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October 31, 2014

California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay Street, Suite 1400  
Oakland, CA 94612  
Attn: Mr. David Barr

Subject: Additional Vapor Intrusion Evaluation Report, June/July 2014, Former Synertek Building No. 1, 3050 Coronado Drive, Santa Clara, California, Final Site Cleanup Requirements Order No. 91-051

Dear Mr. Barr:

CH2M HILL, on behalf of Honeywell International Inc. (Honeywell), is submitting this additional vapor intrusion (VI) evaluation report (Additional VI Report) to the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) for the former Synertek Building No. 1 in Santa Clara, California (site) (Figure 1). The site is currently occupied by a building with three addresses: 3050, 3060, and 3070 Coronado Drive. The VI evaluation activities were conducted in accordance with the *Additional Vapor Intrusion Evaluation Work Plan, Former Synertek Building No.1 Facility, Santa Clara, California* (CH2M HILL, 2014; Additional VI Work Plan), which was prepared in response to the request issued by the Water Board, on December 16, 2013 (Water Board, 2013a) in light of the following new U.S. Environmental Protection Agency (USEPA) guidance:

- *External Review Draft—Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from the Subsurface to Indoor Air* (USEPA, 2013).
- *Guidelines and Supplemental Information Needed for Vapor Intrusion Evaluations at South Bay National Priority List Sites* (USEPA Region 9, 2013).
- *Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion* (USEPA EPA Region 9, 2014).

The Additional VI Work Plan was approved by the Water Board on June 20, 2014 (Water Board, 2014).

Environmental activities at the site are conducted under the Water Board Site Cleanup Requirements (SCR) Order No. 91-051 (Water Board, 1991). Under agreements with the USEPA, the Water Board provides lead regulatory oversight for environmental activities at the site. The USEPA has been involved in this site since it was included on the National Priority List (NPL) as a Superfund site in 1991 and since a USEPA Record of Decision (ROD) was issued (USEPA, 1991). Recently, the USEPA has been providing VI guidance to the South Bay NPL sites as a group, and the site has been included in that group because of its geographic location.

The results of the VI evaluation activities presented in this Additional VI Report and the results of the previous VI evaluations at the site, as reported in the *Vapor Intrusion Evaluation Report, March/April 2013* (2013 VI Report, CH2M HILL, 2013a), provide information to help the Water Board further evaluate potential VI concerns arising in light of new USEPA guidance and whether further action will be required at the site. Specifically, this additional VI evaluation report addresses the following items:

- Commercial indoor air sampling with the heating, ventilation, and air-conditioning (HVAC) system turned off.
- Comparison of indoor air sampling results to the interim trichloroethene (TCE) short-term response action levels (RAL).

One offsite commercial building located at 3111 Coronado Drive overlies the Synertek groundwater pollutant plume where groundwater TCE levels exceed 5 micrograms per liter ( $\mu\text{g/L}$ ). As of the time of this report, access for the offsite building is pending. Upon gaining access, the remaining VI evaluation will be completed and results will be reported as an addendum to this Additional VI Report to address the following item:

- Vapor intrusion evaluation in residential and commercial buildings where groundwater-TCE levels exceed 5  $\mu\text{g/L}$ .

Figures, tables, and attachments are provided at the end of this letter report. References are provided in Attachment 1.

## 1. Background

On March 1, 2012, a VI evaluation for the onsite building (3050/3060/3070 Coronado Drive) at the site was requested by the USEPA and the Water Board during a conference call to support the USEPA's protectiveness determination of the remedy at the site; the protectiveness determination of the remedy is reported in the 5-year review report required in 2012 (USEPA, 2012).

CH2M HILL conducted a building survey, pathway sampling, and preliminary indoor air-screening assessment under normal HVAC operating conditions for the onsite building using the HAPSITE gas chromatograph/mass spectrometer on April 24, 2012. The available evidence from the building survey and the preliminary indoor air evaluation indicated that the VI pathway into the onsite building from groundwater contamination at the site is not a potential concern under current conditions. However, given the uncertainty in addressing this pathway and the potential for changing building conditions in the future, an additional investigation was recommended. More detailed results of the building survey, pathway sampling, and preliminary indoor air-screening assessment are included in the *Revised Vapor Intrusion Investigation Work Plan* (2012 Revised VI Work Plan) submitted in October 2012 (CH2M HILL, 2012a).

On June 29, 2012, CH2M HILL submitted a VI work plan (CH2M HILL, 2012b) to the Water Board. CH2M HILL received comments on the VI work plan from the Water Board in an e-mail dated August 9, 2012 (Water Board, 2012). On October 2, 2012, CH2M HILL submitted to the Water Board the 2012 Revised VI Work Plan (CH2M HILL, 2012a), which addressed Water Board comments. The 2012 Revised VI Work Plan was conditionally approved by the Water Board on February 19, 2013 (Water Board, 2013b). The conditional approval required collecting an additional indoor air sample from the fire closet in the building and removing, at least 48 hours prior to sampling, a container containing TCE (used by the current tenant) that was identified during the April 2012 building inspection.

The results of this VI evaluation for the onsite building with the HVAC on are presented in the 2013 VI Evaluation Report (CH2M HILL, 2013a) and indicate that the VI pathway is neither complete nor significant (were it complete) under current building use and that no further action is required. Results from that study along with results from the 2013 Report (CH2M HILL, 2013b) and the 2012 work plan (CH2M HILL, 2012b) are included in this VI Evaluation report.

Although the low groundwater concentrations beneath the buildings at the site paired with the conclusions of the 2013 VI Evaluation Report (CH2M HILL, 2013a) do not indicate that the VI pathway is complete or significant under current building use and no further action should be required, the Water Board issued a 13267 letter on December 16, 2013 (Water Board, 2013a), to Honeywell requesting an additional VI

investigation work plan for the site to address USEPA December 3, 2013, guidance (USEPA, 2013) and USEPA Region 9 VI guidance for the South Bay NPL sites (USEPA Region 9, 2013).

