ENVIRONMENTAL REMEDIATION GROUP
3855 North Ocoee Street, Suite 200
Cleveland, TN 37312

VIA: Geotracker

July 30, 2013

Mr. Dean Thomas, PG
Engineering Geologist
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, California 93401

Subject: Second Quarter 2013 Groundwater Monitoring Report
Olin Site
425 Tennant Ave
Morgan Hill, California

Dear Mr. Thomas:

The Second Quarter 2013 Groundwater Monitoring Report (GMR) for the Olin Site in Morgan Hill, California is attached. The GMR is prepared pursuant to Monitoring and Reporting Program (MRP) R3-2008-0028 and Cleanup or Abatement Order (CAO) R3-2004-0101, as modified by the State Water Resources Control Board and other Central Coast Regional Water Quality Control Board letters.

With my signature below, as a duly authorized Olin representative, I certify under penalty of perjury that to the best of my knowledge the contents within this report are true, complete, and correct.

If you have any questions, please call me.

Sincerely,
O L I N C O R P O R A T I O N

David M. Share
Director
Environmental Remediation Group

cc (via e-mail):
Thea Tryon, Water Board
Karl Bjarke, City of Morgan Hill
Andria Ventura, PCAG
Behzad Ahmadi, Water District
Curt Richards, Rick McClure, Dane Grimshaw (Olin)
Michael Taraszki, Sean Culkin, Susan Panttaja, Mari Gilmore, Dominique Cox (AMEC)
Evan Cox, Jim Deitsch (Geosyntec)

July 30, 2013

Project 6107130012.02.02

Mr. Dean Thomas, PG
Engineering Geologist
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, California 93401

Subject: Second Quarter 2013 Groundwater Monitoring Report
Monitoring and Reporting Program R3-2008-0028
Olin Site
425 Tennant Avenue
Morgan Hill, California

Dear Mr. Thomas:

AMEC Environment & Infrastructure, Inc. (AMEC) has prepared this report on behalf of Olin Corporation (Olin) to present the results of the Second Quarter 2013 (referred to herein as "2Q13") groundwater monitoring and remediation activities conducted for the Olin Site located at 425 Tennant Avenue, Morgan Hill, California (the "Site"). This report describes the activities conducted pursuant to Monitoring and Reporting Program (MRP) R3-2008-0028 and pursuant to Cleanup or Abatement Order R3-2004-0101, as modified by the Central Coast Regional Water Quality Control Board ("Water Board") and the State Water Resources Control Board ("State Board") Order WQ 2005-0007 ("State Board Order"), which established the Replacement Water Program (RWP). Remediation activities were conducted in compliance with Cleanup and Abatement Order R3-2007-0077, Ordering Paragraph D (the "CAO"; Water Board, 2007).

BACKGROUND

The Site is an approximately 13-acre parcel of land located in the City of Morgan Hill, California, within the Llagas Subbasin ("Subbasin") of the Gilroy-Hollister Groundwater Basin in southern Santa Clara County (see Figure 1). The geologic and hydrogeologic features of the Subbasin are detailed in the *Llagas Subbasin Characterization – 2008* report (MACTEC, 2009a), with refined descriptions included in the 2009, 2010, 2011, and 2012 Annual Cleanup Progress Status Reports (CPSRs; MACTEC, 2010a, 2011; AMEC, 2012, 2013a).

Groundwater flow occurs in three aquifers, as follows:

- Shallow aquifer (from surface to approximately 50 feet below ground surface [bgs])
- Intermediate aquifer (approximately 70–180 feet bgs)
- Deep aquifer (approximately 200–400 feet bgs)

These depth intervals vary with distance from the Site and are separated by aquitards that consist of silty material with discontinuous sand stringers. The intermediate and deep aquifers are each subdivided into three zones (upper, middle, and lower), based on hydraulic head profiles at depth-discrete monitoring wells. Most groundwater pumped by domestic and

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agricultural wells in the Subbasin originates from the intermediate aquifer, whereas groundwater pumped by municipal supply wells is produced predominantly from the deep aquifer zones.

The perchlorate distribution in groundwater within the Subbasin is described in terms of three perchlorate concentration priority zones (MACTEC, 2007), as follows:

- PZA – concentrations above 24.5 micrograms per liter (µg/L)
- PZB – concentrations between 11 and 24.5 µg/L
- PZC – concentrations between 6 and 11 µg/L

California's perchlorate maximum contaminant level (MCL) is 6 µg/L. The CAO defines the perchlorate plume core as consisting of PZA and PZB in the intermediate aquifer and PZA in the deep aquifer (Water Board, 2007). The priority zones were first described in the *Llagas Subbasin Cleanup Work Plan* (MACTEC, 2007), as modified in the *Revised MA* [Monitored Attenuation] *Performance Monitoring Program – Baseline Sampling* (MACTEC, 2009b) and approved by the Water Board on February 25, 2010 (Water Board, 2010).

The on-site groundwater treatment system (GWTS) that operated from early 2004 (Geosyntec, 2004) to February 2012 has been replaced. An expanded GWTS was constructed in 2012 and began full-time operation on September 7, 2012. The expanded GWTS consists of the groundwater extraction system (GES), which includes 2 extraction wells in the shallow aquifer (currently inactive), 2 extraction wells in the intermediate aquifer, and 1 extraction well in the upper and middle deep aquifer zones; the ion exchange system (IES); and the on-site recharge (OSR) system, which includes the injection of treated water via 6 shallow aquifer wells. The GWTS is operated pursuant to Waste Discharge Requirements Order No. R3-2011-0209 (WDR; Water Board, 2011) and the Santa Clara Valley Water District's approved Treated Groundwater Recharge and Reinjection agreement. Standard operations are in accordance with the *Operations, Maintenance, and Monitoring Plan for the Groundwater Treatment System* (OMMP; Geosyntec, 2013).

FIELD ACTIVITIES

Groundwater monitoring conducted during 2Q13 (April through June 2013) consisted of the following field activities:

- Measurement of groundwater depths to water at 140 monitoring wells and piezometers.
- Collection of groundwater samples from 30 wells for perchlorate analysis, as follows:
  - 2 on-site and 13 off-site monitoring wells
  - 9 domestic wells sampled under the MRP or RWP, or both
  - 3 on-site and 2 off-site extraction wells
  - 1 domestic well not included in the MRP or RWP

- Collection of groundwater samples from 3 extraction wells and 8 monitoring wells for nitrate analysis.
- Routine operation and monitoring of 6 domestic ion exchange (IX) systems at 5 domestic wells, including collecting quarterly groundwater samples, inspecting each system monthly, and performing routine repairs and maintenance.
- Routine operation and monitoring of the expanded GWTS, including collecting groundwater samples, inspecting the system monthly, and performing routine repairs and maintenance.

Sampling procedures, protocols, and purge methods for the monitoring wells are described in the revised *Quality Assurance Project Plan* (QAPP; MACTEC, 2010b) and *Sampling and Analysis Plan* (AMEC, 2011).

For the past year prior to 2Q13, access to monitoring wells MW-16-328, MW-16-363, and MW-16-434 was blocked by road construction related to the Butterfield Boulevard extension. With its completion in May 2013, the wells were re-established to the new road grade elevation to allow access for sampling. Top of casing elevations were surveyed and all three wells were sampled in 2Q13.

GROUNDWATER FLOW DIRECTIONS AND GRADIENTS

Groundwater elevations measured during 2Q13 (Table 1) were used to calculate groundwater flow directions and horizontal and vertical gradients. Groundwater elevation contours are shown on Figures 2 through 6 for the shallow and intermediate aquifers and the upper deep, middle deep, and lower deep aquifer zones, respectively. The results of the groundwater elevation measurements are described below:

- Relative to measurements taken in First Quarter 2013 (“1Q13”), groundwater elevations in 2Q13 decreased throughout the Subbasin by an average of approximately 6 feet in the shallow aquifer, 3 feet in the intermediate aquifer, and 3 feet in the deep aquifer. These measurements represent an expected decline in groundwater elevation due to the prolonged drought experienced in the region through the winter and spring months of 2013. The water table beneath the Site was approximately 6 feet higher in 2Q13 than it was a year ago in the First Quarter 2012. The higher water table reflects the expected on-site increase due to injection well operations after the GWTS was expanded in 2012.
- A strong vertical downward gradient persists in the northern portion of the Subbasin (including beneath the Site) as a consequence of (1) the natural downward gradient in this part of the Subbasin flow system, (2) pumping from Morgan Hill municipal wells, and (3) imported water recharging the Subbasin.
- Groundwater flow directions and horizontal and vertical gradients are consistent with previous observations, allowing for seasonal variations and local effects of extraction from extraction wells EW-01B1, IEW-1R, and DEW-1. Groundwater flow is to the southeast in all aquifer zones, except where drought conditions or seasonal

fluctuations in groundwater production by Morgan Hill municipal wells influences the natural flow pattern.

- Extraction wells EW-01B1, IEW-1R, and DEW-1 operated continuously throughout 2Q13, except for short-term shutdowns for maintenance activities. GWTS operations and performance are discussed below. The influence of off-site groundwater extraction in the intermediate and deep aquifers is discussed in detail in the 2012 CPSR (AMEC, 2013a).

GROUNDWATER ANALYTICAL RESULTS

Groundwater samples collected in 2Q13 were analyzed for perchlorate using U.S. Environmental Protection Agency (U.S. EPA) Test Method 314.0 modified (monitoring wells and domestic wells with IX treatment systems) and U.S. EPA Method 331.0 (domestic wells without IX treatment systems), in accordance with the revised QAPP (MACTEC, 2010b). Perchlorate analytical results are provided in Tables 2 and 3, and the laboratory reports are provided in Appendix A. Field measurements associated with the purging of each monitoring well, and a well location map are provided in Appendix B. An updated Microsoft Access database file of analytical results is provided in Appendix C.

Figures 7 through 11 illustrate the perchlorate distribution in the shallow and intermediate aquifers and the upper deep, middle deep, and lower deep aquifer zones, respectively. The perchlorate distribution and concentration changes are consistent with the previously observed shrinking plume footprints observed throughout the Subbasin since basin-wide monitoring began in 2004 (AMEC, 2013a). Specifically, between 1Q13 and 2Q13, declining concentration trends have resulted in shrinking PZA and PZB footprints in the intermediate aquifer near extraction well IEW-1R.

Perchlorate was detected above the MCL in 6 intermediate aquifer domestic wells at concentrations ranging from 6.3 to 35 µg/L (Table 3). The wells are in or adjacent to the plume core and within approximately 1 mile of the Site (Figure 8). In accordance with the State Board Order, replacement water is provided for domestic wells with perchlorate concentrations above the MCL. In accordance with the CAO (Water Board, 2007), IX treatment systems are installed on domestic wells with perchlorate concentrations above 7.9 µg/L, except for 1 well where owner maintenance is required. Currently, 5 domestic wells have IX systems installed, and users of 3 domestic wells receive bottled water.

The current perchlorate results, sampling frequency, and replacement water status of each domestic supply well in the RWP are provided in Table 4. No replacement water status changes were made. Since 2004, the number of wells where replacement water is required has decreased from 661 to 8 wells, representing a 99 percent decrease.

Perchlorate concentration trends were calculated using the Mann Kendall nonparametric statistical trend test and procedures (Gilbert, 1987) for the most recent two years of analytical data, or four data points, whichever data set is larger (Table 5). Of the 23 wells sampled that meet the criteria for Mann Kendall analysis, 17 domestic and monitoring wells (approximately 75 percent) exhibit either a *decreasing*, *probably decreasing*, or *stable* trend; 5 wells

(approximately 23 percent) exhibit *no* trend; and 1 well exhibits a *probably increasing* trend. The single well (MW-73-395) with the probably increasing trend is in the middle portion of the lower deep aquifer zone plume core (Figure 11). This well has had PZA concentrations since monitoring began in 2009. The well will continue to be sampled semiannually pursuant to the MRP.

Groundwater samples were analyzed for nitrate using U.S. EPA Test Method 300.0, in accordance with the MRP (Water Board, 2013). The analytical results are provided in Table 6 and are comparable to previously observed concentrations and expected concentration trends associated with GWTS operation.

TREATMENT SYSTEM OPERATIONS AND PERFORMANCE

The GWTS operated as designed and provided hydraulic containment and remediation of the plume core in the shallow aquifer, intermediate aquifer, and upper and middle deep aquifer zones; perchlorate treatment; and effective recharge to the Llagas Subbasin. The monthly flow rates and flow volumes recorded by the GES and OSR system flow meters are provided in Table 7.

Three GES extraction wells were operated: off-site extraction wells IEW-1R and DEW-1 and on-site extraction well EW-01B1. Perchlorate concentration results for these extraction wells are presented in Table 2. During 2Q13, the extraction rate at IEW-1R was increased in accordance with the current operational strategy, which is to maintain an annual average flow rate of 270 gallons per minute (gpm; AMEC, 2013c). Flow rates will be adjusted based on available drawdown, with lower flow rates expected during summer and fall months (i.e., during drought conditions) and higher flow rates during winter and spring months. This strategy is expected to yield consistent and efficient capture of PZA and PZB concentrations in the intermediate aquifer.

The calculated 2Q13 average extraction rates for IEW-1R and DEW-1 are 234 and 114 gpm, respectively (Table 7). Based on simulated average groundwater flow conditions and average 2Q13 extraction rates, IEW-1R is capturing PZA concentrations in the intermediate aquifer. PZB areas in the intermediate aquifer beyond the estimated IEW-1R capture zone are monitored by wells MW-60-082, MW-63-080, and MW-72-070. Perchlorate concentrations at these wells have been declining for several years, as discussed in the 2012 CPSR (AMEC, 2013a and 2013c), and the recent Mann Kendall trends are either stable (MW-63-080 and MW-72-070) or decreasing (MW-60-082). The average 2Q13 extraction rate at DEW-1 achieves capture of PZA concentrations in the middle deep aquifer zone based on simulated average groundwater flow conditions. Although DEW-1 draws groundwater from both the upper and middle deep aquifer zones, PZA concentrations are not detected in the upper deep aquifer zone.

On-site extraction well EW-01B1 was operated at an average flow rate of approximately 14 gpm. Operation of shallow extraction wells EW-01A and EW-02A was discontinued during the expanded GWTS testing phase because the criteria presented in the OMMP were met (Geosyntec, 2013). Perchlorate concentrations in the shallow extraction wells have remained below the PZA threshold. Concentrations at well EW-01B1 have been consistently above the PZA threshold (between 91 and 98 µg/L). Average injection well flow rates and associated

mounding observed were similar to those during the Fourth Quarter 2012, indicating that recharge patterns are consistent with those presented in the 2012 CPSR (AMEC, 2013a).

Monthly samples were collected from the IES at three sampling ports (influent [SV-100], midpoint [SV-200], and effluent [SV-300]) and analyzed for perchlorate, major anions, and field parameters. The results are presented in Table 8. Perchlorate was not detected in the IES effluent samples, which is in compliance with the WDR.

Based on the treated volume of approximately 47,600,000 gallons of groundwater and on perchlorate concentrations at SV-100, the mass of perchlorate removed was approximately 3.23 kilograms (kg; equal to 7.13 pounds). The cumulative mass removed by system operations since 2004 is approximately 62.88 kg (138.62 pounds).

Six domestic IX systems (on 5 wells) are operated, maintained, and monitored in accordance with the *Operation and Maintenance Manual for Small Residential Ion Exchange Systems for the Removal of Perchlorate* (Siemens, 2007). Performance monitoring results indicate that the domestic IX systems are operating as designed, removing perchlorate to below detectable levels. Analytical results are provided in Appendix A and summarized in Table 9. Field forms related to operation, maintenance, and monitoring of the IX systems are provided in Appendix D.

DATA ACCURACY AND PRECISION

Data validation and precision assessments were performed in accordance with the procedures specified in the *USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Superfund Data Review* (U.S. EPA, 2010); the QAPP (MACTEC, 2010b); and quality control criteria specified in the analytical methods and the MRP.

The perchlorate results for three samples were qualified as non-detect (designated as “U”) because perchlorate was also detected in an associated method blank sample. A summary of the data validation and precision assessment results is provided in Appendix E.

Overall, the data were considered usable as reported by the laboratory with additional qualifiers applied. The 2Q13 samples are considered to have been properly collected and analyzed with the appropriate precision. Data completeness (the number of successful analyses relative to the number of requested analyses) was 100 percent.

RESPONSE TO WATER BOARD COMMENTS

In a letter dated May 1, 2013, the Water Board provided comments on the 2012 Annual Cleanup Progress Status Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report and Effectiveness Evaluation. On May 30, 2013, AMEC submitted a letter response to meet the requirements stated in the Water Board’s Comment #1 (AMEC, 2013c). Responses to the remaining comments are attached to this monitoring report as Appendix F and have been incorporated into the body of this report, as applicable.

GRADIENT-DRIVEN REMEDIATION ACTIVITIES

The second baseline sampling event was conducted and the results were submitted by letter to the Water Board (AMEC, 2013b). The third baseline sampling event is scheduled to be performed approximately six months after the second baseline event.

REPORT RELIANCE

This document was prepared by AMEC for the sole use of Olin and the regulatory agencies for the Olin Site, who are the only intended beneficiaries of this work. No other party should rely on the information contained herein without the prior written consent of Olin. This report and the interpretations, conclusions, and recommendations contained within are based in part on information presented in other documents that are cited in the text and listed in the references. Therefore, this report is subject to the limitations and qualifications presented in the referenced documents.

Should you have any questions regarding this report, please contact Mr. Rick McClure, Olin Corporate Environmental Remediation Group, at (423) 336-4576.

Sincerely,
AMEC Environment & Infrastructure, Inc.

Susan K. Panttaja, PG
Associate Geologist

Sean L. Culkin, PG
Hydrogeologist

SKP/SLC:dcc

I certify under penalty of perjury that information contained within this document (Second Quarter 2013 Groundwater Monitoring Report) and all attachments, exclusive of work prepared by other consultants, is true and accurate, to the best of my knowledge. The services described in this document have been provided in a manner consistent with current standards of the profession and to the best of my knowledge comply with all applicable federal, state, and local statutes, regulations, and ordinances.

