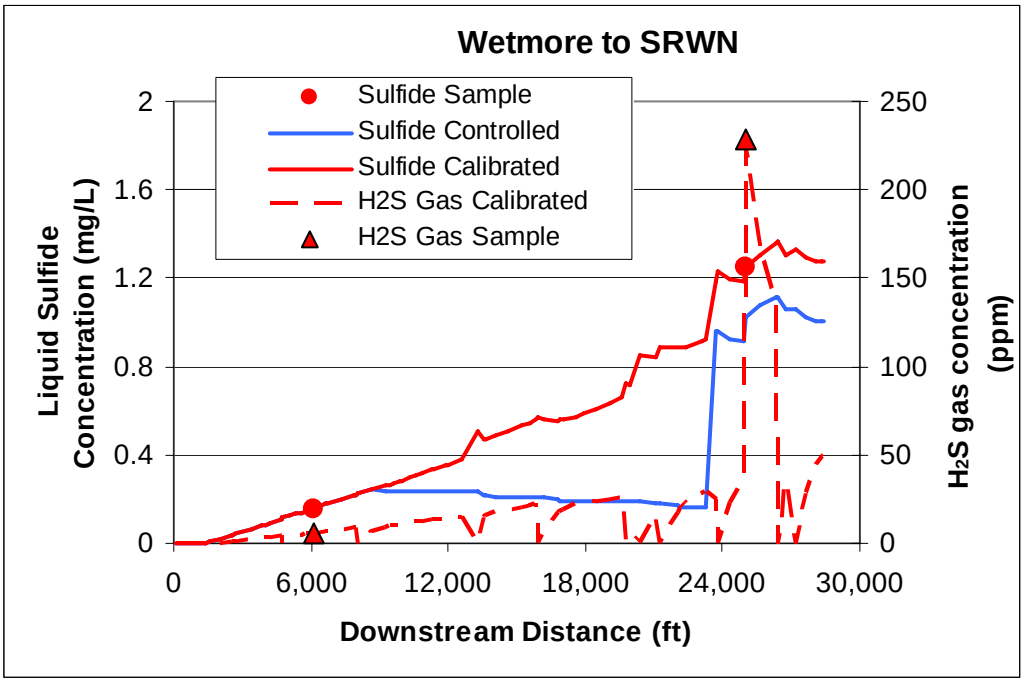
The Wetmore dosing station is not a self contained unit. It is a solar cell powered station for calcium nitrate dosing (Bioxide). **Figure 2-24** shows a photo of the Wetmore chemical metering station. Information obtained after the sampling suggests the Wetmore station was not operational during the sampling day.

Figure 2-24
Wetmore Bioxide™ CDU (Solar Powered)

This evaluation projects that the liquid-phase sulfide concentration would rise from the measured amount of 0.2 mg/L to approximately 1.0 mg/L but only projects headspace vapor-phase H_2S values of approximately 20 ppmv. Actual headspace values by Odalog analysis averaged 229 ppmv with regular peaks in the range of 400 ppmv. Without any other impacts these high vapor-phase H_2S numbers cannot be explained. However, further field investigation showed that there are several small side stream connections just before the downstream sampling point. These side streams are associated with a drop that would promote H_2S stripping. The modeling plot is calibrated assuming a mass loading from these side streams that can explain the higher vapor-phase H_2S values and allows the model to be calibrated to known liquid-phase data.

Figure 2-25 shows the projected INTERCEPTOR results if the Bioxide™ effect is activated.

Figure 2-25
Projected Chemical Performance for Wetmore CDU (Bioxide™)



The Bioxide™ causes an initial reduction in the liquid-phase and vapor-phase H_2S concentrations until side streams enter 16,500 ft downstream of the CDU. This evaluation suggests that these small side streams are dominant and that Bioxide™ dosing at Wetmore prevents sulfide generation in SRWN until the downstream end, at which point, entering side streams overwhelm the effect of Bioxide™.

2.6 Initial Conveyance System Observations

A summary of the downstream liquid and vapor-phase values for each CDU based on field data and the calibrated INTERCEPTOR model along with projected downstream values that would exists if the CDUs were not in service are provided in **Table 2-4**.

Table 2-4
Downstream Liquid and Vapor-Phase Sulfides

CDU	Sampled Downstream Sulfide with Chemical Dosing (mg/L)	Model Predicted Downstream Sulfide with No Chemical Dosing (mg/L)	Chemical Dose (gal/day)
Anita to SCE	0.38	0.95	72
Anita to SCC(1)	0.35	0.71	96
Santa Cruz to SCI	0.43	0.60	50
Mission to NWO	ND	1.2	125-300
18th Street to SEI	ND	0.11	144
Prince to SWRC	0.02	0.39	300
Tucson to SWRC	ND	0.70	168
Tucson to NRI	0.08	0.37	300
Wetmore to SRWN[1]	0.16	0.90	293

(1) Sulfide values with dosing for Anita to SCC and Wetmore were modeled not sampled, because the CDU were out of service during sampling.

Data show that if the chemical stations were not in place and operational that liquid-phase concentrations would be higher for most interceptors. Review of this table suggests that chemical treatment at Santa Cruz, and 18th Street may have limited impact.

Based on the Chemical Jar Testing and CDU-interceptor model evaluations, system observations are:

- Sodium Hypochlorite Use
  - Chemical Jar testing confirms that sodium hypochlorite is the most cost effective chemical for Pima County wastewater. Sodium hypochlorite dosing in the range of 4 lbs hypo per lb of sulfide is required.
- Mission CDU
  - Mission CDU is providing benefit and appears to be dosed correctly, or slightly overdosed. Based on the reported dose rate of 125-300 gpd; it would appear that this location is utilizing 4 to 9 lbs of NaOCl per lb sulfide removed.
- 18th Street CDU
  - 18th Street CDU appears to be dosing sufficiently to keep liquid-phase sulfides down under average conditions.
  - 18th Street CDU appears to be dosing in the range of 15 lbs hypo per lb of sulfide removed which may be overdosing on average. (jar testing indicates only 4 lbs /lb of sulfide removed is required).
  - However, despite low liquid-phase values diurnal vapor-phase data suggests that dosing should be time paced against load and that more chemical should be dosed between noon and 8 PM.
  - Out-gassing at the manhole next to the 18th Street CDU may require vapor-phase treatment regardless of the effectiveness of liquid-phase control.

- Anita to SCC
  - The Anita CDU to SCC was not in service during the sampling event. Under these conditions the liquid sulfides are projected to rise from 0.4 mg/L at the CDU to potentially problematic levels (1.5 mg/L) approximately 2 miles downstream.
  - Analysis with the INTERCEPTOR model suggests that controlling sulfides with a dose of 4 lbs of sodium hypochlorite per lb of sulfide removed would require 350 gpd rather than the reported value of 96 gpd. This suggests that this sampling point is under dosing on an average basis.
  - Review of diurnal Odalog data suggests that dosing should be elevated between the hours of 10 AM and 5 AM.

- Anita to SCE
  - Chemical dosing appears to very effectively reduce typical liquid-phase concentrations from 0.6 just upstream of the CDU to below 0.1 mg/L downstream at an estimated dose rate of 4 lbs sodium hypochlorite per lb of sulfide removed.
  - Timed pacing may be productive at this location with increased chemical delivery in the timeframe of 11 AM to 2 AM.
  - In spite of this the downstream liquid-phase concentrations are projected to rise within approximately 1 mile down stream approaching 0.4 mg/L. This may indicate that a new CDU is needed downstream of the Anita, closer to the junction of Prince Road and Interstate I-10. The residual staying power of the sodium hypochlorite may not carry far enough downstream.

- Tucson SRWC
  - The Tucson SRWC dosing location appears to be effective and dosed at reasonable rates.

- Tucson NRI
  - The Tucson NRI dosing location appears to be relatively effective but the average dosing rate is estimated at 27 lbs of sodium hypochlorite per lb of sulfide removed. Despite this apparent overdosing compared to jar testing, a higher dosing rate may be needed to overcoming a tendency for intermittent low to zero flows towards NRI when the wastewater trapped upstream of the siphon tends to be stagnant.

- Prince CDU
  - Prince CDU appears to be dosing the SRWC line at 16 lbs of sodium hypochlorite/ lb of sulfide removed (apparent overdosing).
  - Despite this, the headspace in Prince is very odorous based on Odalog vapor-phase H_2S concentrations averaging 55 ppmv. The INTERCEPTOR evaluation strongly suggests headspace vapor-phase H_2S is coming in from a smaller 250,000 gpm SRWS line. Treatment of the SRWS line appears to be an opportunity to better use the Prince CDU.

- Santa Cruz CDU
  - Santa Cruz chemical dosing appears to be relatively effective at controlling the low liquid-phase sulfides at this location.
  - Vapor-phase peaks may be effectively controlled, if dosing is elevated within the timeframe of 10 AM to 8 PM.

- Wetmore CDU
  - The Wetmore Bioxide dosing station was not in service during the sampling event. INTERCEPTOR model analysis suggests that Bioxide would be providing benefit several miles downstream of the dosing location but at that point several side streams become the dominant effect and drive downstream vapor-phase H_2S concentrations up to 290 ppm. No direct data exists on these side streams.

Despite upstream treatment near the busy Prince Road and Interstate I-10 junction, this area is known to be an out-gassing location. Vapor-phase capture and treatment should be considered here.

2.7 Design Practices Technical Information

The focus of the PCWMD System Wide Odor Control Plan is on the control or elimination of nuisance odor emissions. To a great extent, as future facilities are planned, designed and constructed to meet future needs, sound design practices must be employed to minimize the potential to generate or emit nuisance odors which have an adverse impact on the community.

This section provides some general guidance to Design Practices geared to minimize the generation of odors or to mitigate the odorous emissions.

2.7.1 Design Practices for Conveyance System

During design of new conveyance system infrastructure, it is recommended that where possible, the following guidelines for mitigating odor generation, release and corrosion be considered:

- For gravity flow sewers, maintain a minimum wastewater flow velocity of 2 ft/sec under minimum flow conditions.
- Minimize turbulence to mitigate stripping of sulfides from wastewater to sewer headspace. Parameters impacting degree of turbulence include high wastewater velocities, sharp turns e.g., 90 degree elbows, changes in slope that may create hydraulic jumps.
- At pipe connection points, attempt to have the angle of intersection between the pipes as small as possible so as to minimize turbulence at the point of flow combination.
- Minimize the use of drop structures in order to minimize stripping. Where drop structures are necessary, consider using a down flow pipe within the drop structure to facilitate submerged or surface combination of the flows.
- Design pipe diameters and slopes to prevent downstream sections of pipe from flowing fuller than upstream sections, e.g., vapor bottlenecks. This will create positive pressurization within the system and will result in the tendency of the system to outgas.
- Minimize the use of inverted siphons. Where these are necessary, consider either installing air jumpers to facilitate the downstream passage of headspace air of install odor control systems at the upstream end of the siphon to collect and treat the sewer air. Periodically clean the siphons by the use of a “pig” if possible, or through jet-washing to remove solids that will settle in the siphon during low flow conditions.

- For force mains, design the force main and pumping cycles to minimize the amount of time that wastewater resides within the force main. Parameters to consider include pipe diameter, multiple pumps, use of variable speed pumps, multiple force main barrels of different diameter.
- For force mains that have air release/vacuum valves consider installing carbon canisters on valve release point to mitigate odors and valve vault corrosion.
- At force main wet wells, consider covering and venting the captured foul air to an odor control treatment device. Protect the wet well concrete with either a protective coating or liner system.
- Minimize turbulence at force main discharge locations using methods described previously.
- Minimize corrosion of conveyance infrastructure by incorporating materials of construction not susceptible to corrosion, e.g., HDPE, PVC pipe.
- For locations where concrete is material of choice, consider protecting concrete with either a protective coating or lining system.

It may not be possible to prevent sulfide generation and release from all conveyance systems. Therefore in addition to following these guidelines during the design phase, it also suggested that an allowance for liquid-phase or vapor phase treatment units be considered in the design. Installation of these units could be implemented after construction and upon receipt of problems but provision for these units during design is recommended.

CHAPTER 3

System Wide Odor Analysis – Treatment Facilities

Chapter 3 System Wide Odor Analysis – Treatment Facilities

Methods and approach to establish the baseline odor levels and odor generating potential at the Roger Road WWTP and Ina Road WPCF are summarized in this chapter.

3.1 Treatment Plant Odor Sampling/Testing Summary

As a part of the System Wide Odor Control Plan for the PCWMD wastewater treatment facilities, air samples were collected from various unit processes at the Roger Road WWTP and at the Ina Road WPCF. These samples were analyzed utilizing three procedures:

1. American Society for Testing and Materials (ASTM) method E-679, Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Method of Limits. This analysis provides a measure of the overall odor intensity of the sample and is reported in dilutions to threshold (D/T), that is, how many dilutions with clean odor free air it would take for the sample to not be recognized as odorous.

2. ASTM D-5504-01, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence. This analysis provides a numeric quantification of the concentration of total reduced sulfur compounds in the sample.

3. US Environmental Protection Agency (EPA) Method TO-15 Modified, VOC's Collected in Canisters – GC/MS. This analysis provides a numeric quantification of the concentration of Volatile Organic Compounds (VOC's) in the sample by use of gas chromatograph (GC) and mass spectrometer MS) techniques.

Laboratory results on air samples gathered as part of the odor investigations utilizing the above analyses are included in **Appendix B**.

Air sampling and analysis was performed to establish baseline odor emission levels at the Roger Road WWTP and the Ina Road WPCF. Locations of sampling and summaries of laboratory results are presented in **Table 3-1 and Table 3-2**.

Sampling locations shown in **"Bold"** typeface in the tables below are considered to be odor sources with **high potential** to contribute to offsite nuisance odor emissions. As a result of these findings, a Short and Near Term Action Plan was developed to mitigate odors from the high potential sources. Details of the Short and Near Term Action Plan are included in Chapter 6.

Table 3-1
Laboratory Testing by Location at Roger Road WWTP

Sampling Location	D/T Detection Threshold	D/T Recognition Threshold	Odor Species (ppmv)		
			H_2S	Methyl Mercaptan	Dimethyl Sulfide
Septage Receiving Facility *(while active)*	NA	NA	0.05	0.027	0.022
Headworks Biofilter Inlet (AM)	9,500	5,300	4.50	0.33	0.032
Headworks Biofilter Inlet (PM)	14,000	8,900	19.00	0.99	0.065
Headworks Biofilter Outlet (AM)	780	440	ND	0.0096	0.020
Headworks Biofilter Outlet (PM)	**2,400**	**1,700**	**0.14**	**0.049**	**0.038**
Yard Structure 1 (AM)	**220,000**	**140,000**	**470**	**9.00**	**0.49**
Yard Structure 1 (PM)	**22,000**	**13,000**	**120**	**5.80**	**0.23**
Gravity Thickener 1 & 2 Scrubber Inlet	16,000	11,000	23.0	0.52	0.015
Gravity Thickener 1 & 2 Scrubber Outlet	**10,000**	**5,600**	**0.078**	**ND**	**ND**
Gravity Thickener 3 Scrubber Inlet	14,000	8,300	20.00	0.21	0.036
Gravity Thickener 3 Scrubber Outlet	**11,000**	**6,800**	**22.00**	**0.23**	**0.031**
Anaerobic Digester 4	90,000	44,000	0.06	ND	ND
Primary Clarifier 5 (AM)	**19,000**	**12,000**	**30.00**	**0.87**	**0.075**
Primary Clarifier 5 (PM)	**17,000**	**11,000**	**38.00**	**0.65**	**0.042**
Primary Clarifier 8 (AM)	**>60,000**	**>60,000**	**140.0**	**4.20**	**0.26**
Primary Clarifier 8 (PM)	**>60,000**	**>60,000**	**110.0**	**2.80**	**0.13**
BioTower 1 (AM)	**2,900**	**1,700**	**0.39**	**0.037**	**0.0058**
BioTower 1 (PM)	**3,800**	**3,300**	**0.87**	**0.064**	**0.0098**
BioTower 2 (AM)	**4,600**	**3,300**	**0.95**	**0.14**	**0.03**
BioTower 2 (PM)	**4,800**	**3,100**	**0.57**	**0.057**	**0.013**
Aeration Basin 3	1,700	1,200	0.022	0.10	0.05

NA = Not Analyzed ND = Not Detected

Table 3-2
Laboratory Testing by Location at Ina Road WPCF

Sampling Location	D/T Detection Threshold	D/T Recognition Threshold	Odor Species (ppmv)		
			H_2S	Methyl Mercaptan	Dimethyl Sulfide
Ina Rd Sludge Transfer Inactive	NA	NA	0.034	0.005	0.01
Headworks Scrubber Inlet (AM)	1,700	910	0.48	0.068	0.014
Headworks Scrubber Outlet (AM)	260	140	ND	ND	0.011
Headworks Scrubber Inlet (PM)	3,400	2,400	0.86	0.081	0.015

Sampling Location	D/T Detection Threshold	D/T Recognition Threshold	Odor Species (ppmv)		
			H_2S	Methyl Mercaptan	Dimethyl Sulfide
Headworks Scrubber Outlet (PM)	1,400	910	0.0031	ND	0.014
Solids Holding Tank Vent Inlet	**510,000**	**320,000**	**58.00**	**0.058**	**ND**
Solids Holding Tank Vent Outlet	7,100	5,100	9.60	0.014	0.011
Solids Holding Tank Vent Outlet	NA	NA	9.30	0.014	0.011
Centrifuge Scrubber Inlet SE	18,000	12,000	23.00	0.16	0.028
Centrifuge Scrubber Outlet SE	**10,000**	**6,200**	**13.00**	**0.11**	**0.037**
Centrifuge Scrubber Inlet NW	150,000	110,000	25.00	0.67	0.073
Centrifuge Scrubber Outlet NW	**9,200**	**5,800**	**7.10**	**0.18**	**0.064**
Intermediate Pump Station Inlet (AM)	490	280	0.011	0.0048	0.032
Intermediate Pump Station Outlet (AM)	**4,200**	**2,600**	**0.008**	**ND**	**0.027**
Intermediate Pump Station Inlet (PM)	1,700	1,200	0.012	0.015	0.037
Intermediate Pump Station Outlet (PM)	**3,800**	**2,500**	**0.024**	**0.018**	**0.04**
HPO Primary Inlet (AM)	4,200	2,200	3.10	0.12	0.0066
HPO Primary Outlet (AM)	**4,200**	**2,200**	**3.20**	**0.12**	**0.0082**
HPO Primary Inlet (PM)	4,100	2,900	1.00	0.055	0.0059
HPO Primary Outlet (PM)	**4,700**	**3,100**	**0.98**	**0.048**	**0.0054**
HPO Primary Outlet (PM)	**NA**	**NA**	**1.00**	**0.052**	**0.0065**
BNRAS Primary Inlet (AM)	420	230	0.24	0.015	ND
BNRAS Primary Outlet (AM)	**1,900**	**1,100**	**0.21**	**0.014**	**ND**
BNRAS Primary Inlet (PM)	1,100	850	0.32	0.015	0.0062
BNRAS Primary Outlet (PM)	**7,000**	**5,000**	**0.22**	**0.011**	**0.0036**
EOB Screenings Pile 1	**50,000**	**25,000**	**1.50**	**1.40**	**0.032**
EOB Screenings Pile 2	**220,000**	**150,000**	**18.00**	**1.40**	**0.08**
EOB Screenings Pile 3	**120,000**	**70,000**	**37.00**	**2.40**	**0.18**
BNRAS Aeration Inlet (AM)	70	45	ND	ND	ND
BNRAS Aeration Outlet (AM)	**1,300**	**730**	**ND**	**ND**	**ND**
BNRAS Aeration Inlet (PM)	1,500	790	ND	ND	ND
BNRAS Aeration Outlet (PM)	**3,900**	**2,700**	**ND**	**ND**	**ND**
Anaerobic Digester 2	6,900	4,200	4.60	ND	ND
Anaerobic Digester 2	NA	NA	4.60	ND	ND
DAF Thickener Scrubber Inlet	5,200	2,700	2.60	0.20	0.017
DAF Thickener Scrubber Outlet	**1,700**	**960**	**1.50**	**0.18**	**0.019**

NA = Not Analyzed ND = Not Detected

Air sampling and analysis has been performed to establish baseline odor emission levels at the Green Valley WWTP. The locations of sampling and analytical results are presented in **Table 3-3.** Complete analytical results are included in **Appendix B**.

Table 3-3
Laboratory Testing by Location at Green Valley WWTP

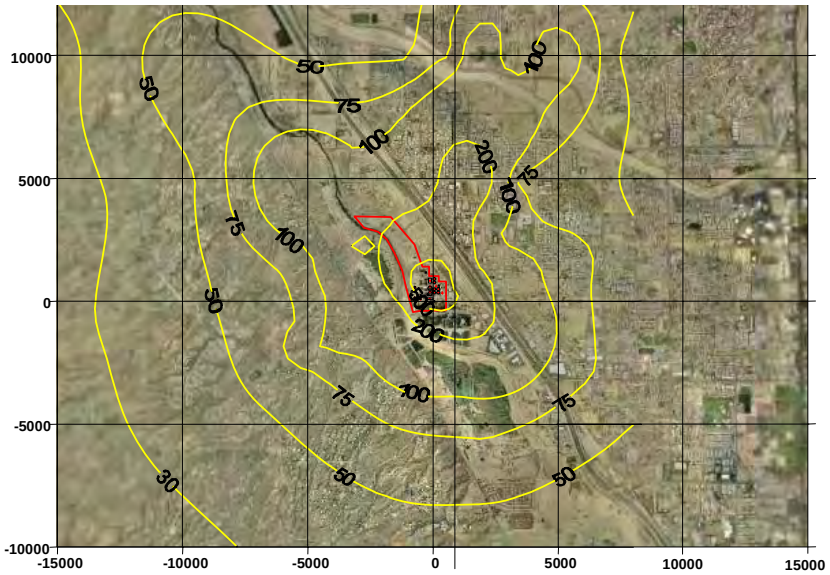
Sampling Location	D/T Detection Threshold	D/T Recognition Threshold	Odor Species (ppmV)		
			H_2S	Methyl Mercaptan	Dimethyl Sulfide
Influent Wet Well	550	270	0.075	0.008	ND
Oxidation Ditch	**2,300**	**1,200**	**0.15**	**0.14**	**.03**
Aerobic Digestion	810	450	0.07	ND	ND
Sludge Beds	**1,900**	**1,000**	**0.07**	**0.04**	**0.48**

NA = Not Analyzed ND = Not Detected

3.2 Odor Dispersion Model

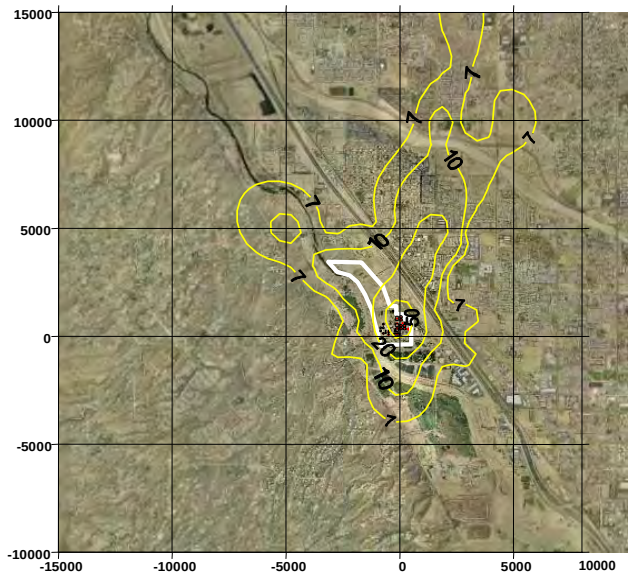
In order to gauge the effectiveness of the recommended Short and Near Term Action Plan for the Treatment Plants, the Industrial Source Complex Short Term (ISCST) Dispersion Model was employed to predict the extent of offsite impacts of uncontrolled odor emissions (current or baseline condition) and to predict the extent of impacts of controlled odor emissions (after full implementation of the Short and Near Term Action Plan. Results of the ISCST model for these conditions for the Roger Road WWTP are shown below by a series of isopleths (contours of odor levels) on an area map in **Figure 3-1 and Figure 3-2** Results of the ISCST model for these conditions for the Ina Road WPCF are shown below in **Figure 3-3 and Figure 3-4**.

Figure 3-1
Odor Dispersion Model – Roger Road WWTP Baseline Condition



All Numbers are in Feet

Figure 3-2
Odor Dispersion Model – Control of All Roger Road WWTP Near Term Sources



All Numbers are in Feet

Figure 3-3
Odor Dispersion Model – Ina Road WPCF Baseline Condition

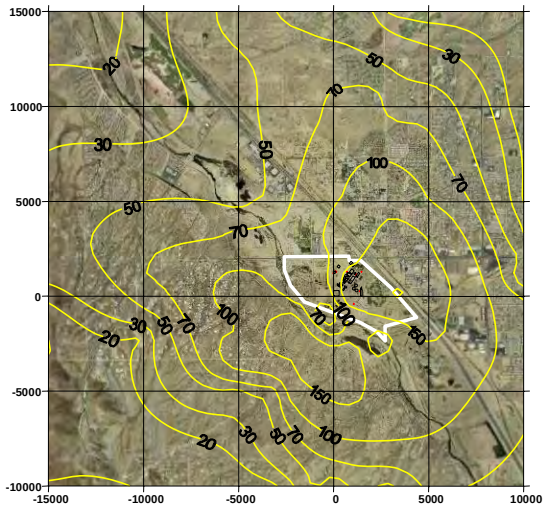
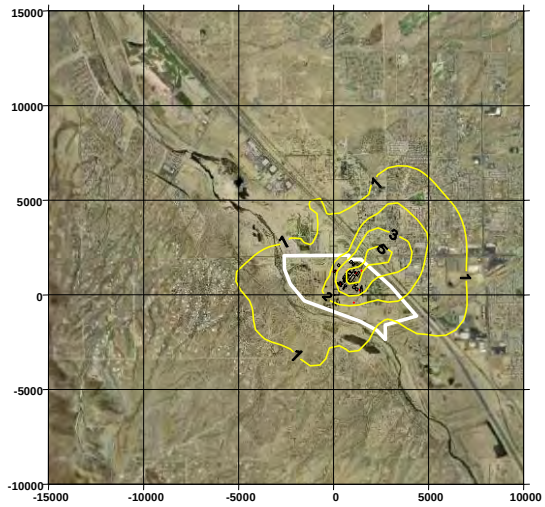


Figure 3-4
Odor Dispersion Model – Control of Ina Road WPCF Short Term Sources



Numbers shown in the isopleths on the above figures indicate the number of dilutions to threshold (D/T), or the number of volumes of non-odorous air volumes that it would take to dilute the odorous air to zero odor detection. Experience demonstrates that when the D/T is at 7, or below, that the odor is no longer considered to be at a nuisance level since most of the population cannot detect odors at this low level.

Isopleths represent conditions under the worst atmospheric conditions, i.e., those conditions which are least favorable for dilution and dispersion of odors within the local area. As illustrated by the isopleths,

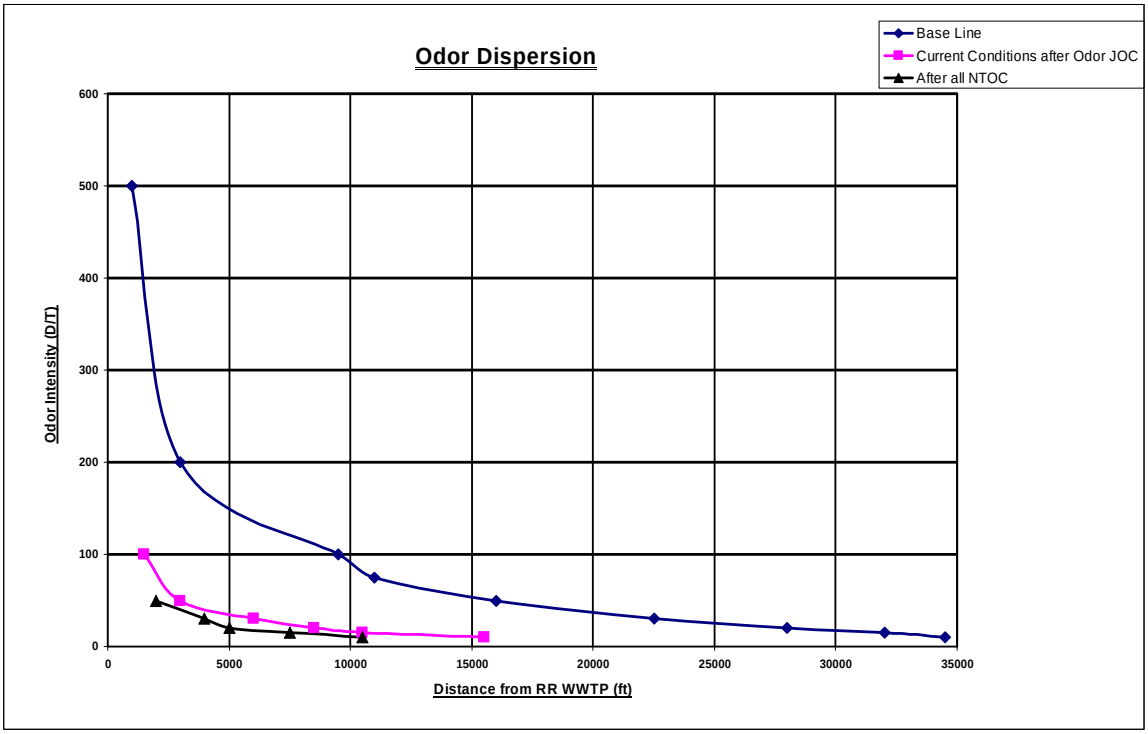
on calm days with atmospheric temperature inversions, odors outside the plant boundaries will be noticeable within areas the bounded by the isopleth contour . For any given day the location of the offsite odors, if any, is wind dependent. On sunny days with good atmospheric mixing, odors may not be noticeable off of the plant property.

From these isopleths it can be observed that between the baseline condition and the headworks + primary clarifiers improvements that the area of impact has shrunk considerably. Under the worse atmospheric conditions, the distance of identifiable odors has been reduced from 6 to 7 miles to about 3 miles. Further, intensity of the odors has been dramatically reduced across the area of impact.

Odors emanating from the biotowers are low intensity, but are of high volume which can cause the odors to migrate offsite rather than dissipate. By adding odor control to the biotowers, the distance of identifiable odors under worse atmospheric conditions will shrink from 3 miles to under two miles. Again the intensity of the odors will be reduced. Also, this does not mean that odors will be detectable every day for a distance of two miles.

The change in odor intensity and distance of impact for each of the conditions, as shown on the isopleths are illustrated in **Figure 3-5.** It must be remembered that although the intensity of the odors are significantly reduced, if the public perceives an odor, to them it still can be a nuisance regardless of intensity.

Figure 3-5
Odor Control Improvements Graph



General observations from the odor dispersion modeling are:

- Confirms extent of the nuisance odor emissions that have been observed by PCWMD staff and as reported by residential complaint logs
- Indicates, once the Short and Near Term Action Plan is fully implemented, that the off site nuisance odors from the wastewater treatment facilities for the most part will be eliminated

3.3 BASTE Model

For future plant expansions and configurations, raw influent wastewater total sulfide concentrations were used in the BASTE (Bay Area Sewage Toxics Emissions) model to predict the estimated hydrogen sulfide emissions from the various unit processes within each plant. These model estimates (for the year 2030 plant configurations) are used in conjunction with field measured emissions of other compounds from existing unit processes to form the basis for selection and evaluation of future odor control equipment.

Results of the BASTE modeling show that the odor emissions are mainly from the headworks, primary clarifiers, flow split structures and open process units prior to the aeration tank reactors. Therefore, the relevant field sample data to compare with the modeling results include two samples from headworks and four samples from primary clarifiers for the Roger Road WWTP, and two samples from headworks, two samples from intermediate pump station and four samples from primary clarifiers for Ina Road WPCF facilities. Concentrations of the reduced sulfur compounds for the field sampling data are summarized in **Table 3-4.**

Table 3-4
Field Sampling Data for Reduced Sulfur Compounds

Odor Compound	Headworks Facility (1) (ppmv)	Intermediate PS (ppmv)	Primary Clarifiers (ppmv)	Odor Detection (ppmv)
Roger Road WWTP				
Hydrogen Sulfide	4.500 – 19.00	-	30.00 – 110.0	0.0005
Carbonyl Sulfide	0.078 – 0.110	-	0.052 – 0.690	-
Methyl Mercaptan	0.330 – 0.990	-	0.650 – 4.200	0.0005
Dimethyl Sulfide	0.032 – 0.065	-	0.042 – 0.260	0.0010
Carbon Disulfide	0.060 – 0.061	-	0.012 – 0.140	-
Dimethyl Disulfide	0.000 – 0.035	-	0.000 – 0.025	-
Ina Road WPCF				
Hydrogen Sulfide	0.480 – 0.860	0.011 - 0.012	0.240 – 3.100	0.0005
Carbonyl Sulfide	0.027 – 0.028	0.030 – 0.034	0.013 – 0.024	-
Methyl Mercaptan	0.068 – 0.081	0.005 – 0.015	0.015 – 0.120	0.0005
Dimethyl Sulfide	0.014 – 0.015	0.032 – 0.037	0.000 – 0.007	0.0010
Carbon Disulfide	0.012 – 0.015	0.014 – 0.017	0.009 – 0.014	-
Dimethyl Disulfide	0	0	0	-

(1) Headworks facility includes coarse screens, influent pump station, fine screens, grit tanks and Parshall flume.

Brief Description of BASTE Model

BASTE (Bay Area Sewage Toxics Emissions) model was originally developed in 1989 by the Bay Area Air Toxics group to inventory air toxics emissions from public owned treatment works (POTWs) and industries. Since then the model has been updated several times. Baste Version 4.0 that Is used in this modeling was updated in 2006. BASTE is a computational model that estimates pathway losses (volatilization, sorption and biodegradation) from wastewater under various conditions. It allows estimates of complex treatment configurations including flow splits, quiescent surfaces, drops, weirs, packed media, aerated processes, biological processes and covered processes. BASTE is a widely used model to predict air emissions of volatile organic compounds (VOCs) in the wastewater treatment process trains. Pollutants that can be used as input to the model comprise over 500 compounds including hydrogen sulfide and ammonia. The model is suitable for estimating odorous air emissions for the PCWMD wastewater treatment facilities.

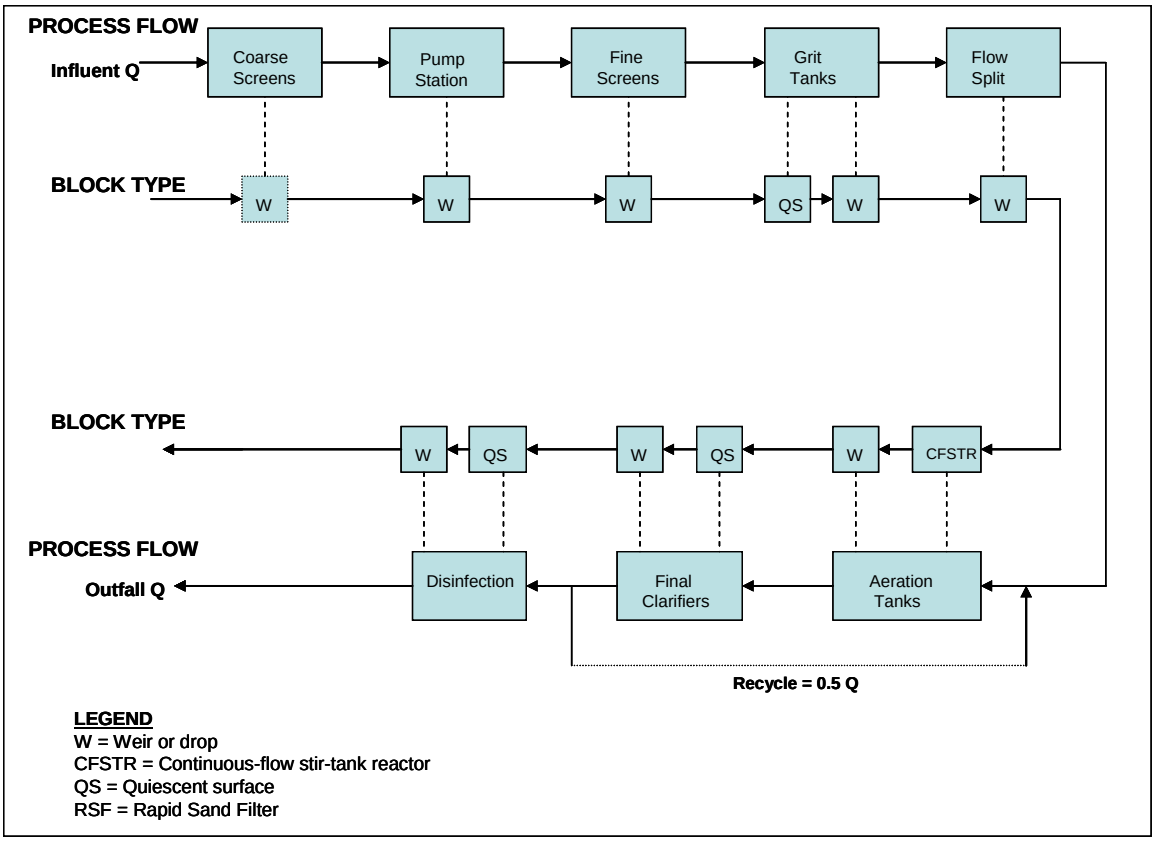
3.4 BASTE Modeling for PCWMD WWTP Facilities

The total sulfide concentration values for the plant influent and plant flows were applied to the model for the new WRC and for the model of the upgraded and expanded facilities at Ina Road WPCF. Results of the model predictions are described below.

1. New Water Reclamation Campus

The PCWMD Regional Optimization Master Plan (ROMP) projects that the Roger Road wastewater facilities by the year 2030 will treat an average flow of 32 mgd with a flow peaking factor of 2.0. The recommended facility will be an all new WRC without primary treatment to replace the existing Roger Road WWTP. The recommended treatment process train will include coarse screening, influent pumping, fine screening, grit removal, flow measurement, flow split, activated sludge system with biological nutrient removal (BNR) including nitrogen and phosphorus removal, final clarification and disinfection. A process flow diagram of the treatment plant is shown on **Figure 3-6.**

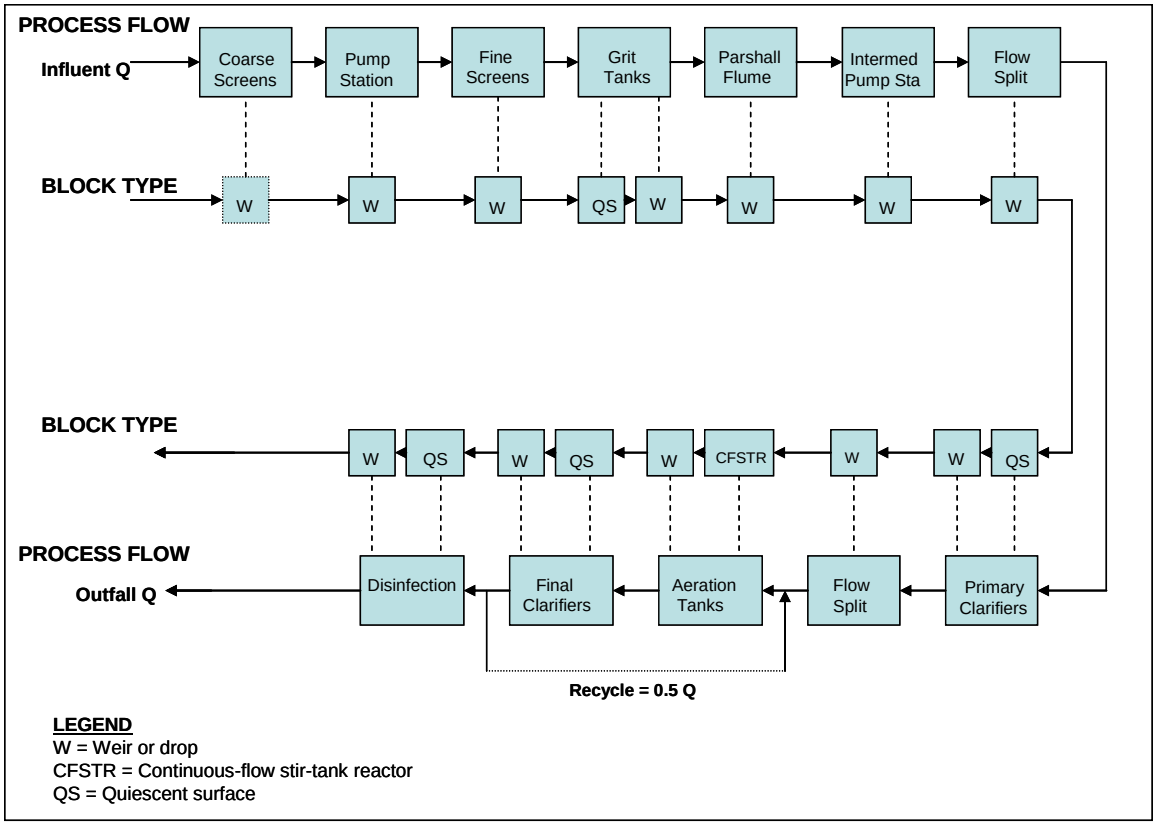
Figure 3-6
Process Flow Diagram for the New WRC



2. Ina Road Water Pollution Control Facility

The Regional Optimization Master Plan projects that the Ina Road WPCF facilities by the year 2030 will handle an average flow of 50 mgd with a flow peaking factor of 2.0. The existing facility will be upgraded and expanded to increase the treatment capacity for biological nutrient removal (BNR) including nitrogen and phosphorus removal to achieve non-toxic ammonia levels in the discharge. The treatment process train will include coarse screening, influent pumping, fine screening, grit removal, flow measurement, intermediate pumping, primary treatment, flow split structure and activated sludge system with BNR, final clarification, and disinfection. A process flow diagram is shown on **Figure 3-7.**

Figure 3-7
Process Flow Diagram of Ina Road WPCF



3.4.1 Model Input Parameters

The following describes the key input parameters:

1. **Global parameters** include: wastewater flow, wastewater temperature, air temperature, influent TSS and VSS concentrations, wind speed and pH. Global parameter values applied to the new WRC and Ina Road WPCF and are summarized in **Table 3-5**

Table 3-5
Global Parameter Values

Global Parameter	New WRC	Ina Road WPCF
Wastewater Flow, m^3/s (mgd)(1)	1.46 (33.2)	2.3 (52.6)
Average Influent Temperature, ^oC (^oF)	25 (77)	25 (77)
TSS, mg/l	310	358

Global Parameter	New WRC	Ina Road WPCF
VSS, mg/l	243	282
Wind Speed, m/s (mph)	3 (6.7)	3 (6.7)_
Ambient Air temperature, ^{o}C(^{o}F)	25 (77)	25 (77)
pH	7.0	7.0

(1) Includes in-plant recycle flows

2. **Process and Modeling Blocks** – The entire treatment plant is divided into unit processes and each process is divided into blocks for which the volatile organic compound (VOC) generation is estimated. There are three block types including: continuous-flow stir-tank reactor (CFSTR), quiescent surface (QS), and weir or drop (W),). Detailed block data are required to be entered.

   Since the WRC facility will be a new plant, design information from other similar wastewater treatment plants without primary treatment was used in developing the unit size, the model block data and odorous air quantities. The input data for the Ina Road WPCF facility were developed based on existing plant design information with additional units needed to be added for the year 2030 facility. Key process and block data used in the modeling are summarized in **Table 3-6 and Table 3-7** for the new WRC and Ina Road WPCF, respectively.

Table 3-6
Key Input Data for the New WRC

Process Unit/ Block Type	No.in Parallel	No. in Series	Alpha Factor	Width (m)	Drop (m)	Depth (m)	Air (m^3/s)
Coarse Screens							
W	2	2	0.25	1.5	0.1	0.9	-
Pump Station							
W	1	1	0.25	3	0.5	0.9	-
Fine Screens							
W	4	1	0.25	1.5	0.34	0.9	-
Grit Tanks							
QS	4	1	0.25	36 (1)	-	-	-
W	4	1	0.25	2.7	0.37	4.0	-
Parshall Flume							
W	1	1	0.25	3.6	0.15	1.5	-

Process Unit/ Block Type	No.in Parallel	No. in Series	Alpha Factor	Width (m)	Drop (m)	Depth (m)	Air (m^3/s)
Distribution Channel							
W	10	1	0.25	1.1	0.15	1.0	-
Aeration Tanks							
CFSTR (AN/AX)	10	4	0.35	12	-	-	-
CFSTR (OX)	10	8	0.75	12	-	-	2.71
CFSTR (AX)	10	2	0.35	12	-	-	-
CFSTR (OX)	10	2	0.75	12	-	-	0.14
W	10	1	0.35	12	0.3	3.0	-
Final Clarifiers							
QS	4	1	0.35	1330 (1)	-	-	-
W	4	1	0.35	129	0.7	1.1	-
Disinfection							
W	4	1	0.35	0.6	1.0	3.0	-

Notes: (1) Surface area of each unit, m^2
(2) Volume of each unit, m^3
Abbreviations: W = Weir or drop
QS = Quiescent surface
CFSTR = Continuous-flow stir-tank reactor
AN/AX = Anaerobic/anoxic zones
OX = Oxic zones

Table 3-7
Key Input Data for BASTE Modeling of Ina Road WPCF

Process Unit/ Block Type	No.in Parallel	No. in Series	Alpha Factor	Width (m)	Drop (m)	Depth (m)	Air (m^3/s)
Coarse Screens							
W	2	2	0.25	2.1	0.03	1.9	-
Pump Station							
W	1	1	0.25	6.4	0.61	2.0	-
Fine Screens							
W	4	1	0.25	1.4	0.4	1.5	-
Grit Tanks							
QS	6	5	0.25	162 (1)	-	-	-
W	6	1	0.25	5.6	0.27	0.9	-

Process Unit/ Block Type	No.in Parallel	No. in Series	Alpha Factor	Width (m)	Drop (m)	Depth (m)	Air (m^3/s)
Parshall Flume							
W	1	1	0.25	5.9	0.47	2.3	-
Intermediate PS							
W	1	1	0.25	7.3	0.1	3.6	-
Primary Clarifiers							
W	6	1	0.25	818 (1)	.5	1.1	-
Distribution Channel							
W	6	1	0.25	1.1	.15	4.6	-
Aeration Tanks							
CFSTR (AN/AX)	26	6	0.35	8.5	-	-	-
CFSTR (OX)	26	5	0.75	8.5	-	-	1.49
CFSTR (AX)	26	2	0.35	8.5	-	-	-
CFSTR (OX)	26	1	0.75	8.5	-	-	0.08
W	26	1	0.35	8.5	1.2	3.0	-
Final Clarifiers							
QS	6	1	0.35	1330 (1)	-	-	-
W	6	1	0.35	129	0.5	1.1	-
Disinfection							
W	6	1	0.35	0.5	1.0	3.0	-

Notes: (1) Surface area of each unit, m^2
(2) Volume of each unit, m^3
abbreviations: W = Weir or drop
QS = Quiescent surface
CFSTR = Continuous-flow stir-tank reactor
AN/AX = Anaerobic/anoxic zones
OX = Oxic zones

3. **Compounds** – Over 500 compounds are available to choose as input to the model. Hydrogen sulfide and ammonia are the two major compounds of concern, in terms of odor potential, for both the new WRC and Ina Road WPCF. Concentrations of other compounds were relatively low and are not of concern regarding odor emissions. Therefore, hydrogen sulfide and ammonia were used in the modeling. The analysis of influent characteristics showed total dissolved sulfide concentration was 0.5 mg/l for both plants. From the ROMP for the year 2030 ammonia concentrations were projected at 30 mg/l and 42 mg/l for the new WRC and Ina Road WPCF, respectively.

3.4.2 Model Output

The model generates the mass quantity of VOC loss or emission. In order to present the results in the form of parts per million by volume (ppmv) or parts per billion by volume (ppbv), it is required to assign estimated flow rates for each process or block.

Summary of BASTE Modeling Results

The model output results are summarized in **Table 3-8 and Table 3-9** for the new WRC and Ina Road WPCF, respectively. Model output provides values of mass emissions for hydrogen sulfide and ammonia in each modeling block. Data were converted to concentrations such as milligrams per cubic meter (mg/m^3) and ppmv based on the estimated odorous air flow rate for each process or block. Results indicate that both ammonia and hydrogen concentrations were depleted after passing through the first aeration tank reactors and no additional emissions occur in the subsequent processes. Therefore, the processes beyond the aeration reactors are not considered.

Odor threshold for hydrogen sulfide is 0.0005 ppmv and for ammonia 2.8 ppmv. The predicted ammonia concentrations from the BASTE modeling were well below odor threshold. Therefore, the tables below show hydrogen sulfide emissions, since ammonia emissions in the model are well below odor threshold limits.

Table 3-8
BASTE Modeling Results for the New WRC

Process Unit	Exit Conc (mg/m^3)	Lost (kg/d)	Emit (kg/d)	Odor Air (scfm)	Concentration	
					(mg/m^3)	(ppmv)
Head Works						
Influent	0.5000	0.000	0.000			
Coarse Screens	0.4993	0.095	0.095			
Pump Station	0.4892	1.269	1.269			
Fine Screens	0.4824	0.859	0.859			
Grit Tanks	0.4727	1.208	1.199			
Total Loss	-	3.432	3.432	10500	8.01	5.72
Influent Distribution	0.4705	0..276	0.276	1200	5.64	4.03
Aeration Tanks	0.000	59.36	0.000	-	-	-
Total	-	63.07	3.708	11700 *	7.77 *	5.55 *

* Not including aeration tank air

Table 3-9
BASTE Modeling Results for Ina Road WPCF

Process Unit	Exit Conc (mg/m^3)	Lost (kg/d)	Emit (kg/d)	Odor Air (scfm)	Concentration (mg/m^3)	Concentration (ppmv)
Head Works						
Influent	0.5000	0.000	0.000			
Coarse Screens	0.4999	0.020	0.020			
Pump Station	0.4843	3.024	3.024			
Fine Screens	0.4770	1.421	1.421			
Grit Tanks	0.4693	1.503	1.503			
Parshall Flume	0.4600	1.817	1.817			
Total Loss	-	7.785	7.785	30000	6.36	4.55
Intermediate PS	0.4591	0.158	0.158	3300	1.17	0.84
Primary Clarifiers				4	2.	1.
Primary Clarifiers	0.4419	3.349	3.349			
Effluent Split JB	0.4405	0.283	0.283			
Total Loss	-	3.632	3.632			
Aeration Tanks	0.0000	885.63	0.000	-	-	-
Total	-	97.205	11.575	73300 *	3.87 *	2.77 *

* Not including aeration tank air

Interpretation of Results

During August 2006, field samples were collected and analyzed for hydrogen sulfide concentrations, along with analysis of other compounds and odor levels, emitted from various unit processes of the existing Roger Road WWTP and Ina Road WPCF. Results of the field sample analysis and BASTE modeling are summarized in **Table 3-10**.

Table 3-10
Comparison of Modeling Results with Field Sample Data

Treatment Process	BASTE Modeling Concentration (ppmv)	Field Sample Concentration (ppmv)
Roger Road WWTP		
Headworks (incl. coarse & fine screens, PS, grit tanks, Parshall flume)	5.72	4.5 – 19.0

Treatment Process	BASTE Modeling Concentration (ppmv)	Field Sample Concentration (ppmv)
Primary Clarifiers	(1)	30.0 – 110.0
Flow Distribution Structure	4.03	(2)
Ina Road WPCF		
Headworks (incl. coarse & fine screens, PS, grit tanks, Parshall flume)	4.55	0.48 – 0.86
Intermediate Pump Station	0.84	0.011 – 0.012
Primary Clarifiers	1.59	0.24 – 3.10

Notes: (1) No primary clarifiers for new Greenfield facility

(2) No test data available

For the Roger Road WWTP/new WRC, the BASTE model predicted hydrogen sulfide concentrations at the headworks is near the low end of the field sample data. The future headworks facility will be provided with an enclosed flow measurement device such as magnetic flow meter or venturi meter instead of using the existing open channel Parshall flume type flow meter. Therefore, the Parshall flume is not included in the modeling and this has some effect of lower estimated emission compared to the existing system. The proposed new facility will not have primary clarifiers and this has a major impact in lowering the estimated emission.

For the Ina Road WPCF facility, the BASTE model predicted hydrogen sulfide concentrations for the headworks and intermediate pumping station are higher than the field sampling data. The BASTE model estimated concentration for the primary clarifiers is within the range of the field sampling data.

The field data collected and analyzed from each unit process is shown in the above table for comparison to the model predictions. The hydrogen sulfide content is often widely variable during sampling depending on the time of collection and exact location and method of sample collection. In consideration of these facts and based on previous experience elsewhere, the BASTE model estimated concentrations appear to represent a reasonable correlation with field sampled data.

The BASTE model predicted concentrations, as shown in the above tables**,** depend on the estimated air flow rates that were used in the calculation of the concentration. Mass quantity of emission is a more convenient parameter to compare the overall odor emission. As shown in the tables**,** the total hydrogen sulfide emission is 3.71 kg/day (8.16 lbs/day) for the new WRC and 11.58 kg/day (25.48 lbs/day) for Ina Road WPCF, respectively. Emissions for the Ina Road WPCF is more than three times higher than for the new WRC because Ina Road WPCF has not only higher influent flows but also additional process units including a Parshall flume and primary clarifiers, all of which have the potential to generate hydrogen sulfide emissions.

3.5 Preliminary Basis of Design Values for 2030 Facility

Hydrogen sulfide emission concentrations were calculated based on BASTE modeling results and estimated odorous air flow rates for the year 2030 operating facilities. Contribution from other reduced sulfur compounds are estimated from the sampling data. Results are summarized as preliminary basis of design values in **Table 3-11**

Table 3-11
Preliminary Basis of Design Values for Hydrogen Sulfide and Other Reduced Sulfur Compounds

Odor Compound	Headworks Facility [1] (ppmv)	Intermediate PS (ppmv)	Primary Clarifiers (ppmv)	Flow Distribution (ppmv)
NEW WRC				
Minimum air flow [2]	10,500	-	-	1,200
Hydrogen Sulfide	10.00	-	-	5.00
Carbonyl Sulfide	0.10	-	-	0.05
Methyl Mercaptan	0.70	-	-	0.05
Dimethyl Sulfide	0.05	-	-	0.02
Carbon Disulfide	0.05	-	-	0.02
Dimethyl Disulfide	0.02	-	-	0.01
Ina Road WPCF				
Minimum air flow, [2]	30,000	3,300	40,000	2,000
Hydrogen Sulfide	10.00	1.00	5.00	5.00
Carbonyl Sulfide	0.10	0.05	0.05	0.05
Methyl Mercaptan	0.10	0.05	0.05	0.05
Dimethyl Sulfide	0.05	0.02	0.02	0.02
Carbon Disulfide	0.05	0.02	0.02	0.02
Dimethyl Disulfide	0.02	0.01	0.01	0.01

(1) Headworks facility includes coarse screens, influent pump station, fine screens, grit tanks and Parshall flume.
(2) Odorous air flow rate in standard cubic feet per minute (scfm).

3.6 BASTE Model - Summary, Conclusions and Recommendations

Based on the field sampling and analysis data and results BASTE modeling, the following conclusions are made:

- Based on the field sampling data of August 2006, hydrogen sulfide was by far the highest potential source of odor emission for both Roger Road WWTP and Ina Road WPCF sites. Influent ammonia concentrations for both plants were high as presented in the projected wastewater

characteristics contained in the 2030 ROMP document. Two compounds, hydrogen sulfide and ammonia were used as the BASTE modeling input.

- Modeling results showed that the estimated ammonia emission is substantially lower than the odor detection limit and would not provide any significant odor impact. Therefore, ammonia emission is not reported in the modeling results tables.

- BASTE modeling results show strong odor potential due to hydrogen sulfide emissions at the coarse screens, pump stations, fine screens, Parshall flume, primary clarifiers and open flow split structures prior to aeration tanks.

- Hydrogen sulfide concentrations predicted by the model were zero at the end of the aeration tank reactors and process units thereafter. Emission predictions in the process units after aeration tanks are not presented in the modeling results tables.

- Estimated hydrogen sulfide concentrations for Roger Road WWTP were comparable to the field test data, and estimated concentrations for Ina Road WPCF were somewhat higher than the field test data. However, they are generally in the norm of the concentrations for similar facilities elsewhere.

- Estimated hydrogen sulfide emission of the Ina Road WPCF is more than three times higher than Roger Road WWTP because the Ina Road WPCF facility has a higher influent flow and additional process units including Parshall flume and primary clarifiers.

Although present in much lower concentrations than hydrogen sulfide from the field sampling report, other odor causing compounds, such as carbonyl sulfide, methyl mercaptan, ethyl mercaptan, dymethyl sulfide and carbon disulfide were detected in concentrations which are above the detection threshold and would be expected to be present in similar concentrations in off gasses from future plant configurations.

Recommendations

As a result of the BASTE modeling the following recommendations are made:

- Establish the preliminary basis of design using the data presented in Table 3-11 for the system wide odor control plan for 2030 facilities.

- Using the BASTE model, update emission estimates (if the data used in the modeling changes) as the detailed facility design is developed.

3.7 Design Practices Technical Information

The focus of the PCWMD System Wide Odor Control Plan is on the control or elimination of nuisance odor emissions. To a great extent, as future facilities are planned, designed and constructed to meet future needs, sound design practices must be employed to minimize the potential to generate or emit nuisance odors which have an adverse impact on the community.

Below is general guidance geared to minimize the generation of odors, or to mitigate odorous emissions.

3.7.1 Design Practices for Treatment Facilities

During design of new, remodeled, or rehabilitated treatment facilities; it is recommended that where possible, the following guidelines be utilized:

- **Treatment Plant Influent Pump Stations**
  - Influent sewers should enter the wet well submerged to minimize turbulence
  - Wet wells should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
  - Coarse bar screens and removed screenings storage containers should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Fine Screens** (usually downstream of influent pump station)
  - Fine screens and removed screenings storage containers should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Grit Tanks**
  - Grit tank influent conduits should enter the grit tanks submerged to minimize turbulence
  - Grit tanks should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
  - Grit separation and dewatering equipment and girt storage containers should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Intermediate Pump Stations (pumping raw or preliminary treated sewage)**
  - Wet wells should be completely enclosed and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Primary Clarifiers**
  - Entire surface of primary clarifiers (or at a minimum, the effluent weir and launder) should be covered and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Aeration Tanks**
  - In highly sensitive areas (where residents or commercial operations are close by the property fence line) aeration tanks should be covered and properly ventilated to a suitable vapor phase odor treatment system
  - In less sensitive areas (where residents or commercial operations are close by the property fence line, perhaps 1000 to 2000 feet away) aeration tanks may not need to be covered, however, some judgment needs to be applied to make the final decision
  - Aeration tank influent conduits should enter the tanks submerged to minimize turbulence
- **Treatment Plant Final Clarifiers**
  - Final Clarifiers generally do not need to be covered
- **Treatment Plant Disinfection Facilities**
  - Disinfection facilities generally do not need to be covered
- **Treatment Plant Sludge Thickening Facilities**
  - Raw primary sludge and raw waste activated sludge should **not** be combined prior to thickening. Combining these two sludge streams contributes to significant odor generation

  - Sludge thickening facilities (gravity or mechanical) should be covered and properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Anaerobic Sludge Digestion**
  - Annular space between the wall and cover on floating cover anaerobic digestion tanks can be a source of odorous emissions. This space may need to be covered and properly ventilated to a suitable vapor phase odor treatment system
  - Telescoping valve pits, sometimes used for supernatant withdraw from anaerobic digestion tanks should be covered and properly ventilated to a suitable vapor phase odor treatment system
  - Sludge pumps, heat exchangers and like equipment often require maintenance which requires flushing of sludge from the equipment. Therefore, such equipment should be housed within a building that is properly ventilated to a suitable vapor phase odor treatment system
- **Treatment Plant Digested Sludge Dewatering and Disposal Facilities**
  - Digested sludge dewatering and disposal equipment should be housed within a building that is properly ventilated to a suitable vapor phase odor treatment system
  - Digested sludge storage tanks should be covered and properly ventilated to a suitable vapor phase odor treatment system
  - Sludge loading operations should include equipment to capture and treat the air released with a suitable vapor phase odor treatment system during loading operations

CHAPTER 4

Short and Near Term Action Plan

Chapter 4 Short and Near Term Action Plan

After collection and analysis of the initial odor data and development of the baseline models, an action plan of short and near term activities was developed to reduce odors. The short and near term actions are those that could be quickly implemented without significant resources. There were short and near term actions identified in both the conveyance system and treatment plants. A summary of the short and near term odor control treatment actions follow.

4.1 Conveyance System

The short and near term Action Plan consists of Category 1 Actions (those which can readily be implemented by PCWMD staff with minimal capital expenditure), and Category 2 Actions (those which require time for engineering and construction, large capital expenditures, or both). The recommended Category 1 and Category 2 Actions for the conveyance systems are summarized below.

4.1.1 Category 1 Actions

- **Anita CDU SCC Feed**. Increase dose rate and step feed chemicals to more effectively match diurnal demand. The step feed process could be achieved by having two chemical metering pumps available. The first pump would deliver chemical at a constant rate throughout the entire day. The second pump would be activated by timer and would feed additional chemical at a selected dose rate to mitigate diurnal peaks. Actual dose rates to be used would be field-adjusted and would require additional downstream sampling to fine-tune actual dose rates and timing of the second pump activation and de-activation.
  Consider deployment of a new CDU downstream of the Anita CDU. It is recommended to attempt dose rate adjustment and step feeding above first.
- **Anita CDU SCE Feed**. Step feed chemicals to more effectively match diurnal demand.
- **18th Street CDU**. Adjust dose rate and step-feed chemicals to more effectively match diurnal demand
- **Prince CDU**. Some or all of the Prince CDU capacity needs to be redirected to side stream(s) responsible for high loads. Additional sampling is required to better understand which interceptors are contributing sulfide loads. Alternatively, if redirecting Prince CDU feed is not possible, give consideration to deploying a new CDU on a to-be-identified side stream (This would be a Category 2 item).
- **Wetmore CDU**. Additional sampling is recommended to better ascertain the cause/source of the downstream side streams raising the sulfide concentrations. During this sampling, it is recommended that the Wetmore CDU operation be monitored daily to better understand feed control of chemicals.

4.1.2 Category 2 Actions

- **Prince and Interstate I-10 Intersection**. Install vapor-phase treatment system utilizing a dry sorbent media (e.g., Sulfa Treat) reported to have an effective media life on the order of one year. Electrical service is required. Alternatively, consider use a packaged biofilter system if both water and electrical service are available and delivery time is suitable.

- **Alameda Siphon Inlet**. Temporary vapor-phase treatment system has been devised and installed at this location. If that system proves inadequate, install a vapor-phase treatment as discussed for the Prince and I-10 intersection above. This location is equipped with electricity.
- **Santa Cruz Siphon Inlet**. Install vapor-phase treatment as discussed for the Prince and I-10 intersection above. There may be some constructability issues at this location. It may be necessary to either enclose the vapor-phase treatment system or move it further upstream.
- **Anita CDU Feed to SCC.** Provide an additional CDU downstream of current CDU if the Category 1 action at Anita above is not sufficient.

PCWMD is currently in the process of implementing the recommendations from the Short and Near Term Action Plan. Actions taken by PCWMD include:

Completion of adjust/optimize the chemical dose and use timers to pace dosing to diurnal flow at three locations:

- Anita CDU
- 18th Street CDU
- Prince CDU

Monitored SRWN to verify that Wetmore nitrate dosing is effective in light of the high vapor-phase H_2S that was measured at the downstream end of SRWN.

Surveyed side stream sewers flowing into downstream SRWN that may be causing the high headspace H_2S that was sampled at the downstream end of SRWN.

Installed of vapor-phase treatment devices to force ventilate and treat foul air from three locations which were determined by modeling and follow-up sampling to be the most severe out gassing locations:

- Intersection of Prince and I-10
- Inlet to Alameda Siphon
- Inlet to Santa Cruz Siphon

Based on follow-up sampling of SCC, PCWMD has determined that a downstream CDU (Anita CDU) is not required at this time. PCWMD is investigating sites to locate a CDU on SRWS. With respect to items 4 and 5, PCWMD has constructed a new CDU on SRWN.

The figures below compare estimated sulfide concentrations within the collection system before and after implementation of short term recommendations. **Figure 4-1** shows INTERCEPTOR Model results calibrated to sampling completed before short term recommendations. shows estimated liquid sulfide upon completion of recommendations from the Short and Near Term Action Plan report.

