



*Practical Solutions
In Groundwater Science*

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Via Electronic Mail

September 1, 2015

Mr. Darryl Crossman, City Manager
City of Litchfield Park
214 W. Wigwam Boulevard
Litchfield Park, AZ 85340

Re: Monthly Update, PGA-North Superfund Site

Dear Mr. Crossman:

As requested, following is a brief update on activities at the Phoenix-Goodyear Airport (PGA) North Superfund Site for the period from July 2015 through early August 2015.

RECENT MONITOR WELL RESULTS

Figure 1, attached, is a summary of recent monitoring results for the northern portion of the Site. The results from the July 2015 sampling event are generally consistent with prior results. Notable findings or exceptions for the July results are summarized below.

- At EPA MW-13A (South of I-10 and west of Litchfield Road) TCE was detected at 219 ug/L, down from the previous months' concentration of 695 ug/L. This is generally consistent with the historical trend observed at this well attributed to regional pumping patterns.
- At EPA MW-63A, located on the west side of Litchfield Road, approximately 500 feet north of Van Buren, TCE concentrations were observed at 60.7 ug/L, up from the previous months' concentration of 49.3 ug/L. Overall, the trend at this location remains an increasing trend. New extraction well EA-10 has been installed along Van Buren in the vicinity of former extraction well EA-04 to enhance on-site capture. Currently, EA-10 is operated in manual mode during business hours until the well can be integrated into the MTS automated control system.
- At EPA MW-48A, located on the east side of Litchfield Road, approximately ¼-mile south of Interstate 10, TCE concentrations were observed at 230 ug/L, down from the prior month's result of 245 ug/L. Although seasonal variability has been observed in EPA MW-48A, historical trends have shown a gradual decline in peak concentrations since 2013.

- At EPA MW-51A, located in the Pebble Creek community located along W Robson Circle North, northwest of 147th Lane, TCE concentrations were at 4.7 ug/L, a slight decrease from the previous month's result of 5.0 ug/L. Future results will be evaluated to confirm the trend; however, decreases are expected to result from injection being conducted in the northwest portion of the Site.
- At EPA MW-11A, located on La Vista Drive (approximately 0.1 mi south of Van Buren) ¼-mile east of Litchfield Road, TCE concentrations were 0.41 ug/L, which is consistent with historical results. The July results suggest that the 10 ug/L reported in June was anomalous.
- At EPA MW-07A, located on Loma Linda west of La Jolla, TCE concentrations were 50.1 ug/L, up from the prior month concentrations of 32.4 ug/L. Seasonal variations related to regional pumping patterns are observed in this location, however, an overall increasing trend is observed in this well due to the past injection of untreated water to the south of the site.
- At EPA MW-10, located approximately 850 north of EPA MW-07A, TCE concentrations were 7.8 ug/L, down from the prior month concentrations of 12 ug/L and 31 ug/L in May. Seasonal variations related to regional pumping patterns are observed in this well, however, an overall decreasing trend is observed in this well from its peak concentration of 130 ug/L observed in December 2012.

CONDUIT WELL UPDATE

Monitoring results for irrigation well 27C collected from Subunit A sample (above the inflatable packer) were 3.4 ug/L, consistent with the previous months' result. Concentrations in Subunit A have been below the aquifer water quality standard of 5 ug/L for several months. TCE concentrations in the deeper (Subunit C) sample were 5.3 ug/L in July, up from the previous months' result of 4.4 ug/L. With the exception of the June 2015 result, concentrations have consistently been above 5 ug/L.

SOURCE AREA INVESTIGATION & REMEDIATION

Crane Co is preparing plans and schedule for implementing the bench scale pilot tests that will be conducted in support of the source area remediation effort.

GROUNDWATER INVESTIGATION

Installation work on new monitor well EPA MW-9A, near Loma Linda Boulevard and Las Palmas Drive, is complete. Work to install monitor well EPA MW-25C, located on Van Buren east of Bullard Avenue, is scheduled to begin the week of September 14.

PLUME CONTAINMENT

Approximately 13% of the water extracted from the EA-06/EA-07 treatment system was utilized by Goodyear for park irrigation; this is consistent with the usage seen last year. Average flow rates in the injection wells for July were 158 gpm, 213 gpm, and 75 gpm in IA-11, IA-12 and IA-15, respectively, (Figure 2). The average reported flow rates for IA-07 and IA-08 for July were 174 and 167 gpm, respectively, generally consistent with the previous months' rates (Figure 2). Groundwater elevations in the vicinity of injection well IA-12 were generally consistent with the previous month's monitoring event (Figure 3). Average flow rates, based on operational uptime, for the off-site extraction wells are shown on Figure 4. The operational uptime for the EA-06/EA-07 treatment system was consistent with the prior month. The average reported flow rates for EA-06 and EA-07 for July were 410 gpm and 112 gpm, respectively. The average reported flow rate for EA-07 for July was 112 gpm, down from the previous months' flow rate. The average reported flow rate for EA-08 for July was 347 gpm, consistent with the previous months' flow rate.

Operation of new extraction well EA-10, continues in manual (daytime) mode. Operation of new injection well IA-09, located in Loma Linda Park, also continues in manual mode.

* * * * *

Sincerely,
Clear Creek Associates, PLC



Thomas R. Suriano, R.G.
Principal Hydrogeologist

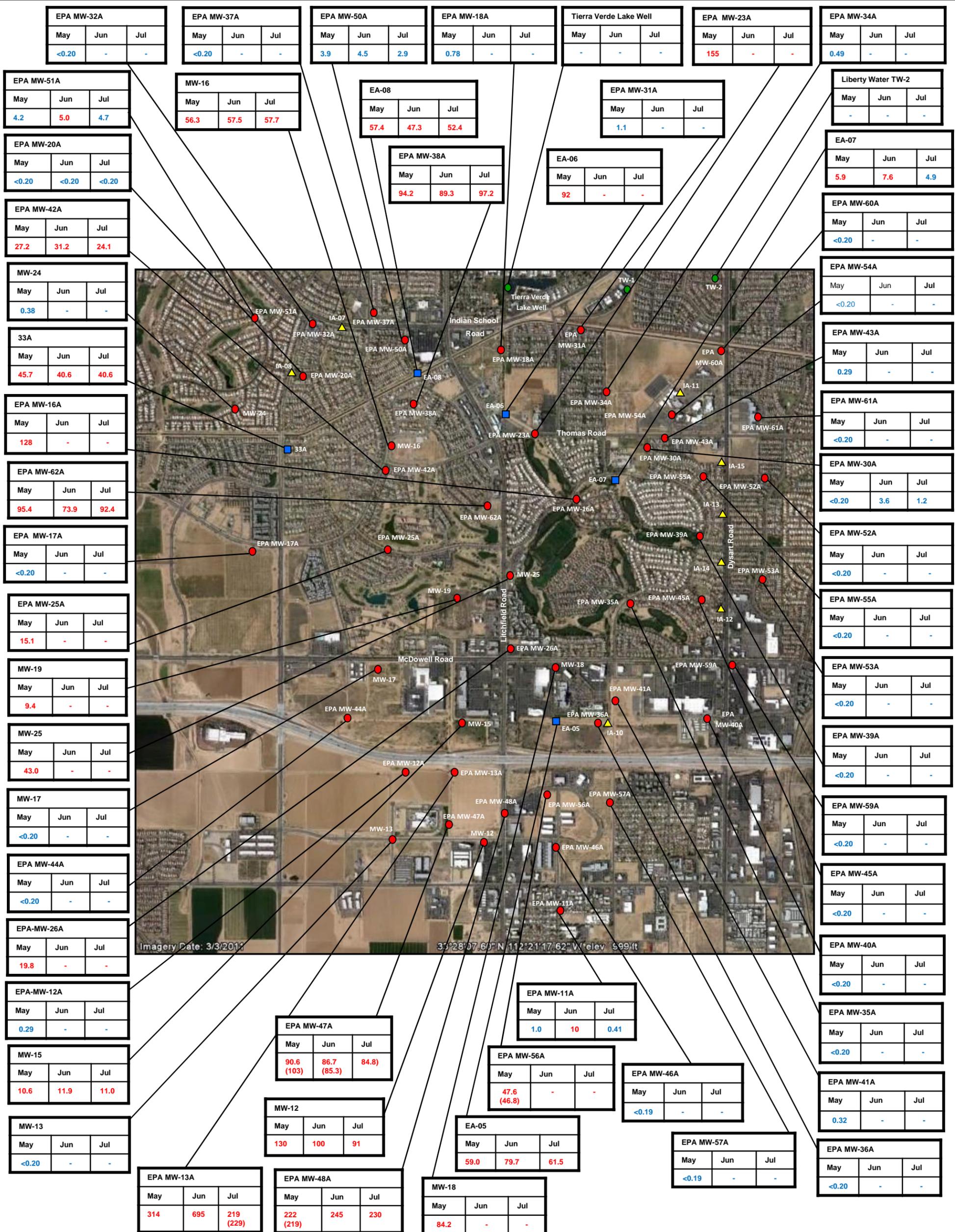
Attachments:

- Figure 1: Recent Analytical Results
- Figure 2: Average Injection Rates

Figure 3: Groundwater Elevations in Monitor Wells near IA-12

Figure 4: Average Extraction Rates

cc: (e-copies)
Carla Reece – City of Litchfield Park
Terri Roth – City of Litchfield Park
Susan Goodwin – City Attorney
Woody Scoutten – EPS Group

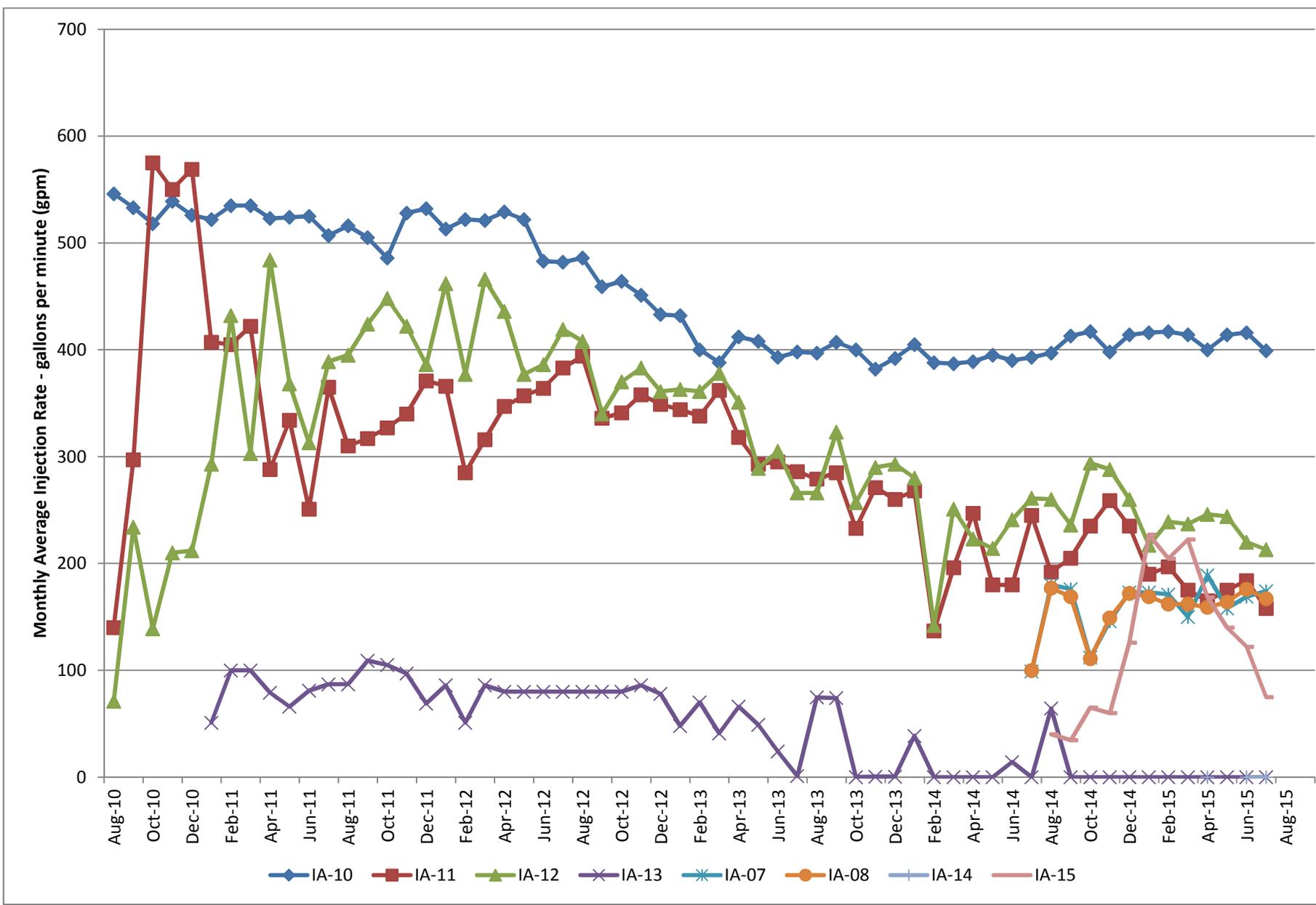


EXPLANATION

- Monitoring well location
 - Production well location
 - Extraction well location
 - ▲ Injection well location
 - Sep Sample Date (Month)
 - 20 TCE concentration in µg/L by EPA Method 8260B.
- Notes: Duplicate samples in parentheses. Results in Red are in excess of 5 µg/L. Results in Blue are less than 5 µg/L.

