SYSTEM-WIDE ODOR MANAGEMENT PROGRAM
Quarterly Report
April-June 2008

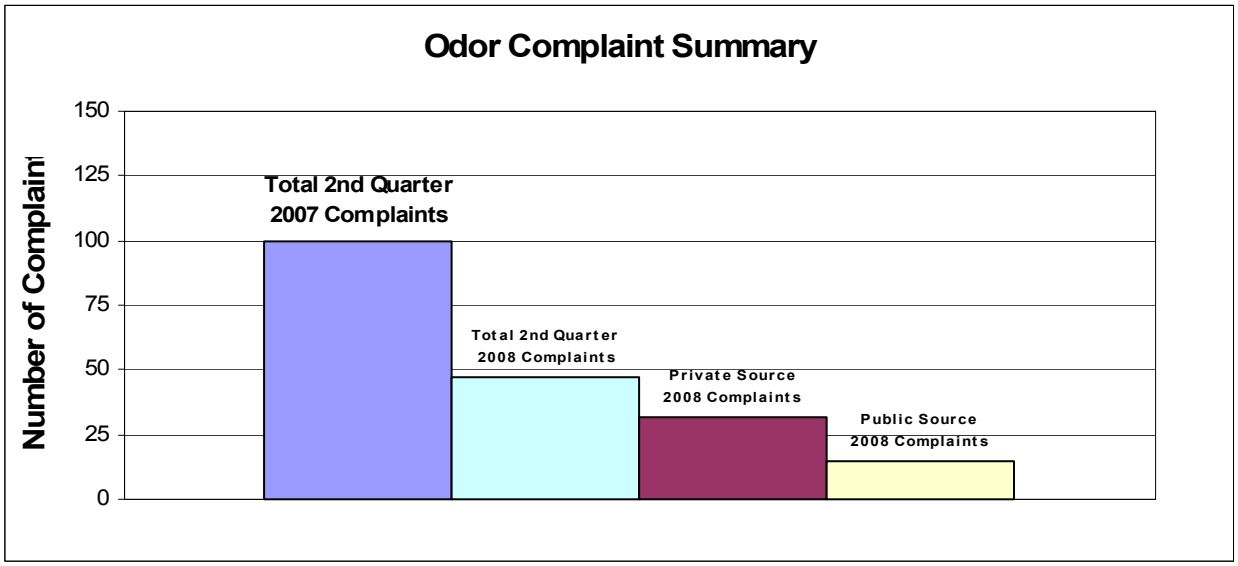
Pima County Regional Wastewater Reclamation Department