Based on the new guidance, the Water Board indicated that VI sampling should be performed with the building in an HVAC-off condition and that the VI study areas should include buildings within the 5- $\mu\text{g/L}$  TCE shallow-zone groundwater contour. This includes the onsite building and one offsite building (3111 Coronado Drive), as shown in Figure 2, updated with the April/May 2014 data (forthcoming 2014 annual reporting).

An additional VI work plan was prepared in response to the Water Board request (CH2M HILL, 2014).

## **2. Field Investigation**

The field investigation activities included an HVAC survey, building survey, preliminary HAPSITE screening, pathway sampling with HVAC on and off, utility clearance, subslab probe installation, subslab soil gas sampling (HVAC off), indoor air sampling (HVAC off), and outdoor air sampling at the onsite building. Similar field activities were planned for the offsite building (3111 Coronado Drive); however, these were not performed during this field event due to building access issues. Once access is secured for the offsite building, these activities will be undertaken and their results reported as an addendum to this Additional VI Report.

### **HVAC Survey**

An evaluation of the onsite building's HVAC systems was conducted on June 26, 2014. The field survey consisted primarily of recording name plate information of the HVAC equipment to determine equipment capabilities and recording the outside air damper positions. Measurements of actual flow rates were not conducted as part of the survey.

Results of the HVAC survey are presented in Attachment 2. The Crystal Solar portion of the building, located at 3050 and 3070 Coronado Drive, is served by 11 rooftop AC units. The thermostats are set so that the fans operate when cooling or heating is required, so ventilation air is not continuously provided by these units. The manufacturing area has a 30,000-cubic-feet-per-minute acid scrubber exhaust system which causes the building to be slightly negatively pressurized. As a result, outside air is brought in through openings in the building envelope and air from the subsurface could be brought in through cracks, joints or other openings.

The Family Prayer House portion of the building, located at 3060 Coronado Drive, is served by three rooftop AC units. The units are capable of providing sufficient ventilation air, though the tenants stated that the HVAC system is infrequently used. The HVAC units were off the day the survey was performed, and an indoor pressure differential was observed to be neutral compared to outdoors.

### **Building Survey**

Building surveys were performed on June 26, 2014, at the onsite building. One survey and interview with a tenant contact was performed for each tenant in the building. The surveys consisted of general observations about the building structure and layout, survey of the building integrity and potential VI pathways, and overview of daily tenant operations.

Building survey results were generally consistent with the survey performed at Crystal Solar in April 2012 (CH2M HILL, 2012b). However, Crystal Solar has since expanded and now encompasses approximately 80 percent of the building's square footage, with the new tenant Family Prayer House occupying the remaining 20 percent of formally unoccupied space. At the time of this report, there is no unoccupied space within the former Synertek Building 1. Results from the extent of the surveys indicate that the building and foundation are in good condition, with no visible indication of conduits for VI. Upon inspection of Crystal Solar's chemical inventory and from information provided by the tenant during the survey, it was noted that TCE is

kept and used in the wet lab. Several other chemicals are present, but none likely to contain chlorinated VOCs.

Building surveys, chemical inventories, and floor plans are included in Attachment 3 of this report.

### **Preliminary HAPSITE Screening and Pathway Sampling—HVAC On/Off**

A preliminary HAPSITE screening and pathway sampling with the HVAC on was conducted at the onsite building on June 26, 2014. Eleven locations within the Synertek building were sampled using the HAPSITE in quantification mode (quant mode). Seven of the quant samples were taken within the Crystal Solar area of the building (3050 and 3070 Coronado Dr.), while the other four were taken in the Family Prayer House area of the building (3060 Coronado Dr.). HAPSITE quant samples were taken at points that were established USEPA Method TO-15 indoor air sample locations and in areas identified as potential sub-HVAC zones. Additionally, pathway samples were taken in locations such as confined areas or rooms that contained conduits, cracks, or penetrations that may have provided a route for VI. The HVAC-on HAPSITE results are presented in Table 1.

The majority of the compounds were largely not detected during the preliminary HAPSITE screening. The only notable detections were for TCE in samples located on the west side of the clean room within the back hallway and in the central office area northwest of the reception area. After review of this data, proximity of the samples to the clean room, and based on findings from prior HAPSITE studies at this building (CH2M HILL 2012a), the assumption was made that an indoor source was likely present near or within the clean room. Access to the clean room was not logistically feasible in the allotted time frame during this event for field staff because it was during business hours and Crystal Solar would have needed to stop work to escort field staff through the clean room. However, after conversations with the current tenant, a bottle of TCE inside the clean room was identified. The tenant was asked to remove this and any potential indoor sources that may be present either inside or outside of the cleanroom area at least 48 hours prior to the HAPSITE HVAC-off event.

Another HAPSITE survey and pathway sampling was performed during the HVAC-off sampling event conducted on July 5, 2014. Twenty-two quant samples were taken during this event. The sample locations included an outdoor air sample taken near the fence line west of the Synertek building, the 11 indoor sample locations sampled during the HVAC-on event, additional indoor locations inside the clean room and main entryway, and several potential VI pathway locations. The HVAC-off HAPSITE results are presented in Table 1.

As with the HVAC-on event, the majority of the compounds were largely not detected. The only notable detection was for TCE in a sample taken in the interior of clean room (HAP-12) at approximately 11:00 a.m. After discussion with tenant, it was discovered that an additional background indoor source, two mostly empty 4-L amber jugs of TCE, were located within a cabinet inside the cleanroom. The tenant removed the jugs that afternoon at 12:50 p.m., approximately midway through the indoor SUMMA sampling period. At 6:03 p.m., another sample was taken at the same location in the clean room and TCE was not detected. An additional sample was taken in the wet lab (HAP-14) at 5:31 p.m., and TCE was not detected.

The HAPSITE sample locations and TCE results are shown in Figure 3. A photo log of HAPSITE sampling locations is included in Attachment 4.

### **Utility Clearance**

USA Ticket number 0254476 was assigned on June 27, 2014, for a utility clearance check of the onsite building. On July 2, 2014, prior to start of intrusive work, Cruz Bros. performed a private utility locate for the proposed subslab probe locations.