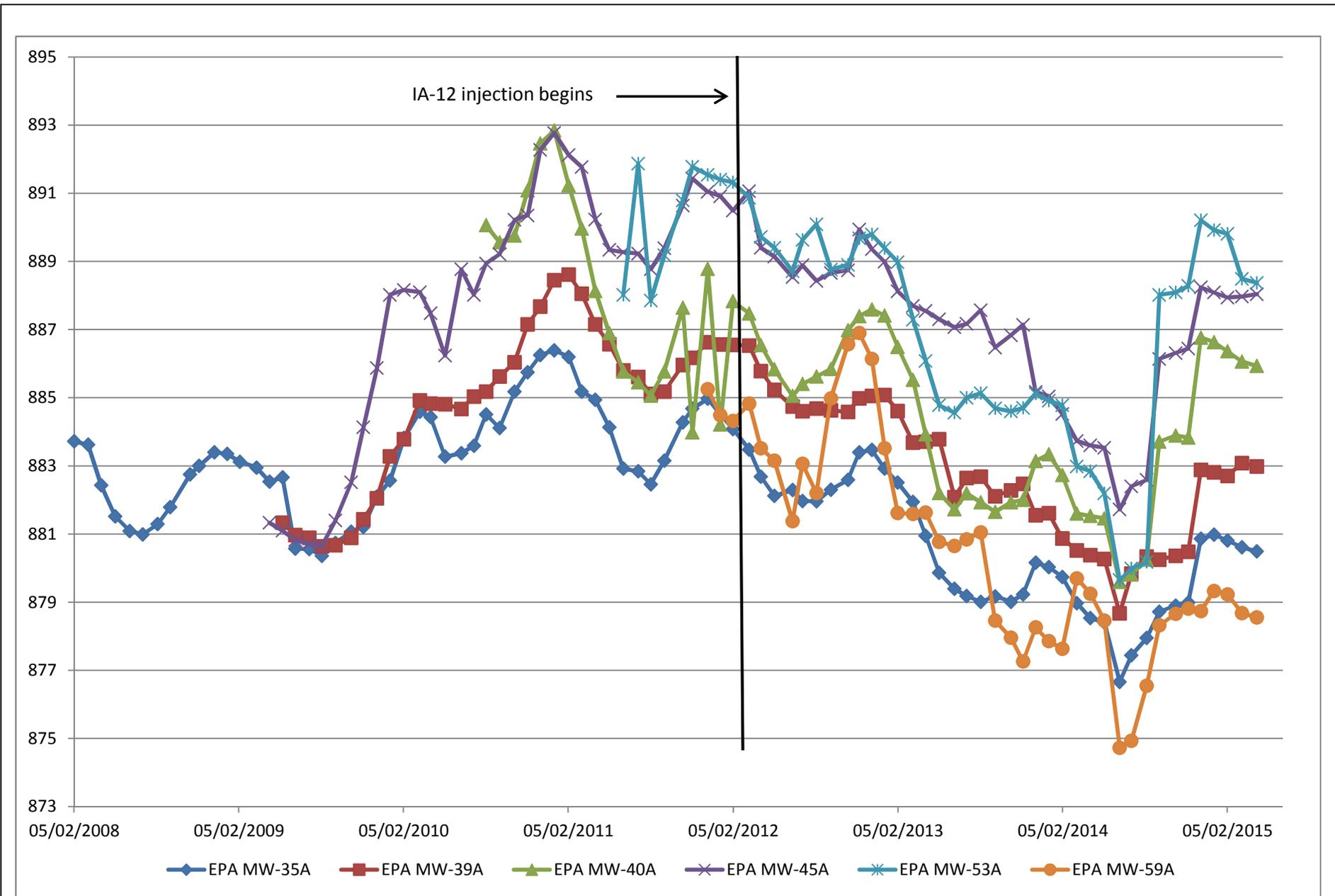


Recent Analytical Results
PGA-North Site
 Goodyear, Arizona
 Figure 1

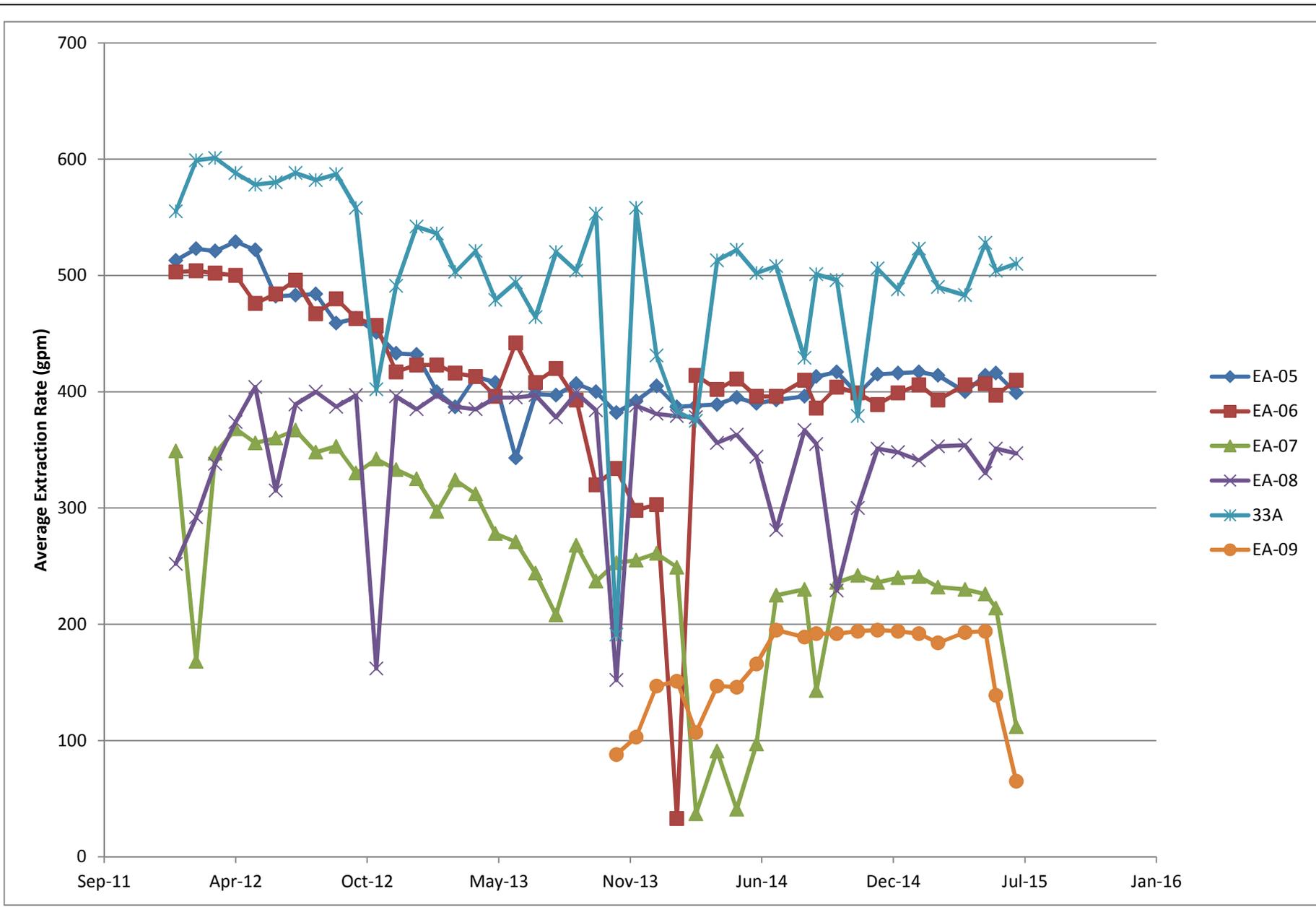


PGA-North Average Injection Rates

| | | | | | |
|-----------------|------|---------------|-----------------|--------------------------------|-------------|
| Approved TRS | Date | Author GJM | Date 8/24/15 | File Name Injection Rates_2 | Figure 2 |
|-----------------|------|---------------|-----------------|--------------------------------|-------------|



| Groundwater Elevations in Monitor Wells Near IA-12 | | | | | |
|--|------|--------|---------|-------------------|--------|
| Approved | Date | Author | Date | File Name | Figure |
| TRS | | GJM | 8/24/15 | Injection Rates_2 | 3 |



In accordance with the agreement between the City of Litchfield Park (COLP) and Crane Co., please find relevant portions of the July 2015 Groundwater Monthly Report and Remediation System Performance Summary as it pertains to the northeast and northwest portions of the Subunit A trichloroethene (TCE) plume associated with the Phoenix-Goodyear Airport-North (PGA-North) Superfund Site in Goodyear, Arizona.