July 2008

Introduction and Odor Complaint Summary

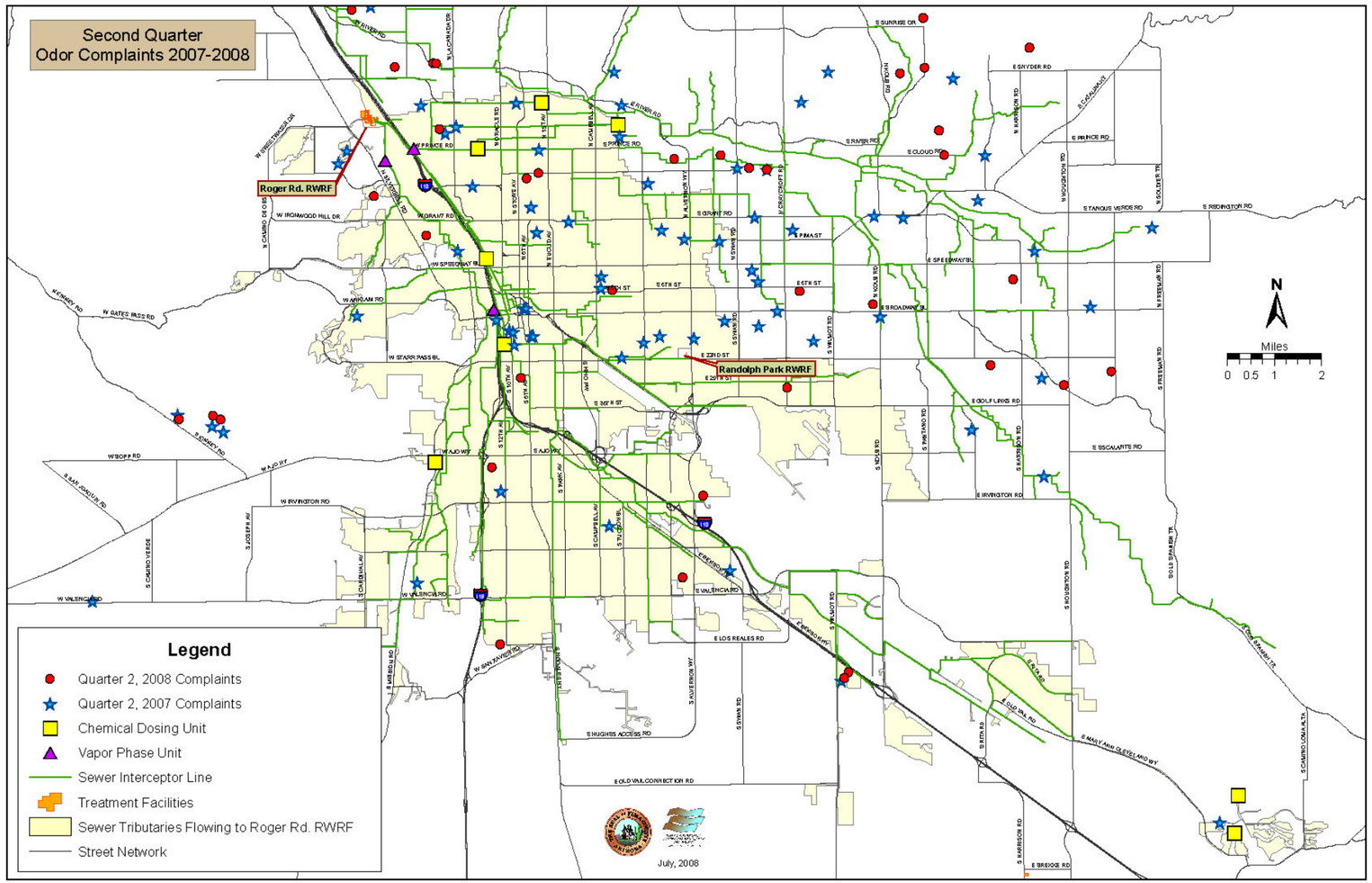
Pima County Regional Wastewater Reclamation Department (PCRWRD) is refining operating procedures to optimize odor control technology reacting to conditions brought on by changes in temperatures, seasons, atmospheric patterns, etc. Because seasonal weather conditions, temperatures, and population-based flows affect system-wide odor generation, odor complaint frequencies are best compared year-to-year for the same period. When comparing second quarter complaints from fiscal years 2007 and 2008, there was a 53 percent reduction in complaints in 2008. Of the 47 2008 complaints, 32, (68 percent) were attributed to private sources, such as private sewer systems, not under the control of PCRWRD.

Figure 1. Odor Complaints for Second Quarter 2008



In Figure 2 below, a map illustrates the quarterly spatial distribution of odor complaints for the second quarter of 2007 and 2008. This map shows that while few odor complaints in the second quarter of 2007 are near the Roger Road Wastewater Reclamation Facility (WRF), only two were reported near the Roger Road WRF in the second quarter of 2008. Also notable is the absence of complaints downstream of chemical dosing units (CDU) in the second quarter of 2008, indicating consistent control, and well functioning CDUs.