### **Subslab Probe Installation**

On July 2, 2014, eight temporary subslab probes (SYN-SS1 through SYN-SS8) were installed, leak tested, and completed with flush-mount covers in the onsite building. The subslab probe locations are shown in Figure 4.

### **Subslab Probe Sampling—HVAC Off**

The onsite building's HVAC systems were shut off on the evening of July 3, 2014, to allow for at least 36 hours of interior air equilibration. Doors and windows were closed to the extent possible to limit air ingress/egress; however, as a safety precaution and in order to keep the integrity of the Crystal Solar's clean room, the acid scrubber exhaust system was left operating at half speed, and half the HEPA filters remained on. This created a slight negative indoor pressure differential in the Crystal Solar's portion of the building. The Family Prayer House's area of the building was observed to be neutral as compared to the outdoors.

On July 5, 2014, temporary subslab probes (SYN-SS1 through SYN-SS8) were leak-tested and eight subslab soil gas samples and one duplicate subslab soil gas sample were collected. This includes the locations proposed in the Additional VI Work Plan as well as addition of one location in the prayer house nursery. Following subslab soil gas sample collection, flush-mount covers were replaced and the floor was restored to its previous condition. These activities were completed as outlined in the Additional VI Work Plan.

The subslab soil gas samples were collected in laboratory-supplied 6-L SUMMA canisters and were analyzed for VOCs using USEPA Method TO-15. Sampling flow controllers were adjusted for a sampling period of 10 hours. Measurements of initial and final vacuum readings in the SUMMA canisters and the time of sample initiation and completion were double-checked with an external digital gauge. The samples were couriered to the analytical laboratory under standard chain-of-custody protocol. The sample canisters were shipped in cardboard boxes at ambient temperature.

### **Indoor and Outdoor Air Sampling—HVAC Off**

On July 5, 2014, eight indoor air samples (SYN-IA1 through SYN-IA8), one outdoor air sample (SYN-OA1), and one duplicate were collected at the onsite building. This included the indoor and outdoor air samples outlined in the Additional VI Work Plan and an additional indoor air location (SYN-IA8) in the prayer house nursery. (Note: The sample taken in the fire line closet in the HVAC-on event (2013) had the sample ID of SYN-IA6 but was not sampled in HVAC-off event (2014). This ID was reused for the clean room sample during the HVAC-off event. Both samples are labeled SYN-IA6 with the location added in parentheses in the tables and figures for clarification.)

At least 48 hours prior to sample collection, the known TCE container was removed from the wet lab, and sample collection commenced the morning of July 5, 2014. As discussed in the HAPSITE screening section above, at approximately 12:50 p.m. on July 5, additional TCE containers were identified by the tenant in the clean room and removed. The outdoor air sample (SYN-OA1) was collected on the fence line west of Building 1. The indoor air samples were collected as outlined in the Additional VI Work Plan. The samples were collected from approximately 3 to 5 feet above the building floor to represent the breathing zone. The indoor and outdoor air sampling locations are shown on Figure 4.

The indoor and outdoor air samples were collected in laboratory-supplied 6-L SUMMA canisters and were analyzed for VOCs using USEPA Method TO-15 SIM. Sampling flow controllers were adjusted for a sampling period of 10 hours. Measurements of initial and final vacuum readings in the SUMMA canisters and the time of sample initiation and completion were double-checked with an external digital gauge. The samples were shipped via FedEx to the analytical laboratory under standard chain-of-custody protocol. The sample canisters were shipped in cardboard boxes at ambient temperature.

### Data Quality Evaluation

A data quality evaluation report is included as Attachment 5. The data quality evaluation is an assessment of whether the data meets the data quality objectives (DQOs), the goal being to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process. The following summarizes the data evaluation findings for the subslab, indoor air, and outdoor air sampling events:

- No data were rejected, and completeness objectives were met.
- No data were qualified because of low-level blank contamination.
- The precision and accuracy of the data, as measured by laboratory QC indicators, suggest that the DQOs were met.
- The canister for sample SYN-SS-FD-140705 was found to have a leaking valve after initial pressurization at the laboratory. The canister was repressurized, analyzed, and the results reported. Field records show that this canister did not leak before or after sampling or in transit to the laboratory. As this sample was a field duplicate and the results matched the native sample, no results were qualified.
- Indoor air samples SYN-IA-3-140705 and SYN-IA-5-140705 were inadvertently collected in evacuated canisters intended for subslab samples. Those canisters were certified to the standard reporting limits of  $0.5 \mu\text{g}/\text{m}^3$  and not down to selective ion monitoring (SIM) levels. As a result, four results for compounds, including 1,2-DCA, cis-1,2-DCE, and TCE, below the  $0.5\text{-}\mu\text{g}/\text{m}^3$  concentrations were flagged as estimated (see Attachment 5). This may have biased the results high for these locations, but it did not have any effect on the overall data evaluation, as these results were already below the indoor air SLs.

### 3. Laboratory Results and Screening Levels Comparison

The laboratory results from both the 2013 HVAC-on and 2014 HVAC-off subslab soil gas, indoor, and outdoor air sampling and comparisons to screening levels are summarized below.

#### Subslab Soil Gas Results

Tables 2 and 3 summarize the subslab soil gas results (laboratory analytical reports can be provided upon request). The subslab soil gas results were compared against the following screening levels for the VOCs that have been detected historically in groundwater at this site:

- Commercial/industrial subslab-to-indoor air environmental screening levels (ESLs) (Water Board, 2013c)
- Commercial/industrial subslab-to-indoor air VI screening levels (VISLs) (USEPA, 2014).
- The ESLs and VISLs are considered investigation screening levels for use in supporting decisions whether additional data collection or evaluation are needed to assess potential VI concern at a site. Exceedance of a screening level is not necessarily an indication of unacceptable health concerns but rather that additional actions may be necessary.
- The published ESL and VISLs are selected from the minimum of the screening level based on cancer effects and the screening level based on non-cancer effects. Investigation screening levels for cancer causing chemicals are generally set to a  $1 \times 10^{-6}$  excess lifetime cancer risk point of departure pursuant to CERCLA (NCP Section 300.430(e)(2)(I)), however, a  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  cancer risk range is used during the risk management decision process on CERCLA projects. Therefore, use of a target cancer risk within the risk management range could result in a screening level that is higher than the published ESL, RSL, or VISL.