Figure 4-1
System Wide Liquid Phase Sulfide Concentration
Before Implementation of Short-Term Recommendations

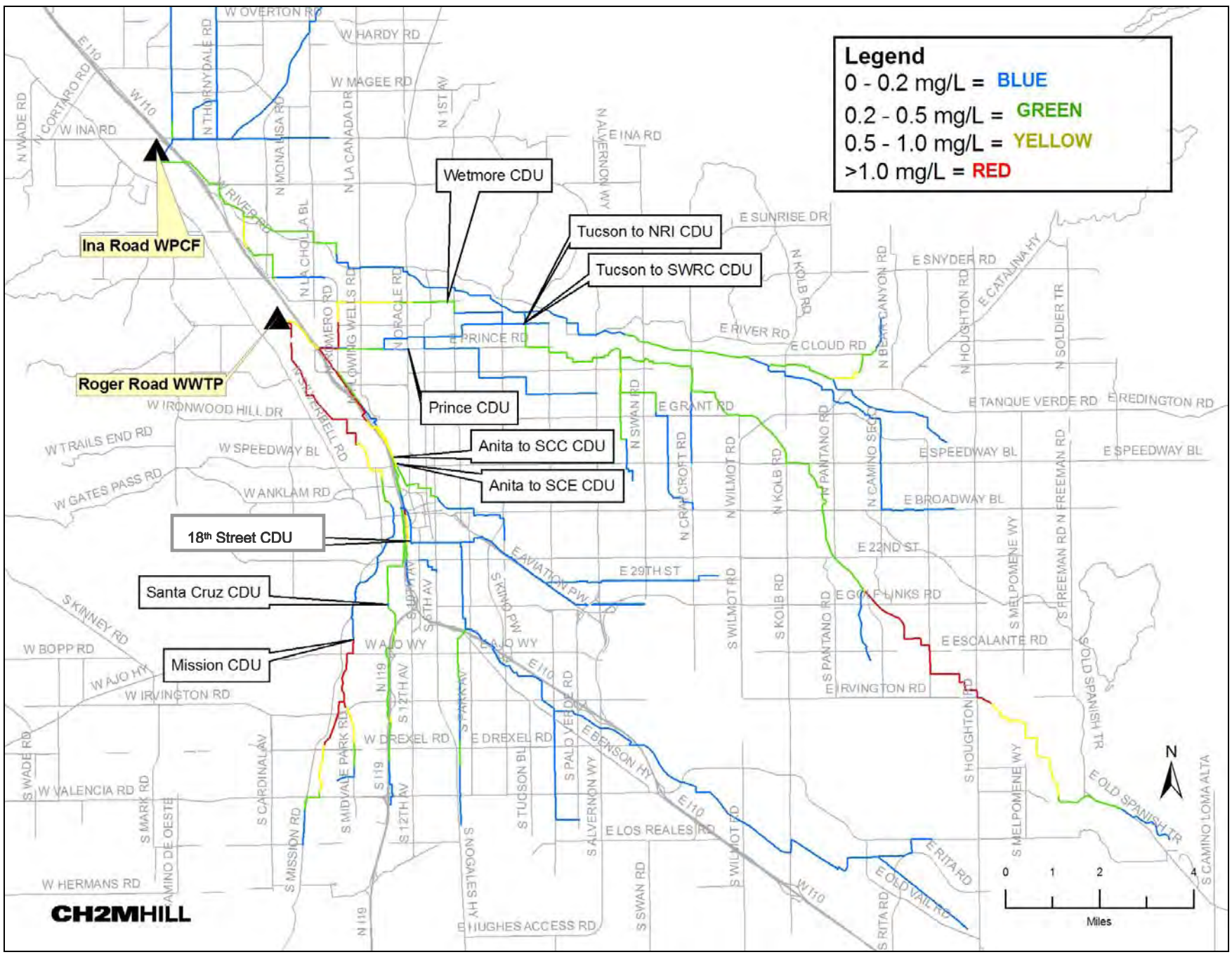
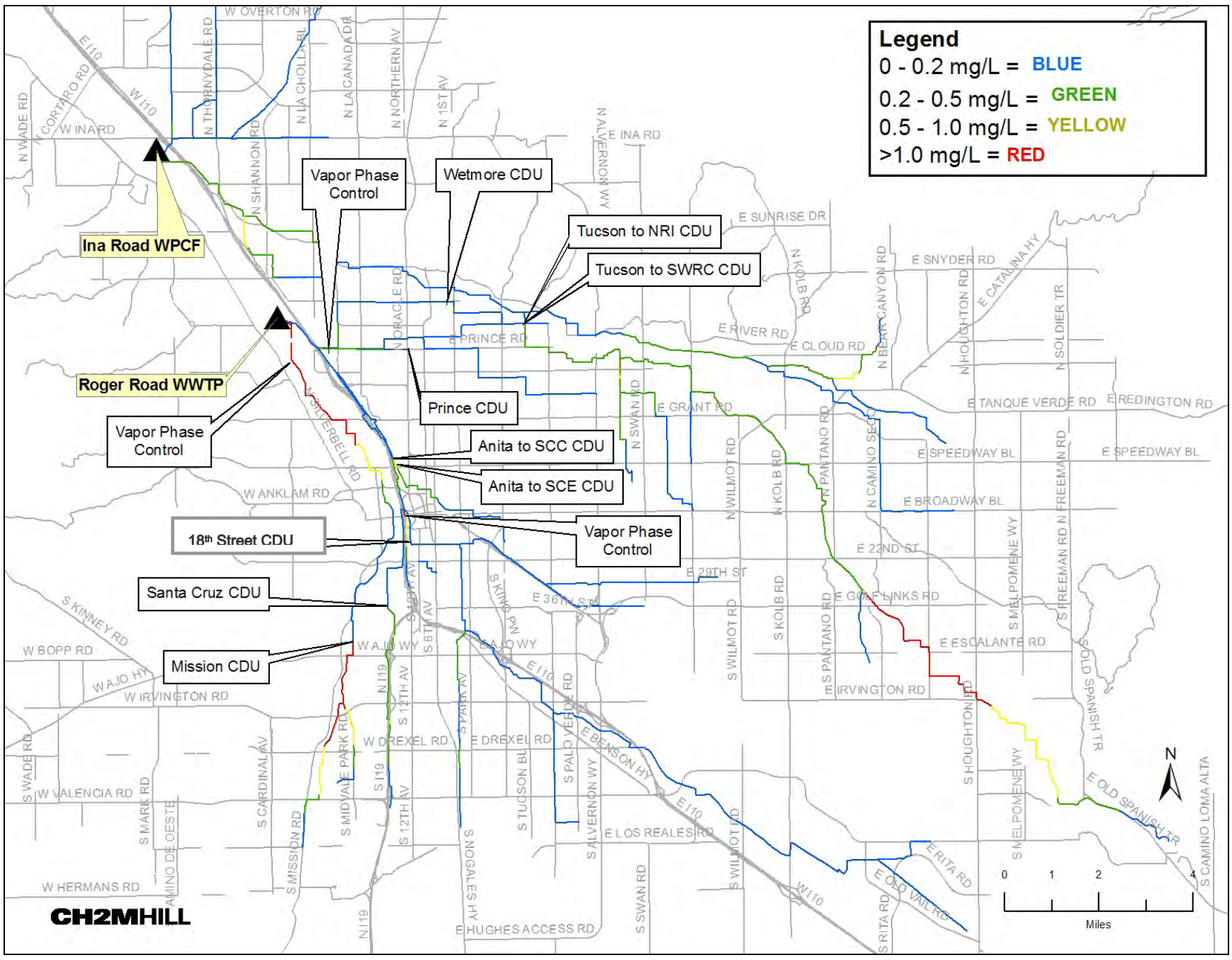


Figure 4-2
System Wide Liquid Phase Sulfide Concentration after Implementation of Short-Term Recommendations



4.1.3 Conveyance Systems Odor Control Improvement Results

As of the completion of this report, PCWMD has implemented several of the short term recommendations proposed for the collection system. These measures have resulted in quantifiable benefits in terms of liquid sulfide reductions and vapor-phase hydrogen sulfide reduction within the collection system. **Table 4-1** shows a before/after comparison of liquid phase sulfide concentration measurements at locations downstream of four chemical dosing stations. These results are typical of liquid sulfide reductions due to implementation of the short term recommendations.

Table 4-1
Liquid Phase Sulfide Improvements

Interceptor	Manhole ID	Summer '06 Sulfide (mg/L)	Summer '07 Sulfide (mg/L)
Santa Cruz Central	9914-07	2.6	ND*
Romero (Wetmore line)	9811-02	1.2	ND
South West Interceptor	1799-47	1.5	0.1
Santa Cruz	4140-03	0.7	ND

*None Detectable Levels

Improvements due to implementation of short term recommendations are also evident in terms of vapor phase H_2S reductions. **Figure 4-3 through Figure 4-6** show two examples of before/after Odalog comparisons. These results demonstrate typical improvements in which headspace H_2S concentrations downstream of chemical dosing stations dropped markedly as a result of implementing short term recommendations.

Figure 4-3
Downstream of the Anita CDU to SCC before Short Term Recommendations were Implemented

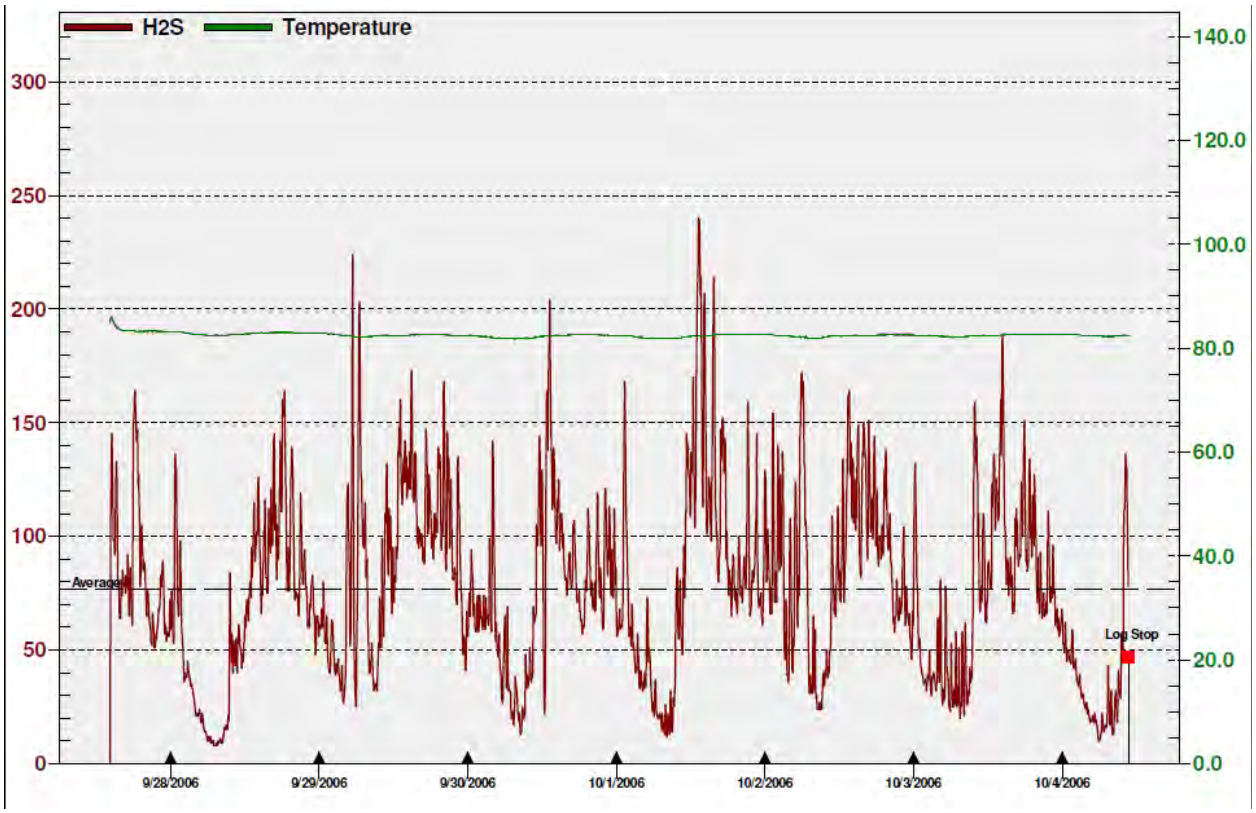


Figure 4-4
Downstream of the Anita CDU to SCC after Short Term Recommendations were Implemented

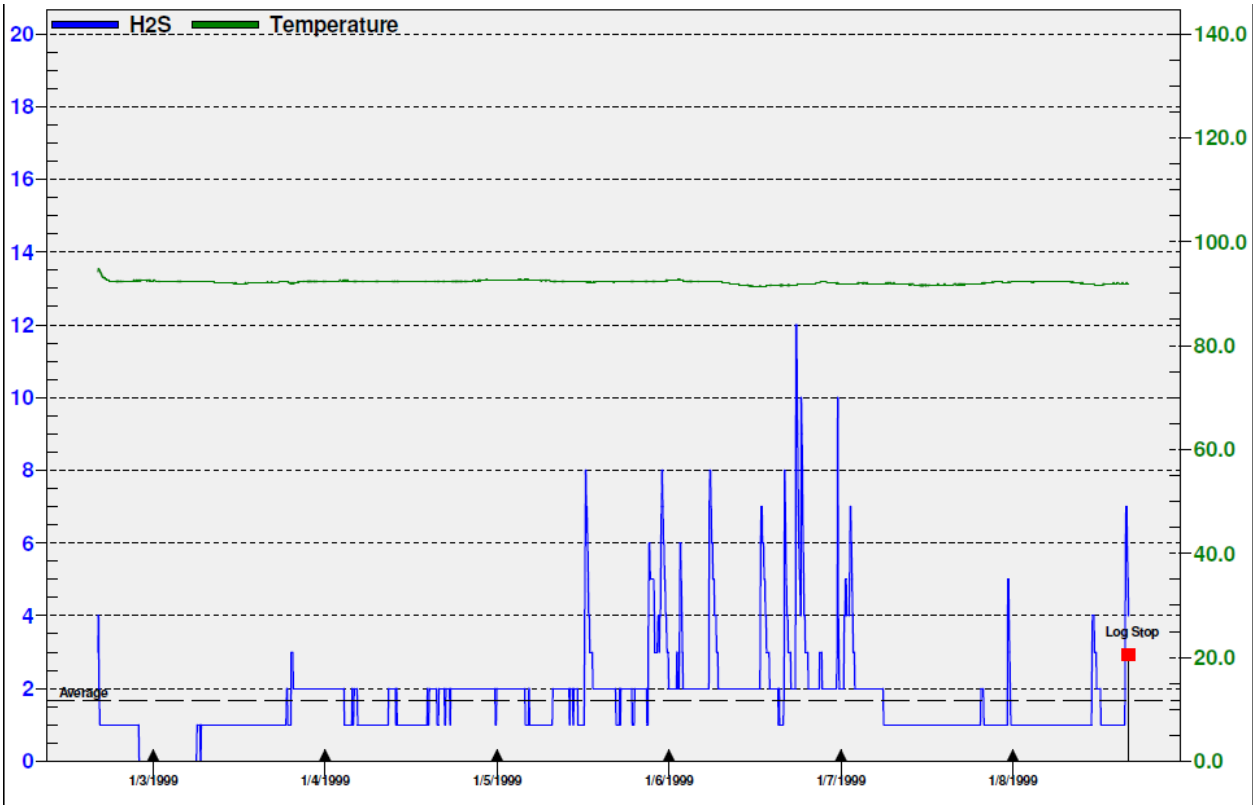


Figure 4-5
Downstream of the Wetmore CDU before Short Term Recommendations were Implemented

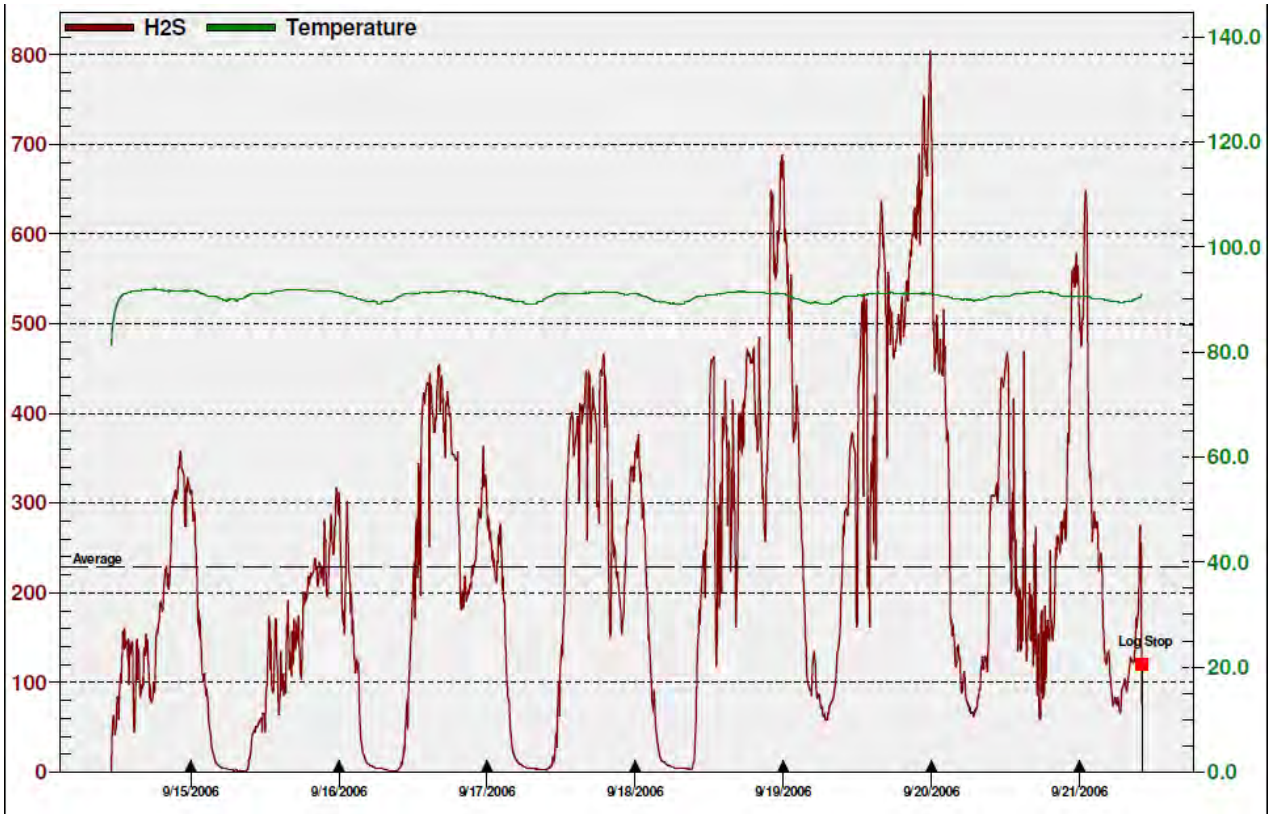
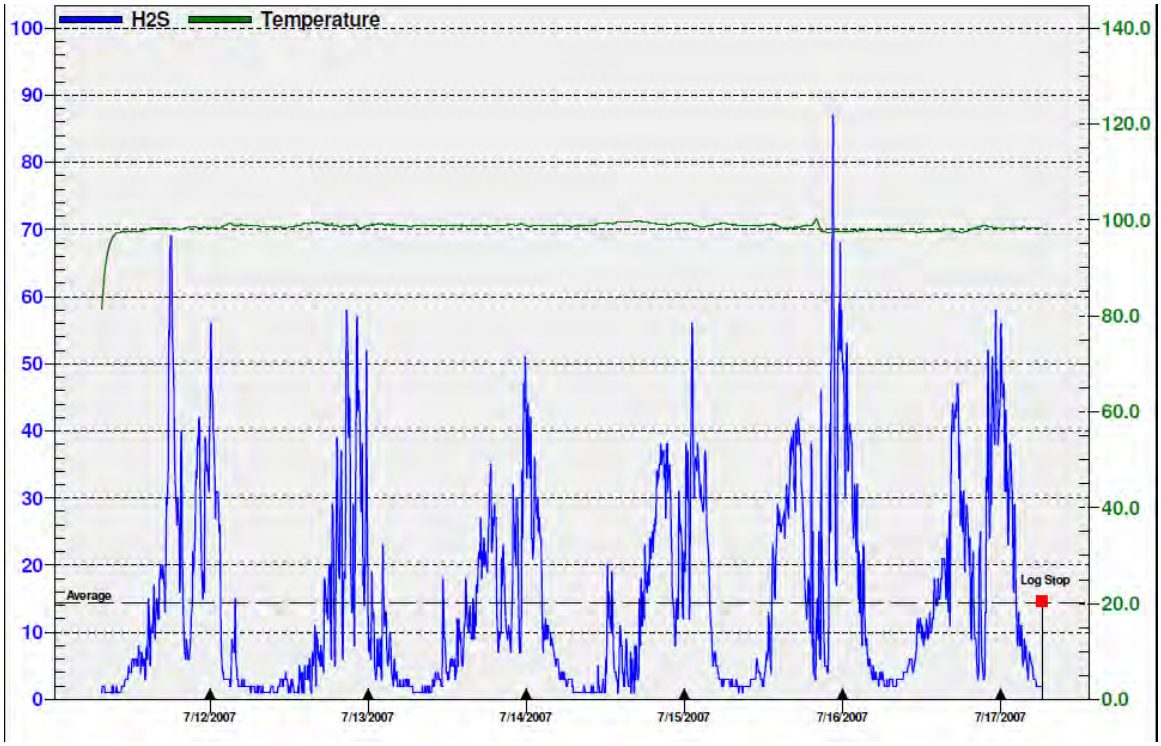


Figure 4-6
Downstream of the Wetmore CDU after Short Term Recommendations were Implemented



The reduction of vapor-phase H_2S will result in reduced odor emissions and concomitant reductions in odor complaints. Reductions in vapor-phase H_2S will have the added benefit of slowing corrosion of concrete sewer components. It is expected that concrete sewer components exposed to lower H_2S concentrations will have a longer service life and require less frequent maintenance and replacement."

4.2 Roger Road WWTP and Ina Road WPCF

The short and near term Action Plan consists of Category 1 Actions (those which can readily be implemented by PCWMD staff with minimal capital expenditure) and Category 2 Actions (those which require time for engineering and construction, large capital expenditures, or both). The recommended Category 1 and Category 2 Actions for the Roger Road WWTP and Ina Road WPCF are summarized below.

4.2.1 Category 1 Actions

- **Roger Road WWTP Headworks**. Spray conveyors and storage vehicle with sodium hypochlorite (NaOCl) solution
- **Roger Road WWTP Gravity Thickeners**. Confirm type and quantity of chemical being used is optimal. Add sodium hydroxide (NaOH) to chemical scrubber for more effective odor removal. Raise discharge stack for enhanced atmospheric dispersion

- **Roger Road WWTP Septage Dump Station**. Discontinue use of Dump Station. Septage haulers could dump in manhole upstream of Headworks. If discontinuance is not option, confirm type and quantity of chemical being used is optimal. Add NaOH to chemical scrubber solution
- **Ina Road WPCF Emergency Overflow Basins**. Spray piles of debris with NaOCl solution as needed
- **Ina Road WPCF BNRAS Primary Clarifiers**. Confirm type and quantity of chemical being used is optimal
- **Ina Road WPCF Centrifuge Building**. Change carbon; install gravity dampeners on vents to only allow air in, not out

4.2.2 Category 2 Actions

- **Roger Road WWTP Primary Clarifiers**. Install covers over effluent weir troughs; collect air and scrub exhaust air
- **Roger Road WWTP Yard Structure No. 1**. Collect air and scrub exhaust air
- **Roger Road WWTP Flow Splitter Structures**. Collect air and scrub exhaust air
- **Roger Road WWTP Headworks Screenings Compactor**. New screenings washer compactor to be installed (job complete)
- **Roger Road WWTP Headworks**. Enclose operation, collect air, and scrub exhaust air
- **Roger Road WWTP Biotowers** Reverse air flow, collect air and scrub exhaust air

PCWMD has taken appropriate steps to implement all of both Category 1 and Category 2 Actions.

4.2.3 Treatment Systems Odor Control Improvement Results

Improvements are illustrated by the Odor Dispersion Model results provided in Section 3.2. Figures in that section show the baseline conditions and the improved conditions resulting from the near and short term actions implementation.

4.3 Short and Near Term Actions for Green Valley WWTP

A separate report titled, "Green Valley WWTP Odor Investigation" has been prepared with recommendations for odor mitigation. This report is attached as **Appendix C.**

These included:

1. Adjust/optimize the chemical dose and use timers to pace dosing to diurnal flow at three locations:
   - Anita CDU
   - 18th Street CDU
   - Prince CDU
2. Install a CDU downstream of Anita to SCC if dose adjustment did not provide sufficient odor control.
3. Dose SRWS from Prince CDU if possible (SRWS runs parallel to SRWC at the Prince CDU location). If not possible, then consider installing a separate CDU to treat SRWS.
4. Monitor SRWN to verify that Wetmore nitrate dosing is effective in light of the high vapor-phase H_2S that was measured at the downstream end of SRWN. The high H_2S may be caused by a “hot” side

stream containing high vapor-phase H_2S concentrations flowing into downstream SRWN and not result from ineffectiveness of Wetmore CDU.

5. Survey to identify side stream sewers flowing into downstream SRWN that may be causing the high headspace H_2S that was sampled at the downstream end of SRWN.
6. Install vapor-phase treatment devices to force ventilate and treat foul air from three locations which were determined by modeling and follow-up sampling to be the most severe out gassing locations:
   - Intersection of Prince and I-10
   - Inlet to Alameda Siphon
   - Inlet to Santa Cruz Siphon

PCWMD is currently in the process of implementing the short-term recommendations from the Short and Near Term Action Plan. Based on follow-up sampling of SCC, PCWMD has determined that a downstream CDU (item 2 above) is not required at this time. PCWMD is investigating sites to locate a CDU on SRWS (item 3). With respect to items 4 and 5, PCWMD has constructed a new CDU on SRWN. With respect to item 6, PCWMD is currently constructing vapor-phase treatment devices at each of the recommended locations.

CHAPTER 5

Community Involvement Program

Chapter 5 Community Involvement Program

County-wide odor complaint logs for the period of 2004 thru 2006 were gathered from a variety of sources and reviewed for type, number and source location. These data were plotted on area maps to identify residents and commercial areas most impacted by odors that may have been attributed to the wastewater infrastructure. These maps are presented in **Figure 5-1 and Figure 5-2,** respectively.

The historic odor complaint logs, as shown graphically on the maps, demonstrate that the odor problem truly is a system wide issue, which requires actions both at the treatment plants and throughout the conveyance system. Further, the information indicates that there were four times more complaints related to Roger Road WWTP than the Ina Road WPCF. Based on this information, citizens from areas of probable odor impact were encouraged to participate with a group, which would provide public input into the system wide odor control study from beginning to completion.

5.1 Citizens Involvement Committee

PCWMD felt it was imperative to have community involvement and buy-in of the process and solutions for the System Wide Odor Control Plan. To facilitate this goal, PCWMD via the office Community Relations Office, established a Citizens Involvement Committee (CIC) of over 25 community residents within the department's service area. Over the course of the committee's tenure, some natural attrition occurred, resulting in the withdrawal of three members from the committee.

CIC members represented a broad cross section of community concerns; quality of life, environment, economic development and neighborhoods. Within the committee many members were directly impacted by chronic odors. Those members in particular had valuable insights regarding nuisance odors in the neighborhoods. The mission statement of the CIC was:

> ***To support Pima County in their efforts to identify and implement short- and long-term solutions for the treatment, odor abatement, discharge and reuse of our community's wastewater by evaluating the benefits and impacts of proposed solutions on the community and making recommendations to the PCWMD and Board for implementation.***

The group opted to focus solely on odor control issues and did not address discharges and reuse of wastewater as stated in the mission statement. CIC members met with PCWMD and the Consultant Team periodically to express concerns and desires of the community which they represent, and to receive updates on the progress of the odor control improvement activities. A total of five meetings were held and covered such topics as:

- Goals and objectives of the system wide odor control program
- Review of existing conditions and odor sources
- Short term odor control actions
- Long term odor control strategies
- Final plan and odor control improvement recommendations.

Input from the CIC was received at each of the scheduled meetings. This input was added to the other information collected on odor issues and evaluated during the planning and implementation phases of the project. In addition, the odor control processes, solutions and costs were reviewed with CIC for comment before final issuance of System Wide Odor Control Plan.

Near the beginning of the project a site tour of the wastewater treatment facilities was conducted with the CIC at the Roger Road WWTP and Ina Road WPCF to review the overall facility operations and the existing odor control systems. Later, after additional odor control measures were installed at Roger Road WWTP, an additional site tour was conducted with the CIC to view the operating systems and witness the odor control improvements.

5.2 Public Open Houses

PCWMD conducted two open houses where the public was invited to comment on the odor control plan and the results. Early in the project the first public meeting addressed the scope and approach of the odor investigations, and was designed to solicit concerns from the community. The second public meeting reviewed odor control recommendations, along with results and actions for additional odor control improvements within the County's wastewater operations. Information gathered from the public open house comments were used to better understand the needs and concerns of the community regarding location and intensity of odor complaints.

Figure 5-1
Odor Complaint Map – 2004-2006

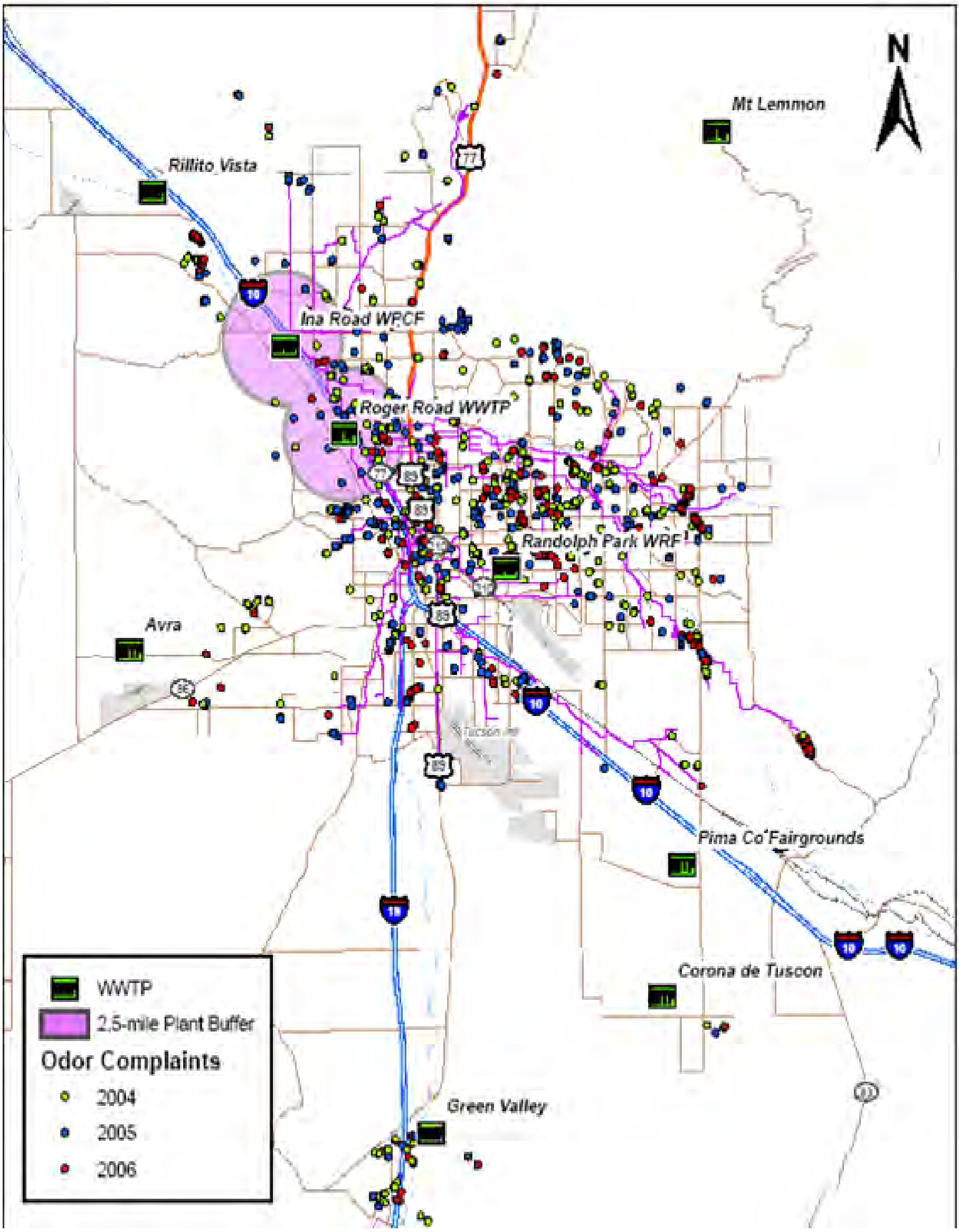
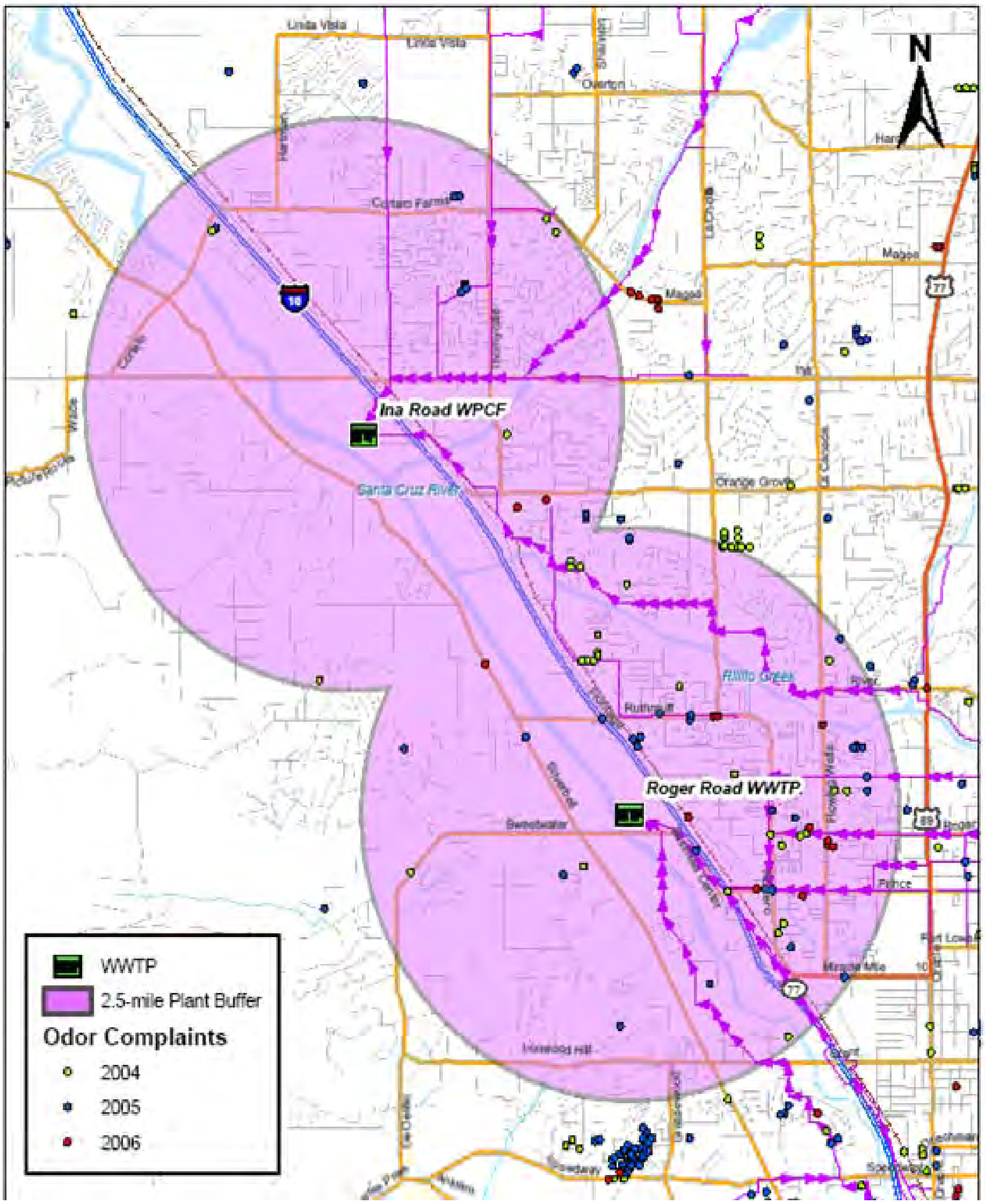


Figure 5-2
Roger Road and Ina Road Facilities



CHAPTER 6

Regulatory Odor Control Requirements

Chapter 6 Regulatory Odor Control Requirements

Currently, Roger Road WWTP and Ina Road WPCF both have air quality operating permits as required by Pima County Code Title 17.12, Article II, which include odor control provisions. Both of these plants will in the near future undergo significant upgrades and expansion programs. By regulations, new facilities or facilities undergoing major modification must meet setback requirements as stated in the Arizona Administrative Code Title 18 Chapter 9 Part B. This document reviews current requirements for odor control and addresses possible future odor control requirements.

6.1 Current Air Quality Operating Permit Requirements

Roger Road WWTP and Ina Road WPCF have almost identical air quality operating permits regarding odor control. Within the air quality operating permits are regulations involving both emissions from diesel generators and odor/hydrogen sulfide emissions at the facilities. This review addresses the odor and hydrogen sulfide emissions at each of the facilities.

The air quality operating permit (#1913) for Roger Road WWTP was issued on February 23, 2005 and expires on February 22, 2010. The air quality operating permit (#1903) for Ina Road WPCP was issued on September 12, 2005 and expires September 11, 2010. Copies of these permits are included in **Appendix D**.

The following summarizes the requirements of *Part A: General Provisions* and *Part B: Specific Conditions* of both facilities' Air Quality Operating Permits regarding odor control issues.

PART A: GENERAL PROVISIONS

Within the General Provisions of the Air Quality Operating Permits are the requirements describing record keeping, reporting, and testing for the odor control systems. These requirements are described below.

Record Keeping Requirement

The record keeping requirements listed in Part XII, Sub-Section A, states the owner/operator shall keep a log of the following items on the odor control systems.

- Date and time of sampling
- Date that any further analysis may have been performed (such as from an independent lab)
- Name of the company that performed the analysis
- A description of the analysis or sampling techniques performed
- Results of the analysis
- Operating conditions present at the time of sampling or when the measurements were taken

Sub-Section B states records shall be retained for at least five years. This includes all calibration of test equipment, strip-chart recordings, maintenance records, and copies of all required reports.

Reporting Requirements

Part XIII lists the reporting requirements. Sub-Section A requires compliance certificates of the previous section, and Sub-Section B covers excess emissions reporting requirements.

Sub-Section B states that the owner or operator must report to the control officer any emissions in excess of the established limits listed in the air quality operating permit. Two notifications are required in this section and are described below.

1. A verbal 24-hour notice to the control officer with a listed phone number of 520-740-3340.
2. A written notice that details the excess emissions within 72 hours of the verbal notification.

The second notice must be submitted to PDEQ at 150 West Congress Street, Tucson, AZ 85701 with the details listed below:

- Identity of the stack/stacks for the source of the emission.
- Magnitude of the emission with the operating data and calculations used to support the level of the emission.
- Identity of the equipment responsible for the emission.
- Nature and cause for the emission.
- Steps taken to remedy the situation if it was due to a malfunction and steps to prevent the malfunction from occurring in the future.
- Steps taken to limit the excess emissions at the time.
- A list of steps to comply with the permit procedures.
- In the case of continuous or recurring excess emissions the notification requirements of this section shall be followed once the excess emissions are first detected, and an estimate of the time excess emissions will continue. If excess emissions are expected to occur after the initial estimate, further notification to the air quality board will be required.

Testing Requirements

Section XVII refers to the testing requirements at each facility and lists the details of what is required. For odor and hydrogen sulfide emissions, testing is not required unless the control officer requests such testing.

PART B: SPECIFIC CONDITIONS

Emission Limits and Standards

Part A Sub-Section II, A.1. states that the Permittee shall install, operate and maintain air pollution control equipment or use good modern practices to minimize gaseous or odorous materials from being emitted in such quantities or concentrations as to cause air pollution. This is listed as a federally enforceable condition.

Part A.3. states that no person shall allow hydrogen sulfide to be emitted from any location in such manner and amount that the concentrations of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.030 PPM by volume for any averaging period of 30 minutes or more. For Ina Road WPCF, the permit states this requirement is a locally enforceable condition. For Roger Road WWTP, there is no statement.

Conversion of detection threshold values to H_2S limits:

- Detection threshold for H_2S = 0.0005 ppmv

- Detection threshold for H_2S = 1 D/T
- Permit allows 0.03 ppmv H_2S, then:
- Allowable D/T for H_2S is computed:
- D/TALLOW = 0.03 ppmv H2S /0.0005 ppmv H2S = 60 D/T

Recommended goal to achieve permit requirement are indicated below:

- Goal for PCWMD Wastewater Treatment Facilities is to Achieve ISCST Model Predicted 7 D/T Beyond Property Line

6.2 Future Setback Requirements

The *Arizona Administrative Code's Title 18, Chapter 9, Part B: BADCT for sewage Treatment Facilities* section discusses general considerations and prohibitions regarding setback requirements for facilities undergoing new construction and major modifications. New facilities or facilities undergoing major modifications must abide by the *A.A.C. Title 18 Chapter 9 Part B* setback requirements.[1, 2] These requirements include providing 1,000 foot setbacks for facilities with No Odor Control and 350 foot setbacks for facilities with Full Odor Controls.[3] The Code also states that operation of sewage treatment facilities shall not cause emission of offensive odors on a persistent basis beyond the setback requirements.

6.3 Comments and Conclusions

Based on the above statements and the listed requirements in the air quality operating permits the following comments are provided and conclusions drawn.

- There are no federal regulations on odor control that apply to Pima County, however, there are State and County odor control requirements that are applicable to Pima County.

- Odor emission requirements in the Pima County Air Quality Permit are not the strictest standard in the nation, but are consistent with odor emission limits in Arizona and elsewhere in the Southwest. There is no current forecast that the odor control limits will become more stringent in the foreseeable future.

- There is no requirement that states that Pima County Wastewater Management Department (PCWMD) must test for hydrogen sulfide and/or odor emissions at either facility. This is to be performed at the direction of the control officer of Pima County DEQ.

- None of the testing to date addresses the specific requirements that the facilities must adhere to, such as the 0.030 PPM hydrogen sulfide limit <u>at any occupied place beyond the premises on which the source is located</u>.

---

[1] Setbacks are measured from the treatment and disposal components within the sewage treatment facility to the nearest property line of an adjacent dwelling, workplace, or private property.

[2] Arizona Administrative Code Title 18 Chapter 9 Part B: R18-9-B201. General Considerations and Prohibitions.

[3] Full Odor Control means all odor-production components of the sewage treatment facility are fully enclosed and odor scrubbers or other odor-control devices are installed on all vents.

- All testing that has been scheduled and is scheduled is for in-house evaluation purposes only and is not required to be submitted to Pima County DEQ. Testing data is kept for five years from the test date to meet the record keeping requirement stated in *Part A: General Provisions*.
- The wastewater treatment facilities currently meet the State setback requirements and are using good modern practices for odor control.
- Stack and fence line testing are part of the current evaluation program to determine if the odor control equipment is operating to the best of its ability and fugitive odor and hydrogen sulfide emissions are kept to a minimum.
- Goal for PCWMD Wastewater Treatment Facilities is to achieve ISCST model predicted 7 D/T beyond property line.

CHAPTER 7

Odor Abatement and Control Alternatives – Conveyance System

Chapter 7 Odor Abatement and Control Alternatives – Conveyance System

The goal of PCWMD's System Wide Odor Control Plan is to develop a system wide plan, which when fully implemented will cost effectively mitigate nuisance odor emissions from PCWMD wastewater conveyance systems and wastewater treatment plants. One component of meeting this goal is to review current PCWMD odor control practices, review and evaluate the effectiveness of other odor control technologies and make recommendations for odor control technologies to be considered for future implementation under the plan.

7.1 Current Odor Control Practices and Technologies

Prior to the start of the plan development, the primary technology used by PCWMD to control odors in the conveyance system was liquid-phase chemical addition using sodium hypochlorite. Hypochlorite had been continuously dosed from seven (7) chemical dosing units (CDUs) to nine (9) locations within the conveyance system. Additionally, magnesium hydroxide had been continuously dosed to one location, and nitrate had been dosed to another location. This study confirmed that PCWMD's current practice of hypochlorite dosing is effective. In addition to continuing chemical dosing to the current locations, a number of short-term measures to increase odor control were recommended in the Short and Near Term Action Plan report.

7.2 Proposed Odor Control Alternatives

The existing chemical dosing units provide good sulfide control in the sewer segments in which they deployed. However, several high sulfide sewer segments remain in areas not easily treatable using CDUs as currently deployed. This section presents an evaluation of three different potential long term alternatives for comprehensively removing sulfide throughout the collection system. These are:

- System wide dissolved oxygen injection,
- Magnesium hydroxide ($Mg(OH)_2$) dosing,
- Additional hypochlorite dosing stations.

Based on these evaluations, the best combination of long term recommendations is provided.

7.2.1 Oxygen Injection

Oxygen injection has been used effectively to prevent sulfide generation in municipal wastewater collection systems. Whereas, oxygen is most commonly used to treat force mains, new technology makes oxygen injection in gravity sewers worthy of consideration. This subsection evaluates the technical feasibility and cost effectiveness of oxygen treatment in the PCWMD wastewater conveyance system.

Oxygen Injection Evaluation Approach

The INTERCEPTOR model contains algorithms that estimate the fate of dissolved oxygen (DO) and its affect on sulfide within a sewer network. Mass transfer between the sewer liquid and vapor phase, biochemical oxygen demand (BOD), and the DO effect on the sewer biofilm is included. By initializing a supersaturated DO concentration at specific upstream locations, the model estimates downstream DO losses due to simultaneous reactions and mass transfer processes.

It was determined that a starting DO concentration of 20 mg/L provided a reasonable target for upstream DO concentration. This value is low enough that equipment vendors could reasonably expect to achieve this concentration in a gravity sewer, but not so low that numerous dosing stations would be needed to replenish DO. The INTERCEPTOR Model was used to locate DO injection stations so that the entire network would be oxygenated thereby preventing sulfide generation. Existing CDU locations were used where possible. Oxygen consumption was calculated for each location based on the average wastewater flow rate and target DO concentration at each DO injection station. For this analysis, it was assumed that no hypochlorite would be dosed.

Oxygen Injection Evaluation Results

The procedure described above resulted in 14 DO injection locations injecting a total of 5,800 lb/day of oxygen**. Figure 7-1** shows model predicted liquid-phase sulfide throughout the sewer network with oxygen injection. Injection stations are called out with the approximate mass of oxygen required based on average flow. If the DO concentration could be increased to 20 mg/L at each location, sulfide could be effectively controlled throughout the network without additional liquid-phase chemicals.

Two advances in oxygen injection technology represent the best potential for using DO injection in gravity sewers. First, down-flow bubble contactors can achieve essentially 100% transfer efficiency, which decreases the amount of oxygen required compared to less efficient conventional diffusers. Secondly, small-scale pressure swing adsorption (PSA) systems can generate oxygen onsite without the need to store and transport liquid oxygen.

At each oxygen injection station a side stream from the main wastewater flow would be pumped through the down-flow bubble contactor, where oxygen would be injected. The side stream would then be mixed into the bulk flow resulting in bulk flow DO concentration of 20 mg/L. Elevated DO would prevent sulfide generation downstream by maintaining an aerobic environment.

Oxygen Injection Costs

A cost summary for the oxygen injection equipment for each location is provided in **Table 7-1**. Budgetary costing information has been provided by ECO_2, a supplier of oxygenation systems that utilize the down flow bubble contactors. Costs shown include equipment costs for the contactor, side stream pump, and pressure-swing adsorber. Operating costs, including costs to operate the pumps and PSA system, are provided. The last column in the table shows the sum of annualized installed costs and operating costs.

Figure 7-1
System Wide Liquid Phase Sulfide Concentration with Oxygen

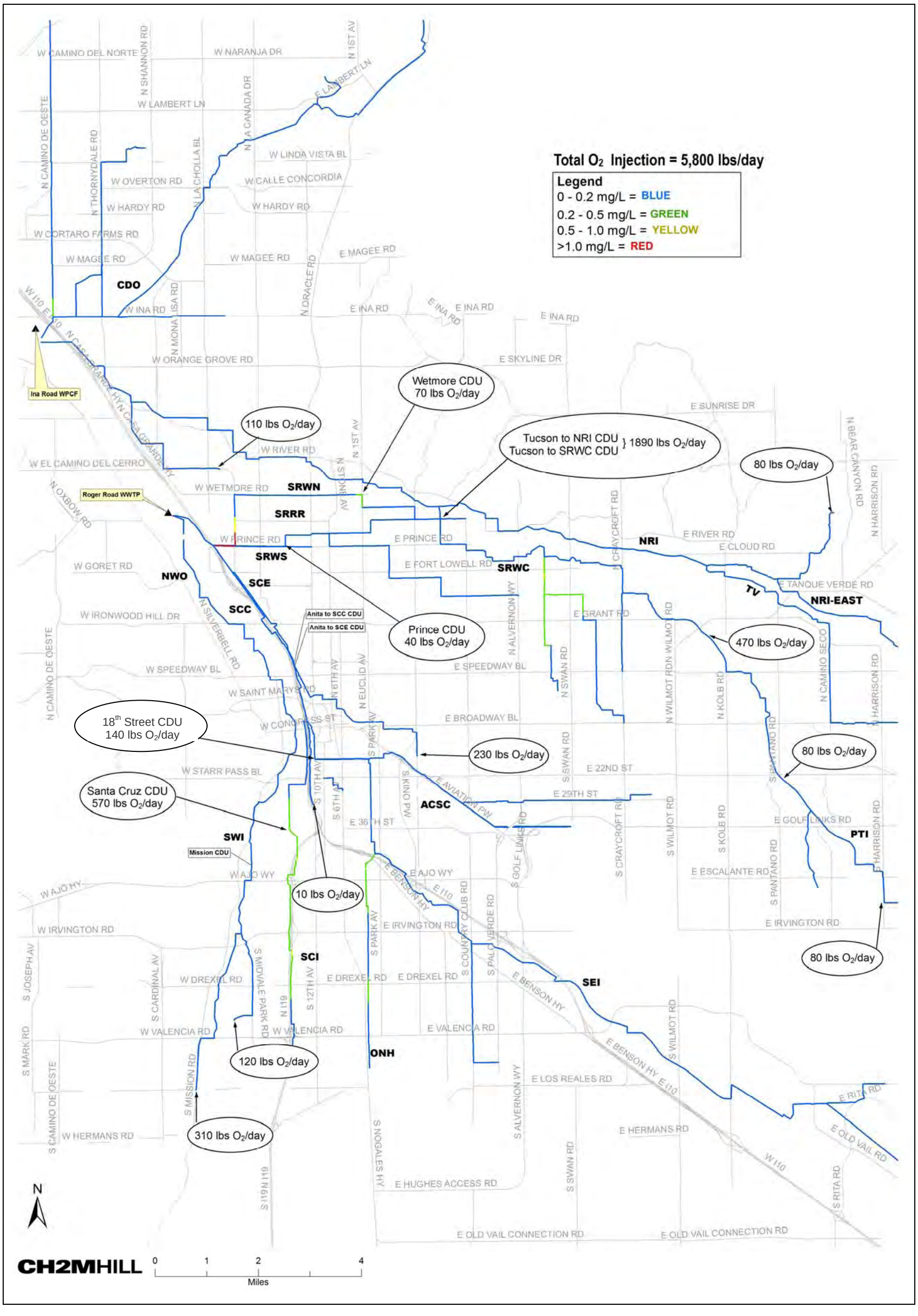


Table 7-1
Capital and Operating Costs

Capital and Operating Costs for Oxygen Injection Using Down Flow Bubble Contactors and Pressure-Swing Adsorbers						
Location	O_2 demand (lb/day)	System size (ft)	Equipment cost	Installed cost[1]	Annual Operating cost	Equivalent Annual Cost[2] (20yr, 8%)
24" branch to NRI	110	3	$219,000	$438,000	$1,687	$39,880
Wetmore CDU	70	3	$219,000	$438,000	$1,073	$39,267
Prince CDU to SRWS	40	3	$219,000	$438,000	$613	$38,807
Tucson CDU	1,890	8	$530,300	$1,060,600	$38,445	$130,930
Upstream NRI	80	3	$219,000	$438,000	$1,227	$39,420
Downstream Pantano	470	4	$245,400	$490,800	$11,243	$54,041
Mid Pantano	80	3	$219,000	$438,000	$1,227	$39,420
Upstream Pantano	80	3	$219,000	$438,000	$1,227	$39,420
Upstream SCE	230	3	$219,000	$438,000	$3,527	$41,720
18th CDU	1,740	8	$530,300	$1,060,600	$35,394	$127,878
SCI-B	10	3	$219,000	$438,000	$153	$38,347
Santa Cruz CDU	570	6	$372,000	$744,000	$10,805	$75,682
Upstream SWI	310	3	$219,000	$438,000	$4,753	$42,947
Upstream SWI-T	120	3	$219,000	$438,000	$1,840	$40,034
total	**5,800**		**$3,868,000**	**$7,736,000**	**$113,200**	**$788,000**

Capital and Operating Costs for Oxygen Injection Using Down Flow Bubble Contactors and Pressure-Swing Adsorbers						
Location	O_2 demand (lb/day)	System size (ft)	Equipment cost	Installed cost[1]	Annual Operating cost	Equivalent Annual Cost[2] (20yr, 8%)

1. Installed costs are assumed to be double equipment costs.
2. This is the sum of annual operating costs and the annualized installed cost over 20 years at 8% discount rate.

A capital expenditure of $7.7 million would be required to install oxygen injection throughout the collection system. However, the annual operating cost of $113,200 would then be significantly less than the current annual cost of approximately $600,000/yr for sodium hypochlorite (This hypochlorite cost is based on dose rates before implementation of Short and Near Term Action Plan CDU optimization recommendations. Assuming a discount rate of 8% over 20 years the equivalent annual cost of $788,000 represents an approximately 30% increase over the current sodium hypochlorite cost.

Oxygen Injection Recommendation

Oxygen injection in gravity sewers is a novel application without a long track record. For example ECO_2 has not yet installed a gravity sewer application. As such, this technology is not recommended for immediate broad scale use. Therefore, due to its higher cost and limited track record in gravity-flow sewers, this technology is not recommended for further consideration.

7.2.2 Magnesium Hydroxide Dosing

Magnesium hydroxide dosing is a proven technology for preventing hydrogen sulfide emissions from wastewater. Where sufficient $Mg(OH)_2$ is dosed, wastewater pH is buffered between approximately 8.0 and 9.0. A pH in this range reduces emissions of H_2S gas. Overdosing does not lead to higher pH, which makes $Mg(OH)_2$ more desirable than other more soluble pH adjustors. $Mg(OH)_2$ dosing to control H_2S emissions in the collection system was evaluated in terms of technical feasibility and cost effectiveness.

Magnesium Hydroxide Dosing Evaluation Approach

The INTERCEPTOR Model contains an algorithm that estimates the distribution of inorganic sulfide species based on pH. It simultaneously estimates mass transfer or H_2S gas (the volatile species of inorganic sulfide) between the liquid and vapor phase and resulting headspace concentration.
The calibrated base case model parameters were modified by elevating the pH to 8.7 in all branches and removing hypochlorite dosing. Testing in other sewers systems has shown 8.7 to be a reasonable target for pH adjustment by $Mg(OH)_2$ dosed at approximately 100 gal of 60% slurry per MGD of wastewater.

Since overdosing is not a concern, $Mg(OH)_2$ was allocated to upstream branches sufficient to supply 100 gal/MGD downstream.

Magnesium Hydroxide Dosing Evaluation Results

The INTERCEPOR model predicted system wide vapor-phase H_2S concentration with comprehensive $Mg(OH)_2$ dosing and no hypochlorite dosing is shown in **Figure 7-2**. It is predicted that $Mg(OH)_2$ dosing could effectively control headspace H_2S gas concentrations.

Magnesium Hydroxide Dosing Costs

At a dose rate of 100 gal/MGD of $Mg(OH)_2$, the estimated chemical consumption would be approximately 5,400 gal/day. At PCWMD's price for $Mg(OH)_2$ slurry of $1.85/gal, the chemical costs for $Mg(OH)_2$ dosing would be $3.7 million per year. Considering hypochlorite savings, the net increase in chemical cost would be greater than $3 million per year.

Magnesium Hydroxide Recommendation

For the purpose of this assessment it has been assumed that capital expenditures associated with converting the existing CDUs to $Mg(OH)_2$ service would be minimal, e.g., addition of tank mixing system. However, the annual chemical cost for $Mg(OH)_2$ dosing would be cost prohibitive compared to other options. Therefore, it is recommended that $Mg(OH)_2$ dosing not be considered further.

7.2.3 Expanded Sodium Hypochlorite Dosing

In the Short and Near Term Plan report sodium hypochlorite was shown to be the most cost effective option for liquid-phase chemical treatment. Also, optimization strategies have resulted in good sulfide control for the locations that are treatable from the current CDU locations. However, several locations within the conveyance system have potentially high sulfide generation that cannot be treated using the existing CDU locations. Such locations occur in the upper Pantano interceptor (PTI), upper Southwest Interceptor (SWI) and downstream Northwest Outfall interceptor (NWO). These three locations were evaluated for hypochlorite treatment.

Expanded Sodium Hypochlorite Dosing Evaluation Approach

The INTERCEPTOR model was used to estimate downstream sulfide generation with hypochlorite dosing at upper Pantano interceptor (PTI), upper Southwest Interceptor (SWI) and downstream Northwest Outfall interceptor (NWO). Also, chemical dosing at Mission CDU was set to zero. The Mission CDU was determined to be more effectively deployed along the SWI further upstream of the current location for two reasons. First, Mission CDU injects hypochlorite into a small side sewer upstream of the targeted location on SWI. This causes loss of some of the oxidative capacity before the chemical reaches the target pipe. Second, Mission CDU doses upstream of a well oxygenated segment of the sewer that is less in need of treatment. Therefore, moving the Mission CDU dosing station upstream was evaluated as an option for increasing overall effectiveness of chemical dosing on SWI.

Figure 7-2
System Wide Vapor-Phase Hydrogen Sulfide Concentration with Magnesium Hydroxide

Expanded Sodium Hypochlorite Dosing Evaluation Results

The system wide liquid sulfide concentrations with existing CDUs optimized and the three additional CDUs added, all operating with sodium hypochlorite, are shown in **Figure 7-3**. By moving the Mission CDU and adding two additional CDUs, comprehensive sulfide control over most of the collection system would result.

Expanded Sodium Hypochlorite Dosing Costs

Currently Mission CDU doses into MH 5689-35, which is located in a 15 inch side sewer to SWI approximately 0.6 miles upstream of the junction with SWI. Since SWI, and not the 15" side sewer, is the target of the chemical dosing, Mission CDU would be more effective if it dosed directly, or at least closer, into SWI. Currently, the chemical travels for 20 to 30 minutes (Assuming a wastewater velocity of approximately 2 ft/s) before it reaches SWI. During that time, chemical is consumed in reactions with wastewater constituents in the side sewer so that less chemical is available for removing sulfide in SWI.

The effectiveness of Mission CDU could be improved by moving it so that it dosed either directly into SWI or closer to SWI. The preferable option is to dose directly into SWI, and the dosing location should be upstream of junction currently receiving chemical from Mission (via the side sewer) – that is dose into MH 1799-38 or upstream of MH 1799-38. Due to the presence of drop structures downstream of the junction, it is recommended that the dosing location not be moved farther downstream in SWI. Otherwise, sulfide would not be removed before it is stripped out in the drop structures.

If the Mission CDU can not be dosed at a recommended location on SWI, a second option is to move Mission CDU so that it doses into the same pipe closer to SWI. Any of the manholes between MH 5689-27 and MH 1799-38 would be acceptable.

For the additional upper Pantano CDU, a spare CDU could be brought online at this location so that any equipment needed would be only to replace parts that have been removed from the existing spare unit for use elsewhere. The costs associated with the upper Pantano additional CDU would include the chemical cost to dose an estimated 25 gal/day of sodium hypochlorite solution and costs associated with installation and land acquisition. The upper Pantano location to be treated with the new CDU was predicted to be a sulfide hot spot in INTERCEPTOR modeling. Moreover, the predicted hotspot is surrounded by a cluster of complaint locations. The new CDU would control sulfide at this hot spot and potentially prevent odors and complaints at this location.

The additional NWO CDU would entail a significant additional chemical cost to dose an estimated 837 gal/day. This represents an approximately 50% increase in system-wide chemical use. Similar to the additional upper Pantano CDU, a spare CDU could be deployed. Therefore, capital costs for the NWO CDU would consist mainly of installation and land. While a new CDU on NWO would reduce sulfide and remove odors along this interceptor, it is recommended that a new NWO CDU only be considered as a last resort, because the chemical costs would be very high. Vapor phase treatment should be considered before considering chemical dosing of NWO.

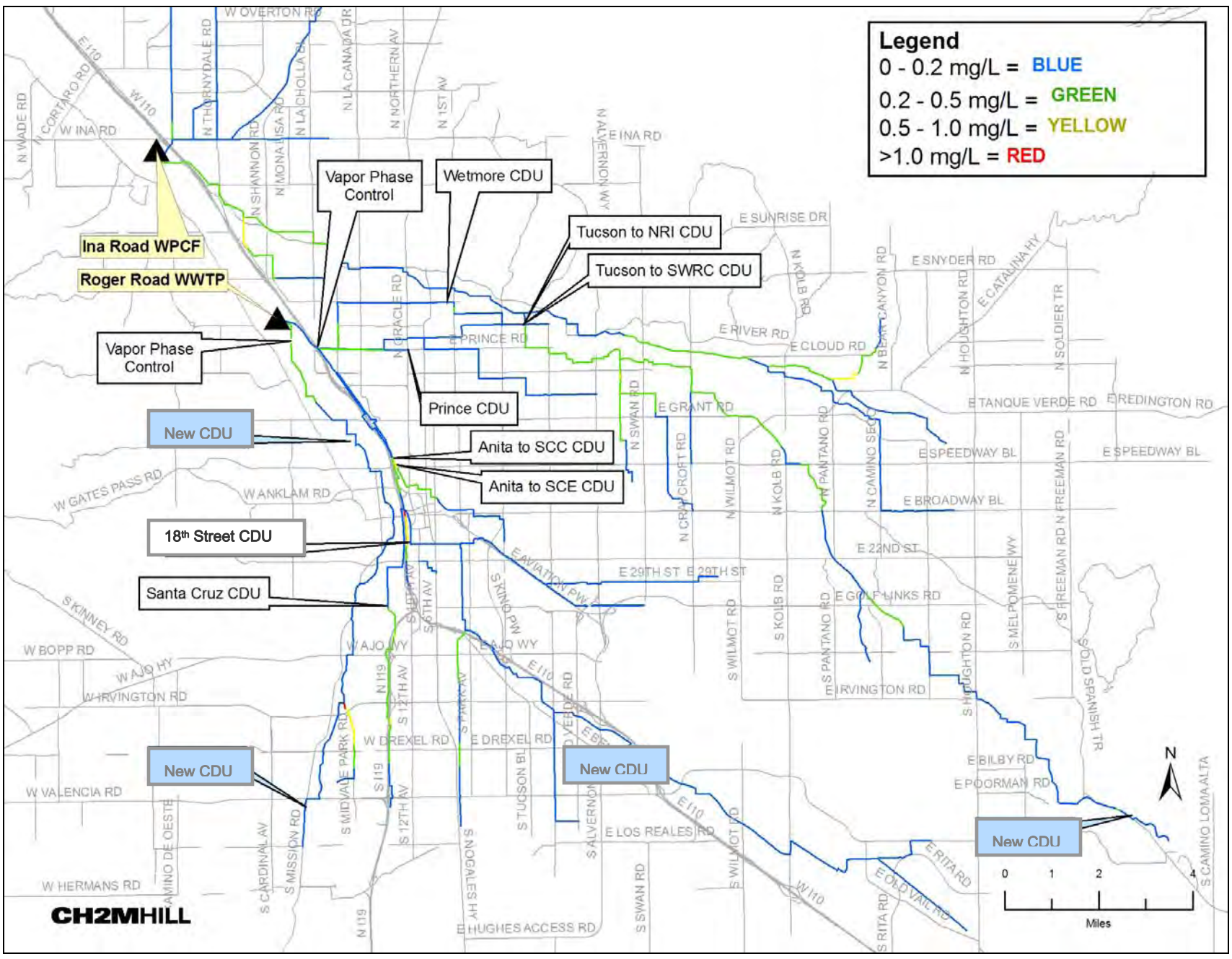
Estimated chemical costs for the additional CDUs are summarized in **Table 7-2**.

Table 7-2
Chemical Consumption in Additional CDUs

	Required sulfide removal (lb/day)	Hypo effectiveness[2] (lbHypo / lbSulfide)	Hypo dose (gal/day)	Chemical cost[3] ($/yr)
Upper SWI[1]	53.3	4.4	234	$85,600
NWO	190	4.4	837	$305,600
Upper Pantano	5.7	4.4	25	$9,125

1. Chemical costs for SWI would not increase due to chemical saved from Mission CDU.
2. Current optimized CDUs have a dosing effectiveness of approximately 4.4 lb hypo per lb sulfide.
3. Chemical costs assume a PCWMD price for hypo of $1.00/gal.

Figure 7-3
System Wide Liquid Phase Sulfide Concentration with Additional Hypochlorite CDUs



Expanded Sodium Hypochlorite Dosing Recommendation

Additional sodium hypochlorite dosing is recommended for upper SWI and upper Pantano. Additional sodium hypochlorite dosing of NWO is recommended only as a last resort. The downstream portion of NWO will have vapor phase treatment that will negatively pressurize a large segment of the interceptor. Therefore, liquid-phase chemical addition on NWO may not be needed. Additional hypochlorite dosing should be implemented in the following steps:

1. Install one of the spare CDUs to treat upper Pantano at or near Houghton Road. Start dosing 25 gal/day, monitor sulfide downstream, and adjust dose to optimize.
2. Install the second spare CDU to treat upper SWI at or near Valencia Road. Start dosing 240 gal/day, turn off dosing at Mission CDU, monitor sulfide downstream and adjust dose to optimize.
3. If dosing on upper SWI is capable of controlling sulfide downstream of Mission CDU, discontinue Mission CDU dosing. Mission CDU equipment would serve as a spare.
4. After start up of vapor-phase treatment on NWO (Santa Cruz siphon inlet) survey NWO to identify upstream out gassing locations. If NWO is negatively pressurized far enough upstream of the Santa Cruz siphon inlet, additional measures will not be needed on NWO.
5. If out gassing is found on NWO after installation of vapor-phase treatment near Santa Cruz siphon, consider installing a second vapor phase treatment unit in the upstream half of NWO.
6. Consider liquid phase treatment on NWO as last resort.