Michael D. Taraszki, PG, CHG, PMP
Principal Hydrogeologist

CERTIFIED HYDROGEOLOGIST
MICHAEL D. TARASZKI
No. 586
EXP. 12/2014
STATE OF CALIFORNIA

Enclosures:

Table 1	Groundwater Depths and Elevations
Table 2	Perchlorate Results – Monitoring Wells and Extraction Wells
Table 3	Perchlorate Results – Domestic Wells
Table 4	Replacement Water Program Well Status
Table 5	Mann Kendall Trend Analysis
Table 6	Nitrate Results
Table 7	Quarterly Average Flow Rates and Volumes Extracted
Table 8	Groundwater Treatment System Analytical Results
Table 9	Perchlorate Results – Domestic Ion Exchange Systems
Figure 1	Site Location Map
Figure 2	Shallow Aquifer Groundwater Elevation Contours
Figure 3	Intermediate Aquifer Groundwater Elevation Contours
Figure 4	Upper Deep Aquifer Zone Groundwater Elevation Contours
Figure 5	Middle Deep Aquifer Zone Groundwater Elevation Contours
Figure 6	Lower Deep Aquifer Zone Groundwater Elevation Contours
Figure 7	Perchlorate Results – Shallow Aquifer
Figure 8	Perchlorate Results – Intermediate Aquifer
Figure 9	Perchlorate Results – Upper Deep Aquifer Zone
Figure 10	Perchlorate Results – Middle Deep Aquifer Zone
Figure 11	Perchlorate Results – Lower Deep Aquifer Zone
Appendix A	Analytical Reports and Chain-of-Custody Records for Groundwater Samples [provided separately]
Appendix B	Field Sampling Data
Appendix C	Analytical Results, Microsoft Access Database [provided separately]
Appendix D	Remediation Performance Monitoring
Appendix E	Data Validation and Precision Assessment Results
Appendix F	Response to Comments – Annual Cleanup Progress Status Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report

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TABLES

TABLE 1

GROUNDWATER DEPTHS AND ELEVATIONS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Screen or BARCAD Interval (feet)[1]	Top of Casing Elevation (feet)[2]	Sample Date	Depth to Water (feet)[3]	Groundwater Surface Elevation (feet)[2]	Aquifer	Comments
EW-01A	11.7 - 51.7	326.24	04/01/2013	16.79	309.45	Shallow	
EW-02A	17.5 - 57.5	325.64	04/01/2013	16.27	309.37	Shallow	
MP-01-050	47 - 53	334.84	04/01/2013	23.34	311.5	Shallow	
MP-01-090	87 - 93	334.84	04/01/2013	25.71	309.13	Intermediate-Upper	
MP-01-210	204 - 216	334.84	04/01/2013	30.16	304.68	Deep-Upper	
MP-02-035	29 - 41	333.14	04/01/2013	20.96	312.18	Shallow	
MP-02-095	92 - 98	333.14	04/01/2013	27.03	306.11	Intermediate-Upper	
MP-02-255	252 - 258	333.14	04/01/2013	46.22	286.92	Deep-Upper	
MP-03-086	85 - 88	342.78	04/01/2013	31.7	311.08	Intermediate-Upper	
MP-03-120	117 - 123	342.78	04/01/2013	33.27	309.51	Intermediate-Upper	
MP-03-255	252 - 258	342.78	04/01/2013	40.37	302.41	Deep-Upper	
MP-04-038	32 - 44	327.83	04/01/2013	17.95	309.88	Shallow	
MP-04-088	85 - 91	327.83	04/01/2013	22.69	305.14	Intermediate-Upper	
MP-04-251	248 - 254	327.83	04/01/2013	NA	NA	Deep-Upper	Unable to collect dtw. Sounder does not beep.
MP-05-039	32 - 46	329.86	04/01/2013	20.93	308.93	Shallow	
MP-05-090	88 - 91	329.86	04/01/2013	26.7	303.16	Intermediate-Upper	
MP-05-260	257 - 263	329.86	04/01/2013	42.82	287.04	Deep-Upper	
MP-16-138	135 - 141	321.94	04/01/2013	27.6	294.34	Intermediate-Middle	
MP-16-229	226 - 232	321.94	04/01/2013	44.96	276.98	Deep-Upper	
MP-16-261	258 - 264	321.94	04/01/2013	48.27	273.67	Deep-Middle	
MP-17-110	105 - 114	319.66	04/01/2013	17.7	301.96	Intermediate-Upper	
MP-21-089	86 - 92	307.91	04/01/2013	16.43	291.48	Intermediate-Upper	
MP-21-230	222 - 238	307.91	04/01/2013	30.72	277.19	Deep-Upper	
MP-21-278	275 - 281	307.91	04/01/2013	28.62	279.29	Deep-Middle	
MP-21-295	294.3 - 294.5	307.91	04/01/2013	33.7	274.21	Deep-Middle	
MP-26-140	132 - 148	275.38	04/01/2013	28.03	247.35	Intermediate	
MP-26-242	239 - 245	275.38	04/01/2013	42.91	232.47	Deep-Upper	
MP-29-169	166 - 172	271.32	04/01/2013	44.15	227.17	Intermediate	
MP-29-242	236 - 248	271.32	04/01/2013	49	222.32	Deep-Upper	
MP-29-292	291.9 - 292	271.32	04/01/2013	52.79	218.53	Deep-Middle	
MP-35-162	159 - 165	240.29	04/01/2013	36.6	203.69	Intermediate	
MP-35-273	272.3 - 272.5	240.29	04/01/2013	37.68	202.61	Deep-Middle	
MP-51-164	159 - 168	244.87	04/01/2013	28.22	216.65	Intermediate	
MP-51-213	208 - 217	244.87	04/01/2013	28.47	216.4	Deep-Upper	
MP-51-272	271.8 - 272	244.87	04/01/2013	33.75	211.12	Deep-Middle	
MP-52-032	24 - 40	321.32	04/01/2013	17.08	304.24	Shallow	
MP-52-095	88 - 102	321.32	04/01/2013	19.88	301.44	Intermediate-Upper	

TABLE 1

GROUNDWATER DEPTHS AND ELEVATIONS

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Olin Site
Morgan Hill, California

Well ID	Screen or BARCAD Interval (feet)[1]	Top of Casing Elevation (feet)[2]	Sample Date	Depth to Water (feet)[3]	Groundwater Surface Elevation (feet)[2]	Aquifer	Comments
MP-52-273	267 - 278	321.32	04/01/2013	37.72	283.6	Deep-Upper	
MP-57-260	257 - 262	277.08	04/01/2013	49.1	227.98	Deep-Middle	
MW-01	20.5 - 35	328.2	04/01/2013	18.36	309.84	Shallow	
MW-02	20 - 34.5	328.25	04/01/2013	18.83	309.42	Shallow	
MW-04B	257 - 260	328.01	04/01/2013	46.72	281.29	Deep-Upper	
MW-04C	335 - 338	327.59	04/01/2013	53.57	274.02	Deep-Middle	
MW-05B	243 - 246	327.94	04/01/2013	19.52	308.42	Deep-Upper	
MW-05C	322.5 - 325.5	327.31	04/01/2013	50.21	277.1	Deep-Middle	Hard to pass tagger past 322'.
MW-06C	338 - 341	329.06	04/01/2013	53.59	275.47	Deep-Middle	
MW-07SA2	89 - 92	327.78	04/01/2013	25.27	302.51	Intermediate-Upper	
MW-12A	31.5 - 56.5	328.37	04/01/2013	18.12	310.25	Shallow	
MW-12B1	79.5 - 99.5	328.32	04/01/2013	22.05	306.27	Intermediate-Upper	
MW-13A	27 - 52	330.76	04/01/2013	18.42	312.34	Shallow	
MW-13B1	85 - 105	330.2	04/01/2013	24.12	306.08	Intermediate-Upper	
MW-14A	28 - 53	330.22	04/01/2013	19.09	311.13	Shallow	
MW-14B1	83 - 103	329.68	04/01/2013	23.83	305.85	Intermediate-Upper	
MW-15	25-Oct	329.54	04/01/2013	19.48	310.06	Shallow	
MW-16	25 - 40	329.42	04/01/2013	19.36	310.06	Shallow	
MW-16-027	17 - 37	322.16	04/01/2013	24.5	297.66	Shallow	
MW-16-082	77 - 87	322.21	04/01/2013	27.45	294.76	Intermediate-Upper	
MW-17	10 - 25	327.63	04/01/2013	18.19	309.44	Shallow	
MW-17-025	15 - 35	319.28	04/01/2013	14.46	304.82	Shallow	
MW-19	79 - 89	329.28	04/01/2013	23.9	305.38	Intermediate-Upper	
MW-26-342	332 - 352	275.51	04/01/2013	54.18	221.33	Deep-Middle	
MW-26-415	405 - 425	275.53	04/01/2013	54.28	221.25	Deep-Lower	
MW-29-352	342 - 362	271.3	04/01/2013	55.3	216	Deep-Middle	
MW-52-347	341.5 - 351.5	321.04	04/01/2013	44.9	276.14	Deep-Middle	
MW-52-403	398 - 408	321.06	04/01/2013	58.52	262.54	Deep-Lower	
MW-53-044	42 - 47	320.96	04/01/2013	15.26	305.7	Shallow	
MW-53-078	73 - 83	320.91	04/01/2013	15.63	305.28	Intermediate-Upper	
MW-53-195	185 - 205	320.93	04/01/2013	20.72	300.21	Deep-Upper	
MW-53-264	254 - 274	320.93	04/01/2013	41.34	279.59	Deep-Middle	
MW-54-260	250 - 270	287.31	04/01/2013	49.1	238.21	Deep-Middle	
MW-54-400	395 - 405	287.35	04/01/2013	60.08	227.27	Deep-Lower	
MW-55-275	270 - 280	324.37	04/01/2013	40.71	283.66	Deep-Middle	
MW-55-410	407 - 413	324.68	04/01/2013	63.29	261.39	Deep-Lower	
MW-56-220	215 - 225	286.23	04/01/2013	52.64	233.59	Deep-Upper	

TABLE 1

GROUNDWATER DEPTHS AND ELEVATIONS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Screen or BARCAD Interval (feet)[1]	Top of Casing Elevation (feet)[2]	Sample Date	Depth to Water (feet)[3]	Groundwater Surface Elevation (feet)[2]	Aquifer	Comments
MW-56-335	330 - 340	286.1	04/01/2013	62.73	223.37	Deep-Middle	
MW-56-433	428 - 438	286.24	04/01/2013	62.8	223.44	Deep-Lower	
MW-59-090	80 - 100	300.59	04/01/2013	13	287.59	Intermediate-Upper	
MW-59-250	240 - 260	300.63	04/01/2013	32.22	268.41	Deep-Middle	
MW-59-386	376 - 396	300.32	04/01/2013	46.36	253.96	Deep-Lower	
MW-60-082	72 - 92	312.39	04/01/2013	14.17	298.22	Intermediate-Upper	
MW-60-180	172-187	312.38	04/01/2013	15.51	296.87	Intermediate-Lower	
MW-60-220	215 - 225	312.51	04/01/2013	33	279.51	Deep-Upper	
MW-60-270	265 - 275	312.54	04/01/2013	33.56	278.98	Deep-Middle	
MW-61-047	45 - 50	325.13	04/01/2013	17.07	308.06	Shallow	
MW-61-056	54 - 59	325.13	04/01/2013	17.87	307.26	A/B Aquitard	
MW-62-041	39 - 44	321.47	04/01/2013	15.65	305.82	Shallow	
MW-62-055	53 - 58	321.48	04/01/2013	19.18	302.3	A/B Aquitard	
MW-63-035	30 - 40	316.81	04/01/2013	14.05	302.76	Shallow	
MW-63-057	52 - 62	316.84	04/01/2013	14.1	302.74	A/B Aquitard	
MW-63-080	75 - 85	316.73	04/01/2013	15.68	301.05	Intermediate-Upper	
MW-64-027	22 - 32	313.53	04/01/2013	13.51	300.02	Shallow	
MW-64-060	55 - 65	313.76	04/01/2013	14.99	298.77	A/B Aquitard	
MW-64-082	77 - 87	313.89	04/01/2013	15.54	298.35	Intermediate-Upper	
MW-65-027	22 - 32	307.78	04/01/2013	12.4	295.38	Shallow	
MW-65-052	47 - 57	307.86	04/01/2013	12.5	295.36	A/B Aquitard	
MW-65-087	82 - 92	307.72	04/01/2013	13.8	293.92	Intermediate-Upper	
MW-65-114	109 - 119	307.89	04/01/2013	14.16	293.73	Intermediate-Upper	
MW-65-153	148 - 158	307.93	04/01/2013	13.4	294.53	Intermediate-Middle	
MW-66-245	240 - 250	288.63	04/01/2013	34.88	253.75	Deep-Middle	
MW-66-390	385 - 395	288.57	04/01/2013	56.78	231.79	Deep-Lower	
MW-67-248	240 - 255	306.64	04/01/2013	36.03	270.61	Deep-Upper	
MW-67-485	480 - 490	306.64	04/01/2013	61.2	245.44	Deep-Lower	
MW-68-382	377 - 387	304.97	04/01/2013	66.92	238.05	Deep-Lower	
MW-69-360	335 - 365	291.89	04/01/2013	63.69	228.2	Deep-Lower	
MW-70-240	235 - 245	320.2	04/01/2013	38.91	281.29	Deep-Upper	
MW-70-317	312 - 322	320.21	04/01/2013	46.1	274.11	Deep-Middle	
MW-70-355	350 - 360	320.26	04/01/2013	50.78	269.48	Deep-Middle	
MW-70-433	428 - 438	320.3	04/01/2013	59.84	260.46	Deep-Lower	
MW-71-075	70 - 80	307.94	04/01/2013	14.26	293.68	Intermediate-Upper	
MW-71-115	105 - 125	307.94	04/01/2013	14.74	293.2	Intermediate-Middle	
MW-72-070	60 - 80	314.39	04/01/2013	14.09	300.3	Intermediate-Upper	

TABLE 1

GROUNDWATER DEPTHS AND ELEVATIONS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Screen or BARCAD Interval (feet)[1]	Top of Casing Elevation (feet)[2]	Sample Date	Depth to Water (feet)[3]	Groundwater Surface Elevation (feet)[2]	Aquifer	Comments
MW-72-145	135 - 155	314.43	04/01/2013	16	298.43	Intermediate-Lower	
MW-73-270	265 - 275	305.69	04/01/2013	30.83	274.86	Deep-Middle	
MW-73-315	310 - 320	305.68	04/01/2013	35.8	269.88	Deep-Middle	
MW-73-395	390 - 400	305.69	04/01/2013	49.93	255.76	Deep-Lower	
OW-01A	10.3 - 50.3	327.69	04/01/2013	18.1	309.59	Shallow	
OW-01B1	77.5 - 102.5	328.13	04/01/2013	27.71	300.42	Intermediate-Upper	
OW-01B3	179 - 199	327.82	04/01/2013	25.18	302.64	Intermediate-Lower	
PM-01A	25 - 50	327.75	04/01/2013	18.49	309.26	Shallow	
PM-01B1	80 - 100	327.49	04/01/2013	23.67	303.82	Intermediate-Upper	
PM-02A	24.5 - 49.5	329.77	04/01/2013	20.89	308.88	Shallow	
PM-03A	25.7 - 50.7	326.62	04/01/2013	17.02	309.6	Shallow	
PM-03B1	80 - 100	326.77	04/01/2013	22.17	304.6	Intermediate-Upper	
PMW-04-090	80 - 100	316.12	04/01/2013	18.04	298.08	Intermediate-Upper	
PMW-04-125	115 - 135	316.13	04/01/2013	18	298.13	Intermediate-Middle	
PMW-04-225	215 - 235	315.99	04/01/2013	35	280.99	Deep-Upper	
PMW-04-255	245 - 265	315.97	04/01/2013	35.26	280.71	Deep-Upper	
PMW-04-282	277 - 287	315.77	04/01/2013	36.26	279.51	Deep-Middle	
PMW-04-312	307 - 317	315.73	04/01/2013	40.7	275.03	Deep-Middle	
PMW-05-090	80 - 100	309.97	04/01/2013	13.46	296.51	Intermediate-Upper	
PMW-05-305	295 - 315	310.03	04/01/2013	35.54	274.49	Deep-Middle	
PZ-01-333	328 - 338	334.66	04/01/2013	56.98	277.68	Deep-Middle	
PZ-02-315	310 - 320	333.17	04/01/2013	54.21	278.96	Deep-Middle	
PZ-02-415	410 - 420	333.17	04/01/2013	70.09	263.08	Deep-Lower	
PZ-03-325	320 - 330	342.31	04/01/2013	63.62	278.69	Deep-Middle	
PZ-03-427	422 - 432	342.32	04/01/2013	78.5	263.82	Deep-Lower	
PZ-04-335	330 - 340	327.93	04/01/2013	51.67	276.26	Deep-Middle	
PZ-04-375	370 - 380	327.92	04/01/2013	52.75	275.17	Deep-Middle	
PZ-05-339	334 - 344	330.43	04/01/2013	54.21	276.22	Deep-Middle	
PZ-05-390	386 -393	330.51	04/01/2013	66.46	264.05	Deep-Lower	

TABLE 1

GROUNDWATER DEPTHS AND ELEVATIONS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Notes

1. Depths measured in feet below ground surface.
2. Elevations are given in feet relative to the National Geodetic Vertical Datum of 1929 (NGVD 29).
3. Depth to water is measured from top of well casing.
4. Calculated groundwater elevations for MW-04B, MW-05B, MW-04C, MW-05C, MW-06C, MP-52-095, MP-26-242, and MW-56-335 were excluded from contouring because they differed by more than 10 feet from those in neighboring wells, which are more representative of the target aquifer interval. The depth to water in MP/MW-16 wells could not be measured due to City of Morgan Hill road construction.

Abbreviations

dtw = depth to water
NA = not applicable

TABLE 2

PERCHLORATE RESULTS - MONITORING AND EXTRACTION WELLS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Sample Type	Sample Date	Test Method	Perchlorate Concentration (µg/L)	Lab MDL (µg/L)	Lab Qualifier	Validation Qualifier	Aquifer
EW-01A	Primary	04/02/2013	EPA 314.0M	ND < 4.0	0.75	J,B	U	Shallow
EW-01A	Duplicate	04/02/2013	EPA 314.0M	ND < 4.0	0.75	J,B	U	Shallow
EW-02A	Primary	04/02/2013	EPA 314.0M	**10**	0.75	B	--	Shallow
EW-01B1	Primary	04/02/2013	EPA 314.0M	**98**	7.5	--	--	Intermediate - Upper
EW-01B1	Primary	05/06/2013	EPA 314.0M	**95**	7.5	--	--	Intermediate - Upper
EW-01B1	Primary	06/04/2013	EPA 314.0M	**91**	7.5	--	--	Intermediate - Upper
IEW-1R	Primary	04/02/2013	EPA 314.0M	**12**	0.75	B	--	Intermediate - Upper
IEW-1R	Primary	05/06/2013	EPA 314.0M	**12**	0.75	--	--	Intermediate - Upper
IEW-1R	Primary	06/04/2013	EPA 314.0M	**11**	0.75	--	--	Intermediate - Upper
IEW-1R	Duplicate	06/04/2013	EPA 314.0M	**11**	0.75	--	--	Intermediate - Upper
MW-60-082	Primary	04/11/2013	EPA 314.0M	5.6	0.75	--	--	Intermediate - Upper
MW-71-075	Primary	04/12/2013	EPA 314.0M	**22**	0.75	--	--	Intermediate - Upper
MW-71-075	Duplicate	04/12/2013	EPA 314.0M	**22**	0.75	--	--	Intermediate - Upper
MW-72-070	Primary	04/11/2013	EPA 314.0M	**11**	0.75	--	--	Intermediate - Upper
MW-72-070	Duplicate	04/11/2013	EPA 314.0M	**11**	0.75	--	--	Intermediate - Upper
PM-01B1	Primary	04/10/2013	EPA 314.0M	**8.3**	0.75	--	--	Intermediate - Upper
PM-03B1	Primary	04/10/2013	EPA 314.0M	**7.3**	0.75	--	--	Intermediate - Upper
PM-03B1	Duplicate	04/10/2013	EPA 314.0M	**7**	0.75	--	--	Intermediate - Upper
PMW-04-090	Primary	04/09/2013	EPA 314.0M	1.1	0.75	J	--	Intermediate - Upper
PMW-05-090	Primary	04/15/2013	EPA 314.0M	3	0.75	J	--	Intermediate - Upper
MW-71-115	Primary	04/12/2013	EPA 314.0M	**11**	0.75	--	--	Intermediate - Middle
PMW-04-125	Primary	04/10/2013	EPA 314.0M	1.4	0.75	J	--	Intermediate - Middle
MW-60-180	Primary	04/11/2013	EPA 314.0M	3.2	0.75	J	--	Intermediate-Lower
MW-60-180	Duplicate	04/11/2013	EPA 314.0M	3.2	0.75	J	--	Intermediate-Lower
MW-72-145	Primary	04/11/2013	EPA 314.0M	2.4	0.75	J	--	Intermediate-Lower
DEW-01	Primary	04/02/2013	EPA 314.0M	**22**	0.75	B	--	Deep - Upper - Middle
DEW-01	Primary	05/06/2013	EPA 314.0M	**22**	0.75	--	--	Deep - Upper - Middle
DEW-01	Primary	06/04/2013	EPA 314.0M	**21**	0.75	--	--	Deep - Upper - Middle
MW-16-328	Primary	05/16/2013	EPA 314.0M	**46**	3.8	--	--	Deep - Middle
MW-16-363	Primary	04/25/2013	EPA 314.0M	**31**	3.8	--	--	Deep - Middle
MW-73-270	Primary	04/12/2013	EPA 314.0M	3.5	0.75	J	--	Deep - Middle
MW-73-315	Primary	04/12/2013	EPA 314.0M	4.2	0.75	--	--	Deep - Middle
PMW-05-305	Primary	04/15/2013	EPA 314.0M	**26**	3.8	--	--	Deep - Middle
PMW-05-305	Duplicate	04/15/2013	EPA 314.0M	**26**	3.8	--	--	Deep - Middle
MW-73-395	Primary	04/03/2013	EPA 314.0M	**39**	3.8	--	--	Deep - Lower
MW-16-434	Primary	04/25/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Sub - alluvium

Note
Bold face type denotes concentration that exceeds the Maximum Contaminant Level (6 µg/L).

Abbreviations
-- = not applicable
MDL = Method Detection Limit
ND < = Not Detected at or above the reporting limit shown
µg/L = micrograms per liter; equivalent to parts per billion

Laboratory Qualifiers
B = Compound is also detected in the laboratory method blank.
J = Perchlorate detected between the MDL and reporting limit. The reported value is estimated.