The published ESLs and VISLs are based on the assumption of a standard 8-hour workday for 250 days per year for 25 years. However, the screening levels for this site were adjusted based on the assumption of a 10-hour work day.

Subslab soil gas results from the HVAC-on sampling (March 2013) were below the commercial/industrial screening levels. During the HVAC-off sampling (July 2014), two locations (SYN-SS2 and SYN-SS4) reported TCE concentrations above the commercial/industrial subslab-to-indoor screening level of  $24 \mu\text{g}/\text{m}^3$ , at 26 and  $72 \mu\text{g}/\text{m}^3$ .

### **Indoor and Outdoor Air Results**

Tables 4 and 5 summarize the indoor air and outdoor air sampling results (laboratory analytical reports can be provided upon request). The indoor air and outdoor air sampling results were compared against the following screening levels for the VOCs that have been detected historically in groundwater at this site:

- Commercial/industrial indoor air ESLs (Water Board, 2013c)
- Commercial/industrial indoor air Regional Screening Levels (RSLs) (USEPA, 2014)
- The published ESLs and RSLs are based on the assumption of a standard 8-hour workday for 250 days per year for 25 years; however, the screening levels for this site were adjusted based on the assumption of a 10-hour work day
- As noted previously, the indoor air ESLs and RSLs are considered investigation screening levels, and an exceedance is not necessarily an indication of unacceptable health concerns. The indoor air screening levels are derived in the same manner as that discussed for the subslab soil gas screening levels, and use of a target cancer risk within the risk management range could result in a screening level that is higher than the published ESL, RSL, or VISL.

Indoor air and outdoor air concentrations from the HVAC-on sampling (March 2013) were below the commercial/industrial screening levels.

During the HVAC-off sampling (July 2014), only TCE indoor air concentrations exceeded the commercial/industrial indoor air screening level. One location (SYN-IA6—clean room) reported a TCE concentration of  $2.5 \mu\text{g}/\text{m}^3$ , which is above the commercial/industrial indoor air screening level of  $2.4 \mu\text{g}/\text{m}^3$ . Although this concentration exceeds the screening level, the result is within the risk management range ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  cancer risk range is used during the risk management decision process on CERCLA projects) and does not exceed the screening level based on a non-cancer hazard quotient of 1. Indoor air concentrations did not exceed the interim TCE indoor air short-term RAL assuming a 10-hour exposure time, which is  $7 \mu\text{g}/\text{m}^3$ .

### **4. Multiple Lines of Evidence Vapor Intrusion Evaluation**

Data collected during the field sampling events were evaluated using the multiple lines of evidence (MLE) approach to evaluate VI as described in the Additional VI Work Plan. The lines of evidence evaluated included the results of the HVAC survey, building survey, preliminary indoor screening assessment, and pathway sampling performed in 2012 and 2014, the subslab soil gas, indoor air, and outdoor air sampling results from both 2013 and 2014. In addition, the groundwater sampling results (CH2M HILL, 2013b, and forthcoming 2014 annual reporting) were used to support the evaluation.

The focus of the MLE evaluation discussion in this section is on TCE, as it was the only target compound detected above the commercial/industrial SLs in the VI samples collected during the three investigations conducted in the last 3 years. The sampling results of the other target compounds are assessed as needed in relation to the completeness and significance of the VI pathway.

The available evidence strongly suggests that the indoor air concentrations of TCE and 1,2-DCA are mainly due to background indoor and/or outdoor sources and not related to VI under current and likely future building conditions (commercial/industrial):

- Bottles containing new and waste TCE were reported in the 2012 and 2014 preliminary HAPSITE screenings and building surveys as well as in the 2014 HVAC-off HAPSITE surveys.
  - Concentrations of TCE above screening levels were detected with the HAPSITE during the 2012 survey at locations in and around the clean room/wet lab where a bottle containing TCE was later discovered. The bottle was removed 48 hours before the HVAC-on SUMMA canister sampling event to allow for multiple air exchanges. The concentrations of TCE in those SUMMA canister samples were below screening levels.
  - Concentrations of TCE above screening levels were detected with the HAPSITE during the 2014 survey at locations around the wet lab where a bottle containing TCE was previously discovered. All the bottles containing TCE were reported to have been removed 48 hours before the HVAC-off SUMMA canister sampling event. However, during HAPSITE HVAC-off field activities, elevated concentrations of TCE were again discovered in the adjacent clean room. Upon further investigation, additional bottles of TCE were discovered nearby and removed from the building approximately midway through the indoor SUMMA sampling period. Even though the HVAC was off, the acid scrubber exhaust system was left operating at half speed and half the HEPA filters remained on, so some air exchange was likely. TCE was not detected in HAPSITE samples taken later in the day (HAP-4 and HAP-12). Results from the SUMMA samples taken inside the clean room and right outside the wet lab had concentrations of TCE that were approximately half of two HAPSITE results, which is consistent with what would be expected based on the sequencing of events.
- Indoor air sample locations in Crystal Solar had slightly higher TCE concentrations during the HVAC-off event than during the HVAC on-event. But the presence of the TCE bottles during part of the sampling period likely impacted indoor air concentrations, and since the HVAC system was off, the stagnant air was not able to fully clear during the sampling period.
- Indoor air TCE concentrations in the Family Prayer House remained fairly consistent; near or below the reporting limit for both HVAC events. The physical separation (HVAC and walls) of Family Prayer House from Crystal Solar likely minimized the effects of the background indoor sources of TCE.
- The attenuation factor of 0.1 used in calculating the VISL for subslab soil gas may be overly conservative for this building. Concentrations of TCE in the indoor air samples in the Family Prayer House are low ( $<0.055 \mu\text{g}/\text{m}^3$ ). Yet, if the attenuation factor were 0.1, then much higher indoor air concentrations would have been observed. Subslab soil gas concentrations found at SYN-SS3 were 11–18  $\mu\text{g}/\text{m}^3$ . If the attenuation factor in this building were 0.1, the indoor air concentrations would have been 1.1 to 1.8  $\mu\text{g}/\text{m}^3$ .
- The commercial/industrial screening level exceedance of TCE at SYN-IA6 (clean room) during the HVAC-off sampling was co-located with a subslab probe that was reported as a nondetect for TCE ( $<2.6 \mu\text{g}/\text{m}^3$ ). Even if the concentration of TCE in the subslab probe were equal to the detection limit and a conservative attenuation factor of 0.1 were used, the source strength would not be high enough to produce the concentration of TCE that was detected in indoor air.
- If VI were occurring, the ratios of VOCs in indoor air would be expected to be similar to ratios in the subslab soil gas. However, at the onsite building, the ratio of 1,1,1-TCA to TCE in subslab soil gas is not consistent with the ratio of those VOCs in indoor air. In both indoor air HVAC-off samples with elevated levels of TCE (SYN-IA4 and SYN-IA6), 1,1,1-TCA was not detected (reporting limits of 0.037 and