7.3 Odor Control Alternatives Summary Advantages and Disadvantages Summary

The goal of liquid phase treatment is to reduce the dissolved sulfide concentration throughout the collection system to below a target of 0.2 mg/L, thereby limiting the potential for H_2S outgassing and concrete corrosion. A liquid-phase treatment technology that can not achieve the target concentration or one that is not cost effective should be eliminated from further consideration. Several alternative technologies were evaluated to determine whether they should be considered for use in the PCWMD system. The INTERCEPTOR model was used to estimate sulfide concentrations that could be achieved based on known performance of these alternatives in other locations. Model predicted dose rates were then used to estimate costs associated with applying each alternative in the Pima County system. The results of this analysis are summarized below.

7.3.1 Oxygen Injection

Advantages:

- Potential comprehensive sulfide control throughout the collection system
- Low annual operating costs

Disadvantages:

- Technology is untried for gravity sewers
- Large initial capital costs

7.3.2 Magnesium Hydroxide Dosing

Advantages:

- Potential comprehensive control of H_2S emissions throughout the collection system
- Technology has demonstrated track record of effectiveness

Disadvantages:

- Does not prevent emissions of organic compounds
- High annual chemical costs

7.3.3 Expanded Hypochlorite Dosing

Advantages:

- Potential elimination of remaining sulfide hot spots
- Low capital costs
- Low operating costs compared to other alternatives

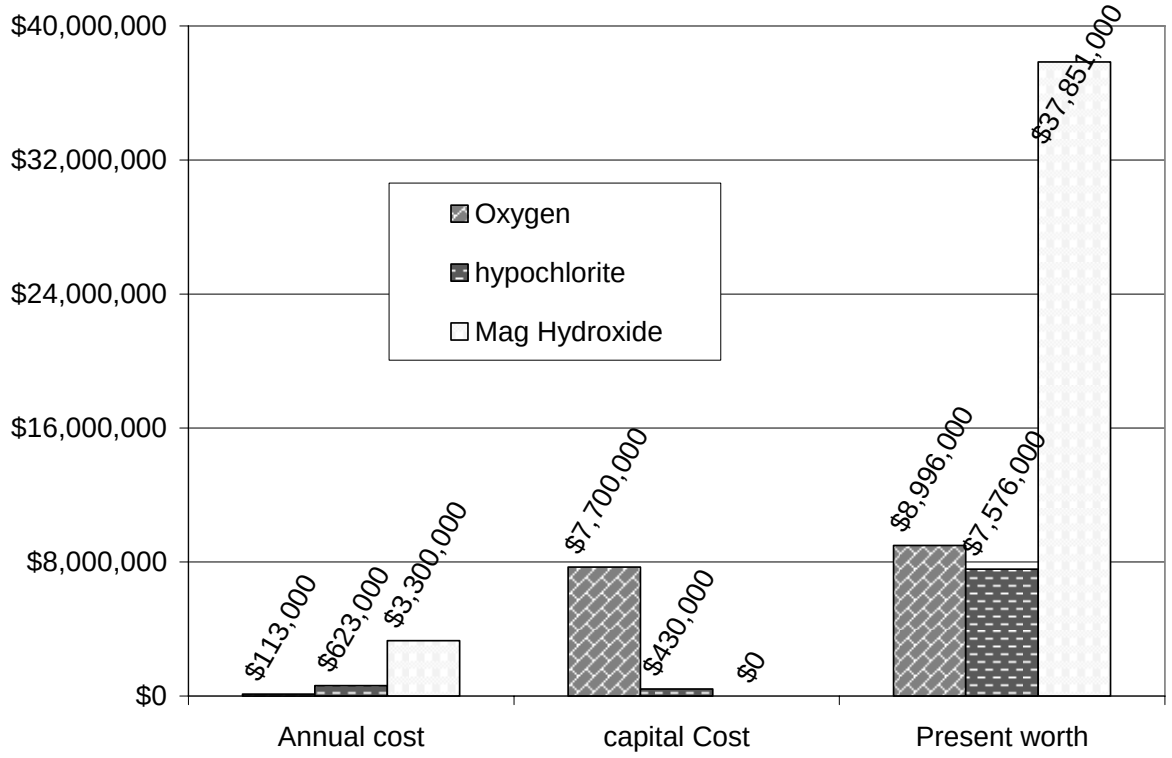
Disadvantages:

- Additional vapor-phase treatment may be needed on NWO

7.4 Cost Comparison

An economic analysis was prepared for each of the evaluated long term solutions option**.** The technology comparison evaluation includes capital, annual costs, and present worth for each alternative and is shown in **Figure 7-4**. The oxygen and magnesium hydroxide options are shown as outlined above. The hypochlorite option includes estimated capital costs for installation of two additional dosing stations and one additional vapor-phase control system.

Figure 7-4
Cost Comparison of Evaluated Long Term Odor Control Options



7.5 Comprehensive Odor Control Alternatives Recommendations

Three technologies were evaluated for comprehensive system wide odor control: oxygen injection, magnesium hydroxide dosing, and expanded sodium hypochlorite dosing. Oxygen injection and magnesium hydroxide dosing is not recommended due to high present worth costs. Expanded hypochlorite dosing is the recommended alternative.

7.6 Future and Historical Odor Complaint Recommendations

Measures recommended in this plan are expected to solve the majority of odor problems associated with the collection system. However, the odor complaint record shows clusters of complaints that are not apparently related to sewer segments evaluated. A provisional list of these locations is provided below.

- South Galileo Lane area
- Neighborhood southeast of Houghton Road and Irvington Road
- Neighborhood south of Houghton Road and Speedway Boulevard
- Neighborhood southwest of Houghton Road and Tanque Verde Road
- Miramar Drive/Tucson Country Club area

- Neighborhood bounded by Alvernon way Craycroft Road, Broadway Boulevard, and 22nd Street
- Neighborhood northwest of Speedway Blvd and Greenswood Rd.
- Neighborhood northwest of Ina Rd and Pima Canyon Dr.
- Santa Cruz River Park area

A systematic procedure is recommended to address these locations and future complaint clusters. The procedure should include the following steps:

- Overlay gravity sewers down to 6" onto the historical complaint map.
- Identify siphons, force main outfalls, drops, or other structures that may be causing odors.
- Survey these locations to locate the odor source. Identify nearby agricultural or industrial activities that could be the cause of the complaint clusters.
- If an obvious odor source associated with the collection system is determined, consider liquid-phase or vapor-phase treatment.

7.7 Miscellaneous Recommendations

Flow Pacing Chemical dose: Following recommendations from the Short and Near Term Plan, PCWMD installed equipment at three CDUs to step the chemical feed based on diurnal wastewater flow. Since this measure was apparently effective for increasing the odor control benefit of chemical dosing, it is recommended that the same measure be applied at all of the CDUs to save chemical costs.

Additional Vapor-phase treatment equipment: While the recommendations provided in the plan are expected to solve the bulk of odor problems within the conveyance system, it is anticipated that additional odor problems may arise due to increased population or other future demands on the system. It is therefore recommended that PCWMD establish a standard design for a modular vapor-phase treatment system. For example, modular vapor-phase treatment units sized to treat 500 or 1,000 cfm could be utilized. If possible, it is recommended that biofiltration biotechnology be considered as the standard treatment technology for systems requiring permanent placement as these systems have an economic advantage due to low operating and maintenance requirements. This would enable PCWMD to deploy vapor-phase treatment units at relatively short notice, similarly to the current practice of maintaining stock CDU equipment

CHAPTER 8

Odor Abatement and Control Alternatives – Treatment Facilities

Chapter 8 Odor Abatement and Control Alternatives – Treatment Facilities

PCWMD currently utilizes several technologies for the treatment of the odorous emissions from the various PCWMD Wastewater Treatment Facilities, and these are:

- In-vessel biofilters.
- Granular Activated Carbon
- Single-Stage Packed Bed Chemical Scrubbers
- Multi-stage packed bed chemical scrubbers

Typical schematics and the relative advantages and disadvantages of each of the current odor control technologies along with other currently employed elsewhere are presented below.

8.1 Proposed Odor Control Alternatives

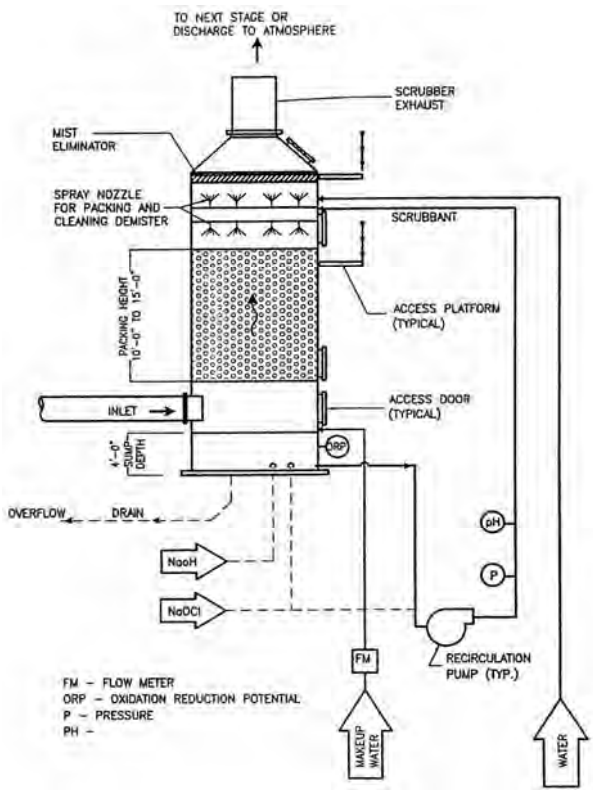
There are several types of odor control systems capable of treating odors being generated at the PCWMD wastewater treatment facilities. The odor control system alternatives that may be considered for possible use in Pima County are:

- Single-Stage Packed Bed Chemical Scrubbers
- Multi-Stage Packed Bed Chemical Scrubbers
- Mist Type Chemical Scrubbers
- Granular Activated Carbon
- Bio-Towers
- Biofilters – Open Bed
- Biofilters – In-vessel
- Ozone Contact Chambers
- Impregnated Media Beds (Activated Alumina Impregnated with Potassium Permanganate)
- Vent to Atmosphere Untreated

8.1.1 Single-Stage Packed Bed Chemical Scrubbers

Single-stage packed bed chemical scrubbing units consist of a single chemical or a combination of two compatible chemicals to remove odors from the air, generally when one odor causing compound is predominant and adequate reaction time can be provided in a single stage. Scrubbing solution is sprayed over a bed of packing material and odorous air is passed through the packing bed in a counter flow pattern. A mist eliminator is installed at the end of the stage to prevent the release of chemical droplets through the exhaust. Each scrubber system contains re-circulating pumps to re-circulate the chemical solutions through the system and metering pumps to feed raw chemicals into the system. The single-stage packed bed chemical scrubber is shown in **Figure 8-1**.

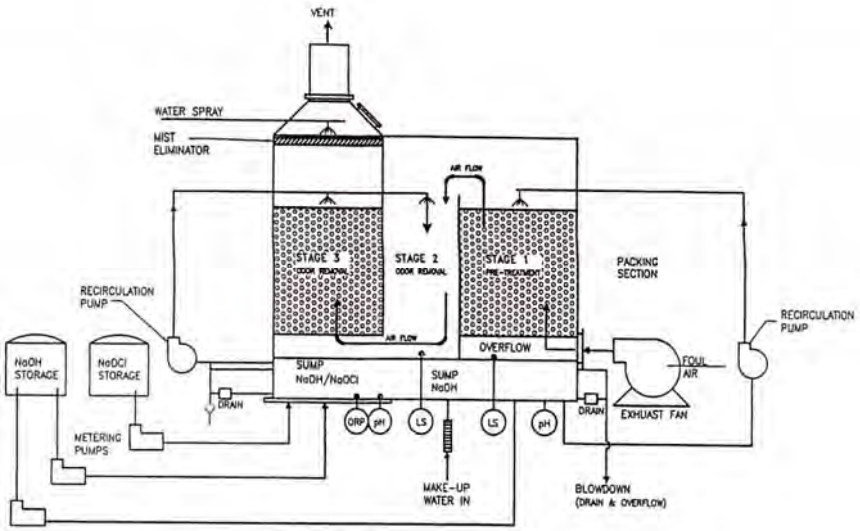
Figure 8-1
Single Stage Packed Bed, Chemical Scrubber



8.1.2 Multi-Stage Packed Bed Chemical Scrubbers

Multi-stage packed bed chemical scrubbers are used when concentrations of various compounds present in the odorous air require different types of chemicals to be used in combination, or sequentially and require longer reaction times than can readily be provided in a single stage scrubber to neutralize these odors. Single-stage chemical scrubbers are arranged in a series flow pattern to provide the multi-stage chemical scrubber. A mist eliminator may be located between stages if warranted to prevent the mixture of different chemicals. A mist eliminator is installed after the final stage to prevent the release of chemical droplets through the exhaust. The multi-stage packed bed chemical scrubber is shown in **Figure 8-2**.

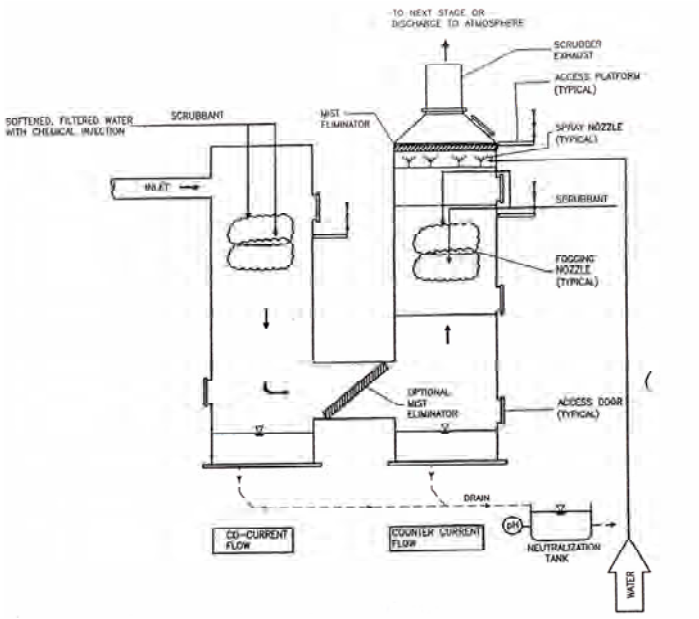
Figure 8-2
Multi Stage Packed Bed, Chemical Scrubber



8.1.3 Multi-Stage Mist Type Chemical Scrubbers

Like the multi-stage packed bed chemical scrubbers, the mist type chemical scrubbers are used when concentrations of various compounds present in the odorous air require different types of chemicals to be used in combination, or sequentially and require longer reaction times than can readily be provided in a single stage scrubber to neutralize these odors. The multi-stage mist type chemical scrubber is shown in **Figure 8-3**.

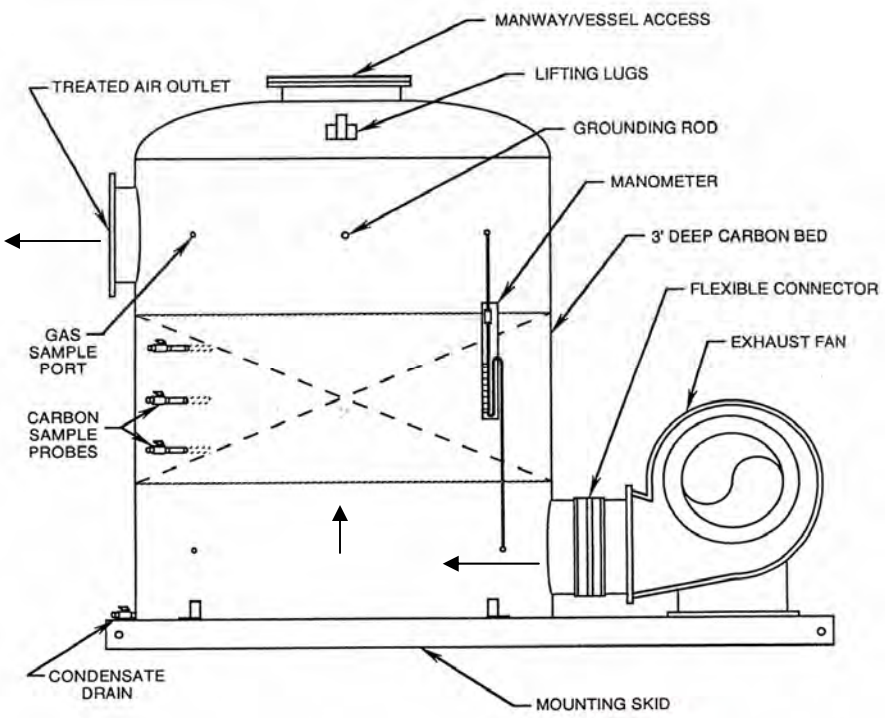
Figure 8-3
Mist Type Chemical Scrubber



8.1.4 Granular Activated Carbon (GAC)

Activated carbon systems are capable of removing high levels of hydrogen sulfide from the air. However, high concentrations of hydrogen sulfide rapidly deplete the adsorptive capacity of the carbon, requiring frequent replacement. GAC has capacity to remove a variety of other odorous compounds, including VOC's, however; the longer molecular chain makeup of such compounds limits the removal capacity of carbon for this service. In many cases, GAC units will experience break through of such odor causing compounds while still having capacity to remove hydrogen sulfide. Additionally, activated carbon has not demonstrated the ability to remove ammonia from air streams. The granular activated carbon scrubber is shown in **Figure 8-4**.

Figure 8-4
Granulated Activated Carbon (GAC)



8.1.5 Bio-towers

Bio-towers, sometimes referred to as "Bio-Trickling Filters or Bio-Scrubbers" operate on much the same principals as the biofilters, in that they utilize microorganisms to assimilate the odorous compounds and remove them from the air stream. The difference is that all the biofilter media is inert, usually lava rock, plastic or ceramic, which provides a surface for the microorganisms to grow, and they employ a continuous water recirculation over the media. The bio-tower is configured in vertical towers similar in appearance to packed bed chemical scrubbers. Bio-towers usually require some separate facilities to store and feed chemicals for pH adjustment and nutrient addition. The bio-tower system, however, typically has a much higher surface loading rate and thus a much smaller foot print than a bio-filter. The bio-tower bio-scrubber and bio-trickling filter systems are shown in **Figure 8-5 and Figure 8-6,** respectively.

Figure 8-5
Bio-towers (Bio-Scrubber)

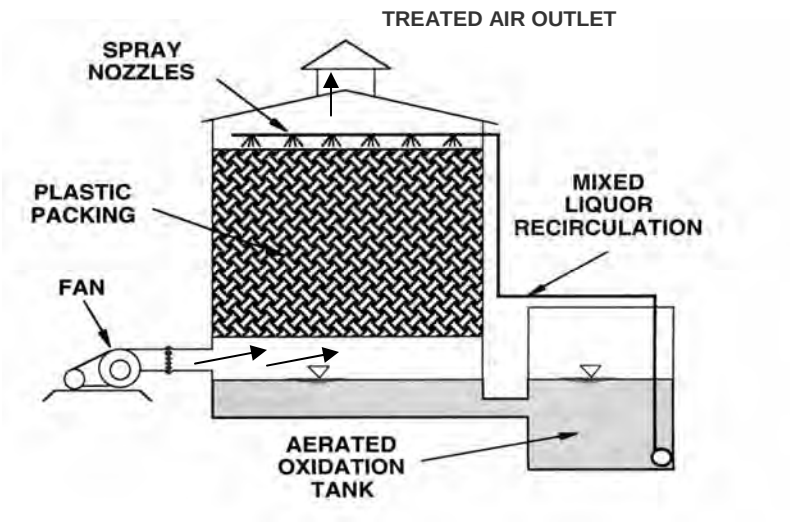
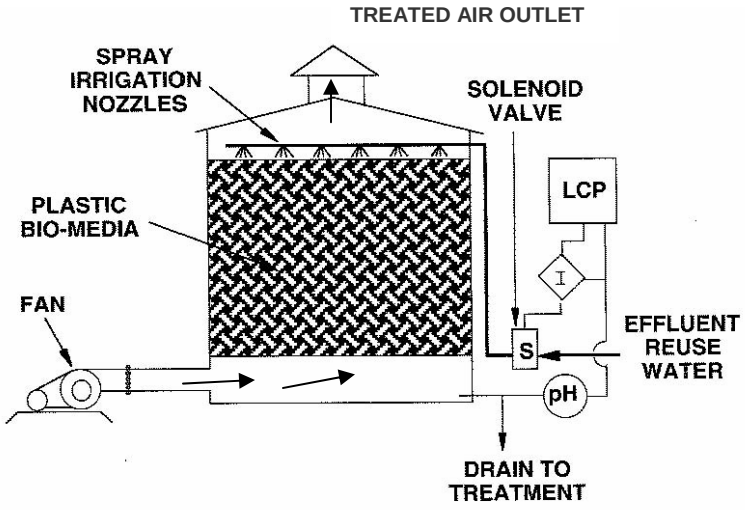


Figure 8-6
Bio-towers (Bio-Trickling Filter)



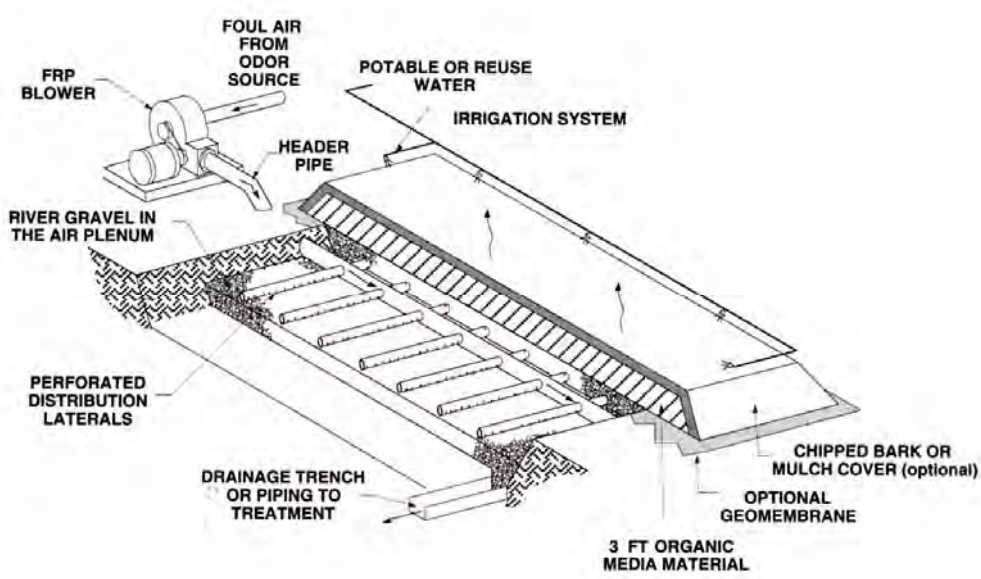
8.1.6 Open-Bed Biofilters

Biofiltration utilizes microorganisms to assimilate the odorous compounds and remove them from the air stream. As in any biological process, favorable conditions for microbial growth must be maintained for a successful system. A biofilter containing organic material and continuously fed with odorous air will provide sufficient food for a thriving biological system. Environmental conditions that must be maintained for a successful system are moisture content and temperature. Pre-humidification or irrigation piping and sprinkler heads must be provided to maintain the proper moisture content. Usually, the ambient temperature of the air withdrawn from the odor containment of the odor control system will maintain temperatures above freezing to allow the biofilters to be operated during cold weather.

The biofilter media is typically a mixture of relatively inexpensive organic and inorganic material. Typical materials include any of the following items: wood bark, compost, peat, leaf compost, sandy clay, rice hulls, cotton straws, etc. Experience with different mixes of materials over the past few years has lead to a fairly thorough list of the best materials to use for biofilter media.

A biofilter system is typically designed with multiple modules with a loading rate of 2 to 4 cfm/sf. This allows one of the biofilter modules to be taken down for maintenance or media replacement. Separate fans or an isolation damper can be located at the inlet end of each biofilter module. The open bed biofilter scrubber is shown in **Figure 8-7**.

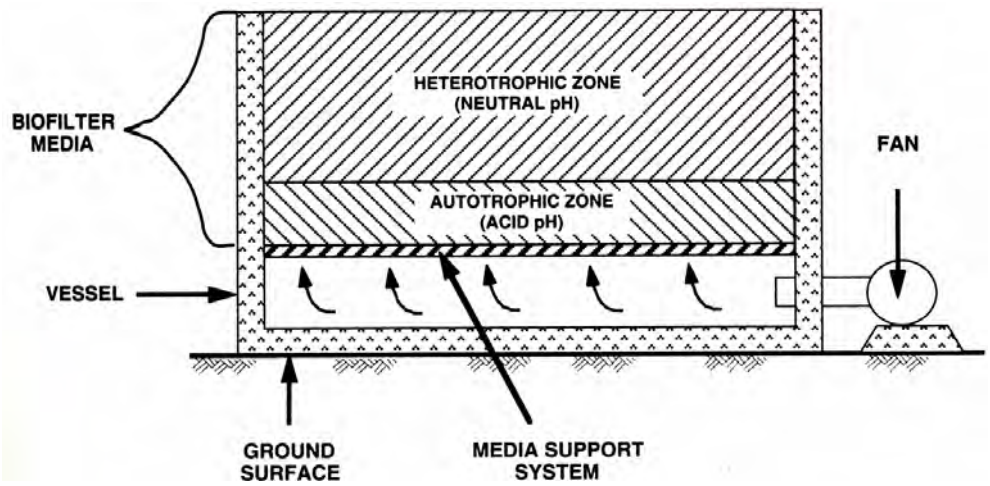
Figure 8-7
Biofilters (Open Bed)



8.1.7 In-Vessel Biofilters

The In-Vessel type biofilters operate under the same principals as the open bed biofilters. The In-Vessel type biofilters hold the biofilter material in horizontal holding tanks. The In-Vessel type biofilter usually can be loaded at higher air flow rates and therefore reduce the size of the footprint of the open bed biofilter. The in-vessel biofilter scrubber is shown in **Figure 8-8**.

Figure 8-8
In –Vessel Biofilters



8.1.8 Ozone Contact Chambers

Ozone contact chambers have been used primarily to control odors from large volumes of air with relatively low concentrations of odor causing compounds which can be oxidized to form non-odorous compounds. For example, ozone oxidizes sulfides and ammines to non-odorous sulfoxides and amino oxides.

Ozone can be produced in quantities required for odor control service with on site ozone generators. The ozone generators pass dry, filtered air through a high voltage field which converts a portion of the oxygen to ozone. The air containing ozone is sent through a sparger into a pipe or contact chamber. After ozone is injected into the odorous air stream, a contact period of approximately 15 to 30 seconds is recommended.

8.1.9 Impregnated Media Beds

Impregnated media beds utilizing activated alumina impregnated with potassium permanganate has a high capacity for hydrogen sulfide adsorption and oxidation and is also effective for removal of many volatile organic compounds (VOC's). However, because of the high cost, they are generally not cost effective to treat large volumes of odorous air. Impregnated media beds, have been employed for secondary polishing in cases where it is very important to remove all corrosive compounds from an air stream, for example in supply air to a laboratory or computer room.

8.1.10 Dispersion to Atmosphere (Untreated)

In some cases, large volumes of building air that contain very low concentrations of odors may be vented directly to atmosphere via discharge stacks whose design is based upon dispersion modeling. The dispersion modeling must demonstrate that the odorous air plume can be effectively dispersed and diluted in the atmosphere to non-nuisance levels in order to consider this approach.

8.2 Advantages and Disadvantages of Odor Control Practices and Technologies

The advantages and disadvantages of nine odor control technologies are provided in **Table 8-1** through **Table 8-9**

Table 8-1
Single-Stage or Multi-Stage Chemical Scrubbers

Advantage	Disadvantage
• Well established proven technology • Consistent high level of odor control performance • Removes wide range of sulfur compounds • Low energy costs • Competitive bidding • Small footprint for installation • Ability to control swings in inlet odor concentrations • Immediate startup	• Moderate to high capital costs • Moderate to high operation costs (Chemicals) • Not effective for VOC removal • Moderate to high O & M costs (manpower)

Table 8-2
Mist Type Chemical Scrubbers

Advantage	Disadvantage
• Proven technology • Consistent high level of odor control performance • Removes wide range of sulfur compounds • Low energy costs • Small footprint for installation • Ability to control swings in inlet odor concentrations • Somewhat effective for VOC removal Immediate startup	• Technology not currently supported by any major manufacturer • Problems with visible plume – cannot eliminate mist carry-over • Excessive maintenance on spray nozzles • Moderate to high capital costs • Moderate to high operation costs (Chemicals) • High O & M costs (manpower)

Table 8-3
Granular Activated Carbon

Advantage	Disadvantage
• Well established proven technology • Consistent high level of odor control performance • Removes hydrogen sulfide at relatively low concentrations • Competitive bidding • Small footprint for installation • Moderate O&M costs (manpower) • Ability to control swings in inlet odor concentrations • Immediate startup	• Moderate to high capital costs • High operation costs (electrical energy) • Limited capacity for VOC removal • High GAC replacement cost

Table 8-4
Bio-Towers

Advantage	Disadvantage
• Removes range of sulfur compounds and VOCs • Biological process readily understood by Operations Staff • Low energy costs • Competitive bidding • Small footprint for installation Low operation costs (no chemicals)	• Moderate to high capital costs • Moderate to high O&M (manpower) • Not good for wide swings in inlet odor concentrations • Not as effective in controlling odors as chemicals or GAC • Subject to biological kill off • Long start up time

Table 8-5
Bio-Filters - Open Bed

Advantage	Disadvantage
• Removes range of sulfur compounds and VOCs • Biological process readily understood by Operations Staff • Low O&M costs (manpower) • Moderate operation cost (energy – no chemical)	• Large footprint • Not as effective in controlling odors as chemicals or GAC • High capital cost • Long start up time

Table 8-6
Bio-Filters – In Vessel Type

Advantage	Disadvantage
• Removes range of sulfur compounds and VOCs • Biological process readily understood by Operations Staff • Low O&M costs (manpower) • Moderate operation cost (energy – no chemical) • Smaller footprint than open bed type bio-filter	• Not as effective in controlling odors as chemicals or GAC • High capital cost • Long start up time

Table 8-7
Ozone Contact Chamber

Advantage	Disadvantage
• Low capital costs • Low O&M costs (manpower) • Treats large volumes and low concentrations of air flows • Low operational costs (energy – no chemical)	• Only for compounds which can be oxidized • Not effective for many Reduced Sulfur Compounds and most VOCs • Health concerns with use of Ozone gas • Negative connotation

Table 8-8
Impregnated Media Beds

Advantage	Disadvantage
• Very good for odor control polishing applications where very high level of corrosive compound removal is required	• Not cost effective to treat large volumes of raw odorous air • Moderate to High energy costs

Table 8-9
Dispersion to Atmosphere

Advantage	Disadvantage
• Suitable for air from large buildings where only small concentrations of odors are detected • Cost efficient • Minimal design of treatment system • Low capital costs	• Not effective for air with high concentrations of odors • Atmospheric conditions may not permit efficient dispersion of odorous air plume • May not provide effective relief from odors at certain times

.

8.3 Recommendations on Odor Control Alternatives -Treatment Facilities

Based on the foregoing evaluations and discussions between Greeley and Hansen and PCWMD the odor control alternatives recommended for consideration of future implementation are:

- Multi-stage Chemical Scrubbers
- Granulated Activated Carbon (GAC)
- Bio-Towers
- Biofilters (open bed)
- Biofilters (in vessel)
- Dispersion to Atmosphere

CHAPTER 9

Odor Control Plan Costs Implementation Schedule

Chapter 9 Odor Control Plan Costs Implementation Schedule

Meeting the goal of a cost effect odor control system plan requires the development of the overall costs which will be incurred as a result of the System Wide Odor Control Plan. This is accomplished by reviewing current PCWMD odor control practices, review and evaluate the effectiveness of other odor control technologies and make recommendations for odor control technologies to be considered for implementation under the plan, and ascertaining the expected costs of each of the various odor control issues which will need to be addressed by PCWMD.

9.1 Capital Costs

The capital costs for the conveyance system and wastewater treatment facilities were developed for the recommended the long term odor control systems.

9.1.1 Conveyance System

New Liquid Phase Odor Control Units

The long term conveyance system recommendations include installing sodium hypochlorite (NaOCl) dosing stations at two new locations. Capital costs associated with these recommendations are summarized as shown in **Table 9-1**.

Table 9-1
Estimated Capital Costs For Future Hypochlorite Dosing Stations

Location	Equipment Cost	Installation	Installed Cost
Upper Pantano	$40,000	$190,000	$230,000
Upper SWI	$40,000	$190,000	$230,000

PCWMD currently has two spare CDUs that could be deployed at upper Pantano and upper SWI. Therefore, equipment costs shown in the table for these installations are intended to include to costs associated with replacing pumps or other equipment that may have been removed from the two spare CDUs and used elsewhere. Installation costs include installation of equipment, fencing, utilities, manhole modifications, mobilization, and permits. Installation costs were estimated based on contractor estimates previously provided for similar services associated with installing the vapor-phase treatment system for the Santa Cruz siphon inlet. These costs do not include land/easement procurement.

New Vapor Phase Odor Control Units

Long term recommendations include the potential installation of a vapor-phase treatment system on the upper NWO line. This recommendation should only be implemented if the other short and long term recommendations do not mitigate odors along this line to an acceptable level. The cost for an additional

vapor treatment unit for NWO is expected to be comparable to the installed cost for the Santa Cruz siphon vapor treatment unit. Therefore it is recommended that $200,000 be budgeted for installed costs. This does not include land/easement procurement.

For preliminary planning purposes, the use of $200,000 for an installed cost to treat 1,000 cfm is considered a reasonable placeholder if additional vapor-phase treatment units are required in the future.

Land/Easement Procurement

Land/Easement procurement costs are not developed in this report. Such costs will need to be determined at the time the long term conveyance system recommendations are implemented.

Roger Road WWTP (Existing Plant)

Under PCWMD's System Wide Odor Control Plan, one of the issues to be addressed is the problem of odors generated at the existing Roger Road WWTP. Under the PCWMD Regional Optimization Master Plan (ROMP), it is proposed that the existing Roger Road WWTP will be decommissioned in 2015 and a new Water Reclamation Campus (WRC) constructed adjacent to the existing plant will be operating in its place. However, as this new WRC will not be operational until 2015, and the existing plant will continue to be in service until that time, PCWMD has developed a series of projects to address the problem of odors generated at the existing plant until the new facility is commissioned. These projects are called the Roger Road Near Term Odor Control Projects.

Under the Near Term Odor Control Projects, several of the major sources of odor at the Roger Road WWTP are addressed and the odorous compounds removed from the air. PCWMD has informed residents and concerned groups in the vicinity of the Roger Road WWTP that a noticeable reduction in odors from the plant will be achieved by July 2007. To achieve this goal several of the major sources of odors at the plant were identified and a plan to reduce the odors from these sources was created.

The main sources of odors at the Roger Road WWTP which need to be addressed are:

- Headworks and screenings area.
- Primary Clarifiers No's 5, 6, 7, 8, 9 and 10.
- Biotowers No's 1 and 2
- Flow Splitter Structures 1, 2 and 7.
- Yard Structure No. 1.
- Sludge Thickening Facilities.

For each of these odor sources the odorous air needed to be contained and the odorous compounds removed by either chemical or biological treatment on the site before being released to the atmosphere. The method for containing and treating the odors for each of the sources is described below.

Headworks and Screenings Area

The Headworks facility is located adjacent to the site boundary fence to the East of the facility. To treat the odors generated at this source it is proposed to erect a fabric enclosure structure to entirely enclose the

major sources of odors in this area, and collect the odorous air and deliver this air to a bio-filter where a biological process will take place that will remove the odorous compounds from the air, prior to discharge to the atmosphere.

The bio-filter is to be located in the vacant area to the north of the headworks facility. Currently some of the air from the headworks is being treated by means of three in-vessel biofilters located to the south of the headworks area. These in-vessel biofilter units are currently at the end of their useful life, and as a result the air that currently passes through these units will be redirected to the biofilter and treated with the odorous air from inside the enclosure structure.

As this project was being developed, Cultural Resources of Pima County discovered the presence of archeological artifacts on the site of the new biofilter. Cultural Resources of Pima County have advised that it may take several months to resolve issues regarding recovery or preservation of the archeological artifacts before construction of biofilters on the proposed site may begin. Therefore, this plan was modified to provide temporary, rented, Granular Activated Carbon (GAC) units to provide odor control within the original time frame.

Primary Clarifiers and Yard Structures

There are six circular Primary Clarifier tanks located at the existing Roger Road WWTP facility which require treatment of the odors generated, along with a yard structure (Yard structure No.1) which diverts flow to each group of Primary Clarifiers and three flow splitter structures (Flow Splitter Structures No.'s 1, 2 and 7) which split the sewage flows between each set of two clarifiers.

To reduce the odor emissions from each of these sources the areas with high odor concentrations will have to be enclosed and the odorous air treated in a bio-filter similar to the treatment of the air from the Headworks, described above.

The six (6) primary clarifiers are located in the eastern portion of the Plant, adjacent to the headworks facility. Primary Clarifiers 9 and 10 are located immediately to the west of the headworks, Primary Clarifiers 5 and 6 are located west of Primary Clarifiers 9 and 10. Primary Clarifiers 7 and 8 are located to the north of Primary Clarifiers 5 and 6. In the case of the Primary Clarifiers, the majority of the odor emissions that originate at the primary clarifiers occur at the effluent launder weirs and effluent boxes, where the flows over the weirs and effluent walls are very turbulent, while substantially less odor emissions originate from the relatively calm areas of the center of the tank. For this reason it was decided that the area around the perimeter of the tank from the outer tank wall to the scum baffle would be enclosed with a rigid, relatively air tight structure, that would allow the air to be collected and removed through ductwork for treatment at the bio-filter. The area of the effluent box on the outside edge of the tank would also be enclosed and the air removed for treatment. It was decided on the basis of costs effectiveness and installation efficiency that this containment structure would be constructed from HDPE sheeting, and supported with a Fiberglass Reinforced Plastic (FRP) structural frame.

Splitter structures No.'s 1, 2 and 7 are located between the specific clarifiers which they divert incoming flows. Splitter structure No.1 is located between P. C.'s 5 and 6, Splitter structure No.2 is located between P. C.'s 7 and 8 and Splitter structure No.7 is located between P. C.'s 9 and 10. These structures are a source of odor emissions and therefore need to be covered entirely, and the air must be treated for odors

in the same way as the air from the Primary Clarifiers. These structures are to be covered using an air tight decking material, either Aluminum decking or FRP sheets which allow operations and maintenance staff to walk on the structure for operation and maintenance purposes. Yard structure No.1 currently has an existing aluminum decking cover system in use and it is proposed to use this existing cover system to contain the odors from this structure, but measures are added withdraw the odorous air for treatment.

As with the headworks construction of the biolfilters was delayed by Cultural Resources of Pima County and the plan was modified to provide temporary, rented, Granular Activated Carbon (GAC) units to provide odor control within the original time frame.

Biotowers

Currently at the Roger Road WWTP facility there are two Biotower structures which utilize a biological process to breakdown the waste products in the sewage prior to secondary treatment. These Biotowers operate by distributing the sewage onto a fixed media structure where the sewage comes into contact with a fixed film of biological growth on the surface of the fixed media in the Biotower and then flows to the aeration tanks for further treatment. To ensure that the process has sufficient oxygen for the biological process to take place air is circulated through the media. Currently, this is accomplished by means of four fans located at equal intervals around the Biotower which force air upwards from the base of the tower, and also by a series of air vents around the base of the tower. Due to this arrangement of the air traveling upwards through the Biotower odors that are generated in the process are forced through the top of the tower and into the atmosphere untreated.

To minimize the odor emissions generated in the Biotowers two options were available. The first is to construct an enclosure structure to cover the top of the Biotower and draw the air from under this cover through ductwork similar to that of the primary clarifiers and treat it in a similar fashion. The second option is to reverse the flow of the air in the Biotowers from an upward flow to a downward flow configuration where air enters the Biotower at the top of the structure and flows downwards through the structure.

Although the second option will not be as effective as the first option in completely containing and collecting all odor emissions, it was deemed the cost effective solution to capture and treat most of the odor emissions from the Biotowers. The existing four fans located at the base of the Biotowers will be replaced by a series of ducts that will take the air to an odor control biofilter. Two new 75 hp fans for each biofilter will be provided to pull air down through each Biotower and will transfer the air from the Biotowers through the ductwork to the biofilters for treatment.

Due to the large quantity of air that is required to be treated from the Biotowers, each Biotower will require a separate a biofilter cell through which the odorous gases can be treated. Due to the small quantity of air from the Primary Clarifiers and Yard Structures, it will be possible to treat the odors from Primary Clarifiers 5, 6, 9, 10 and Splitter Structures 1 and 7 and Yard Structure No. 1 in the same biofilter as Biotower No. 1, while odors from Primary Clarifiers 7, 8 and Splitter Structure No. 2 will be treated with the odors from Biotower No. 2.

As with the headworks construction of the biolfilters was delayed by Cultural Resources of Pima County. Because of the large volume of air to be treated from each biotower (40,000 cfm each), it is impractical to

provide temporary GAC units to treat this odor source. Therefore, it was decided to postpone implementation of this portion of the project until after Cultural Resources of Pima County permits construction of Biofilters on the proposed site.

Sludge Thickening Facilities

Currently the sludge gravity thickening facilities at the Roger Road WWTP have an odor control system in operation for the three thickening tanks. Under this system the air in the tanks is collected and passed through two single stage packed bed chemical scrubbers that are located adjacent to the thickening tanks. The existing packed bed chemical scrubbers at this location were operated as single stage, single chemical sodium hypochlorite (NaOCl) scrubbers and were not achieving the desired level of odor removal. Recommendations were made and implemented by PCWMD staff to add a second chemical sodium hydroxide (NaOH) to the scrubbing solution and to upgrade chemical pacing controls. Also, for one of the scrubbers, located in close proximity to existing structures, recommendations were made and implemented to raise the discharge stack by approximately 10 ft for better atmospheric dispersion of the treated exhaust air.

Costs Associated with Odor Improvements

In addition to making improvements to the scrubbers for the gravity thickening tanks, the costs for the various odor improvements for the Primary Clarifiers, Biotowers and Yard structures are summarized below.

The various odor control projects are implemented via Job Order Contracts, (JOC), which allow the projects to be completed in a shorter time frame than would be possible by the traditional Design-Bid-Build form of contracts.

The description of work included in each JOC contract is as follows:

- JOC 25 includes the construction of the Headworks enclosure and temporary GAC units.
- JOC 26 includes the construction of covers for Primary Clarifiers No. 9 & 10, Splitter Structure 7 and temporary GAC unit.
- JOC 27 includes the construction of covers for Primary Clarifiers No. 5 & 6, Splitter Structure 7, Yard Structure 1 and temporary GAC unit.
- JOC 28 includes the construction of covers for Primary Clarifiers No. 7 & 8, Splitter Structure 2 and temporary GAC unit.
- JOC 29 includes the construction of Instrumentation and Electrical upgrades for JOC Contracts 25, 26, 27 & 28.

The individual costs for each of the JOC packages are shown in **Table 9-2** below.

Table 9-2
Costs for JOC Packages

JOC Package	Cost$
JOC –25 – Headworks Enclosure	$971,840
JOC 26 – Primary Clarifiers 9 & 10	$997,995
JOC 27 – Primary Clarifiers 5 & 6	$994,773
JOC 28– Primary Clarifiers 7 & 8	$978,256
JOC 29 – Instrumentation and Electrical	$539,661

After Cultural Resources of Pima County has resolved issues regarding recovery or preservation of the archeological artifacts and permits construction of biofilters on the proposed site, a separate construction contract will construct the modifications to the biotowers, ductwork, biofilters, and make connections of the facilities provided under JOC Contracts 25, 26, 27 & 27 to the biofilters. The estimated construction cost for this contract is $5,412,000.

The improvements to the existing single stage packed bed scrubbers at the Sludge Thickening tanks was carried out by Roger Road WWTP personnel. Costs associated with this odor improvement were covered by budgeted operations and maintenance funds.

9.2 Odor Control Proposal for the PCWMD Regional Optimization Master Plan

In PCWMD Regional Optimization Master Plan, the existing metropolitan treatment plants located at Ina Road and Roger Road are to be upgraded and expanded to deal with the projected increase in wastewater flows from the region in the future as well as more stringent regulatory effluent limits. To accomplish the plan goal of meeting the region's wastewater needs for the next 30 years, it is proposed to increase the capacity of the Ina Road Water Pollution Control Facility (WPCF) to a total of 50 million gallons per day (MGD), while the existing Roger Road WWTP will be replaced by a new Water Reclamation Campus (WRC) with a capacity of 32 MGD.

The new WRC site will have odor containment and treatment facilities incorporated into the design of the facility which will eliminate odor emissions from the facility.

The Ina Road WPCF has some existing odor control facilities in operation. During the plan, short term improvements were made to the existing odor control facilities. These improvements have eliminated nuisance odor emissions from the existing Ina Road WPCF. The ROMP proposed expansion to the Ina Road WPCF will have odor control treatment facilities incorporated into the plant which will continue the practice of effectively containing and treating the odors generated in this facility.

9.2.1 Odor Control for the New Water Reclamation Campus (WRC)

The PCWMD Regional Optimization Master Plan (ROMP) recommends that the existing Roger Road WWTP be decommissioned and replaced with a new WRC with a capacity of 32 MGD to be operational by the year 2015. This new WRC will incorporate complete odor control facilities to contain and treat the odors generated at the facility. These odor control facilities are to comply with the State of Arizona Administrative Code, Title 18, Chapter 9. Under this code any treatment facility with a capacity greater than 1 MGD, must incorporate full odor control and aesthetic provisions, in addition to having a minimum of 350' set back from the treatment facility to any adjacent property boundary.

To fulfill the requirements of this regulatory requirement, several provisions to eliminate odors will need to be incorporated into the new WRC at various stages of the treatment process, where odors are encountered.

For future plant expansions and configurations, the raw wastewater influent total sulfide concentration was used in the BASTE model to predict the estimated hydrogen sulfide emissions from the various unit processes at each plant. These model estimates (for the year 2030 plant configurations) are used in conjunction with field measured emissions of other compounds from existing unit processes to form the basis for selection and evaluation of future odor control equipment.

Areas which are predicted to require odor control containment and treatment facilities are:

- Headworks and Screenings Area
- Aeration Tanks
- Sludge Thickening and Handling Facilities

9.2.2 Headworks and Screenings Area

The Headworks area is the location where the raw wastewater effluent enters the treatment plant and undergoes preliminary processes before entering the Treatment phase of the facility.

This headworks area contains an influent pump station to elevate the influent sewage to permit gravity flow throughout the remainder of the facility. The Headworks will also include and a screening facility to remove any material or debris suspended in the wastewater as it enters the plant. The Headworks area will also include a grit removal system that will remove grit from the wastewater. As the Headworks area is the initial stage in the treatment process it has a high concentration of odors present that need to be contained and treated. To accomplish this requirement the headworks area will need to be completely enclosed and odors collected and treated before being released into the atmosphere.

9.2.3 Aeration Tanks

This portion of the treatment process can generate odors in high concentrations due to the amount of air passing through the wastewater and the biological activity in the treatment process. For this reason the Aeration Tanks will need to be completely enclosed and the odorous gases generated at the basins will

then be vented to a suitable odor treatment unit for removal of the odors before being released into the atmosphere.

9.2.4 Sludge Thickening Facilities

The Sludge Thickening Facilities and Sludge Transfer Station are potential sources of odors at the treatment plant. These areas are where the dilute sludge from the treatment process are thickened and then transferred via the sludge transfer station for further processing at the Ina Road WPCF. This sludge thickening facility and transfer station will need to be entirely enclosed to contain the high concentrations of odors generated by the process, and these odors treated to an acceptable level before discharge into the atmosphere.

9.2.5 Costs Associated with Odor Improvements at the New WRC

Planning level costs associated with the provision of odor control for the various areas listed above are based on engineering experience on previous projects of similar scope and on established costs for the various materials and odor control systems that would be required to required level of odor control. Costs for the odor control facilities are divided into two categories. First is the cost of the odor control treatment of the air to remove the odorous compounds, and second is the estimated cost of enclosure structures needed to contain the odors generated at a particular odor source.

Costs estimated for the odor control treatment (conveyance and treatment system) is $50 per Cubic Feet / Minute (CFM) of airflow from the area where odors are generated. Costs for enclosure structures are based on estimates for costs developed for previous projects which have had similar odor control designs. Costs for the enclosures vary depending on the type of structure, and are :

- Headworks enclosure, $200 /sq. ft of enclosure
- Aeration Tanks, $75 / sq. ft of enclosure
- Sludge Thickening Facilities, $200 /sq. ft of enclosure

Based on this estimate the costs associated for each of the areas requiring odor control is shown in **Table 9-3**.

Table 9-3
Costs for the New WRC Odor Control

Odor Source	Odor Control Cost $	Enclosure Cost $	Total Cost $
Headworks and Screenings	$900,000	$900,000	$1,800,000
Aeration Tanks	$1,100,000	$7,500,000	$8,600,000
Sludge Thickening Facilities	$300,000	$300,000	$600,000
Totals	**$2,300,000**	**$8,700,000**	**$11,000,000**

These costs reflect the overall expected costs associated with providing suitable odor control facilities at the new WRC. These costs provide a planning level representation of the costs that would be associated with utilizing any of the odor control technologies recommended for further consideration. A final design

evaluation of each of the recommended odor control technologies will need to be carried out in conjunction with the final design of the new WRC to determine the appropriate odor control technology for each unit process area.

9.2.6 Odor Control for Proposed Expansion to Ina Road Water Pollution Control Facility

The PCWMD Regional Optimization Master Plan (ROMP) recommends that the Existing Ina Road WPCF be expanded from its current capacity of 37.5 million gallons per day (MGD) to a total capacity of 50 MGD by the year 2014. This expanded Ina Road WPCF will incorporate complete odor control facilities to contain and treat the odors generated at the facility. These odor control facilities are to comply with the State of Arizona Administrative Code, Title 18, Chapter 9. Under this code any treatment facility with a capacity greater than 1 MGD, must incorporate full odor control and aesthetic provisions, in addition to having a minimum of 350' set back from the treatment facility any adjacent property boundary.

Initial Odor Control Study

An odor study was carried out at the Ina Road WPCF and on the basis of the results, various improvements to the existing odor control facilities at the Ina Road WPCF were carried out by plant staff. Costs associated with those odor improvement were covered by budgeted operations and maintenance funds.

Current Odor Control Facilities at the Ina Road WPCF

Ina Road WPCF currently has odor control facilities in operation at significant odor generation locations throughout the plant. The odor generation locations at the Ina Road WPCF that currently have existing odor control facilities are:

- Headworks (influent pumps, screenings and grit removal facilities)
- Primary Clarifiers
- Aeration Tanks
- Centrifuge Building
- Sludge Thickening Facilities

Existing odor control facilities meet the standards required by the State of Arizona Administrative Code, Title 18, Chapter 9. Under the Near Term Odor Control Plan, plant staff has made several improvements to the existing odor control facilities to increase the efficiency of the odor control units, and reduce odor emissions from the plant.

The various odor control facilities for each of these odor sources, the technology applied and its viability throughout the long term planning, period are shown in **Table 9-4** below.

Table 9-4
Existing Odor Control Facilities at the Ina Road WPCF

Odor Source	Odor Control Provided Y/N	Odor Control Technology Employed	Viable for Planning Period Y/N
Headworks	Y	Packed Tower Scrubbers followed by GAC(1)	Y
Primary Clarifiers	Y	Packed Tower Scrubbers	Y(2)
Aeration Basins	Y	Packed Tower Scrubbers	Y
Centrifuge Building	Y	GAC	N
Sludge Thickening Facilities	Y	Packed Tower Scrubbers	Y
Emergency Overflow Basins	Y	Chemical Spray Application(3)	N

(1) At the time of this planning effort, only the GAC units are in service and are providing adequate odor control without the use of the Packed Tower Scrubbers
(2) The Packed Tower Scrubber associated with the existing HPO Plant Primary Clarifiers is at the end of its useful life and it is recommended to be replaced under the long term plan.
(3) At the Emergency Overflow Basins, PCWMD has a temporary practice of storing/dewatering screenings, grit, and debris removed from conveyance system sewers. For the duration of this temporary operation, PCWMD applies a sodium hypochlorite (NaOCl) spray to hold down odors emanating from this area.

Several of these areas at the plant currently give rise for concern regarding odor emissions and these will be addressed under the PCWMD System Wide Odor Control Plan.

Odor Control Issues at the Ina Road WPCF

Currently at the Ina Road WPCF the areas that present the largest problem for odor control are as follows:

- Debris Piles located in the Emergency Overflow Basins.
- Centrifuge Building

Debris Piles in Emergency Overflow Basins

Currently at the Ina Road WPCF, PCWMD has a temporary practice of storing/dewatering screenings, grit, and debris removed from conveyance system sewers in the emergency overflow basins. This area is a major source of odors at the plant due to the contents of the material deposited and the exposure of the debris to the atmosphere where the odorous gases are free to escape. Due to the high concentrations of

odors at this location odor control is a priority and it is proposed to deal with it in both the short term and long term.

The short term solution to reduce the odors generated at this location is to use a method of chemical stabilization. This is accomplished by spraying a chemical such as sodium hypochlorite onto the debris piles to reduce the odors generated at this location.

A permanent solution to the problem of odors at this location if the emergency overflow basin is required to be kept in use for the storing/dewatering of screenings, grit, and debris removed from conveyance system sewers is to enclose the area where the debris is placed with a structure that will be substantially airtight and treat the odorous air generated with a suitable odor control treatment system.

Centrifuge Building

The centrifuge building located to the West of the treatment plant is a substantial source of odors at the Ina Road WPCF. Currently this structure has an odor control system in operation to deal with the odors generated from the processes ongoing in the structure. The existing Granular Activated Carbon (GAC) units are treating odors from Sludge holding tanks in addition to air from the centrifuge building, which are major sources of H_2S and Ammonia. As a result of the high concentrations of H_2S and Ammonia in the odors generated at these locations, the current GAC odor control units in use at the Centrifuge Building are not a suitable method for dealing with these odors. The high levels of H_2S cause the carbon to be used up at too frequent intervals to be economical and the carbon does not remove ammonia. It is recommended that these GAC units be replaced with a system of Packed Bed Scrubbers or a similar system that has capacity to treat both the high levels of H_2S and the ammonia loadings in the air from this location.

One odor control measure which has been implemented by staff in this building is the installation of gravity dampers on the roof vents which will allow air to enter the sludge storage tanks but not to exit thereby allowing the air in the sludge storage tanks to be contained and controlled effectively.

Costs Associated with Odor Improvements at Ina Road WPCF

Planning level costs associated with the provision of odor control for the various areas listed above are based on engineering experience on previous projects of similar scope and on established costs for the various materials and odor control systems that would be required to required level of odor control. The costs for the odor control facilities are divided into two categories. First is the cost of the odor control treatment of the air to remove the odorous compounds, and second are the estimated cost of enclosure structures needed to contain the odors generated at a particular odor source.

The existing odor control technology serving the high purity oxygen (HPO) primary clarifiers needs to be upgraded to modern standards and practices. The established costs for system replacement is $500,000.

Costs estimated for the odor control treatment (conveyance and treatment system) is $50 per Cubic Feet / Minute (CFM) of airflow from the area where odors are generated. Costs for enclosure structures are based on estimates for costs developed for previous projects which have had similar odor control designs. Costs for enclosures vary depending on the type of structure, and are:

- Overflow Basins enclosure, $200 /Sq. ft of enclosure

Based on required odor control systems and equipment, estimate costs associated for each of the areas is shown in **Table 9-5**.

Table 9-5
Costs for Odor Control Improvements at Ina Road WPCF

Odor Source	Odor Control Cost $	Enclosure Cost $	Total Cost $
Primary Clarifiers @ HPO Plant	$500,000	$0	$500,000
Centrifuge Building	$500,000	$0	$500,000
Overflow Basins	$500,000	$1,000,000	$1,500,000
Totals	**$1,500,000**	**$1,000,000**	**$2,500,000**

Proposed New Facilities Recommended in the PCWMD Regional Optimization Master Plan

Under the PCWMD ROMP the current Ina Road WPCF is to be expanded to a capacity of 50 MGD. This expansion will require the construction of new Primary Clarifiers, Aeration Tanks, Secondary Clarifiers, Sludge Thickening Facilities, an expansion to the Centrifuge Facilities and Sludge Storage facilities in addition to several other structures needed to support this additional capacity.

All these new structures will have to comply with the State of Arizona Administrative Code, Title 18, Chapter 9,. Under this code any treatment facility with a capacity greater than 1 MGD, must incorporate full odor control and aesthetic provisions, in addition to having a minimum of 350’ set back from the treatment facility any adjacent property boundary.

Of the new structures associated with the expansion of the Ina Road WPCF, several will need odor control facilities to deal with odors generated during the treatment process, and these structures are:

- New Primary Clarifiers
- New Aeration Tanks
- New Sludge Thickening Facilities
- Expansion to the Centrifuge Building and Sludge Storage Facilities

New Primary Clarifiers

The proposed new Primary Clarifiers at the Ina road WPCF will incorporate complete odor control provisions into the clarifier design. These new clarifier units will need to be completely enclosed to prevent the discharge of odors to the atmosphere before these odors can be treated. It is recommended that these clarifiers have a packed tower odor control system similar to the existing primary clarifiers associated with the BNRAS system.

New Aeration Tanks

The proposed new Aeration Tanks at the Ina Road WPCF, as is the case with the Primary Clarifiers, will be required to incorporate a full odor control system to deal with the odors generated at this stage of the treatment facility. These new Aeration Tanks will be required to be fully enclosed to prevent any odors escaping from the plant. It is recommended that these Aeration Tanks have a packed tower odor control system similar to the existing Aeration Tanks associated with the BNRAS system.

New Sludge Thickening Facilities

Under the PCWMD Regional Optimization Master Plan it is recommended that processing of all sludges produced at the new WRC, and at Ina Road WPCF be carried out at the Ina Road facility. Due to the high concentration of sludge processing facilities at Ina Road WPCF the potential for odor generation is significant and therefore odor control provisions will need to be incorporated into the design of the thickening facilities. This odor control design will include complete enclosure of the sludge thickening facilities in addition to the odor control equipment required to deal with the odors generated at this location.

Expansion to the Centrifuge Building and Sludge Storage Facilities

Due to the expansion of the existing Ina Road WPCF, the current Centrifuge Building and Sludge Storage Facilities will need to be expanded to deal with the additional sludge from the Ina Road WPCF and the new WRC. Due to the high concentrations of H_2S and ammonia in the odors generated at these locations the recommended method of odor control will be either multi-stage chemical scrubbers or bio-tower scrubbers.

Costs Associated with Odor Improvements at the Ina Road WPCF

It is anticipated that the costs associated with the improvements of the odor control facilities at the existing plant and providing complete odor control facilities for the proposed expansion to the Ina Road WPCF will be similar to the costs associated with the odor control for the proposed new WRC based on the air flows to be treated and the enclosure costs for the structures.

Costs estimated for the odor control treatment (conveyance and treatment system) is $50 per Cubic Feet / Minute (CFM) of airflow from the area where odors are generated. Costs for enclosure structures are based on estimates for costs developed for previous projects which have had similar odor control designs. Costs for enclosures vary depending on the type of structure, and are:

- Screenings, Grit and Scum Handling Building, $200 /Sq. ft of enclosure,
- Primary Clarifiers, $75/ Sq. ft of enclosure,
- Aeration Tanks, $75 / Sq. ft of enclosure.

These costs are shown in **Table 9-6.**

Table 9-6
Costs for Odor Control Improvements at Ina Road WPCF

Odor Source	Odor Control Cost $	Enclosure Cost $	Total Cost $
Primary Clarifiers	$200,000	$1,300,000	$1,500,000
Aeration Tanks	$3,000,000	$11,300,000	$14,300,000
Sludge Thickening Facilities	$1,500,000	(1)	$1,500,000
Centrifuge Building And Sludge Storage Facilities	$2,000,000	(1)	$2,000,000
Totals			**$19,300,000**

(1) Enclosure cost included in the building cost under the ROMP Capital Improvement Plan for these facilities

These costs reflect overall anticipated costs associated with providing suitable odor control facilities at the existing Ina Road WPCF and for the proposed expansion to the plant as recommended by the PCWMD Regional Optimization Master Plan. These costs provide a planning level representation of the costs that would be associated with utilizing any of the odor control technologies recommended for further consideration. A final design evaluation of each of the recommended odor control technologies will need to be carried out in conjunction with the final design of odor control upgrades for the existing Ina Road WPCF and for the proposed expansion to the plant as recommended by the PCWMD Regional Optimization Master Plan,

9.3 Regional Treatment Facilities

In addition to the Metropolitan Wastewater Treatment Facilities at Roger Road and Ina Road there are several smaller regional wastewater treatment facilities under the jurisdiction of PCWMD that will require Odor treatment systems to deal with odor emissions generated at these plants. When originally constructed the locations of these facilities were remote from developed areas to minimize public impact of odor emissions from these plants. However, with the continued growth of residential communities and commercial developments in the area near these plants, nuisance odor complaints from populated areas nearby these facilities have increased.

These regional facilities are listed below.

- Arivaca Junction WWTF
- Avra Valley WWTF
- Corona de Tucson WWTF
- Green Valley WWTF
- Marana WWTF
- Mt. Lemmon WWTF
- Pima County Fairgrounds WWTF
- Randolph Park WRF
- Rillito Vista WWTF

The PCWMD Regional Optimization Master Plan describes each of these facilities and plans for future requirements in detail. A brief summary of each facility with recommendations for odor control is presented below.

9.3.1 Arivaca Junction Wastewater Treatment Facility

The facility has a permitted treatment capacity of 0.1 mgd. Arivaca Junction WWTF contains a single 3.2-acre, 13-ft deep, unlined aerated facultative stabilization pond (side slope of 3:1) with two surface aspirating aerators/mixers.

Arivaca Junction WWTF expects to close once construction of the gravity sewer line between Arivaca Junction WWTF and Green Valley WWTF is completed. Wastewater flow from Arivaca Junction WWTF will be transported to Green Valley WWTF for treatment. Completion of the gravity sewer line is scheduled for 2007/2008.

Odor Control

No plans for Odor Control are contemplated. Sodium hypochlorite addition may be required on occasion to address odors that are a result of floating sludge or seasonal pond "turnover."

9.3.2 Avra Valley Wastewater Treatment Facility

Avra Valley's treatment process is a BNROD and consists of a flow equalization basin, an oxidation ditch, two secondary clarifiers, four sludge-drying beds, and four percolation basins. Sewage enters the facility through a lift station where it is discharged to a screening channel. Influent is then equalized in a 0.37 million gallon basin and flows to a 1.33 million gallon oxidation ditch (1.6 mgd permitted treatment capacity as of January 26, 2007. By the end of 2007, an additional 0.6-mgd capacity will be added.). The process is based on extended aeration, nitrification, and de-nitrification within the oxidation ditch by cycling the aeration on and off.

PCWMD Avra Valley future expansion plan recommends two concurrent expansion projects, the first is to increase current 1.6 mgd BNROD capacity to 2.2 mgd through interim improvements and the second is to have a dual oxidation ditches online and permitted to treat 4.0 mgd by 2009. Current design improvements include a new inlet gravity sewer and influent lift station, headworks modifications, two BNRODs, clarifiers, continuous backwashing deep bed filters, ultraviolet disinfection, and sludge holding equipment with an area to provide sludge treatment in the future. A study to determine optimum biosolids processing for both the existing BNROD and new BNROD for the site is currently underway. Avra Valley also plans to treat effluent to Class A+ treatment requirements prior to discharge to percolation basins and/or the Black Wash spray fields.

Odor Control

Odor control is recommended to treat the exhaust air from the influent lift station, headworks and sludge holding equipment and sludge treatment.

An allowance of $1,500,000 for odor control equipment and facilities is recommended for planning purposes.

9.3.3 Corona de Tucson Wastewater Treatment Facility

The facility has a permitted treatment capacity of 0.30 mgd. Sewage enters Corona's WWTF through a gravity interceptor, then through a Parshall flume flow-metering chamber. The sewage then flows into a series of "splitter manholes" dividing the flow between the two concrete-lined stabilization ponds of 3.3- and 3.7-acres with an average operating depth of 4-feet. Ponds can be operated in series or parallel. The treated water overflows from the stabilization ponds into the 10.2-acre evaporation pond with a 6.1-acre unlined SAT pond used as a recharge basin.

Corona de Tucson WWTF is in an area of rapid population growth and the facility has recently installed two new, 0.5 mgd permitted, closed loop reactors to be online. The existing lagoons will remain online as backup capacity. The new facility includes new headworks, Parshall flume, RAS/WAS station, polymer storage, sludge holding tanks, a sludge pump, and a mechanical/electrical/ administration complex. Effluent will be disposed of via the soil aquifer treatment (SAT) basins regulated by the facility's Aquifer Protection Permit (APP). Biosolids are pumped to the facility's sludge holding tanks before being hauled and discharged into the South East Interceptor of the Roger Road WWTP service area for final processing and disposal at the Ina Road WPCF biosolids processing facility

Odor Control

Odor control is recommended to treat the exhaust air from the new headworks, Parshall flume, RAS/WAS station, polymer storage and sludge holding tanks.

An allowance of $1,500,000 for odor control equipment and facilities is recommended for planning purposes.