Validation Qualifiers
U = Data are qualified as nondetected, because the analyte was observed in an associated laboratory or field blank.

TABLE 3

PERCHLORATE RESULTS - DOMESTIC WELLS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID[1]	Sample Type	Sample Date	Test Method	Perchlorate Concentration (µg/L)	Lab MDL (µg/L)	Lab Qualifier	Validation Qualifier	Aquifer
09S03E34C002	Primary	4/10/2013	EPA 331.0	**8.1**	0.082	--	--	Intermediate (Unk)
09S03E34C003	Primary	4/10/2013	EPA 314.0M	**34**	3.8	--	--	Intermediate (Unk)
09S03E34C003	Duplicate	4/10/2013	EPA 314.0M	**35**	3.8	--	--	Intermediate (Unk)
09S03E34G001	Primary	4/10/2013	EPA 314.0M	**23**	0.75	--	--	Intermediate (Unk)
09S03E34G002	Primary	4/10/2013	EPA 314.0M	**13**	0.75	--	--	Intermediate (Unk)
09S03E34J003	Primary	4/10/2013	EPA 314.0M	**6.3**	0.75	--	--	Intermediate (Unk)
09S03E34J003	Primary	4/10/2013	EPA 314.0M	**6.4**	0.75	--	--	Intermediate (Unk)
09S03E34R007	Primary	4/10/2013	EPA 314.0M	**6.7**	0.75	--	--	Intermediate
09S03E35M006	Primary	4/10/2013	EPA 331.0	4.1	0.082	--	--	Intermediate
09S03E35M006	Duplicate	4/10/2013	EPA 331.0	4	0.082	--	--	Intermediate
09S03E35N008	Primary	4/10/2013	EPA 331.0	3.7	0.082	--	--	Intermediate (Unk)
09S03E35N013	Primary	4/10/2013	EPA 331.0	5.2	0.082	--	--	Intermediate
10S03E02G013	Primary	6/27/2013	EPA 314.0M	3.6	0.75	--	--	Intermediate (Unk)
10S03E02G013	Primary	6/27/2013	EPA 331.0	4	0.082	--	--	Intermediate (Unk)

Notes
1. See Table 4 for replacement water status.
2. **Bold face type** denotes concentration that exceeds the Maximum Contaminant Level (6 µg/L).

Abbreviations
-- = not applicable
Intermediate (Unk) = Screen interval unknown; assigned to intermediate aquifer based on production rate and local domestic wells
MDL = Method Detection Limit
µg/L = micrograms per liter; equivalent to parts per billion

TABLE 4

REPLACEMENT WATER PROGRAM WELL STATUS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Replacement Water Method	RWP Approved Sampling Frequency	MRP Sampling Frequency	Most Recent Perchlorate Concentration (µg/L)	Most Recent Quarter Sampled
09S03E34C002	BW	QTR	--	**8.1**	2Q13
09S03E34C003	IX	QTR	SEMI	**35**	2Q13
09S03E34G001	IX	QTR	--	**23**	2Q13
09S03E34G002	IX	QTR	--	**13**	2Q13
09S03E34J003	IX	QTR	SEMI	**6.4**	2Q13
09S03E34R007	IX	QTR	QTR	**6.7**	2Q13
09S03E35M005	--	ANN	SEMI	2	1Q13
09S03E35M006	--	SEMI	QTR	4.1	1Q13
09S03E35N008	BW	QTR	SEMI	3.7	2Q13
09S03E35N013	BW	QTR	SEMI	5.2	2Q13
10S03E01M002	--	ANN	--	5.3	3Q12
10S03E12A015	--	ANN	--	4.7	3Q12
10S04E33R007	--	ANN	--	6	1Q13

Note
1. **Bold face type** denotes concentration that exceeds the Maximum Contaminant Level (6 µg/L).

Abbreviations
-- = Not required
µg/L = micrograms per liter
1Q13 = First Quarter 2013
2Q13 = Second Quarter 2013
3Q12 = Third Quarter 2012
ANN = annual
BW = well receiving bottled water
IX = well with ion exchange system installed
MRP = Monitoring and Reporting Program
QTR = quarterly
RWP = Replacement Water Program
SEMI = semiannual

TABLE 5

MANN KENDALL TREND ANALYSIS - DOMESTIC AND MONITORING WELLS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Aquifer	Number of Samples[1] 3Q11-2Q13	Number of Detects[1] 3Q11-2Q13	Perchlorate Concentration (µg/L)			Coefficient of Variation	Mann Kendall Statistic[2]	Confidence in Trend	Concentration Trend
				Historic Minimum	Historic Maximum	Second Quarter 2013 Maximum				
09S03E35N008	Intermediate (Unk)[3]	8	8	3.7	19	3.7	0.33	-15	95.8%	D
MW-60-082	Intermediate-Upper	8	8	5.6	26.9	5.6	0.45	-18	98.4%	D
MW-60-180	Intermediate-Lower	8	8	3.2	5.8	3.2	0.15	-16	96.9%	D
MW-71-075	Intermediate-Upper	8	8	21	25.4	**22**	0.03	-17	97.7%	D
MW-73-315	Deep-Middle	8	8	3.9	7.5	4.2	0.22	-19	98.9%	D
PMW-05-305	Deep-Middle	8	8	26	45	**26**	0.13	-20	99.3%	D
09S03E34C002	Intermediate (Unk)	8	8	4	100	**8.1**	1.22	8	80.1%	NT
09S03E34C003	Intermediate (Unk)	8	8	2.46	100	**35**	0.59	3	59.4%	NT
09S03E35M006	Intermediate	9	9	ND < 4.0	23	4.1	0.45	1	50.0%	NT
PM-01B1	Intermediate-Upper	8	8	4.5	300	**8.3**	0.53	5	68.3%	NT
PM-03B1	Intermediate-Upper	8	8	5.1	96	**7.3**	0.19	1	50.0%	NT
PMW-05-090	Intermediate-Upper	8	8	3	14	3	0.57	-14	94.6%	PD
MW-73-395	Deep-Lower	8	8	34	43	**39**	0.05	14	94.6%	PI
09S03E34G001	Intermediate (Unk)	8	8	20.2	78	**23**	0.13	-4	64.0%	S
09S03E34G002	Intermediate (Unk)	9	9	12	32	**13**	0.15	-5	65.7%	S
09S03E34J003	Intermediate (Unk)	8	8	ND < 4.0	19	**6.4**	0.35	-10	86.2%	S
09S03E34R007	Intermediate	9	8	ND < 4.0	15	**6.7**	0.33	-8	76.2%	S
09S03E35N013	Intermediate	10	10	2.8	19	5.2	0.24	-3	56.9%	S
MW-16-328	Deep-Middle	4	4	44	62	**46**	0.03	-3	72.9%	S
MW-16-363	Deep-Middle	4	4	9.6	44	**31**	0.04	-5	89.6%	S
MW-71-115	Intermediate-Middle	8	8	5.7	16	**11**	0.17	-6	72.6%	S
MW-72-070	Intermediate-Upper	7	7	9.4	21.9	**11**	0.18	-7	80.9%	S
MW-72-145	Intermediate-Lower	7	7	ND < 4.0	8.1	2.4	0.29	-9	88.1%	S

TABLE 5

MANN KENDALL TREND ANALYSIS - DOMESTIC AND MONITORING WELLS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Notes

1. The Number of Samples and Number of Detects shown above are for the past two years or four samples, whichever dataset is larger. Where duplicate samples were collected, the greater concentration value is used.
2. MAROS Version 2, 2003, AFCEE.
3. Intermediate (Unk) = Screen interval unknown; assigned to intermediate aquifer based on production rate and local domestic wells.
4. **Bold face type** denotes highest concentration detected in the current quarter that exceeds the Maximum Contaminant Level (6 µg/L).

Abbreviations

µg/L = micrograms per liter
2Q13 = Second Quarter 2013
3Q11 = Third Quarter 2013
D = Decreasing
ND < 4.0 = Not Detected at or above the reporting limit shown
NT = No Trend
PD = Probably Decreasing
PI = Probably Increasing
S = Stable

TABLE 6

NITRATE RESULTS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Sample Type	Sample Date	Nitrate Concentration (mg/L)	Lab MDL (mg/L)	Lab Qualifier	Validation Qualifier	Aquifer
MP-04-038	Primary	04/15/2013	30	2.6	--	--	Shallow
MP-04-038	Duplicate	04/15/2013	32	2.6	--	--	Shallow
MW-01	Primary	04/10/2013	30	2.6	--	--	Shallow
MW-13A	Primary	04/10/2013	34	2.6	--	--	Shallow
PM-01A	Primary	04/10/2013	29	2.6	--	--	Shallow
PM-02A	Primary	04/10/2013	34	2.6	--	--	Shallow
EW-01B1	Primary	04/02/2013	35	2.6	--	--	Intermediate - Upper
EW-01B1	Primary	05/06/2013	33	2.6	--	--	Intermediate - Upper
EW-01B1	Primary	06/04/2013	35	2.6	--	--	Intermediate - Upper
IEW-1R	Primary	04/02/2013	32	2.6	--	--	Intermediate - Upper
IEW-1R	Primary	05/06/2013	32	2.6	--	--	Intermediate - Upper
IEW-1R	Primary	06/04/2013	33	2.6	--	--	Intermediate - Upper
IEW-1R	Duplicate	06/04/2013	33	2.6	--	--	Intermediate - Upper
DEW-01	Primary	04/02/2013	34	2.6	--	--	Deep-Upper - Middle
DEW-01	Primary	05/06/2013	34	2.6	--	--	Deep-Upper - Middle
DEW-01	Primary	06/04/2013	36	2.6	--	--	Deep-Upper - Middle
MW-16-328	Primary	05/16/2013	40	2.6	--	--	Deep - Middle
MW-16-363	Primary	04/25/2013	34	2.6	--	--	Deep - Middle
MW-16-434	Primary	04/25/2013	4.4	0.26	--	--	Sub - alluvium

Abbreviations
-- = not applicable
MDL = Method Detection Limit
mg/L = milligrams per liter; equivalent to parts per million

TABLE 7

QUARTERLY AVERAGE FLOW RATES AND VOLUMES EXTRACTED
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Monitoring Period	Extraction System			Injection System		
	Wells	Average Flow Rate (gpm)	Total Monthly Flow (gallons)	Wells	Average Flow Rate (gpm)	Total Monthly Flow (gallons)
April (3/31/13 - 4/30/13)	EW-01A	0	1,111	INJ-001	50	2,156,366
	EW-02A	0	505	INJ-002	26	1,118,937
	EW-01B1	14	624,287	INJ-003	96	4,143,112
	IEW-1R[a]	210	9,065,332	INJ-004	105	4,525,664
	DEW-1	116	5,003,580	INJ-005	49	2,131,008
				INJ-006	14	587,300
May (4/30/13 - 5/31/13)	EW-01A	0	9	INJ-001	53	2,354,980
	EW-02A	0	5	INJ-002	27	1,196,459
	EW-01B1	14	642,383	INJ-003	98	4,391,540
	IEW-1R[a]	223	9,959,420	INJ-004	107	4,795,192
	DEW-1	113	5,042,372	INJ-005	51	2,277,154
				INJ-006	14	604,481
June (5/31/13 - 6/30/13)	EW-01A	0	0	INJ-001	62	2,685,600
	EW-02A	0	19,493	INJ-002	32	1,383,526
	EW-01B1	14	626,301	INJ-003	110	4,764,348
	IEW-1R[a]	270	11,675,052	INJ-004	119	5,128,412
	DEW-1	115	4,951,844	INJ-005	59	2,547,838
				INJ-006	18	758,229
Total Flow - 2Q13 (gallons)			**47,611,694**			**47,550,146**
Percent Reinjected:			**100%**			

Notes

[a] In July 2013, it was discovered that the magnetic flow meter used for process control on well IEW-1R (FE-200) was not accurately representing the flow rate. The meter was recalibrated on 7/11/13. The 2Q13 IEW-1R flow rates and flow volumes were calculated based on the main off-site influent flow meter (FE-400), which measures the combined flow from IEW-1R and DEW-1, and the DEW-1 process control flow meter (FE-100).

1. Average flow rates were calculated over the period of operation.
2. All extracted groundwater is reinjected to the Llagas Subbasin per design of the GWTS. Differences between recorded extraction and injection volumes originate either from groundwater in temporary storage within the treatment system or slight differences in meter tolerances. Additional differences may arise from treatment and injection of water originating from monitoring well purging activities or other investigation-derived water.

Abbreviations

gpm = gallons per minute

TABLE 8

GROUNDWATER TREATMENT SYSTEM ANALYTICAL RESULTS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Parameters	Date	SV-100 (Influent)	SV-200 (Midpoint)[1]	SV-300 (Effluent)	Lab MDL	Reporting Limit	Test Method
Critical Parameters							
Perchlorate, µg/L	4/2/2013	19	ND < 4.0	ND < 4.0	0.75	4	EPA 314.0M
	5/6/2013	19	ND < 4.0	ND < 4.0	0.75	4	EPA 314.0M
	6/4/2013	17	ND < 4.0	ND < 4.0	0.75	4	EPA 314.0M
pH (field)	4/2/2013	6.78	7.03	6.66	--	--	--
	5/6/2013	6.74	6.49	6.24	--	--	--
	6/4/2013	6.67	7.00	6.74	--	--	--
Additional Analytical Data							
Chloride, mg/L	4/2/2013	35.0	--	34.0	1.4	10	EPA 300.0
	5/6/2013	37.0	--	37.0	1.4	10	EPA 300.0
	6/4/2013	37.0	--	37.0	1.4	10	EPA 300.0
Nitrate (as NO_3), mg/L	4/2/2013	34	32	32	2.6	10	EPA 300.0
	5/6/2013	33	33	33	2.6	10	EPA 300.0
	6/4/2013	34	34	35	2.6	10	EPA 300.0
Sulfate, mg/L	4/2/2013	29	--	31	2.5	10	EPA 300.0
	5/6/2013	30	--	30	2.5	10	EPA 300.0
	6/4/2013	30	--	30	2.5	10	EPA 300.0
Field Data							
Specific Conductivity, µS/cm	4/2/2013	443	444	445	--	--	--
	5/6/2013	451	448	510	--	--	--
	6/4/2013	442	443	445	--	--	--
Temperature, °C	4/2/2013	18.55	19.10	18.63	--	--	--
	5/6/2013	18.86	18.39	18.79	--	--	--
	6/4/2013	18.07	18.10	18.27	--	--	--
Total Dissolved Solids, mg/L	4/2/2013	288	288	289	--	--	--
	5/6/2013	293	291	331	--	--	--
	6/4/2013	289	287	288	--	--	--

Note
1. Midpoint refers to the effluent of the lead IX resin vessel prior to entering the lag IX resin vessel.

Abbreviations
-- = Not analyzed or not applicable
µg/L = micrograms per liter
µS/cm = microsiemens per centimeter
°C = degrees Celsius
EPA = United States Environmental Protection Agency
IX = treatment
MDL = method detection limit
mg/L = milligrams per liter
mV = millivolts
ND < = Not Detected at or above the laboratory reporting limit shown

TABLE 9

PERCHLORATE RESULTS - DOMESTIC ION EXCHANGE SYSTEMS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

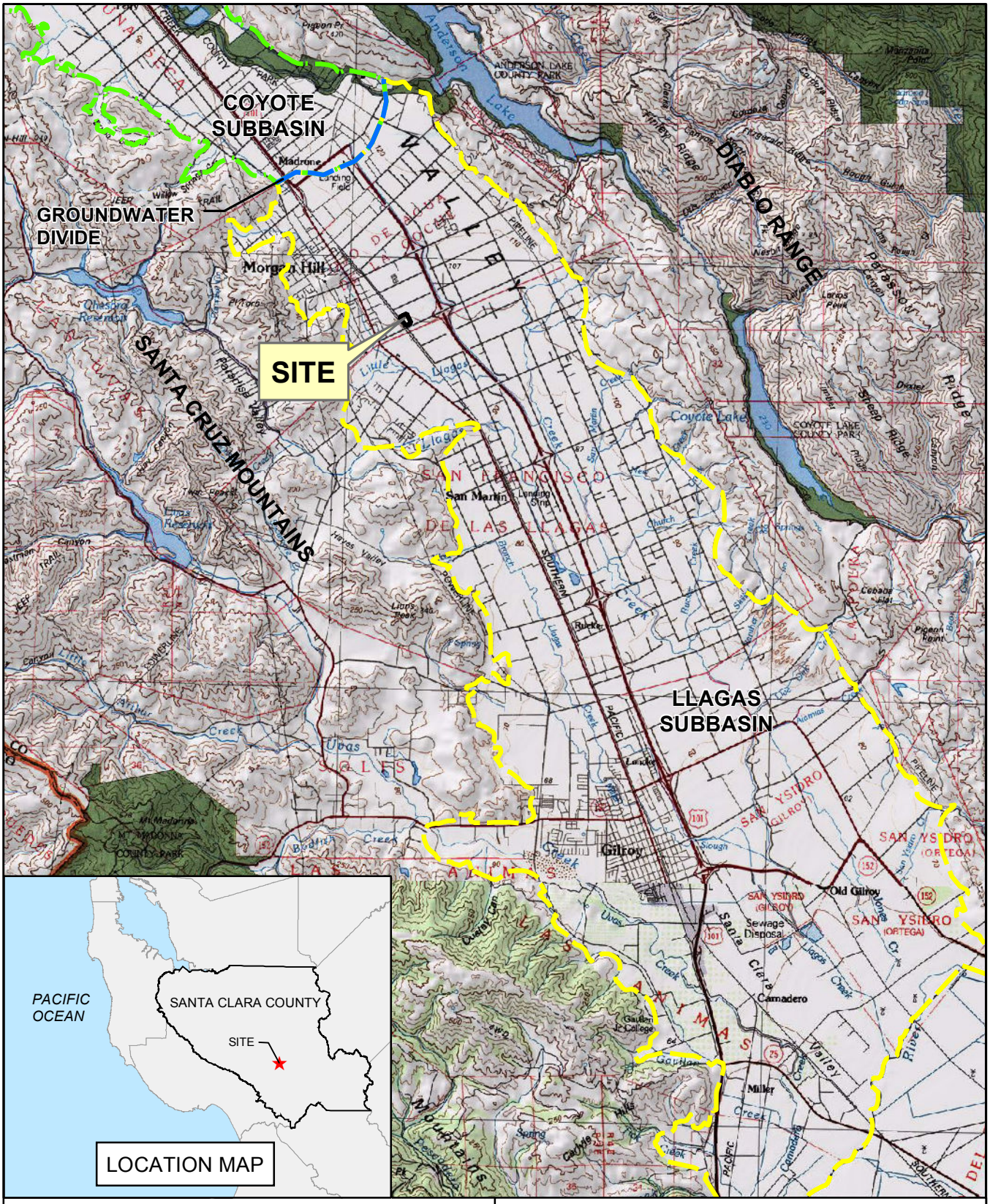
Station	Sample Type	Sample Date	Test Method	Perchlorate Concentration (µg/L)	Lab MDL (µg/L)	Lab Qualifier	Validation Qualifier	Aquifer
09S03E34C003	Primary	04/03/2013	EPA 314.0M	**34**	3.8	--	--	Intermediate (Unk)
09S03E34C003-DUP	Duplicate	04/03/2013	EPA 314.0M	**35**	3.8	--	--	Intermediate (Unk)
09S03E34C003-EFF	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34C003-MID	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34G001	Primary	04/03/2013	EPA 314.0M	**23**	0.75	--	--	Intermediate (Unk)
09S03E34G001-EFF	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34G001-MID	Primary	04/03/2013	EPA 314.0M	5.2	0.75	--	--	Intermediate (Unk)
09S03E34G002	Primary	04/03/2013	EPA 314.0M	**13**	0.75	--	--	Intermediate (Unk)
09S03E34G002B-EFF	Primary	04/03/2013	EPA 314.0M	1.4	0.75	J	--	Intermediate (Unk)
09S03E34G002B-MID	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34J003-A	Primary	04/03/2013	EPA 314.0M	**6.4**	0.75	--	--	Intermediate (Unk)
09S03E34J003-A-EFF	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34J003-A-MID	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34J003-B	Primary	04/03/2013	EPA 314.0M	**6.3**	0.75	--	--	Intermediate (Unk)
09S03E34J003-B-EFF	Primary	04/03/2013	EPA 314.0M	1.2	0.75	J	--	Intermediate (Unk)
09S03E34J003-B-MID	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate (Unk)
09S03E34R007	Primary	04/03/2013	EPA 314.0M	**6.7**	0.75	--	--	Intermediate
09S03E34R007-EFF	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate
09S03E34R007-MID	Primary	04/03/2013	EPA 314.0M	ND < 4.0	0.75	--	--	Intermediate