0.039  $\mu\text{g}/\text{m}^3$  respectively). TCE was reported above the reporting limit at only one of the two co-located subslab samples (SYN-SS4 at 70  $\mu\text{g}/\text{m}^3$ ). The concentration of 1,1,1-TCA (21  $\mu\text{g}/\text{m}^3$ ) at that location was 30 percent that of TCE. If subslab soil gas were the source of the TCE, concentrations of 1,1,1-TCA in the indoor air samples would have been expected to be present and above the reporting limit at approximately 0.6 and 0.8  $\mu\text{g}/\text{m}^3$ .

## 5. Conclusions and Follow-on Work

The objective of this VI evaluation was to assess whether site-related VOCs detected in the shallow groundwater pose a significant health concern to indoor air through the VI pathway and whether further action will be required at the site. Based on the results of this evaluation, the VI pathway is not complete or significant under current building use or in worse case situations created by turning HVAC systems off.

Additional sampling may be required if building use or building conditions change significantly. No response or rapid response actions (building controls and/or mitigation measures) are required at this time.

Once building access has been arranged with the offsite building (3111 Coronado Drive), the offsite VI evaluation field work will be performed according to the work plan (CH2M HILL, 2014), and the results submitted as an addendum to this additional VI report. If Honeywell (with support from the Water Board and/or USEPA) is unable to secure access to the property, Honeywell will delay efforts to secure access until resolution is provided from the property owner to the Water Board and/or USEPA.

Should you require any additional information and/or clarification, please call me at (415) 513-5719 or Mr. Benny DeHghi, Honeywell Project Manager, at (310) 512-2296.

Sincerely,



Teresa Tamburello, P.E.  
Project Manager  
CH2M HILL

Enclosures

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**Tables**

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TABLE 1

## Summary of HAPSITE and Pathway Volatile Organic Compound Results, June 2014 (HVAC On Event) and July 2014 (HVAC Off Event)

Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA

Location	HAP-01		PATH-01	HAP-02		PATH-02	HAP-03		PATH-03	HAP-04	
	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014
VOLATILE ORGANIC COMPOUNDS ( $\mu\text{g}/\text{m}^3$ )											
TCE	1.1 U	1.1 U	1.1 U	1.3	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	9.1	1.1 U
PCE	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Freon 113	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
trans-1,2-DCE	2.2	11.7	5.8	4.3	20.4 E	8.3	0.8 U	7.4	7.6	2.6	12.2
1,1-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
cis-1,2-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,1-TCA	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U

Location	HAP-05/PATH-05		HAP-06/PATH-04		PATH-06	HAP-07		PATH-07	HAP-08/PATH-08		HAP-09/PATH-09	
	6/26/2014	7/5/2014	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014	6/26/2014	7/5/2014
VOLATILE ORGANIC COMPOUNDS ( $\mu\text{g}/\text{m}^3$ )												
TCE	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
PCE	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Freon 113	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
trans-1,2-DCE	4.0	6.5	3.4	2.8	7.1	0.8 U	7.5	6.2	1.5	5.7	2.6	8.0
1,1-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
cis-1,2-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,1-TCA	1.1 U	0.8 U	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U	1.1 U	0.8 U

Location	HAP-10		PATH-10	HAP-11		HAP-12		HAP-13	HAP-14	OA-1
	6/26/2014	7/5/2014	7/5/2014	6/26/2014	7/5/2014	7/5/2014 (11:00)	7/5/2014 (18:03)	7/5/2014	7/5/2014	7/5/2014
VOLATILE ORGANIC COMPOUNDS ( $\mu\text{g}/\text{m}^3$ )										
TCE	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	7.9	1.1 U	1.1 U	1.1 U	1.1 U
PCE	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Freon 113	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
trans-1,2-DCE	2.5	7.4	8.6	2.1	7.5	7.7	16.2	7.4	10.5	0.8 U
1,1-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
cis-1,2-DCE	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,2-DCA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
1,1,1-TCA	1.1 U	0.8 U	0.8 U	1.1 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U

TABLE 1

**Summary of HAPSITE and Pathway Volatile Organic Compound Results, June 2014 (HVAC On Event) and July 2014 (HVAC Off Event)**

*Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA*

**Notes**

1. HVAC was operational during the June 26, 2014 sampling event. HVAC was non-operational for 36 hours prior to and during the July 5, 2014 sampling event.