9.3.4 Green Valley Wastewater Treatment Facility

Green Valley WWTF is split into two processes. The first is a 2.1 mgd Class B effluent producing process. It consists of two trains of primary and secondary aerated lagoons followed by two effluent maturation/settling lagoons and four percolation basins. The second process is a 2.0 mgd BNROD Class A+ effluent producing process. The BNROD process operates on an extended aeration, nitrification, and denitrification process within the oxidation ditch by cycling the aeration on and off. Flows greater than BNROD's capacity are directed to the aerated lagoons and polishing ponds

Green Valley WWTF is the only regional facility with biosolids treatment and disposal capacity. The sludge is thickened, digested, and dried (Class A biosolids) before being utilized as a mine tailing reclamation product at the ASARCO Mines.

Green Valley WWTF will be treating flow from the Arivaca Junction WWTF's treatment area once the gravity sewer main is completed (completion is expected in 2008).

Odor Control

An allowance of $1,500,000 for odor control equipment and facilities is recommended for planning purposes

9.3.5 Marana Wastewater Treatment Facility

Marana WWTF started treatment via two facultative/evaporation ponds (FEPs) in 1986. Accelerated development of the Marana area began in 2000 and continues. Additional treatment capacity was provided. The western FEP was closed and the eastern FEP has been converted into an emergency influent storage basin and is lined with soil cement.

The current wastewater treatment system includes a headworks and a Parshall flume with a maximum capacity of 1.1 mgd. To provide wastewater treatment for the accelerated development, three 0.05 mgd biological nutrient removal package plants began operation at the end of 2001 and a fourth was added in 2005 providing a treatment capacity of 0.2 mgd. The four package plants will be supplemented with a 0.5 mgd "Biolac" activated sludge treatment system, as an interim treatment process. The Biolac will be used as a supplemental treatment capacity until the new 1.5 mgd facility is constructed.

Effluent discharges into a high-density polyethylene (HDPE) lined effluent storage pond and disinfected with sodium hypochlorite. Odorous air from the treatment of process is collected and treated in an in-ground biofilter located onsite.

Design of a new 1.5 mgd BNROD facility is completed, but construction is not currently scheduled. Once BNROD construction is complete, the existing package plants should be evaluated to determine their remaining life and application for future projects.

Odor Control

Expansion of the existing odor control facility or new odor control facilities are recommended for future plant expansions.

An allowance of $1,000,000 for odor control equipment and facilities is recommended for planning purposes.

9.3.6 Mount Lemmon Wastewater Treatment Facility

The facility treats an average of 12,500 gpd and treated an average daily influent flow of 1,900 gpd in 2006 (average flow is just over 15% of capacity).

The Mt. Lemmon WWTF consists of a closed loop reactor followed by chlorination-dechlorination units. The facility is the only treatment plant in Pima County experiencing freezing temperatures and is entirely enclosed.

PCWMD, the County Department of Environmental Quality and the United States Forest Service (USFS) are working together on the Mt. Lemmon Service Area Watershed and Wastewater Management Plan,

and the study is currently underway. This plan hopes to identify the conditions and circumstances existing in and around the Mt. Lemmon community, and the significant issues and challenges involved in planning wastewater systems. The study is anticipated to be completed in 2008. Due to its location and limited service, Mt. Lemmon WWTF will most likely continue to be a stand alone facility in the future.

Odor Control

Odor control is recommended to treat the exhaust air from future plant expansions.

An allowance of $100,000 for odor control equipment and facilities is recommended for planning purposes.

9.3.7 Pima County Fairgrounds

The Fairgrounds has measurable flow in the month of April when the Pima County Fair is held. The facility has a permitted treatment capacity of 0.035 mgd. The Fairgrounds facility consists of two primary stabilization ponds and an overflow pond. Flow is split or directed into a stabilization pond via a manual splitter device.

Flow originating from the Pima County Fairgrounds can be transferred once a conveyance structure connecting the Fairgrounds to the South East Interceptor, or other location is completed. Such a conveyance structure has not been included in any Capital Improvement Plan budget to date but is under long term consideration. The study currently proposes to determine the feasibility of transferring flows to Corona de Tucson or the South East Interceptor-Metro Facilities for treatment.

Odor Control

No plans for Odor Control are recommended.

9.3.8 Randolph Park Water Reclamation Facility

Randolph Park WRF is a subregional facility to Roger Road WWTP. The facility treats 3 mgd using membrane technology. Solids from this facility are returned to the conveyance system for transport to Roger Road WWTP for processing and treatment The treated effluent of this facility is discharged to the Tucson Water Water Reclamation Distribution System. Complete odor control and treatment systems have been provided for Randolph Park WRF.

Odor Control

No plans for Odor Control are recommended.

9.3.9 Rillito Vista Wastewater Treatment Facility

The facility has a permitted treatment capacity of 0.02 mgd and treats an average daily influent flow of 0.012 mgd in 2006 (60% capacity). The treatment method for this area consists of two

stabilization/evaporation/percolation ponds. One pond is in use while the adjacent pond is dried and scraped before returning to service.

Rillito Vista WWTF is operated by PCWMD on land leased from the Arizona Portland Cement Company and treatment should be transferred to a treatment location on County owned property as soon as a conveyance structure connecting the service area to a facility for treatment is completed (Marana WWTF or Ina Road WPCF). Continued operation on leased land reduces the County's control in providing reliable treatment for its customers.

Odor Control

No plans for Odor Control are recommended.

9.4 Operation and Maintenance Costs

Conveyance System

Long term odor control recommendations include hypochlorite stations at two additional locations, and one additional vapor-phase treatment unit, if needed. In one location, upper Southwest Interceptor (SWI), no net operating cost increase is expected, because the estimated required chemical dose is comparable to that of the Mission CDU, which upper SWI is intended to replace. **Table 9-7** shows estimated operating costs for the additional equipment.

Table 9-7
Operation costs for long term odor control recommendations

Location	Annual Operation Cost
Upper Pantano	$9,170
Upper SWI	$0
Upper NWO Vapor Phase	$13,860

Present Worth Comparison

Table 9-8 shows the present worth cost estimate for the long term odor control recommendations assuming an 8% annual interest rate over 20 years. The total estimated capital expenditure associated with these conveyance system improvements is on the order of $430,000. This is due to fact that PCWMD already has two CDUs that can be utilized at the Upper Pantano and Upper SWI locations. Capital costs for these two units primarily consists of site preparation and installation. Increases to the existing annual operating cost of the conveyance system odor control program is estimated to be on the order of $23,000. The Upper SWI CDU is not predicted to result in an increase in current chemical costs

due to the decommissioning of the Mission CDU and the use of dose rate at the Upper SWI CDU similar to currently being used at the Mission CDU.

Table 9-8
Present Worth Analysis of Recommended Long Term Odor Control Measures.

Location	Installed Cost	Additional Annual Operating Cost	Present Worth (20yr, 8%)
Upper Pantano	$230,000	$9,170	$310,000
Upper SWI	$115,000	$0	$115,000
Upper NWO Vapor Phase	$200,000	$13,860	$336,000
Total	$545,000	$23,030	$751,000

Treatment Plants

The Operation and Maintenance Costs (O & M) associated with the odor control facilities are an important part of the process of selecting a suitable odor control system. The O & M costs are based on a number of factors such as manpower requirements, chemical usage, power requirements, equipment maintenance and media (carbon, biofilter media, etc.) replacement costs.

Odor Improvements to the Existing Roger Road WWTP

As described in Chapter 8, design for the existing Roger Road WWTP Near Term Odor Control consisted of a series of odor control biofilters that will treat the odorous air from the major sources of odors at the plant.

The O & M costs associated with that design are minimal as there is no use of chemicals and there is no activated carbon to be replaced. The only item that will need to be replaced for this design is the water to keep the moisture content of the biofilters at a level to sustain the biological activity in the biofilter media which eliminates the odorous compounds in the air. The major cost associated with that design is the electrical costs required for the operation of the fans to deliver the odorous air from its source to the odor control biofilter. The maintenance costs for this system are considered minimal due to the simple nature of the system, and maintenance should only be required on the fan units. The electrical costs required for the operation of the fans are estimated to be $213,000 per year based on the operation of five 75HP fans. Maintenance costs for the fans are estimated to be $3,000 per year. Therefore, the total estimated annual O and M costs for the Near Term Odor Control at the Roger Road WWTP are estimated to be $216,000.

Present Worth Costs

Based on further odor control evaluations of the Ina Road WCPF and both the existing Roger Road WWTP and the new Water Reclamation Campus, the alternative of dispersion of the untreated odors to the atmosphere is not likely to be considered a viable option.

Any of the remaining odor control technologies recommended could potentially be employed for the future facilities.

As this study is at the Master Plan level it is not possible to compile a detailed Present Worth evaluation for each facility and each alternative odor control technology which may ultimately be implemented under the treatment plant improvements recommended in the Regional Optimization Master Plan.

For planning and Construction Project estimates, the total Capital Cost, Annual Operation and Maintenance Costs, and Present Worth analysis are intended to cover the estimated costs associated with any of the processes which may be used at either of the new facilities.

The operation and maintenance costs for this project are based on estimates of what type of system of odor control is anticipated for the project. As this project is not designed yet the operation and maintenance costs are based on a percentage of the capital costs, and are as follows;

- Power costs are calculated at a rate of 5% of the estimated capital costs
- Maintenance costs are calculated at a rate of 3% of the estimated capital costs
- Chemical/Media (GAC or other Media) annual costs are based at a rate of 5% of the estimated capital costs.

Operation and Maintenance Costs for the New WRC

The estimated O & M Costs for the proposed new WRC are shown in **Table 9-9**

Table 9-9
O & M Costs for the Proposed New Water Reclamation Campus

Odor Source	Total Capital Cost	Annual O&M Cost	Present Worth of Annual Costs	Total Present Worth
Headworks & Screenings	$1,800,000	$234,000	$2,300,000	$4,100,000
Aeration Tanks	$8,600,000	$1,118,000	$11,000,000	$19,600,000
Sludge Facilities	$600,000	$78,000	$800,000	$1,400,000
TOTALS	$11,000,000	$1,430,000	$14,100,000	$25,100,000

Operation and Maintenance Costs for Ina Road WPCF

The estimated O & M Costs for the proposed expansion to the Ina Road W.P.C.F. are shown in **Table 9-10.**

Table 9-10
O & M Costs for Proposed Ina Road Water Pollution Control Facility

Odor Source	Total Capital Cost	Annual O&M Cost	Present Worth of Annual Costs	Total Present Worth
Overflow Basins	$1,500,000	$200,000	$2,000,000	$3,500,000
Primary Clarifiers	$1,500,000	$200,000	$2,000,000	$3,500,000
Aeration Tanks	$14,300,000	1,900,000	$18,700,000	$33,000,000
Sludge Thickening Facilities	$1,500,000	$200,000	$2,000,000	$3,500,000
Centrifuge Building And Sludge Storage Facilities	$2,000,000	$260,000	$2,600,000	$4,600,000
TOTALS	$20,800,000	$2,760,000	$27,300,000	$48,100,000

9.5 CIP Elements

A summary of the Long Term System Wide Odor Control Plan capital improvements plan (CIP) elements is presented in this section.

Conveyance System

The Long Term System Wide Odor Control Plan CIP Elements for the Conveyance System is presented in **Table 9-11.**

Table 9-11
Conveyance System CIP Elements

Location	Installed Cost
Upper Pantano	$230,000
Upper SWI	$230,000
Upper NWO Vapor Phase	$200,000
Total	$660,000

Treatment Plants

New Water Reclamation Campus (WRC)

The Long Term System Wide Odor Control Plan CIP Elements for the new WRC is presented in **Table 9-12.**

Table 9-12
New WRC CIP Elements

Odor Source	Total Capital Cost
Headworks & Screenings	$1,800,000
Aeration Tanks	$8,600,000
Sludge Facilities	$600,000
TOTALS	$11,000,000

Capital costs of these odor control elements are included in the ROMP CIP Program for the new WRC.

Ina Road WPCF

The Long Term System Wide Odor Control Plan CIP Elements for the Ina Road WPCF is presented in **Table 9-13**

Table 9-13
Ina Road WPCF CIP Elements

Odor Source	Total Capital Cost
Overflow Basins	$1,500,000
Primary Clarifiers	$1,500,000
Aeration Tanks	$14,300,000
Sludge Thickening Facilities	$1,500,000
Centrifuge Building And Sludge Storage Facilities	$2,000,000
Totals	$20,800,000

Capital costs of these odor control elements are included in the ROMP CIP Program for the Ina Road WPCF.

Regional Treatment Facilities

The long term System Wide Odor Control Plan CIP Elements for the Regional Treatment Facilities are presented in **Table 9-14.**

Table 9-14
CIP Elements for Regional Treatment Facilities

Regional WWTF	Total Capital Allowance
Arivaca Junction WWTF	$0
Avra Valley WWTF	$1,500,000
Corona de Tucson WWTF	$1,500,000
Green Valley WWTF	$1,500,000
Marana WWTF	$1,000,000
Mt. Lemmon WWTF	$100,000
Pima County Fairgrounds WWTF	$0
Rillito Vista WWTF	$0
Totals	$5,600,000

9.6 Recommended Implementation Plan

Short and Near Term Plan for Odor Reduction

The Short and Near Term Action Plan consists of Category 1 Actions, those which can readily be implemented by PCWMD staff with minimal capital expenditure, and Category 2 Actions, those which require significant engineering and construction, or large capital expenditures, or both.

Status of the short and near term action items is presented in **Table 9-15**. As shown in the table, all short and near term action items have been completed except for Item No. 17, Roger Road Headworks – Biotower Reverse Air Flow and Scrubber. This action item is scheduled for completion by the end of 2007, or early 2008.

Table 9-15
Status of Short and Near Term Action Items

Action Number	Category	Action Name	Completion Date
1	1	Roger Road Headworks – NaOCl Spray	11/17/2006 DONE
2	1	Roger Road Gravity Thickeners – NaOH to Scrubbers	5/01/2007 DONE
3	1	Roger Road – Raise Stack	3/15/2007 DONE
5	1	Ina Road – Overflow Basin – NaOCl Spray	11/22/2006 DONE
6	1	Ina Road BNRAS Primary Clarifier Scrubber – Chemical Optimization	2/23/2007 DONE
7	1	Ina Road Centrifuge Building – Replace Carbon	11/17/2006 DONE
8	1	Anita CDU on SCC	12/19/2006 DONE
9	1	Anita CDU on SCE	12/19/2006 DONE
10	1	18th St CDU	12/14/2006 DONE
4	2	Roger Road Septage Dumping – Relocation	4/16/2007 DONE
11	2	Prince CDU	NOT REQUIRED
12	2	Wetmore CDU	4/13/2007 DONE
13	2	Roger Road Primary Clarifiers Weir Trough Covers	7/1-29/2007 DONE

Action Number	Category	Action Name	Completion Date
14	2	Roger Road Yard Structure #1	7/1-29/2007 DONE
15	2	Roger Road Headworks – Screenings Washer and Compactor	12/29/2006 DONE
16	2	Roger Road Headworks – Enclosure & Scrubber	7/2/2007 DONE
17	2	Roger Road Headworks – Biotower Reverse Air Flow and Scrubber	12/31/2007
18	2	Ina Road – Centrifuge Building Roof Dampers	12/29/2006 DONE

Recommendations for the Long Term System Wide Odor Control Plan.

Long Term System Wide Odor Control Plan recommendations are presented above.

Implementation Schedule for Recommended Short and Near Term / Long Term System Wide Odor Control Plan

The odor control improvements recommended in the Short and Near Term Action Plan were those which identified the most severe sources of odor emissions and which could be readily implemented. The schedule for completing those actions was originally set for July 2007. As shown in the above table**,** all action items were completed by July 29, 2007 except for Item No. 17, Roger Road Headworks – Biotower Reverse Air Flow and Scrubber. This item was delayed due to Cultural Resources of Pima County discovery of the presence of archeological artifacts on the site of the new Biofilter. Issues relating to construction on this site have been resolved and construction of this project is now scheduled for completion by the end of 2007.

Long Term System Wide Odor Control Plan recommendations for the wastewater treatment plants are currently scheduled to be implemented along with other treatment plant upgrades and improvements recommended in the Regional Optimization Master Plan.

Long Term System Wide Odor Control Plan recommendations for the Conveyance System should be implemented as soon as CIP budgets are available to fund these projects.

9.7 Expected Level of Odor Reduction

Conveyance System

The short and near term action items for the Conveyance System are expected to mitigate nuisance odor emission under normal operation in the vicinity of these improvements.

The long term system wide odor control improvements for the Conveyance System are expected to mitigate nuisance odor emission under normal operation. However, as the conveyance system changes over time due to population growth and resultant changes in the flow and wastewater characteristics in the system, additional odor control measures or adjustments to those in place will need to be implemented. Odor control on the Conveyance System requires on going monitoring to assure proper effectiveness of existing odor control measures and that additional odor control is applied when necessary.

Existing Roger Road WWTP

The near term odor control measures, when fully implemented are expected to significantly reduce odor emissions from the existing Roger Road WWTP. However, because the existing Roger Road WWTP is planned to be decommissioned and replaced with a new WRC by 2015, economic considerations dictated that these near term odor control measures would not be designed to capture and treat all odor emissions.

Proposed New WRC

The proposed new WRC will include complete control for all sources of odor emissions and is expected to mitigate nuisance odor emissions under normal operation.

Ina Road WPCF

The short and near term action items for the Ina Road WPCF are expected to mitigate nuisance odor emission from the existing plant under normal operation.

The proposed improvements and expansion at the Ina Road WPCF will include complete control for all sources of odor emissions and is expected to mitigate nuisance odor emissions under normal operation.

CHAPTER 10

Control Strategy/Plan – CIP and Facility Plan Coordination

Chapter 10 Odor Control Strategy/Plan –CIP and Facility Plan Coordination

The project goal for PCWMD's System Wide Odor Control Plan is to develop a system wide plan, which when fully implemented will mitigate nuisance odor emissions from PCWMD wastewater conveyance systems and wastewater treatment plants. Meeting this goal requires the development of an overall system wide odor control strategy, identify the plan components and to coordinate recommended odor control CIP with the Regional Optimization Master Plan (ROMP).

10.1 Plan Strategy

The overall strategy for the PCWMD System Wide Odor Control Plan to develop and provide guidance for implementation of both short term and long term odor control for wastewater conveyance and treatment facilities.

The short term odor control improvements were recommended in the short and near term action plan, that is, those which were identified in the first 90 days of this planning effort. These identified the most severe sources of odor emissions that could be readily implemented with available capital resources. The schedule for completing those actions was originally set for July 2007.

The long term odor control improvements were those which could not be reasonably implemented in a short time frame due to long design/construction time frames, requirement for CIP budgeting or those that will not be required until some future wastewater collection or treatment facilities are constructed.

10.2 Conveyance System Odor Control Strategy

For the conveyance system the strategy includes short, near and long-term actions. These are described in the paragraphs below.

10.2.1 Short Term

The conveyance system odor control short term plan consists of Category 1 Actions, those which can readily be implemented by PCWMD staff with minimal capital expenditure, and Category 2 Actions, those which require significant engineering and construction, or large capital expenditures, or both. The recommended Category 1 and Category 2 Actions are summarized below.

Category 1 Actions

- **Anita CDU SCC Feed**. Increase dose rate and step feed chemicals to more effectively match diurnal demand. The step feed process could be achieved by having two chemical metering pumps available. The first pump would be delivering chemical at a constant rate throughout the entire day. The second pump would be activated by timer and would feed additional chemical at a selected dose rate to mitigate diurnal peaks. Actual dose rates to be used would be field-adjusted and would require additional downstream sampling to fine-tune actual rates and timing of the second pump activation and de-activation.

Consider deployment of a new CDU downstream of the Anita CDU. It is recommended to attempt dose rate adjustment and step feeding above first.

- **Anita CDU SCE Feed**. Step feed chemicals to more effectively match diurnal demand.
- **18th Street CDU**. Adjust dose rate and step-feed chemicals to more effectively match diurnal demand
- **Prince CDU**. Some or all of the Prince CDU capacity needs to be redirected to side stream(s) responsible for high loads. Additional sampling is required to better understand which interceptors are contributing sulfide loads. Alternatively, if redirecting Prince CDU feed is not possible, consideration should be given to deploying a new CDU on a to be identified side stream (This would be a category 2 item).
- **Wetmore CDU**. Additional sampling is recommended to better ascertain the cause/source of the downstream side streams raising the sulfide concentrations. During this sampling, it is recommended that the Wetmore CDU operation be monitored daily to better understand feed control of chemicals.

Category 2 Actions

- **Prince and I-10 Intersection**. Use vapor-phase treatment system utilizing a dry sorbent media (e.g., Sulfa Treat) reported to have an effective media life on the order of one year. Electrical service is required. Alternatively, consider use a packaged biofilter system if water and electrical service are available and delivery time is suitable.
- **Alameda Siphon Inlet**. Temporary vapor-phase treatment system has been devised and installed at this location. If that system proves inadequate, install a vapor-phase treatment as discussed for the Prince and I10 intersection above. This location has already been equipped with electricity.
- **Santa Cruz Siphon Inlet**. Install vapor-phase treatment as discussed for the Prince and I-10 intersection above. There may be some constructability issues at this location. It may be necessary to either enclose the vapor-phase treatment system or move it further upstream.
- **Anita CDU Feed to SCC.** Provide an additional CDU Downstream of current CDU if the Category 1 action above is not sufficient.

Short term odor control on the conveyance system has been completed.

10.2.2 Long Term

Additional sodium hypochlorite dosing is recommended for upper Southwest Interceptor (SWI) and upper Pantano interceptor. Additional sodium hypochlorite dosing of Northwest Outfall (NOW) interceptor is recommended only as a last resort. The downstream portion of NWO will have vapor phase treatment that will negatively pressurize a large segment of the interceptor. Therefore, liquid-phase chemical addition on NWO may not be needed. Additional hypochlorite dosing should be implemented in the following steps:

1. Install spare CDU to treat upper Pantano interceptor at or near Houghton Road. Start dosing 25 gal/day, monitor sulfide downstream, and adjust dose to optimize.
2. Install second spare CDU to treat upper Southwest Interceptor (SWI) at or near Valencia Road. Start dosing 240 gal/day, turn off dosing at Mission CDU, monitor sulfide downstream and adjust dose to optimize.

3. If dosing on upper SWI is capable of controlling sulfide downstream of Mission CDU, discontinue Mission CDU dosing. Mission CDU equipment would serve as a spare.
4. After start up of vapor-phase treatment on NWO (Santa Cruz siphon inlet) survey NWO to identify upstream outgassing locations. If NWO is negatively pressurized far enough upstream, additional measures will not be needed on NWO.

The Long Term System Wide Odor Control Plan CIP Elements for the conveyance system are presented in **Table 10-1.**

Table 10-1
Conveyance System CIP Elements

Location	Installed Cost
Upper Pantano	$230,000
Upper SWI	$230,000
Upper NWO Vapor Phase	$200,000
Total	$660,000

Long Term System Wide Odor Control Plan recommendations for the Conveyance System should be implemented as soon as CIP budgets are available to fund these projects.

The long term system wide odor control improvements for the Conveyance System are expected to mitigate nuisance odor emission under normal operation. However, as the conveyance system changes over time due to population growth and resultant changes in the flow and wastewater characteristics in the system, additional odor control measures or adjustments to those in place will need to be implemented. Odor control on the Conveyance System requires on going monitoring to assure proper effectiveness of existing odor control measures and that additional odor control is applied when necessary.

10.3 Treatment System Odor Control Strategy

For the Ina Road and Roger Road wastewater treatment facilities the strategy includes short, near and long-term actions. These are described in the paragraphs below

10.3.1 Short Term

The treatment system odor control short term plan consists of Category 1 Actions, those which can readily be implemented by PCWMD staff with minimal capital expenditure, and Category 2 Actions, those which require significant engineering and construction, or large capital expenditures, or both. The recommended Category 1 and Category 2 Actions are summarized below.

Category 1 Actions

- **Roger Road Headworks**. Spray conveyors and storage vehicle with sodium hypochlorite (NaOCl) solution
- **Roger Road Gravity Thickeners**. Confirm type and quantity of chemical being used is optimal. Add sodium hydroxide (NaOH) to chemical scrubber solution. Raise discharge stack for enhanced atmospheric dispersion
- **Roger Road Septage Dump Station**. Discontinue use of Dump Station. Septage haulers could dump in manhole upstream of Headworks. Confirm type and quantity of chemical being used is optimal. Add sodium hydroxide (NaOH) to chemical scrubber solution
- **Ina Road Emergency Overflow Basins**. Spray piles of debris with sodium hypochlorite (NaOCl) solution as needed
- **Ina Road BNRAS Primary Clarifiers**. Confirm type and quantity of chemical being used is optimal
- **Ina Road Centrifuge Building**. Change carbon; install gravity dampeners on vents to only allow air in, not out

Category 2 Actions

- **Roger Road Primary Clarifiers**. Install covers over effluent weir troughs; collect air and scrub exhaust air
- **Roger Road Yard Structure No. 1**. Collect air and scrub exhaust air
- **Roger Road Headworks**. Install new screenings washer compactor
- **Roger Road Headworks**. Enclose operation, collect air, and scrub exhaust air
- **Roger Road Yard Flow Splitter Structures**. Collect air and scrub exhaust air
- **Roger Road Biotowers** Reverse air flow, collect air and scrub exhaust air

Short term odor control on the treatment system has been completed except for the "Roger Road Biotowers".

10.3.2 Long Term

New Water Reclamation Campus

The Long Term System Wide Odor Control Plan CIP Elements for the new WRC is presented in **Table 10-2.**

Table 10-2
New WRC CIP Elements

Odor Source	Total Capital Cost
Headworks & Screenings	$1,800,000
Aeration Tanks	$8,600,000
Sludge Facilities	$600,000
Totals	$11,000,000

Capital cost of these odor control elements has been included in the ROMP CIP Program for the new WRC.

Ina Road WPCF

The Long Term System Wide Odor Control Plan CIP Elements for the Ina Road WPCF is presented in **Table 10-3.**

Table 10-3
Ina Road WPCF CIP Elements

Odor Source	Total Capital Cost
Overflow Basins	$1,500,000
Primary Clarifiers	$1,500,000
Aeration Tanks	$14,300,000
Sludge Thickening Facilities	$1,500,000
Centrifuge Building And Sludge Storage Facilities	$2,000,000
Totals	$20,800,000

Capital cost of these odor control elements has been included in the ROMP CIP Program for the Ina Road WPCF.

Regional Treatment Facilities

The Long Term System Wide Odor Control Plan CIP Elements for the Regional Treatment Facilities are presented in **Table 10-4.**

Table 10-4
CIP Elements for Regional Treatment Facilities

Regional WTF	Total Capital Allowance
Arivaca Junction WWTF	$0
Avra Valley WWTF	$1,500,000
Corona de Tucson WWTF	$1,500,000
Green Valley WWTF	$1,500,000

Regional WTF	Total Capital Allowance
Marana WWTF	$1,000,000
Mt. Lemmon WWTF	$100,000
Pima County Fairgrounds WWTF	$0
Totals	$5,600,000

Long Term System Wide Odor Control Plan recommendations for the Regional Treatment Facilities need to be included in the CIP budgets for related upgrades and expansions recommended in the Regional Optimization Master Plan.

10.4 Odor Control Management

An active odor control management system requires people and resources to be effective. When separately accounting for odor abatement and control within operating units of municipal wastewater utilities, budgets for odor control can range from 10 to 20 percent of total operation and maintenance (O&M) costs. These costs include staff (including operations, maintenance, planning, engineering, permitting and public relations), chemicals, energy and supplies.

In the past PCWMD has had segregated management and accounting of its odor control operations. Each of the facilities operated and controlled its own odor control systems independently of each other. The odor control system operations for Ina Road WPCF, Roger Road WTTP, Conveyance, and each of regional wastewater treatment plants along with compliance and permitting were operated more or less independently of each other. The importance of odor control was determined by the managers of each of these facilities. In the case of conveyance, its odor control actions can have beneficial or negative impacts on the wastewater treatment works. A unified approach would provide a consistent odor control approach throughout the Department, would standardized odor control systems, processes and procedures; and look for the optimal life cycle costs for odor control.

For successful odor management roles and responsibilities of all staff involved with any odor control system and key measures need to be identified, and the importance of odor control systems within the hierarchy of need within the department needs to be established. For example, odor control can have the same importance level as a major wastewater pumping stations in terms of 24 hour 7-day per week operation with the appropriate redundancy, backup and emergency procedures to keep systems in service. A successful unified management plan will address the following key areas:

- PCWMD Culture/organization/leadership
- Roles and responsibilities
- Odor control processes and system automation
- O&M and training
- Document control

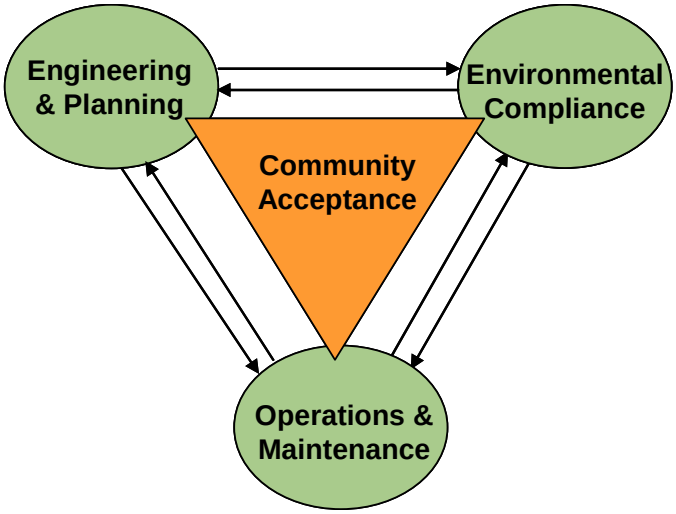
- QA/QC
- Planning and engineering
- Reporting and Permits
- Budgeting for capital equipment and O&M
- Public outreach

Without a unified odor management approach the following leadership and management issues can occur.

- Responses and corrective actions to public complaints can be inconsistent or inadequate, because of inter-departmental jurisdiction over odor system control.
- Lines of responsibility for continuous operation, maintenance and performance are unclear, because the system responsibility falls between operating group's authority.
- Budgets for odor control capital improvements and O&M can be insufficient or re-allocated to other "higher" priority needs
- Conflicts between conveyance and treatment operations can occur preventing efficient or effective control of odors
- Unilateral decisions by conveyance having negative impacts on wastewater treatment

The three basic elements of a unified Odor Management approach are illustrated below. Community acceptance is the driving force that determines the level or standard of odor control performance.

Figure 10-1
Unified Odor Management Elements



Features of a unified odor management approach include:

- Supports odor sensitivity awareness system wide within PCWMD and in the community.
- Identifies an in-charge person and resolves role and responsibility gray areas
- Implements function-based operations in three areas:
  - Odor control systems O&M

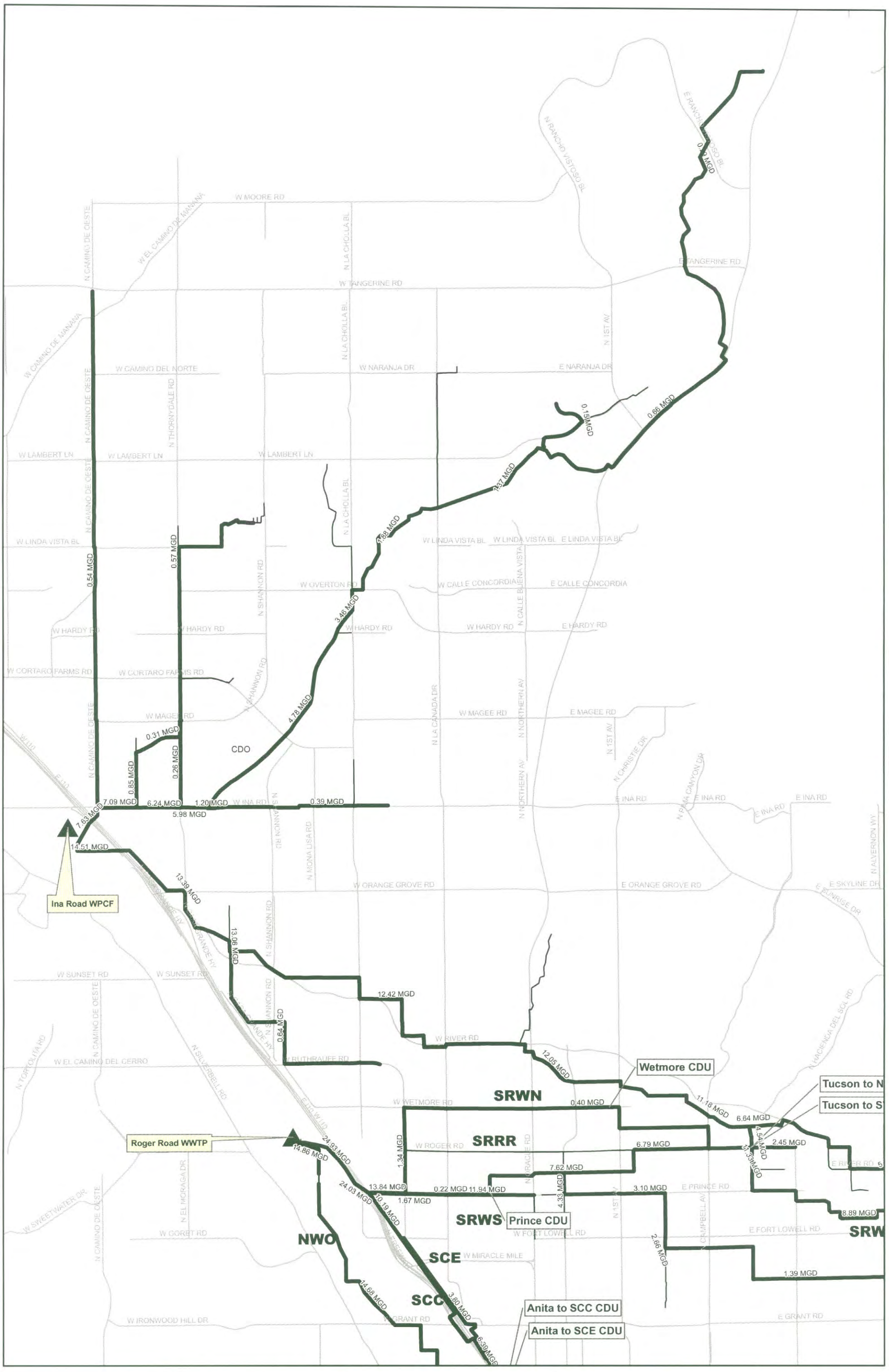
  - Compliance with standards and regulations
  - Planning for adjustments and additions as base conditions change over time (management of change)
- Tracks number and location of odor complaints.
- Operates under a continuous improvement philosophy to provide efficient and effective odor control and abatement throughout the wastewater enterprise.

The recommendation is for PCWMD to unify the odor management under a central operation with a steward identified to be responsible within the department and to the community to address all odor issues system wide. Since unified odor management will cross over department (conveyance, treatment, engineering, planning, industrial waste, permits and public relations) boundaries, a clear charter will be required to affect a unified odor management plan. A lesser option would be the formation of a committee of stakeholders formed from the various departments and facilities that have odor issues. This committee could address odor policies and goals; and recommend budgets for odor control improvements and operations. The committee could have odor control oversight responsibility for the wastewater infrastructure in the County. One of the committee members could be the chair and be the responsible person for the Department's odor system operations.

APPENDIX A
Interceptor System Maps

Figure No.	Description
2-5-A	INTERCEPTOR Model Domain and Simulated Average Dray Weather Wastewater Flow
2-5-B	INTERCEPTOR Model Domain and Simulated Average Dray Weather Wastewater Flow
2-5-C	INTERCEPTOR Model Domain and Simulated Average Dray Weather Wastewater Flow
2-5-D	INTERCEPTOR Model Domain and Simulated Average Dray Weather Wastewater Flow
2-6-A	System Wide Liquid-Phase Sulfide Concentration Results
2-6-B	System Wide Liquid-Phase Sulfide Concentration Results
2-6-C	System Wide Liquid-Phase Sulfide Concentration Results
2-6-D	System Wide Liquid-Phase Sulfide Concentration Results
2-7-A	System Wide Vapor-Phase H_2S Concentration Results
2-7-B	System Wide Vapor-Phase H_2S Concentration Results
2-7-C	System Wide Vapor-Phase H_2S Concentration Results
2-8-D	System Wide Vapor-Phase H_2S Concentration Results
2-8-A	System Wide Model-Predicted Out-Gassing Locations
2-8-B	System Wide Model-Predicted Out-Gassing Locations
2-8-C	System Wide Model-Predicted Out-Gassing Locations
2-8-D	System Wide Model-Predicted Out-Gassing Locations

Figure 2-5-A: INTERCEPTOR Model Domain and Simulated Average Dry Weather Wastewater Flow

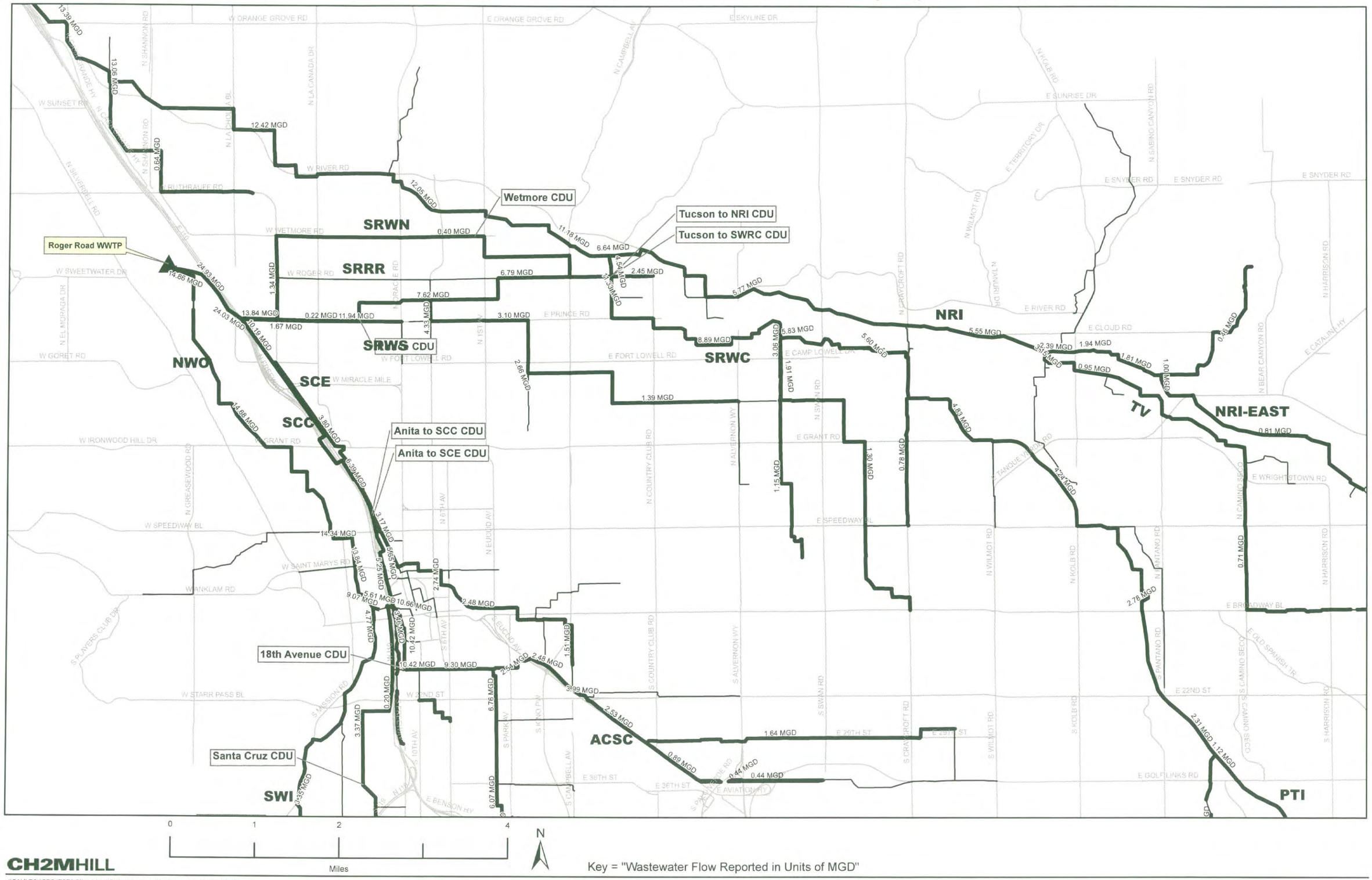


CH2MHILL

Key = "Wastewater Flow Reported in Units of MGD"

\\GALILEO\L\PROJECTS\PIMACO\MXD\FlowMap_A_11X17.MXD BBodinso 11/20/2006

Figure 2-5-B: INTERCEPTOR Model Domain and Simulated Average Dry Weather Wastewater Flow

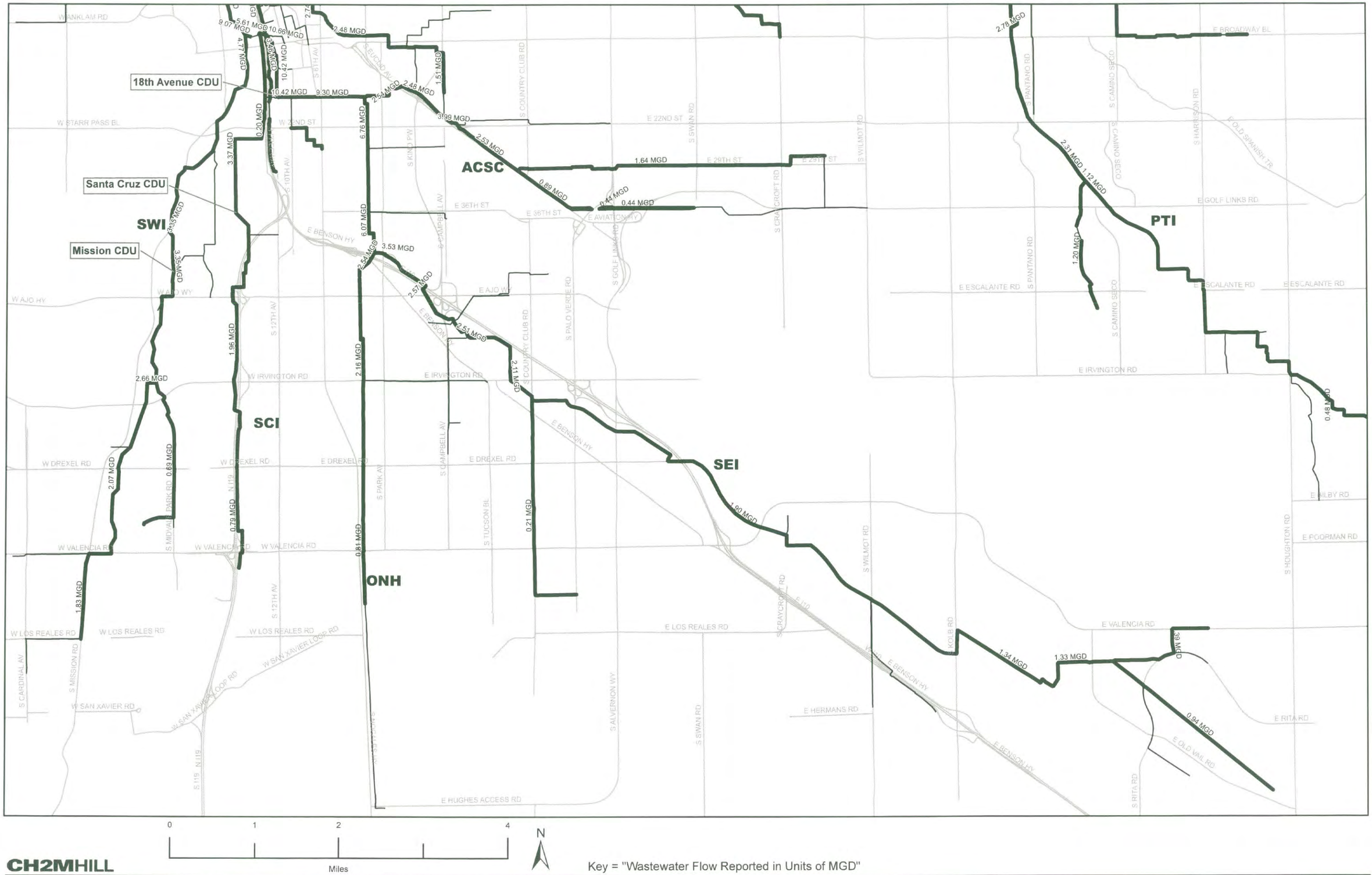


CH2MHILL

Key = "Wastewater Flow Reported in Units of MGD"

\\GALILEO\I\PROJECTS\PIMACO\MXD\Flow\Map_B_11X17.MXD BBodinso 11/20/2006

Figure 2-5-C: INTERCEPTOR Model Domain and Simulated Average Dry Weather Wastewater Flow



CH2MHILL

Key = "Wastewater Flow Reported in Units of MGD"

\\GALILEO\PROJECTS\PIMACO\MXD\FlowMap_C_11X17.MXD BBodinso 11/20/2006

Figure 2-5-D: INTERCEPTOR Model Domain and Simulated Average Dry Weather Wastewater Flow

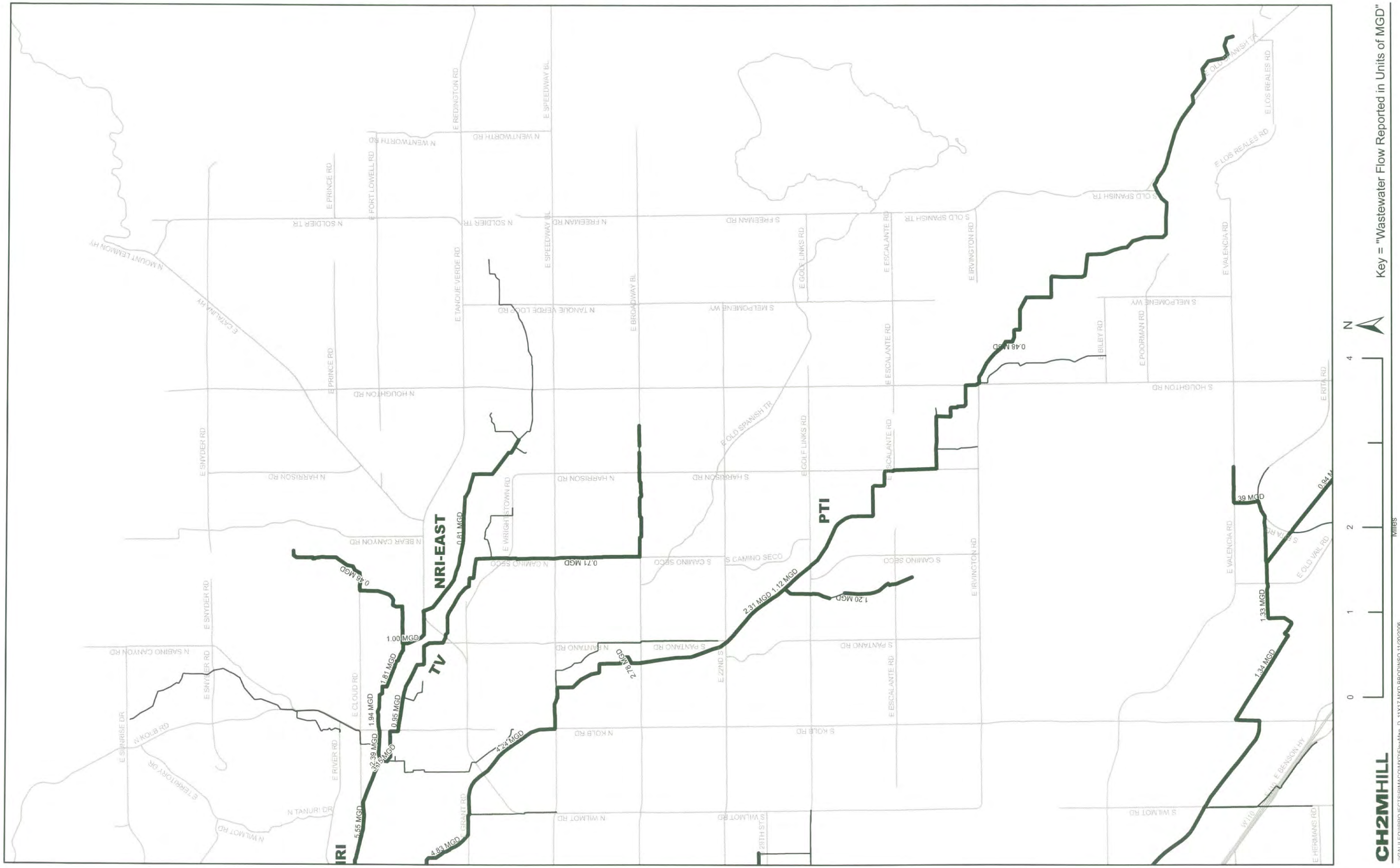
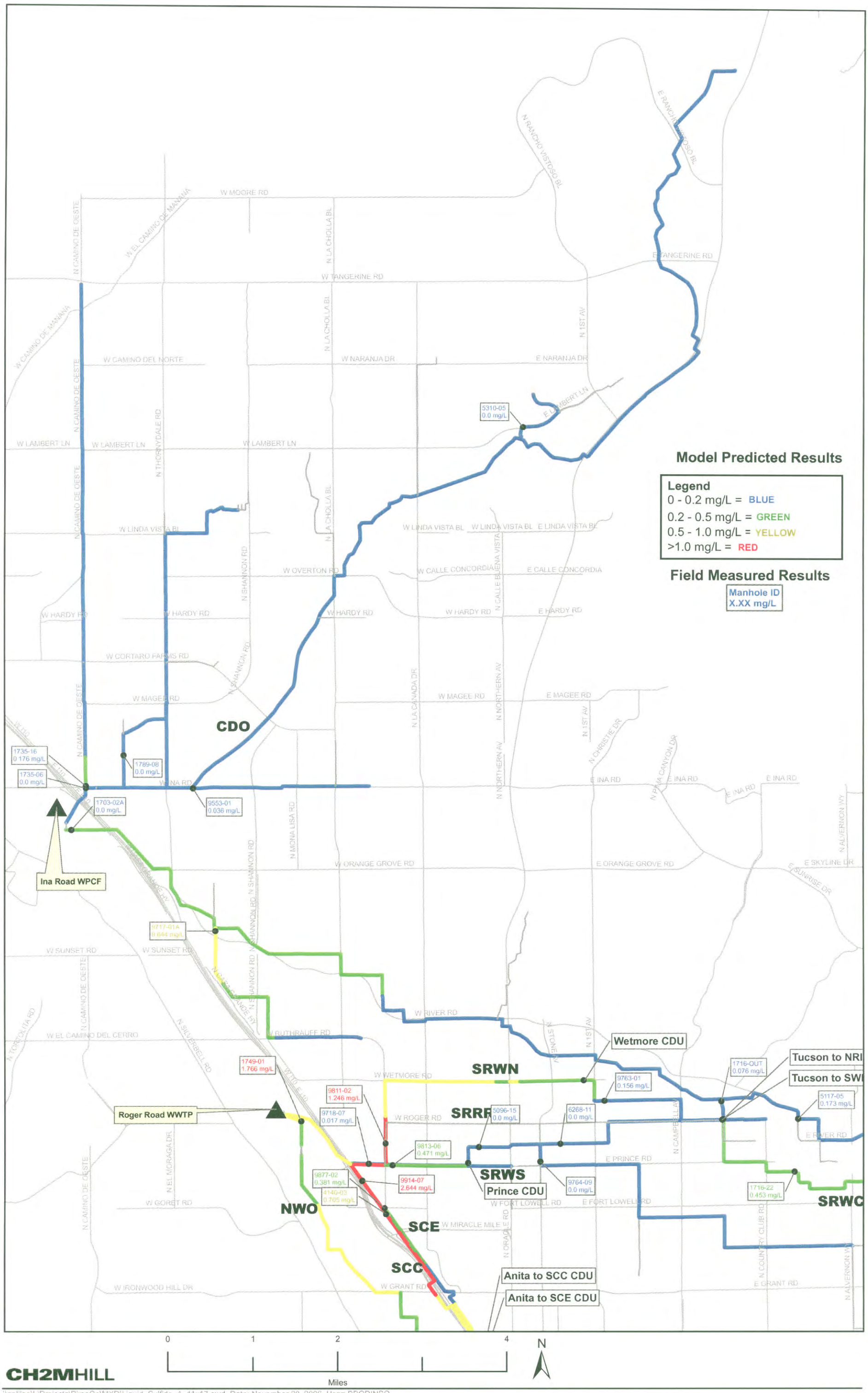


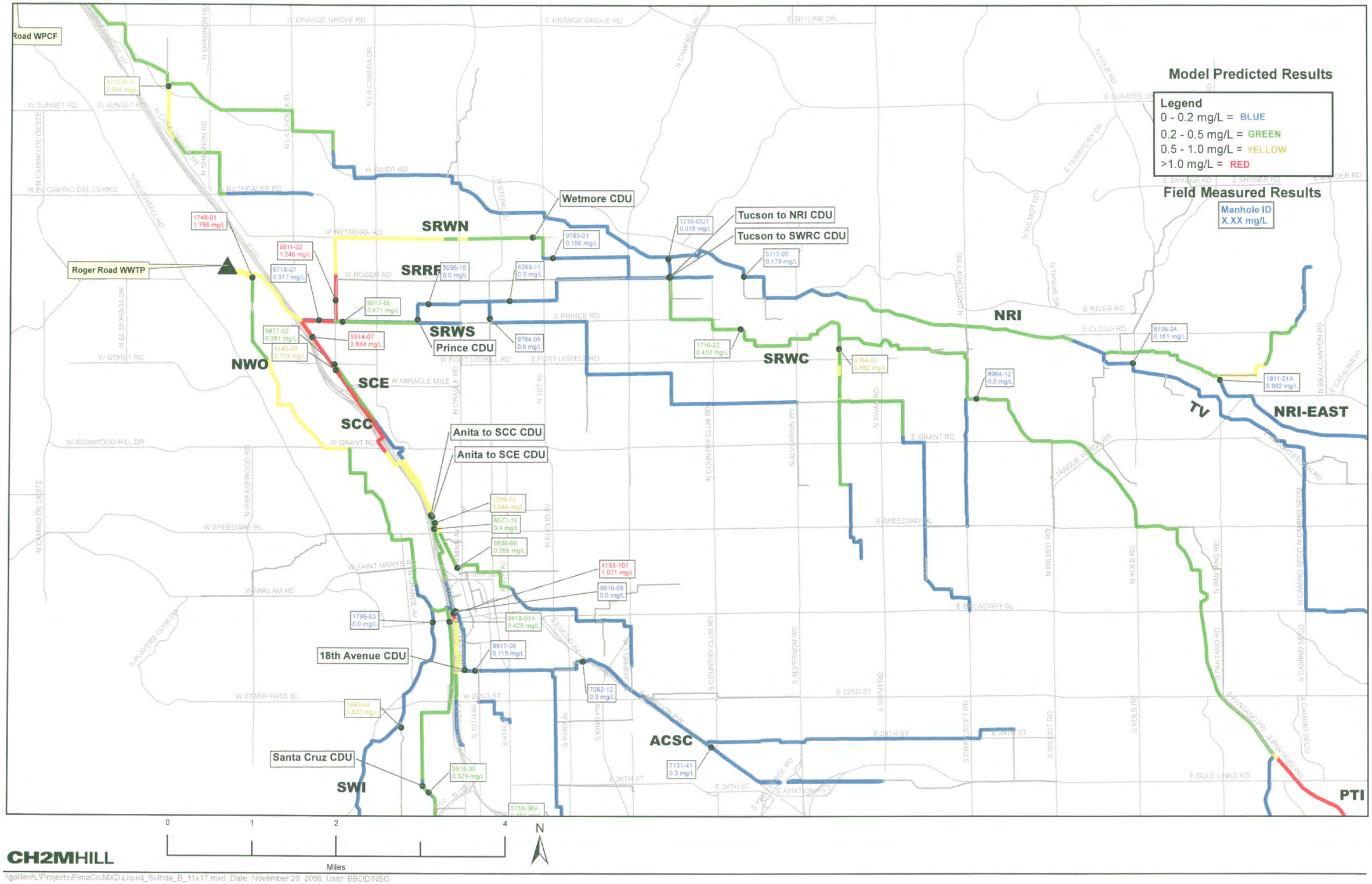
Figure 2-6-A: System Wide Liquid-Phase Sulfide Concentration Results



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\Liquid_Sulfide_A_11x17.mxd, Date: November 20, 2006, User: BBODINSO

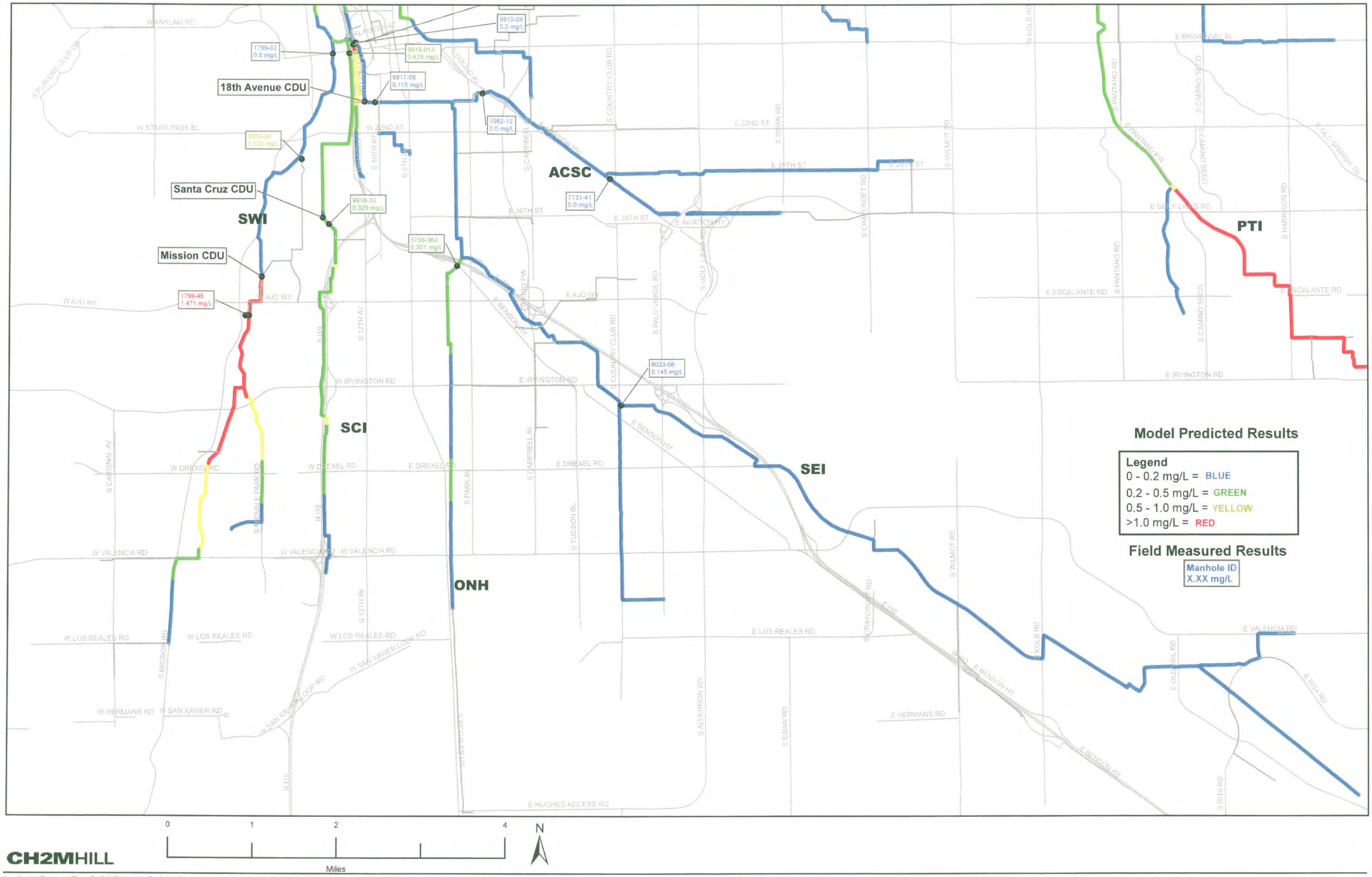
Figure 2-6-B: System Wide Liquid-Phase Sulfide Concentration Results



CH2MHILL

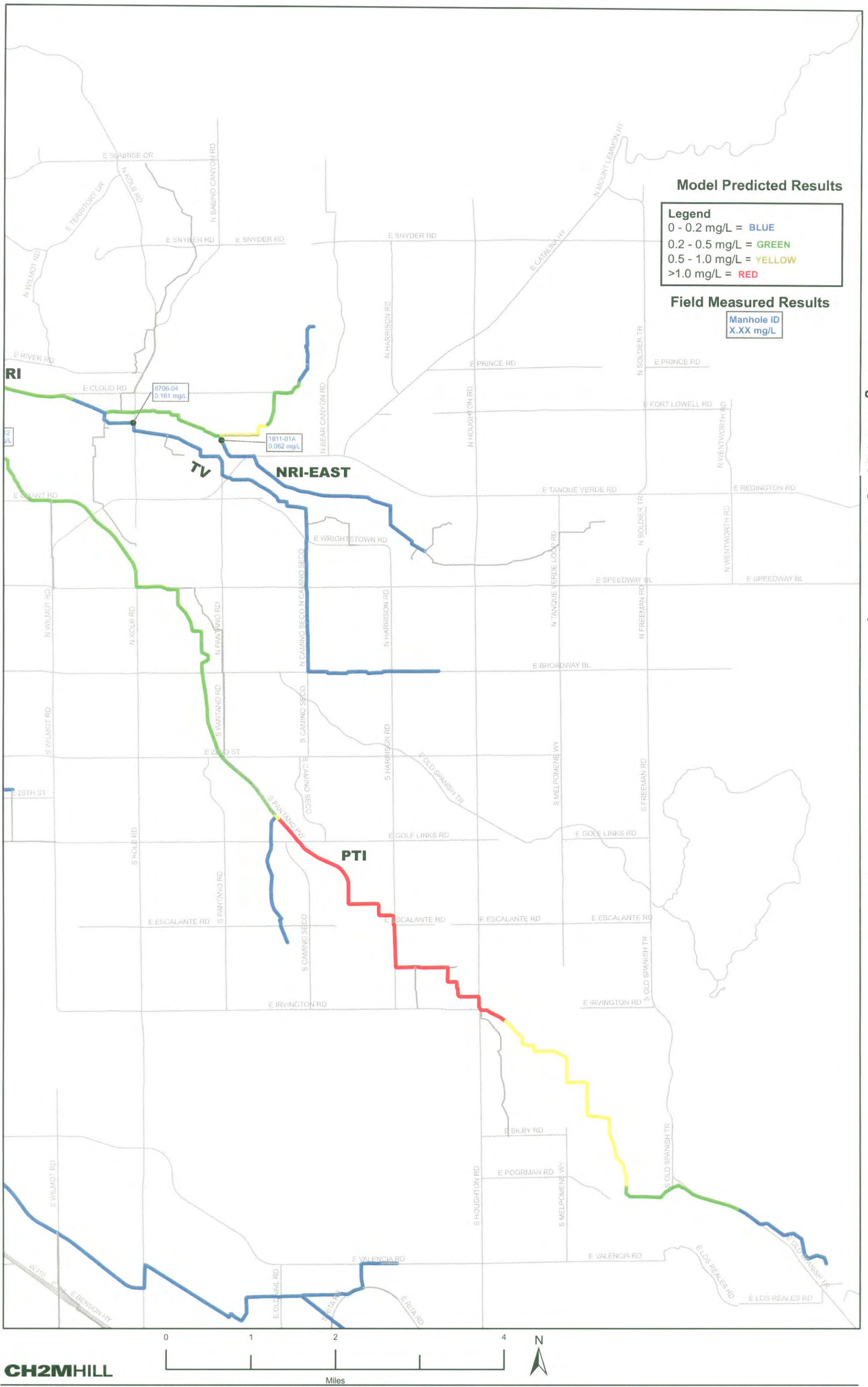
\\galileo\L\Projects\PimaCo\MXD\Liquid_Sulfide_B_11x17.mxd; Date: November 20, 2006; User: BBODINSO

Figure 2-6-C: System Wide Liquid-Phase Sulfide Concentration Results



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\Liquid_Sulfide_C_11x17.mxd. Date: November 20, 2006, User: BBODINSO