Figure 2. Odor Complaint Map for second Quarter 2007 and 2008



Roger Road WRF Odor Sources

RWRD's odor study identified five significant odor sources at the Roger Road WRF. These sources and corresponding odor control systems are listed below:

1) **The headworks** tent building was constructed in June 2007 and ventilated with an odor scrubber.
2) **The six primary clarifiers'** overflow weirs and launders were covered in June 2007. All are ventilated in pairs to three carbon adsorbers. Odor control has been further improved with the addition of an odor-reducing chemical (Biocope).
3) **Yard-structure number-one**, a flow diversion structure controlling influent and flows to the primary clarifiers was covered and ventilated to a carbon adsorber in June 2007.
4) **No. 2 biotower** (north) odor control went into service on April 1, 2008. **No. 1 biotower** (south) odor control went into service on June 10, 2008. Both towers were equipped with fans to reverse air flow downward into four carbon adsorbers (two adsorbers service each tower).
5) **No. 3 gravity thickener** and the **gravity belt thickener**, went into service on June 6th, 2008. **No. 1 and No. 2 gravity thickeners** went into service on June 25, 2008. Chemical scrubbers were replaced with more efficient carbon adsorbers.

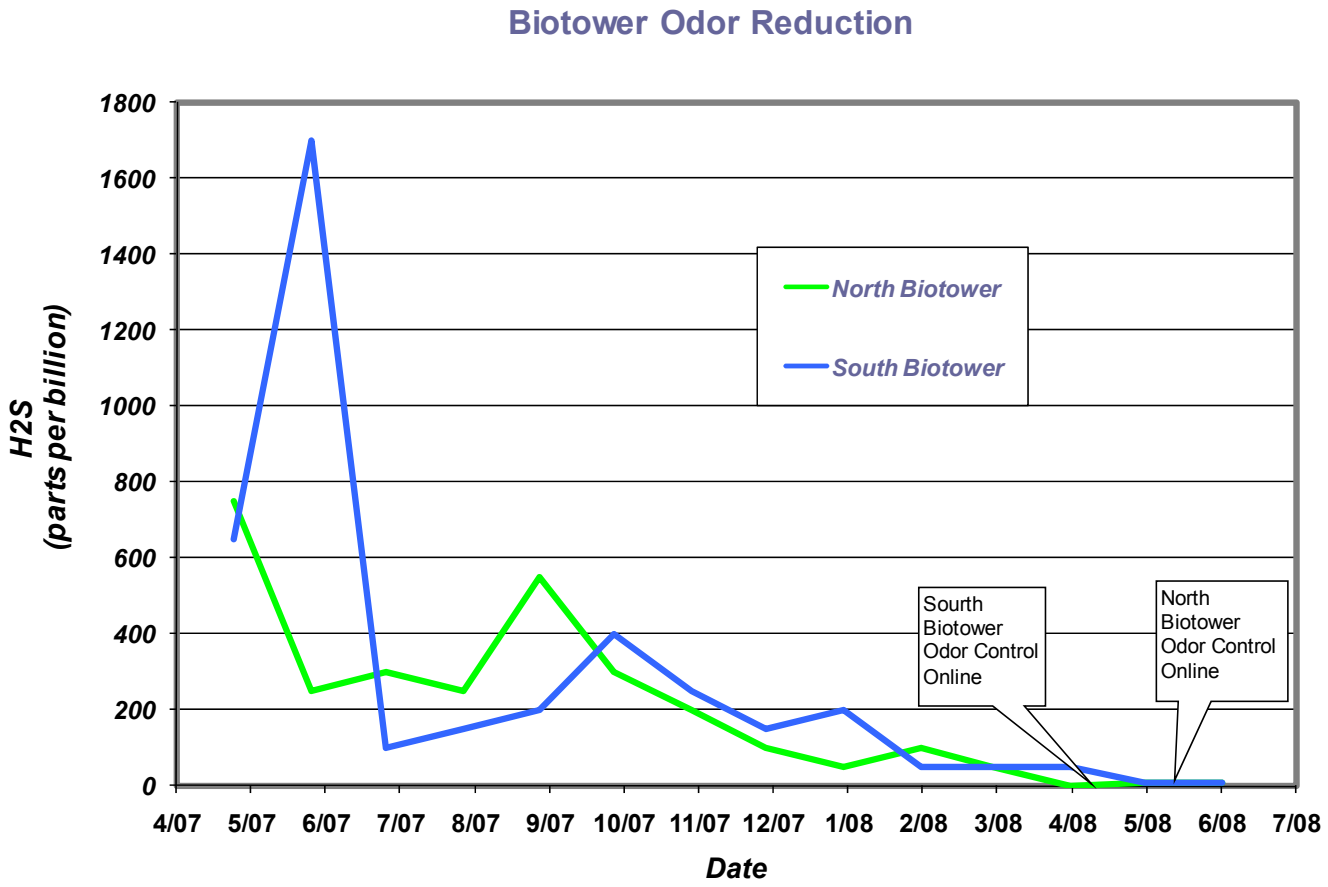
Of these odor sources, all are now well controlled with the newly installed odor control equipment.