**Abbreviations:**

-- = no screening level available

HVAC = Heating, Ventilation, and Air Conditioning

ESLs = Environmental Screening Levels

VISLs = Vapor Intrusion Screening Levels

U = not detected

E = concentration exceeds the calibration range

$\mu\text{g}/\text{m}^3$  = micrograms per meter cube

TCE = Trichloroethene

PCE = Tetrachloroethene

1,1-DCE = 1,1-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

1,1-DCA = 1,1-Dichloroethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,2-DCA = 1,2-Dichloroethane

1,1,1-TCA = 1,1,1-Trichloroethane

TABLE 2

**Summary of Subslab Soil Gas Volatile Organic Compound Results, March/April 2013 (HVAC On Event)**

Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA

Location Sample Date	Commercial / Industrial Subslab- to-Indoor Air ESLs	Commercial / Industrial Subslab- to-Indoor Air VISLs	SYN-SS1 3/28/2013	SYN-SS2 3/28/2013	SYN-SS3 3/28/2013	SYN-SS4 4/3/2013	SYN-SS5 3/28/2013
<b>VOLATILE ORGANIC COMPOUNDS (<math>\mu\text{g}/\text{m}^3</math>)</b>							
TCE	2,400	24	0.57 J	5.9	18	17	0.81 U
PCE	1,680	376	1.1	0.57 J	0.65 J	0.59 J	0.39 J
Vinyl Chloride	128	22	0.52 J	0.8 U	0.77 U	0.93 U	0.81 U
1,1-DCE	704,000	7,040	0.83 U	0.8 U	0.4 J	0.93 U	0.81 U
Freon 113	--	1,040,000	2.2	5.2	5.5	7.6	0.67 J
trans-1,2-DCE	208,000	--	0.83 U	0.55 J	0.29 J	0.93 U	0.3 J
1,1-DCA	6,160	62	0.83 U	0.8 U	0.77 U	4.5	0.81 U
cis-1,2-DCE	24,800	--	0.83 U	0.8 U	0.77 U	0.31 J	0.81 U
1,2-DCA	464	3.8	0.83 U	0.8 U	0.77 U	0.93 U	0.81 U
1,1,1-TCA	17,600,000	176,000	0.27 J	0.96	0.78	6.7	0.81 U

**Notes**

1. Samples were collected while building HVAC system was operational.
2. Commercial / Industrial Subslab-to-Indoor Air ESLs (Water Board, 2013b)
3. Commercial / Industrial Subslab-to-Indoor Air VISLs (USEPA, 2014)
4. Results that exceed the Commercial Subslab-to-Indoor Air VISLs are in **BOLD**
5. The published Commercial/Industrial ESLs and VISLs are based on a standard 8-hour workday, an exposure frequency of 250 days per year and an exposure c adjusted based on a 10-hour workday

**Abbreviations:**

-- = no screening level available

HVAC = Heating, Ventilation, and Air Conditioning

ESLs = Environmental Screening Levels

VISLs = Vapor Intrusion Screening Levels

U = not detected

J = estimated concentration

 $\mu\text{g}/\text{m}^3$  = micrograms per meter cube

TCE = Trichloroethene

PCE = Tetrachloroethene

1,1-DCE = 1,1-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

1,1-DCA = 1,1-Dichloroethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,2-DCA = 1,2-Dichloroethane

1,1,1-TCA = 1,1,1-Trichloroethane

TABLE 3

**Summary of Subslab Soil Gas Volatile Organic Compound Results, July 2014 (HVAC Off Event)**

Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA

Location Sample Date	Commercial / Industrial Subslab- to-Indoor Air ESLs	Commercial / Industrial Subslab- to-Indoor Air VISLs	SYN-SS1 7/5/2014	SYN-SS2 7/5/2014	SYN-SS3 7/5/2014	SYN-SS4 7/5/2014	SYN-SS4 (FD) 7/5/2014	SYN-SS5 7/5/2014
<b>VOLATILE ORGANIC COMPOUNDS (<math>\mu\text{g}/\text{m}^3</math>)</b>								
TCE	2,400	24	0.74 U	<b>26</b>	11	<b>70</b>	<b>72</b>	0.72 U
PCE	1,680	376	0.94	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
Vinyl Chloride	128	22	0.74 U	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
1,1-DCE	704,000	7,040	0.74 U	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
Freon 113	--	1,040,000	2.6	12	1.2	5.6	5.5	0.72 U
trans-1,2-DCE	208,000	--	0.74 U	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
1,1-DCA	6,160	62	0.74 U	0.79 U	0.85 U	11	11	0.72 U
cis-1,2-DCE	24,800	--	0.74 U	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
1,2-DCA	464	3.8	0.74 U	0.79 U	0.85 U	2.6 U	3.1 U	0.72 U
1,1,1-TCA	17,600,000	176,000	0.74 U	2.5	1.2	21	21	0.72 U

**Notes**

1. Samples were collected while building HVAC system was non-operational for 36 hours prior to and during the event.
2. Commercial / Industrial Subslab-to-Indoor Air ESLs (Water Board, 2013b)
3. Commercial / Industrial Subslab-to-Indoor Air VISLs (USEPA, 2014)
4. Results that exceed the Commercial Subslab-to-Indoor Air VISLs are in **BOLD**
5. The published Commercial/Industrial ESLs and VISLs are based on a standard 8-hour workday, an exposure frequency of 250 days per year and an exposure duration of 25 year Levels presented here are adjusted based on a 10-hour workday

**Abbreviations:**

-- = no screening level available

HVAC = Heating, Ventilation, and Air Conditioning

ESLs = Environmental Screening Levels

VISLs = Vapor Intrusion Screening Levels

FD = Field Duplicate

U = not detected

 $\mu\text{g}/\text{m}^3$  = micrograms per meter cube

TCE = Trichloroethene

PCE = Tetrachloroethene

1,1-DCE = 1,1-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

1,1-DCA = 1,1-Dichloroethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,2-DCA = 1,2-Dichloroethane