The northeast area Subunit A TCE plume groundwater remediation systems consist of three groundwater extraction wells (EA-05, EA-06, and EA-07), and six groundwater injection wells (IA-10, IA-11, IA-12, IA-13, IA-14, and IA-15). These remediation systems were installed to remove TCE mass from groundwater, maintain an effective hydraulic barrier west of Dysart Road, protect the water supply wells in the area, reduce TCE concentrations in the area, and ultimately restore the Subunit A aquifer. The groundwater pumped from extraction well EA-05 is treated at the EA-05 groundwater treatment system (GTS) and re-injected into injection well IA-10. The groundwater pumped from extraction wells EA-06 and EA-07 is treated at the EA-06 GTS and currently re-injected into injection wells IA-11, IA-12, and IA-15. Injection wells IA-11 and IA-12 came online in August 2010, injection well IA-13 came online in January 2011, and injection well IA-15 came online August 2014 with all flow from IA-13 diverted to this well. Injection well IA-14 is installed and connected to the system, but currently is not being used due to the effective hydraulic barrier that is currently being provided by primarily three injection wells IA-11, IA-12, and IA-15.

The northwest area Subunit A TCE plume groundwater remediation systems consist of two groundwater extraction wells (33A and EA-08) and two groundwater injection wells (IA-07 and IA-08). Extraction well 33A came online in 1997, and extraction well EA-08 came online in December 2011. The groundwater pumped from 33A is treated at the 33A GTS, and is used for irrigation by the Palm Valley Lakes Golf Course, or is discharged to the Roosevelt Irrigation District (RID) canal. The groundwater pumped from EA-08 is treated at the EA-08 GTS, and is conveyed to injection wells IA-07 and IA-08 to provide a hydraulic barrier in the northwest area, protect water supply wells, and reduce the size of the plume.

The average groundwater extraction and injection rates for the northeast and northwest area remediation system wells during July 2015 are summarized below:

Northeast Area

- EA-05 – 399 gallons per minute (gpm)
- EA-06 – 410 gpm
- EA-07 – 112 gpm
- IA-10 – 399 gpm
- IA-11 – 158 gpm
- IA-12 – 213 gpm
- IA-15 – 75 gpm

Northwest Area

- EA-08 – 347 gpm
- 33A – 510 gpm
- IA-07 – 174 gpm
- IA-08 – 167 gpm

A. Treatment Systems and TCE Mass Removal

EA-05 GTS

During this reporting period, approximately 20.1 million gallons (Mgals) of groundwater was extracted and treated at the EA-05 GTS; removing 10.3 pounds of TCE.

EA-06 GTS

During this reporting period, approximately 26.3 Mgals of groundwater was extracted from extraction wells EA-06 and EA-07, and treated at the EA-06 GTS; removing 15.4 pounds of TCE.

EA-08 GTS

During this reporting period, approximately 17.5 Mgals of groundwater was extracted and treated at the EA-08 GTS; removing 7.6 pounds of TCE.

33A GTS

During this reporting period, approximately 25.7 Mgals of groundwater was extracted and treated at the 33A GTS; removing approximately 10.1 pounds of TCE.

B. Northeast Area Subunit A Groundwater Quality and Plume Extent

The May/July 2015 analytical results indicate that the northeast portion of the Subunit A TCE plume continues to be delineated by monitor wells EPA MW-18A, EPA MW-30A, EPA MW-31A, EPA MW-34A, EPA MW-35A, EPA MW-36A, EPA MW-39A, EPA MW-40A, EPA MW-41A, EPA MW-43A, EPA MW-45A, EPA MW-52A, EPA MW-53A, EPA MW-54A, and EPA MW-55A, EPA MW-59A, EPA MW-60A, EPA MW-61A, and IR-34B (Figure 1). Groundwater samples collected from these wells continue to exhibit TCE concentrations that are either below the laboratory detection limit or are less than the United States Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 5 µg/L.

In the IA-12 area, since injection of treated groundwater commenced in August 2010, TCE concentration trends for key performance monitor wells continue to indicate that the Subunit A plume continues to be reduced in size. For example:

- Historically, TCE concentrations in EPA MW-35A, (Figure 2) typically peaked during the winter and spring months in response to rising groundwater levels related to the reduced pumping schedules from local irrigation and supply wells. In February 2010, TCE was reported at a concentration of 48 µg/L in EPA MW-35A. However, since the injection of treated water began into injection wells IA-12, IA-13, and most recently IA-15 (August 2014), TCE concentrations have been reduced by two orders

of magnitude in this well, and continue to remain low; the most recent (May 2015) TCE concentration for this well was below the laboratory detection limit of 0.20 µg/L.

- In IR-34B TCE was reported at a concentration of 180 µg/L in July 2009. However since the initiation of injection of treated water into wells IA-11, IA-12, IA-13, and most recently IA-15, TCE concentrations have been reduced by two orders of magnitude. The most recent (July 2015) TCE concentration for this well is 3.2 µg/L, which is below the MCL.
- In monitor wells EPA MW-39A, EPA MW-40A, EPA MW-45A, EPA MW-55A and EPA MW-59A the most recent (May 2015) TCE concentrations have remained below the laboratory detection limit of 0.20 µg/L.

Similarly, in the area of injection well IA-11 and IA-15, TCE concentrations have decreased in monitor wells EPA MW-30A, EPA MW-43A, and EPA MW-54A. For example:

- In monitor well EPA MW-30A, concentrations have decreased from 29 µg/L in August 2010 to 1.2 µg/L (below the MCL) in July 2015;
- In monitor well EPA MW-43A, concentrations have decreased from 6.3 µg/L in August 2010 to 0.30 µg/L (below the MCL) in May 2015.
- In monitor well EPA MW-54A, concentrations have decreased from 28 µg/L in October 2010 to below the laboratory detection limit of 0.20 µg/L in May 2015.

The TCE concentration trends for northeast area wells continue to demonstrate that the plume in this area is defined and has continued to decrease in size as a result of the extraction operations at EA-05, EA-06, and EA-07 and the reinjection of treated groundwater into injection wells IA-10, IA-11, IA-12, and IA-15.

C. Northwest Area Subunit A Groundwater Quality and Plume Extent

The May/July 2015 analytical results indicate that the northwest portion of the Subunit A TCE plume is delineated by monitor wells MW-17, EPA MW-17A, EPA MW-20A, EPA MW-21A, EPA MW-32A, EPA MW-37A, EPA MW-50A, and MW-24 (Figure 1). Groundwater samples collected from these wells exhibit TCE concentrations that are either below the laboratory detection limit or are less than the EPA MCL of 5 µg/L.

In the EA-08 GTS area, since the startup of extraction well EA-08 in December 2011, TCE concentrations in key performance monitor well (EPA MW-50A) continue to indicate TCE mass in the area has been reduced. For example:

- In sentinel monitor well EPA MW-50A, TCE concentrations have decreased from 19 µg/L in October 2010 to 2.9 µg/L in July 2015 (Figure 1).