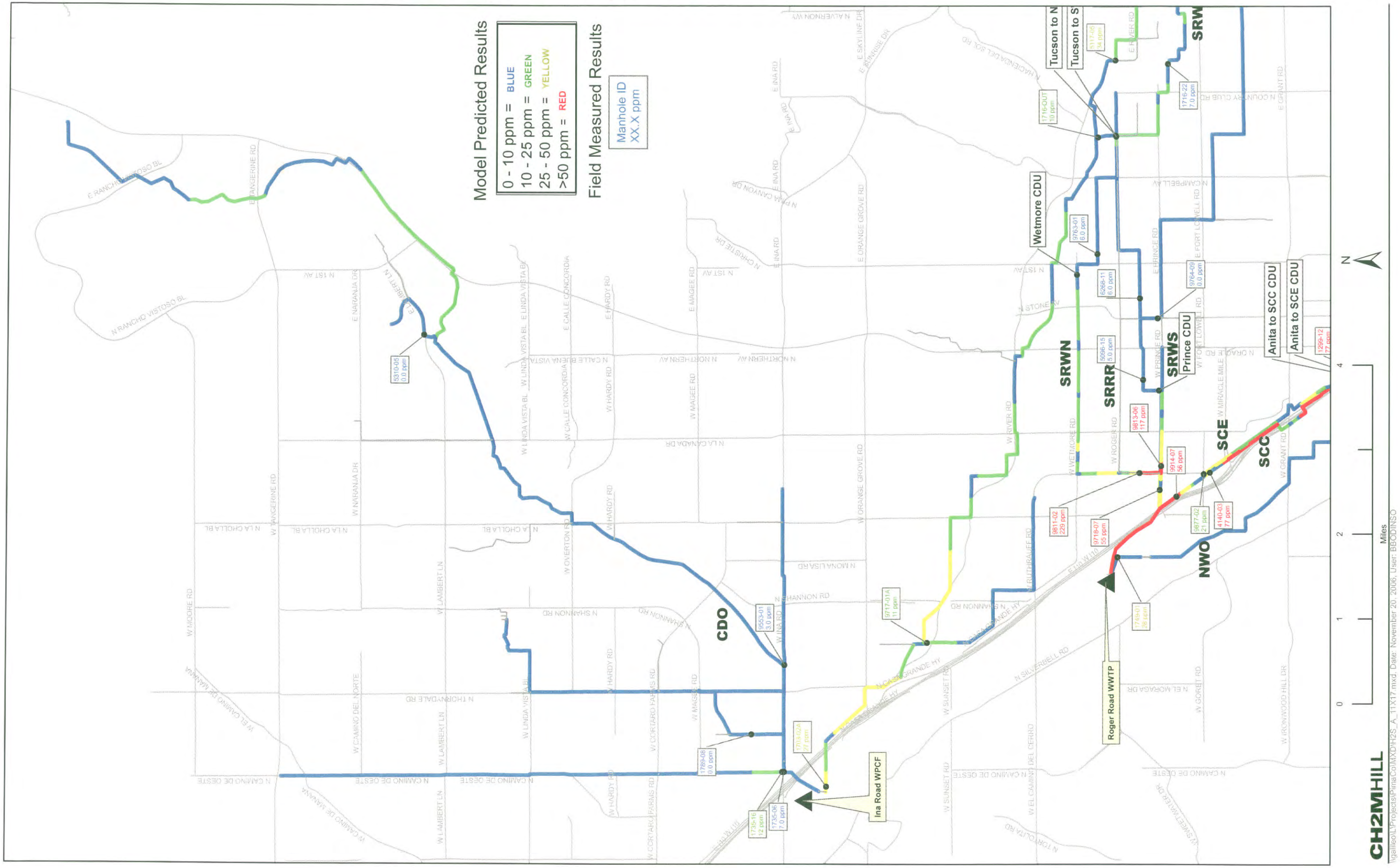


CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\Liquid_Sulfide_D_11x17.mxd, Date: November 20, 2006, User: BBODINSO

Figure 2-6-D: System Wide Liquid-Phase Sulfide Concentration Results

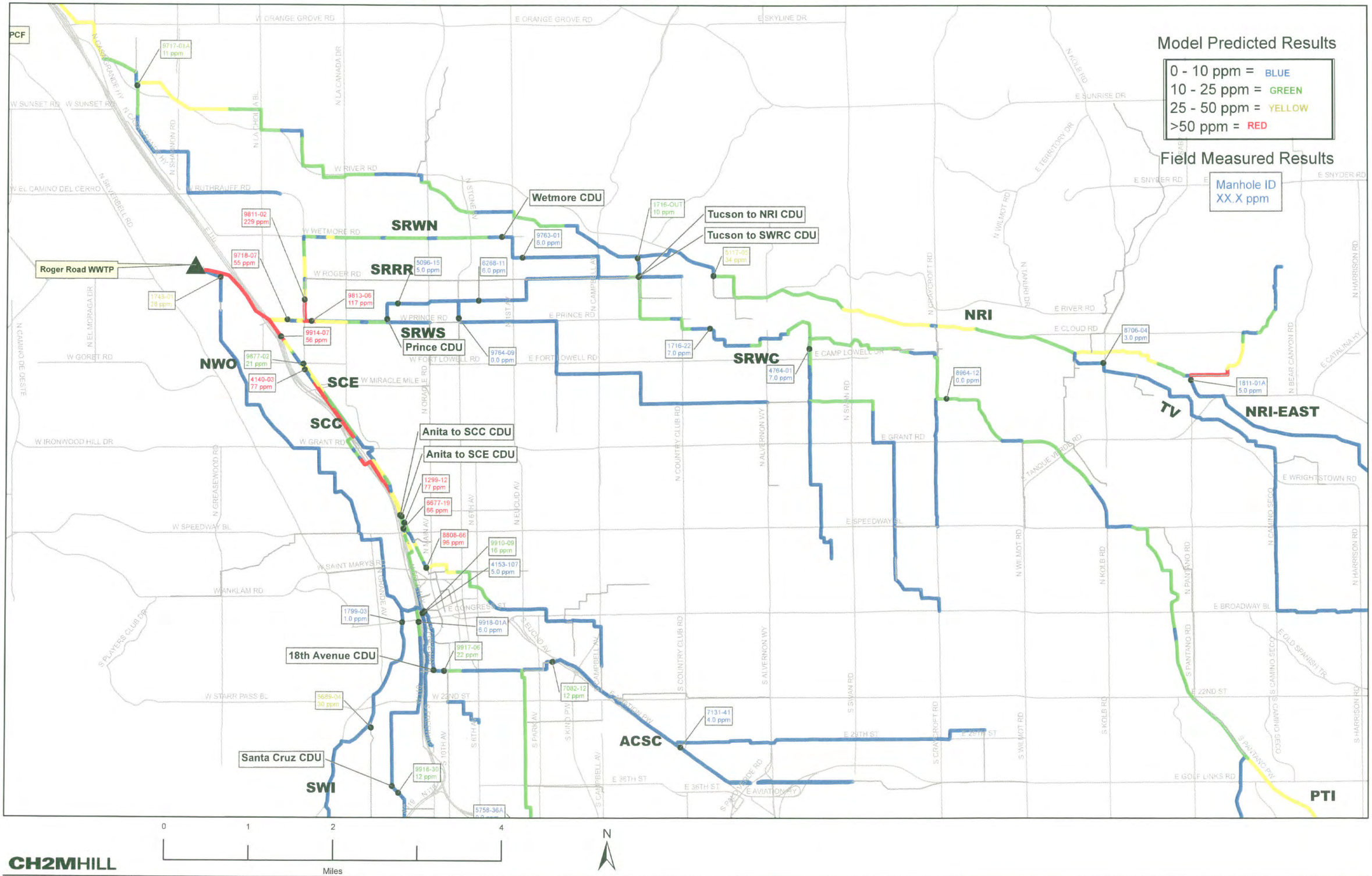
Figure 2-7-A: System Wide Vapor-Phase H2S Concentration Results



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\H2S_A_11X17.mxd, Date: November 20, 2006, User: BBODINSO

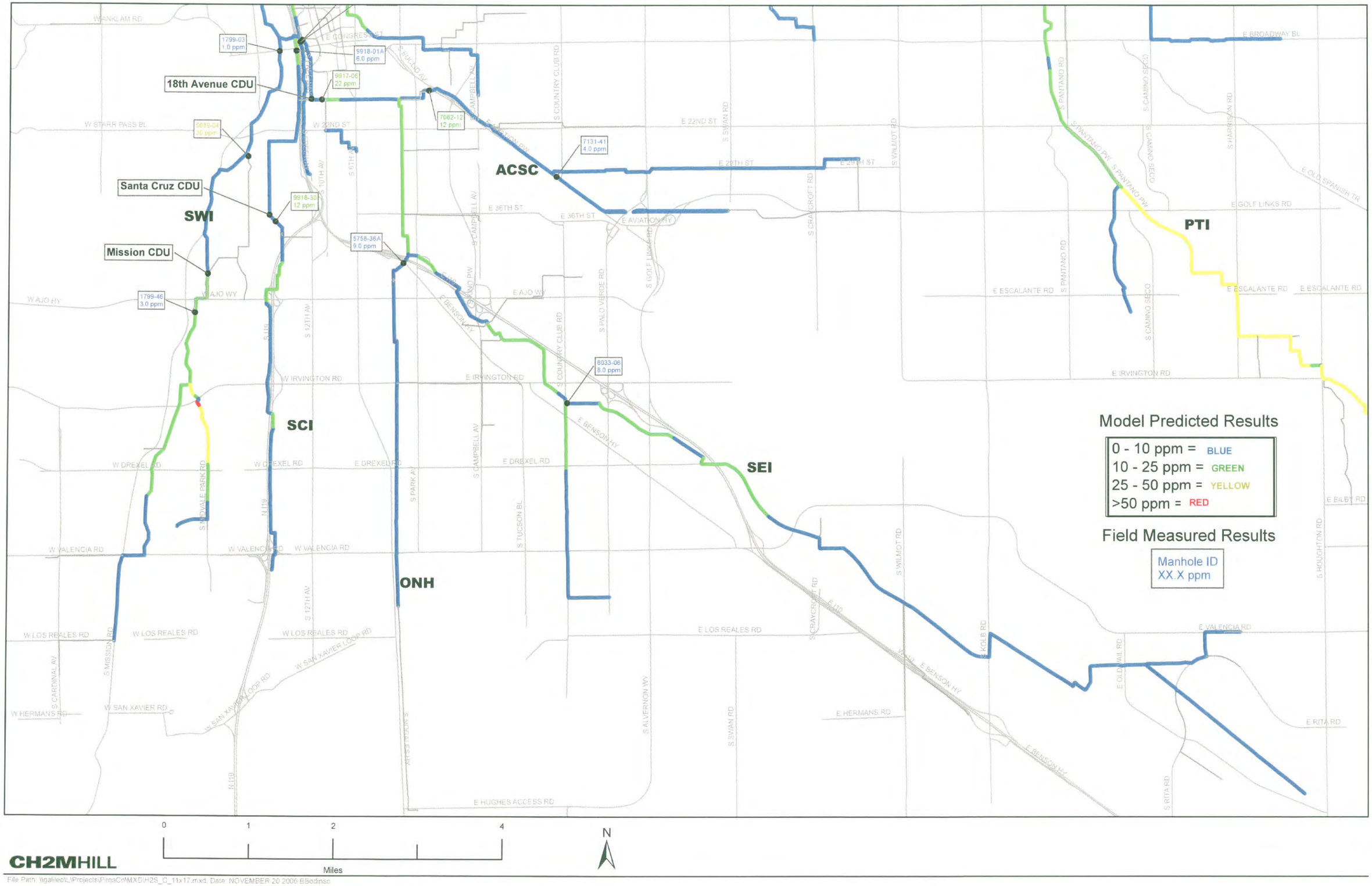
Figure 2-7-B: System Wide Vapor-Phase H2S Concentration Results



CH2MHILL

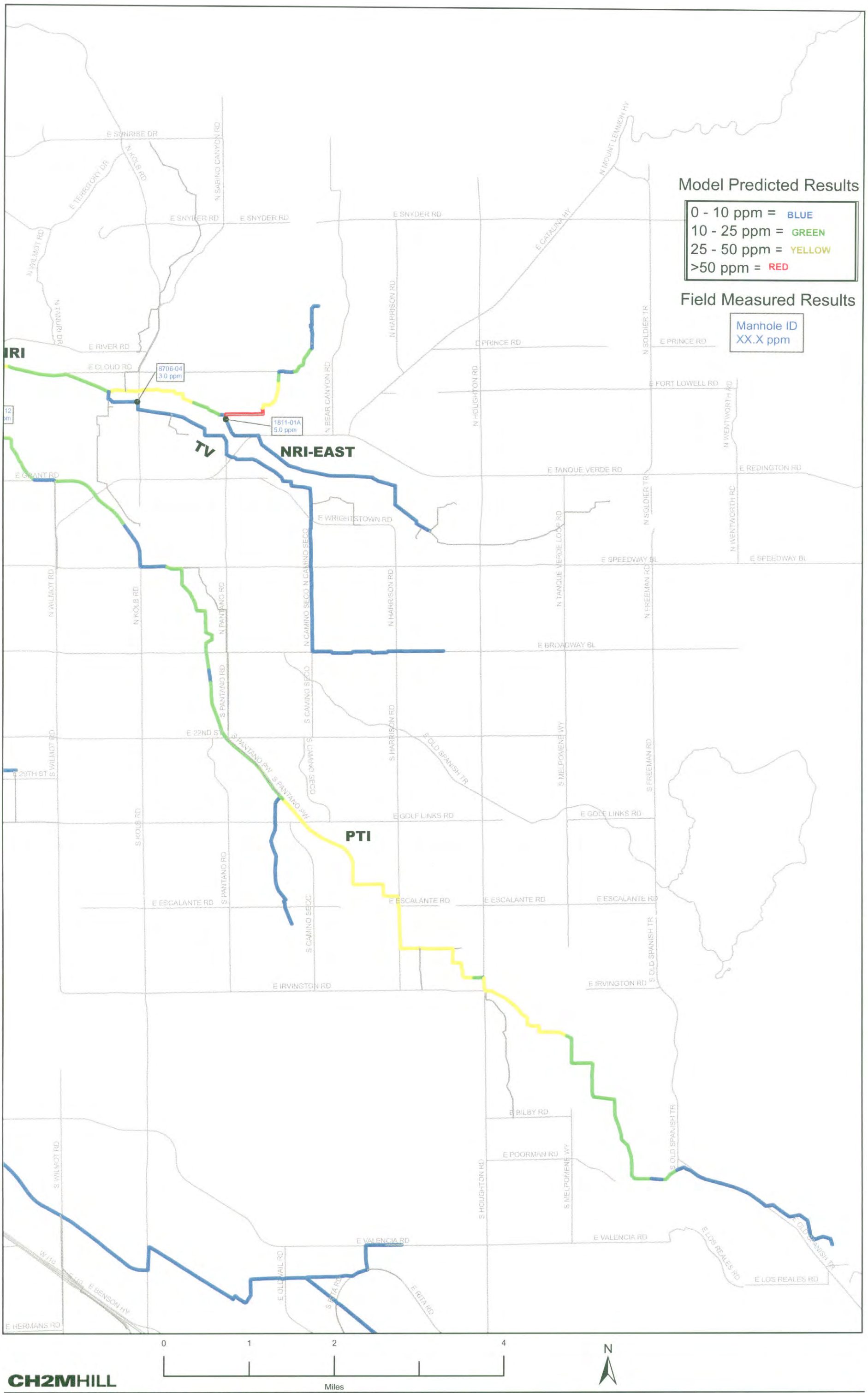
File Path: \\galilec\L\Projects\PimaCo\MXD\H2S_B_11x17.mxd, Date: NOVEMBER 20 2006 BBODINSO

Figure 2-7-C: System Wide Vapor-Phase H2S Concentration Results



CH2MHILL

File Path: \\galileo\L\Projects\PimaCo\MXD\H2S_C_11x17.mxd, Date: NOVEMBER 20 2006 BBodinso



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\H2S_D_11X17.mxd, Date: November 20, 2006, User: BBODINSO

Figure 2-7-D: System Wide Vapor-Phase H2S Concentration Results

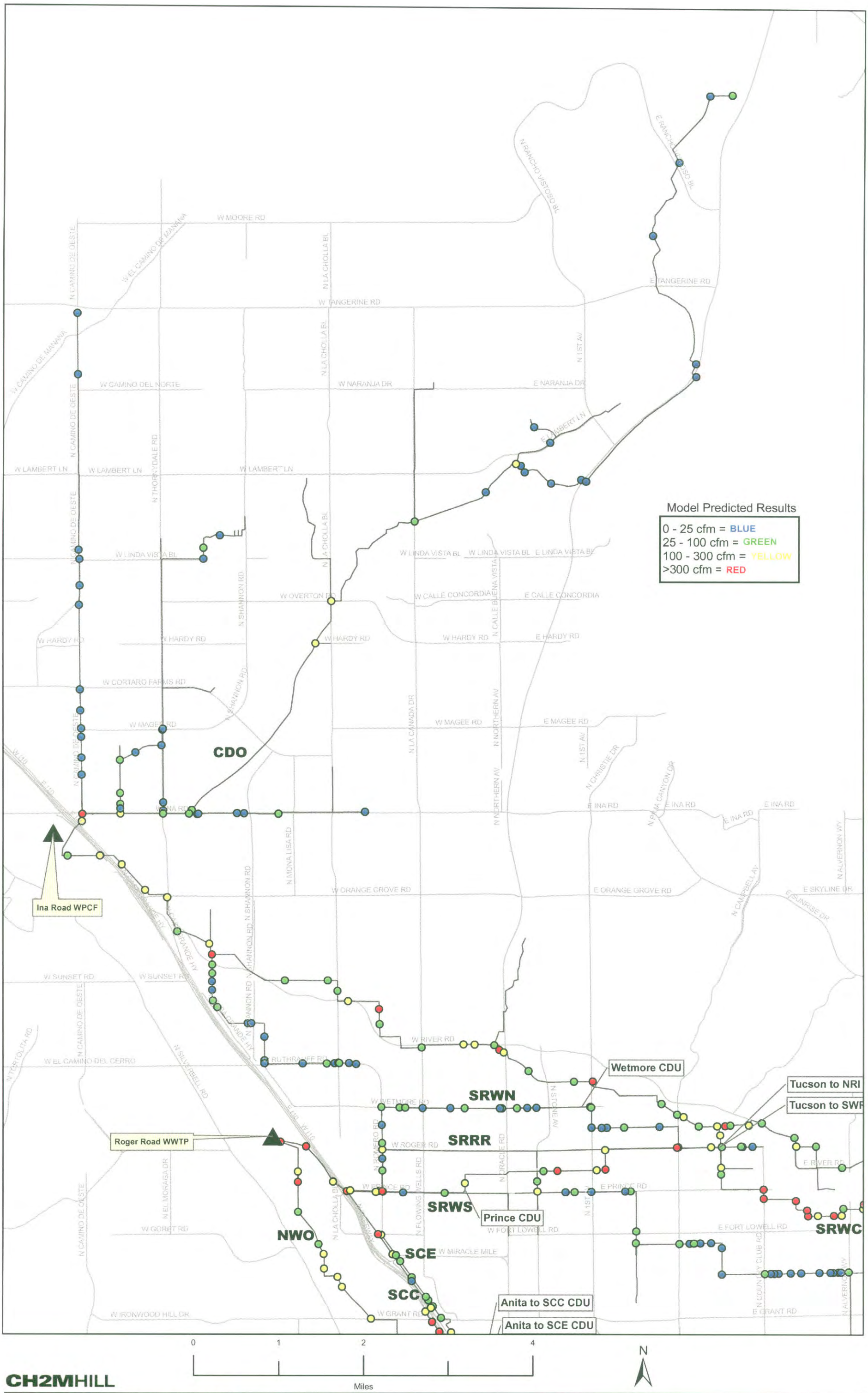
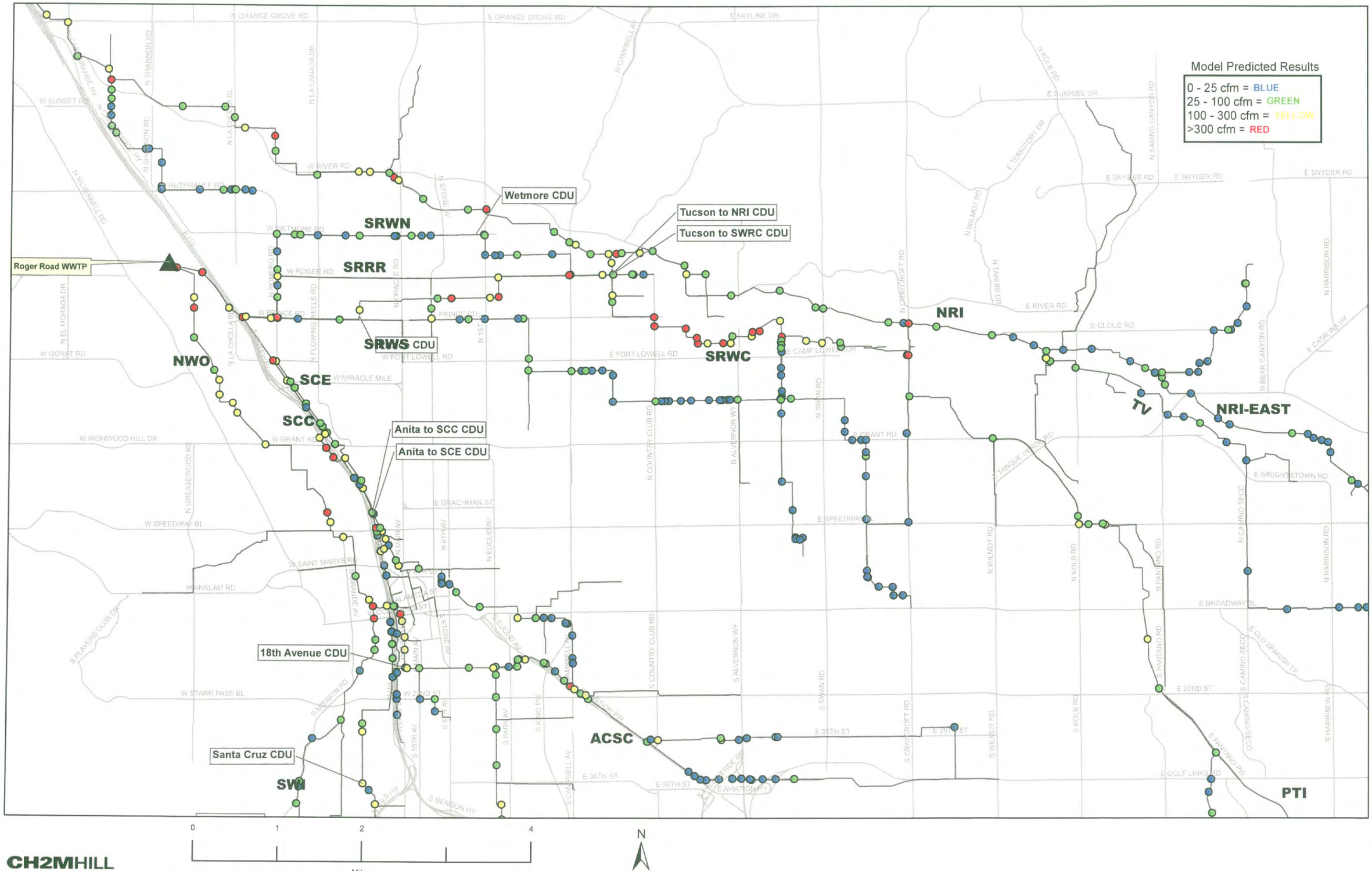


Figure 2-8-A: System Wide Model-Predicted Outgassing Locations

CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\OutGasing_A_11x17.mxd, Date: November 20, 2006, User: BBODINSO

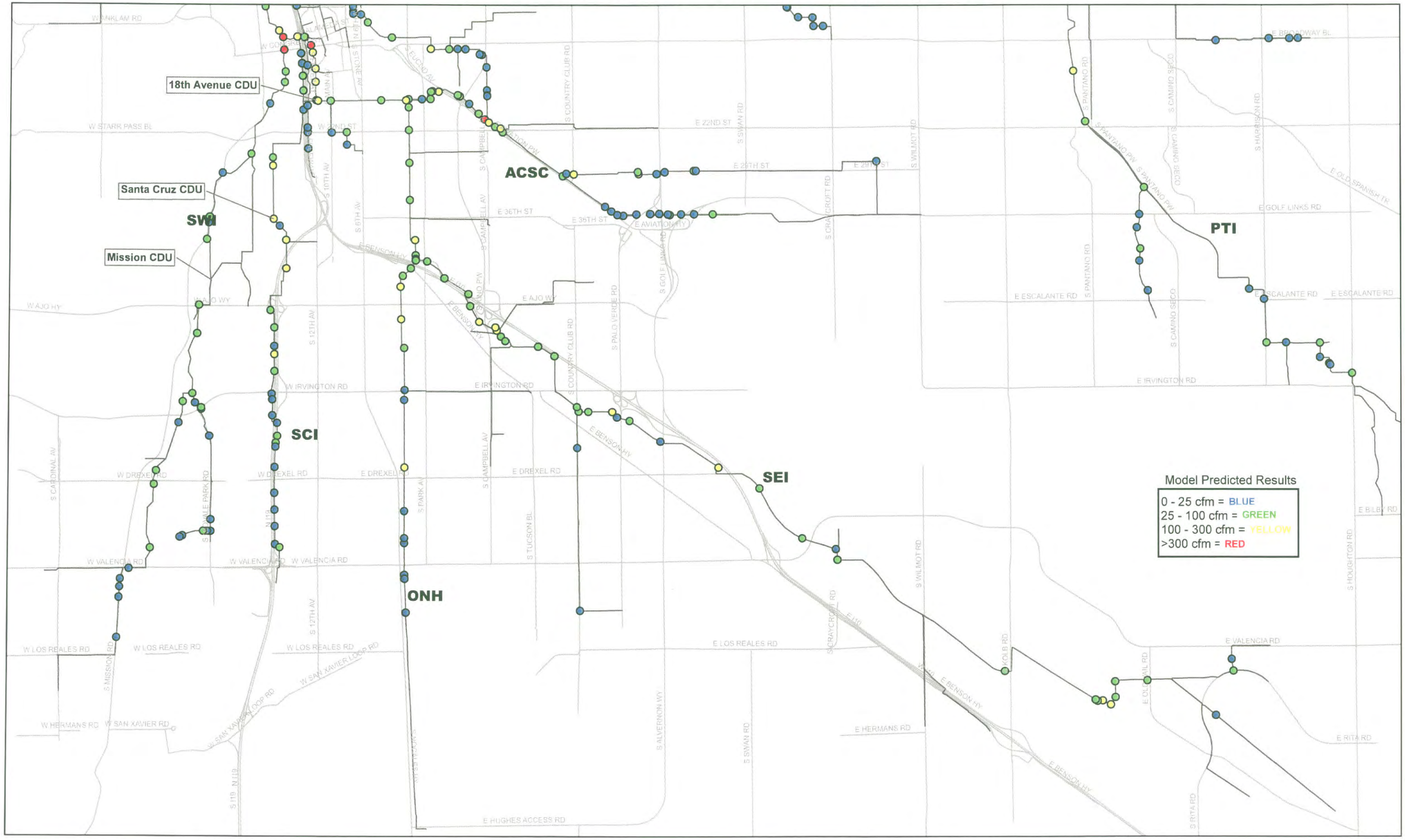
Figure 2-8-B: System Wide Model-Predicted Outgassing Locations



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\OutGasing_B_11x17.mxd. Date: November 20, 2006. User: BBODINSO

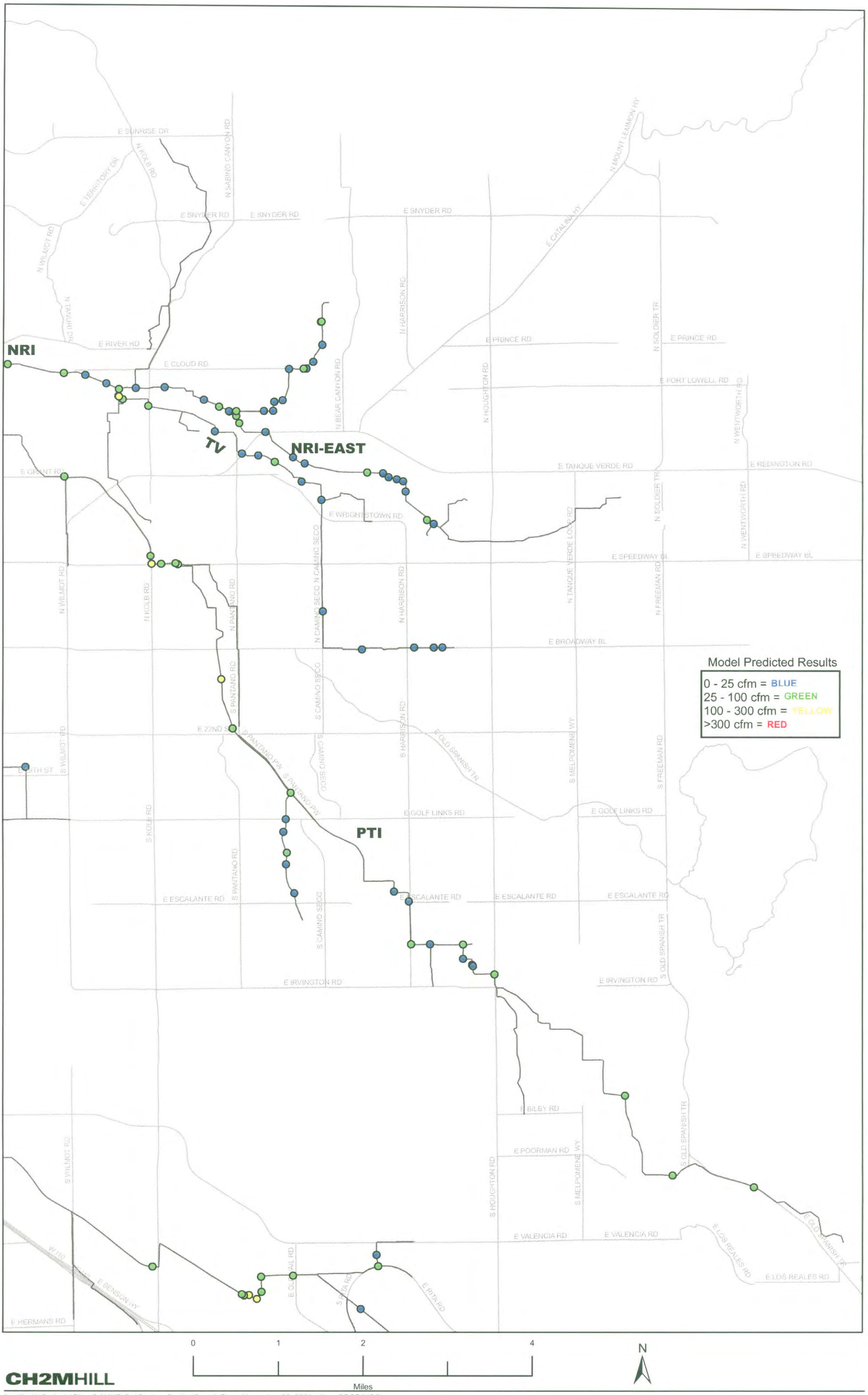
Figure 2-8-C: System Wide Model-Predicted Outgassing Locations



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\OutGasing_C_11x17.mxd Date: November 20, 2006, User: BBODINSO

Figure 2-8-D: System Wide Model-Predicted Outgassing Locations



CH2MHILL

\\galileo\L\Projects\PimaCo\MXD\OutGasing_D_11x17.mxd, Date: November 20, 2006, User: BBODINSO

APPENDIX B

Odor Analysis Laboratory Results

Roger Road WWTP
Odor Analysis Laboratory Results

Ina Road WPCF
Odor Analysis Laboratory Results

Green Valley WWTP
Odor Analysis Laboratory Results

APPENDIX B

Roger Road WWTP
Odor Analysis Laboratory Results

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 12:00
Date Received: 2/9/2007
Date Analyzed: 2/7/07
Time Analyzed: 10:53
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**18**	12	**7.2**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**11**	7.8	**3.6**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 11:00
Date Received: 2/9/2007
Date Analyzed: 2/7 - 2/9/07
Time Analyzed: 09:59, 10:21
Volume(s) Analyzed: 0.20 ml(s)
0.05 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**120,000**	35	**88,000**	25	
463-58-1	Carbonyl Sulfide	ND	61	ND	25	
74-93-1	Methyl Mercaptan	**4,500**	49	**2,300**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**3,800**	64	**1,500**	25	
75-15-0	Carbon Disulfide	**51**	39	**16**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	ND	48	ND	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive**
Client Project ID: **Pima County WMD**

CAS Project ID: P2700334
CAS Sample ID: P2700334-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 11:10
Date Received: 2/9/2007
Date Analyzed: 2/7/07
Time Analyzed: 10:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	**Compound**	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**47**	7.0	**34**	5.0	
463-58-1	Carbonyl Sulfide	**28**	12	**11**	5.0	
74-93-1	Methyl Mercaptan	**10**	9.8	**5.2**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**25**	13	**9.8**	5.0	
75-15-0	Carbon Disulfide	**16**	7.8	**5.0**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 2/09/07
Time Analyzed: 09:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	ND	25	ND	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**16**	5.0	**5.1**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**8.0**	5.0	**2.1**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	ND	5.0	ND	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**21**	5.0	**3.6**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**8.4**	5.0	**2.2**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**43**	25	**18**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**320**	5.0	**100**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**16**	5.0	**5.5**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**8.0**	5.0	**2.0**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**84**	5.0	**22**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**7.9**	5.0	**1.8**	1.2	
179601-23-1	*m,p* -Xylenes	**17**	5.0	**3.8**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**7.8**	5.0	**1.8**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**23**	5.0	**3.8**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**26**	25	**11**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**7.1**	5.0	**2.3**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**7.9**	5.0	**2.7**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**13**	5.0	**3.5**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**5.4**	5.0	**1.2**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Active** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P2700407-001

Test Code: ASTM D 5504-01 Date Collected: 2/15/2007
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 06:15
Analyst: Zheng Wang Date Received: 2/16/2007
Sampling Media: Tedlar Bag Date Analyzed: 2/16/07
Test Notes: **RH** Time Analyzed: 12:32
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**70**	7.0	**50**	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	**53**	9.8	**27**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**56**	13	**22**	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**13**	9.6	**3.4**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P070216-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 2/16/07
Time Analyzed: 09:30
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Active** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P2700407-001

Test Code: EPA TO-15 Modified Date Collected: 2/15/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/16/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/16/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**28**	25	**12**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**5.1**	5.0	**1.6**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Active** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P2700407-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/15/07
Date Received: 2/16/07
Date(s) Analyzed: 2/16/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**7.1**	5.0	**1.9**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	ND	5.0	ND	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**20**	5.0	**3.3**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P070216-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/16/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700407
Client Project ID: **Pima County** CAS Sample ID: P070216-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/16/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-001

Test Code: ASTM D 5504-01 Date Collected: 8/21/2006
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 10:00
Analyst: Zheng Wang Date Received: 8/22/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/22/06
Test Notes: **H** Time Analyzed: 16:33
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**6,300**	7.0	**4,500**	5.0	
463-58-1	Carbonyl Sulfide	**190**	12	**78**	5.0	
74-93-1	Methyl Mercaptan	**640**	9.8	**330**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**81**	13	**32**	5.0	
75-15-0	Carbon Disulfide	**190**	7.8	**60**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 10:10
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 16:54
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**180**	12	**72**	5.0	
74-93-1	Methyl Mercaptan	**19**	9.8	**9.6**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**51**	13	**20**	5.0	
75-15-0	Carbon Disulfide	**140**	7.8	**44**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1**
Client Project ID: **Roger Rd WPCP**

CAS Project ID: P2602283
CAS Sample ID: P2602283-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 10:20
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 17:27, 17:51
Volume(s) Analyzed: 0.050 ml(s)
0.010 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**660,000**	140	**470,000**	100	
463-58-1	Carbonyl Sulfide	**770**	250	**310**	100	
74-93-1	Methyl Mercaptan	**18,000**	200	**9,000**	100	
75-08-1	Ethyl Mercaptan	ND	250	ND	100	
75-18-3	Dimethyl Sulfide	**1,300**	250	**490**	100	
75-15-0	Carbon Disulfide	ND	160	ND	50	
75-33-2	Isopropyl Mercaptan	ND	310	ND	100	
75-66-1	tert-Butyl Mercaptan	ND	370	ND	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	ND	340	ND	100	
513-44-0	Isobutyl Mercaptan	ND	370	ND	100	
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 10:30
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 18:02, 18:23
Volume(s) Analyzed: 1.0 ml(s)
0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**32,000**	7.0	**23,000**	5.0	
463-58-1	Carbonyl Sulfide	**22**	12	**9.0**	5.0	
74-93-1	Methyl Mercaptan	**1,000**	9.8	**520**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**37**	13	**15**	5.0	
75-15-0	Carbon Disulfide	**50**	7.8	**16**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 Out** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 10:40
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 18:29
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**110**	7.0	**78**	5.0	
463-58-1	Carbonyl Sulfide	**72**	12	**29**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**42**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 10:50
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 21:48, 22:06
Volume(s) Analyzed: 1.0 ml(s)
0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**28,000**	7.0	**20,000**	5.0	
463-58-1	Carbonyl Sulfide	**47**	12	**19**	5.0	
74-93-1	Methyl Mercaptan	**420**	9.8	**210**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**92**	13	**36**	5.0	
75-15-0	Carbon Disulfide	**37**	7.8	**12**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 Out**
Client Project ID: **Roger Rd WPCP**

CAS Project ID: P2602283
CAS Sample ID: P2602283-007

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/21/2006
Time Collected: 11:00
Date Received: 8/22/2006
Date Analyzed: 8/22/06
Time Analyzed: 22:10, 22:30
Volume(s) Analyzed: 1.0 ml(s)
0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**30,000**	7.0	**22,000**	5.0	
463-58-1	Carbonyl Sulfide	**48**	12	**20**	5.0	
74-93-1	Methyl Mercaptan	**450**	9.8	**230**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**78**	13	**31**	5.0	
75-15-0	Carbon Disulfide	**40**	7.8	**13**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aneorobic Dig 4** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-008

Test Code: ASTM D 5504-01 Date Collected: 8/21/2006
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 11:20
Analyst: Zheng Wang Date Received: 8/22/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/22/06
Test Notes: **H** Time Analyzed: 22:35
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**83**	7.0	**60**	5.0	
463-58-1	Carbonyl Sulfide	**71**	12	**29**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**36**	7.8	**11**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Roger Rd WPCP**

CAS Project ID: P2602283
CAS Sample ID: P060822-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/22/06
Time Analyzed: 10:39
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-001

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes: 0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**38**	5.0	**19**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**230**	25	**96**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**11**	5.0	**3.1**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**140**	5.0	**43**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**20**	5.0	**6.7**	1.7	
156-59-2	cis-1,2-Dichloroethene	**5.8**	5.0	**1.5**	1.3	
67-66-3	Chloroform	**290**	5.0	**60**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**140**	5.0	**45**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)
0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**11**	5.0	**1.6**	0.75	**M**
79-01-6	Trichloroethene	**5.3**	5.0	**0.99**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**530**	5.0	**140**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	**8.9**	5.0	**1.0**	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**52**	5.0	**7.7**	0.74	
108-90-7	Chlorobenzene	**7.9**	5.0	**1.7**	1.1	
100-41-4	Ethylbenzene	**140**	5.0	**33**	1.2	
179601-23-1	*m,p* -Xylenes	**380**	5.0	**88**	1.2	
75-25-2	Bromoform	**8.6**	5.0	**0.83**	0.48	
100-42-5	Styrene	**18**	5.0	**4.2**	1.2	
95-47-6	o-Xylene	**170**	5.0	**39**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**83**	5.0	**14**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-002

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**32**	5.0	**15**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**81**	25	**34**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.5**	5.0	**2.4**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**73**	5.0	**23**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**56**	5.0	**19**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**230**	5.0	**46**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**54**	5.0	**17**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out AM** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**8.6**	5.0	**1.3**	0.75	**M**
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**220**	5.0	**58**	1.3	
591-78-6	2-Hexanone	**12**	5.0	**2.9**	1.2	**M**
124-48-1	Dibromochloromethane	**7.4**	5.0	**0.86**	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**42**	5.0	**6.2**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**75**	5.0	**17**	1.2	
179601-23-1	*m,p* -Xylenes	**130**	5.0	**29**	1.2	
75-25-2	Bromoform	**7.7**	5.0	**0.75**	0.48	
100-42-5	Styrene	**7.2**	5.0	**1.7**	1.2	
95-47-6	o-Xylene	**60**	5.0	**14**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**42**	5.0	**6.9**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Aristotle Bragasin/Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23 - 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)
0.010 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**9.7**	5.0	**4.7**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**59**	5.0	**15**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**120**	25	**52**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**17**	5.0	**4.9**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**2,800**	5.0	**900**	1.6	**H**
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**33**	5.0	**11**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**76**	5.0	**16**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**16**	5.0	**5.0**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin/Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:
#

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23 - 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)
0.010 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**210**	5.0	**55**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**24**	5.0	**3.5**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**17**	5.0	**3.9**	1.2	
179601-23-1	*m,p* -Xylenes	**49**	5.0	**11**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**20**	5.0	**4.7**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**47**	5.0	**7.9**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-004

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**72**	25	**30**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**260**	5.0	**83**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**19**	5.0	**6.6**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**15**	5.0	**3.9**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**13**	5.0	**2.9**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 Out** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/22 - 8/23/06
Volume(s) Analyzed: 0.010 Liter(s)
0.0020 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	100	ND	48	
75-01-4	Vinyl Chloride	ND	100	ND	39	
74-83-9	Bromomethane	ND	100	ND	26	
75-00-3	Chloroethane	ND	100	ND	38	
67-64-1	Acetone	**2,000**	500	**840**	210	
75-69-4	Trichlorofluoromethane	ND	100	ND	18	
75-35-4	1,1-Dichloroethene	ND	100	ND	25	
75-09-2	Methylene chloride	ND	100	ND	29	
76-13-1	Trichlorotrifluoroethane	ND	100	ND	13	
75-15-0	Carbon Disulfide	ND	100	ND	32	
156-60-5	trans-1,2-Dichloroethene	ND	100	ND	25	
75-34-3	1,1-Dichloroethane	ND	100	ND	25	
1634-04-4	Methyl tert-Butyl Ether	ND	100	ND	28	
108-05-4	Vinyl Acetate	ND	100	ND	28	
78-93-3	2-Butanone (MEK)	**27,000**	100	**9,100**	34	
156-59-2	cis-1,2-Dichloroethene	ND	100	ND	25	
67-66-3	Chloroform	ND	100	ND	20	
107-06-2	1,2-Dichloroethane	ND	100	ND	25	
71-55-6	1,1,1-Trichloroethane	ND	100	ND	18	
71-43-2	Benzene	ND	100	ND	31	
56-23-5	Carbon Tetrachloride	ND	100	ND	16	
78-87-5	1,2-Dichloropropane	ND	100	ND	22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 1 & 2 Out** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/22 - 8/23/06
Volume(s) Analyzed: 0.010 Liter(s)
0.0020 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	100	ND	15	
79-01-6	Trichloroethene	ND	100	ND	19	
10061-01-5	cis-1,3-Dichloropropene	ND	100	ND	22	
108-10-1	4-Methyl-2-pentanone	ND	100	ND	24	
10061-02-6	trans-1,3-Dichloropropene	ND	100	ND	22	
79-00-5	1,1,2-Trichloroethane	ND	100	ND	18	
108-88-3	Toluene	**190**	100	**51**	27	
591-78-6	2-Hexanone	ND	100	ND	24	
124-48-1	Dibromochloromethane	ND	100	ND	12	
106-93-4	1,2-Dibromoethane	ND	100	ND	13	
127-18-4	Tetrachloroethene	ND	100	ND	15	
108-90-7	Chlorobenzene	ND	100	ND	22	
100-41-4	Ethylbenzene	ND	100	ND	23	
179601-23-1	*m,p* -Xylenes	ND	100	ND	23	
75-25-2	Bromoform	ND	100	ND	9.7	
100-42-5	Styrene	ND	100	ND	23	
95-47-6	o-Xylene	ND	100	ND	23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	100	ND	15	
541-73-1	1,3-Dichlorobenzene	ND	100	ND	17	
106-46-7	1,4-Dichlorobenzene	ND	100	ND	17	
95-50-1	1,2-Dichlorobenzene	ND	100	ND	17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-006

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**52**	25	**22**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**120**	5.0	**38**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**12**	5.0	**4.2**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 In** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**55**	5.0	**15**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**10**	5.0	**2.3**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 Out** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-007

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**52**	25	**22**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**120**	5.0	**40**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**17**	5.0	**5.9**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**10**	5.0	**2.1**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Gravity Thick 3 Out** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-007

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**54**	5.0	**14**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**13**	5.0	**3.0**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aneorobic Dig 4** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-008

Test Code: EPA TO-15 Modified Date Collected: 8/21/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/22/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**41**	25	**17**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**22**	5.0	**7.0**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**11**	5.0	**3.8**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aneorobic Dig 4** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602283-008

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/21/06
Date Received: 8/22/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**38**	5.0	**10**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**160**	5.0	**23**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**11**	5.0	**2.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060822-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/22/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060822-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/22/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060823-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060823-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602283
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/22/2006
Time Collected: 08:30
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 13:15
Volume(s) Analyzed: 0.20 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**42,000**	35	**30,000**	25	
463-58-1	Carbonyl Sulfide	**130**	61	**52**	25	
74-93-1	Methyl Mercaptan	**1,700**	49	**870**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**190**	64	**75**	25	
75-15-0	Carbon Disulfide	**110**	39	**35**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	ND	48	ND	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/22/2006
Time Collected: 08:50
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 13:36
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**200,000**	140	**140,000**	100	
463-58-1	Carbonyl Sulfide	**1,700**	250	**690**	100	
74-93-1	Methyl Mercaptan	**8,200**	200	**4,200**	100	
75-08-1	Ethyl Mercaptan	ND	250	ND	100	
75-18-3	Dimethyl Sulfide	**660**	250	**260**	100	
75-15-0	Carbon Disulfide	**430**	160	**140**	50	
75-33-2	Isopropyl Mercaptan	ND	310	ND	100	
75-66-1	tert-Butyl Mercaptan	ND	370	ND	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	ND	340	ND	100	
513-44-0	Isobutyl Mercaptan	ND	370	ND	100	
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/22/2006
Time Collected: 09:05
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 13:58
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**540**	7.0	**390**	5.0	
463-58-1	Carbonyl Sulfide	**34**	12	**14**	5.0	
74-93-1	Methyl Mercaptan	**73**	9.8	**37**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**15**	13	**5.8**	5.0	
75-15-0	Carbon Disulfide	**35**	7.8	**11**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/22/2006
Time Collected: 09:15
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 14:20
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,300**	7.0	**950**	5.0	
463-58-1	Carbonyl Sulfide	**65**	12	**26**	5.0	
74-93-1	Methyl Mercaptan	**280**	9.8	**140**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**77**	13	**30**	5.0	
75-15-0	Carbon Disulfide	**48**	7.8	**15**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/2006
Time Collected: 12:40
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 10:28, 10:50
Volume(s) Analyzed: 1.0 ml(s)
0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**53,000**	7.0	**38,000**	5.0	
463-58-1	Carbonyl Sulfide	**34**	12	**14**	5.0	
74-93-1	Methyl Mercaptan	**1,300**	9.8	**650**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**110**	13	**42**	5.0	
75-15-0	Carbon Disulfide	**36**	7.8	**12**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/2006
Time Collected: 12:55
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 10:58, 11:19
Volume(s) Analyzed: 0.20 ml(s)
0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**150,000**	35	**110,000**	25	
463-58-1	Carbonyl Sulfide	**570**	61	**230**	25	
74-93-1	Methyl Mercaptan	**5,400**	49	**2,800**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**340**	64	**130**	25	
75-15-0	Carbon Disulfide	**170**	39	**55**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	**97**	48	**25**	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-007

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/2006
Time Collected: 13:10
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 11:47
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,200**	7.0	**870**	5.0	
463-58-1	Carbonyl Sulfide	**33**	12	**13**	5.0	
74-93-1	Methyl Mercaptan	**130**	9.8	**64**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**25**	13	**9.8**	5.0	
75-15-0	Carbon Disulfide	**35**	7.8	**11**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-008

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/2006
Time Collected: 13:20
Date Received: 8/23/2006
Date Analyzed: 8/23/06
Time Analyzed: 12:09
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**790**	7.0	**570**	5.0	
463-58-1	Carbonyl Sulfide	**29**	12	**12**	5.0	
74-93-1	Methyl Mercaptan	**110**	9.8	**57**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**32**	13	**13**	5.0	
75-15-0	Carbon Disulfide	**30**	7.8	**9.7**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Roger Rd WPCP**

CAS Project ID: P2602298
CAS Sample ID: P060823-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/23/06
Time Analyzed: 09:59
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-001

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**19**	5.0	**9.1**	2.4	**M**
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**5.6**	5.0	**1.4**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**340**	25	**140**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**9.0**	5.0	**2.6**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**410**	5.0	**130**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**43**	5.0	**15**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**110**	5.0	**23**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**7.1**	5.0	**2.2**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**6.4**	5.0	**1.6**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**200**	5.0	**54**	1.3	
591-78-6	2-Hexanone	**14**	5.0	**3.4**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**64**	5.0	**9.5**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**12**	5.0	**2.8**	1.2	
179601-23-1	*m,p* -Xylenes	**28**	5.0	**6.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**9.4**	5.0	**2.2**	1.2	
95-47-6	o-Xylene	**11**	5.0	**2.5**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**43**	5.0	**7.2**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-002

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date(s) Analyzed: 8/23 - 8/24/06
Analyst: Aristotle Bragasin/Chaney Bolster Volume(s) Analyzed: 0.20 Liter(s)
Sampling Media: Tedlar Bag 0.025 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**57**	5.0	**28**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**15**	5.0	**3.8**	1.3	
75-00-3	Chloroethane	**6.0**	5.0	**2.3**	1.9	
67-64-1	Acetone	**420**	25	**180**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**33**	5.0	**9.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**1,500**	5.0	**490**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**72**	5.0	**24**	1.7	
156-59-2	cis-1,2-Dichloroethene	**9.3**	5.0	**2.4**	1.3	
67-66-3	Chloroform	**330**	5.0	**67**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**17**	5.0	**5.2**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Aristotle Bragasin/Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23 - 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**7.5**	5.0	**1.1**	0.75	
79-01-6	Trichloroethene	**27**	5.0	**5.0**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**7.4**	5.0	**1.8**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**270**	5.0	**72**	1.3	
591-78-6	2-Hexanone	**16**	5.0	**4.0**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**360**	5.0	**54**	0.74	
108-90-7	Chlorobenzene	**9.0**	5.0	**2.0**	1.1	
100-41-4	Ethylbenzene	**37**	5.0	**8.4**	1.2	
179601-23-1	*m,p* -Xylenes	**67**	5.0	**15**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**14**	5.0	**3.4**	1.2	
95-47-6	o-Xylene	**25**	5.0	**5.8**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**68**	5.0	**11**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-003

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**140**	25	**58**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**7.9**	5.0	**2.3**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**58**	5.0	**19**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**46**	5.0	**16**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**33**	5.0	**8.9**	1.3	
591-78-6	2-Hexanone	**10**	5.0	**2.4**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**8.5**	5.0	**1.3**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**9.6**	5.0	**2.2**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**11**	5.0	**1.8**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-004

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**200**	25	**86**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**9.6**	5.0	**2.8**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**52**	5.0	**17**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**61**	5.0	**21**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**15**	5.0	**3.0**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 AM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**40**	5.0	**11**	1.3	
591-78-6	2-Hexanone	**13**	5.0	**3.3**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**15**	5.0	**2.2**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**11**	5.0	**2.6**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**12**	5.0	**2.0**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-005

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**330**	25	**140**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**5.1**	5.0	**1.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**310**	5.0	**99**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**110**	5.0	**39**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**70**	5.0	**14**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**5.1**	5.0	**1.6**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 5 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-005

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	**5.3**	5.0	**0.99**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**130**	5.0	**34**	1.3	
591-78-6	2-Hexanone	**23**	5.0	**5.7**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**9.7**	5.0	**1.4**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**5.8**	5.0	**1.3**	1.2	
179601-23-1	*m,p* -Xylenes	**18**	5.0	**4.2**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**5.3**	5.0	**1.2**	1.2	
95-47-6	o-Xylene	**6.8**	5.0	**1.6**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**11**	5.0	**1.8**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-006

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date(s) Analyzed: 8/23 - 8/24/06
Analyst: Aristotle Bragasin/Chaney Bolster Volume(s) Analyzed: 0.20 Liter(s)
Sampling Media: Tedlar Bag 0.025 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**27**	5.0	**13**	2.4	**M**
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**9.5**	5.0	**2.4**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**410**	25	**170**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**19**	5.0	**5.6**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**890**	5.0	**290**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**140**	5.0	**49**	1.7	
156-59-2	cis-1,2-Dichloroethene	**7.7**	5.0	**1.9**	1.3	
67-66-3	Chloroform	**350**	5.0	**72**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**15**	5.0	**4.8**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Primary Clarifier 8 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Aristotle Bragasin/Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23 - 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**8.8**	5.0	**1.3**	0.75	**M**
79-01-6	Trichloroethene	**47**	5.0	**8.7**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**5.3**	5.0	**1.3**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**360**	5.0	**94**	1.3	
591-78-6	2-Hexanone	**30**	5.0	**7.3**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**100**	5.0	**15**	0.74	
108-90-7	Chlorobenzene	**8.7**	5.0	**1.9**	1.1	
100-41-4	Ethylbenzene	**21**	5.0	**4.8**	1.2	
179601-23-1	*m,p* -Xylenes	**55**	5.0	**13**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**8.6**	5.0	**2.0**	1.2	
95-47-6	o-Xylene	**23**	5.0	**5.4**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**52**	5.0	**8.6**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-007

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**240**	25	**100**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**7.3**	5.0	**2.1**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**55**	5.0	**18**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**93**	5.0	**32**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**6.4**	5.0	**1.3**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 1 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-007

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**30**	5.0	**7.9**	1.3	
591-78-6	2-Hexanone	**18**	5.0	**4.4**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**5.0**	5.0	**0.74**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**8.9**	5.0	**2.0**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-008

Test Code: EPA TO-15 Modified Date Collected: 8/22/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/23/06
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**180**	25	**75**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**9.1**	5.0	**2.6**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**38**	5.0	**12**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**60**	5.0	**20**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**8.0**	5.0	**1.6**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Biofilter 2 PM** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602298-008

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Aristotle Bragasin
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/22/06
Date Received: 8/23/06
Date(s) Analyzed: 8/23/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**30**	5.0	**7.9**	1.3	
591-78-6	2-Hexanone	**13**	5.0	**3.3**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**8.5**	5.0	**1.9**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**5.4**	5.0	**0.89**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060823-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060823-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Aristotle Bragasin Date(s) Analyzed: 8/23/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602298
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/23/2006
Time Collected: 12:25
Date Received: 8/24/2006
Date Analyzed: 8/24/06
Time Analyzed: 11:57
Volume(s) Analyzed: 0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**26,000**	35	**19,000**	25	
463-58-1	Carbonyl Sulfide	**280**	61	**110**	25	
74-93-1	Methyl Mercaptan	**2,000**	49	**990**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**160**	64	**65**	25	
75-15-0	Carbon Disulfide	**190**	39	**61**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	**130**	48	**35**	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/23/2006
Time Collected: 12:35
Date Received: 8/24/2006
Date Analyzed: 8/24/06
Time Analyzed: 13:10
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**200**	7.0	**140**	5.0	
463-58-1	Carbonyl Sulfide	**220**	12	**90**	5.0	
74-93-1	Methyl Mercaptan	**96**	9.8	**49**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**97**	13	**38**	5.0	
75-15-0	Carbon Disulfide	**140**	7.8	**43**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1 PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/23/2006
Time Collected: 12:15
Date Received: 8/24/2006
Date Analyzed: 8/24/06
Time Analyzed: 13:53, 14:15
Volume(s) Analyzed: 0.10 ml(s)
0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**170,000**	70	**120,000**	50	
463-58-1	Carbonyl Sulfide	**560**	120	**230**	50	
74-93-1	Methyl Mercaptan	**11,000**	98	**5,800**	50	
75-08-1	Ethyl Mercaptan	ND	130	ND	50	
75-18-3	Dimethyl Sulfide	**590**	130	**230**	50	
75-15-0	Carbon Disulfide	ND	78	ND	25	
75-33-2	Isopropyl Mercaptan	ND	160	ND	50	
75-66-1	tert-Butyl Mercaptan	ND	180	ND	50	
107-03-9	n-Propyl Mercaptan	ND	160	ND	50	
624-89-5	Ethyl Methyl Sulfide	ND	160	ND	50	
110-02-1	Thiophene	ND	170	ND	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	**280**	96	**74**	25	
616-44-4	3-Methylthiophene	ND	200	ND	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	ND	230	ND	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aeration Basin 3**
Client Project ID: **Roger Rd WPCP**

CAS Project ID: P2602317
CAS Sample ID: P2602317-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/23/2006
Time Collected: 10:45
Date Received: 8/24/2006
Date Analyzed: 8/24/06
Time Analyzed: 14:29
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	**Compound**	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**30**	7.0	**22**	5.0	
463-58-1	Carbonyl Sulfide	**83**	12	**34**	5.0	
74-93-1	Methyl Mercaptan	**200**	9.8	**100**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**130**	13	**50**	5.0	
75-15-0	Carbon Disulfide	**46**	7.8	**15**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/24/06
Time Analyzed: 10:26
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-001

Test Code: EPA TO-15 Modified Date Collected: 8/23/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/24/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**34**	5.0	**17**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**5.9**	5.0	**1.5**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**390**	25	**160**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**45**	5.0	**13**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**230**	5.0	**73**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**34**	5.0	**12**	1.7	
156-59-2	cis-1,2-Dichloroethene	**5.9**	5.0	**1.5**	1.3	
67-66-3	Chloroform	**440**	5.0	**90**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**8.8**	5.0	**2.7**	1.6	
56-23-5	Carbon Tetrachloride	**5.9**	5.0	**0.93**	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter In PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-001

Test Code: EPA TO-15 Modified Date Collected: 8/23/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/24/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**12**	5.0	**1.8**	0.75	
79-01-6	Trichloroethene	**10**	5.0	**1.9**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**9.4**	5.0	**2.3**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**280**	5.0	**76**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	**10**	5.0	**1.2**	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**71**	5.0	**10**	0.74	
108-90-7	Chlorobenzene	**9.8**	5.0	**2.1**	1.1	**M**
100-41-4	Ethylbenzene	**47**	5.0	**11**	1.2	
179601-23-1	*m,p* -Xylenes	**130**	5.0	**30**	1.2	
75-25-2	Bromoform	**12**	5.0	**1.2**	0.48	
100-42-5	Styrene	**18**	5.0	**4.3**	1.2	
95-47-6	o-Xylene	**42**	5.0	**9.7**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**100**	5.0	**17**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-002

Test Code: EPA TO-15 Modified Date Collected: 8/23/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/24/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**26**	5.0	**13**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**200**	25	**85**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**30**	5.0	**8.7**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**83**	5.0	**27**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**78**	5.0	**27**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**270**	5.0	**55**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**5.1**	5.0	**1.6**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Biofilter Out PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/23/06
Date Received: 8/24/06
Date(s) Analyzed: 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	**6.7**	5.0	**1.0**	0.75	
79-01-6	Trichloroethene	**6.2**	5.0	**1.2**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**74**	5.0	**20**	1.3	
591-78-6	2-Hexanone	**18**	5.0	**4.4**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**35**	5.0	**5.1**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**14**	5.0	**3.2**	1.2	
179601-23-1	*m,p* -Xylenes	**26**	5.0	**6.1**	1.2	
75-25-2	Bromoform	**5.0**	5.0	**0.48**	0.48	
100-42-5	Styrene	**5.3**	5.0	**1.2**	1.2	
95-47-6	o-Xylene	**9.5**	5.0	**2.2**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**17**	5.0	**2.8**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1 PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-003

Test Code: EPA TO-15 Modified Date Collected: 8/23/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/24/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**8.0**	5.0	**2.1**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**160**	25	**69**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**12**	5.0	**3.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**480**	5.0	**150**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**63**	5.0	**21**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**16**	5.0	**3.2**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Yard Structure 1 PM** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/23/06
Date Received: 8/24/06
Date(s) Analyzed: 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**74**	5.0	**20**	1.3	
591-78-6	2-Hexanone	**15**	5.0	**3.6**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**18**	5.0	**2.7**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**13**	5.0	**3.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**5.0**	5.0	**1.2**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**5.5**	5.0	**0.92**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aeration Basin 3** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-004

Test Code: EPA TO-15 Modified Date Collected: 8/23/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/24/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**240**	25	**100**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.3**	5.0	**2.4**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**40**	5.0	**13**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**93**	5.0	**32**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**14**	5.0	**2.8**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aeration Basin 3** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P2602317-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/23/06
Date Received: 8/24/06
Date(s) Analyzed: 8/24/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**36**	5.0	**9.5**	1.3	
591-78-6	2-Hexanone	**22**	5.0	**5.4**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**8.9**	5.0	**2.0**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**5.1**	5.0	**0.84**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602317
Client Project ID: **Roger Rd WPCP** CAS Sample ID: P060824-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/24/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

St. Croix Sensory, Inc.

Lamb Technical Services

Roger Rd WPCP

Odor Evaluation Report

Report No. 623403
08/22/06

Data Release Authorization:

Natasha Kaslow
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services

Project: Roger Rd WPCP

Report No.: **623403**

Evaluation Date: 08/22/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Headworks Biofilter In AM	9,500	5,300					
2	2	Headworks Biofilter Out AM	780	440					
3	3	Yard Structure 1	220,000	140,000					**Field sample diluted 100:1 for threshold evaluation.**
4	4	Gravity Thickener Scrubber 1&2 In	16,000	11,000					
5	5	Gravity Thickener Scrubber 1&2 Out	10,000	5,600					
6	6	Gravity Thickener Scrubber 3 In	14,000	8,300					
7	7	Gravity Thickener Scrubber 3 Out	11,000	6,800					
8	8	Aneorobic Digester 4	90,000	44,000					**Field sample diluted 100:1 for threshold evaluation.**

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services

Project: Roger Rd WPCP

Report No.: **623403**

Evaluation Date: 08/22/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Roger Rd WRCP

Sampling Date: 8/21/06

Comments: Billing: P.O. Box 6117
Chino Valley, AZ 86323

Odor Evaluations Requested: (X)

For Laboratory use Only: Odor Evaluation Report No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	Laboratory Sample No. LN	Laboratory Sample No. FN
1	1	Headworks Biofilter In AM	10:00		X					
2	2	" " Out AM	10:10		X					
3	3	Yard Structure 1	10:20		X					
4	4	Gravity Thickener #2 Scrubber In	10:30		X					
5	5	" " " Out	10:40		X					
6	6	" " Scrubber 3 In	10:50		X					
7	7	" " 3 Out	11:00		X					
8	8	Anaerobic Digester 4	11:20		X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/21/06	12:00				
Received at St. Croix Sensory Laboratory			Melissa McCarthy	8/22/06	9:30am	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

St. Croix Sensory, Inc.

LTS, Inc.

Roger Rd WPCP

Odor Evaluation Report

Report No. 623601
08/24/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623601**

Evaluation Date: 08/24/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Headworks Biofilter Inlet PM	14,000	8,900					
2	2	Headworks Biofilter Outlet PM	2,400	1,700					
3	3	Yard Structure 1 PM	22,000	13,000					
4	4	Aeration Basin 3	1,700	1,200					
5									
6									
7									
8									
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623601**

Evaluation Date: 08/24/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Roger Rd WPCP

Sampling Date: 8/23/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Headworks Biofilter In PM	12:25		X					
2	2	" " Out PM	12:35		X					
3	3	Yard Structure 1 PM	12:15		X					
4	4	Aeration Basin 3	10:45		X					
5										
6										
7										
8										
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 1

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
[illegible]	8/23/06	14:00				
Received at St. Croix Sensory Laboratory			Cathy Moos	8/24/06	9:30	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

St. Croix Sensory, Inc.

Lamb Technical Services

Roger Rd WPCP

Odor Evaluation Report

Report No. 623403
08/22/06

Data Release Authorization:

Natasha Kaslow
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services

Project: Roger Rd WPCP

Report No.: **623403**

Evaluation Date: 08/22/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Headworks Biofilter In AM	9,500	5,300					
2	2	Headworks Biofilter Out AM	780	440					
3	3	Yard Structure 1	220,000	140,000					**Field sample diluted 100:1 for threshold evaluation.**
4	4	Gravity Thickener Scrubber 1&2 In	16,000	11,000					
5	5	Gravity Thickener Scrubber 1&2 Out	10,000	5,600					
6	6	Gravity Thickener Scrubber 3 In	14,000	8,300					
7	7	Gravity Thickener Scrubber 3 Out	11,000	6,800					
8	8	Aneorobic Digester 4	90,000	44,000					**Field sample diluted 100:1 for threshold evaluation.**

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services

Project: Roger Rd WPCP

Report No.: **623403**

Evaluation Date: 08/22/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Roger Rd WRCP

Sampling Date: 8/21/06

Comments: Billing: P.O. Box 6117
Chino Valley, AZ 86323

Odor Evaluations Requested: (X)

For Laboratory use Only: Odor Evaluation Report No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	Laboratory Sample No. LN	Laboratory Sample No. FN
1	1	Headworks Biofilter In AM	10:00		X					
2	2	" " Out AM	10:10		X					
3	3	Yard Structure 1	10:20		X					
4	4	Gravity Thickener #2 Scrubber In	10:30		X					
5	5	" " " Out	10:40		X					
6	6	" " Scrubber 3 In	10:50		X					
7	7	" " 3 Out	11:00		X					
8	8	Anaerobic Digester 4	11:20		X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/21/06	12:00				
Received at St. Croix Sensory Laboratory			Melissa McCarthy	8/22/06	9:30am	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

St. Croix Sensory, Inc.

LTS, Inc.

Roger Rd WPCP

Odor Evaluation Report

Report No. 623502
08/23/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623502**

Evaluation Date: 08/23/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Primary Clarifier 5 AM	19,000	12,000					
2	2	Primary Clarifier 8 AM	>60,000	>60,000					
3	3	Biofilter 1 AM	2,900	1,700					
4	4	Biofilter 2 AM	4,600	3,300					
5	5	Primary Clarifier 5 PM	17,000	11,000					
6	6	Primary Clarifier 8 PM	>60,000	>60,000					
7	7	Biofilter 1 PM	3,800	3,300					
8	8	Biofilter 2 PM	4,800	3,100					
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623502**

Evaluation Date: 08/23/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Gamb

Project Name: Roger Rd WPCP

Sampling Date: 8/22/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Primary Clarifier 5 AM	8:30		X					
2	2	" " 8 AM	8:50		X					
3	3	Biofilter 1 AM	9:05		X					
4	4	" 2 AM	9:15		X					
5	5	Primary Clarifier 5 PM	12:40		X					
6	6	" " 8 PM	12:55		X					
7	7	Biofilter 1 PM	13:10		X					
8	8	" 2 PM	13:20		X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Gamb	8/22/06	14:00				
Received at St. Croix Sensory Laboratory			Natasha Kolson	8/23/06	10:10	FN 6 had small split near valve Taped @ 10:10

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ♦ 3549 Lake Elmo Avenue North ♦ Lake Elmo, MN 55042 U.S.A.♦ Tel:800-879-9231 ♦ Fax:651-439-1065 ♦ Email:reports@fivesenses.com ♦ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

St. Croix Sensory, Inc.