1,1,1-TCA = 1,1,1-Trichloroethane

TABLE 4

**Summary of Indoor and Outdoor Air Volatile Organic Compound Results, March/April 2013 (HVAC On Event)**

Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA

Location Sample Date	Commercial / Industrial Indoor Air ESLs	Commercial / Industrial Indoor Air RSLs	SYN-IA1 3/28/2013	SYN-IA2 3/28/2013	SYN-IA3 3/28/2013	SYN-IA4 4/3/2013	SYN-IA5 3/28/2013	SYN-IA5 3/28/2013	SYN-IA6 (Fire Line Closet) 3/28/2013	OUTDOOR1 3/28/2013
<b>VOLATILE ORGANIC COMPOUNDS (<math>\mu\text{g}/\text{m}^3</math>)</b>										
TCE	2.4	2.4	0.014 J	0.033 J	0.023 J	0.21	0.021 J	0.025 J	0.029 J	0.036 J
PCE	1.7	38	0.022 J	0.024 J	0.022 J	0.031 J	0.024 J	0.025 J	0.022 J	0.024 J
Vinyl Chloride	0.13	2.2	0.042 U	0.044 U	0.038 U	0.04 U	0.042 U	0.041 U	0.042 U	0.042 U
1,1-DCE	704	704	0.042 U	0.044 U	0.038 U	0.04 U	0.042 U	0.041 U	0.042 U	0.042 U
Freon 113	--	104,000	0.45	0.46	0.46	0.51	0.44	0.45	0.46	0.43
trans-1,2-DCE	208	--	0.91	2.7	1.9	2.6	3.7	3.8	6.1	0.29
1,1-DCA	6.2	6.2	0.042 U	0.04 J	0.024 J	0.0087 J	0.042 U	0.041 U	0.042 U	0.043
cis-1,2-DCE	24.8	--	0.042 U	0.044 U	0.038 U	0.04 U	0.042 U	0.041 U	0.019 J	0.042 U
1,2-DCA	0.46	0.38	0.081	0.082	0.073	0.063	0.082	0.083	0.072	0.066
1,1,1-TCA	17,600	17,600	0.022 J	0.024 J	0.023 J	0.026 J	0.027 J	0.023 J	0.023 J	0.023 J

**Notes**

1. Samples were collected while building HVAC system was operational.
2. Commercial / Industrial Indoor Air ESLs (Water Board, 2013b)
3. Commercial / Industrial Indoor Air RSLs (USEPA, 2014)
4. The published Commercial/Industrial ESLs and RSLs are based on a standard 8-hour workday, an exposure frequency of 250 days per year and an exposure duration of 25 years. However, the risk-based Screening Levels presented here are adjusted based on a 10-hour workday

**Abbreviations:**

-- = no screening level available  
 HVAC = Heating, Ventilation, and Air Conditioning  
 ESLs = Environmental Screening Levels  
 VISLs = Vapor Intrusion Screening Levels  
 FD = Field Duplicate  
 U = not detected  
 J = estimated concentration  
 $\mu\text{g}/\text{m}^3$  = micrograms per meter cube  
 TCE = Trichloroethene  
 PCE = Tetrachloroethene  
 1,1-DCE = 1,1-Dichloroethene  
 trans-1,2-DCE = trans-1,2-Dichloroethene  
 1,1-DCA = 1,1-Dichloroethane  
 cis-1,2-DCE = cis-1,2-Dichloroethene  
 1,2-DCA = 1,2-Dichloroethane  
 1,1,1-TCA = 1,1,1-Trichloroethane

TABLE 5

**Summary of Indoor and Outdoor Air Volatile Organic Compound Results, July 2014 (HVAC Off Event)**

Former Synertek Building No. 1, 3050/3060/3070 Coronado Drive, Santa Clara, CA

Location Sample Date	Commercial / Industrial Indoor Air ESLs	Commercial / Industrial Indoor Air RSLs	SYN-IA1 7/5/2014	SYN-IA2 7/5/2014	SYN-IA3 7/5/2014	SYN-IA4 7/5/2014	SYN-IA4 (FD) 7/5/2014	SYN-IA5 7/5/2014	SYN-IA6 (Clean Room) 7/5/2014	SYN-IA7 7/5/2014	SYN-IA8 7/5/2014	OA-1 7/5/2014
<b>VOLATILE ORGANIC COMPOUNDS (<math>\mu\text{g}/\text{m}^3</math>)</b>												
TCE	2.4	2.4	0.18	0.14	0.043 U	1.5	1.2	0.055 J	<b>2.5</b>	0.2	0.039 U	0.034 U
PCE	1.7	38	0.032 U	0.037 U	0.043 U	0.037 U	0.039 U	0.036 U	0.039 U	0.065	0.039 U	0.034 U
Vinyl Chloride	0.13	2.2	0.032 U	0.037 U	0.043 U	0.037 U	0.039 U	0.036 U	0.039 U	0.043 U	0.039 U	0.034 U
1,1-DCE	704	704	0.032 U	0.037 U	0.043 U	0.037 U	0.039 U	0.036 U	0.039 U	0.043 U	0.039 U	0.034 U
Freon 113	--	104,000	0.55	0.54	0.55	0.55	0.55	0.56	0.55	0.6	0.55	0.56
trans-1,2-DCE	208	--	10	12	5.2	11	10	15	12	9.5	5.8	0.034 U
1,1-DCA	6.2	6.2	0.032 U	0.037 U	0.043 U	0.037 U	0.039 U	0.036 U	0.039 U	0.043 U	0.039 U	0.034 U
cis-1,2-DCE	24.8	--	0.032 U	0.037	0.043 U	0.037 U	0.058	0.039 J	0.043	0.043 U	0.039 U	0.034 U
1,2-DCA	0.46	0.38	0.066	0.073	0.26 J	0.082	0.086	0.11 J	0.07	0.16	0.27	0.056
1,1,1-TCA	17,600	17,600	0.032 U	0.037 U	0.043 U	0.037 U	0.039 U	0.036 U	0.039 U	0.043 U	0.039 U	0.034 U

**Notes**

1. Samples were collected while building HVAC system was non-operational for 36 hours prior to and during the event.
2. Commercial / Industrial Indoor Air ESLs (Water Board, 2013b)
3. Commercial / Industrial Indoor Air RSLs (USEPA, 2014)
4. Results that exceed the Commercial Indoor Air RSLs are in **BOLD**
5. The published Commercial/Industrial ESLs and RSLs are based on a standard 8-hour workday, an exposure frequency of 250 days per year and an exposure duration of 25 years. However, the risk-based Screening Levels presented here are adjusted based on a 10-hour workday