In the 33A GTS area, northwest area sentinel wells continue to indicate that the plume is defined to concentrations less than the laboratory reporting limit, or less than the MCL.

- In monitor well EPA MW-51A, TCE concentration was 4.7 µg/L in July 2015 (Figure 1). As the injection of treated water to injection wells IA-07 and IA-08 continue, TCE concentrations in this well may occasionally increase to levels slightly above the MDL, but over time concentrations are expected to be reduced.
- In interior monitor well MW-16, the July 2015 TCE concentration was 57.7 µg/L (Figure 1). Due to the interior location of the well, the aquifer dynamics in this area, and the historic high TCE mass in the area, TCE concentrations may remain above the MCL and may occasionally spike as shown in Figure 3.

D. Groundwater Elevations and Flow Directions

Northeast Area

The July 2015 groundwater elevations in key northeast area monitor wells (EPA MW-30A, EPA MW-34A, EPA MW-35A, EPA MW-39A, EPA MW- 43A, EPA MW-45A, EPA MW-54A, and EPA MW-55A) continue to indicate an effective hydraulic barrier and groundwater mound west of Dysart Road that is maintained by the injection of treated groundwater into injection wells IA-11, IA-12, and IA-15 (Figure 4 and Figure 5). Additionally, groundwater elevations and the local potentiometric surface calculated for July 2015 continue to demonstrate that the operation of the extraction and injection wells in this area are maintaining groundwater flow directions away from the Litchfield Park and COA water supply wells in the area and toward extraction wells EA-06 and EA-07 (Figure 6).

Northwest Area

In the northwest area, the extraction operations at 33A, EA-08, and injection wells IA-07 and IA-08 are the dominant potentiometric features. Groundwater elevations in key monitor wells PZ-16, PZ-17, EPA MW-3A, EPA MW-20A, EPA MW-32A, and EPA MW-37A continue to indicate that an effective hydraulic barrier has been developed in the northwest area by the injection of treated water into IA-07 and IA-08 (Figure 7). The small gap in hydraulic capture that had previously existed between extraction wells 33A and EA-08 has been eliminated by the injection of treated water into these wells.

E. Activities Planned for September 2015

- Continued operation and maintenance of the existing groundwater treatment systems.
- Monthly groundwater sampling and water level measurements of key performance and plume delineation monitor wells north of I-10.
- Continue to evaluate water levels, TCE concentrations, and groundwater flow directions in the northeast area. Make flow rate adjustments to the injection wells as necessary to maintain hydraulic control and protect water supply wells.
- Monitor and evaluate the mounding from the injection of treated water from extraction well EA-08 to new injection wells IA-07 and IA-08.

Please feel free to contact me if you have any questions or if you need additional information.

Harry Brenton, RG

Director of Hydrogeological Services

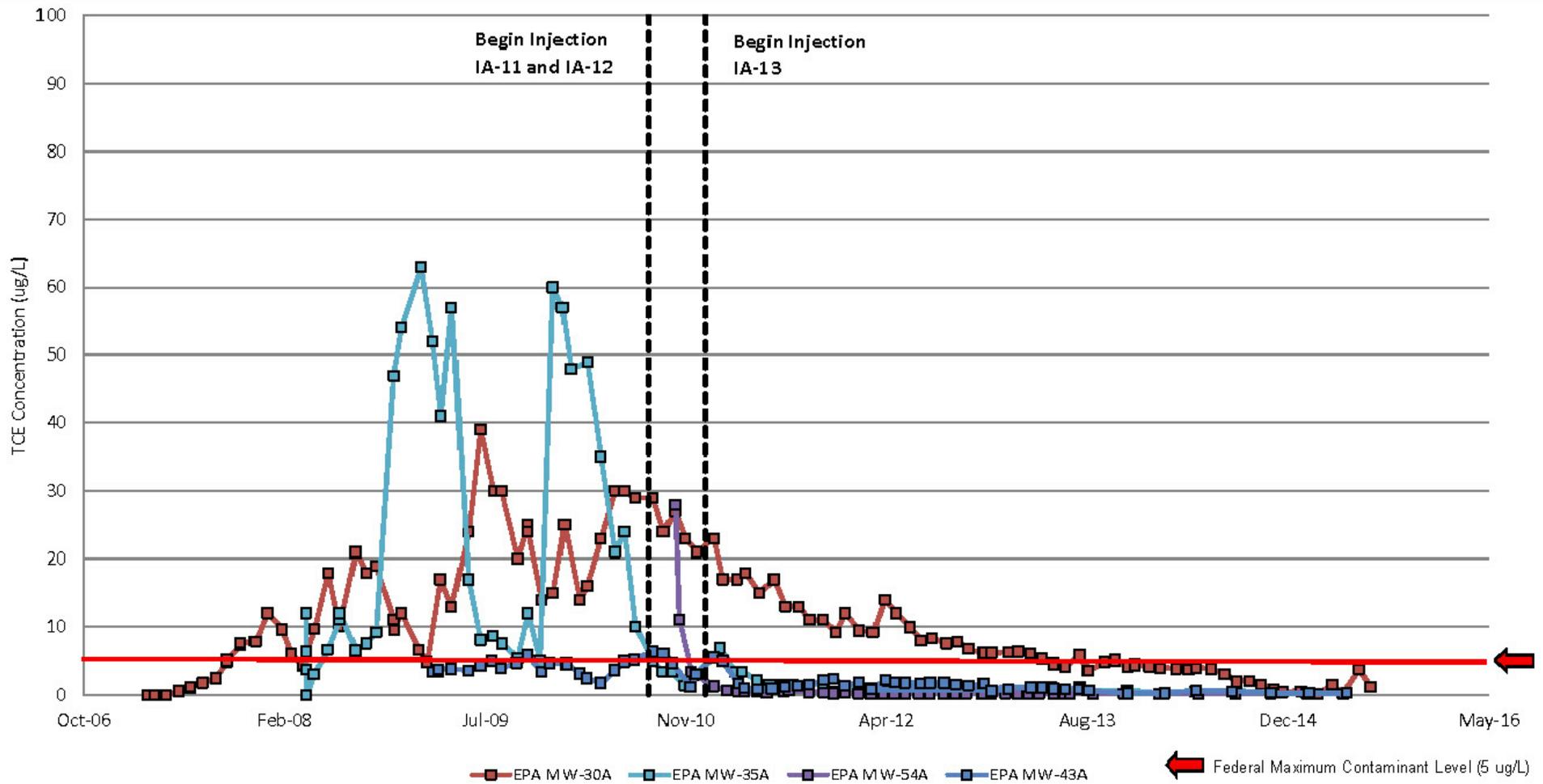
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**TCE Concentrations EPA MW-30A, EPA MW-35A, EPA MW-43A, and EPA MW-54A
Phoenix-Goodyear Airport-North
Goodyear, AZ**



© MATRIXNEWORLD (P:2015) 15-100 PGA-North/CAD/City Summaries/07-July/COA-COL/PCOA-CLP Figure 2 - July 2015.dwg