LTS, Inc.

Roger Rd WPCP

Odor Evaluation Report

Report No. 623601
08/24/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623601**

Evaluation Date: 08/24/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Headworks Biofilter Inlet PM	14,000	8,900					
2	2	Headworks Biofilter Outlet PM	2,400	1,700					
3	3	Yard Structure 1 PM	22,000	13,000					
4	4	Aeration Basin 3	1,700	1,200					
5									
6									
7									
8									
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Roger Rd WPCP

Report No.: **623601**

Evaluation Date: 08/24/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Roger Rd WPCP

Sampling Date: 8/23/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Headworks Biofilter In PM	12:25		X					
2	2	" " Out PM	12:35		X					
3	3	Yard Structure 1 PM	12:15		X					
4	4	Aeration Basin 3	10:45		X					
5										
6										
7										
8										
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 1

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
[illegible]	8/23/06	14:00				
Received at St. Croix Sensory Laboratory			Cathy Moos	8/24/06	9:30	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

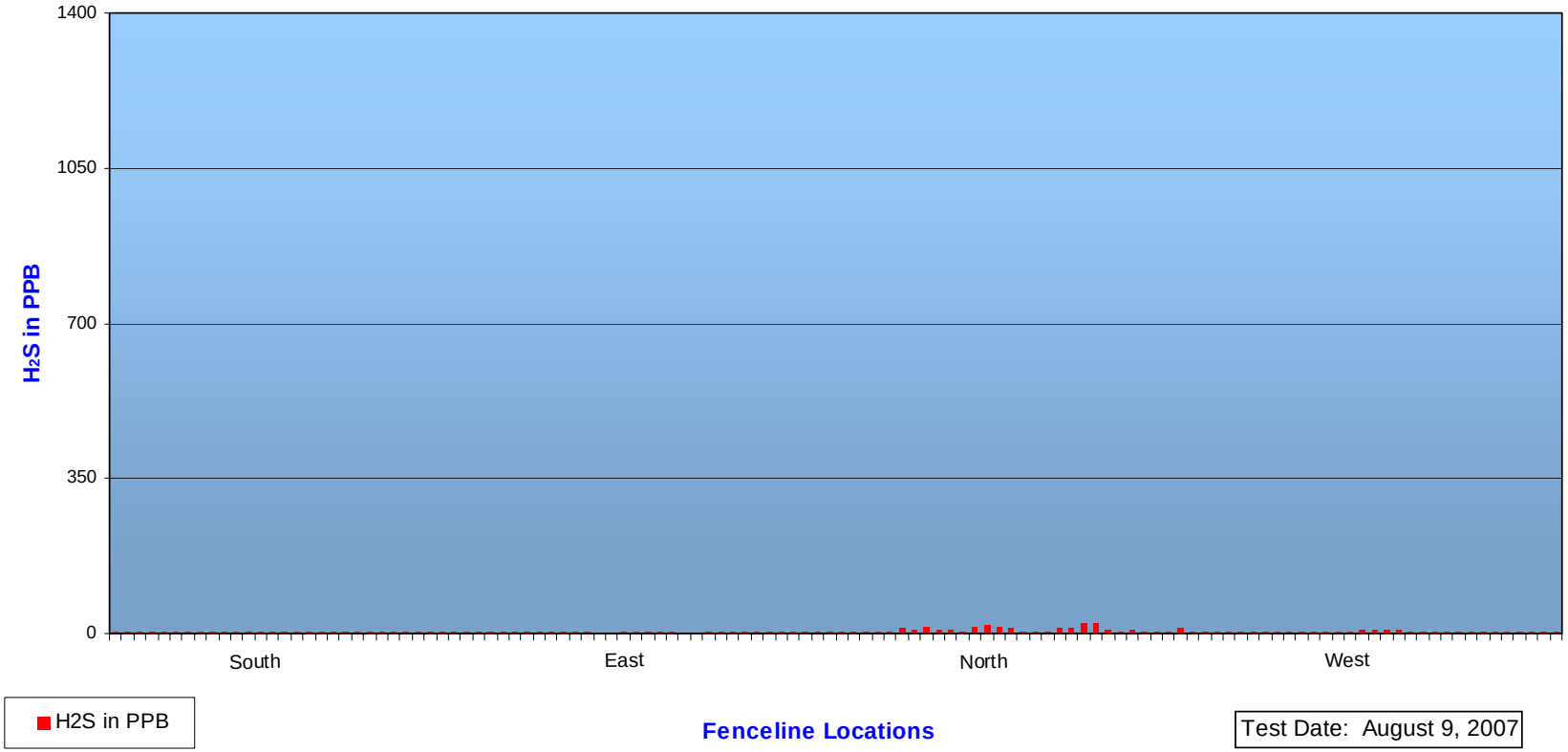
LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline

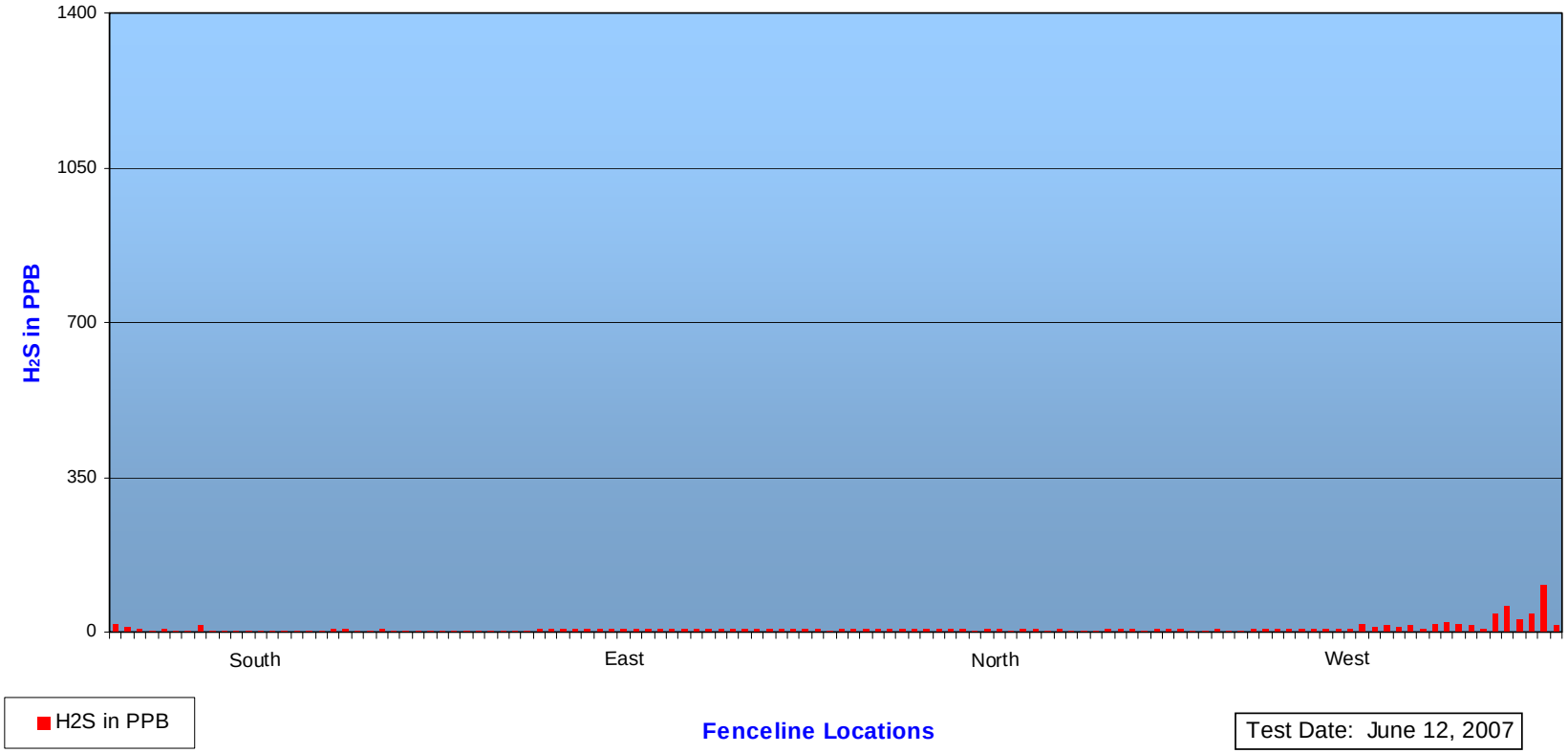


Test Date: August 9, 2007

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline

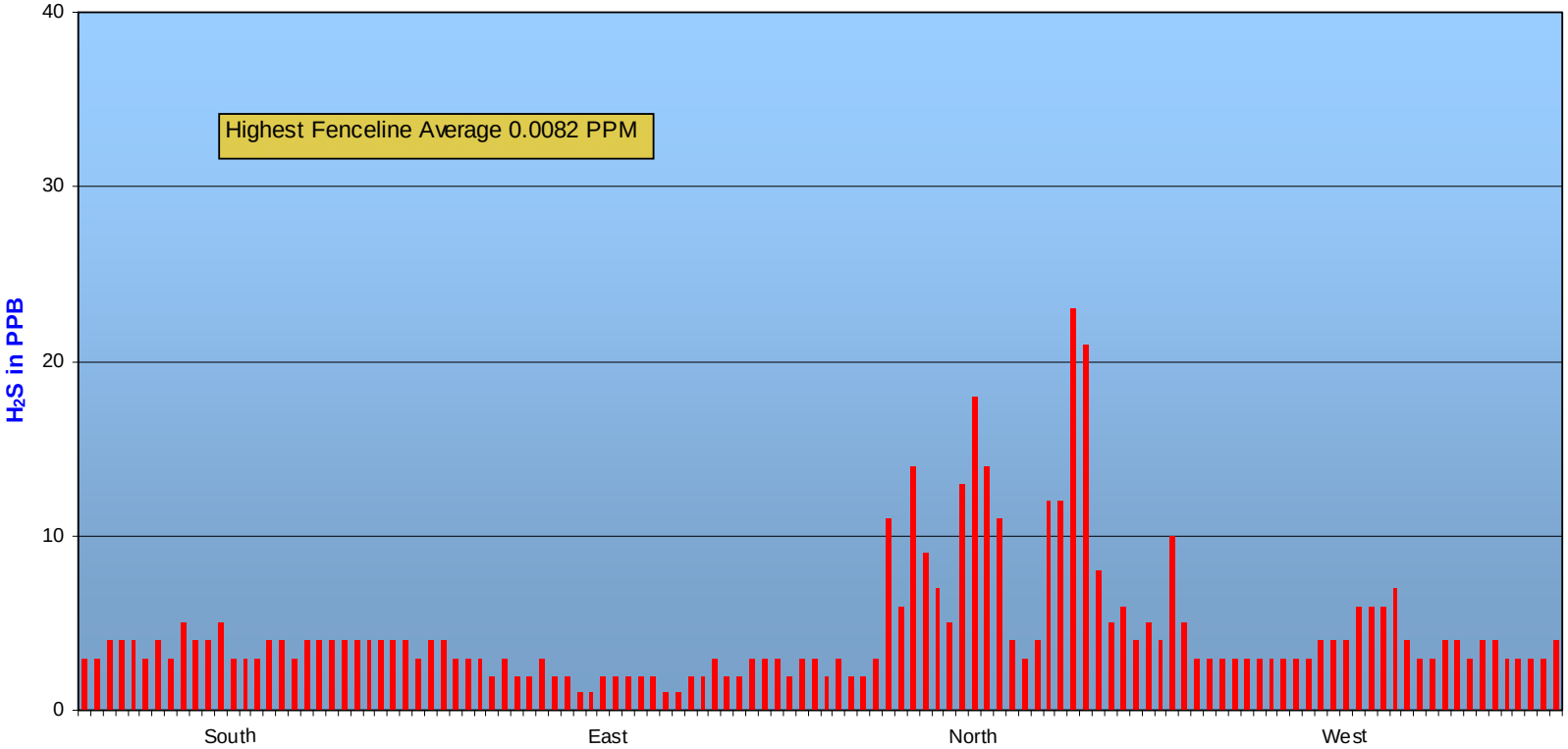


Test Date: June 12, 2007

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



H2S in PPB

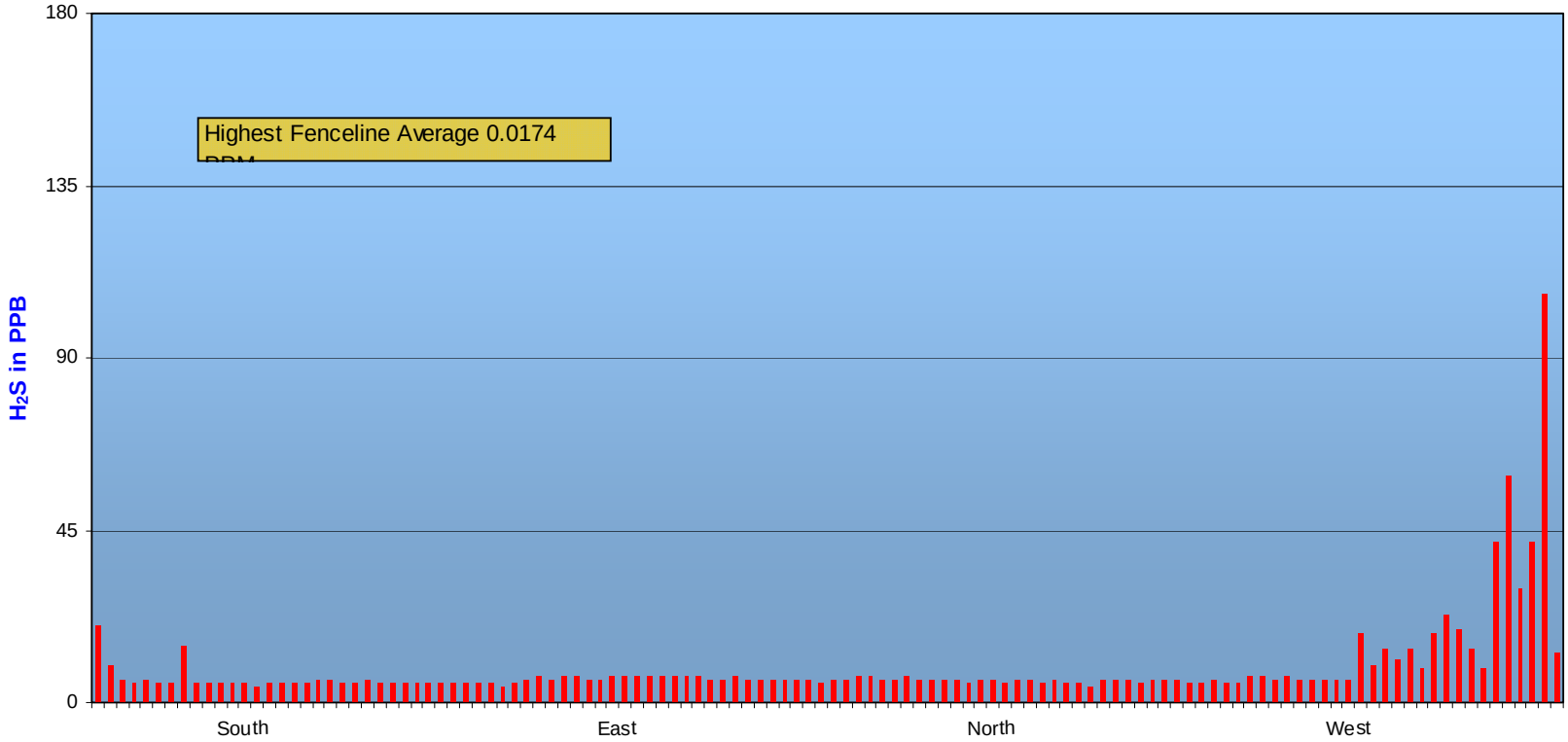
Fenceline Locations

Test Date: August 9, 2007

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



H2S in PPB

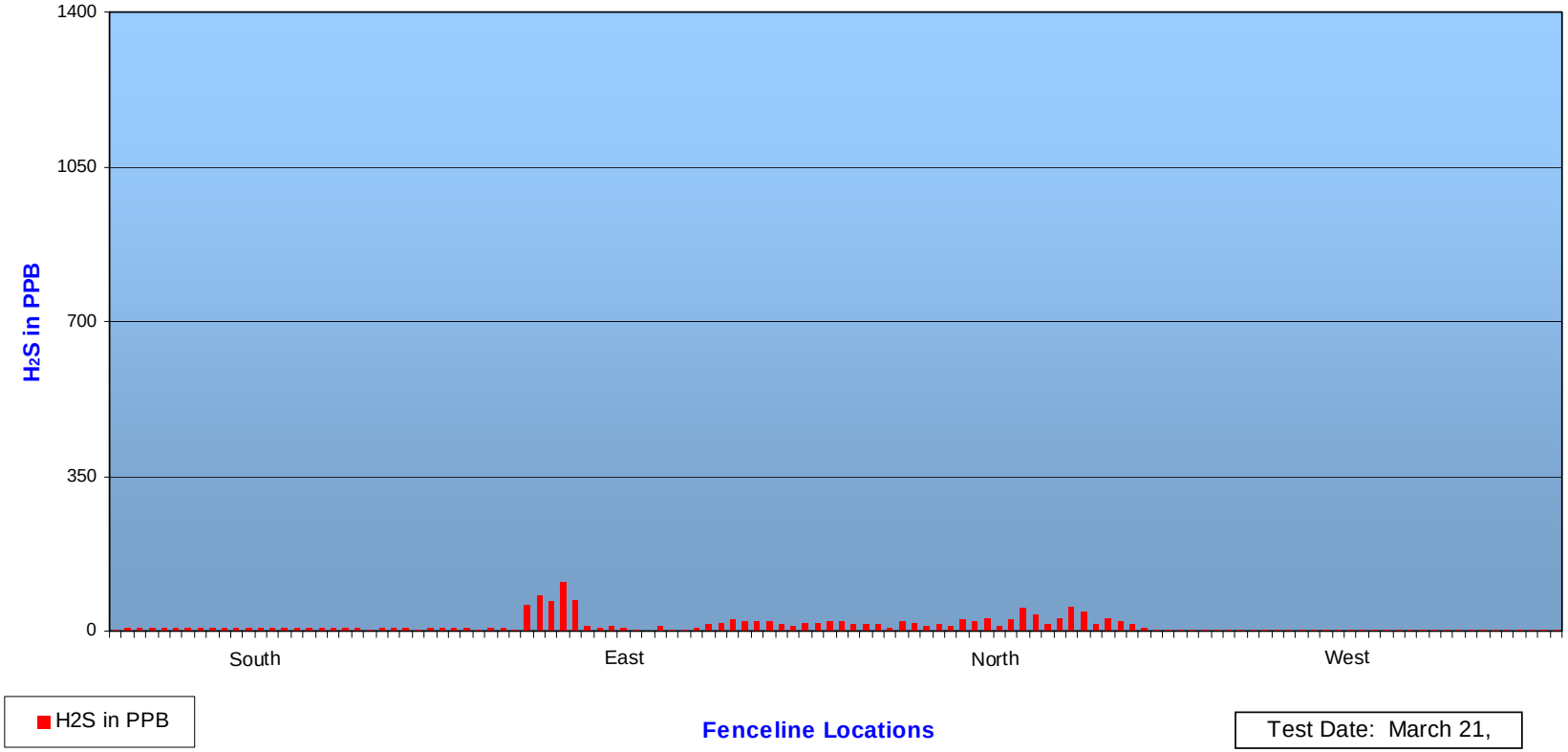
Fenceline Locations

Test Date: June 12, 2007

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

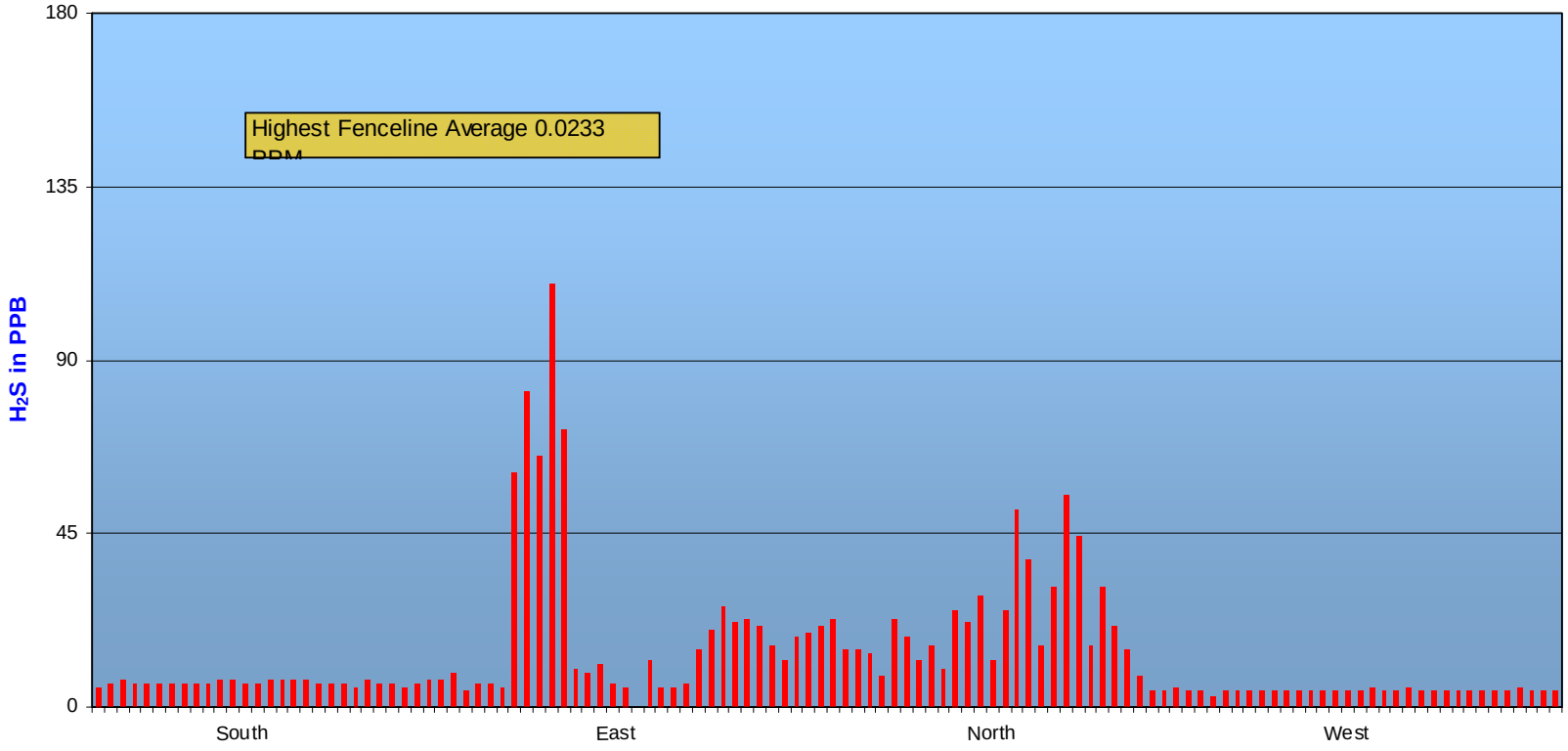
PPB H_2S Versus Fenceline



Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



H2S in PPB

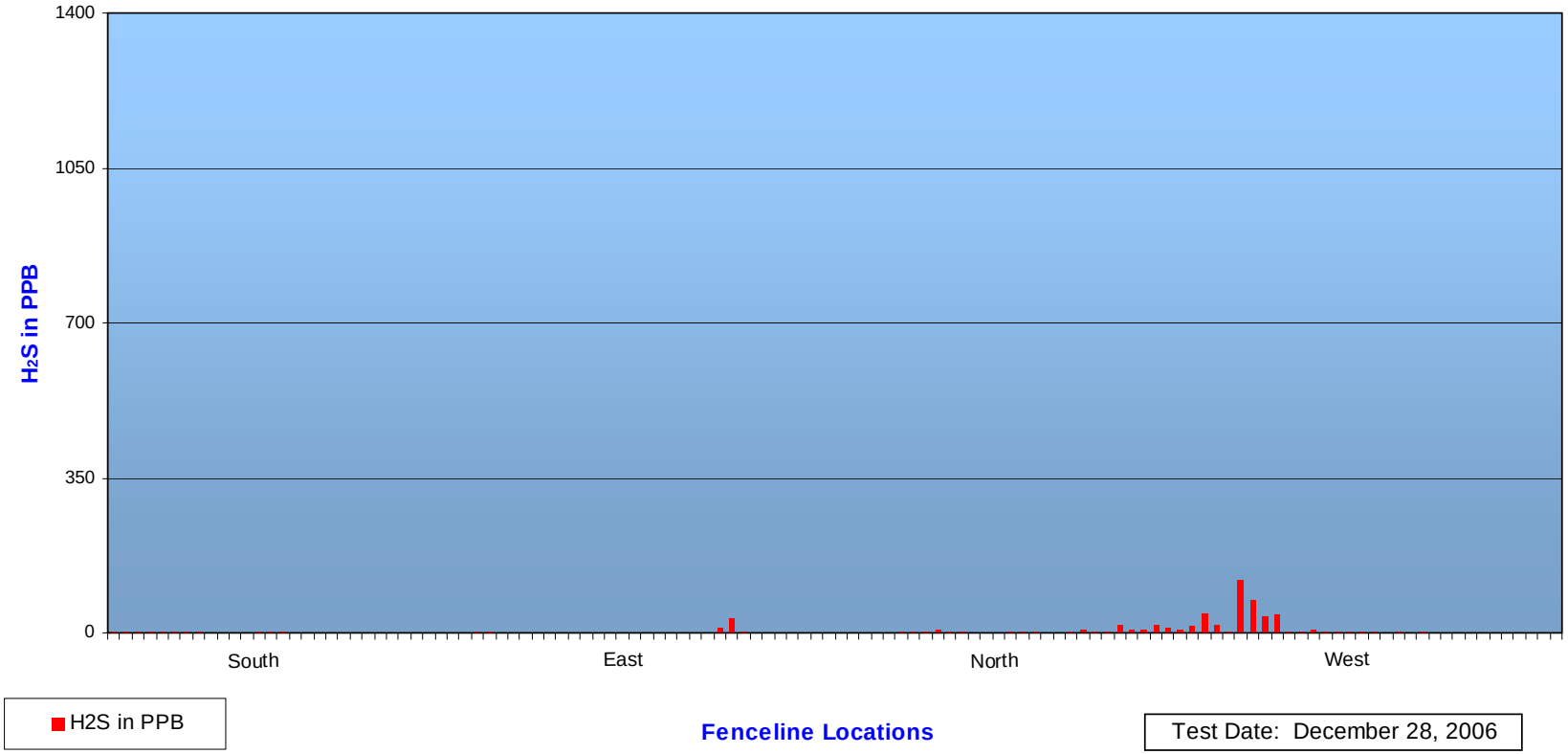
Fenceline Locations

Test Date: March 21,

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline

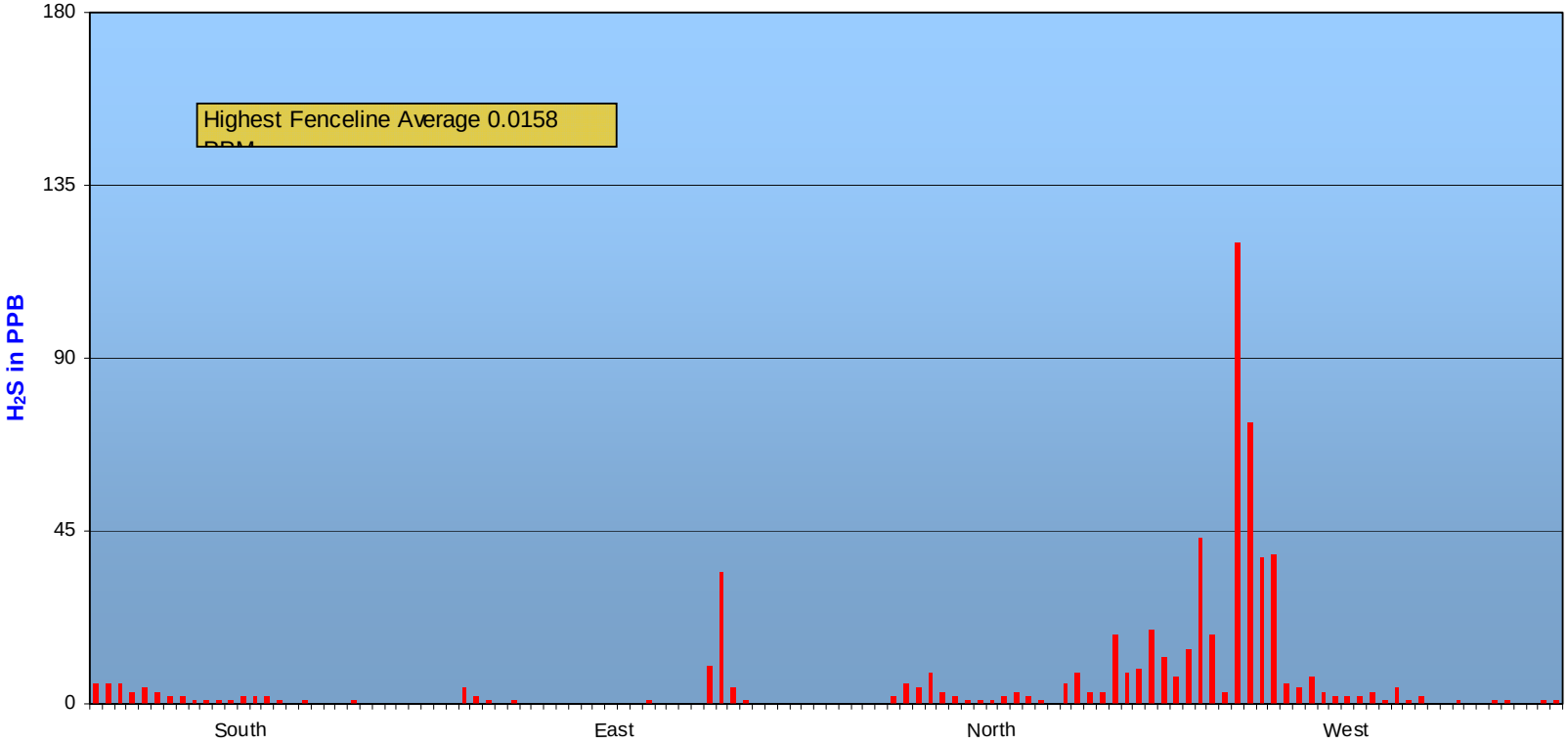


Test Date: December 28, 2006

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



H2S in PPB

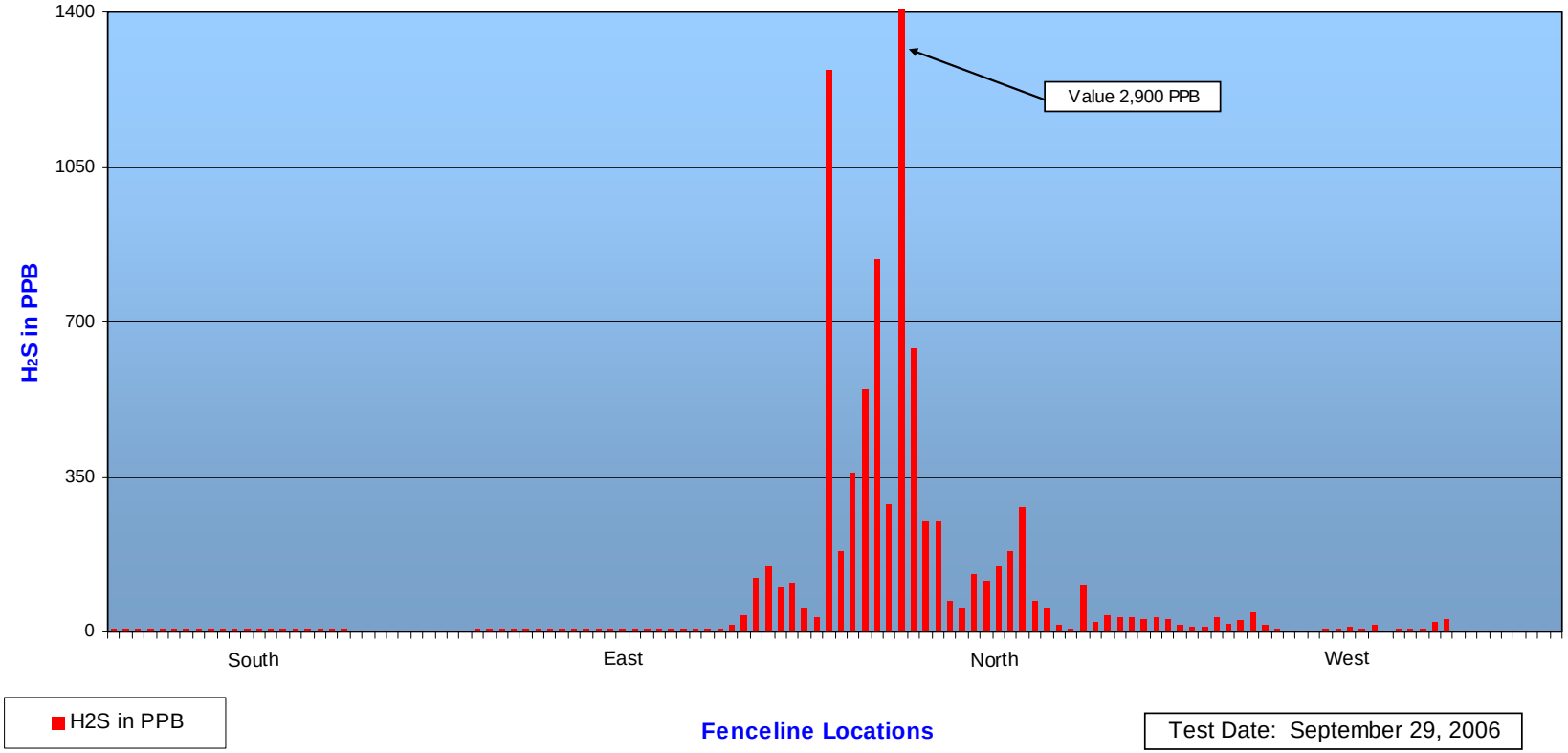
Fenceline Locations

Test Date: December 28, 2006

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline

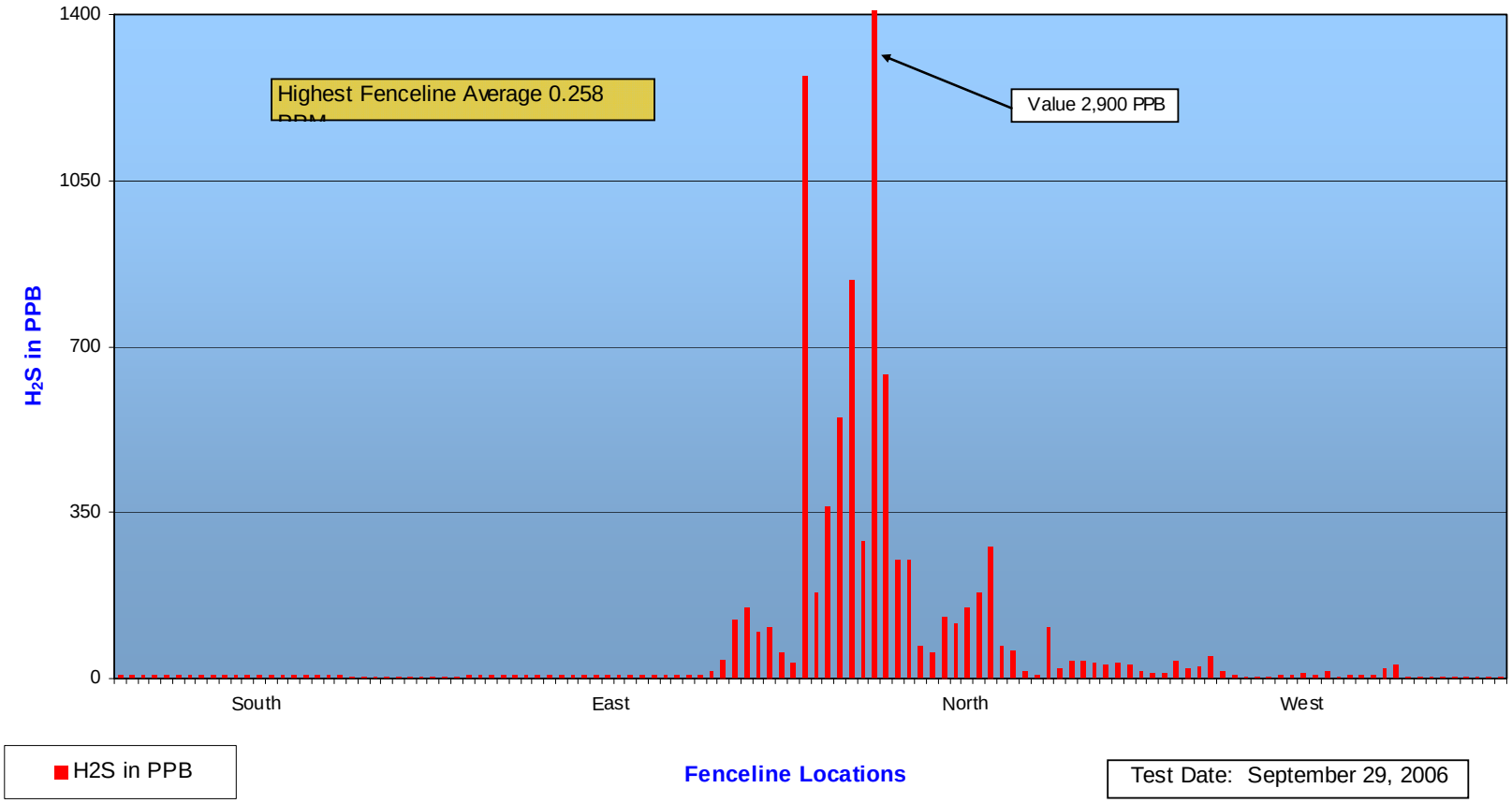


Test Date: September 29, 2006

Roger Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



Test Date: September 29, 2006

APPENDIX B

Ina Road WPCF
Odor Analysis Laboratory Results

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 12:00
Date Received: 2/9/2007
Date Analyzed: 2/7/07
Time Analyzed: 10:53
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**18**	12	**7.2**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**11**	7.8	**3.6**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 11:00
Date Received: 2/9/2007
Date Analyzed: 2/7 - 2/9/07
Time Analyzed: 09:59, 10:21
Volume(s) Analyzed: 0.20 ml(s)
0.05 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**120,000**	35	**88,000**	25	
463-58-1	Carbonyl Sulfide	ND	61	ND	25	
74-93-1	Methyl Mercaptan	**4,500**	49	**2,300**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**3,800**	64	**1,500**	25	
75-15-0	Carbon Disulfide	**51**	39	**16**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	ND	48	ND	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive**
Client Project ID: **Pima County WMD**

CAS Project ID: P2700334
CAS Sample ID: P2700334-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/2007
Time Collected: 11:10
Date Received: 2/9/2007
Date Analyzed: 2/7/07
Time Analyzed: 10:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	**Compound**	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**47**	7.0	**34**	5.0	
463-58-1	Carbonyl Sulfide	**28**	12	**11**	5.0	
74-93-1	Methyl Mercaptan	**10**	9.8	**5.2**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**25**	13	**9.8**	5.0	
75-15-0	Carbon Disulfide	**16**	7.8	**5.0**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 2/09/07
Time Analyzed: 09:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	ND	25	ND	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**16**	5.0	**5.1**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Roger Rd Septage Rec Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**8.0**	5.0	**2.1**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	ND	5.0	ND	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**21**	5.0	**3.6**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**8.4**	5.0	**2.2**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**43**	25	**18**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**320**	5.0	**100**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**16**	5.0	**5.5**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Active** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**8.0**	5.0	**2.0**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**84**	5.0	**22**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**7.9**	5.0	**1.8**	1.2	
179601-23-1	*m,p* -Xylenes	**17**	5.0	**3.8**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**7.8**	5.0	**1.8**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**23**	5.0	**3.8**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**26**	25	**11**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**7.1**	5.0	**2.3**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**7.9**	5.0	**2.7**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Ina Rd Sludge Transfer Inactive** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P2700334-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**13**	5.0	**3.5**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**5.4**	5.0	**1.2**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2700334
Client Project ID: **Pima County WMD** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks In** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-001

Test Code: ASTM D 5504-01 Date Collected: 8/7/2006
Instrument ID: HP5890 II/GC5/SCD Time Collected: 10:40
Analyst: Zheng Wang/Wade Henton Date Received: 8/8/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/8/06
Test Notes: **H** Time Analyzed: 13:08
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**670**	7.0	**480**	5.0	
463-58-1	Carbonyl Sulfide	**67**	12	**27**	5.0	
74-93-1	Methyl Mercaptan	**130**	9.8	**68**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**36**	13	**14**	5.0	
75-15-0	Carbon Disulfide	**38**	7.8	**12**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Headworks Out** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-002

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/7/2006
Time Collected: 10:50
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 10:50
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**69**	12	**28**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**27**	13	**11**	5.0	
75-15-0	Carbon Disulfide	**43**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**18**	9.6	**4.6**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Carbon #3 Inlet** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-003

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/7/2006
Time Collected: 11:20
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 11:14
Volume(s) Analyzed: 0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**80,000**	35	**58,000**	25	
463-58-1	Carbonyl Sulfide	**200**	61	**81**	25	
74-93-1	Methyl Mercaptan	**110**	49	**58**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	ND	64	ND	25	
75-15-0	Carbon Disulfide	**280**	39	**91**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	ND	48	ND	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Carbon #3 Outlet** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-004

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/7/2006
Time Collected: 11:30
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 13:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**13,000**	7.0	**9,600**	5.0	
463-58-1	Carbonyl Sulfide	**210**	12	**87**	5.0	
74-93-1	Methyl Mercaptan	**28**	9.8	**14**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**27**	13	**11**	5.0	
75-15-0	Carbon Disulfide	**270**	7.8	**85**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	**9.3**	16	**3.0**	5.0	**J**
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Carbon #3 Outlet** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-004DUP

Test Code: ASTM D 5504-01 Date Collected: 8/7/2006
Instrument ID: HP5890 II/GC5/SCD Time Collected: 11:30
Analyst: Zheng Wang/Wade Henton Date Received: 8/8/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/8/06
Test Notes: **H** Time Analyzed: 13:54
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**13,000**	7.0	**9,300**	5.0	
463-58-1	Carbonyl Sulfide	**210**	12	**85**	5.0	
74-93-1	Methyl Mercaptan	**28**	9.8	**14**	5.0	
75-08-1	Ethyl Mercaptan	**5.6**	13	**2.2**	5.0	**J**
75-18-3	Dimethyl Sulfide	**27**	13	**11**	5.0	
75-15-0	Carbon Disulfide	**260**	7.8	**85**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	**12**	16	**4.0**	5.0	**J**
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**5.6**	9.6	**1.5**	2.5	**J**
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Centrifuge In SE** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-005

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/7/2006
Time Collected: 11:40
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 11:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**32,000**	7.0	**23,000**	5.0	
463-58-1	Carbonyl Sulfide	**54**	12	**22**	5.0	
74-93-1	Methyl Mercaptan	**320**	9.8	**160**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**70**	13	**28**	5.0	
75-15-0	Carbon Disulfide	**44**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	**7.7**	16	**2.5**	5.0	**J**
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**9.7**	9.6	**2.5**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Centrifuge Out SE** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-006

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/7/2006
Time Collected: 11:50
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 12:22
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**18,000**	7.0	**13,000**	5.0	
463-58-1	Carbonyl Sulfide	**62**	12	**25**	5.0	
74-93-1	Methyl Mercaptan	**220**	9.8	**110**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**95**	13	**37**	5.0	
75-15-0	Carbon Disulfide	**65**	7.8	**21**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**34**	9.6	**8.7**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Centrifuge In NW** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-007

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/7/2006
Time Collected: 12:00
Date Received: 8/8/2006
Date Analyzed: 8/8/06
Time Analyzed: 11:59
Volume(s) Analyzed: 0.50 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**34,000**	14	**25,000**	10	
463-58-1	Carbonyl Sulfide	**66**	25	**27**	10	
74-93-1	Methyl Mercaptan	**1,300**	20	**670**	10	
75-08-1	Ethyl Mercaptan	ND	25	ND	10	
75-18-3	Dimethyl Sulfide	**180**	25	**73**	10	
75-15-0	Carbon Disulfide	**56**	16	**18**	5.0	
75-33-2	Isopropyl Mercaptan	ND	31	ND	10	
75-66-1	tert-Butyl Mercaptan	ND	37	ND	10	
107-03-9	n-Propyl Mercaptan	ND	31	ND	10	
624-89-5	Ethyl Methyl Sulfide	ND	31	ND	10	
110-02-1	Thiophene	ND	34	ND	10	
513-44-0	Isobutyl Mercaptan	ND	37	ND	10	
352-93-2	Diethyl Sulfide	ND	37	ND	10	
109-79-5	n-Butyl Mercaptan	ND	37	ND	10	
624-92-0	Dimethyl Disulfide	**9.1**	19	**2.4**	5.0	**J**
616-44-4	3-Methylthiophene	ND	40	ND	10	
110-01-0	Tetrahydrothiophene	ND	36	ND	10	
638-02-8	2,5-Dimethylthiophene	ND	46	ND	10	
872-55-9	2-Ethylthiophene	ND	46	ND	10	
110-81-6	Diethyl Disulfide	ND	25	ND	5.0	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Centrifuge Out NW** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602132-008

Test Code: ASTM D 5504-01 Date Collected: 8/7/2006
Instrument ID: HP5890 II/GC5/SCD Time Collected: 12:10
Analyst: Zheng Wang/Wade Henton Date Received: 8/8/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/8/06
Test Notes: **H** Time Analyzed: 12:45
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**9,900**	7.0	**7,100**	5.0	
463-58-1	Carbonyl Sulfide	**63**	12	**26**	5.0	
74-93-1	Methyl Mercaptan	**350**	9.8	**180**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**160**	13	**64**	5.0	
75-15-0	Carbon Disulfide	**63**	7.8	**20**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**53**	9.6	**14**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602132
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060808-MB

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang/Wade Henton
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/08/06
Time Analyzed: 09:49
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	**Compound**	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P060809-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	1.0		ND	0.48	
75-01-4	Vinyl Chloride		ND	1.0		ND	0.39	
74-83-9	Bromomethane		ND	1.0		ND	0.26	
75-00-3	Chloroethane		ND	1.0		ND	0.38	
67-64-1	Acetone		ND	5.0		ND	2.1	
75-69-4	Trichlorofluoromethane		ND	1.0		ND	0.18	
75-35-4	1,1-Dichloroethene		ND	1.0		ND	0.25	
75-09-2	Methylene chloride		ND	1.0		ND	0.29	
76-13-1	Trichlorotrifluoroethane		ND	1.0		ND	0.13	
75-15-0	Carbon Disulfide		ND	1.0		ND	0.32	
156-60-5	trans-1,2-Dichloroethe		ND	1.0		ND	0.25	
75-34-3	1,1-Dichloroethane		ND	1.0		ND	0.25	
1634-04-4	Methyl tert-Butyl Ether		ND	1.0		ND	0.28	
108-05-4	Vinyl Acetate		ND	1.0		ND	0.28	
78-93-3	2-Butanone (MEK)		ND	1.0		ND	0.34	
156-59-2	cis-1,2-Dichloroethene		ND	1.0		ND	0.25	
67-66-3	Chloroform		ND	1.0		ND	0.20	
107-06-2	1,2-Dichloroethane		ND	1.0		ND	0.25	
71-55-6	1,1,1-Trichloroethane		ND	1.0		ND	0.18	
71-43-2	Benzene		ND	1.0		ND	0.31	
56-23-5	Carbon Tetrachloride		ND	1.0		ND	0.16	
78-87-5	1,2-Dichloropropane		ND	1.0		ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P060809-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropen	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloroprop	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroeth	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Headworks In	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-001

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	120		25	51		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	8.6		5.0	2.5		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	37		5.0	12		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	9.0		5.0	3.0		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	38		5.0	7.7		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Headworks In	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-001

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	78		5.0	21		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethane		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	15		5.0	3.5		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	5.1		5.0	1.2		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	6.8		5.0	1.1		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Headworks Out	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-002

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	110		25	45		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	7.6		5.0	2.2		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	35		5.0	11		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	8.4		5.0	2.8		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	30		5.0	6.0		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Headworks Out	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-002

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	53		5.0	14		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethane		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene	10		5.0	1.5		0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	6.6		5.0	1.5		1.2	
179601-23-1	m,p-Xylenes	26		5.0	6.0		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	11		5.0	2.6		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	17		5.0	2.8		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Carbon #3 Inlet	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-003

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/9 - 8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.025	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	71		25	30		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	11		5.0	3.2		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	200		5.0	64		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	9.8		5.0	3.3		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	54		5.0	11		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Carbon #3 Inlet	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-003

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/9 - 8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.025	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone	8.5		5.0	2.1		1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	1,100		5.0	300		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	11		5.0	2.6		1.2	
179601-23-1	m,p-Xylenes	26		5.0	6.0		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	12		5.0	2.7		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	24		5.0	4.0		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Carbon #3 Outlet	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-004

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.025	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	66		25	28		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	12		5.0	3.3		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	150		5.0	48		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	10		5.0	3.5		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	66		5.0	14		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Carbon #3 Outlet	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-004

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.025	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene	14		5.0	2.6		0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone	8.2		5.0	2.0		1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	790		5.0	210		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene	8.3		5.0	1.2		0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	18		5.0	4.1		1.2	
179601-23-1	m,p-Xylenes	28		5.0	6.5		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	13		5.0	2.9		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	16		5.0	2.7		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge In SE	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-005

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	49		25	21		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	7.1		5.0	2.0		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	87		5.0	28		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	8.5		5.0	2.9		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge In SE	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-005

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	180		5.0	47		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	5.7		5.0	1.3		1.2	
179601-23-1	m,p-Xylenes	17		5.0	3.8		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	6.5		5.0	1.5		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge Out SE	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-006

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	63		25	26		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	7.7		5.0	2.2		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	73		5.0	24		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	11		5.0	3.6		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge Out SE	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-006

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Aristotle Bragasin	Date(s) An	8/9/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	190		5.0	49		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethane		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	7.8		5.0	1.8		1.2	
179601-23-1	m,p-Xylenes	20		5.0	4.6		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	7.9		5.0	1.8		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	6.0		5.0	0.99		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge In NW	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-007

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	59		25	25		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	8.8		5.0	2.5		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	150		5.0	47		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	8.0		5.0	2.7		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge In NW	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-007

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06
Analyst:	Chaney Bolster	Date(s) An	8/10/06
Sampling Media:	Tedlar Bag	Volume(s) 0.20	Liter(s)
Test Notes:			

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	170		5.0	44		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethane		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	5.2		5.0	1.2		1.2	
179601-23-1	m,p-Xylenes	15		5.0	3.4		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	5.9		5.0	1.4		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge Out NW	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-008

Test Code:	EPA TO-15 Modified	Date Colle	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	66		25	28		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	10		5.0	3.0		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	76		5.0	24		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	9.4		5.0	3.2		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Centrifuge Out NW	CAS Projec	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602132-008

Test Code:	EPA TO-15 Modified	Date Collec	8/7/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/8/06	
Analyst:	Chaney Bolster	Date(s) An	8/10/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	170		5.0	46		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethane		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	6.5		5.0	1.5		1.2	
179601-23-1	m,p-Xylenes	17		5.0	3.9		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	6.7		5.0	1.5		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P060808-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Aristotle Bragasin	Date(s) An	8/8/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethe	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602132
Client Project ID:	Ina Rd WPCP	CAS Samp	P060808-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA
Analyst:	Aristotle Bragasin	Date(s) An	8/8/06
Sampling Media:	Tedlar Bag	Volume(s) 1.00	Liter(s)
Test Notes:			

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropen	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloroprop	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroeth	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Inlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-001

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 13:40
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 10:51
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**16**	7.0	**12**	5.0	
463-58-1	Carbonyl Sulfide	**74**	12	**30**	5.0	
74-93-1	Methyl Mercaptan	**30**	9.8	**15**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**95**	13	**37**	5.0	
75-15-0	Carbon Disulfide	**44**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Outlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-002

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 13:50
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 12:01
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**34**	7.0	**24**	5.0	
463-58-1	Carbonyl Sulfide	**94**	12	**38**	5.0	
74-93-1	Methyl Mercaptan	**35**	9.8	**18**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**100**	13	**40**	5.0	
75-15-0	Carbon Disulfide	**53**	7.8	**17**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-003

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 14:20
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 13:43
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,400**	7.0	**1,000**	5.0	
463-58-1	Carbonyl Sulfide	**31**	12	**13**	5.0	
74-93-1	Methyl Mercaptan	**110**	9.8	**55**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**15**	13	**5.9**	5.0	
75-15-0	Carbon Disulfide	**43**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-004

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 14:30
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 14:07
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,400**	7.0	**980**	5.0	
463-58-1	Carbonyl Sulfide	**52**	12	**21**	5.0	
74-93-1	Methyl Mercaptan	**95**	9.8	**48**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**14**	13	**5.4**	5.0	
75-15-0	Carbon Disulfide	**41**	7.8	**13**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-004DUP

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/8/2006
Time Collected: 14:30
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 14:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,400**	7.0	**1,000**	5.0	
463-58-1	Carbonyl Sulfide	**52**	12	**21**	5.0	
74-93-1	Methyl Mercaptan	**100**	9.8	**52**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**16**	13	**6.5**	5.0	
75-15-0	Carbon Disulfide	**40**	7.8	**13**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-005

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 14:00
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 12:55
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**450**	7.0	**320**	5.0	
463-58-1	Carbonyl Sulfide	**31**	12	**13**	5.0	
74-93-1	Methyl Mercaptan	**30**	9.8	**15**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**16**	13	**6.2**	5.0	
75-15-0	Carbon Disulfide	**30**	7.8	**9.5**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-006

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 14:10
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 13:19
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**300**	7.0	**220**	5.0	
463-58-1	Carbonyl Sulfide	**46**	12	**19**	5.0	
74-93-1	Methyl Mercaptan	**22**	9.8	**11**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**9.1**	13	**3.6**	5.0	**J**
75-15-0	Carbon Disulfide	**43**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks In PM**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602145
CAS Sample ID: P2602145-007

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 13:10
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 11:36
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** µg/m³	MRL µg/m³	**Result** ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**1,200**	7.0	**860**	5.0	
463-58-1	Carbonyl Sulfide	**69**	12	**28**	5.0	
74-93-1	Methyl Mercaptan	**160**	9.8	**81**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**37**	13	**15**	5.0	
75-15-0	Carbon Disulfide	**48**	7.8	**15**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-008

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/2006
Time Collected: 13:20
Date Received: 8/9/2006
Date Analyzed: 8/9/06
Time Analyzed: 12:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**4.3**	7.0	**3.1**	5.0	**J**
463-58-1	Carbonyl Sulfide	**70**	12	**29**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**36**	13	**14**	5.0	
75-15-0	Carbon Disulfide	**65**	7.8	**21**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**12**	9.6	**3.1**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602145
CAS Sample ID: P060809-MB

Test Code: ASTM D 5504-01
Instrument ID: HP5890 II/GC5/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/09/06
Time Analyzed: 10:02
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Inlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-001

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**190**	25	**81**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**14**	5.0	**4.0**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**31**	5.0	**9.9**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**11**	5.0	**3.9**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**81**	5.0	**16**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Inlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**62**	5.0	**17**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**35**	5.0	**5.1**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**7.5**	5.0	**1.7**	1.2	
179601-23-1	*m,p* -Xylenes	**22**	5.0	**5.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**6.5**	5.0	**1.5**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**15**	5.0	**2.6**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Outlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**11**	5.0	**5.1**	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	**46**	5.0	**17**	1.9	
67-64-1	Acetone	**1,700**	25	**700**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**20**	5.0	**5.8**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**33**	5.0	**11**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**16**	5.0	**4.6**	1.4	**M**
78-93-3	2-Butanone (MEK)	**880**	5.0	**300**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**110**	5.0	**22**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**5.6**	5.0	**1.8**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Outlet PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**70**	5.0	**19**	1.3	
591-78-6	2-Hexanone	**72**	5.0	**18**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**28**	5.0	**4.2**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**8.0**	5.0	**1.8**	1.2	
179601-23-1	*m,p* -Xylenes	**22**	5.0	**5.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**5.8**	5.0	**1.4**	1.2	
95-47-6	o-Xylene	**6.6**	5.0	**1.5**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-003

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/11/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**120**	25	**49**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**5.9**	5.0	**1.7**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**38**	5.0	**12**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**12**	5.0	**4.2**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**6.3**	5.0	**1.3**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**55**	5.0	**14**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**11**	5.0	**2.4**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-004

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/11/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**110**	25	**47**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**6.3**	5.0	**1.8**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**46**	5.0	**15**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**10**	5.0	**3.4**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**5.2**	5.0	**1.1**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**46**	5.0	**12**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**9.5**	5.0	**2.2**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-005

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/11/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**63**	25	**27**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.7**	5.0	**2.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**38**	5.0	**12**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**34**	5.0	**11**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**59**	5.0	**16**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**6.0**	5.0	**1.4**	1.2	
179601-23-1	*m,p* -Xylenes	**19**	5.0	**4.3**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**5.6**	5.0	**1.3**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-006

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.10 Liter(s)
Test Notes: 0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	**38**	10	**18**	4.8	
75-01-4	Vinyl Chloride	**14**	10	**5.4**	3.9	
74-83-9	Bromomethane	ND	10	ND	2.6	
75-00-3	Chloroethane	**290**	10	**110**	3.8	
67-64-1	Acetone	**2,300**	50	**990**	21	**M**
75-69-4	Trichlorofluoromethane	ND	10	ND	1.8	
75-35-4	1,1-Dichloroethene	ND	10	ND	2.5	
75-09-2	Methylene chloride	**21**	10	**6.0**	2.9	
76-13-1	Trichlorotrifluoroethane	ND	10	ND	1.3	
75-15-0	Carbon Disulfide	**33**	10	**11**	3.2	
156-60-5	trans-1,2-Dichloroethene	ND	10	ND	2.5	
75-34-3	1,1-Dichloroethane	**26**	10	**6.4**	2.5	
1634-04-4	Methyl tert-Butyl Ether	ND	10	ND	2.8	
108-05-4	Vinyl Acetate	**24**	10	**6.8**	2.8	**M**
78-93-3	2-Butanone (MEK)	**1,600**	10	**530**	3.4	
156-59-2	cis-1,2-Dichloroethene	ND	10	ND	2.5	
67-66-3	Chloroform	ND	10	ND	2.0	
107-06-2	1,2-Dichloroethane	ND	10	ND	2.5	
71-55-6	1,1,1-Trichloroethane	ND	10	ND	1.8	
71-43-2	Benzene	ND	10	ND	3.1	
56-23-5	Carbon Tetrachloride	ND	10	ND	1.6	
78-87-5	1,2-Dichloropropane	ND	10	ND	2.2	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Prim Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.10 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	10	ND	1.5	
79-01-6	Trichloroethene	ND	10	ND	1.9	
10061-01-5	cis-1,3-Dichloropropene	ND	10	ND	2.2	
108-10-1	4-Methyl-2-pentanone	ND	10	ND	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	10	ND	2.2	
79-00-5	1,1,2-Trichloroethane	ND	10	ND	1.8	
108-88-3	Toluene	**45**	10	**12**	2.7	
591-78-6	2-Hexanone	**230**	10	**57**	2.4	
124-48-1	Dibromochloromethane	ND	10	ND	1.2	
106-93-4	1,2-Dibromoethane	ND	10	ND	1.3	
127-18-4	Tetrachloroethene	ND	10	ND	1.5	
108-90-7	Chlorobenzene	ND	10	ND	2.2	
100-41-4	Ethylbenzene	ND	10	ND	2.3	
179601-23-1	*m,p* -Xylenes	**13**	10	**3.1**	2.3	
75-25-2	Bromoform	ND	10	ND	0.97	
100-42-5	Styrene	ND	10	ND	2.3	
95-47-6	o-Xylene	ND	10	ND	2.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ND	1.5	
541-73-1	1,3-Dichlorobenzene	ND	10	ND	1.7	
106-46-7	1,4-Dichlorobenzene	ND	10	ND	1.7	
95-50-1	1,2-Dichlorobenzene	ND	10	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-007

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**140**	25	**60**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.3**	5.0	**2.4**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**51**	5.0	**16**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**18**	5.0	**6.2**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**37**	5.0	**7.6**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**5.5**	5.0	**1.7**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks In PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-007

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**69**	5.0	**18**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**20**	5.0	**2.9**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**6.0**	5.0	**1.4**	1.2	
179601-23-1	*m,p* -Xylenes	**18**	5.0	**4.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**5.6**	5.0	**1.3**	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**5.7**	5.0	**0.95**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-008

Test Code: EPA TO-15 Modified Date Collected: 8/8/06
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/9/06
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**120**	25	**52**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.6**	5.0	**2.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**50**	5.0	**16**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**14**	5.0	**4.8**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**36**	5.0	**7.3**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Hdwks Out PM** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602145-008

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/8/06
Date Received: 8/9/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**72**	5.0	**19**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**14**	5.0	**2.1**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**8.1**	5.0	**1.9**	1.2	
179601-23-1	*m,p* -Xylenes	**33**	5.0	**7.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**14**	5.0	**3.2**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**18**	5.0	**3.1**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602145
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Bolster Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 1**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P2602164-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/9/2006
Time Collected: 09:00
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 12:47
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**2,100**	7.0	**1,500**	5.0	
463-58-1	Carbonyl Sulfide	**120**	12	**50**	5.0	
74-93-1	Methyl Mercaptan	**2,700**	9.8	**1,400**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**82**	13	**32**	5.0	
75-15-0	Carbon Disulfide	**63**	7.8	**20**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**50**	9.6	**13**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 2**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P2602164-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/9/2006
Time Collected: 09:15
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 13:21
Volume(s) Analyzed: 0.20 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**26,000**	35	**18,000**	25	
463-58-1	Carbonyl Sulfide	**270**	61	**110**	25	
74-93-1	Methyl Mercaptan	**2,700**	49	**1,400**	25	
75-08-1	Ethyl Mercaptan	ND	64	ND	25	
75-18-3	Dimethyl Sulfide	**200**	64	**80**	25	
75-15-0	Carbon Disulfide	**79**	39	**25**	13	
75-33-2	Isopropyl Mercaptan	ND	78	ND	25	
75-66-1	tert-Butyl Mercaptan	ND	92	ND	25	
107-03-9	n-Propyl Mercaptan	ND	78	ND	25	
624-89-5	Ethyl Methyl Sulfide	ND	78	ND	25	
110-02-1	Thiophene	ND	86	ND	25	
513-44-0	Isobutyl Mercaptan	ND	92	ND	25	
352-93-2	Diethyl Sulfide	ND	92	ND	25	
109-79-5	n-Butyl Mercaptan	ND	92	ND	25	
624-92-0	Dimethyl Disulfide	ND	48	ND	13	
616-44-4	3-Methylthiophene	ND	100	ND	25	
110-01-0	Tetrahydrothiophene	ND	90	ND	25	
638-02-8	2,5-Dimethylthiophene	ND	110	ND	25	
872-55-9	2-Ethylthiophene	ND	110	ND	25	
110-81-6	Diethyl Disulfide	ND	62	ND	13	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 3**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P2602164-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/9/2006
Time Collected: 09:30
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 13:45
Volume(s) Analyzed: 0.10 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**51,000**	70	**37,000**	50	
463-58-1	Carbonyl Sulfide	**570**	120	**230**	50	
74-93-1	Methyl Mercaptan	**4,800**	98	**2,400**	50	
75-08-1	Ethyl Mercaptan	ND	130	ND	50	
75-18-3	Dimethyl Sulfide	**450**	130	**180**	50	
75-15-0	Carbon Disulfide	ND	78	ND	25	
75-33-2	Isopropyl Mercaptan	ND	160	ND	50	
75-66-1	tert-Butyl Mercaptan	ND	180	ND	50	
107-03-9	n-Propyl Mercaptan	ND	160	ND	50	
624-89-5	Ethyl Methyl Sulfide	ND	160	ND	50	
110-02-1	Thiophene	ND	170	ND	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	ND	96	ND	25	
616-44-4	3-Methylthiophene	ND	200	ND	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	ND	230	ND	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration In PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/9/2006
Time Collected: 13:00
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 14:09
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**52**	12	**21**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**32**	7.8	**10**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration Out PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/9/2006
Time Collected: 13:10
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 14:32
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**43**	12	**18**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**24**	7.8	**7.9**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS In AM**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P2602164-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/9/2006
Time Collected: 10:00
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 15:07
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**16**	7.0	**11**	5.0	
463-58-1	Carbonyl Sulfide	**85**	12	**34**	5.0	
74-93-1	Methyl Mercaptan	**9.5**	9.8	**4.8**	5.0	**J**
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**80**	13	**32**	5.0	
75-15-0	Carbon Disulfide	**52**	7.8	**17**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Out AM**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P2602164-007