The anaerobic digesters emerged as an intermittent odor source during digester cleaning operations. As a result, inadvertent biogas releases occurred during this activity. The figure 4 chart shows how this activity created an odor spike. However, since maintenance has been performed, gas emissions have been minimized. Although this maintenance activity resulted in significant but temporary odor events, the long-term result of the maintenance has been improved odor control.

Roger Road WRF Odor Control Systems

Roger Road WRF Odor Control Systems are monitored on a monthly basis.
The headworks carbon media was changed-out this quarter. Biotower emissions have continued to decrease with the completion of the carbon adsorbers serving both biotowers.

Figure 3



Wastewater Reclamation Facilities Fence Line Monitoring

An independent consultant performs monthly fence line monitoring. This entails collecting measurements at 50-foot intervals along the linear perimeter of the fence line at each facility. The measurements are recorded in parts per billion, (which is equivalent to one second of time in a 32-year span). The 30 parts-per-billion (ppb) hydrogen Sulfide fence line goal is considered to be below the nuisance threshold. The following graphs depict peak and average fence line concentrations measured at each facility.

Figure 4

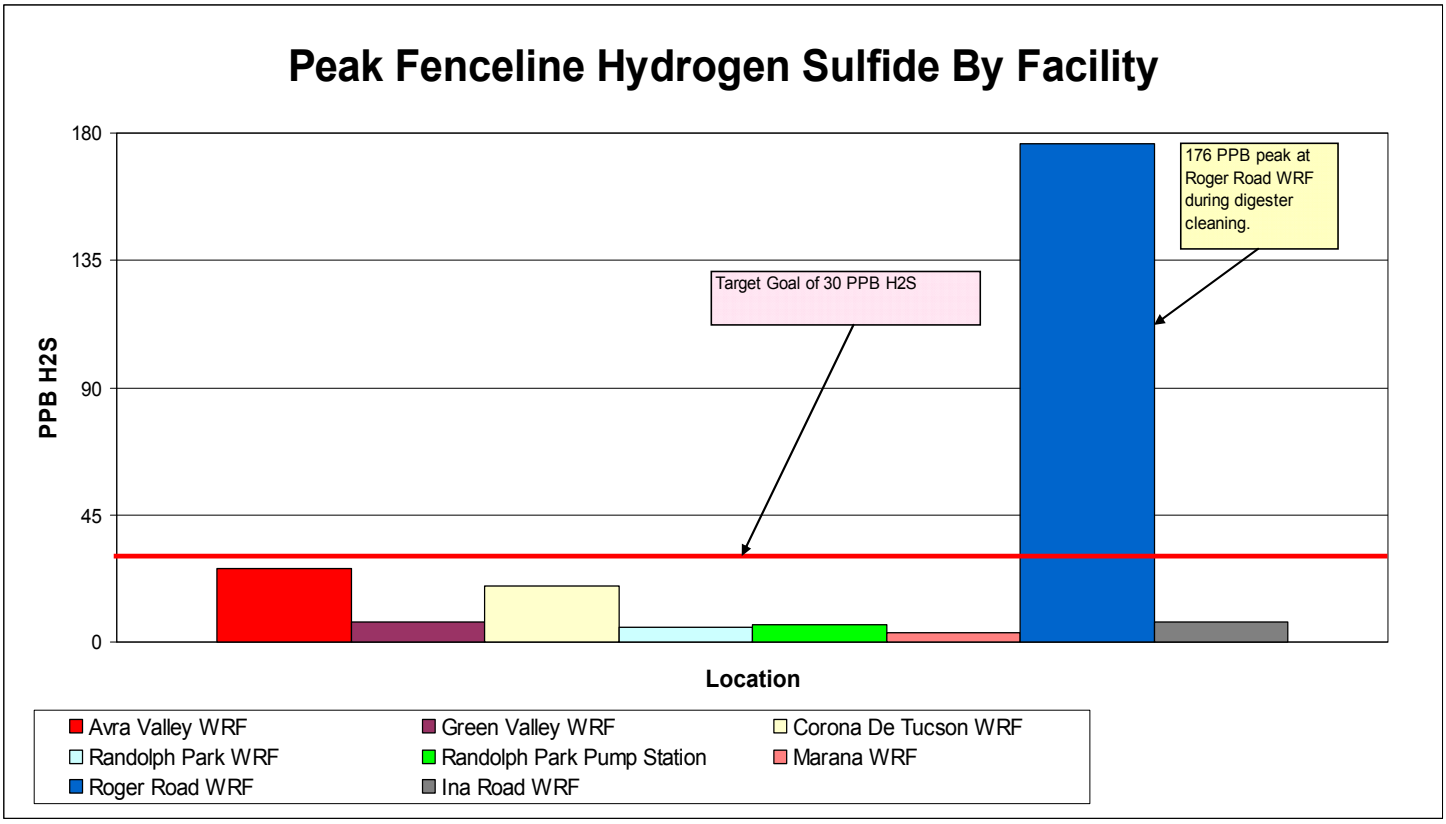
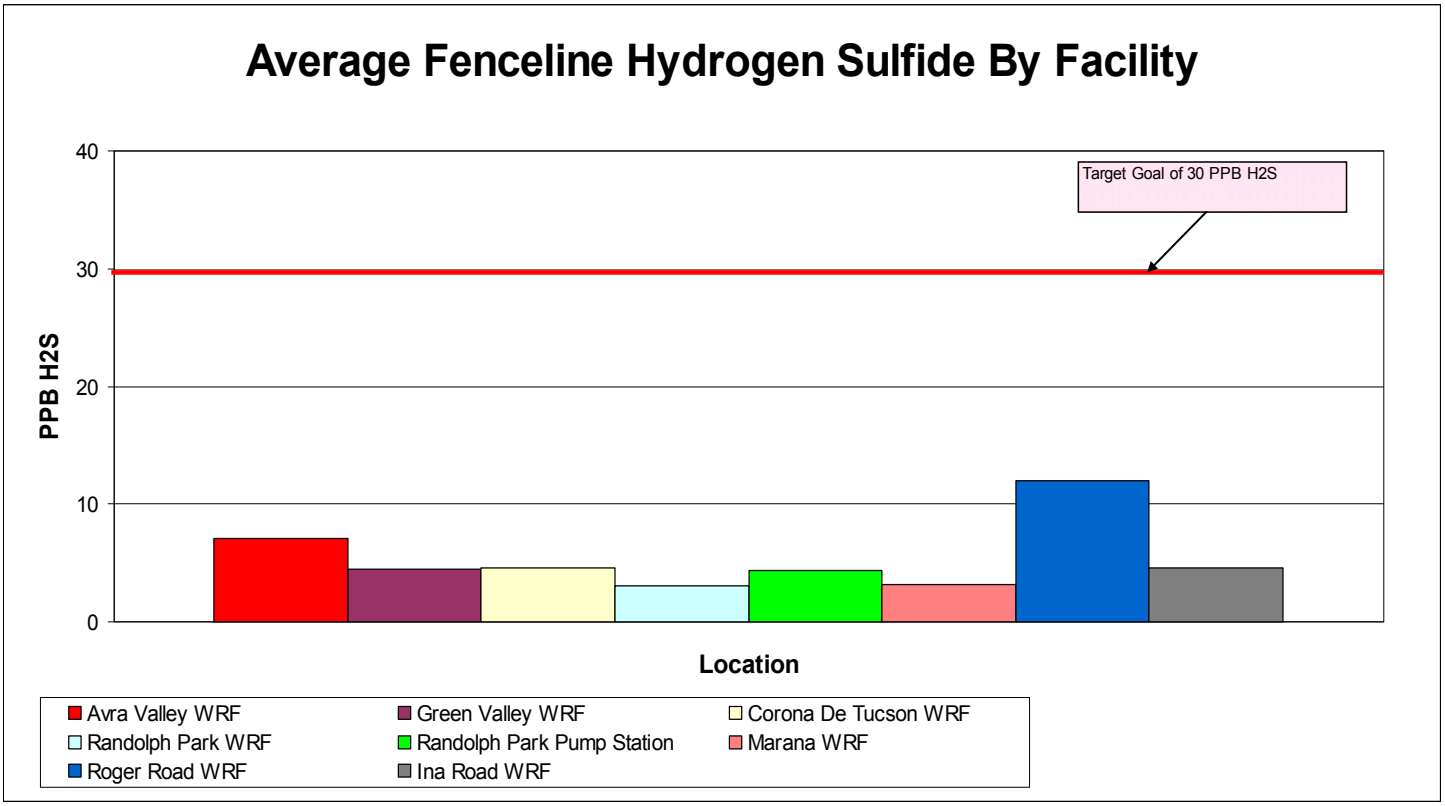