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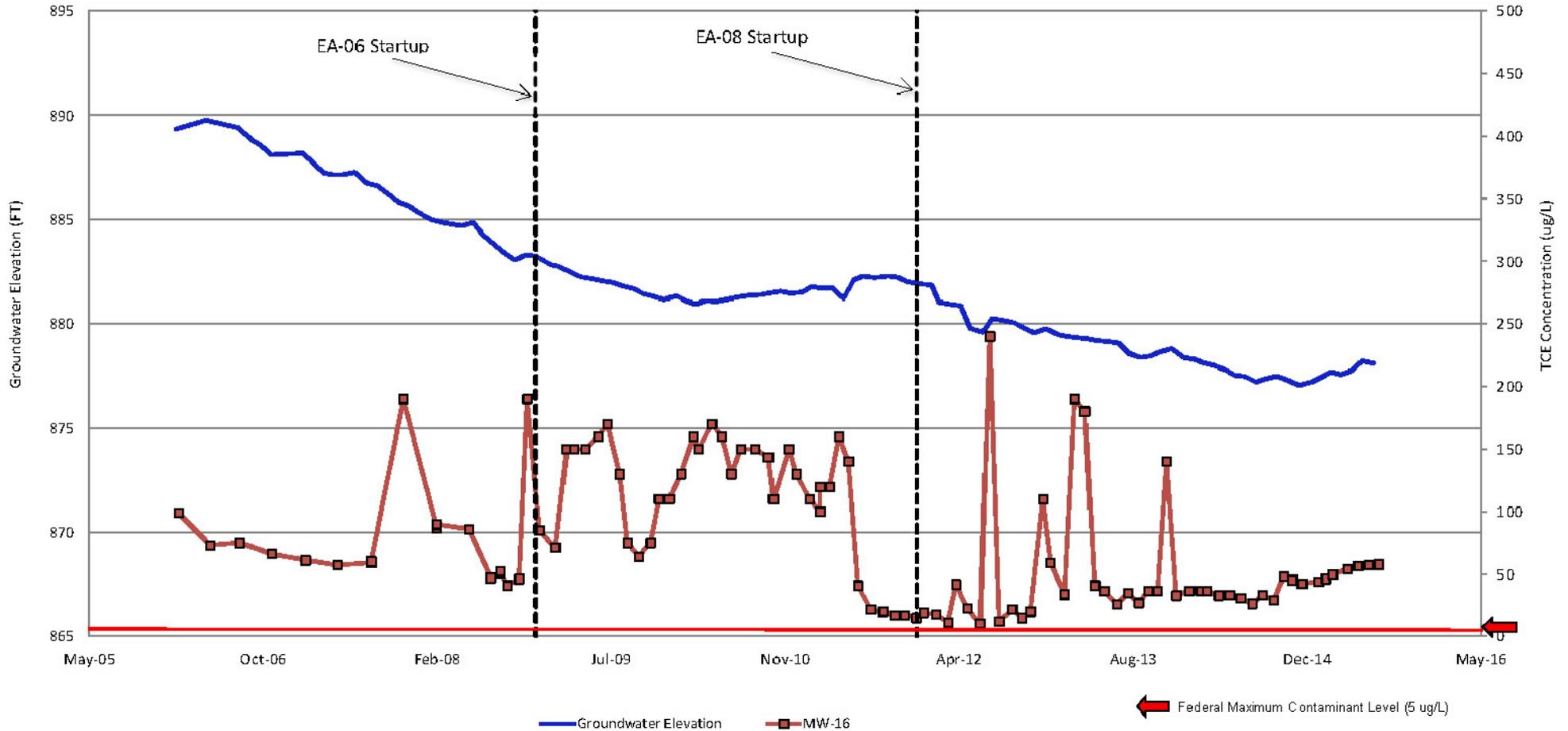
TCE TREND GRAPHS-PERFORMANCE
 MONITOR WELLS - SUBUNIT A
 NORTHEAST AREA

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| DATE: 08-11-15 | DATE: 08-11-15 | DATE: 08-11-15 | SCALE: NONE |

FIGURE NUMBER:

2

MW-16 GROUNDWATER LEVELS and TCE CONCENTRATIONS (2006 - 2015)
Phoenix-Goodyear Airport-North
Goodyear, AZ



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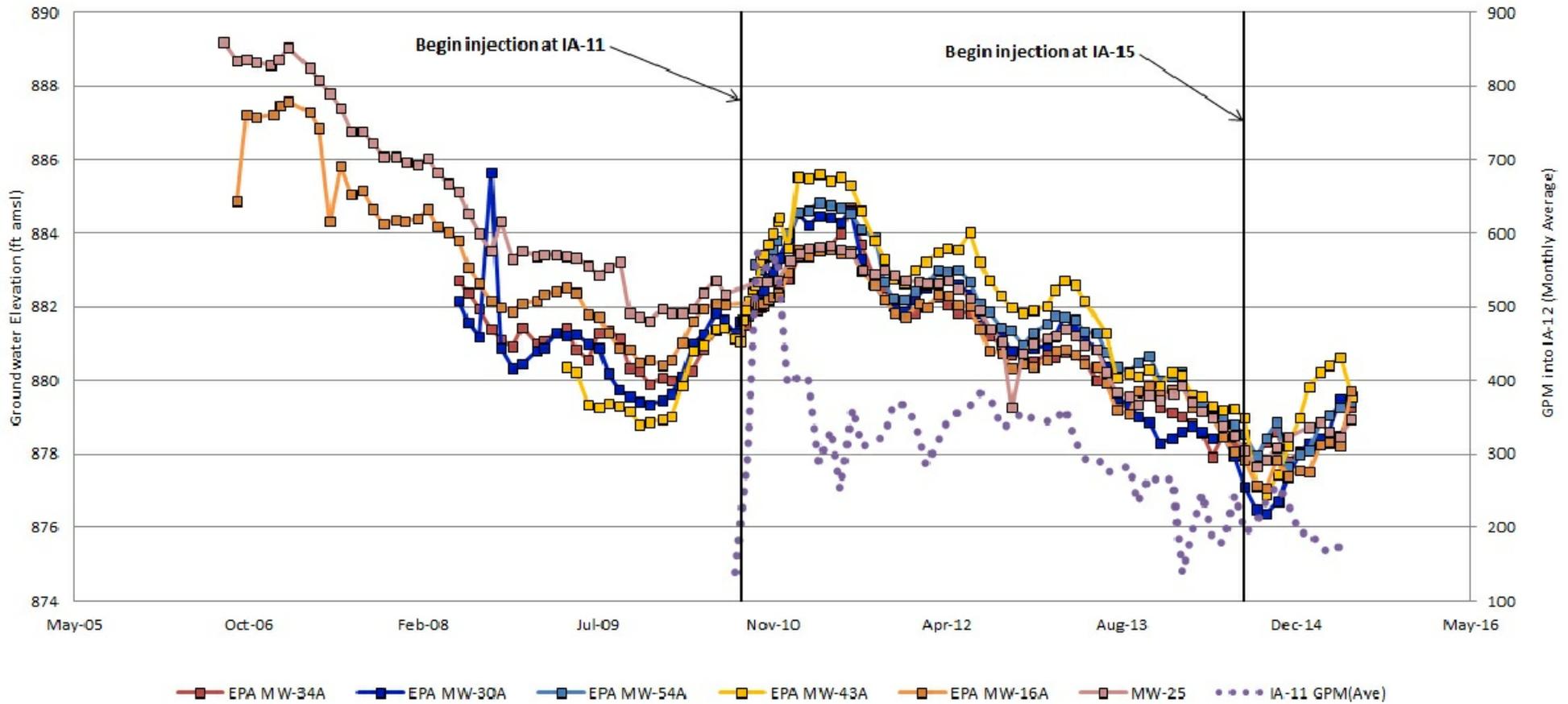
**GROUNDWATER ELEVATION & TCE
 CONCENTRATION TRENDS
 MW-16**