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **H**

Date Collected: 8/9/2006
Time Collected: 10:10
Date Received: 8/10/2006
Date Analyzed: 8/10/06
Time Analyzed: 15:30
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**11**	7.0	**8.0**	5.0	
463-58-1	Carbonyl Sulfide	**81**	12	**33**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**69**	13	**27**	5.0	
75-15-0	Carbon Disulfide	**69**	7.8	**22**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Anearobic Dig 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-008

Test Code: ASTM D 5504-01 Date Collected: 8/9/2006
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 09:45
Analyst: Zheng Wang Date Received: 8/10/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/10/06
Test Notes: **RH** Time Analyzed: 15:53
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**6,400**	7.0	**4,600**	5.0	
463-58-1	Carbonyl Sulfide	**73**	12	**30**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**52**	7.8	**17**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Anearobic Dig 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-008DUP

Test Code: ASTM D 5504-01 Date Collected: 8/9/2006
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 09:45
Analyst: Zheng Wang Date Received: 8/10/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/10/06
Test Notes: **RH** Time Analyzed: 16:16
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**6,400**	7.0	**4,600**	5.0	
463-58-1	Carbonyl Sulfide	**72**	12	**29**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**51**	7.8	**17**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602164
CAS Sample ID: P060810-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/10/06
Time Analyzed: 10:50
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 1** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-001

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes: 0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**14**	5.0	**3.6**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**410**	25	**170**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**100**	5.0	**33**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**270**	5.0	**92**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**5.1**	5.0	**1.6**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 1** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)
0.025 Liter(s)

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**140**	5.0	**36**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**9.7**	5.0	**2.2**	1.2	
179601-23-1	*m,p* -Xylenes	**31**	5.0	**7.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**11**	5.0	**2.5**	1.2	
95-47-6	o-Xylene	**7.7**	5.0	**1.8**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**44**	5.0	**7.3**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-002

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	**21**	5.0	**5.4**	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**220**	25	**94**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**280**	5.0	**90**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**100**	5.0	**34**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**150**	5.0	**39**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**6.8**	5.0	**1.6**	1.2	
179601-23-1	*m,p* -Xylenes	**21**	5.0	**4.8**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**9.6**	5.0	**2.2**	1.2	
95-47-6	o-Xylene	**5.6**	5.0	**1.3**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**18**	5.0	**3.0**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 3** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	40	ND	19	
75-01-4	Vinyl Chloride	ND	40	ND	16	
74-83-9	Bromomethane	**41**	40	**10**	10	
75-00-3	Chloroethane	ND	40	ND	15	
67-64-1	Acetone	**280**	200	**120**	84	**M**
75-69-4	Trichlorofluoromethane	ND	40	ND	7.1	
75-35-4	1,1-Dichloroethene	ND	40	ND	10	
75-09-2	Methylene chloride	ND	40	ND	12	
76-13-1	Trichlorotrifluoroethane	ND	40	ND	5.2	
75-15-0	Carbon Disulfide	**700**	40	**230**	13	
156-60-5	trans-1,2-Dichloroethene	ND	40	ND	10	
75-34-3	1,1-Dichloroethane	ND	40	ND	9.9	
1634-04-4	Methyl tert-Butyl Ether	ND	40	ND	11	
108-05-4	Vinyl Acetate	**67**	40	**19**	11	**V**
78-93-3	2-Butanone (MEK)	**130**	40	**44**	14	
156-59-2	cis-1,2-Dichloroethene	ND	40	ND	10	
67-66-3	Chloroform	ND	40	ND	8.2	
107-06-2	1,2-Dichloroethane	ND	40	ND	9.9	
71-55-6	1,1,1-Trichloroethane	ND	40	ND	7.3	
71-43-2	Benzene	ND	40	ND	13	
56-23-5	Carbon Tetrachloride	ND	40	ND	6.4	
78-87-5	1,2-Dichloropropane	ND	40	ND	8.7	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.
V = The continuing calibration verification standard was outside (biased high) the method limits for this compound.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Screenings 3** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.025 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	40	ND	6.0	
79-01-6	Trichloroethene	ND	40	ND	7.4	
10061-01-5	cis-1,3-Dichloropropene	ND	40	ND	8.8	
108-10-1	4-Methyl-2-pentanone	ND	40	ND	9.8	
10061-02-6	trans-1,3-Dichloropropene	ND	40	ND	8.8	
79-00-5	1,1,2-Trichloroethane	ND	40	ND	7.3	
108-88-3	Toluene	**130**	40	**36**	11	
591-78-6	2-Hexanone	ND	40	ND	9.8	
124-48-1	Dibromochloromethane	ND	40	ND	4.7	
106-93-4	1,2-Dibromoethane	ND	40	ND	5.2	
127-18-4	Tetrachloroethene	ND	40	ND	5.9	
108-90-7	Chlorobenzene	ND	40	ND	8.7	
100-41-4	Ethylbenzene	ND	40	ND	9.2	
179601-23-1	*m,p* -Xylenes	ND	40	ND	9.2	
75-25-2	Bromoform	ND	40	ND	3.9	
100-42-5	Styrene	ND	40	ND	9.4	
95-47-6	o-Xylene	ND	40	ND	9.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	40	ND	5.8	
541-73-1	1,3-Dichlorobenzene	ND	40	ND	6.7	
106-46-7	1,4-Dichlorobenzene	ND	40	ND	6.7	
95-50-1	1,2-Dichlorobenzene	ND	40	ND	6.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration In PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-004

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**56**	25	**24**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**34**	5.0	**11**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**120**	5.0	**41**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**14**	5.0	**2.8**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration In PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-004

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	**5.3**	5.0	**0.98**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**9.4**	5.0	**2.3**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**54**	5.0	**14**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**6.0**	5.0	**0.88**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**7.7**	5.0	**1.8**	1.2	
179601-23-1	*m,p* -Xylenes	**32**	5.0	**7.3**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**9.3**	5.0	**2.1**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**6.9**	5.0	**1.2**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration Out PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-005

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**350**	25	**150**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**24**	5.0	**7.7**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**310**	5.0	**110**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**13**	5.0	**2.7**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration Out PM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**9.9**	5.0	**2.4**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**45**	5.0	**12**	1.3	
591-78-6	2-Hexanone	**44**	5.0	**11**	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**7.5**	5.0	**1.7**	1.2	
179601-23-1	*m,p* -Xylenes	**28**	5.0	**6.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**8.4**	5.0	**2.0**	1.2	
95-47-6	o-Xylene	**8.2**	5.0	**1.9**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS In AM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-006

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**290**	25	**120**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.2**	5.0	**2.4**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**47**	5.0	**15**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**23**	5.0	**7.9**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**97**	5.0	**20**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**9.1**	5.0	**2.9**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS In AM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	**28**	5.0	**5.2**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**140**	5.0	**38**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	**5.5**	5.0	**0.65**	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**68**	5.0	**10**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**11**	5.0	**2.6**	1.2	
179601-23-1	*m,p* -Xylenes	**37**	5.0	**8.4**	1.2	
75-25-2	Bromoform	**5.2**	5.0	**0.51**	0.48	
100-42-5	Styrene	**7.8**	5.0	**1.8**	1.2	
95-47-6	o-Xylene	**14**	5.0	**3.1**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**19**	5.0	**3.1**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Out AM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-007

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	**9.3**	5.0	**3.5**	1.9	
67-64-1	Acetone	**510**	25	**220**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**8.1**	5.0	**2.3**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**55**	5.0	**18**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**220**	5.0	**74**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**84**	5.0	**17**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	**8.9**	5.0	**2.8**	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Int PS Out AM** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-007

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	**20**	5.0	**3.8**	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**180**	5.0	**48**	1.3	
591-78-6	2-Hexanone	**27**	5.0	**6.6**	1.2	
124-48-1	Dibromochloromethane	**5.2**	5.0	**0.62**	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**71**	5.0	**10**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**12**	5.0	**2.8**	1.2	
179601-23-1	*m,p* -Xylenes	**37**	5.0	**8.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**14**	5.0	**3.3**	1.2	
95-47-6	o-Xylene	**12**	5.0	**2.9**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**8.3**	5.0	**1.4**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Anearobic Dig 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-008

Test Code: EPA TO-15 Modified Date Collected: 8/9/06
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/10/06
Analyst: Ku Chung Date(s) Analyzed: 8/10/06
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**89**	25	**37**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	ND	5.0	ND	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**56**	5.0	**18**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	**25**	5.0	**8.5**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Anearobic Dig 2** CAS Project ID: P2602164
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602164-008

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Ku Chung
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**130**	5.0	**36**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**14**	5.0	**3.1**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**8.2**	5.0	**1.9**	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **DAF Thickener In**
Client Project ID: **Ina Rd WPCP**

CAS Project ID: P2602176
CAS Sample ID: P2602176-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 09:10
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 12:31
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**3,600**	7.0	**2,600**	5.0	
463-58-1	Carbonyl Sulfide	**59**	12	**24**	5.0	
74-93-1	Methyl Mercaptan	**390**	9.8	**200**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**44**	13	**17**	5.0	
75-15-0	Carbon Disulfide	**29**	7.8	**9.2**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Primary In AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 08:45
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 12:54
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**4,300**	7.0	**3,100**	5.0	
463-58-1	Carbonyl Sulfide	**58**	12	**24**	5.0	
74-93-1	Methyl Mercaptan	**240**	9.8	**120**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**17**	13	**6.6**	5.0	
75-15-0	Carbon Disulfide	**27**	7.8	**8.7**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **HPO Primary Out AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 08:55
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 14:17
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**4,500**	7.0	**3,200**	5.0	
463-58-1	Carbonyl Sulfide	**56**	12	**23**	5.0	
74-93-1	Methyl Mercaptan	**240**	9.8	**120**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**21**	13	**8.2**	5.0	
75-15-0	Carbon Disulfide	**31**	7.8	**10**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Primary In AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 08:00
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 14:40
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**330**	7.0	**240**	5.0	
463-58-1	Carbonyl Sulfide	**51**	12	**21**	5.0	
74-93-1	Methyl Mercaptan	**29**	9.8	**15**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**33**	7.8	**11**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Primary Out AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 08:10
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 15:03
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**290**	7.0	**210**	5.0	
463-58-1	Carbonyl Sulfide	**72**	12	**29**	5.0	
74-93-1	Methyl Mercaptan	**27**	9.8	**14**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**39**	7.8	**12**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration In AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 08:20
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 15:26
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**46**	12	**19**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**42**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **BNRAS Aeration Out AM** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-007

Test Code: ASTM D 5504-01 Date Collected: 8/10/2006
Instrument ID: Agilent 6890A/GC13/SCD Time Collected: 08:30
Analyst: Zheng Wang Date Received: 8/11/2006
Sampling Media: Tedlar Bag Date Analyzed: 8/11/06
Test Notes: **RH** Time Analyzed: 15:49
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**68**	12	**28**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**44**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **DAF Thickener Out** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P2602176-008

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes: **RH**

Date Collected: 8/10/2006
Time Collected: 09:20
Date Received: 8/11/2006
Date Analyzed: 8/11/06
Time Analyzed: 16:12
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**2,200**	7.0	**1,500**	5.0	
463-58-1	Carbonyl Sulfide	**52**	12	**21**	5.0	
74-93-1	Methyl Mercaptan	**360**	9.8	**180**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**48**	13	**19**	5.0	
75-15-0	Carbon Disulfide	**41**	7.8	**13**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
RH = Sample received outside of holding time.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2602176
Client Project ID: **Ina Rd WPCP** CAS Sample ID: P060811-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 8/11/06
Time Analyzed: 09:38
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	DAF Thickener In	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-001

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	44		25	18		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride		ND	5.0		ND	1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	61		5.0	20		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	9.0		5.0	3.1		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	DAF Thickener In	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-001

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	110		5.0	28		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	9.9		5.0	2.3		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene		ND	5.0		ND	1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	HPO Primary In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-002

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	78		25	33		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride		ND	5.0		ND	1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	54		5.0	17		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	12		5.0	4.0		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	HPO Primary In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-002

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	58		5.0	16		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene	8.8		5.0	1.3		0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	11		5.0	2.4		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene		ND	5.0		ND	1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	HPO Primary Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-003

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	70		25	29		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride		ND	5.0		ND	1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	54		5.0	17		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	12		5.0	3.9		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	HPO Primary Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-003

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06
Analyst:	Chaney Bolster	Date(s) An	8/11/06
Sampling Media:	Tedlar Bag	Volume(s) 0.20	Liter(s)
Test Notes:			

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	66		5.0	17		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene	12		5.0	1.8		0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	12		5.0	2.8		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene		ND	5.0		ND	1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Primary In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-004

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	51		25	21		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride		ND	5.0		ND	1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	27		5.0	8.6		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	87		5.0	30		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	6.6		5.0	1.3		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Primary In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-004

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	52		5.0	14		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	12		5.0	2.8		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene		ND	5.0		ND	1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Primary Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-005

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11 - 8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.050	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane	12		5.0	5.6		2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane	70		5.0	27		1.9	
67-64-1	Acetone	590		25	250		11	M
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	8.2		5.0	2.4		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	29		5.0	9.3		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane	6.3		5.0	1.6		1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	440		5.0	150		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	6.3		5.0	1.3		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene	9.4		5.0	2.9		1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Primary Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-005

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/11 - 8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:			0.050	Liter(s)
		D.F. =	1.00	

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	77		5.0	21		1.3	
591-78-6	2-Hexanone	93		5.0	23		1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	11		5.0	2.6		1.2	
179601-23-1	m,p-Xylenes	31		5.0	7.2		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	9.3		5.0	2.1		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Aeration In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-006

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	40		25	17		11	
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	5.2		5.0	1.5		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	35		5.0	11		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	76		5.0	26		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	13		5.0	2.7		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Aeration In AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-006

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06
Analyst:	Chaney Bolster	Date(s) An	8/12/06
Sampling Media:	Tedlar Bag	Volume(s) 0.20	Liter(s)
Test Notes:			

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone	7.3		5.0	1.8		1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	45		5.0	12		1.3	
591-78-6	2-Hexanone		ND	5.0		ND	1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	6.7		5.0	1.5		1.2	
179601-23-1	m,p-Xylenes	26		5.0	6.1		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene	8.1		5.0	1.9		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene	6.7		5.0	1.1		0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Aeration Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-007

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	130		25	54		11	M
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	5.7		5.0	1.6		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	33		5.0	11		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	130		5.0	45		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform	12		5.0	2.5		1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	BNRAS Aeration Out AM	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-007

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone	7.5		5.0	1.8		1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	47		5.0	13		1.3	
591-78-6	2-Hexanone	16		5.0	3.9		1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene		ND	5.0		ND	0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene	7.4		5.0	1.7		1.2	
179601-23-1	m,p-Xylenes	27		5.0	6.3		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene	6.0		5.0	1.4		1.2	
95-47-6	o-Xylene	8.3		5.0	1.9		1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	DAF Thickener Out	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-008

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
74-87-3	Chloromethane		ND	5.0		ND	2.4	
75-01-4	Vinyl Chloride		ND	5.0		ND	2.0	
74-83-9	Bromomethane		ND	5.0		ND	1.3	
75-00-3	Chloroethane		ND	5.0		ND	1.9	
67-64-1	Acetone	120		25	50		11	M
75-69-4	Trichlorofluoromethane		ND	5.0		ND	0.89	
75-35-4	1,1-Dichloroethene		ND	5.0		ND	1.3	
75-09-2	Methylene chloride	5.9		5.0	1.7		1.4	
76-13-1	Trichlorotrifluoroethane		ND	5.0		ND	0.65	
75-15-0	Carbon Disulfide	56		5.0	18		1.6	
156-60-5	trans-1,2-Dichloroethe		ND	5.0		ND	1.3	
75-34-3	1,1-Dichloroethane		ND	5.0		ND	1.2	
1634-04-4	Methyl tert-Butyl Ether		ND	5.0		ND	1.4	
108-05-4	Vinyl Acetate		ND	5.0		ND	1.4	
78-93-3	2-Butanone (MEK)	53		5.0	18		1.7	
156-59-2	cis-1,2-Dichloroethene		ND	5.0		ND	1.3	
67-66-3	Chloroform		ND	5.0		ND	1.0	
107-06-2	1,2-Dichloroethane		ND	5.0		ND	1.2	
71-55-6	1,1,1-Trichloroethane		ND	5.0		ND	0.92	
71-43-2	Benzene		ND	5.0		ND	1.6	
56-23-5	Carbon Tetrachloride		ND	5.0		ND	0.80	
78-87-5	1,2-Dichloropropane		ND	5.0		ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	DAF Thickener Out	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P2602176-008

Test Code:	EPA TO-15 Modified	Date Colle	8/10/06	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	8/11/06	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	0.20	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³		MRL µg/m³	Result ppbV		MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan		ND	5.0		ND	0.75	
79-01-6	Trichloroethene		ND	5.0		ND	0.93	
10061-01-5	cis-1,3-Dichloropropen		ND	5.0		ND	1.1	
108-10-1	4-Methyl-2-pentanone		ND	5.0		ND	1.2	
10061-02-6	trans-1,3-Dichloroprop		ND	5.0		ND	1.1	
79-00-5	1,1,2-Trichloroethane		ND	5.0		ND	0.92	
108-88-3	Toluene	110		5.0	29		1.3	
591-78-6	2-Hexanone	5.3		5.0	1.3		1.2	
124-48-1	Dibromochloromethan		ND	5.0		ND	0.59	
106-93-4	1,2-Dibromoethane		ND	5.0		ND	0.65	
127-18-4	Tetrachloroethene	6.1		5.0	0.90		0.74	
108-90-7	Chlorobenzene		ND	5.0		ND	1.1	
100-41-4	Ethylbenzene		ND	5.0		ND	1.2	
179601-23-1	m,p-Xylenes	13		5.0	3.0		1.2	
75-25-2	Bromoform		ND	5.0		ND	0.48	
100-42-5	Styrene		ND	5.0		ND	1.2	
95-47-6	o-Xylene		ND	5.0		ND	1.2	
79-34-5	1,1,2,2-Tetrachloroeth		ND	5.0		ND	0.73	
541-73-1	1,3-Dichlorobenzene		ND	5.0		ND	0.83	
106-46-7	1,4-Dichlorobenzene		ND	5.0		ND	0.83	
95-50-1	1,2-Dichlorobenzene		ND	5.0		ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P060811-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethe	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P060811-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/11/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropen	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloroprop	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethan	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroeth	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P060812-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethe	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	Lamb Technical Services, Inc.		
Client Sample ID:	Method Blank	CAS Proje	P2602176
Client Project ID:	Ina Rd WPCP	CAS Samp	P060812-MB

Test Code:	EPA TO-15 Modified	Date Colle	NA	
Instrument ID:	Tekmar AUTOCAN/HP5972/HP5890 II+/MS2	Date Recei	NA	
Analyst:	Chaney Bolster	Date(s) An	8/12/06	
Sampling Media:	Tedlar Bag	Volume(s)	1.00	Liter(s)
Test Notes:				

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethan	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropen	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloroprop	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethan	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroeth	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

St. Croix Sensory, Inc.

LTS, Inc.

Ina Rd WPCP

Odor Evaluation Report

Report No. 622001
08/08/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622001**

Evaluation Date: 08/08/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Headworks Scrubber Inlet	1,700	910					
2	2	Headworks Scrubber Outlet	260	140					
3	3	Solid Holding Tank Inlet	510,000	320,000					**The field sample was diluted 200:1 for the odor evaluation.**
4	4	Solid Holding Tank Outlet	7,100	5,100					
5	5	Centrifuge Scrubber Inlet SE	18,000	12,000					
6	6	Centrifuge Scrubber Outlet SE	10,000	6,200					
7	7	Centrifuge Scrubber Inlet NW	150,000	110,000					**The field sample was diluted 200:1 for the odor evaluation.**
8	8	Centrifuge Scrubber Outlet NW	9,200	5,800					
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622001**

Evaluation Date: 08/08/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Page 1 of 1

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Ina Rd WPCP

Sampling Date: 8/7/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Headworks Scrubber Inlet	10:40	–	X					
2	2	Headworks Scrubber Outlet	10:50	–	X					
3	3	Solid Holding Tank ~~DAF Thickener Scrubber Inlet~~	11:20	–	X					
4	4	Solid Holding Tank " " " Outlet	11:30	–	X					
5	5	Centrifuge Scrubber In SE	11:40	–	X					
6	6	" " Out SE	11:50	–	X					
7	7	" " In NW	12:00	–	X					
8	8	" " Out NW	12:10	–	X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/7/06	17:15				Per Ed Lamb change sample discriptions
Received at St. Croix Sensory Laboratory			[illegible]	8/8/06	9:30	From DAF thickener scrubber to solids holding tank.

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ♦ 3549 Lake Elmo Avenue North ♦ Lake Elmo, MN 55042 U.S.A. ♦ Tel:800-879-9231 ♦ Fax:651-439-1065 ♦ Email:reports@fivesenses.com ♦ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Comments Key:

A Sample bag was received without sample.

B Insufficient sample volume to complete evaluation.

C Sample bag was received with condensation in the bag.

D Sample description was not provided.

E Assessors did not observe the sample at full stregth for Intensity, Characterization, or Persistency evaluations.

- **E1** Sample was observed at a maximum of 50% dilution.
- **E2** Only Persistency evaluation was conducted.

F Assessors did not observe the sample for Intensity, Characterization, or Persistency evaluations.

G By client request, the IITRI Dynamic Dilution Triangle Olfactometer, with a sample presentation flow rate of 0.5-lpm and a Method Detection Limit for Detection and Recognition Threshold of '4', was used to determine the thresholds for this odor evaluation

If you have any questions regarding the comments for this evaluation, please contact our lab at +800-879-9231 ext.12.

St. Croix Sensory, Inc.

LTS, Inc.

Ina Rd WPCP

Odor Evaluation Report

Report No. 622101
08/09/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622101**

Evaluation Date: 08/09/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Intermediate PS Inlet PM	1,700	1,200					
2	2	Intermediate PS Outlet PM	3,800	2,500					
3	3	HPO Primary Inlet PM	4,100	2,900					
4	4	HPO Primary Outlet PM	4,700	3,100					
5	5	BNRAS Primary Inlet PM	1,100	850					
6	6	BNRAS Primary Outlet PM	7,000	5,000					
7	7	Headworks Inlet PM	3,400	2,400					
8	8	Headworks Outlet PM	1,400	910					
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622101**

Evaluation Date: 08/09/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Ina Rd WPCP

Sampling Date: 8/8/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Intermediate PS Inlet PM	13:40		X					
2	2	" " Outlet PM	13:50		X					
3	3	HPO Primary Inlet PM	14:20		X					
4	4	" " Outlet PM	14:30		X					
5	5	BNRAS Primary Inlet PM	14:00		X					
6	6	BNRAS Primary Outlet PM	14:10		X					
7	7	Headworks Inlet PM	13:10		X					
8	8	" Outlet PM	13:20		X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/8/06	15:00				
Received at St. Croix Sensory Laboratory			[illegible]	8/9/06	9:45	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ♦ 3549 Lake Elmo Avenue North ♦ Lake Elmo, MN 55042 U.S.A. ♦ Tel:800-879-9231 ♦ Fax:651-439-1065 ♦ Email:reports@fivesenses.com ♦ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Comments Key:

A Sample bag was received without sample.

B Insufficient sample volume to complete evaluation.

C Sample bag was received with condensation in the bag.

D Sample description was not provided.

E Assessors did not observe the sample at full stregth for Intensity, Characterization, or Persistency evaluations.

- **E1** Sample was observed at a maximum of 50% dilution.
- **E2** Only Persistency evaluation was conducted.

F Assessors did not observe the sample for Intensity, Characterization, or Persistency evaluations.

G By client request, the IITRI Dynamic Dilution Triangle Olfactometer, with a sample presentation flow rate of 0.5-lpm and a Method Detection Limit for Detection and Recognition Threshold of '4', was used to determine the thresholds for this odor evaluation

If you have any questions regarding the comments for this evaluation, please contact our lab at +800-879-9231 ext.12.

St. Croix Sensory, Inc.

LTS, Inc.

Ina Rd WPCP

Odor Evaluation Report

Report No. 622201
08/10/06

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622201**

Evaluation Date: 08/10/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Screenings 1	50,000	25,000					**The field sample was prediluted 100:1 for evaluation.**
2	2	Screenings 2	220,000	150,000					**The field sample was prediluted 100:1 for evaluation.**
3	3	Screenings 3	120,000	70,000					**The field sample was prediluted 100:1 for evaluation.**
4	4	BNRAS Aeration Inlet PM	1,500	790					
5	5	BNRAS Aeration Outlet PM	3,900	2,700					
6	6	Intermediate PS Inlet AM	490	280					
7	7	Intermediate PS Outlet AM	4,200	2,600					
8	8	Anaerobic Dig #2	6,900	4,200					
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LTS, Inc.

Project: Ina Rd WPCP

Report No.: **622201**

Evaluation Date: 08/10/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Ing Rd WPCP

Sampling Date: 8/9/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	Screenings 1	9:00		X					
2	2	" 2	9:15		X					
3	3	" 3	9:30		X					
4	4	BNRAS Aeration In PM	13:00		X					
5	5	" " Out PM	13:10		X					
6	6	Intermediate PS In AM	10:00		X					
7	7	" " Out AM	10:10		X					
8	8	Anaerobic Dig #2	9:45		X					
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/9/06	14:30				
Received at St. Croix Sensory Laboratory			Arthur Klont	8/10/06	10:05	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ♦ 3549 Lake Elmo Avenue North ♦ Lake Elmo, MN 55042 U.S.A. ♦ Tel:800-879-9231 ♦ Fax:651-439-1065 ♦ Email:reports@fivesenses.com ♦ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Comments Key:

A Sample bag was received without sample.

B Insufficient sample volume to complete evaluation.

C Sample bag was received with condensation in the bag.

D Sample description was not provided.

E Assessors did not observe the sample at full stregth for Intensity, Characterization, or Persistency evaluations.

- **E1** Sample was observed at a maximum of 50% dilution.
- **E2** Only Persistency evaluation was conducted.

F Assessors did not observe the sample for Intensity, Characterization, or Persistency evaluations.

G By client request, the IITRI Dynamic Dilution Triangle Olfactometer, with a sample presentation flow rate of 0.5-lpm and a Method Detection Limit for Detection and Recognition Threshold of '4', was used to determine the thresholds for this odor evaluation

If you have any questions regarding the comments for this evaluation, please contact our lab at +800-879-9231 ext.12.

St. Croix Sensory, Inc.

Lamb Technical Services, Inc.

Ira Rd WPCP

Odor Evaluation Report

Report No. 622301
08/11/06

Data Release Authorization:

Natasha Kaslow
Laboratory Associate

Reviewed and Approved:

Michael A. McGinley, P.E.
Laboratory Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services, Inc. Report No.: **622301**

Project: Ira Rd WPCP Evaluation Date: 08/11/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	DAF Thickener Scrubber Inlet	5,200	2,700					
2	2	HPO Primary In AM	4,200	2,200					
3	3	HPO Primary Out AM	4,200	2,200					
4	4	BNRAS Primary In AM	420	230					
5	5	BNRAS Primary Out AM	1,900	1,100					
6	6	BNRAS Aeration In AM	70	45					
7	7	BNRAS Aeration Out AM	1,300	730					
8	8	DAF Thickener Scrubber Outlet	1,700	960					

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: Lamb Technical Services, Inc. Report No.: **622301**

Project: Ira Rd WPCP Evaluation Date: 08/11/06

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Client: LTS, Inc

Sampled By: Ed Lamb

Project Name: Ina Rd WPCP

Sampling Date: 8/10/06

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1	1	DAF Thickener Scrubber Inlet	9:10		X					
2	2	H2O Primary In AM	8:45		X					
3	3	" " Out AM	8:55		X					
4	4	BNRAS " In AM	8:00		X					
5	5	" " Out AM	8:10		X					
6	6	BNRAS Aeration In AM	8:20		X					
7	7	" " Out AM	8:30		X					
8	8	DAF Thickener Scrubber Outlet	9:20							
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes 2

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	8/10/06	11:00				
Received at St. Croix Sensory Laboratory			Nathan Bloom	8/11/06	10:00	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Comments Key:

A Sample bag was received without sample.

B Insufficient sample volume to complete evaluation.

C Sample bag was received with condensation in the bag.

D Sample description was not provided.

E Assessors did not observe the sample at full stregth for Intensity, Characterization, or Persistency evaluations.

- **E1** Sample was observed at a maximum of 50% dilution.
- **E2** Only Persistency evaluation was conducted.

F Assessors did not observe the sample for Intensity, Characterization, or Persistency evaluations.

G By client request, the IITRI Dynamic Dilution Triangle Olfactometer, with a sample presentation flow rate of 0.5-lpm and a Method Detection Limit for Detection and Recognition Threshold of '4', was used to determine the thresholds for this odor evaluation

If you have any questions regarding the comments for this evaluation, please contact our lab at +800-879-9231 ext.12.

St. Croix Sensory, Inc.

LambTech, Inc.

Pima County WMD

Odor Evaluation Report

Report No. 704001
02/09/07

Data Release Authorization:

Natasha Kaslow
Laboratory Associate

Reviewed and Approved:

Michael A. McGinley, P.E.
Laboratory Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LambTech, Inc.

Project: Pima County WMD

Report No.: **704001**

Evaluation Date: 02/09/07

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1	1	Ina Rd Sludge xfer Active	21,000	14,000					
2	2	Ina Rd Sludge xfer Inactive	160	110					
3	4	Roger Rd Septage Rec Inactive	110	60					
4									
5									
6									
7									
8									
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LambTech, Inc.

Project: Pima County WMD

Report No.: **704001**

Evaluation Date: 02/09/07

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Page 1 of 1

Client: LambTech

Sampled By: Ed Lamb

Project Name: Pima County WMD

Sampling Date: 2/8/07

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No. 1N 1N

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")
1	1	Ina Rd Sludge xfer Active	11:00	/	X			
2	2	" " " " Inactive	11:10	/	X			
3	~~3~~	~~Roger Rd Septage Rec. Active~~	/	~~/~~	~~X~~			
4	4	" " " " Inactive	12:00	/	X			
5								
6								
7								
8								
9								
10								
11								
12								

Transmittal

Number of Shipping Boxes 1

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
Ed Lamb	2/9/07					
Received at St. Croix Sensory Laboratory			Natasha Koslow	2/9/07	10:15	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

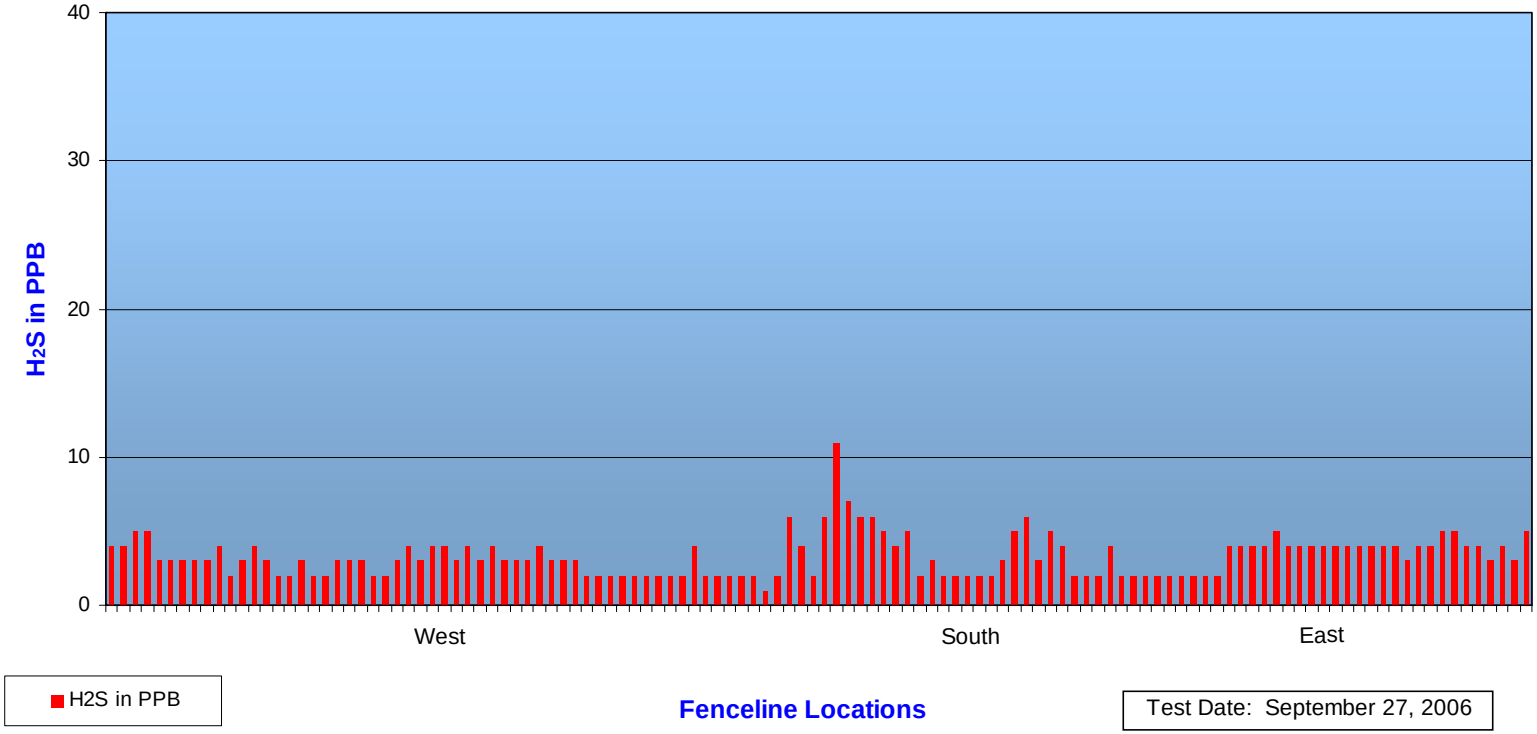
LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

Ina Road Wastewater Treatment Facility

Fenceline Evaluation

PPB H_2S Versus Fenceline



APPENDIX B

Green Valley WWTP
Odor Analysis Laboratory Results

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Grit & Rags**
Client Project ID: **Green Valley/1**

CAS Project ID: P2701813
CAS Sample ID: P2701813-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/2007
Time Collected: 13:00
Date Received: 6/21/2007
Date Analyzed: 6/21/07
Time Analyzed: 10:01
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** µg/m³	MRL µg/m³	**Result** ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**14**	7.0	**10**	5.0	
463-58-1	Carbonyl Sulfide	**14**	12	**5.7**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**28**	7.8	**8.9**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Oxidation Ditch** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/2007
Time Collected: 13:45
Date Received: 6/21/2007
Date Analyzed: 6/21/07
Time Analyzed: 13:07
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**210**	7.0	**150**	5.0	
463-58-1	Carbonyl Sulfide	**33**	12	**13**	5.0	
74-93-1	Methyl Mercaptan	**270**	9.8	**140**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**71**	13	**28**	5.0	
75-15-0	Carbon Disulfide	**27**	7.8	**8.6**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aerobic Digestion** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/2007
Time Collected: 14:30
Date Received: 6/21/2007
Date Analyzed: 6/21/07
Time Analyzed: 13:28
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**100**	7.0	**72**	5.0	
463-58-1	Carbonyl Sulfide	**40**	12	**16**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**36**	7.8	**11**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Sludge Beds** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/2007
Time Collected: 14:50
Date Received: 6/21/2007
Date Analyzed: 6/21/07
Time Analyzed: 13:50
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**95**	7.0	**68**	5.0	
463-58-1	Carbonyl Sulfide	**57**	12	**23**	5.0	
74-93-1	Methyl Mercaptan	**86**	9.8	**44**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	**1,200**	13	**480**	5.0	
75-15-0	Carbon Disulfide	**55**	7.8	**18**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	**230**	9.6	**60**	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Influent Wet Well** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/2007
Time Collected: 15:15
Date Received: 6/21/2007
Date Analyzed: 6/21/07
Time Analyzed: 14:12
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	**Result** **µg/m³**	MRL µg/m³	**Result** **ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**100**	7.0	**75**	5.0	
463-58-1	Carbonyl Sulfide	**30**	12	**12**	5.0	
74-93-1	Methyl Mercaptan	**15**	9.8	**7.7**	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**37**	7.8	**12**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Green Valley/1**

CAS Project ID: P2701813
CAS Sample ID: P070621-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 6/21/07
Time Analyzed: 09:16
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	**Compound**	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

St. Croix Sensory, Inc.

LambTech

Green Valley

Odor Evaluation Report

Report No. 717203
06/21/07

Data Release Authorization:

Melissa McGinley
Laboratory Associate

Reviewed and Approved:

Charles M. McGinley, P.E.
Technical Director

St. Croix Sensory is a laboratory dedicated to practicing state-of-the-art sensory evaluation and to advancing the science of sensory perception.

We are a family owned and operated business providing our clients with personal customer service, flexible scheduling, timely results.

Our focus is to provide the best professional services available to help make your project or product a success.

www.fivesenses.com

3549 Lake Elmo Avenue North
P.O. Box 313
Lake Elmo, Minnesota 55042 U.S.A.

Tel: 800-879-9231
Fax: 651-439-1065

Email: stcroix@fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LambTech

Project: Green Valley

Report No.: **717203**

Evaluation Date: 06/21/07

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
1		Grit & Rags Bin	550	270					**Sample Field Numbers were not provided.**
2		Oxidation Ditch	2,300	1,200					
3		Aerobic Digester	810	450					
4		Sludge Beds	1,900	1,100					
5		Influent Wet Well	1,200	810					
6									
7									
8									
9									
10									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc. **Odor Evaluation Report**

Client: LambTech

Project: Green Valley

Report No.: **717203**

Evaluation Date: 06/21/07

			ASTM E679 & EN13725		ASTM E544	PERSISTENCY	CHARACTERIZATION		
#	Field No.	Sample Description	Detection Threshold	Recognition Threshold	Intensity	Dose-Response Slope	Hedonic Tone	Principal Odor Descriptors	**Comments**
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

P.O. Box 313, 3549 Lake Elmo Ave. N., Lake Elmo, MN 55042 U.S.A. Tel:800-879-9231 Fax:651-439-1065 E-mail:stcroix@fivesenses.com Web:www.fivesenses.com

St. Croix Sensory, Inc.

CHAIN OF CUSTODY RECORD FOR ODOR SAMPLES

Page 1 of 1

Client: Green valley WWTP

Sampled By: Jarrod Camp

Project Name: Green valley

Sampling Date: 6-20-07

Comments:

Odor Evaluations Requested: (X)

For Laboratory use Only

Odor Evaluation Report No.

Laboratory Sample No.

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Odor Concentration* (Detection & Recognition Threshold)	Odor Intensity* (PPM 1-Butanol)	Odor Characterization (Hedonic Tone & Descriptors)	Odor Persistency ("Dose-Response")	LN	FN
1		Grit Rag's Bin	1:00							
2		oxidation Ditch	1:45							
3		Aerobic Digestor	2:30							
4		Sludge Beds	2:50							
5		Influent wet well	3:15							
6										
7										
8										
9										
10										
11										
12										

Transmittal

Number of Shipping Boxes _____

Relinquished By	Date	Time	Accepted By	Date	Time	Comments & Exceptions Noted
[signature]	6/20/07	4:30pm				
Received at St. Croix Sensory Laboratory			[signature]	6/21/07	9:55	

*Odor Concentration: ASTM E679-04 and EN13725:2003 and Odor Intensity: ASTM E544-99(2004)

St. Croix Sensory, Inc. ◆ 3549 Lake Elmo Avenue North ◆ Lake Elmo, MN 55042 U.S.A. ◆ Tel:800-879-9231 ◆ Fax:651-439-1065 ◆ Email:reports@fivesenses.com ◆ Web:www.fivesenses.com

LAB COPIES WHITE & YELLOW

CLIENT COPY PINK

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Grit & Rags** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-001

Test Code: EPA TO-15 Modified Date Collected: 6/20/07
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/21/07
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**33**	25	**14**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**12**	5.0	**3.4**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**19**	5.0	**6.2**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**7.2**	5.0	**2.1**	1.4	
78-93-3	2-Butanone (MEK)	**5.6**	5.0	**1.9**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Grit & Rags** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/07
Date Received: 6/21/07
Date(s) Analyzed: 6/21/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**13**	5.0	**3.6**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**6.9**	5.0	**1.0**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**11**	5.0	**2.6**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	**5.3**	5.0	**1.2**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Oxidation Ditch** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-002

Test Code: EPA TO-15 Modified Date Collected: 6/20/07
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/21/07
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**120**	25	**51**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**14**	5.0	**4.0**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**18**	5.0	**5.7**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	**5.4**	5.0	**1.3**	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**6.1**	5.0	**1.7**	1.4	
78-93-3	2-Butanone (MEK)	**7.4**	5.0	**2.5**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	**21**	5.0	**4.3**	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	**260**	5.0	**48**	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Oxidation Ditch** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/07
Date Received: 6/21/07
Date(s) Analyzed: 6/21/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**16**	5.0	**4.3**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**6.7**	5.0	**0.98**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**5.6**	5.0	**1.3**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aerobic Digestion** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-003

Test Code: EPA TO-15 Modified Date Collected: 6/20/07
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/21/07
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**49**	25	**21**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**10**	5.0	**3.0**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**22**	5.0	**6.9**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**5.6**	5.0	**1.6**	1.4	**M**
78-93-3	2-Butanone (MEK)	**20**	5.0	**6.7**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference due to coelution with a non-target compound; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Aerobic Digestion** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/07
Date Received: 6/21/07
Date(s) Analyzed: 6/21/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**280**	5.0	**74**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**6.0**	5.0	**0.89**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	ND	5.0	ND	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Sludge Beds** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-004

Test Code: EPA TO-15 Modified Date Collected: 6/20/07
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/21/07
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**140**	25	**59**	11	**M**
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**12**	5.0	**3.3**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**34**	5.0	**11**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**5.2**	5.0	**1.5**	1.4	**M**
78-93-3	2-Butanone (MEK)	**100**	5.0	**34**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference due to coelution with a non-target compound; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Sludge Beds** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/07
Date Received: 6/21/07
Date(s) Analyzed: 6/21/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	**5.3**	5.0	**1.3**	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**190**	5.0	**51**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**5.5**	5.0	**0.82**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**6.7**	5.0	**1.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	ND	5.0	ND	1.2	
95-47-6	o-Xylene	ND	5.0	ND	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Influent Wet Well** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-005

Test Code: EPA TO-15 Modified Date Collected: 6/20/07
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/21/07
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.20 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
74-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**39**	25	**17**	11	
75-69-4	Trichlorofluoromethane	ND	5.0	ND	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**12**	5.0	**3.5**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**26**	5.0	**8.2**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	**9.3**	5.0	**2.6**	1.4	**M**
78-93-3	2-Butanone (MEK)	**6.6**	5.0	**2.3**	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference due to coelution with a non-target compound; results may be biased high.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Influent Wet Well** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P2701813-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 6/20/07
Date Received: 6/21/07
Date(s) Analyzed: 6/21/07
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	ND	5.0	ND	0.93	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**17**	5.0	**4.5**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	**9.3**	5.0	**1.4**	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	ND	5.0	ND	1.2	
179601-23-1	*m,p* -Xylenes	**15**	5.0	**3.5**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**6.4**	5.0	**1.5**	1.2	
95-47-6	o-Xylene	**7.0**	5.0	**1.6**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	**6.1**	5.0	**1.0**	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P070621-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Lamb Technical Services, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P2701813
Client Project ID: **Green Valley/1** CAS Sample ID: P070621-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date(s) Analyzed: 6/21/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By:_____Date:_____

APPENDIX C

Green Valley WWTP Odor Investigation Report

Green Valley WWTP

Odor Complaint Investigations

Pima County
Wastewater Management Department

DRAFT – June 2007

GREELEY AND HANSEN

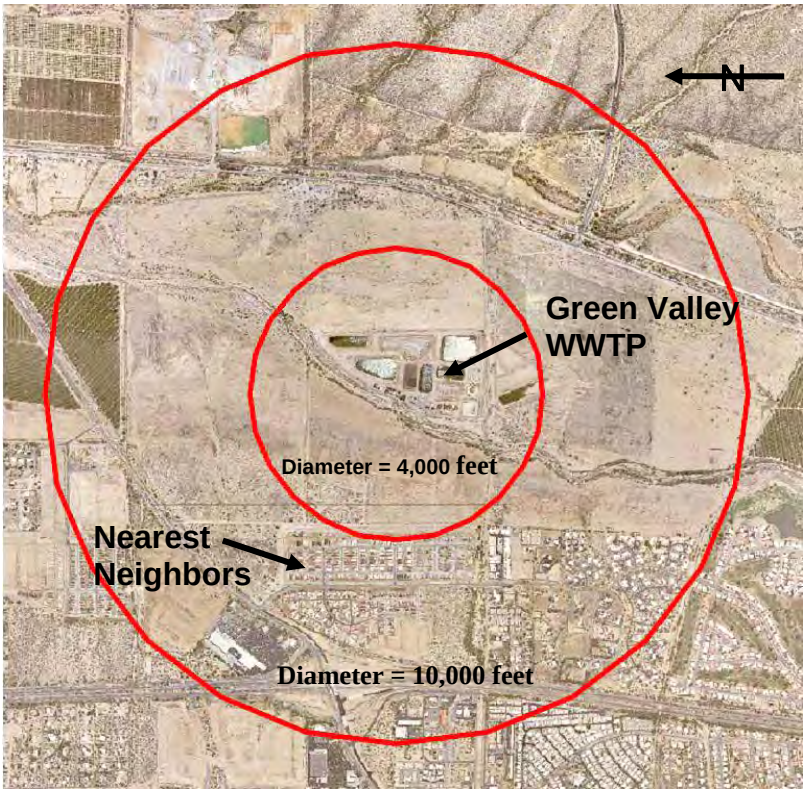
1. Introduction

On Tuesday, June 12th, the Green Valley Wastewater Treatment Plant was visited to investigate the probable cause of recent community odor complaints attributed to the facilities. The time of the visit was late morning. The weather was sunny with a mild wind traveling north to northwest across the site during the visit.

2. Treatment Facilities/Operations

The Green Valley treatment facilities are new and are situated along the east bank of the Santa Cruz River approximately 22 miles south of downtown Tucson. The facilities are surrounded by open lands on the south, east and north. The Santa Cruz River valley lies along the west side of the plant. The nearest neighbors are in a housing development on the west bank of the Santa Cruz River which is about 2,200 feet from the facilities. These houses are at or above the same elevation as the plant, and have a clear sight of the treatment works. Just north and west of the housing development is a strip mall with a variety of stores and a bank. This mall also has clear sight lines to the facilities. The location of the plant is shown on **Figure No. 1**.

Figure 1
Location of the WWTP



Wastewater treatment includes preliminary treatment works (headworks), followed by the biological nutrient removal oxidation ditch (BNROD) and circular clarifiers. Effluent is pumped to percolation basins located south of the plant. No effluent is discharged into the Santa Cruz River. The treatment works handle about 1.8 to 2.0 mgd. Parallel to the BNROD operation are two parallel trains of primary and secondary lagoons each followed by an effluent maturation/settling lagoon. One lagoon train system was in service and receives about 100,000 gallons of wastewater per day.

Solids removed from the clarifiers are pumped to a gravity belt thickener which discharges thickened sludge into one of two aerobic digesters. The gravity belt thickener increases solids to 3 to 4 percent. Periodically when sludge in the first aerobic digester reaches the level of 12 feet a portion (3 feet) of the contents is withdrawn and is discharged into the second aerobic digester. Digested sludge is withdrawn from the second aerobic digester every two to three days and is pumped to a belt filter press to dewater sludge to 15 percent prior to depositing the solids into a dump body truck for transport to a set of drying beds. The reported solids retention time under aerobic digestion is 22 days. The belt filter press is operated on a routine basis two or three times per week to dewater the solids.

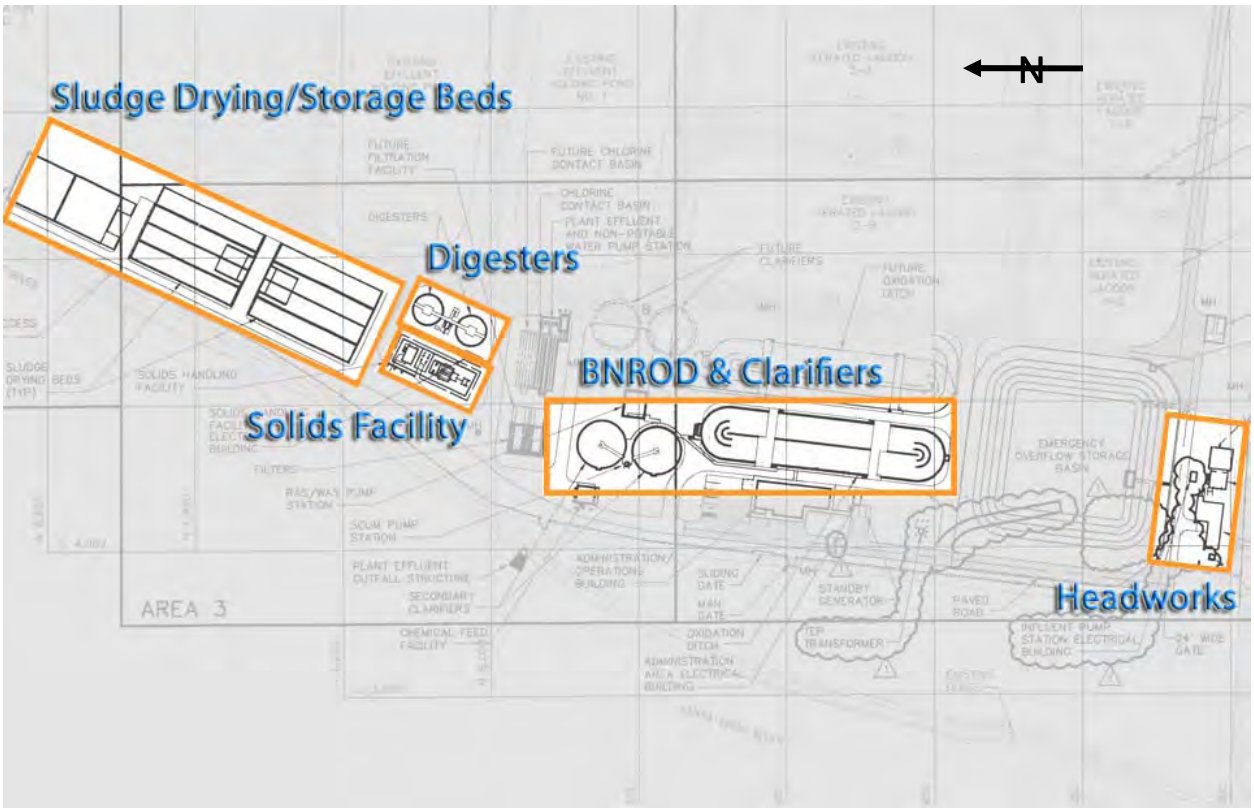
Sludge drying beds are open air type with low walls (2 to 3 feet high) to contain the solids during the air drying process. Bottoms of the drying beds are gently sloped to an under-drain trough along the length of the drying bed. There are a total of five (5) sludge drying beds. The fifth drying bed is used for long-term storage (over 90 days). The other four drying beds are actively utilized on a rotational basis to receive dewatered sludge and to dry the solids by turning with mechanical equipment (front-end loader). It is reported that the under-drain is plugged and nonfunctional. This is common for drying beds. During the rainy season a vactor truck is brought on site to collect and remove the free-standing water.

The sludge loading and handling procedure in the drying beds is as follows. Several time a week dewatered solids are directly deposited with a dump body truck into one drying bed (depth of deposited sludge is one to two feet). No free water was observed from the deposited solids. After 5 to 6 weeks of depositing dewatered sludge the bed will be one-half full. Once the bed is one-half full, solids are turned over with a front-end loader to promote drying. Prior to this time the solids are too “wet” to be handled by mechanical equipment. After the initial turning of the solids in a bed, solids will be continually turned every two to three days until the solids content reaches approximately 75 percent. This requires about 90 days.

Once the solids are turned in a drying bed no additional solids are added to that bed. The next empty drying bed is used to receive dewatered sludge. Once the sludge is in the drying beds and turned over for drying for 90 days, the dried solids are moved to storage (bed #5) where the solids are stockpiled until moved offset for final disposition (mine tailings at ASARCO Mines). Over the last two years, solids have been removed from the stockpile twice. This final disposal operation creates a significant stockpile before the solids are transported offsite.

A site plan of the facilities is shown on **Figure 2.**

Figure 2
Plant Facilities Site Plan



3. Odor Observations

South of the main plant gate of the Green Valley WWTP are the effluent percolation basins. These operations were observed for traces of odors or odor potential. There were no noticeable or objectionable odors emanating from the percolation system operations.

After entering the main gates the preliminary treatment operations (grit and screenings removal systems) were observed. These facilities were covered and a biofilter odor control system was in service to treat odors from these unit operations. There were no objectionable odors discharging from the biofilter system and it appeared to be performing satisfactorily. It was observed that the grit classifier was under repair and the grit receiving bin cover was open which created some localized odors. Later it was learned that the grit classifier was under repair earlier that day and was being placed back into service later that day.

Also, it was learned that the water irrigation system for the preliminary treatment biofilter odor control system was not functioning, however, a work authorization order was being issued to correct the malfunction. PCWMD was informed that the media in the biofilter is organic and that they should fix the water system as soon as possible, because if the media dries out, it may not be "rewettable" and would therefore need to be replaced in its entirety.

Near the preliminary treatment works there is a splitter box that appears to divide the flow between the BNROD and the lagoon systems. This splitter box has an open top arrangement and some odors were emanating from this structure. The odors were localized and not highly malodorous.

Plant overflow basin, which is located between the preliminary treatment facilities and the BNROD facilities, was clean and dry. No odors were present.

The BNROD facilities were in service and no objectionable odors were noticed in the vicinity of the units.

The area around the aerobic digesters, gravity belt thickener and belt press dewater units had some odors associated with them. Aerobic digesters are open top units. The gravity belt thickener and belt dewatering press have a canopy roof overhead and screening walls surrounding the units, but are essentially open air facilities.

Odors around the drying beds were the most noticeable. These drying areas have large exposed surfaces and depending on wind direction and velocity may carry odors for some distance offsite. Samples were taken from three different sludge drying beds which represented different stages of the drying process. The samples were from:

- Sample 1 - from "freshest" bed
- Sample 2 - from bed that had just been turned, sludge approx. 5-6 weeks old.
- Sample 3 - from bed that was considered finished and was ready to have biosolids transferred to storage (bed # 5)

Samples were tested for hydrogen sulfide (H2S) and ammonia (NH3) using Gastec Adsorbent tubes specific for those two compounds. Detection level of the tubes is on order of 1 ppmv for both compounds.

Test Results

Sample #	H2S conc (ppmv)	NH3 conc (ppmv)
1	ND*	55
2	ND*	120
3	ND *	32

ND = Non Detect

From the data above, NH3 concentrations were higher in Sample # 2 than in the fresh biosolids dumped into the beds that day. This strongly suggests that the sludge is continuing to stabilize or "be biologically worked upon" after placement in the drying beds.

The operating lagoon system was observed and no objectionable odors were present. It was understood that a blue dye was added to at least one lagoon basin to suppress excessive algae growth and the associated odors.

4. Conclusions

While there is potential for offsite odors from the aerobic digesters, gravity belt thickeners and belt dewatering press areas, the most prominent odor source appears to be the sludge drying beds area. Based on field observations and testing of the odors being released from the different drying beds, it is apparent that the biosolids may not be completely stabilized during aerobic digestion process and that there is additional biological activity ongoing within the drying beds. As the biosolids dry in the beds, there is a crust formed on the surface which essentially caps the odors, although there are low levels of "earthy" odors adjacent sludge piles with a crust. When the beds are turned to facilitate drying, significant odors are released.

In sampling and testing the different sludge drying beds, the bed that was several weeks old and had just been turned earlier that day had higher odor levels than the fresh sludge placed on the drying bed. With a well stabilized sludge odor concentrations would be expected to decline over time. Ammonia was detected in all samples. Sulfides were not detected in any sample.

5. Next Steps

There are several steps for addressing odors at the Green Valley Plant, which are:

1. Conduct a formal odor collection and testing survey of the plant facilities. This has been ordered by Pima County and will be conducted on the week of June 18th. Results from the laboratory testing are expected within one to three weeks following sampling.

2. Determine the volatile solids reduction achieved in the aerobic digesters. This would provide some insight as to the level of stabilization that is being achieved.

3. PCWMD needs to address the continuation of sludge drying at Green Valley. There are three options listed in the order of consideration:

    - If class A biosolids from Green Valley are needed for use as cover on the mine tailings, consider moving the drying bed process to a more remote facility (perhaps the ASARCO Mine location for drying). The drying beds will continue to release odors when mixing of the bed contents occurs.
    - If sludge drying is to continue at Green Valley, consider installing a counteractant misting system around the beds. At a minimum, the counteractant system should be located along the bed perimeter walls on the west and north sides between the neighbors and the dying beds. The system could be mounted on a new fence which would also provide a visual barrier.

    - The last option would be to add chemicals to the dewatering process in order to assist in stabilizing the biosolids and mitigate odor generation/release. This would require bench and pilot-scale testing prior to full-scale implementation. The chemical to be used and the injection point would need to be determined. There is potential for other odor release points at the dewatering process.

APPENDIX D

Air Quality Operating Permits

Roger Road WWTP Air Quality Operating Permits
Ina Road WPCF Air Quality Operating Permits

APPENDIX D

Roger Road WWTP
Air Quality Operating Permits

T-0085

DEPARTMENT OF ENVIRONMENTAL QUALITY
150 West Congress Street
Tucson, Arizona 85701-1317

Ursula Kramer
Director

(520) 740-3340
FAX (520) 882-7709

Bye m
3/7/05

February 23, 2005

Jackson Jenkins
Deputy Director
Wastewater Management Department
201 N. Stone Avenue
Tucson, Arizona 85701-1207

Dear Mr. Jenkins:

Enclosed is a final, renewal permit for Roger Road Wastewater Treatment Plant, located at 2600 W. Sweetwater Drive in Tucson, Arizona. The permit contains parts A, B, C, and D. Part A consists of the general conditions that apply to all facilities. Part B consists of the specific conditions that apply to your facility. Part C contains the list of applicable requirements and Part D is an equipment list.

Please keep a copy of this permit at the 2600 W. Sweetwater Drive - Tucson, AZ facility for the life of the permit term. This renewal will go into effect on February 23, 2005 and remain valid for 5 years.

If you have any questions or need additional information, please contact me or Mukonde Chama at (520) 740-3340.

Sincerely,

K Lawrence

Kathi Lawrence
Environmental Planning Manager

Enclosure: Final Renewal Permit for Roger Road Treatment Plant #1913

PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY

150 West Congress Street • Tucson, AZ 85701 • Phone: (520) 740-3340

AIR QUALITY OPERATING PERMIT

(As required by Title 17.12, Article II, Pima County Code)

ISSUED TO:

PIMA COUNTY WASTEWATER MANAGEMENT DIVISION
ROGER ROAD TREATMENT PLANT
2600 WEST SWEETWATER DRIVE
TUCSON, AZ 85705

This air quality operating permit does not relieve applicant of responsibility for meeting all air pollution regulations

THIS PERMIT ISSUED SUBJECT TO THE FOLLOWING **Conditions contained in Attachments "A", "B", "C", "D" and "E".**

PDEQ PERMIT NUMBER **1913** PERMIT CLASS **II** EXPIRATION DATE **February 22, 2010**

PERMIT ISSUED THIS **23rd** DAY OF **FEBRUARY TWO THOUSAND AND FIVE**

SIGNATURE

Kathi Lawrence Environmental Planning Manager, PDEQ
TITLE

November 2004

INTRODUCTION

The Roger Road Wastewater Treatment Plant is a Publicly Owned Treatment Facility operated by Pima County Wastewater Management Department. It serves a portion of the Tucson metropolitan area. The treatment plant is rated at 41 million gallons per day (average dry weather flow). It is an emission source for criteria pollutants and HAPS. Emission sources include the headworks, primary clarifiers, biotowers, aeration basins, secondary clarifiers, chlorination and dechlorination systems, natural/digester gas powered engines, an emergency generator and digester gas flares. Emissions from the treatment process are insignificant sources of potential VOCs and HAPs from the process fluids. Capturing air at the Headworks and passing it through wood chips controls most of these emissions. This also helps in odor control. The emergency generator and emergency flare are also classified as an insignificant activity.

After Dechlorination, the fluids are discharged to the Santa Cruz River, Tucson Water Reclamation Plant for further treatment or to the Silverbell Golf Course for irrigation. Digested sludge is pumped to the regional sludge management facility at the Ina Road Water Pollution Control Facility.

Electric power for the plant is provided by nine engines ranging from 357 HP to 935 HP that are fueled by Digester Gas generated from the treatment process. The engines burn natural gas or propane gas when there is not sufficient Digester gas, although this is not preferred due to the relative higher cost of pipeline natural gas. Normally, eight engines are sufficient to meet the power demand, while one engine in the power house is for standby. The emergency generator is located in the chlorine building. There is another mobile generator that is not permitted under this permit since it is not stationary. It would be insignificant equipment even if it were stationary.

The following Table shows the Potential to Emit for the plant with synthetic minor limitations as outlined in Part B of the permit for the various buildings, engines and processes.

Pollutant	TPY
Nitrogen Dioxide (as NO_x)	39.18
Carbon Monoxide (CO)	84.49
Volatile Organic Compounds (VOC)	32.51
Total Hazardous Air Pollutants (HAPS)	6.98

Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant
Air Quality Permit Number 1913
Summary Table

Emission Unit	Pollutants Emitted	Control Measure	Emission Limits/Standards	Monitoring/ Recordkeeping	Reporting	Testing Frequency/Methods
Facility-wide	Odor Hydrogen Sulfide	Control Odors and hydrogen sulfide through the use of scrubbers & similar control equipment or use of good modern practices to minimize odor emissions.	Limit odors so as not to cause air pollution. H_2S concentration beyond premises < 0.03 ppm by volume for any period ≥ 30min.	Inspect facility Maintain all records of inspections for five years	Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	Not necessary unless requested by the Control Officer.
Stationary Rotating Equipment 9 Natural Gas and Digester Gas fired electric power generators	CO, NOx, VOC, HAPs	Fuel Limitation Hourly Limitation	$E \leq 1.02 Q^{0.716}$ lb/hr Opacity ≤ 40% for any period >10 seconds. (10 seconds: First 10min: exempt Opacity ≤ 40 % for point sources. Only use pipeline quality natural gas, commercial propane or digester gas in engines. Group GB ≤ 18,000 hrs/yr Group PS4 ≤ 21,000 hrs/yr Group DB ≤ 18,000 hrs/yr	Monitor operating hours. Fuel type records. Opacity monitoring. Maintain records for five years.	Report when sulfur content > 0.8 % Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	Testing to determine compliance with the mass emission limit for PM is not necessary unless requested by the Control Officer. EPA Test Method 9 or Test Method 22 shall be used to monitor compliance with the opacity standard.
Particulate Matter	PM_{10}	Use of reasonably necessary and feasible precautions to control particulate matter.	Opacity ≤ 20 % for fugitive sources. No visible emissions beyond property boundary line. Limit odors beyond property line.	Opacity monitoring. Maintain records for five years.	Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	EPA Test Method 9 or Test Method 22 shall be used to monitor compliance with the opacity standard.

Permit Issued To:
Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant
Tucson, AZ 85705

Permit Number: 1913

TABLE OF CONTENTS

Part "A": General Provisions 5
- I. Permit Expiration and Renewal 5
- II. Compliance with Permit Conditions 5
- III. Permit Revision, Reopening, Revocation and Reissuance, or Termination for Cause 5
- IV. Posting of Permit 6
- V. Fee Payment 6
- VI. Annual Emissions Inventory Questionnaire 6
- VII. Compliance Certification 7
- VIII. Certification of Truth, Accuracy and Completeness 7
- IX. Inspection and Entry 7
- X. Permit Revision Pursuant to Federal Hazardous Air Pollutant Standard 8
- XI. Affirmative Defenses for Excess Emissions Due to Malfunctions, Startup, and Shutdown 8
- XII. Record Keeping Requirements 10
- XIII. Reporting Requirements 11
- XIV. Duty to Provide Information 12
- XV. Permit Amendment or Revision 13
- XVI. Facility Change Without Permit Revision 13
- XVII. Testing Requirements 14
- XVIII. Property Rights 15
- XIX. Severability Clause 15
- XX. Permit Shield 15
- XXI. Accident Prevention Requirements Under the Clean Air Act (CAA Section 112(r)) 15

Part "B": Specific Conditions 17
- I. Applicability 17
- II. Emission Limits and Standards 17
- III. Monitoring Requirements 19
- IV. Recordkeeping Requirements 20
- IV. Reporting requirements 21
- V. Testing Requirements 22

Part "C": Applicable Regulations 23

Part "D": Equipment List & Insignificant Activities 24

Permit Issued To:
Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant

Permit Number: 1913

PART A: GENERAL PROVISIONS

(References to A.R.S. are references to the Arizona Revised Statutes, references to A.A.C. are references to the Arizona Administrative Code, and references to PCC are references to Title 17 of the Pima County Code)

I. PERMIT EXPIRATION AND RENEWAL [A.R.S. § 49-480.A, PCC 17.12.160.C.2 and PCC 17.12.180.A.1]

A. This permit is valid for a period of five years from the date of issuance of the permit.

B. The Permittee shall submit an application for renewal of this permit at least 6 months, but not greater than 18 months prior to the date of permit expiration.

II. COMPLIANCE WITH PERMIT CONDITIONS [PCC 17.12.180.A.8.a and b]

A. The Permittee shall comply with all conditions of this permit including all applicable requirements of Arizona air quality statutes and the air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act.