Note
1. **Bold face type** denotes concentration that exceeds the Maximum Contaminant Level (6 µg/L)

Abbreviations
-- = not applicable
µg/L = micrograms per liter; equivalent to parts per billion
EFF = Treated effluent sample, collected downstream of the lag ion exchange vessel
EPA = U.S. Environmental Protection Agency
Intermediate (Unk) = Screen interval unknown; assigned to intermediate aquifer based on production rate and local domestic wells
MID = Midpoint sample, collected between the lead and lag ion exchange vessels
MDL = Method Detection Limit
ND < = Not Detected at or above the reporting limit shown

Laboratory Qualifiers
J = Perchlorate detected between the MDL and reporting limit. The reported value is estimated

FIGURES



N

2 1 0 2

Miles

Source: San Jose and Monterey Quadrangles
(USGS 1:100,000 sheets)

SITE LOCATION MAP
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 07/26/2013	Project No. 6107130012
amec		Figure 1

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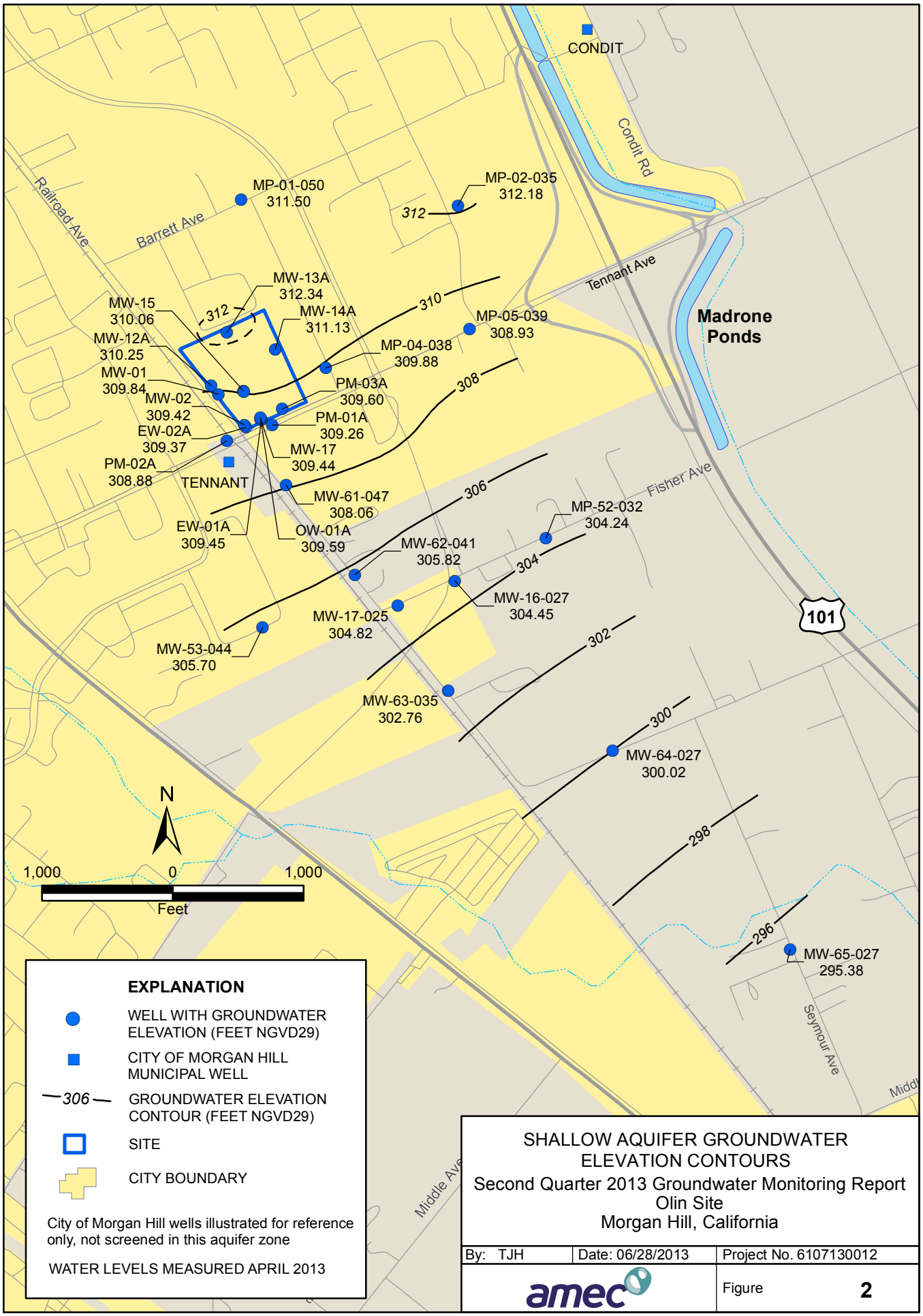

EXPLANATION

- WELL WITH GROUNDWATER ELEVATION (FEET NGVD29)
- CITY OF MORGAN HILL MUNICIPAL WELL
- 306 GROUNDWATER ELEVATION CONTOUR (FEET NGVD29)
- SITE
- CITY BOUNDARY

City of Morgan Hill wells illustrated for reference only, not screened in this aquifer zone

WATER LEVELS MEASURED APRIL 2013

SHALLOW AQUIFER GROUNDWATER ELEVATION CONTOURS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 2

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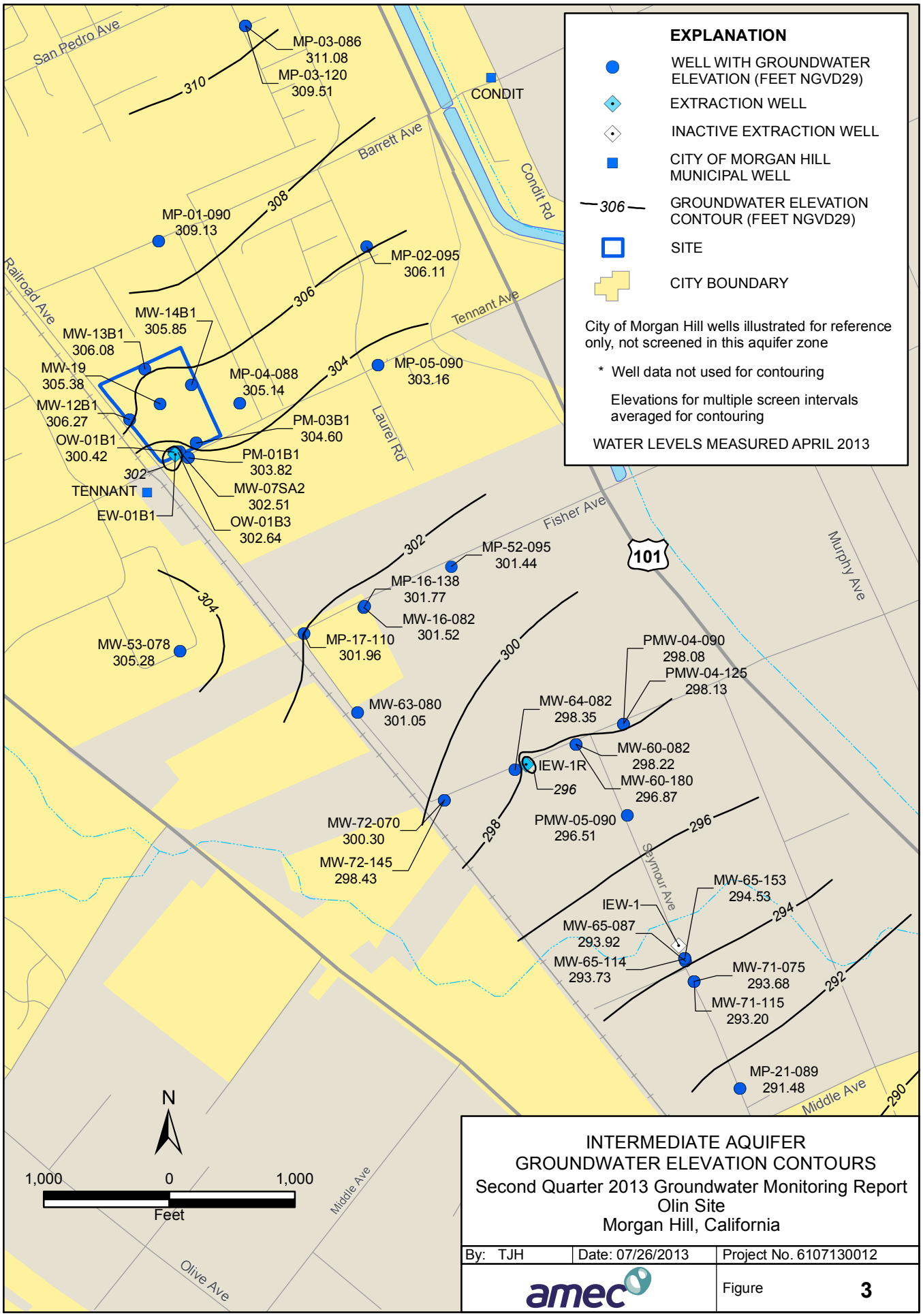

INTERMEDIATE AQUIFER
GROUNDWATER ELEVATION CONTOURS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 07/26/2013	Project No. 6107130012
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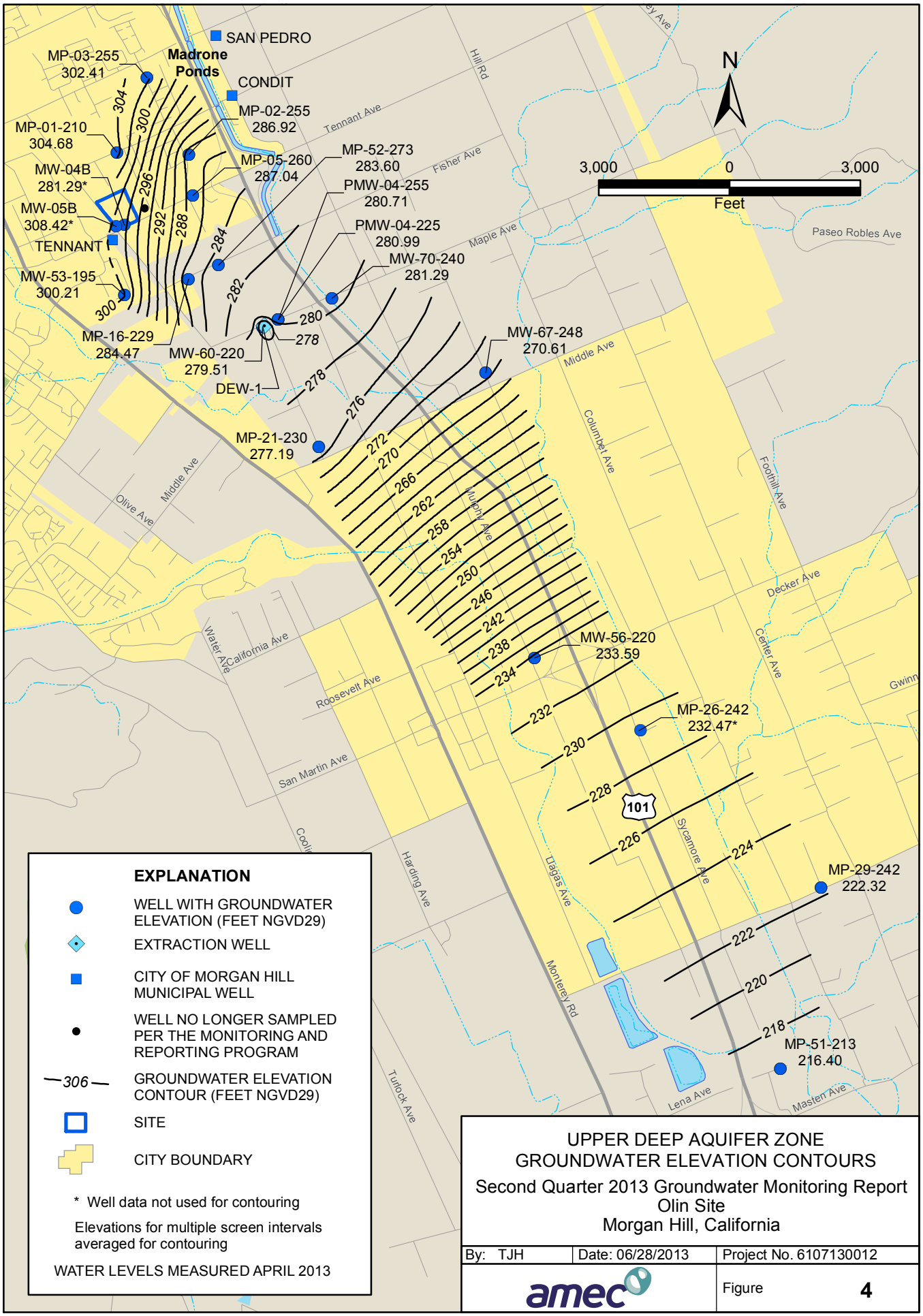

UPPER DEEP AQUIFER ZONE
GROUNDWATER ELEVATION CONTOURS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 4

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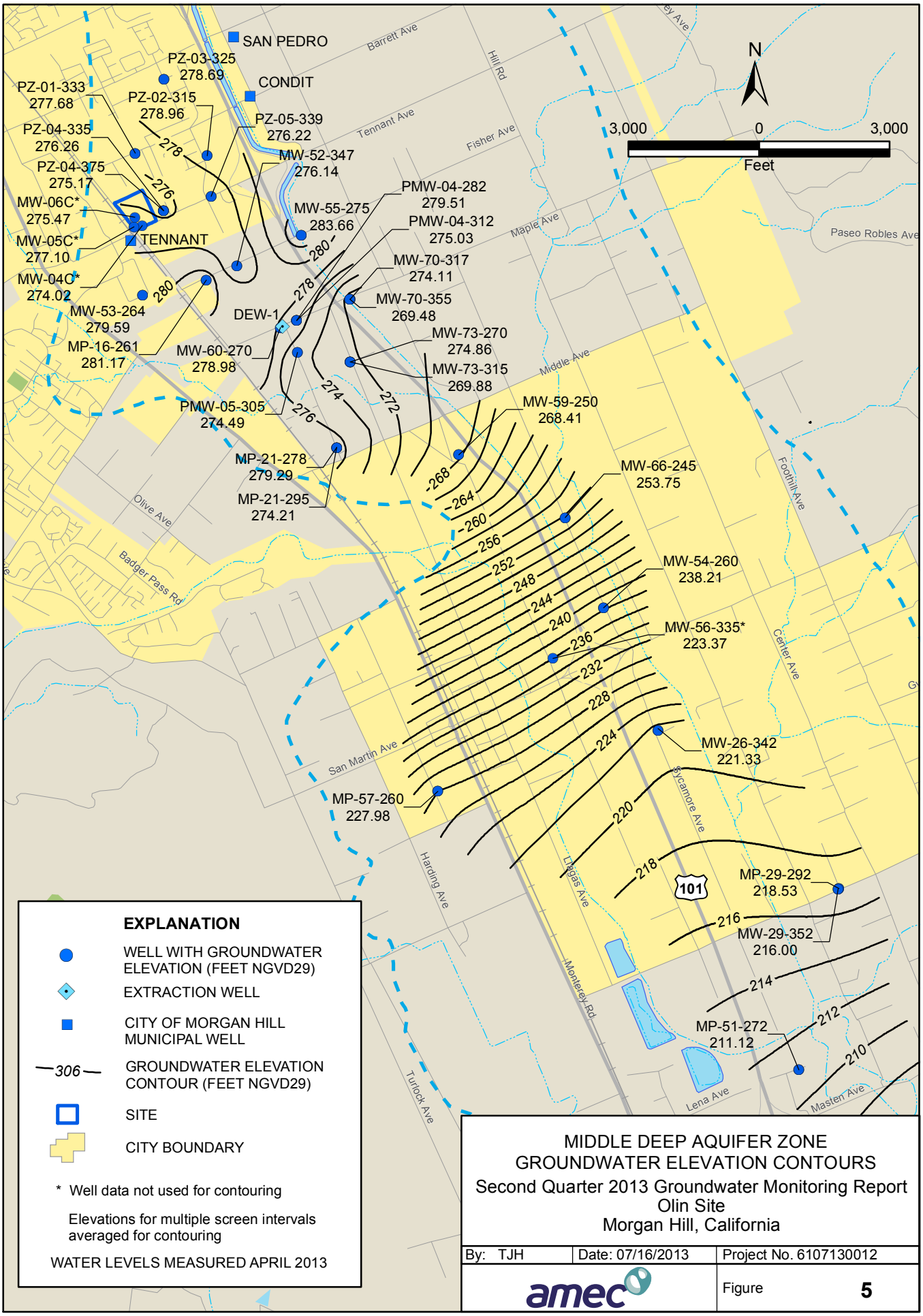

MIDDLE DEEP AQUIFER ZONE
GROUNDWATER ELEVATION CONTOURS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 07/16/2013	Project No. 6107130012
amec		Figure 5

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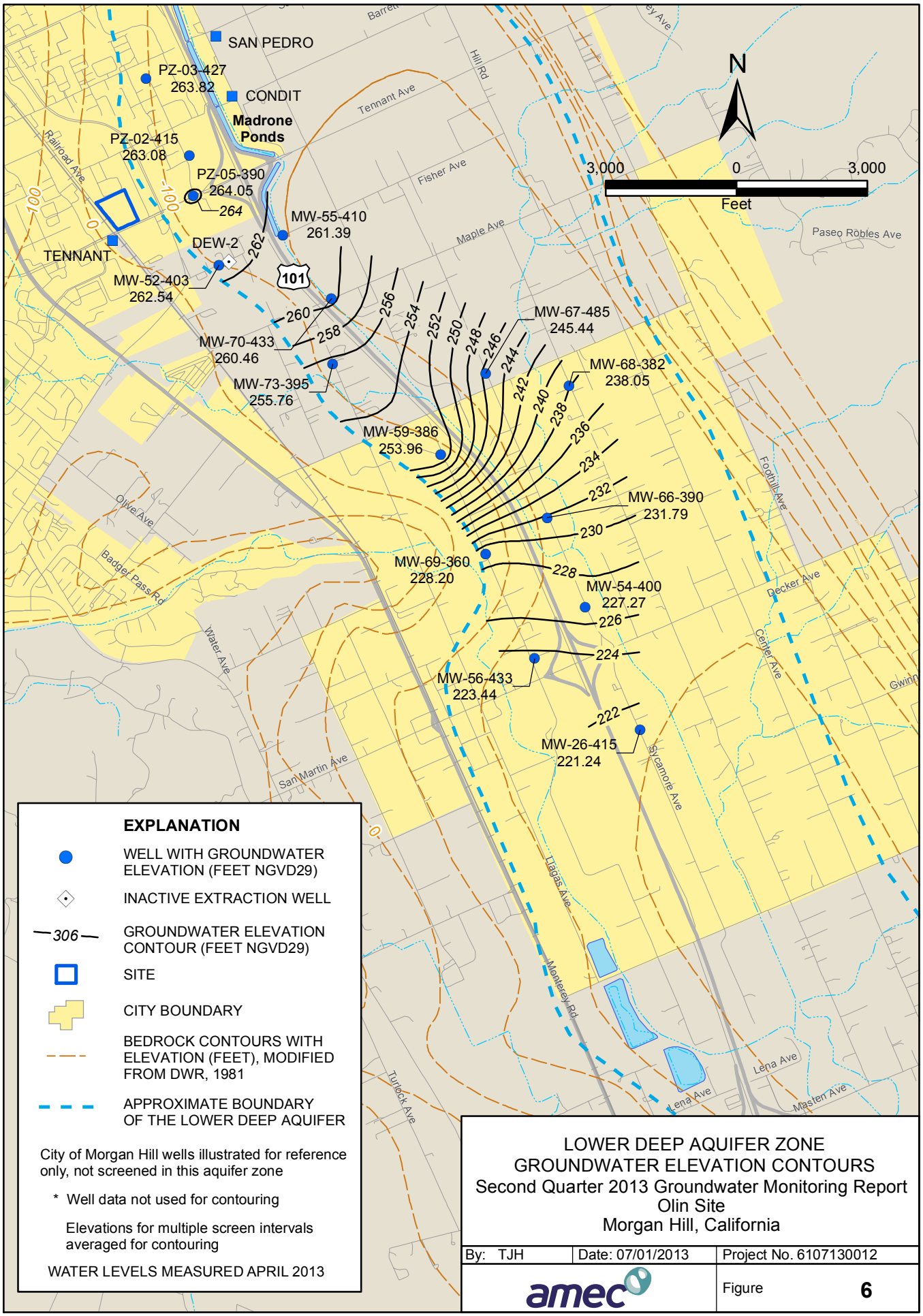