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| DATE: 08-11-15 | DATE: 08-11-15 | DATE: 08-11-15 | SCALE: NONE |

FIGURE NUMBER:

3

Hydrograph - IA-11 Area Wells Phoenix-Goodyear Airport-North Goodyear, AZ



© MATRIXNEWORLD (F:\2015\15-100 PGA-North\CAD\City Summaries\07-July\COA-COL\PCOA-CLP Figure 4 - July 2015.dwg

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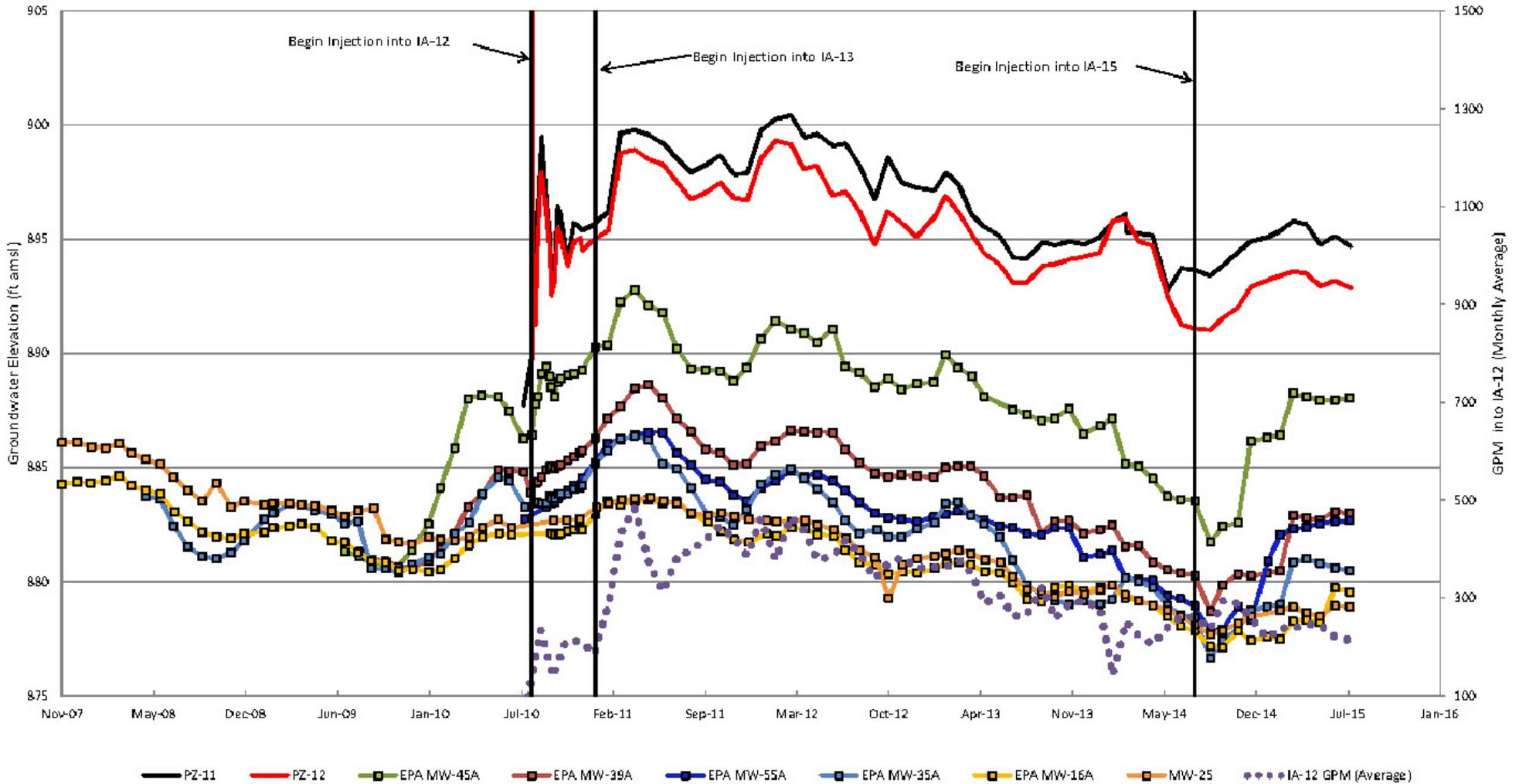
NE AREA SUBUNIT A GROUNDWATER ELEVATION TRENDS INJECTION WELL IA-11 AREA

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| DATE: 08-11-15 | DATE: 08-11-15 | DATE: 08-11-15 | SCALE: NONE |

FIGURE NUMBER:

4

Hydrograph - IA-12 and IA-13 Area Wells Phoenix-Goodyear Airport-North Goodyear, AZ



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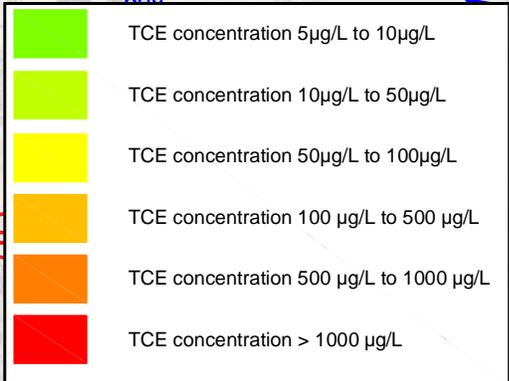
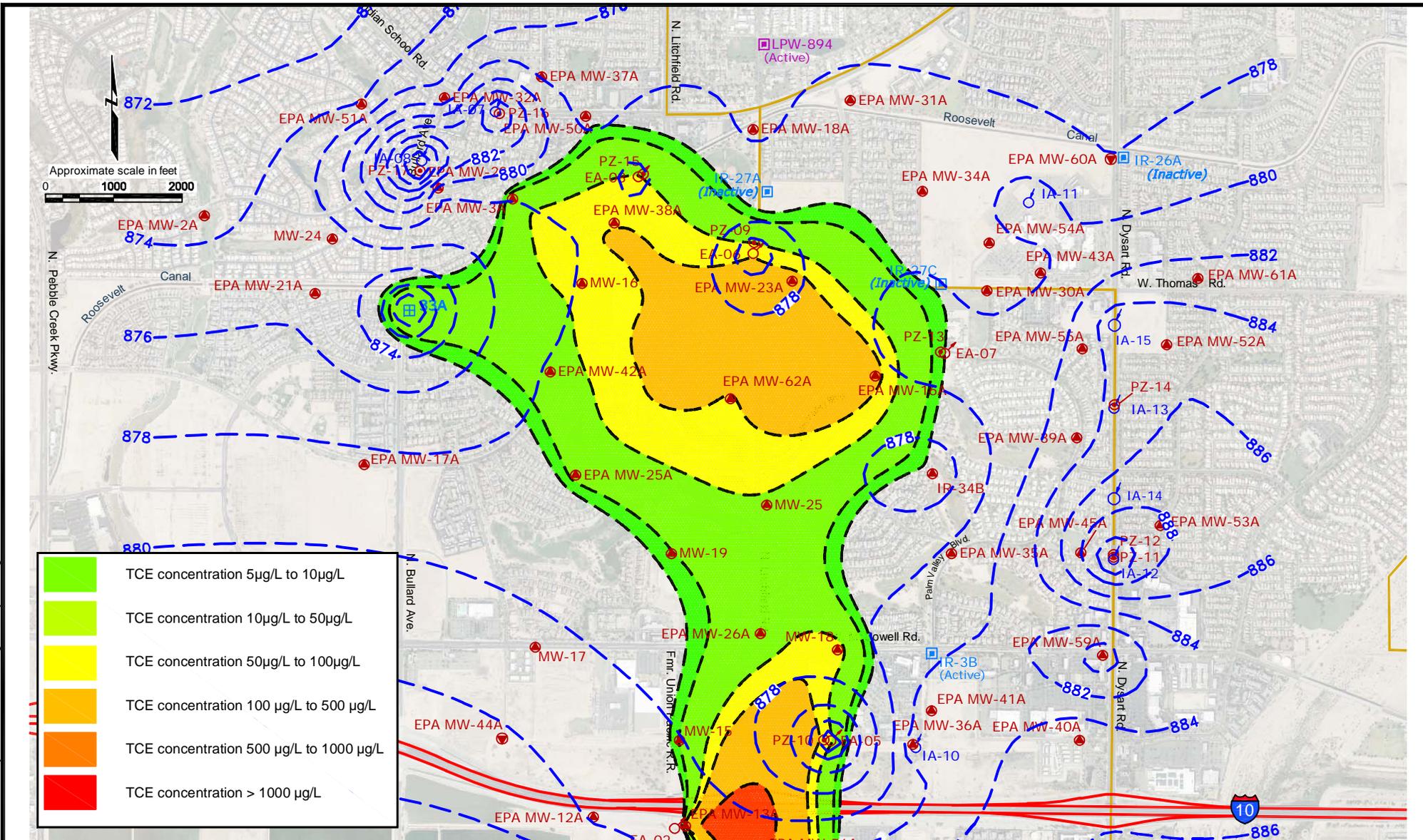
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NE AREA SUBUNIT A GROUNDWATER ELEVATION TRENDS INJECTION WELL IA-12 and IA-13 AREA