B. Need to halt or reduce activity not a defense. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE [PCC 17.12.180.A.8.c and PCC 17.12.270]

A. The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, or termination; or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. The permit shall be reopened and revised under any of the following circumstances:

1. Additional applicable requirements under the Act become applicable to a major source. Such reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions has been extended pursuant to PCC 17.12.280. Any permit reopening required pursuant to this paragraph shall comply with provisions in PCC 17.12.280 for

permit renewal and shall reset the five-year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.

3. The control officer or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

4. The control officer or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.

C. Proceedings to reopen and issue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance. Such reopenings shall be made as expeditiously as practicable. Permit reopenings for reasons other than those stated in paragraph III.B.1 of this Part shall not result in the resetting of the five-year permit term.

IV. POSTING OF PERMIT [PCC 17.12.080]

A. Permittee shall post such permit, or a certificate of permit issuance on location where the equipment is installed in such a manner as to be clearly visible and accessible. All equipment covered by the permit shall be clearly marked with one of the following:

1. Current permit number;

2. Serial number or other equipment number that is also listed in the permit to identify that piece of equipment.

B. In the event that the equipment is so constructed or operated that such permit cannot be so placed, the permit shall be mounted so as to be clearly visible in an accessible place within a reasonable distance of the equipment or maintained readily available at all times on the operating premises.

C. A copy of the complete permit shall be kept on the site.

V. FEE PAYMENT [PCC 17.12.180.A.9. and PCC 17.12.510]

Permittee shall pay fees to the control officer pursuant to A.R.S. § 49-480.D and PCC 17.12.510.

VI. ANNUAL EMISSIONS INVENTORY QUESTIONNAIRE [PCC 17.12.320]

A. When requested by the control officer, the Permittee shall complete and submit an annual emissions inventory questionnaire. The questionnaire is due by March 31 or ninety days after the control officer makes the request and provides the inventory form each year, whichever occurs later, and shall include emission information for the previous calendar year.

B. The questionnaire shall be on a form provided by or approved by the control officer and shall include the information required by PCC 17.12.320.

VII. COMPLIANCE CERTIFICATION [PCC 17.12.180.A.5 and PCC 17.12.210.A.2]

Permittee shall submit to the control officer a compliance certification that describes the compliance status of the source with respect to each permit condition. Certifications shall be submitted as specified in Part "B" of this permit.

A. The compliance certification shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;

2. Compliance status of each applicable requirement;

3. Whether compliance was continuous or intermittent;

4. Method(s) used for determining the compliance status of the source, currently and over the reporting period;

5. A progress report on all outstanding compliance schedules submitted pursuant to PCC 17.12.180.A.5.d.

B. A copy of all compliance certifications for Class I permits shall also be submitted to the EPA Administrator.

The address for the EPA administrator is:

EPA Region 9 Enforcement Office, 75 Hawthorne St (Air-5), San Francisco, CA 94105

VIII. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS [PCC 17.12.210.A.3]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification and any other certification required by this permit shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

IX. INSPECTION AND ENTRY [PCC 17.12.210.A.4]

The Permittee shall allow the control officer or the authorized representative of the control officer upon presentation of proper credentials to:

A. Enter upon the Permittee's premises where a source is located or emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;

B. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;

C. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

D. Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and

E. Record any inspection by use of written, electronic, magnetic and photographic media.

X. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD

[PCC 17.12.160.C.4]

If this source becomes subject to a standard promulgated by the Administrator pursuant to section 112(d) of the Act, then the Permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

XI. AFFIRMATIVE DEFENSES FOR EXCESS EMISSIONS DUE TO MALFUNCTIONS, STARTUP, AND SHUTDOWN

[A.R.S. §49-480.B and A.A.C. 18-2-310]

A. Applicability. This permit condition establishes affirmative defenses for certain emissions in excess of an emission standard or limitation and applies to all emission standards or limitations except for standards or limitations:

1. Promulgated pursuant to Sections 111 or 112 of the Act,

2. Promulgated pursuant to Titles IV or VI of the Clean Air Act,

3. Contained in any Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit issued by the U.S. E.P.A.,

4. Contained in PCC 17.16.280.F or

5. Included in a permit to meet the requirements of PCC 17.16.590.A.5.

B. Affirmative Defense for Malfunctions

Emissions in excess of an applicable emission limitation due to malfunction shall constitute a violation. The owner or operator of a source with emissions in excess of an applicable emission limitation due to malfunction has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the owner or operator of the source has complied with the reporting requirements of XIII.B of this Part and has demonstrated all of the following:

1. The excess emissions resulted from a sudden and unavoidable breakdown of process

equipment or air pollution control equipment beyond the reasonable control of the operator;

2. The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

3. If repairs were required, the repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded. Off-shift labor and overtime were utilized where practicable to ensure that the repairs were made as expeditiously as possible. If off-shift labor and overtime were not utilized, the owner or operator satisfactorily demonstrated that the measures were impracticable;

4. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

5. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

6. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

7. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in PCC Chapter 17.08 that could be attributed to the emitting source;

8. The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned, and could not have been avoided by better operations and maintenance practices;

9. All emissions monitoring systems were kept in operation if at all practicable; and

10. The owner or operator's actions in response to the excess emissions were documented by contemporaneous records.

C. Affirmative Defense for Startup and Shutdown

1. Except as provided in XI.C.2, and unless otherwise provided for in the applicable requirement, emissions in excess of an applicable emission limitation due to startup and shutdown shall constitute a violation. The owner or operator of a source with emissions in excess of an applicable emission limitation due to startup and shutdown has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the owner or operator of the source has complied with the reporting requirements of XIII.B of this Part and has demonstrated all of the following:

   a. The excess emissions could not have been prevented through careful and prudent planning and design;

b. If the excess emissions were the result of a bypass of control equipment, the bypass was unavoidable to prevent loss of life, personal injury, or severe damage to air pollution control equipment, production equipment, or other property;

c. The source's air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

d. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

e. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

f. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in PCC Chapter 17.08 that could be attributed to the emitting source;

g. All emissions monitoring systems were kept in operation if at all practicable; and

h. The owner or operator's actions in response to the excess emissions were documented by contemporaneous records.

2. If excess emissions occur due to a malfunction during routine startup and shutdown, then those instances shall be treated as other malfunctions subject to XI.B.

D. Affirmative Defense for Malfunctions During Scheduled Maintenance

If excess emissions occur due to a malfunction during scheduled maintenance, then those instances will be treated as other malfunctions subject to XI.B.

E. Demonstration of Reasonable and Practicable Measures

For an affirmative defense under XI.B or C, the owner or operator of the source shall demonstrate, through submission of the data and information required by this Section and XII.B, that all reasonable and practicable measures within the owner or operator's control were implemented to prevent the occurrence of the excess emissions.

XII. RECORD KEEPING REQUIREMENTS [PCC 17.12.180.A.4]

A. Permittee shall keep records of all required monitoring information including, but not limited to, the following:

1. The date, place as defined in the permit, and time of sampling or measurements;

2. The date(s) analyses were performed;

3. The name of the company or entity that performed the analyses;

4. A description of the analytical techniques or methods used;

5. The results of such analyses; and

6. The operating conditions as existing at the time of sampling or measurement.

B. Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

XIII. REPORTING REQUIREMENTS [PCC 17.12.180.A.5.a]

The Permittee shall comply with all of the reporting requirements of this permit. These include all of the following:

A. Compliance certifications pursuant to Part "A", Section VII of this permit.

B. Excess Emissions Reporting Requirements [A.R.S. §49-480.B and A.A.C. 18-2-310.01]

1. The owner or operator of any source shall report to the control officer any emissions in excess of the limits established by this permit. The report shall be in two parts as specified below:

a. Notification by telephone or facsimile within 24 hours of the time the owner or operator first learned of the occurrence of excess emissions that includes all available information from XIII.B.2.

The number to call to report excess emissions is **520-740-3340**.

b. Detailed written notification by submission of an excess emissions report within 72 hours of the notification under XIII.B.1.a.

PDEQ 150 W. Congress St. Tucson AZ, 85701

2. The excess emissions report shall contain the following information:

a. The identity of each stack or other emission point where the excess emissions occurred;

b. The magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used

in determining the magnitude of the excess emissions;

c. The time and duration or expected duration of the excess emissions;

d. The identity of the equipment from which the excess emissions emanated;

e. The nature and cause of the emissions;

f. The steps taken, if the excess emissions were the result of a malfunction, to remedy the malfunction and the steps taken or planned to prevent the recurrence of the malfunctions;

g. The steps that were or are being taken to limit the excess emissions; and

h. If the source's permit contains procedures governing source operation during periods of startup or malfunction and the excess emissions resulted from startup or malfunction, a list of the steps taken to comply with the permit procedures.

3. In the case of continuous or recurring excess emissions, the notification requirements of this Section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in the notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period or changes in the nature of the emissions as originally reported shall require additional notification pursuant to XIII.B.1 and 2.

C. Permit Deviations (Other Than Excess Emissions) Reporting Requirements. The Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. For the purposes of this condition, "promptly report" shall mean that the Permittee submitted the report to the control officer by certified mail or hand-delivery within two working days of the of time the deviation was discovered.

D. Reporting requirements listed in Part "B" of this permit.

XIV. DUTY TO PROVIDE INFORMATION [PCC 17.12.160.G. and PCC 17.12.180.A.8.e]

A. The Permittee shall furnish to the control officer, within a reasonable time, any information that the control officer may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the Permittee shall also furnish to the control officer copies of records required to be kept by the permit. For information claimed to be confidential, the Permittee, for Class I sources, shall furnish an additional copy of such records directly to the Administrator along with a claim of confidentiality.

B. If the Permittee has failed to submit any relevant facts or if the Permittee has submitted incorrect information in the permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or

corrected information.

XV. PERMIT AMENDMENT OR REVISION [PCC 17.12.240, PCC 17.12.250 and PCC 17.12.260]

Permittee shall apply for a permit amendment or revision for changes to the facility which do not qualify for a facility change without revision under Section XVI, as follows:

A. Administrative Permit Amendment (PCC 17.12.240.);

B. Minor Permit Revision (PCC 17.12.250.);

C. Significant Permit Revision (PCC 17.12.260.).

The applicability and requirements for such action are defined in the above referenced regulations.

XVI. FACILITY CHANGE WITHOUT PERMIT REVISION [PCC 17.12.230]

A. Permittee may make changes at the permitted source without a permit revision if all of the following apply:

1. The changes are not modifications under any provision of Title I of the Act or under A.R.S. § 49-401.01(17).

2. The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions.

3. The changes do not violate any applicable requirements or trigger any additional applicable requirements.

4. The changes satisfy all requirements for a minor permit revision under PCC 17.12.250.

5. The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.

B. The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of subsections (A) and (C) of this Section.

C. For each such change under subsections A and B of this Section, a written notice by certified mail or hand delivery shall be received by the control officer and, for Class I permits, the Administrator, a minimum of 7 working days in advance of the change. Notifications of changes associated with emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change but must be provided as far in advance of the change as possible or, if advance notification is not practicable, as soon after the change as possible. Each notification shall include:

1. When the proposed change will occur.

2. A description of each such change.

3. Any change in emissions of regulated air pollutants.

4. The pollutants emitted subject to the emissions trade, if any.

5. The provisions in the implementation plan that provide for the emissions trade with which the source will comply and any other information as may be required by the provisions in the implementation plan authorizing the trade.

6. If the emissions trading provisions of the implementation plan are invoked, then the permit requirements with which the source will comply.

7. Any permit term or condition that is no longer applicable as a result of the change.

XVII. TESTING REQUIREMENTS [PCC 17.12.050]

A. Operational Conditions During Testing

Tests shall be conducted while the unit is operating at full load under representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the control officer, testing may be performed at a lower rate. Operations during start-up, shutdown, and malfunction (as defined in PCC 17.04.340.A.) shall not constitute representative operational conditions unless otherwise specified in the applicable requirement.

B. Test Plan

At least 14 calendar days prior to performing a test, the Permittee shall submit a test plan to the control officer, in accordance with PCC 17.12.050.B. and the Arizona Testing Manual. This test plan must include the following:

1. test duration;

2. test location(s);

3. test method(s); and

4. source operation and other parameters that may affect test results.

C. Stack Sampling Facilities

Permittee shall provide or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;

2. Safe sampling platforms;

3. Safe access to sampling platforms; and

4. Utilities for sampling and testing equipment.

D. Interpretation of Final Results

Each performance test shall consist of three separate runs using the required test method. Each run shall be conducted in accordance with the applicable standard and test method. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. If a sample is accidentally lost or conditions occur which are not under the Permittee's control and which may invalidate the run, compliance may, upon the control officer's approval, be determined using the arithmetic mean of the other two runs.

E. Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the control officer within 30 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and PCC 17.12.050.A.

F. Cessation of Testing After the First Run Has Started

If the control officer or the control officer's designee is not present, tests may only be stopped for good cause. Good cause includes forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other conditions beyond the Permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation that demonstrates good cause must be submitted.

XVIII. PROPERTY RIGHTS [PCC 17.12.180.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

XIX. SEVERABILITY CLAUSE [PCC 17.12.180.A.7]

The provisions of this permit are severable. If any provision of this permit is held invalid, the remainder of this permit shall not be affected thereby.

XX. PERMIT SHIELD [PCC 17.12.310]

Compliance with the conditions of this permit shall be deemed compliance with the applicable requirements identified in Part "C" of this permit. The permit shield shall not apply to any change made pursuant to Section XV.B of this Part and Section XVI of this Part.

XXI. ACCIDENT PREVENTION REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA Section

112(r))
Should this stationary source, as defined in 40 CFR Section 68.3, become subject to the accidental release prevention regulations in Part 68, then the Permittee shall submit a risk management plan (RMP) by the date specified in Section 68.10 and shall certify compliance with the requirements of Part 68 as part of the semiannual compliance certification as required by 40 CFR Part 70 and Part "B" of this permit.

Part B: SPECIFIC CONDITIONS

Air Quality Control Permit #1913
Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant

Note: This Part B contains equipment specific requirements for the operation of the Roger Road Wastewater Treatment Plant located at 2600 W. Sweetwater Drive, Tucson AZ.

I. APPLICABILITY

Affected Emission Source: **Class II Synthetic Minor Stationary Source for NOx, CO.**

This is an existing synthetic minor source based upon limitations on nine motors fueled by digester gas generated from the treatment process that provide electric power for the plant. The motors burn natural gas when there is not sufficient digester gas.

II. EMISSION LIMITS AND STANDARDS

A. Standards of Performance for the facility

1. The Permittee shall install, operate, and maintain air pollution control equipment or use good modern practices to minimize gaseous or odorous materials from being emitted in such quantities or concentrations as to cause air pollution. [PCC 17.16.030] [SIP Rule 344.A] [PCC 17.16.430.D] **[Federally Enforceable Condition]**

2. Materials including solvents or other volatile compounds, paints, acids, alkalies, pesticides, fertilizers and manure shall be processed, stored, used and transported in such manner and by such means that they will not evaporate, leak, escape or be otherwise discharged into the ambient air so as to cause or contribute to air pollution. [PCC 17.16.430.F]

3. No person shall allow hydrogen sulfide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.03 parts per million by volume for any averaging period of 30 minutes or more. [PCC 17.16.430.H]

B. Standards of Performance for Stationary Rotating Equipment

1. Particulate Emissions

The maximum allowable emission discharge rate (in terms of mass per unit time) and mass concentration (in terms of mass per unit volume of gas) for an air pollutant shall be determined by the following equation:

$$E = 1.02\ Q^{0.769}$$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour
Q = the heat input in million Btu per hour [SIP Rule 332] [PCC 17.16.340.C]
[Federally Enforceable Condition]

2. The total heat input of all operating fuel burning units on a plant or premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted. [PCC 17.16.340.B]

3. The actual values shall be calculated from the applicable equations and rounded off to two decimal places. [PCC 17.16.340.D]

4. No person shall cause, allow or permit to be emitted into the atmosphere from any rotating machinery, smoke for any period greater than ten consecutive seconds which exceeds 40 per cent opacity. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes. [PCC 17.16.340.E]

5. The Permittee shall burn only pipeline quality natural gas, commercial propane or digester gas generated at the Roger Road facility in the engines. [PCC 17.12.220.B]
[Federally Enforceable condition] [Material Permit Condition]

6. The Permittee shall not allow the hours of operation for the group of engines at each location to exceed the following hours per year calculated as a twelve month rolling total. [PCC17.12.220.B]
[Federally Enforceable Condition] [Material Permit Condition]

Group GB	18,000 Hours per Year
Group PS4	21,000 Hours per Year
Group BB	18,000 Hours per Year*

C. General Particulate Matter Standards for the Facility

1. Opacity Standards

a. No person shall cause, allow or permit the effluent from a single emission point, multiple emission point, or fugitive emissions source to have an average optical density equal to or greater than 40 percent opacity, subject to the following provisions:

(i) Opacities (optical densities) of an effluent shall be measured by a certified visible emissions evaluator with his natural eyes, approximately following the procedures used during his certification, or by an approved and precisely calibrated in-stack monitoring instrument.

(ii) The use of air or other gaseous diluents solely for the purpose of achieving compliance with an opacity standard is prohibited. **[Federally Enforceable Condition]** [SIP Rule 321.A]

(iii) After April 23, 2006, except as otherwise provided in this permit relating to specific types of sources, the opacity of any plume or effluent from an existing, stationary, point source shall not exceed 20%. [PCC 17.16.130.B.3]

b. The Permittee shall not cause or permit the effluent from any fugitive emissions source to have an average optical density greater than 20%, as measured in accordance with the Arizona Testing Manual, Reference Method 9. [PCC 17.16.050.B]

c. If more than one emission limit or emission standard is applicable to the same source, the more stringent standard or emission limit shall apply. [PCC 17.16.010.B]

2. Visibility Limiting Standard [PCC 17.16.050.D]

The Permittee shall not allow the diffusion of visible emissions including fugitive dust beyond the property boundary line within which the emissions become airborne without taking reasonably necessary and feasible precautions to control generation of airborne particulate matter. Sources may be required to cease temporarily the activity or operation which is causing or contributing to the emissions until reasonably necessary and feasible precautions are taken.

a. This provision shall not apply when wind speeds exceed twenty-five (25) miles per hour (using the Beaufort Scale of Wind Speed Equivalents, or as recorded by the National Weather Service). This exception does not apply if control measures have not been taken or were not commensurate with the size or scope of the emission source.

b. This shall not apply to the generation of airborne particulate matter from undisturbed land.

III. MONITORING REQUIREMENTS [PCC 17.12.180.A.3]

A. Odor and Hydrogen Sulfide Control

The Permittee shall perform weekly checks of the air pollution control equipment or use of good modern practices to control odors or hydrogen sulfide.

B. Stationary Rotating Machinery

1. The Permittee shall monitor the hours of operation for each engine listed in the equipment List in Part 'D' of the permit. [PCC 17.16.010]

2. The Permittee shall, upon request by the Control Officer, conduct performance tests to measure emissions from the Plant.

3. The Permittee shall observe the emission points at least once each day when the internal combustion engines are operating. If the observer sees a plume that, on an instantaneous basis, appears to exceed 40%, then the Permittee shall, if practicable, take a six-minute Method 9 observation of the plume. If the emissions are 40% or more, this shall be recorded and reported as an excess emission and a permit deviation.

C. General

1. The Permittee shall observe the non-point emission sources at least once each day. If the observer sees a plume that, on an instantaneous basis, appears to exceed 20% or the plume is crossing property boundaries, then the Permittee shall, if practicable, take a six-minute Method 9 observation of the plume. If the emissions are 20% or more, this shall be recorded and reported as an excess emission and a permit deviation.

2. The Permittee shall observe the point emission sources at least once each day. If the observer sees a plume that, on an instantaneous basis, appears to exceed 40% or the plume is crossing property boundaries, then the Permittee shall, if practicable, take a six-minute Method 9 observation of the plume. If the emissions are 40% or more, this shall be recorded and reported as an excess emission and a permit deviation.

3. After April 23, 2006, except as otherwise provided in this permit relating to specific types of sources, the opacity of any plume or effluent from an existing, stationary, point source referred to in Part 'B' III.C.3 above shall not exceed 20%. [PCC 17.16.130.B.3]

IV. RECORDKEEPING REQUIREMENTS [PCC 17.12.180.A.3 and 4]

A. Odor and Hydrogen Sulfide Control

The Permittee shall maintain records of all weekly odor and hydrogen sulfide control inspections. The inspection record shall include the date, the identification of air pollution control equipment or good modern practices being checked, the name of the person making the check, and the results of the check (i.e., any indications of any operation or maintenance required or identification of emissions, and, if so, what corrective action was taken).

B. Stationary Rotating Equipment

1. The owner or operator of any stationary or portable source of air pollution which burns any material, except natural gas shall keep complete records of the materials used as fuel. [PCC 17.16.010.C]

2. The owner or operator of any stationary rotating equipment subject to the provisions of PCC Section 17.16.340 shall record daily the sulfur content and lower heating value of the fuel being fired in the machines. [PCC 17.16.340.I][PCC 17.16.010]

   Use of pipeline quality natural gas, commercial propane and digester gas makes it unnecessary to daily record the sulfur content and lower heating value of the fuel being used.

3. The Permittee shall keep and maintain an operation log for each group of engines showing the following: [17.12.220.B and 17.16.230.E.1] **[Federally Enforceable Condition]**

   i. engine group ID;

   ii. fuels and quantity used for each engine during the month of record;

   iii. hours of operation for each group of engines during the month of record;

   iv. hours of operation during the eleven (11) months prior to the month of record plus the month of record for each Group of Motors. The totals for each month shall be recorded within five working days after the end of the month of record. If there are no hours of operation for any Group of Motors during a given month, the log shall note that no Hours of Operation occurred.

4. The Permittee shall record the results of the opacity monitoring as described in Part 'B' Section III.B.

C. General

1. The Permittee shall record the results of the Opacity Monitoring as described in Part 'B' III.C.

2. Records shall be kept in accordance with the Record Keeping Requirements described in Part "A" Section XII of this Permit.

V. REPORTING REQUIREMENTS

A. Stationary Rotating Equipment

1. The Permittee shall report to the Control Officer any daily period during which the sulfur content of the fuel being fired in the machine exceeds 0.8 percent. [PCC 17.16.340.J]

2. If the Permittee proposes to use any other fuel than the fuels described in Part "B".II.B.5 of this permit for each of the engines listed in Part "D", an application for a significant permit revision must be submitted in accordance with Part "A" Section XV.C. [PCC 17.12.250.A.6]

3. Any occurrence of excess emissions shall be immediately reported in writing to the Control Officer. An excess emission occurrence shall include, but not be limited to, any time period in which the annual hours of operation, calculated on a rolling twelve-month total for any group of engines, exceeds the limit described in Part B of this permit. [PCC 17.28.065]

B. General

1. Permit Deviations Reporting

The Permittee shall promptly report excess emissions and deviations from permit requirements in accordance with the requirements outlined in Part 'A' Section XIII.C of this permit. [PCC 17.12.180.A.5.b]

2. Compliance Certification Reporting

The Permittee shall submit a semiannual compliance certification to the Control Officer and to EPA Region IX. The Compliance Certification Report is due on January 31st and July 31st of each year. The first report due after permit issuance may not cover a full 6-month period. (See Part "A", Section VII for detailed information on this report). [PCC 17.12.210.A.2]

3. Emissions Inventory Reporting [PCC 17.12.320]

Every source subject to a permit requirement shall complete and submit an annual emissions inventory questionnaire when requested by the control officer. (See Part "A", Section VI for additional information on this report).

VI. TESTING REQUIREMENTS [PCC 17.20.010]

A. Opacity and Visible Emissions Testing

EPA Test Method 9 may be used to monitor compliance with the opacity standard in Part "B" Section II.C.1.

B. Particulate Matter Testing

Mass emission testing to determine compliance with the particulate matter standard in II.B 1 is not normally necessary as standard emission factors yield emission estimates of particulate matter that are far less than the standard allowed by the referenced equation. The control officer may require the Permittee to quantify its particulate matter emissions if the control officer has reasonable cause to believe a violation of a standard has been committed.

C. Hydrogen Sulfide Testing

Hydrogen sulfide testing to determine compliance with the standard in II.A.3 is not normally necessary because the use of good modern practices prevents the emission of hydrogen sulfide beyond the property boundary. The control officer may require the Permittee to test for hydrogen sulfide emissions if the control officer has reasonable cause to believe a violation of a standard has been committed.

Part C: APPLICABLE REGULATIONS
Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant
Air Quality Control Permit #1913

Compliance with the terms contained in this permit shall be deemed compliance with the following federally applicable requirements in effect on the date of permit issuance:

Pima County State Implementation Plan:

Rule 321 - Emissions-Discharge Opacity Limiting Standards
Rule 332 - Compilation of Mass Rates and Concentrations
Rule 343 - Visibility Limiting Standard
Rule 344 - Odor Limiting Standards

Compliance with the terms contained in this permit shall be deemed compliance with the following non-federally applicable requirements in effect on the date of permit issuance:

Pima County Code (PCC) Title 17

17.12.050 - Performance Tests (Section A)
17.12.220 - Permits Containing Voluntarily Accepted Emissions and Standards (Section B)
17.16.010 - Local rules and standards (Section B)
17.16.030 - Odor Limiting Standards
17.16.050 - Visibility Limiting Standard (Sections B, D)
17.16.130 - Applicability (Section B)
17.16.340 - Standards of performance for stationary rotating machinery (Sections B, C, D, E, F, H)
17.16.430 - Standards of Performance for Unclassified Sources (Sections D, F, G, H, I)

Part D: EQUIPMENT LIST
Air Quality Control Permit #1913
Pima County Wastewater Management Department
Roger Road Wastewater Treatment Plant

Table D: List of Equipment (Includes Insignificant equipment i.e. emergency generator & flares)

ENGINE GROUP ID	LOCATION	EQUIPMENT NAME	MODEL	FUEL TYPE	SERIAL NUMBER	CAPACITY HP
Group GB	Generator Bldg	Waukesha	L7042GL	NG/DG	339851	935
Group GB	Generator Bldg	Waukesha	L7042GL	NG/DG	339852	935
Group GB	Generator Bldg	Waukesha	F3521GL	NG/DG	C12019/1	580
Group PS4	Pump Station #4	Waukesha	2895GL	NG/DG	C12020/2	477
Group PS4	Pump Station #4	Waukesha	2895GL	NG/DG	C12020/3	477
Group PS4	Pump Station #4	Waukesha	2895GL	NG/DG	C12020/1	477
Group BB	Blower Building	Waukesha	H24GL	NG	C12021/1	354
Group BB	Blower Building	Waukesha	H24GL	NG	C12021/2	354
Group BB	Blower Building	Waukesha	H24GL	NG	C12021/3	354
N/A	Chlorine Building	Generac	97A00302S	Diesel	2032625	135
N/A	Near Digester Bldg	Varec	239A	NG	N/A	N/A
N/A	Near Digester Bldg	Varec	239A	NG/DG	N/A	N/A
N/A	Near Digester Bldg	Varec	239A	NG/DG	N/A	N/A
N/A	Near Digester Bldg	Varec	239A	NG/DG	N/A	N/A
N/A	Near Digester Bldg	Varec	239A	NG/DG	N/A	N/A

Acronyms Used in the Permit

GB Generator Building
PS#4 Pump Station Number 4
BB Blower Building
NG Natural Gas
DG Digester Gas

APPENDIX D

Ina Road WPCF
Air Quality Operating Permits

DEPARTMENT OF ENVIRONMENTAL QUALITY
150 West Congress Street
Tucson, Arizona 85701-1317

Ursula Kramer
Director

(520) 740-3340
FAX (520) 882-7709

September 12, 2005

Jeff Prevatt
Pima County Wastewater Management Department (PCWWMD)
201 N. Stone Ave
8th Floor
Tucson, AZ 85701

Dear Mr. Prevatt:

Enclosed is a final permit # 1903 for PCWWMD located at 7101 N. Casa Grande Highway in Tucson, AZ. The permit contains parts A, B, C, and D. Part A consists of the general conditions that apply to all facilities in Pima County. Part B consists of the specific conditions that apply to your facility. Part C contains the list of applicable requirements and Part D is an equipment list.

Please keep a copy of this permit at the 7101 N. Casa Grande Highway - Tucson, AZ facility for the life of the permit term. This issuance will go into effect on September 12, 2005 and remain valid for 5 years.

If you have any questions or need additional information, please contact me at (520) 740-3340.

Sincerely,

Kathi Lawrence
Environmental Planning Manager

Enclosure: Final Permit, Technical Support & Potential To Emit Documents.

PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY

150 West Congress Street • Tucson, AZ 85701 • Phone: (520) 740-3340

AIR QUALITY OPERATING PERMIT

(As required by Title 17.12, Article II, Pima County Code)

ISSUED TO

PIMA COUNTY WASTEWATER MANAGEMENT DEPARTMENT
7101 NORTH CASA GRANDE HIGHWAY
TUCSON, AZ 85743

This air quality operating permit does not relieve applicant of responsibility for meeting all air pollution regulations

THIS PERMIT ISSUED SUBJECT TO THE FOLLOWING **conditions contained in Parts "A", "B", "C" and "D".**

PDEQ PERMIT NUMBER **1903** PERMIT CLASS **I** EXPIRATION DATE **SEPTEMBER 11, 2010**

PERMIT ISSUED THIS **TWELFTH** DAY OF **SEPTEMBER TWO THOUSAND AND FIVE**

K Lawrence

SIGNATURE

Kathi Lawrence Environmental Planning Manager, PDEQ

TITLE

INTRODUCTION

The Ina Road Water Pollution Control Facility provides preliminary, primary and secondary treatment of wastewaters collected from the Tucson Metropolitan Area. The facility consists of the headworks, primary sedimentation, aeration, secondary sedimentation, chlorination and dechlorination systems. The plant has been undergoing an expansion construction over the last few years, to increase the capacity from 25 Million Gallons per Day to 37.5 Million Gallons per Day. The expansion consists of adding parallel independent primary treatment, secondary treatment and disinfection lines to the existing facility.

The plant provides preliminary, primary and secondary treatment of wastewaters collected from the Tucson Metropolitan area. The facility consists of the headworks, primary sedimentation, aeration, secondary sedimentation, chlorination and dechlorination systems. The existing treatment process uses a High Purity Oxygen - Activated Sludge process (HPOAS) for secondary treatment. The new parallel line, when it becomes operational will also provide secondary treatment by activated sludge but will also include a nitrification - denitrification process. Each Treatment Train will have its own chlorination contact tank for the fluids, but the dechlorination process will combine the two streams. Fluids are sent either to the City of Tucson as gray water for irrigation, or to the Santa Cruz River. Solids are shipped offsite as fertilizer for local agriculture, or incineration where necessary.

Electric power for the plant is provided by seven 1000 Hp engines that are fueled by Digester gas generated from the treatment process. The engines burn natural gas or propane gas when there is not sufficient Digester gas, although this is not preferred due to the relative higher cost of pipeline natural gas. Normally, five engines are sufficient to meet the power demand, but it is possible to run all seven at the same time.

There are several smaller engines that are standby and emergency power sources, less than 100 Hp each and an emergency flare, which are all classified as Insignificant Activities.

The following Table shows the Potential to Emit of the various criteria pollutants for this plant, with all engines and processes operating 24 hours per day, 365 days per year, with no controls.

Potential to Emit (tons per year)					
Nitrogen Oxides	Carbon Monoxide	Volatile Organic Compounds	Sulfur Dioxide	Particulate Matter (as PM10)	Hazardous Air Pollutants
580.82	2405.08	35.45	11.42	2.35	11.74

This is a **Class I Permit**. Based upon emissions, Ina Road Wastewater Treatment Plant is an existing **Major Source** of nitrogen oxides and carbon monoxide, and a minor source of the other criteria pollutants. It is also an area source for HAPs.

All terms and conditions of this permit are federally enforceable by the Administrator of the United States Environmental Protection Agency (U.S.EPA). This permit cites only the current state rules.

Ina Road Wastewater Treatment Plant
Air Quality Permit Number 1903
Summary Table

Emission Unit	Pollutants Emitted	Control Measure	Emission Limits/Standards	Monitoring/ Recordkeeping	Reporting	Testing Frequency/Methods
Facility Odor Limiting Standards [SIP Rule 344] [PCC Rule 17.16.430.D] [PCC Rule 17.16.430.F] [PCC Rule 17.16.430.H]	Odor Hydrogen Sulfide	Control Odors and hydrogen sulfide through the use of scrubbers & similar control equipment or use of good modern practices to minimize odor emissions.	Limit odors so as not to cause air pollution. H_2S concentration beyond premises ≤ 0.03 ppm by volume for any period ≥ 30min.	Inspect facility Maintain records for five years Record all results of opacity observations	Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. Semiannual summary reports of required monitoring The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	Not necessary unless requested by the Control Officer
§stationary Rotating Equipment 7 -Natural Gas and Digester Gas fired electric power generators [SIP Rule 321] [PCC Rule 17.16.340.C] [PCC Rule 17.16.340.E]	PM_{10}, NOx, CO, VOC, SOx	None	$E \leq 1.02\ Q^{0.26}$ lb/hr Opacity ≤ 40% for 40 seconds during excess emissions ≤1.0 lb SO_2/MM-BTU input No use of high sulfur fuel oil Opacity ≤ 20 % for point sources	Monitor operating hours Fuel Records Opacity monitoring & recording Maintain records for five years	Report when sulfur content > 0.8 % Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. Semiannual summary reports of required monitoring. The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	Testing to determine compliance with the mass emission limit for PM, SO_2, lower heating value is not necessary unless requested by the Control Officer. EPA Test Method 9 shall be used to monitor compliance with the opacity standard. Testing on engines once per 5-yr permit term. Testing for formaldehyde within 365 days of *first* 5-yr permit issuance.
Particulate Matter	PM_{10}	Use of reasonably necessary and feasible precautions to control particulate matter.	Opacity ≤ 20 % for fugitive sources. No visible emissions beyond property boundary line. Limit odors beyond property line.	Opacity monitoring & recording. Maintain records for five years	Prompt reporting of deviations from permit requirements. Annual compliance certification. Emissions inventory report when requested. Semiannual summary reports of required monitoring. The Permittee shall submit quarterly summary reports during periods in which a permit deviation occurs.	EPA Test Method 9 shall be used to monitor compliance with the opacity standard.

Air Quality Permit #1903
Ina Road Wastewater Treatment Plant
7101 N. Casa Grande Highway,
Marana, Arizona

TABLE OF CONTENTS

Part "A": General Provisions 5
- I. Permit Expiration and Renewal 5
- II. Compliance with Permit Conditions 5
- III. Permit Revision, Reopening, Revocation and Reissuance, or Termination for Cause 5
- IV. Posting of Permit 6
- V. Fee Payment 6
- VI. Annual Emissions Inventory Questionnaire 6
- VII. Compliance Certification 7
- VIII. Certification of Truth, Accuracy and Completeness 7
- IX. Inspection and Entry 7
- X. Permit Revision Pursuant to Federal Hazardous Air Pollutant Standard 8
- XI. Affirmative Defenses for Excess Emissions Due to Malfunctions, Startup, and Shutdown 8
- XII. Record Keeping Requirements 10
- XIII. Reporting Requirements 11
- XIV. Duty to Provide Information 12
- XV. Permit Amendment or Revision 12
- XVI. Facility Change Without Permit Revision 13
- XVII. Testing Requirements 14
- XVIII. Property Rights 15
- XIX. Severability Clause 15
- XX. Permit Shield 15
- XXI. Accident Prevention Requirements Under the Clean Air Act (CAA Section 112(r)) 15

Part "B": Specific Conditions 16
- I. Applicability 16
- II. Emission Limits and Standards 16
- III. Monitoring Requirements 18
- IV. Recordkeeping Requirements 19
- V. Reporting Requirements 20
- VI. Testing Requirements 21

Part "C": Applicable Regulations 23

Part "D": Equipment List & Insignificant Activities 24

Permit Issued To:
Ina Road Water Pollution Control Facility

Permit Number: 1903

PART A: GENERAL PROVISIONS

(References to A.R.S. are references to the Arizona Revised Statutes, references to A.A.C. are references to the Arizona Administrative Code, and references to PCC are references to Title 17 of the Pima County Code)

I. PERMIT EXPIRATION AND RENEWAL [A.R.S. § 49-480.A., PCC 17.12.160.C.2, and PCC 17.12.180.A.1]

A. This permit is valid for a period of five years from the date of issuance of the permit.

B. The Permittee shall submit an application for renewal of this permit at least 6 months, but not greater than 18 months prior to the date of permit expiration.

II. COMPLIANCE WITH PERMIT CONDITIONS [PCC 17.12.180.A.8 a and b]

A. The Permittee shall comply with all conditions of this permit including all applicable requirements of Arizona air quality statutes and the air quality rules. Any permit noncompliance constitutes a violation of the Arizona Revised Statutes and is grounds for enforcement action; for permit termination, revocation and reissuance, or revision; or for denial of a permit renewal application. In addition, noncompliance with any federally enforceable requirement constitutes a violation of the Clean Air Act.

B. Need to halt or reduce activity not a defense. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

III. PERMIT REVISION, REOPENING, REVOCATION AND REISSUANCE, OR TERMINATION FOR CAUSE [PCC 17.12.180.A.8.c. and PCC 17.12.270]

A. The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit revision, revocation and reissuance, or termination; or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. The permit shall be reopened and revised under any of the following circumstances:

1. Additional applicable requirements under the Act become applicable to a major source. Such reopening shall only occur if there are three or more years remaining in the permit term. The reopening shall be completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions has been extended pursuant to PCC 17.12.280. Any permit reopening required pursuant to this paragraph shall comply with provisions in PCC 17.12.280 for permit renewal and shall reset the five-year permit term.

2. Additional requirements, including excess emissions requirements, become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the Class I permit.

3. The control officer or the Administrator determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit.

4. The control officer or the Administrator determines that the permit needs to be revised or revoked to assure compliance with the applicable requirements.

C. Proceedings to reopen and issue a permit, including appeal of any final action relating to a permit reopening, shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of the permit for which cause to reopen exists. Such reopenings shall be made as expeditiously as practicable. Permit reopenings for reasons other than those stated in paragraph III.B.1 of this Part shall not result in the resetting of the five-year permit term.

IV. POSTING OF PERMIT [PCC 17.12.080]

A. Permittee shall post such permit, or a certificate of permit issuance on location where the equipment is installed in such a manner as to be clearly visible and accessible. All equipment covered by the permit shall be clearly marked with one of the following:

1. Current permit number.

2. Serial number or other equipment number that is also listed in the permit to identify that piece of equipment.

B. In the event that the equipment is so constructed or operated that such permit cannot be so placed, the permit shall be mounted so as to be clearly visible in an accessible place within a reasonable distance of the equipment or maintained readily available at all times on the operating premises.

C. A copy of the complete permit shall be kept on the site.

V. FEE PAYMENT [PCC 17.12.180.A.9. and PCC 17.12.510]

Permittee shall pay fees to the control officer pursuant to A.R.S. § 49-480.D and PCC 17.12.510.

VI. ANNUAL EMISSIONS INVENTORY QUESTIONNAIRE [PCC 17.12.320]

A. When requested by the control officer, the Permittee shall complete and submit an annual emissions inventory questionnaire. The questionnaire is due by March 31 or ninety days after the control officer makes the request and provides the inventory form each year, whichever occurs later, and shall include emission information for the previous calendar year.

B. The questionnaire shall be on a form provided by or approved by the control officer and shall include the information required by PCC 17.12.320.

VII. COMPLIANCE CERTIFICATION

[PCC 17.12.180.A.5. and PCC 17.12.210.A.2]

Permittee shall submit to the control officer a compliance certification that describes the compliance status of the source with respect to each permit condition. Certifications shall be submitted as specified in Part "B" of this permit.

A. The compliance certification shall include the following:

1. Identification of each term or condition of the permit that is the basis of the certification;

2. Compliance status of each applicable requirement;

3. Whether compliance was continuous or intermittent;

4. Method(s) used for determining the compliance status of the source, currently and over the reporting period;

5. A progress report on all outstanding compliance schedules submitted pursuant to PCC 17.12.180.A.5.d.

B. A copy of all compliance certifications for Class I permits shall also be submitted to the EPA Administrator.

The address for the EPA administrator is:

EPA Region 9 Enforcement Office, 75 Hawthorne St (Air-5), San Francisco, CA 94105

VIII. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS

[PCC 17.12.210.A.3]

Any document required to be submitted by this permit, including reports, shall contain a certification by a responsible official of truth, accuracy, and completeness. This certification and any other certification required by this permit shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

IX. INSPECTION AND ENTRY

[PCC 17.12.210.A.4]

The Permittee shall allow the control officer or the authorized representative of the control officer upon presentation of proper credentials to:

A. Enter upon the Permittee's premises where a source is located or emissions-related activity is conducted, or where records are required to be kept under the conditions of the permit;

B. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;

C. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit;

D. Sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or other applicable requirements; and

E. Record any inspection by use of written, electronic, magnetic and photographic media.

X. PERMIT REVISION PURSUANT TO FEDERAL HAZARDOUS AIR POLLUTANT STANDARD

[PCC 17.12.160.C.4]

If this source becomes subject to a standard promulgated by the Administrator pursuant to section 112(d) of the Act, then the Permittee shall, within twelve months of the date on which the standard is promulgated, submit an application for a permit revision demonstrating how the source will comply with the standard.

XI. AFFIRMATIVE DEFENSES FOR EXCESS EMISSIONS DUE TO MALFUNCTIONS, STARTUP, AND SHUTDOWN

[A.R.S. §49-480.B. and A.A.C. 18-2-310]

A. Applicability. This permit condition establishes affirmative defenses for certain emissions in excess of an emission standard or limitation and applies to all emission standards or limitations except for standards or limitations:

1. Promulgated pursuant to Sections 111 or 112 of the Act,

2. Promulgated pursuant to Titles IV or VI of the Clean Air Act,

3. Contained in any Prevention of Significant Deterioration (PSD) or New Source Review (NSR) permit issued by the U.S. EPA,

4. Contained in PCC 17.16.280.F, or

5. Included in a permit to meet the requirements of PCC 17.16.290.A.5.

B. Affirmative Defense for Malfunctions

Emissions in excess of an applicable emission limitation due to malfunction shall constitute a violation. The owner or operator of a source with emissions in excess of an applicable emission limitation due to malfunction has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the owner or operator of the source has complied with the reporting requirements of XIII.B of this Part and has demonstrated all of the following:

1. The excess emissions resulted from a sudden and unavoidable breakdown of process equipment or air pollution control equipment beyond the reasonable control of the operator;

2. The air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for

minimizing emissions;

3. If repairs were required, the repairs were made in an expeditious fashion when the applicable emission limitations were being exceeded. Off-shift labor and overtime were utilized where practicable to ensure that the repairs were made as expeditiously as possible. If off-shift labor and overtime were not utilized, the owner or operator satisfactorily demonstrated that the measures were impracticable;

4. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

5. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

6. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

7. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in PCC Chapter 17.08 that could be attributed to the emitting source;

8. The excess emissions did not stem from any activity or event that could have been foreseen and avoided, or planned, and could not have been avoided by better operations and maintenance practices;

9. All emissions monitoring systems were kept in operation if at all practicable; and

10. The owner or operator's actions in response to the excess emissions were documented by contemporaneous records.

C. Affirmative Defense for Startup and Shutdown

1. Except as provided in XI.C.2 and unless otherwise provided for in the applicable requirement, emissions in excess of an applicable emission limitation due to startup and shutdown shall constitute a violation. The owner or operator of a source with emissions in excess of an applicable emission limitation due to startup and shutdown has an affirmative defense to a civil or administrative enforcement proceeding based on that violation, other than a judicial action seeking injunctive relief, if the owner or operator of the source has complied with the reporting requirements of XIII.B of this Part and has demonstrated all of the following:

   a. The excess emissions could not have been prevented through careful and prudent planning and design;

   b. If the excess emissions were the result of a bypass of control equipment, the bypass was unavoidable to prevent loss of life, personal injury, or severe damage to air pollution control equipment, production equipment, or other property;

c. The source's air pollution control equipment, process equipment, or processes were at all times maintained and operated in a manner consistent with good practice for minimizing emissions;

d. The amount and duration of the excess emissions (including any bypass operation) were minimized to the maximum extent practicable during periods of such emissions;

e. All reasonable steps were taken to minimize the impact of the excess emissions on ambient air quality;

f. During the period of excess emissions there were no exceedances of the relevant ambient air quality standards established in PCC Chapter 17.08 that could be attributed to the emitting source;

g. All emissions monitoring systems were kept in operation if at all practicable; and

h. The owner or operator's actions in response to the excess emissions were documented by contemporaneous records.

2. If excess emissions occur due to a malfunction during routine startup and shutdown, then those instances shall be treated as other malfunctions subject to XI.B.

D. Affirmative Defense for Malfunctions During Scheduled Maintenance

If excess emissions occur due to a malfunction during scheduled maintenance, then those instances will be treated as other malfunctions subject to XI.B.

E. Demonstration of Reasonable and Practicable Measures

For an affirmative defense under XI.B or C, the owner or operator of the source shall demonstrate, through submission of the data and information required by this Section and XII.B, that all reasonable and practicable measures within the owner or operator's control were implemented to prevent the occurrence of the excess emissions.

XII. RECORD KEEPING REQUIREMENTS [PCC 17.12.180.A.4]

A. Permittee shall keep records of all required monitoring information including, but not limited to, the following:

1. The date, place as defined in the permit, and time of sampling or measurements;

2. The date(s) analyses were performed;

3. The name of the company or entity that performed the analyses;

4. A description of the analytical techniques or methods used;

5. The results of such analyses; and

6. The operating conditions as existing at the time of sampling or measurement.

B. Permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

XIII. REPORTING REQUIREMENTS [PCC 17.12.180.A.5.a]

The Permittee shall comply with all of the reporting requirements of this permit. These include all of the following:

A. Compliance certifications pursuant to Part "A", Section VII of this permit.

B. Excess Emissions Reporting Requirements [PCC 17.28.065A.R.S. §49-480.B, and A.A.C. 18-2-310.01]

1. The owner or operator of any source shall report to the control officer any emissions in excess of the limits established by this permit. The report shall be in two parts as specified below:

   a. Notification by telephone or facsimile within 24 hours of the time the owner or operator first learned of the occurrence of excess emissions that includes all available information from XIII.B.2.

   The number to call to report excess emissions is 520-740-3340.

   b. Detailed written notification by submission of an excess emissions report within 72 hours of the notification under XIII.B.1.a. The notification shall be sent to the following address:

   PDEQ 150 W. Congress St. Tucson AZ, 85701

2. The excess emissions report shall contain the following information:

   a. The identity of each stack or other emission point where the excess emissions occurred;

   b. The magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;

   c. The time and duration or expected duration of the excess emissions;

   d. The identity of the equipment from which the excess emissions emanated;

   e. The nature and cause of the emissions;

   f. The steps taken, if the excess emissions were the result of a malfunction,

to remedy the malfunction and the steps taken or planned to prevent the recurrence of the malfunctions;

g. The steps that were or are being taken to limit the excess emissions; and

h. If the source's permit contains procedures governing source operation during periods of startup or malfunction and the excess emissions resulted from startup or malfunction, a list of the steps taken to comply with the permit procedures.

3. In the case of continuous or recurring excess emissions, the notification requirements of this Section shall be satisfied if the source provides the required notification after excess emissions are first detected and includes in the notification an estimate of the time the excess emissions will continue. Excess emissions occurring after the estimated time period or changes in the nature of the emissions as originally reported shall require additional notification pursuant to XIII.B.1 and 2.

C. Permit Deviations (Other Than Excess Emissions) Reporting Requirements. The Permittee shall promptly report deviations from permit requirements, including those attributable to upset conditions as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. For the purposes of this condition, "promptly report" shall mean that the Permittee submitted the report to the control officer by certified mail or hand delivery within two working days of the of time the deviation was discovered.

D. Reporting requirements listed in art. B of this permit.

XIV. DUTY TO PROVIDE INFORMATION [PCC 17.12.160.G, and PCC 17.12.180.A.8.e]

A. The Permittee shall furnish to the control officer, within a reasonable time, any information that the control officer may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the Permittee shall also furnish to the control officer copies of records required to be kept by the permit. For information claimed to be confidential, the Permittee for Class I sources shall furnish an additional copy of such records directly to the Administrator along with a claim of confidentiality.

B. If the Permittee has failed to submit any relevant facts or if the Permittee has submitted incorrect information in the permit application, the Permittee shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information.

XV. PERMIT AMENDMENT OR REVISION [PCC 17.12.240, PCC 17.12.250, and PCC 17.12.260]

Permittee shall apply for a permit amendment or revision for changes to the facility which do not qualify for a facility change without revision under Section XVI, as follows:

A. Administrative Permit Amendment (PCC 17.12.240.);

B. Minor Permit Revision (PCC 17.12.250.);

C. Significant Permit Revision (PCC 17.12.260.).

The applicability and requirements for such action are defined in the above referenced regulations.

XVI. FACILITY CHANGE WITHOUT PERMIT REVISION [PCC 17.12.230]

A. Permittee may make changes at the permitted source without a permit revision if all of the following apply:

1. The changes are not modifications under any provision of Title I of the Act or under A.R.S. § 49-401.01(17).

2. The changes do not exceed the emissions allowable under the permit whether expressed therein as a rate of emissions or in terms of total emissions.

3. The changes do not violate any applicable requirements or trigger any additional applicable requirements.

4. The changes satisfy all requirements for a minor permit revision under PCC 17.12.250.

5. The changes do not contravene federally enforceable permit terms and conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements.

B. The substitution of an item of process or pollution control equipment for an identical or substantially similar item of process or pollution control equipment shall qualify as a change that does not require a permit revision, if it meets all of the requirements of subsections (A) and (C) of this Section.

C. For each such change under subsections A and B of this Section, a written notice by certified mail or hand delivery shall be received by the control officer and, for Class I permits, the Administrator, a minimum of 7 working days in advance of the change. Notifications of changes associated with emergency conditions, such as malfunctions necessitating the replacement of equipment, may be provided less than 7 working days in advance of the change but must be provided as far in advance of the change as possible or, if advance notification is not practicable, as soon after the change as possible. Each notification shall include:

1. When the proposed change will occur.

2. A description of each such change.

3. Any change in emissions of regulated air pollutants.

4. The pollutants emitted subject to the emissions trade, if any.

5. The provisions in the implementation plan that provide for the emissions trade with which the source will comply and any other information as may be required by the provisions in the implementation plan authorizing the trade.

6. If the emissions trading provisions of the implementation plan are invoked, then the permit requirements with which the source will comply.

7. Any permit term or condition that is no longer applicable as a result of the change.

XVII. TESTING REQUIREMENTS [PCC 17.12.050]

A. Operational Conditions During Testing

Tests shall be conducted while the unit is operating at full load under representative operational conditions unless other conditions are required by the applicable test method or in this permit. With prior written approval from the control officer, testing may be performed at a lower rate. Operations during start-up, shutdown, and malfunction (as defined in PCC 17.04.340.A) shall not constitute representative operational conditions unless otherwise specified in the applicable requirement.

B. Test Plan

At least 14 calendar days prior to performing a test, the Permittee shall submit a test plan to the control officer, in accordance with PCC 17.12.050.B. and the Arizona Testing Manual. This test plan must include the following:

1. test duration;
2. test location(s);
3. test method(s); and
4. source operation and other parameters that may affect test results.

C. Stack Sampling Facilities

Permittee shall provide or cause to be provided, performance testing facilities as follows:

1. Sampling ports adequate for test methods applicable to the facility;
2. Safe sampling platforms;
3. Safe access to sampling platforms; and
4. Utilities for sampling and testing equipment.

D. Interpretation of Final Results

Each performance test shall consist of three separate runs using the required test method. Each run shall be conducted in accordance with the applicable standard and test method. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. If a sample is accidentally lost or

conditions occur which are not under the Permittee's control and which may invalidate the run, compliance may, upon the control officer's approval, be determined using the arithmetic mean of the other two runs.

E. Report of Final Test Results

A written report of the results of all performance tests shall be submitted to the control officer within 30 days after the test is performed. The report shall be submitted in accordance with the Arizona Testing Manual and PCC 17.12.050.A.

F. Cessation of Testing After the First Run Has Started

If the control officer or the control officer's designee is not present, tests may only be stopped for good cause. Good cause includes, forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions or other conditions beyond the Permittee's control. Termination of any test without good cause after the first run is commenced shall constitute a failure of the test. Supporting documentation that demonstrates good cause must be submitted.

XVIII. PROPERTY RIGHTS [PCC 17.12.180.A.8.d]

This permit does not convey any property rights of any sort, or any exclusive privilege.

XIX. SEVERABILITY CLAUSE [PCC 17.12.180.A.7]

The provisions of this permit are severable, if any provision of this permit is held invalid, the remainder of this permit shall not be affected thereby.

XX. PERMIT SHIELD [PCC 17.12.310]

Compliance with the conditions of this permit shall be deemed compliance with the applicable requirements identified in Part "C" of this permit. The permit shield shall not apply to any change made pursuant to Section XV.B of this Part and Section XVI of this Part.

XXI. ACCIDENT PREVENTION REQUIREMENTS UNDER THE CLEAN AIR ACT (CAA Section 112(r))

Should this stationary source, as defined in 40 CFR Section 68.3, become subject to the accidental release prevention regulations in Part 68, then the Permittee shall submit a risk management plan (RMP) by the date specified in Section 68.10 and shall certify compliance with the requirements of Part 68 as part of the semiannual compliance certification as required by 40 CFR Part 70 and Part "B" of this permit.

Part B: SPECIFIC CONDITIONS
Air Quality Permit #1903
Ina Road Water Pollution Control Facility

Note: This Part B contains equipment specific requirements for the operations of the Ina Road Water Pollution Control Facility located at 7101 N. Casa Grande Highway, Marana AZ.

I. APPLICABILITY:

Affected Emission Source: **Class I Stationary Source; Major Source for NOx, CO.**

This is an existing major source based upon emissions from seven 1000 hp engines fueled by natural gas, propane and digester gas generated from the treatment process that provide electric power for the plant.

II. EMISSION LIMITS AND STANDARDS:

A. Standards of Performance for the facility

1. The Permittee shall install, operate, and maintain air pollution control equipment or use good modern practices to minimize gaseous or odorous materials from being emitted in such quantities or concentrations as to cause air pollution. [PCC 17.16.030 SIP Rule 344.A, PCC 17.16.430.D]

2. Materials including solvents or other volatile compounds, paints, acids, alkalies, pesticides, fertilizers and manure shall be processed, stored, used and transported in such manner and by such means that they will not evaporate, leak, escape or be otherwise discharged into the ambient air so as to cause or contribute to air pollution. [PCC 17.16.430.F]
[Locally Enforceable Condition]

3. No person shall allow hydrogen sulfide to be emitted from any location in such manner and amount that the concentration of such emissions into the ambient air at any occupied place beyond the premises on which the source is located exceeds 0.03 parts per million by volume for any averaging period of 30 minutes or more. [PCC 17.16.430.H]
[Locally Enforceable Condition]

B. Standards of Performance for Stationary Rotating Equipment

1. Particulate Emissions

The maximum allowable emission discharge rate (in terms of mass per unit time) and mass concentration (in terms of mass per unit volume of gas) for an air pollutant shall be determined by the following equation:

$$E = 1.02Q^{0.769}$$

Where:

E = the maximum allowable particulate emissions rate in pounds-mass per hour
Q = the heat input in million Btu per hour. [SIP Rule 332][PCC 17.16.340.C.1]

2. The total heat input of all operating fuel burning units on a plant or premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted. [PCC 17.16.340.B]
[Locally Enforceable Condition]

3. The actual values shall be calculated from the applicable equations and rounded off to two decimal places. [PCC 17.16.340.D]
[Locally Enforceable Condition]

4. No person shall cause, allow or permit to be emitted into the atmosphere from any rotating machinery, smoke for any period greater than ten consecutive seconds which exceeds 40 percent opacity. Visible emissions when starting cold equipment shall be exempt from this requirement for the first ten minutes. [PCC 17.16.340.E]
[Locally Enforceable Condition]

5. The Permittee shall not use high sulfur fuel oil in any Stationary Rotating Machinery. [PCC 17.16.340.H]
[Locally Enforceable Condition]

6. When low sulfur oil is fired Stationary Rotating Machinery installations shall burn fuel which limits the emission of sulfur dioxide to 1.0 pound per million Btu heat input. [PCC 17.16.340.F]
[Locally Enforceable Condition]

7. The Permittee shall only use Natural Gas, Commercial Propane or Digester gas in the seven Waukesha Model Stationary Rotating engines. [PCC 17.12.220.B]

C. General Particulate Matter Standards for the Facility

1. Opacity Standards

a. No person shall cause, allow or permit the effluent from a single emission point, multiple emission point, or fugitive emissions source to have an average optical density equal to or greater than 40 percent opacity, subject to the following provisions:

(i) Opacities (optical densities) of an effluent shall be measured by a certified visible emissions evaluator with his natural eyes, approximately following the procedures used during his certification, or by an approved and precisely calibrated in-stack monitoring instrument.

(ii) The use of air or other gaseous diluents solely for the purpose of achieving compliance with an opacity standard is prohibited.

b. The Permittee shall not cause or permit the effluent from any fugitive emissions source to have an average optical density greater than 20%, as measured in accordance with the Arizona Testing Manual, Reference Method 9.

[PCC 17.16.050.B]
[Locally Enforceable Condition]

c. If more than one emission limit or emission standard is applicable to the same source, the more stringent standard or emission limit shall apply.

[PCC 17.16.010.B]
[Locally Enforceable Condition]

2. Visibility Limiting Standard

[PCC 17.16.050.D]
[Locally Enforceable Condition]

The Permittee shall not allow the diffusion of visible emissions including fugitive dust beyond the property boundary line within which the emissions become airborne without taking reasonably necessary and feasible precautions to control generation of airborne particulate matter. Sources may be required to cease temporarily the activity or operation that is causing or contributing to the emissions until reasonably necessary and feasible precautions are taken.

This provision shall not apply when wind speeds exceed twenty-five (25) miles per hour (using the Beaufort Scale of Wind Speed Equivalents, or as recorded by the National Weather Service). This exception does not apply if control measures have not been taken or were not commensurate with the size or scope of the emission source.

This shall not apply to the generation of airborne particulate matter from undisturbed land.

III. MONITORING REQUIREMENTS

[PCC 17.12.180.A.3]
[Locally Enforceable Conditions]

A. Odor and Hydrogen Sulfide Control

The Permittee shall perform weekly checks of the air pollution control equipment or use of good modern practices to control odors or hydrogen sulfide.

B. Stationary Rotating Equipment

1. The Permittee shall monitor the hours of operation for each engine listed in this Part 'D' Equipment List.

2. The Permittee shall observe the emission points at least once each day when the internal combustion engines are operating. If the observer sees a plume that, on an instantaneous basis, appears to exceed 40%, then the Permittee shall, if practicable, take a six-minute Method 9 observation of the plume. If the

emissions are 40% or more, this shall be recorded and reported as an excess emission and a permit deviation.

3. The Permittee shall determine the sulfur content from each digester at least once during each quarter.

C. Particulate Matter Monitoring

The Permittee shall observe the no-point emission sources at least once each day. If the observer sees a plume that, on an instantaneous basis, appears to exceed 20% or the plume is crossing property boundaries, then the Permittee shall, if practicable, take a six-minute Method 9 observation of the plume. If the emissions are 20% or more, this shall be recorded and reported as an excess emission and a permit deviation.

IV. RECORDKEEPING REQUIREMENTS

[PCC 17.12.180.A.3 and 4]
[Locally Enforceable Conditions]

A. Odor and Hydrogen Sulfide Control

The Permittee shall maintain records of all weekly odor and hydrogen sulfide control inspections. The inspection record shall include the date, the identification of air pollution control equipment or good modern practices being checked, the name of the person making the check, and the results of the check (i.e., any indications of any operation or maintenance required or identification of emissions, and, if so, what corrective action was taken).

B. Stationary Rotating Equipment

1. The owner or operator of any stationary or portable source of air pollution which burns any material, except natural gas shall keep complete records of the materials used as fuel including the total hours for which that material was used.
[PCC 17.16.010.C]

2. a. The owner or operator of any stationary rotating equipment subject to the provisions of PCC section 17.16.340 shall record daily the sulfur content and lower heating value of the fuel being fired in the machines.
[PCC 17.16.340.I]

Part B.III.B.3 shall satisfy the requirement for recording the daily sulfur content in IV.B.2.a above unless the Control Officer has reason to believe that a standard is being violated. The Permittee is also not required to record the lower heating value when using digester gas unless the Control Officer has reasonable cause to believe that the heating value of digester gas would violate the Particulate Matter Standard in Part B.II.B.1.

b. Use of Pipeline Quality Natural Gas and Commercial Propane makes it unnecessary to daily record the sulfur content and lower heating value when these are **exclusively** being used as fuel.

[PCC 17.16.340.I] [PCC 17.16.010]

c. The Permittee shall record the results of III.B.3 in a log containing the date of the check, the person making the check, and the sulfur content of the digester gas. If the sulfur content is greater than the limit in V.A.1 the Permittee shall include in the log entry any corrective action taken and report to the Control Officer according the requirements in Part A.XIII.B. [PCC 17.12.180.A.3. and 4]

3. The Permittee shall record the Hours of Operation for each Engine listed in this Part 'D' Equipment List. The totals for each month shall be recorded within five working days after the end of the month and shall be recorded as follows:

The Permittee shall keep rolling monthly totals of the engine-hours of operation for each generator for the most recent 12-consecutive month period. These shall be kept by adding the totals from III.B.1 above to the record of the previous 11 consecutive months.

4. The Permittee shall record all observations made under Opacity Monitoring described in Part 'B' Section III.B. If no visible emissions are observed, the record shall reflect this.

C. Particulate Matter Monitoring

The Permittee shall record all observations made under Opacity Monitoring described in Part 'B' III.C. If no visible emissions are observed the record shall reflect this.

D. General

Records shall be kept in accordance with the Record Keeping Requirements described in Part "A", Section XII of this Permit.

V. REPORTING REQUIREMENTS **[Locally Enforceable Conditions]**

A. Stationary Rotating Equipment

1. The Permittee shall report to the Control Officer any daily period during which the sulfur content of the fuel being fired in the machine exceeds 0.8 percent.

[PCC 17.16.340.J]

2. If the Permittee proposes to use any other fuel than natural gas, propane or digester gas, for each of the engines listed in Part "D", an application for a significant permit revision must be submitted in accordance with Part "A" Section XV.C. [PCC 17.12.250.A.6]

B. General

1. Permit Deviations Reporting

The Permittee shall promptly report excess emissions and deviations from permit requirements in accordance with the requirements outlined in Part 'A' Section XIII.C of this permit.

2. Semiannual Summary Reports of Required Monitoring. [PCC 17.12.180.A.5.a]

The Permittee is required to submit semiannual reports of required monitoring including excess emissions or permit deviations that have occurred during the reporting period. Summary reports shall be due on January 31st (covering the period July 1st through December 31st) and July 31st (covering the period January 1st through June 30th) of each year. The first summary reports due after permit issuance may not cover a six-month period. All instances of excess emissions and deviations from permit requirements shall be clearly identified in such reports.

3. Compliance Certification Reporting

The Permittee shall submit an annual Compliance Certification Report to the Control Officer and to EPA Region IX. The Compliance Certification Report is due on July 31st of each year. The first report due after permit issuance may not cover a full 12-month period. (See Part "A", Section VII for detailed information on this report). [PCC 17.12.210.A.2]

Emissions Inventory Reporting [PCC 17.12.320]

Every source subject to a permit requirement shall complete and submit an annual emissions inventory questionnaire when requested by the control officer. (See Part "A", Section VI for additional information on this report).

VI. TESTING REQUIREMENTS **[Locally Enforceable Conditions]**

A. Opacity and Visible Emissions Testing

EPA Test Method 9 shall be used to monitor compliance with the opacity standard in Part "B" Section II.C.1 [PCC 17.20.010]

B. Particulate Matter Testing

Not required. The control officer may require the Permittee to quantify its particulate matter emissions if the control officer has reasonable cause to believe a violation of a standard has been committed. [PCC 17.20.010]

C. Hydrogen Sulfide Testing

Not required. The control officer may require the Permittee to test for hydrogen sulfide emissions if the control officer has reasonable cause to believe a violation of a standard has been committed. [PCC 17.20.010]

D. Performance Testing [PCC 17.20.070 & PCC 17.12.050]

Permittee shall conduct one performance test at least once per 5-yr permit term on each of the seven engines listed in Part D of this permit using solely digester gas to fuel the engines. These performance tests shall be completed no later than six months prior to permit expiration. Each set of performance tests shall include all of the pollutants listed in Section VI.D.1 of this section.

1. Permittee shall use the following EPA approved reference test methods to conduct performance tests for the specified pollutants:

   i. Nitrogen Oxides. EPA Reference Method 20.

   ii. Carbon Monoxide. EPA Reference Method 10.

   iii. Volatile Organic Content (Hydrocarbons) EPA Reference Method 25.

   iv. Sulfur Dioxides. EPA Reference Method 6.

E. Performance Testing [PCC 17.20.010 & PCC 17.12.050]

Within 365 days of issuance of this first five-year permit, the Permittee shall carry out a performance test to establish the base emissions of formaldehyde from the current permitted seven engines. For the duration of the test, the engines shall be fueled by digester gas alone. The Permittee shall submit to the Control Officer for approval of the test method/s to be used before carrying out any testing.

The Permittee may submit an alternate and equivalent test method(s) that is listed in 40 CFR Subpart 60, Appendix A to the Control Officer in a test plan, for approval by the Control Officer.

Greeley and Hansen LLC
4400 East Broadway, Suite 600P
Tucson, Arizona 85711
602-275-5595
www.greeley-hansen.com

GREELEY AND HANSEN

CH2MHILL