LOWER DEEP AQUIFER ZONE
GROUNDWATER ELEVATION CONTOURS
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 07/01/2013	Project No. 6107130012
amec		Figure 6

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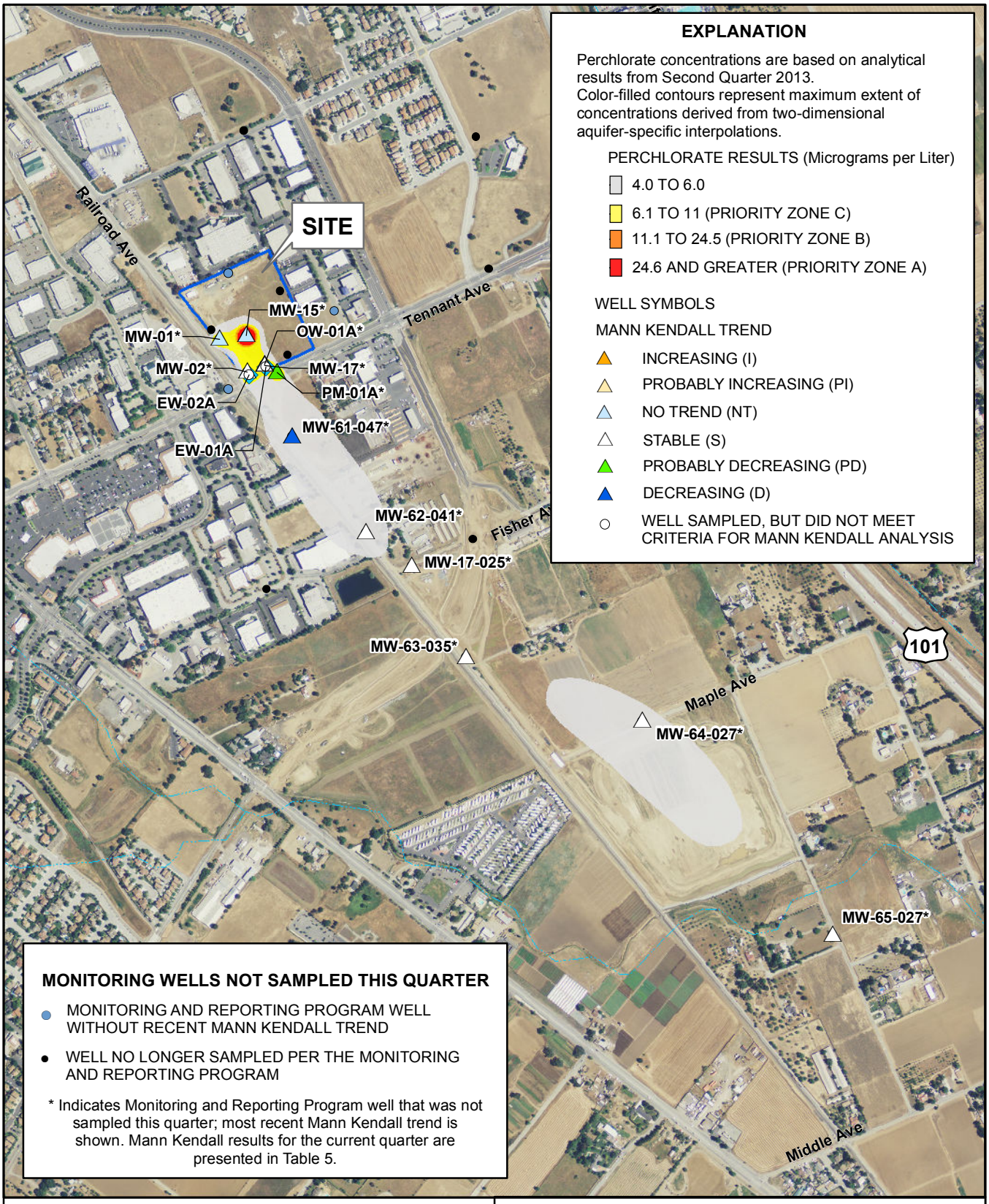

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Feet

PERCHLORATE RESULTS
SHALLOW AQUIFER
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 7

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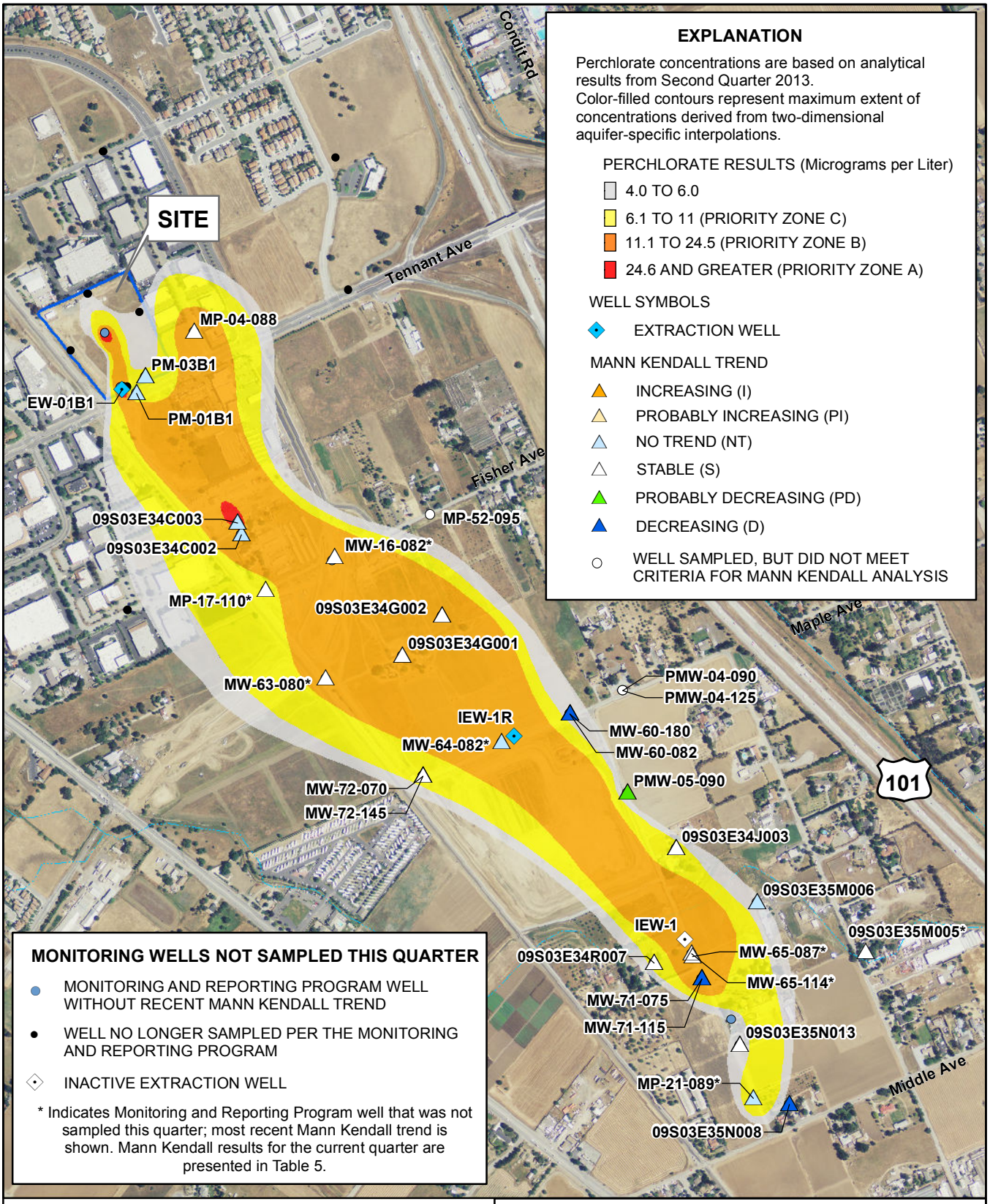

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Feet

PERCHLORATE RESULTS
INTERMEDIATE AQUIFER
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 07/26/2013	Project No. 6107130012
amec		Figure 8

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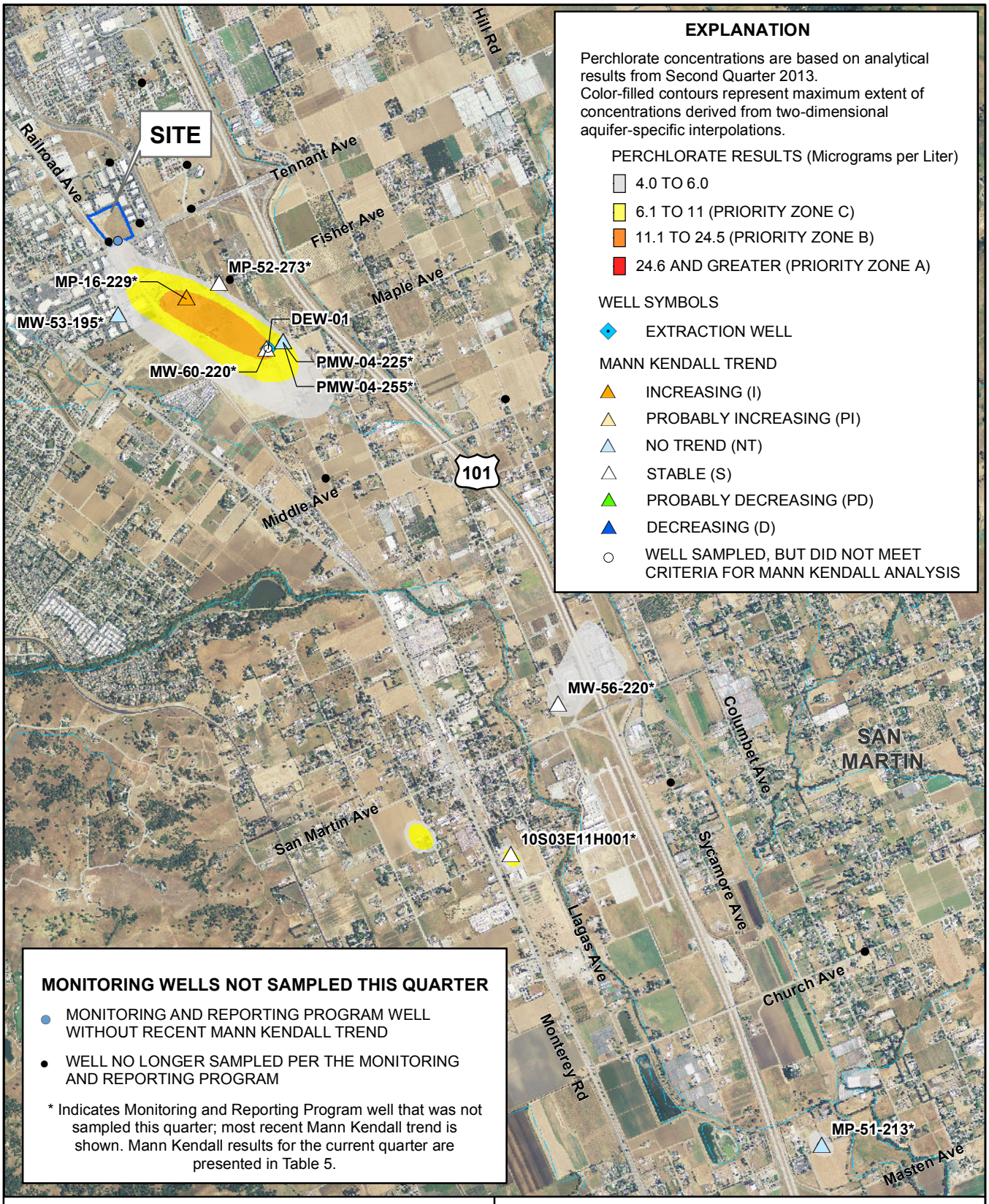

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Feet

PERCHLORATE RESULTS
UPPER DEEP AQUIFER ZONE
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 9

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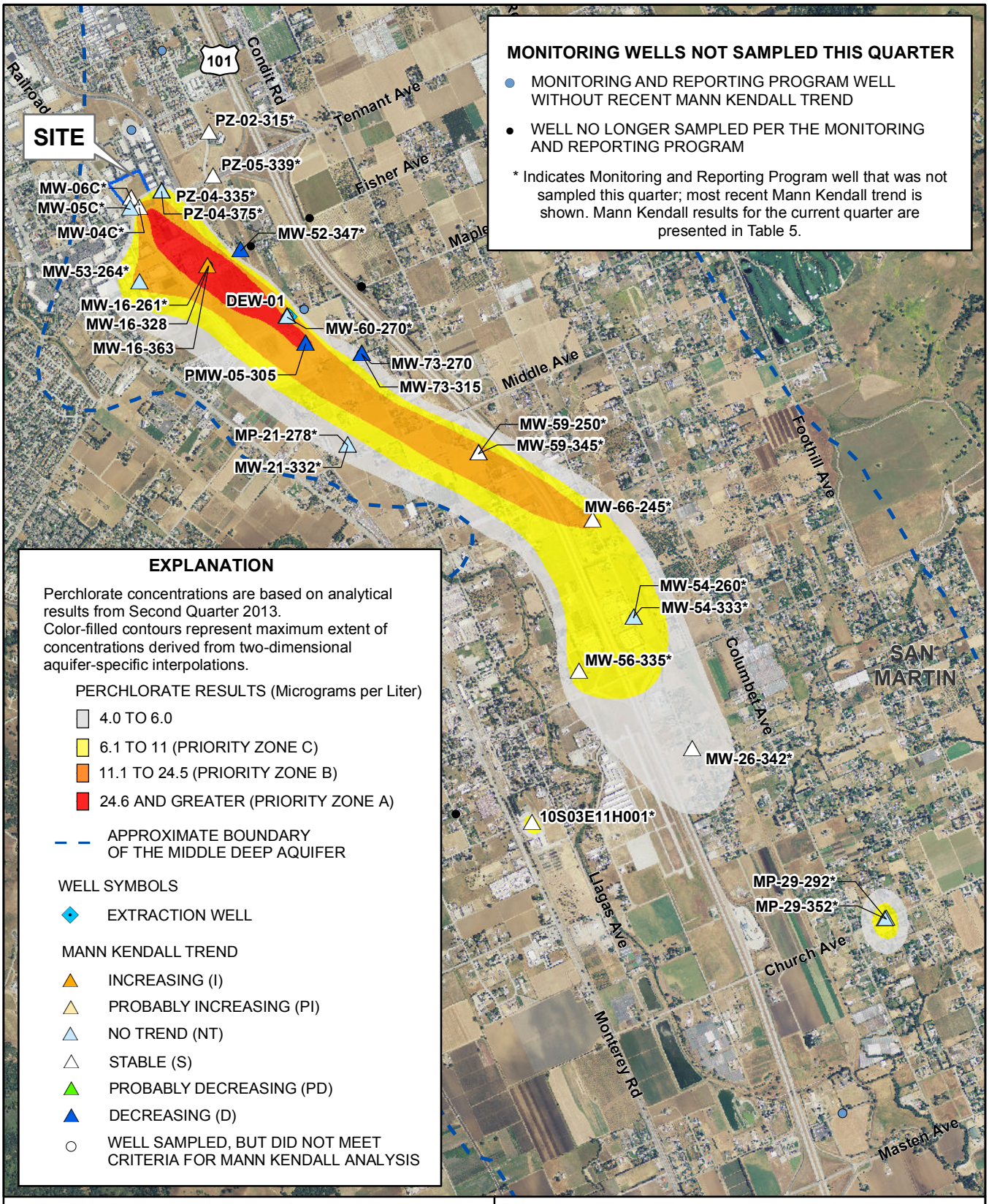

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Feet

PERCHLORATE RESULTS
MIDDLE DEEP AQUIFER ZONE
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 10

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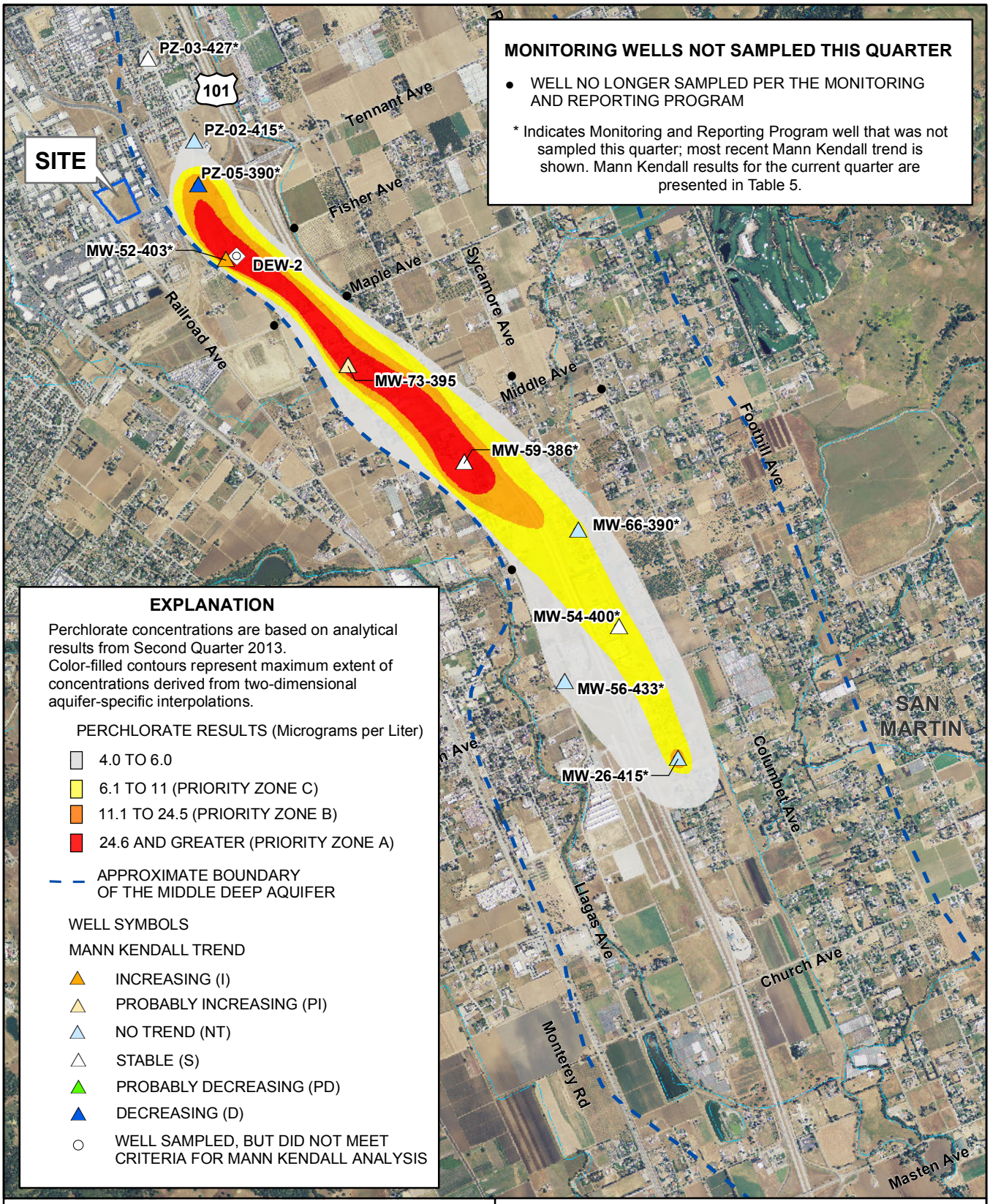

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Feet

PERCHLORATE RESULTS
LOWER DEEP AQUIFER ZONE
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 06/28/2013	Project No. 6107130012
amec		Figure 11

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APPENDIX A

Analytical Reports and Chain-of-Custody Records for Groundwater Samples
[provided separately]