Peak Fenceline Hydrogen Sulfide By Facility
180
135
90
45
0
PPB H2S
Target Goal of 30 PPB H2S
176 PPB peak at Roger Road WRF during digester cleaning.
Location
Avra Valley WRF
Green Valley WRF
Corona De Tucson WRF
Randolph Park WRF
Randolph Park Pump Station
Marana WRF
Roger Road WRF
Ina Road WRF

Figure 5



Roger Road WRF Fence Line Performance

The fence line consists of 6,000 linear feet requiring 120 separate sample collections. The peak as indicated in the first graph occurred during digester cleaning activities. The second graph indicates the average measurements at the fence line are well below the target goal.

Ina Road WRF Fence Line Performance

All of the odor control systems operating at Ina Road WRF performed at greater than 99.9 percent removal. Fence line monitoring indicates that the odor control systems in operation successfully control odors at the fence line.

Sub-Regional Facilities Fence Line Performance

The sub-regional wastewater reclamation facilities include:

- Green Valley WRF
- Avra Valley WRF
- Marana WRF
- Corona de Tucson WRF
- Randolph Park WRF

Sub regional facilities are scheduled for quarterly fence line monitoring. As indicated in the previous two graphs fence line performance is significantly below target goals.

Conveyance System Odor Monitoring and Control Performance

Forty-four unscheduled sampling work orders were completed this quarter, 19 of which were for the resolution of two private odor problems: Gallego School (10) and La Paloma Village (9). Although these were private issues, the department assisted in the resolution of these odor issues.

Conveyance system odor control has improved significantly in terms of total complaints and hydrogen sulfide control has been very good at CDU performance monitoring locations. Three odor control systems (Silverbell, Alameda and Prince Road sites) had removal efficiencies of over 99 percent and are doing an excellent job of keeping odor emissions under control at these positive pressure locations.

Operating and Maintenance Costs

During the second quarter, the following costs were incurred:

• Roger WRF - 24,000 lbs. Carbon	$36,480
• CDUs - 193,070 gallons Sodium Hypochlorite	$188,726
• State Prison Site - 2,625 gallons Thioguard	$5,198
• Staffing Costs	$34,011
Total costs for second quarter operating and maintenance	$ 264,515

Wastewater Reclamation Facilities Odor Capital Improvements

This quarter, construction of odor control systems for the Roger Road WRF biotowers and solids thickening units was completed. These systems are now operational.

Conveyance System Odor Control Capital Improvements

The Conveyance System Odor Control CIP program for FY 2008/2009 will begin with the third quarter. Projects included in this fiscal year's CIP include: CDU Safety and Improvements, Vapor Treatment Systems, and CDU Expansions. These projects will improve odor control through hot-spot control, improved reliability and control, and strategic system expansion.

RWRD currently treats approximately 35 miles of interceptor with the current CDU system. The strategic CDU expansion is anticipated to treat over 100 miles of interceptor with significant benefits to the treatment plant odor system and treatment processes. In addition to odor control, the chemical treatment program results in significant reductions in corrosion rates of the sanitary sewer system.