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FIGURE NUMBER:

5



Explanation

882 --- Potentiometric Isocontour showing groundwater elevation in feet above MSL; dashed where inferred

--- Isocontour showing TCE concentration in µg/L, dashed where inferred. Based on May/July 2015 data.

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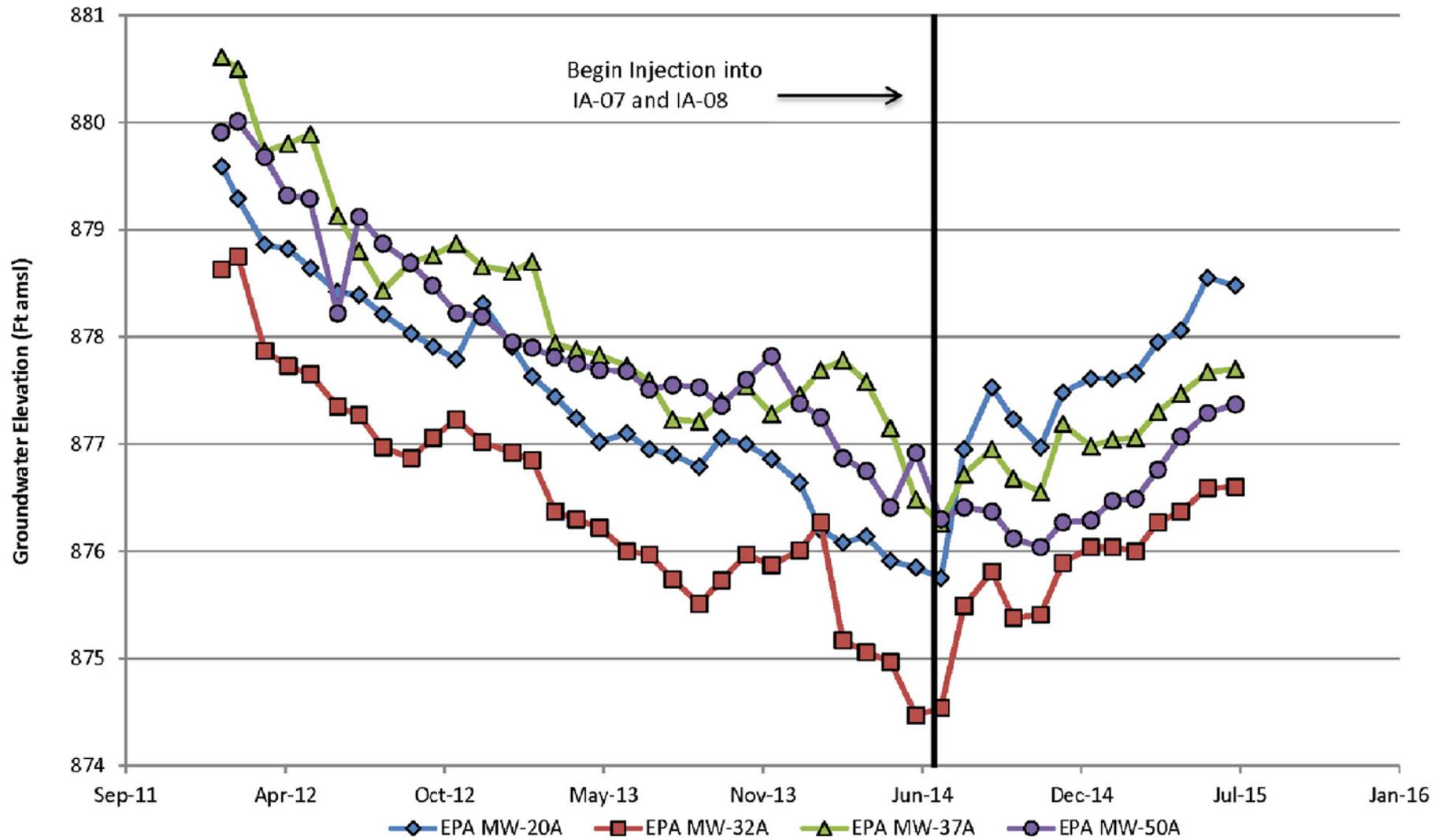
SUBUNIT A GROUNDWATER CONTOURS
 AND TCE PLUME NORTH OF I-10
 MAY/JULY 2015

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| DRAWN BY: AR | DESIGNED BY: JLM | APPROVED BY: HB | PROJECT NUMBER: 15-100E |
| DATE: 8-11-15 | DATE: 8-11-15 | DATE: 8-11-15 | SCALE: 1" = 2000' |

FIGURE NUMBER:

6

Hydrograph - IA-07 and IA-08 Area Wells Phoenix-Goodyear Airport-North Goodyear, AZ



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NW AREA SUBUNIT A GROUNDWATER ELEVATION TRENDS INJECTION WELL IA-07 and IA-08 AREA

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| DRAWN BY: AR | DESIGNED BY: JLM | APPROVED BY: HB | PROJECT NUMBER: 15-100E |
| DATE: 08-11-15 | DATE: 08-11-15 | DATE: 08-11-15 | SCALE: NONE |

FIGURE NUMBER:

7