APPENDIX B

Field Sampling Data

TABLE B1

MONITORING WELL PURGE DATA
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

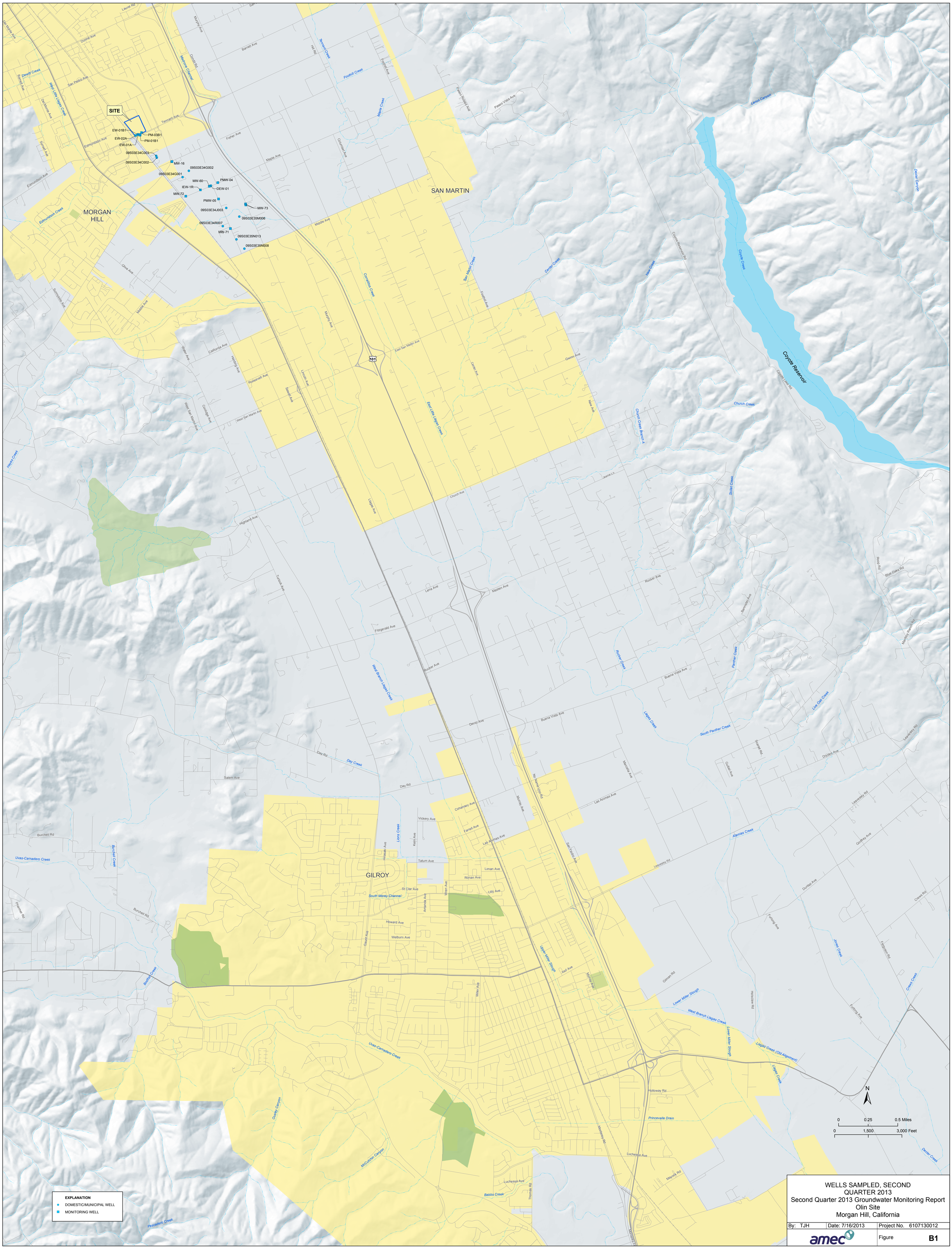
Well	Sample Date	Sample Time	Purge Method	Micro Purge?	Depth to Water	Purge Volume	Purge Volume Units	Flow Rate (ml/min)	Temp (degC)	Specific Conductivity (µmhos/CM)	Dissolved Oxygen (mg/L)	pH (pH units)	Oxygen Reduction Potential (mV)	Turbidity (NTU)
MP-04-038	4/15/2013	13:30	Micro-purge by Double Valve Pump	yes	16.42	Initial	ml	200	18.23	21	7.66	5.72	199.1	7.5
MP-04-038	4/15/2013	13:52	Micro-purge by Double Valve Pump	yes	NM	4400	ml	200	17.79	399	6.11	6.27	191.9	26.1
MP-04-038	4/15/2013	14:03	Micro-purge by Double Valve Pump	yes	NM	6600	ml	200	17.77	400	5.99	6.36	187.5	11.1
MP-04-038	4/15/2013	14:06	Micro-purge by Double Valve Pump	yes	NM	7200	ml	200	17.75	401	5.96	6.36	187.4	9
MW-16-328	4/25/2013	10:00	3 well vol. purge by Waterra Pump	no	62.82	Initial	gal	NA	18.50	467	1.60	6.21	199.8	40.4
MW-16-328	4/25/2013	10:15	3 well vol. purge by Waterra Pump	no	NM	11	gal	NA	18.34	452	2.15	6.62	169.9	29.9
MW-16-328	4/25/2013	10:27	3 well vol. purge by Waterra Pump	no	NM	22	gal	NA	18.80	450	5.15	6.94	164.4	14
MW-16-328	4/25/2013	10:44	3 well vol. purge by Waterra Pump	no	NM	33	gal	NA	18.82	449	5.71	6.94	175.1	13.2
MW-16-363	4/25/2013	10:55	3 well vol. purge by Waterra Pump	no	69.81	Initial	gal	NA	18.13	440	0.88	6.95	195.7	13
MW-16-363	4/25/2013	11:09	3 well vol. purge by Waterra Pump	no	NM	12	gal	NA	18.65	430	1.22	7.09	187.7	28.5
MW-16-363	4/25/2013	11:26	3 well vol. purge by Waterra Pump	no	NM	24	gal	NA	19.46	427	1.23	7.30	177.3	36.7
MW-16-363	4/25/2013	11:40	3 well vol. purge by Waterra Pump	no	NM	36	gal	NA	19.58	427	1.24	7.30	178.1	16
MW-60-082	4/11/2013	11:10	3 well vol. purge by Waterra Pump	no	14.31	Initial	gal	NA	17.16	437	6.87	6.42	156.7	25.9
MW-60-082	4/11/2013	11:16	3 well vol. purge by Waterra Pump	no	NM	3	gal	NA	17.35	482	7.20	5.75	171.1	9.23
MW-60-082	4/11/2013	11:22	3 well vol. purge by Waterra Pump	no	NM	6	gal	NA	17.34	485	7.08	6.13	152.1	7.31
MW-60-082	4/11/2013	11:28	3 well vol. purge by Waterra Pump	no	NM	9	gal	NA	17.35	485	7.01	6.35	145.1	0.4
MW-60-180	4/11/2013	11:47	3 well vol. purge by Waterra Pump	no	15.92	Initial	gal	NA	17.38	507	5.12	6.39	156.8	12.88
MW-60-180	4/11/2013	11:54	3 well vol. purge by Waterra Pump	no	NM	7	gal	NA	17.62	499	7.50	6.61	142.4	4.72
MW-60-180	4/11/2013	12:01	3 well vol. purge by Waterra Pump	no	NM	14	gal	NA	17.64	500	7.55	6.69	140.7	3
MW-60-180	4/11/2013	12:07	3 well vol. purge by Waterra Pump	no	NM	22	gal	NA	17.68	500	7.56	6.73	142.0	4.7
MW-71-075	4/12/2013	11:45	3 well vol. purge by Waterra Pump	no	14.60	Initial	gal	NA	16.98	390	9.88	7.43	146.3	10.8
MW-71-075	4/12/2013	11:50	3 well vol. purge by Waterra Pump	no	NM	3	gal	NA	16.90	374	6.47	6.99	117.7	11.1
MW-71-075	4/12/2013	11:55	3 well vol. purge by Waterra Pump	no	NM	6	gal	NA	17.02	373	6.76	6.88	119.0	26.1
MW-71-075	4/12/2013	12:08	3 well vol. purge by Waterra Pump	no	NM	9	gal	NA	17.09	372	6.81	6.90	122.1	9.6
MW-71-115	4/12/2013	12:15	3 well vol. purge by Waterra Pump	no	15.11	Initial	gal	NA	16.96	443	5.38	6.59	148.8	27
MW-71-115	4/12/2013	12:21	3 well vol. purge by Waterra Pump	no	NM	4.5	gal	NA	17.23	446	6.54	6.72	140.1	66.1
MW-71-115	4/12/2013	12:28	3 well vol. purge by Waterra Pump	no	NM	9	gal	NA	17.33	443	6.30	6.87	134.2	16.1
MW-71-115	4/12/2013	12:36	3 well vol. purge by Waterra Pump	no	NM	13.5	gal	NA	17.32	442	6.49	6.87	136.7	9.1
MW-72-070	4/11/2013	13:47	3 well vol. purge by Waterra Pump	no	14.19	Initial	gal	NA	17.73	305	4.59	5.35	236.5	11.1
MW-72-070	4/11/2013	13:52	3 well vol. purge by Waterra Pump	no	NM	3	gal	NA	17.74	310	6.02	5.18	240.5	2.1
MW-72-070	4/11/2013	13:57	3 well vol. purge by Waterra Pump	no	NM	6	gal	NA	18.03	308	6.69	5.92	193.6	4.7
MW-72-070	4/11/2013	14:02	3 well vol. purge by Waterra Pump	no	NM	8	gal	NA	18.09	308	6.71	6.16	178.8	4.1

TABLE B1

MONITORING WELL PURGE DATA
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well	Sample Date	Sample Time	Purge Method	Micro Purge?	Depth to Water	Purge Volume	Purge Volume Units	Flow Rate (ml/min)	Temp (degC)	Specific Conductivity (µmhos/CM)	Dissolved Oxygen (mg/L)	pH (pH units)	Oxygen Reduction Potential (mV)	Turbidity (NTU)
MW-72-145	4/11/2013	14:14	3 well vol. purge by Waterra Pump	no	16.10	Initial	gal	NA	17.87	523	5.32	6.50	168.5	20.8
MW-72-145	4/11/2013	14:22	3 well vol. purge by Waterra Pump	no	NM	5.5	gal	NA	18.15	538	6.19	6.20	178.7	11
MW-72-145	4/11/2013	14:30	3 well vol. purge by Waterra Pump	no	NM	11	gal	NA	18.19	536	6.46	6.42	167.9	17.7
MW-72-145	4/11/2013	14:38	3 well vol. purge by Waterra Pump	no	NM	16.5	gal	NA	18.18	536	6.22	6.44	167.2	6
MW-73-270	4/12/2013	14:00	3 well vol. purge by Waterra Pump	no	33.10	Initial	gal	NA	20.01	487	5.71	7.44	177.0	27
MW-73-270	4/12/2013	14:16	3 well vol. purge by Waterra Pump	no	NM	10	gal	NA	18.27	482	3.73	6.84	197.0	3.27
MW-73-270	4/12/2013	14:30	3 well vol. purge by Waterra Pump	no	NM	20	gal	NA	18.39	483	4.50	7.05	184.6	2.62
MW-73-270	4/12/2013	14:45	3 well vol. purge by Waterra Pump	no	NM	30	gal	NA	18.51	482	4.79	7.09	185.4	2.02
MW-73-315	4/12/2013	15:02	3 well vol. purge by Waterra Pump	no	37.42	Initial	gal	NA	21.03	496	3.79	7.15	179.7	26
MW-73-315	4/12/2013	15:17	3 well vol. purge by Waterra Pump	no	NM	12	gal	NA	18.94	511	5.59	7.28	175.3	50.8
MW-73-315	4/12/2013	15:32	3 well vol. purge by Waterra Pump	no	NM	24	gal	NA	18.47	510	5.23	7.01	190.9	30.2
MW-73-315	4/12/2013	15:50	3 well vol. purge by Waterra Pump	no	NM	35	gal	NA	18.72	511	5.50	7.04	190.8	2.91
PMW-05-090	4/15/2013	11:35	3 well vol. purge by Waterra Pump	no	13.49	Initial	gal	NA	17.21	498	7.56	7.34	84.8	26.1
PMW-05-090	4/15/2013	11:40	3 well vol. purge by Waterra Pump	no	NM	3.5	gal	NA	17.40	500	6.24	6.55	103.4	40.3
PMW-05-090	4/15/2013	11:45	3 well vol. purge by Waterra Pump	no	NM	7	gal	NA	17.33	501	6.51	6.74	99.3	14.7
PMW-05-090	4/15/2013	11:52	3 well vol. purge by Waterra Pump	no	NM	10.5	gal	NA	17.41	501	6.48	6.81	101.4	3.65
PMW-05-305	4/15/2013	12:10	3 well vol. purge by Waterra Pump	no	38.40	Initial	gal	NA	17.32	430	4.66	6.91	132.0	37
PMW-05-305	4/15/2013	12:20	3 well vol. purge by Waterra Pump	no	NM	11	gal	NA	17.96	423	2.47	7.19	125.9	71.4
PMW-05-305	4/15/2013	12:35	3 well vol. purge by Waterra Pump	no	NM	22	gal	NA	18.18	422	3.76	7.18	125.2	18.2
PMW-05-305	4/15/2013	13:51	3 well vol. purge by Waterra Pump	no	NM	33	gal	NA	18.25	424	4.52	7.15	129.1	9

Abbreviations
degC = degrees Celsius
gal = gallons
max = turbidity above upper limit of turbidimeter measurement capability
mg/L = milligrams per liter
ml/min = milliliters per minute
ml = milliliters
mV = millivolts
NA = not applicable
NM = not measured after initial measurement
NTU = nephelometric turbidity units
µmhos/CM = micromhos per centimeter



WELLS SAMPLED, SECOND QUARTER 2013
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

By: TJH	Date: 7/16/2013	Project No. 6107130012
amec		Figure B1

Friday, July 26, 2013 9:30:20 AM
P:\6107\GIS\Projects\2Q13\FigureB1-WellsSampled.mxd

APPENDIX C

Analytical Results, Microsoft Access Database
[provided separately]

APPENDIX D

Remediation Performance Monitoring

TABLE D1

GROUNDWATER EXTRACTION WELL FIELD PARAMETERS

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well ID	Date	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Total Dissolved Solids (mg/L)
EW-01A	4/2/2013	17.46	6.26	393	256
EW-02A	4/2/2013	14.64	6.34	394	256
EW-01B1	4/2/2013	17.96	6.81	405	263
EW-01B1	5/6/2013	18.63	6.81	407	265
EW-01B1	6/4/2013	17.92	6.78	408	266
IEW-1R	4/2/2013	18.28	5.61	426	277
IEW-1R	5/6/2013	18.66	6.27	428	278
IEW-1R	6/4/2013	18.65	5.7	427	274
DEW-1	4/2/2013	19.75	6.6	476	309
DEW-1	5/6/2013	19.46	7.07	467	304
DEW-1	6/4/2013	19.08	6.67	475	310

Notes
1. Parameters presented are the last readings recorded prior to sampling.

Abbreviations
-- = Not analyzed or not applicable
µS/cm = microsiemens per centimeter
°C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

TABLE D2

GROUNDWATER TREATMENT SYSTEM MONITORING DATA
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

	Date	4/30/13	5/31/13	6/30/13
Effluent pH	pH units	6.60	6.50	6.50
Effluent Nitrate	mg/L	29.2	0.0 [1]	27.7
IEW-1R Nitrate	mg/L	31.5	31.8	31.5
DEW-1 Nitrate	mg/L	0.2 [1]	30.4	30.4
EW-01A Totalizer	gal	1,111	9	0
EW-01A Average Flowrate	gpm	0	0	0
EW-02A Totalizer	gal	505	5	19,493
EW-02A Average Flowrate	gpm	0	0	0
EW-01B1 Totalizer	gal	624,287	642,383	626,301
EW-01B1 Average Flowrate	gpm	14	14	14
IEW-1R Totalizer [2]	gal	8,621,988	8,733,624	10,621,464
IEW-1R Average Flowrate [2]	gpm	200	196	246
DEW-1 Totalizer	gal	45,275,620	50,317,992	55,269,836
DEW-1 Average Flowrate	gpm	116	113	115
Combined Offsite Totalizer (FE-400)	gal	14068912	15001792	16626896
Combined Offsite Average Flowrate	gpm	326	336	385
INJ-001 Totalizer Reading	gal	2,156,366	2,354,980	2,685,600
INJ-001 Average Flow Rate	gpm	50	53	62
INJ-002 Totalizer Reading	gal	1,118,937	1,196,459	1,383,526
INJ-002 Average Flow Rate	gpm	26	27	32
INJ-003 Totalizer Reading	gal	4,143,112	4,391,540	4,764,348
INJ-003 Average Flow Rate	gpm	96	98	110
INJ-004 Totalizer Reading	gal	4,525,664	4,795,192	5,128,412
INJ-004 Average Flow Rate	gpm	105	107	119
INJ-005 Totalizer Reading	gal	2,131,008	2,277,154	2,547,838
INJ-005 Average Flow Rate	gpm	49	51	59
INJ-006 Totalizer Reading	gal	587,300	604,481	758,229
INJ-006 Average Flow Rate	gpm	14	14	18

Notes

[1] The nitrate sensor was not operating properly and was recalibrated.

[2] In July 2013, it was discovered that the magnetic flow meter used for process control on well IEW-1R (FE-200) was not accurately representing the flow rate. The meter was recalibrated on 7/11/13. The 2Q13 IEW-1R flow rates and flow volumes were calculated based on the main off-site influent flow meter (FE-400), which measures the combined flow from IEW-1R and DEW-1, and the DEW-1 process control flow meter (FE-100).

gpm = gallons per minute
gal = gallons
mg/L = milligrams per liter

amec

IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Grimsha
Project & Task Number: :	**State Well ID:**	**Date & Time Arrived Site:**
6107120012.01.02	09S03E34G002-A	12:38

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)

Section III – System Status

Is the IX system bypassed/offline?	
Yes	*No*

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	*No*	3.	Are chemicals, used bag filters and drums properly stored & labeled?	*Yes*	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	*Yes*	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	*Yes*	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?	Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☐	*Yes* *No*		
2. Post-Inlet Filter (Pre-Lead Vessel)	☐	*Yes* *No*		
3. Mid-Point (Post-lead/pre-Lag Vessel)	☐	*Yes* *No*		
4. Post-Lag Vessel	☐	*Yes* *No*		

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. System is bypassed.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y N

Sample Collected: Y N Duplicate Collected: Y N Check By-pass Valve: Y N

Signature of Inspector: D. G

Time Departed Site: 13:10

✓(1)

amec

IX System
Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Gkiwisk
Project & Task Number: : 6107120012.01.02	State Well ID: 09S03E34G002-B	Date & Time Arrived Site: 4/3/13 12:38

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
06327298/06327336

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Are chemicals, used bag filters and drums properly stored & labeled?	*Yes* N/A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	(Yes)	*No*	58-62	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	(Yes)	*No*	52-54	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	(Yes)	*No*	47-50	
4. Post-Lag Vessel	☑	(Yes)	*No*	44-47	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. New P-tank installed. Feed pumps working correctly.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Cleaned out trash/debris & spider webs.

ST: EFF 12:56, MID 12:56, PAW: 12:57

Sediment Filter Changed: Y (N)

Sample Collected: (Y) N Duplicate Collected: Y N Check By-pass Valve: (Y) N

Signature of Inspector: [signature] Time Departed Site: 13:10

✓(4)

amec

IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Grimshaw
Project & Task Number: :	**State Well ID:**	**Date & Time Arrived Site:**
6107120012.01.02	09S03E34C003	4/3/13 13:21

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
01907664 / 01907710

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Are chemicals, used bag filters and drums properly stored & labeled?	N/A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	38/ 59	Pump cycles very fast
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	40/ 50	~15 sec or so.
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	36/ 48	
4. Post-Lag Vessel	☑	*Yes*	*No*	44/ 47	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. * dup (RAW)
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

* Need to bring a single-length filter bag in May 13
dp = 10psi

Sediment Filter Changed: Y (N)

Sample Collected: (Y) N Duplicate Collected: (Y) N Check By-pass Valve: (Y) N

Signature of Inspector: D. Hu **Time Departed Site:** 13:45

(7)

IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Grimshaw
Project & Task Number: :	State Well ID:	Date & Time Arrived Site:
6107100014-01	09S03E34R007	4/3/13 14:03

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
4138967 / 4138999

Section III – System Status

Is the IX system bypassed/offline?	
Yes	No

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	No	3.	Are chemicals, used bag filters and drums properly stored & labeled?	*Yes* N/A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	Yes	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	Yes	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	90-97	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	87-90	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	54-61	
4. Post-Lag Vessel	☑	*Yes*	*No*	40-45	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y N

Sample Collected: Y N Duplicate Collected: Y N

Check By-pass Valve: Y N

Signature of Inspector: D. Gr

Time Departed Site: 14:22

✓ (5)

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IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D Grimshaw
Project & Task Number: :	**State Well ID:**	**Date & Time Arrived Site:**
6107120012.01.02	09S03E34J003-B	4/3/13 14:30

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)	
03874761	03874769

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Are chemicals, used bag filters and drums properly stored & labeled?	~~Yes~~ N/A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	32	51	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	38	55	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	38	47	
4. Post-Lag Vessel	☑	*Yes*	*No*	10	21	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: (Y) N Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. G **Time Departed Site:** 1444

✓ (3)

amec

IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Grimshaw
Project & Task Number: :	**State Well ID:**	**Date & Time Arrived Site:**
6107120012.01.02	09S03E34J003-A	4/3/13 14:45

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
01250344 /

Section III – System Status

Is the IX system bypassed/offline?	
Yes	*No*

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	*No*	3.	Are chemicals, used bag filters and drums properly stored & labeled?	~~*Yes*~~ N/A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	*Yes*	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	*Yes*	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	34	66	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	34	56	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	42	49	
4. Post-Lag Vessel	☑	*Yes*	*No*	30	30	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y N

Sample Collected: Y N Duplicate Collected: Y N Check By-pass Valve: Y N

Signature of Inspector: D. G. Time Departed Site: 14:55

✓ (2)

amec

IX System Inspection Log

Section I – General Information

Project Name:	Property Name & Address:	Inspected By:
Olin/Standard Fusee		D. Grimshaw
Project & Task Number: :	**State Well ID:**	**Date & Time Arrived Site:**
6107120012.01.02	09S03E34G001	4/3/13 1457

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
05172870 / 05172900

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Are chemicals, used bag filters and drums properly stored & labeled?	N ~~*Yes*~~ A	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)	4.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	34	72	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	30	70	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	30	38	
4. Post-Lag Vessel	☑	*Yes*	*No*	0	29	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: (Y) N Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. R. [illegible] **Time Departed Site:** 15:14

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G002-B**	Date & Time Arrived Site: 10 MAY 13 12:30

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
6340437 / 6340462

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	0	54	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	0	50	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	0	47	
4. Post-Lag Vessel	☑	*Yes*	*No*	0	43	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

removed cobwebs & some trash.

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: [signature] Time Departed Site: 12:44

Document modified 5/10/2012

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34R007**	Date & Time Arrived Site: 10MAY13 13:08

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
4234884 / 4234906

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	63	100	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	50	97	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	50	60	
4. Post-Lag Vessel	☑	*Yes*	*No*	47	47	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Remove chlorine

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. [illegible] Time Departed Site: 13:20

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G001**	Date & Time Arrived Site: 10 MAY 13 1400

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
05224901 / 05224927

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	42	77	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	44	75	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	43	60	
4. Post-Lag Vessel	☑	*Yes*	*No*	40	55	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D-R M Time Departed Site: 1415

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G002-A**	Date & Time Arrived Site: 10 MAY 1245

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)

Section III – System Status

Is the IX system bypassed/offline?	
Yes	*No*

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	*No*	3.	Is the site properly secured (e.g. gated & locked)?	*Yes*	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	*Yes*	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☐	*Yes*	*No*		
2. Post-Inlet Filter (Pre-Lead Vessel)	☐	*Yes*	*No*		
3. Mid-Point (Post-lead/pre-Lag Vessel)	☐	*Yes*	*No*		
4. Post-Lag Vessel	☐	*Yes*	*No*		

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. System bypassed
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y N

Sample Collected: Y N Duplicate Collected: Y N Check By-pass Valve: Y N

Signature of Inspector: D-R Time Departed Site: 1246

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34C003**	Date & Time Arrived Site: 10MAY13 1341

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
1920978 / 1920997

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	68	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	59	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	44	
4. Post-Lag Vessel	☑	*Yes*	*No*	41	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. New hoses ordered 5/10
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. G. H. Time Departed Site: 1350

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34J003-B**	Date & Time Arrived Site: 10MAY1313 30

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
1258970 / 1258980

Section III – System Status

Is the IX system bypassed/offline?	
Yes	*No*

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	*No*	3.	Is the site properly secured (e.g. gated & locked)?	*Yes*	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	*Yes*	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	55	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	52	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	45	
4. Post-Lag Vessel	☑	*Yes*	*No*	34	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y N

Sample Collected: Y N Duplicate Collected: Y N Check By-pass Valve: Y N

Signature of Inspector: D. [illegible] Time Departed Site: 1375

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34J003-A**	Date & Time Arrived Site: 10 MAY 13 1325

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
3875610 / 3875660

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI) Static	Pressure Range (PSI) Run	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	26	54	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	31	(50)	(may need new Press gauge)
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	31	47	
4. Post-Lag Vessel	☑	*Yes*	*No*	15	30	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. [illegible] Time Departed Site: 1335

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G002-B**	Date & Time Arrived Site: 7/6/13 11:30

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)	
6352205	6352235

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)		Observations
1. Pre-Inlet Filter	☑	(Yes)	*No*	0	60	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	(Yes)	*No*	0	54	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	(Yes)	*No*	0	48	
4. Post-Lag Vessel	☑	(Yes)	*No*	0	42	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: [signature] Time Departed Site: 11:42

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G002-A**	Date & Time Arrived Site: 7/6/13 11:42

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)

Section III – System Status

Is the IX system bypassed/offline?	
Yes	*No*

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	*No*	3.	Is the site properly secured (e.g. gated & locked)?	*Yes*	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	*Yes*	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☐	*Yes*	*No*		
2. Post-Inlet Filter (Pre-Lead Vessel)	☐	*Yes*	*No*		
3. Mid-Point (Post-lead/pre-Lag Vessel)	☐	*Yes*	*No*		
4. Post-Lag Vessel	☐	*Yes*	*No*		

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1.
2. SYSTEM BY PASSED
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D-R [illegible] Time Departed Site: 11:44

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34J003-A**	Date & Time Arrived Site: 7/6/13 1215

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
1262980 / 1262992

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(NO)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	57	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	51	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	47	
4. Post-Lag Vessel	☑	*Yes*	*No*	33	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2. Replaced post-Inlet pressure gauge
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D. R. Time Departed Site: 1230

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34G001**	Date & Time Arrived Site: 7/6/13 1210

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
5338370 / 5338380

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	(Yes)	*No*	71	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	(Yes)	*No*	40	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	(Yes)	*No*	41	
4. Post-Lag Vessel	☑	(Yes)	*No*	38	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1. System running when I arrived.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) (N)

Signature of Inspector: [signature] Time Departed Site: 1217

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34C003**	Date & Time Arrived Site: 7/6/13 1225

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
1533421 / 1533427

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☐	*Yes*	*No*	44	
2. Post-Inlet Filter (Pre-Lead Vessel)	☐	*Yes*	*No*	39	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☐	*Yes*	*No*	33	
4. Post-Lag Vessel	☐	*Yes*	*No*	33	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.
1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) (N)

Signature of Inspector: D. R. B. Time Departed Site: 1233

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34J003-B**	Date & Time Arrived Site: 7/6/13 1207

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)
3876609 / 3876629

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	58	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	49	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	45	
4. Post-Lag Vessel	☑	*Yes*	*No*	36	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1.
2.
3.
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

Sediment Filter Changed: Y (N)

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D-R Time Departed Site: 1214

Olin

IX System Inspection Log

Section I – General Information

Project Name: Olin/Standard Fusee	Property Name & Address:	Inspected By: Dane Grimshaw
Project & Task Number: :	State Well ID: **09S03E34R007**	Date & Time Arrived Site: 7/4/13 1150

Section II – Treated Water Totalizer Reading

Gallons Treated (Initial/Final)	
4329830	4329851

Section III – System Status

Is the IX system bypassed/offline?	
Yes	(No)

Section IV – General Site Inspection (circle *Yes* or *No*)

1.	Are there any unmitigated Health & Safety hazards on the site?	*Yes* (explain in Section VI)	(No)	3.	Is the site properly secured (e.g. gated & locked)?	(Yes)	*No* (explain in Section VI)
2.	Is general housekeeping acceptable (e.g. no loose trash, high weeds etc.)?	(Yes)	*No* (explain in Section VI)				

Section V – System Operating Pressures

While the pump is running record the IX system operating pressures. During the observation period if pressures are fluctuating, note the minimum and maximum pressures, and any miscellaneous observations. If differential pressure between Pre-Inlet Filter and Post-Inlet Filter readings is >15 psi, change the sediment filter.

Gauge Location	Pump On?	Gauge Operational?		Pressure Range (PSI)	Observations
1. Pre-Inlet Filter	☑	*Yes*	*No*	100	
2. Post-Inlet Filter (Pre-Lead Vessel)	☑	*Yes*	*No*	97	
3. Mid-Point (Post-lead/pre-Lag Vessel)	☑	*Yes*	*No*	62	
4. Post-Lag Vessel	☑	*Yes*	*No*	48	

Section VI – Irresolvable Maintenance Issues (continue on rear if necessary)

Describe system maintenance issues such as leaks, broken gauges, or any other conditions that require Siemens' attention.

1.
2. High dp across lead IX? ✓ when IX is
3. dnd for replacement?
4.
5.
6.

Section VII – Describe any light maintenance and housekeeping performed. General comments & observations (continue on rear if necessary):

lock is sticking need to replace IX

Sediment Filter Changed: (Y) N

Sample Collected: Y (N) Duplicate Collected: Y (N) Check By-pass Valve: (Y) N

Signature of Inspector: D-R M Time Departed Site: 1206

APPENDIX E

Data Validation and Precision Assessment Results

TABLE OF CONTENTS

Page

E1 DATA ACCURACY AND PRECISION E1

E2 REFERENCES E2

TABLES

Table E1 Perchlorate Detected in Quality Control Samples

Table E2 Field Duplicate Relative Percent Differences

E1 DATA ACCURACY AND PRECISION

Second Quarter 2013 (2Q13) data validation and precision assessments were performed in accordance with the procedures specified in the USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review (National Functional Guidelines [USEPA, 2010]), the QAPP (MACTEC, 2010), and quality control (QC) criteria specified in the analytical methods and Monitoring and Reporting Program (MRP) R3-2008-0028 (Water Board, 2011). Results of the data validation and precision assessment indicated the following:

- Analytical accuracy was evaluated by reviewing laboratory control sample recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries, holding times, and blank results for samples collected in 2Q13. QC criteria were met for the laboratory and field QC samples associated with the project, with the following exceptions:
  - One method blank sample had an estimated result for perchlorate below the reporting limit, but above the method detection limit at an estimated concentration of 1.32 micrograms per liter (µg/L). In accordance with the National Functional Guidelines (USEPA, 2010), associated field sample results reported as estimated values between the method detection limit and reporting limit (RL) were reported as nondetect and a “U” flag was added to the result. Field sample results reported as nondetect or above the reporting limit were accepted as reported. In all, the perchlorate results for three project samples were qualified as nondetect (U) at the RL of 4.0 µg/L due to the method blank findings. Table D1 provides the method blank number and identifies the associated field samples with perchlorate results that were qualified as nondetect (U).
- Relative percent differences (RPDs) were calculated for both field duplicate samples and internal laboratory MS/MSD samples. Specific results for perchlorate are:
  - RPD values calculated for nine field duplicate sample pairs ranged from 0 to 4 percent, with an overall average of 1 percent; these results met the project-specific RPD criterion of 25 percent. Table D2 presents the field duplicate RPDs.
  - RPD values calculated for twelve project-related MS/MSD pairs ranged from 0 to 3 percent, with an overall average of 1 percent, which meets the QAPP-specified 15 percent acceptance criterion.

The 2Q13 data are considered useable as reported by the laboratory, with additional qualifiers. Based upon the data review the results are considered valid and usable to support project decisions as qualified. Data completeness (the number of successful analyses relative to the number of requested analyses) was 100 percent for 2Q13 samples.

E2 REFERENCES

MACTEC Engineering and Consulting, Inc. (MACTEC), 2010. Quality Assurance Project Plan (QAPP), Olin/Standard Fusee Site, 425 Tennant Avenue, Morgan Hill, California. Revised March.

Water Board, 2011. Monitoring and Reporting Program No. R3-2008-0028 for Olin Corporation, 425 Tennant Avenue, Morgan Hill, Santa Clara County. December 22.

U.S. Environmental Protection Agency (USEPA), 2010. USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review. January.

TABLE E1

PERCHLORATE DETECTED IN QUALITY CONTROL SAMPLES
Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

QC Sample ID	Analysis Date	QC Batch	QC Sample Perchlorate Concentration (µg/L)	Associated Field Samples with Perchlorate Qualified as Nondetect*	
MB 720-133762/15	4/5/2013	720-133762	1.32 J	EW-01A	Sample Date 4/2/13
				EW-01A-DUP	Sample Date 4/2/13
				MP-01-090	Sample Date 4/2/13

Notes
1. Samples were analyzed for perchlorate using EPA Method 314.0M.
2. * Results reported by the laboratory as estimated, i.e., between the method detection limit and reporting limit; in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (2010), results were qualified as nondetect (U) at the reporting limit of 4.0 µg/L.

Abbreviations
J = estimated concentration
QC = Quality Control
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency

TABLE E2

FIELD DUPLICATE RELATIVE PERCENT DIFFERENCES

Second Quarter 2013 Groundwater Monitoring Report
Olin Site
Morgan Hill, California

Well	Sample Date	Sample Type	Perchlorate Concentration (µg/L)	MDL (µg/L)	Relative Percent Difference
Onsite Wells:					
EW-01A	4/2/2013	Primary	ND(4.0)	0.75	N/A
EW-01A-DUP	4/2/2013	Duplicate	ND(4.0)	0.75	
IEW-1R	6/4/2013	Primary	11	0.75	0%
IEW-1R-DUP	6/4/2013	Duplicate	11	0.75	
PM-03B1	4/10/2013	Primary	7.3	0.75	4%
PM-03B1-DUP	4/10/2013	Duplicate	7.0	0.75	
Offsite Wells:					
09S03E34C003	4/3/2013	Primary	34	3.8	3%
09S03E34C003-DUP	4/3/2013	Duplicate	35	3.8	
09S03E35M006	4/10/2013	Primary	4.1	0.08	2%
09S03E35M006-DUP	4/10/2013	Duplicate	4.0	0.08	
MW-60-180	4/11/2013	Primary	3.2	0.75	0%
MW-60-180-DUP	4/11/2013	Duplicate	3.2	0.75	
MW-71-75	4/12/2013	Primary	22	0.75	0%
MW-71-75-DUP	4/12/2013	Duplicate	22	0.75	
MW-72-70	4/11/2013	Primary	11	0.75	0%
MW-72-70-DUP	4/11/2013	Duplicate	11	0.75	
PMW-05-305	4/15/2013	Primary	26	3.8	0%
PMW-05-305-DUP	4/15/2013	Duplicate	26	3.8	
			Maximum RPD		4%
			Minimum RPD		0%
			Average RPD		1%

Notes
1. All concentrations in micrograms per liter (µg/L)

Abbreviations
MDL = method detection limit
ND = Nondetect at the reporting limit specified in parentheses.
N/A = not applicable; RPDs are not calculated for results less than the reporting limit.
RPD = relative percent difference

APPENDIX F

Response to Comments – Annual Cleanup Progress Status Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report

July 30, 2013

Project 6107130012

Mr. Dean Thomas
Engineering Geologist
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, California 93401

Subject: Response to Comments – Annual Cleanup Progress Status Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report
Olin Site
425 Tennant Avenue
Morgan Hill, California

Dear Mr. Thomas:

In a letter dated May 1, 2013, the Central Coast Regional Water Quality Control Board (the "Water Board") provided comments on the 2012 Annual Cleanup Progress Status Report (CPSR; see attachment) for the Olin Site located at 425 Tennant Avenue in Morgan Hill, California (the "Site"). On behalf of Olin Corporation (Olin), AMEC Environment & Infrastructure, Inc. (AMEC) submitted a letter response, dated May 30, 2013, to meet the requirements stated in the Water Board's Comment #1. This letter summarizes the response to Comment #1 and provides Olin's responses to the remaining comments.

Comment 1. *Section 5.1, Page 9, second paragraph after the bullets.*
The Report states that the average flow rate of 214 gallons per minute (gpm) at extraction well IEW-1R is sufficient to achieve capture of PZA and PZB concentrations in the intermediate aquifer. As discussed during an April 26, 2013 teleconference between Central Coast Water Board staff, Olin, and its consultants, the capture flow lines shown on Figure 15 of the Report indicate that portions of the PZB plume upgradient from IEW-1R in the intermediate aquifer are not hydraulically captured by the extraction well. These areas of the plume, as represented by upgradient and crossgradient monitoring locations MW-60 and MW-63, are above 11 micrograms per liter for perchlorate, and are not captured and remediated, as required by the CAO and our May 13, 2008 Response to Area I Plume Migration Control Feasibility Study Addendum and Intermediate Aquifer Cleanup Work Plan. In addition, the area near MP-04 (east of the site) appears marginally captured by IEW-1R. The current discharge rate at IEW-1R is significantly lower than the originally designed flow rate. AMEC justifies the reduced discharge at IEW-1R, and associated smaller capture zone by stating that concentrations at MW-60 and MW-63 will decline below PZB in the near future. Near future is a relative term, therefore, per the contingency process outlined in Olin's April 2011 100% Engineering Design Report, Olin must provide additional information (using modeling or empirical data with charts, etc.) to demonstrate that perchlorate concentrations will be below PZB concentrations at MW-60 and MW-63 in a reasonable timeframe. Otherwise, Olin must implement contingency measures such as increasing the flow rate at IEW-1R to achieve increased capture at Maple Avenue. Increasing

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the flow rate would be expected to also increase dispersion and attenuation rates in areas downgradient of IEW-1R (e.g., MW-65 and MW-71 where elevated or stable perchlorate concentrations exist) because less perchlorate will be allowed to migrate southeastward towards these wells. Therefore, by May 30, 2013, Olin must either 1) demonstrate that PZB areas upgradient and crossgradient and outside of IEW-1R capture zone will attenuate quickly, or 2) provide a proposal for achieving increased capture by either increasing the IEW-1R flow rate, redeveloping IEW-1R (see our comments below on this issue), or increasing capture with alternative methods.

Response 1. This comment was addressed in AMEC's letter to the Water Board dated May 30, 2013. In a letter dated June 5, 2013, the Water Board concluded that the May 30 letter met the Water Board's requirements and provided dates for when the Water Board could expect the perchlorate attenuation to be observed at Wells MP-21-089 and MP-71-075, after extraction well IEW-1R began operation in September 2012. In a letter dated June 7, 2013, AMEC responded by clarifying that the active intermediate aquifer extraction is not expected to have observable effects on perchlorate concentrations in these two wells until First Quarter 2015 (MP-21-089) and First Quarter 2014 (MP-71-075).

Comment 2. *Section 6.1 Mann Kendall Trends, page 11.*
Please double-check the accuracy of the statistical output of the Maros software. For instance, in Appendix D, for PZ-05-390, the historical number of samples in the Olin database is 30 (including duplicates), whereas Appendix D (Maros output) says 22. Please explain the discrepancy.

Response 2. The MAROS software consolidates results for duplicate pairs by assigning the maximum value of the pair for each sample before calculating the Mann Kendall statistic. In the case of PZ-05-390, the well was sampled 22 times, so there were 22 primary perchlorate results. For 8 of the 22 sampling events, duplicate samples were collected, thus yielding a total of 30 analytical results. Therefore, the maximum value for each pair of the samples was used in the Mann Kendall analysis.

Comment 3. *Section 6.2, Control Charts.*
For the control charts, does a monitoring location move to a new priority zone designation if concentrations pass the threshold or does it stay in its original PZ designation?

Response 3. Throughout the baseline period, the priority zone group designations for wells in the control charts have been based on the highest historical concentration and updated when necessary between CPSR submittals. In cases where the perchlorate concentration in a given well increased above the threshold into a higher priority zone, the well was given the appropriate new priority zone designation.

Now that the groundwater treatment system (GWTS) is operating, the baseline period has ended. Henceforth, each well will maintain its 2012 CPSR priority zone

assignment, even if the perchlorate concentration were to increase above the threshold for a higher priority zone. As outlined in the Llagas Subbasin Cleanup Work Plan (MACTEC, 2007), this approach is intended to maintain a fixed baseline period dataset (through the Fourth Quarter 2012) to compare future results against.

Comment 4. *Section 6.3, Attenuation Factors, page 15, last paragraph.*

The Report states that most wells with increasing concentration trends are within the GWTS capture zones or will be addressed with Gradient Driven Remediation (GDR) for the lower deep aquifer. However, the GDR concept is still undergoing a feasibility evaluation. Preliminary monitoring results indicate that the anti-degradation policy will not be violated by GDR; however, Olin needs to complete the GDR pilot study to determine how many wells will be required (along with associated cost) to sufficiently cleanup the lower deep aquifer. Therefore, Olin's statement that GDR will address increasing concentration trends may need to be revisited if GDR is not feasible.

Response 4. Comment acknowledged. The feasibility and effectiveness for GDR to remediate the lower deep aquifer zone priority zone A (PZA) concentrations will continue to be evaluated throughout the pilot study.

Comment 5. *Section 7.0, Characterization Update, page 16, second bullet and page 17 first full paragraph; Appendix G.*

Geosyntec performed both step-testing and long-term pumping/aquifer testing to evaluate well losses and aquifer properties (transmissivity, leakage, etc.), respectively, after effectively packing off the deeper screened zone in the well. The results of the step test (Appendix G) indicate that there are significant well losses (i.e., the water level in the well is significantly lower than the formation adjacent to the well at operating discharge rates). Well re-development may be necessary to increase the well efficiency so Olin can increase the well capacity and hydraulic capture area. Redeveloping the well would have the added benefit of reducing energy consumption and cost per unit discharge rate.

Response 5. Issues associated with aquifer properties and well loss were addressed in our letter dated May 30, 2013 (AMEC, 2013a). Regarding potential redevelopment of IEW-1R, please see the response to Comment 10.

Comment 6. *Section 9.1 Quarterly Groundwater Monitoring, page 17, first paragraph, second sentence.*

The Report states that flow directions and gradients were consistent with previous observations; however, the groundwater contour maps indicate that the GWTS does locally influence gradients and flow direction. The next sentence says that the mass removed to date is approximately 51.6 kg, but Table 9 says 56.59 kg. Please verify the correct number.

Response 6. With respect to groundwater flow directions and gradients, the overall flow regime in the Llagas Subbasin was consistent with previous observations. Localized changes around extraction wells were observed, but do not appear to

significantly alter the overall flow regime. With respect to mass removed, the number in Table 9 (56.59 kg) is the correct value.

Comment 7. *Table 8.*

Central Coast Water Board staff recommends monitoring for turbidity, suspended solids, (or equivalent) in the influent/effluent to check for the potential for extraction well problems and associated potential injection system plugging. Central Coast Water Board staff also recommends monitoring the specific capacity at injection and extraction well. Olin could use the system shutdowns to obtain specific capacity at each well to monitor changes in well efficiency.

Response 7. Turbidity is not currently monitored as a part of GWTS sample collection and this data is not needed for GWTS maintenance purposes. Water levels and flow rates at each extraction and injection well are monitored and logged continuously. These data can be used to calculate pumping and injection capacity. This information will be used to inform future operational strategies for the GWTS.

Comment 8. *Figure 6.*

Olin did not use water elevation data from several onsite monitoring wells in the potentiometric surface contour interpolation for the middle deep aquifer. Please provide justification why Olin did not use these data.

Response 8. As indicated in the footnotes in Table 1, wells MW-04B, MW-05B, MW-04C, MW-05C, and MW-06C were not used for potentiometric surface contouring in the CPSR because there was a difference of more than 10 feet in groundwater elevation from those in neighboring wells. These on-site Barcad wells have historically yielded inaccurate or questionable water level results, likely because of their design. Groundwater elevations from these wells have historically been excluded and will continue to be excluded in future reports.

Comment 9. *Figures 9 and 44.*

Given that perchlorate concentrations in the upper intermediate extraction well EW-01B1 are consistently above 100 micrograms per liter at a width of capture of about 300 feet, and two other onsite monitoring wells have perchlorate above PZA concentrations, the PZA contour does not appear to adequately represent the onsite perchlorate distribution in the upper intermediate aquifer because it is barely visible on Figure 9. Concentrations of perchlorate in EW-01B1 have been stable over several years indicates a steady flux/source for perchlorate. Going forward, Olin must evaluate the nature (distribution and concentrations) of the perchlorate source in groundwater so that it can be effectively remediated within a reasonable timeframe. The next five-year review must evaluate whether the current remedial approach will achieve the desired cleanup; if not, Olin must identify an alternative approach.

Response 9. The extent of PZA on site is constrained by stable concentrations observed in the current and former MRP wells. The PZA area, which includes wells OW-01B1 and MW-07SA2 and is centered on EW-01B1, is constrained to the immediate south and east by intermediate aquifer wells with low-PZB and PZC

concentrations (i.e., PM-01B1, PM-03B1, MW-04A) and to the west by MW-08SA2 (sub-PZC, no longer sampled).

The extent of PZA at MW-19 is constrained by sub-PZC concentrations in surrounding wells MW-12B1, MW-13B1, MW-14B1, and former MRP well MW-06A. Perchlorate concentrations at MW-19 are typically an order of magnitude less than those near EW-01B1. Based on historical concentrations at MW-06A, this PZA area should not be connected to the southern PZA area. Nonetheless, this area has been made more visible in the Second Quarter 2013 groundwater monitoring report in response to your comment.

The next five-year review will include an evaluation of the effectiveness of the current remedial approach.

Comment 10. *Figure 15, Simulated Groundwater Capture, Intermediate Aquifer.*
It is unclear from the figure as to which sub-aquifer the flow particles are traveling. For instance, some particles have a more southerly component, particularly those that pass through the MP-04-088 area. Please indicate the sub-aquifer that the flow particles are traveling in and verify that perchlorate in the upper intermediate is captured east of the site.

Response 10. Simulated backward-tracking particles in Figure 15 migrate both through the intermediate aquifer to the northwest and into the shallower water-bearing units in a more northward direction. To avoid confusion, future versions of this figure will include only the length of the path lines that remain within the intermediate aquifer. With respect to specific areas of this plume captured by extraction well IEW-1R, please refer AMEC's May 30, 2013, letter.

Comment 11. *Figure 18, Perchlorate Time Series: Intermediate Aquifer.*
Please include monitoring well MP-04-088 in future renditions of this figure because this well has PZB concentrations and it is near the original source area; therefore, this well is an important well to monitor.

Response 11. Comment acknowledged; MP-04-088 will be added to Figure 18 in future CPSRs.

Comment 12. *Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 1 of the Report, page 2, third bullet.*
Appendix G indicates that the transmissivity in the flow model was updated based on results of the testing and adjusted from 16,000 ft2 per day to 19,000 ft2 per day. Were the leakance values determined from the testing commensurate with the model; if not, was the model calibrated to the new leakance values? Please explain the mechanism for the almost immediate response to rainfall events indicated by the rise in water levels measured in all of the observation wells. Does the model adequately represent this phenomenon? Please elaborate.

Response 12. Leakance, though not explicitly defined in the flow model, is a function of the relative vertical hydraulic conductivities. The conductivities assigned to the model were regarded as reasonable in the context of the new pumping test data and previous calibration of the model, thus indicating that communication between layers is adequately captured in the model.

The rapid response to rain events in the intermediate and deep aquifers is associated with the low storage values of those aquifer materials. With respect to response to rainfall events, previous investigations that included passive (transducer) monitoring of the Llagas Subbasin show a response in all aquifer layers to stresses such as recharge and precipitation cycles. The groundwater flow model is run as a steady-state model, so individual transient events such as rainfall are not explicitly simulated in model runs.

Comment 13. *Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 3, page 5, last sentence.*
Central Coast Water Board staff concurs that Olin should redevelop the well. Losses from turbulent flow appear to be greater than 90%, and the well is less than 10% efficient. Well efficiencies exceeding 70% should be achievable.

Response 13. As discussed in our letter dated May 30, 2013, IEW-1R has the capacity to meet the current target average annual pumping rate. The specific capacity is being monitored to determine when redevelopment may be necessary.

Comment 14. *Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 4, page 5, last sentence.*
Appendix G states water levels were corrected for precipitation events. Please specify how Olin made the corrections.

Response 14. The impact of precipitation events on testing and analysis is described in Section 4.1 of Appendix G (page 6) with reference to Figures 3 and 4. Our evaluation of possible precipitation corrections concluded that potential corrections would not improve the reliability of the analysis. Therefore, as stated in the last sentence of Section 4.1, no correction for precipitation was made to the data. The last sentence of page 5 in Appendix G could have been stated more clearly as follows: “The analysis of test results, including *evaluation of whether there was a need for* corrections for the precipitation events, were performed on data after it had been converted to elapsed time and drawdown.” [text in italics added].

REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC), 2013a. Annual Cleanup Progress Status Report, Fourth Quarter 012 Groundwater Monitoring Report, and Five-Year Status Report and IEW-1R Operation: Response to Water Board Comment #1. Olin Site, 425 Tennant Avenue, Morgan Hill, California. May 30.

_____, 2013b. Response to May 2013 Annual Cleanup Progress Report, Fourth Quarter 012 Groundwater Monitoring Report, and Five-Year Status Report and Effectiveness Evaluation Comment Letter. Olin Site, 425 Tennant Avenue, Morgan Hill, California. June 7.

Central Coast Regional Water Quality Control Board (Water Board), 2013a. Site Cleanup Program: Olin Corporation, 425 Tennant Avenue, Morgan Hill – Response to Annual Cleanup Progress Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report and Effectiveness Evaluation. May 1.

_____, 2013b. Site Cleanup Program: Olin Corporation, 425 Tennant Avenue, Morgan Hill – Response to May 2013 Annual Cleanup Progress Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report and Effectiveness Evaluation Comment Letter. June 5.

MACTEC, 2007. Llagas Subbasin Cleanup Work Plan, Olin/Standard Fusee Site, Morgan Hill California. June 15.

Sincerely yours,
AMEC Environment & Infrastructure, Inc.

Sean Culkin, PG
Hydrogeologist

Michael D. Taraszki, PG, CHG, PMP
Project Principal

SC/MDT/dc
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May 1, 2013

Mr. David M. Share
Olin Corporation
Environmental Remediation Group
3855 North Ocoee Street, Suite 200
Cleveland, TN 37312

Dear Mr. Share:

SITE CLEANUP PROGRAM: OLIN CORPORATION, 425 TENNANT AVENUE, MORGAN HILL – RESPONSE TO ANNUAL CLEANUP PROGRESS REPORT, FOURTH QUARTER 2012 GROUNDWATER MONITORING REPORT, AND FIVE-YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION

Central Coast Regional Water Quality Control Board (Central Coast Water Board) staff reviewed Olin Corporation's (Olin) February 13, 2013 "*2012 Annual Cleanup Progress Status Report, Fourth Quarter 2012 Groundwater Monitoring Report, and Five-Year Status Report and Effectiveness Evaluation"* (Report), prepared by AMEC Environment & Infrastructure, Inc. (AMEC) on behalf of Olin. The Report presents fourth quarter groundwater monitoring data and includes the first full quarter's worth of operational data from the offsite (expanded) groundwater extraction and treatment system (GWTS). The Report also includes an evaluation of the short-term hydraulic effectiveness of the GWTS and the monitored attenuation components of the cleanup remedy, pursuant to Cleanup and Abatement Order (CAO) R3-2007-0077 Ordering Paragraph I's (Ordering Paragraph I) requirement for a five-year status report and effectiveness evaluation. The Report also includes results from an aquifer re-test conducted at IEW-1R during December 2012 after repairing the well's packer device to isolate the lower portion of the intermediate aquifer from the well where perchlorate concentrations are below Priority Zone B (PZB) concentrations (11 micrograms per liter). The Report concludes that perchlorate concentrations continue to attenuate most rapidly in the shallow and intermediate aquifers in response to Olin's onsite source control and removal measures completed in 2004. However, perchlorate is generally stable or declining more slowly in the deep aquifer, which is also consistent with past observations.

Central Coast Water Board staff finds that the Report substantively meets the requirements of CAO Ordering Paragraph I, given that Olin recently commissioned the expanded GWTS in July of 2012. It is too early to evaluate aquifer cleanup trends resulting from offsite groundwater extraction and make conclusions about potential improvements (and associated cost). However, the next five-year status report is due December 2017; at that time sufficient data will be available for Olin to evaluate overall system effectiveness, as required by Ordering Paragraph I.

CENTRAL COAST WATER BOARD STAFF COMMENTS AND REQUIREMENTS

The following section includes comments on the Report that Olin can respond to and address in the next quarterly groundwater monitoring report. The following section also includes a requirement for Olin to submit a report to address capture of the PZB areas of the intermediate aquifer outside of the IEW-1R capture zone.

1. Section 5.1, Page 9, second paragraph after the bullets – The Report states that the average flow rate of 214 gallons per minute (gpm) at extraction well IEW-1R is sufficient to achieve capture of PZA and PZB concentrations in the intermediate aquifer. As discussed during an April 26, 2013 teleconference between Central Coast Water Board staff, Olin, and its consultants, the capture flow lines shown on Figure 15 of the Report indicate that portions of the PZB plume upgradient from IEW-1R in the intermediate aquifer are not hydraulically captured by the extraction well. These areas of the plume, as represented by upgradient and crossgradient monitoring locations MW-60 and MW-63, are above 11 micrograms per liter for perchlorate, and are not captured and remediated, as required by the CAO and our May 13, 2008 Response to Area I Plume Migration Control Feasibility Study Addendum and Intermediate Aquifer Cleanup Work Plan. In addition, the area near MP-04 (east of the site) appears marginally captured by IEW-1R. The current discharge rate at IEW-1R is significantly lower than the originally designed flow rate. AMEC justifies the reduced discharge at IEW-1R, and associated smaller capture zone by stating that concentrations at MW-60 and MW-63 will decline below PZB in the near future. Near future is a relative term, therefore, per the contingency process outlined in Olin's April 2011 100% Engineering Design Report, Olin must provide additional information (using modeling or empirical data with charts, etc.) to demonstrate that perchlorate concentrations will be below PZB concentrations at MW-60 and MW-63 in a reasonable timeframe. Otherwise, Olin must implement contingency measures such as increasing the flow rate at IEW-1R to achieve increased capture at Maple Avenue. Increasing the flow rate would be expected to also increase dispersion and attenuation rates in areas downgradient of IEW-1R (e.g., MW-65 and MW-71 where elevated or stable perchlorate concentrations exist) because less perchlorate will be allowed to migrate southeastward towards these wells. Therefore, **by May 30, 2013**, Olin must either 1) demonstrate that PZB areas upgradient and crossgradient and outside of IEW-1R capture zone will attenuate quickly, or 2) provide a proposal for achieving increased capture by either increasing the IEW-1R flow rate, redeveloping IEW-1R (see our comments below on this issue), or increasing capture with alternative methods.

2. Section 6.1 Mann Kendall Trends, page 11. Please double-check the accuracy of the statistical output of the Maros software. For instance, in Appendix D, for PZ-05-390, the historical number of samples in the Olin database is 30 (including duplicates), whereas Appendix D (Maros output) says 22. Please explain the discrepancy.

3. Section 6.2, Control Charts. For the control charts, does a monitoring location move to a new priority zone designation if concentrations pass the threshold or does it stay in its original PZ designation?

4. Section 6.3, Attenuation Factors, page 15, last paragraph. The Report states that most wells with increasing concentration trends are within the GWTS capture zones or will be addressed with Gradient Driven Remediation (GDR) for the lower deep aquifer. However, the GDR concept is still undergoing a feasibility evaluation. Preliminary monitoring results indicate that the anti-degradation policy will not be violated by GDR; however, Olin needs to complete the GDR pilot study to determine how many wells will be required (along with associated cost) to sufficiently cleanup the lower deep aquifer. Therefore, Olin's statement

that GDR will address increasing concentration trends may need to be revisited if GDR is not feasible.

5. Section 7.0, Characterization Update, page 16, second bullet and page 17 first full paragraph; Appendix G. Geosyntec performed both step-testing and long-term pumping/aquifer testing to evaluate well losses and aquifer properties (transmissivity, leakage, etc.), respectively, after effectively packing off the deeper screened zone in the well. The results of the step test (Appendix G) indicate that there are significant well losses (i.e., the water level in the well is significantly lower than the formation adjacent to the well at operating discharge rates). Well re-development may be necessary to increase the well efficiency so Olin can increase the well capacity and hydraulic capture area. Redeveloping the well would have the added benefit of reducing energy consumption and cost per unit discharge rate.

6. Section 9.1 Quarterly Groundwater Monitoring, page 17, first paragraph, second sentence. The Report states that flow directions and gradients were consistent with previous observations; however, the groundwater contour maps indicate that the GWTS does locally influence gradients and flow direction. The next sentence says that the mass removed to date is approximately 51.6 kg, but Table 9 says 56.59 kg. Please verify the correct number.

7. Table 8. Central Coast Water Board staff recommends monitoring for turbidity, suspended solids, (or equivalent) in the influent/effluent to check for the potential for extraction well problems and associated potential injection system plugging. Central Coast Water Board staff also recommends monitoring the specific capacity at injection and extraction well. Olin could use the system shutdowns to obtain specific capacity at each well to monitor changes in well efficiency.

8. Figure 6. Olin did not use water elevation data from several onsite monitoring wells in the potentiometric surface contour interpolation for the middle deep aquifer. Please provide justification why Olin did not use these data.

9. Figures 9 and 44 . Given that perchlorate concentrations in the upper intermediate extraction well EW-01B1 are consistently above 100 micrograms per liter at a width of capture of about 300 feet, and two other onsite monitoring wells have perchlorate above PZA concentrations, the PZA contour does not appear to adequately represent the onsite perchlorate distribution in the upper intermediate aquifer because it is barely visible on Figure 9. Concentrations of perchlorate in EW-01B1 have been stable over several years indicates a steady flux/source for perchlorate. Going forward, Olin must evaluate the nature (distribution and concentrations) of the perchlorate source in groundwater so that it can be effectively remediated within a reasonable timeframe. The next five-year review must evaluate whether the current remedial approach will achieve the desired cleanup; if not, Olin must identify an alternative approach.

10. Figure 15, Simulated Groundwater Capture, Intermediate Aquifer. It is unclear from the figure as to which sub-aquifer the flow particles are traveling. For instance, some particles have a more southerly component, particularly those that pass through the MP-04-088 area. Please indicate the sub-aquifer that the flow particles are traveling in and verify that perchlorate in the upper intermediate is captured east of the site.

11. Figure 18, Perchlorate Time Series: Intermediate Aquifer. Please include monitoring well MP-04-088 in future renditions of this figure because this well has PZB concentrations and it is near the original source area; therefore, this well is an important well to monitor.

12. Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 1 of the Report, page 2, third bullet. Appendix G indicates that the transmissivity in the flow model was updated based on results of the testing and adjusted from 16,000 ft^2 per day to 19,000 ft^2 per day. Were the leakance values determined from the testing commensurate with the model; if not, was the model calibrated to the new leakance values? Please explain the mechanism for the almost immediate response to rainfall events indicated by the rise in water levels measured in all of the observation wells. Does the model adequately represent this phenomenon? Please elaborate.

13. Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 3, page 5, last sentence. Central Coast Water Board staff concurs that Olin should redevelop the well. Losses from turbulent flow appear to be greater than 90%, and the well is less than 10% efficient. Well efficiencies exceeding 70% should be achievable.

14. Appendix G, Hydraulic Testing Report for Intermediate Aquifer Extraction Well IEW-1R, Section 4, page 5, last sentence. Appendix G states water levels were corrected for precipitation events. Please specify how Olin made the corrections.

Failure to comply with our request to address our comments in the next quarterly monitoring report and our requirement to provide a response regarding IEW-1R's hydraulic capture of PZB in the intermediate aquifer by **May 30, 2013** will subject Olin to enforcement action by the Central Coast Water Board, including issuance of an order under Water Code Sections 13267 and/or 13304, and potential administrative civil liabilities.

If you have additional questions, please contact **Dean Thomas at (805) 549-3690** or Thea Tryon at (805) 542-4776.

Sincerely,

for Kenneth A. Harris Jr.
Interim Executive Officer

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Olin Technical Contacts IPL

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