**Abbreviations:**

-- = no screening level available

HVAC = Heating, Ventilation, and Air Conditioning

ESLs = Environmental Screening Levels

VISLs = Vapor Intrusion Screening Levels

FD = Field Duplicate

U = not detected

J = estimated concentration

 $\mu\text{g}/\text{m}^3$  = micrograms per meter cube

TCE = Trichloroethene

PCE = Tetrachloroethene

1,1-DCE = 1,1-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

1,1-DCA = 1,1-Dichloroethane

cis-1,2-DCE = cis-1,2-Dichloroethene

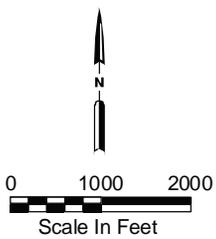
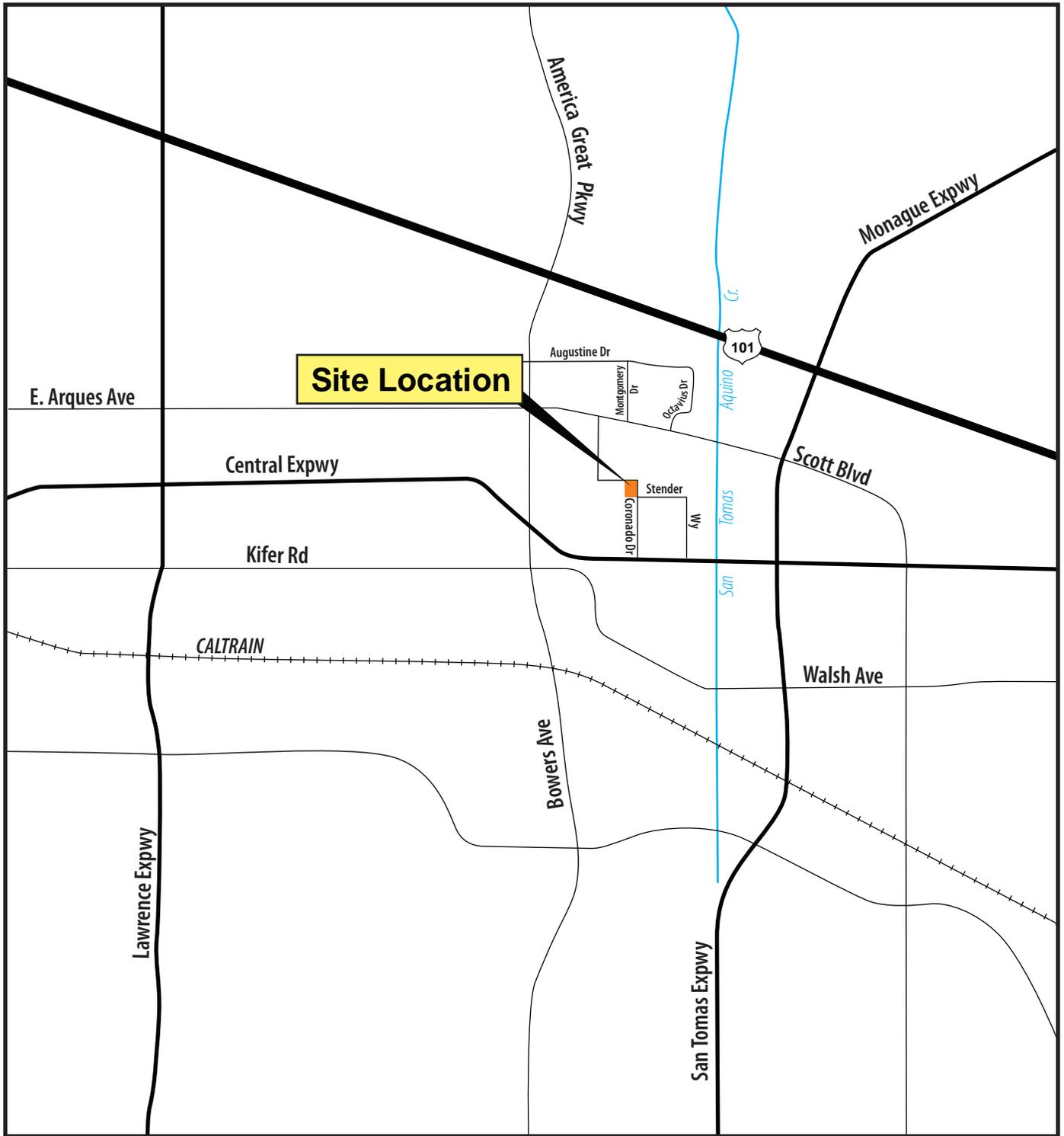
1,2-DCA = 1,2-Dichloroethane

1,1,1-TCA = 1,1,1-Trichloroethane

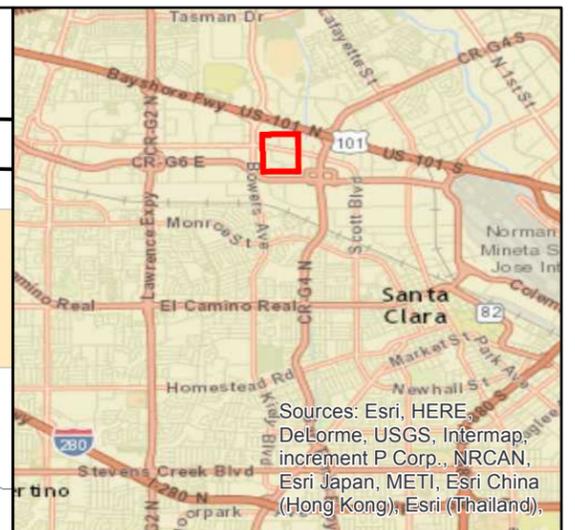
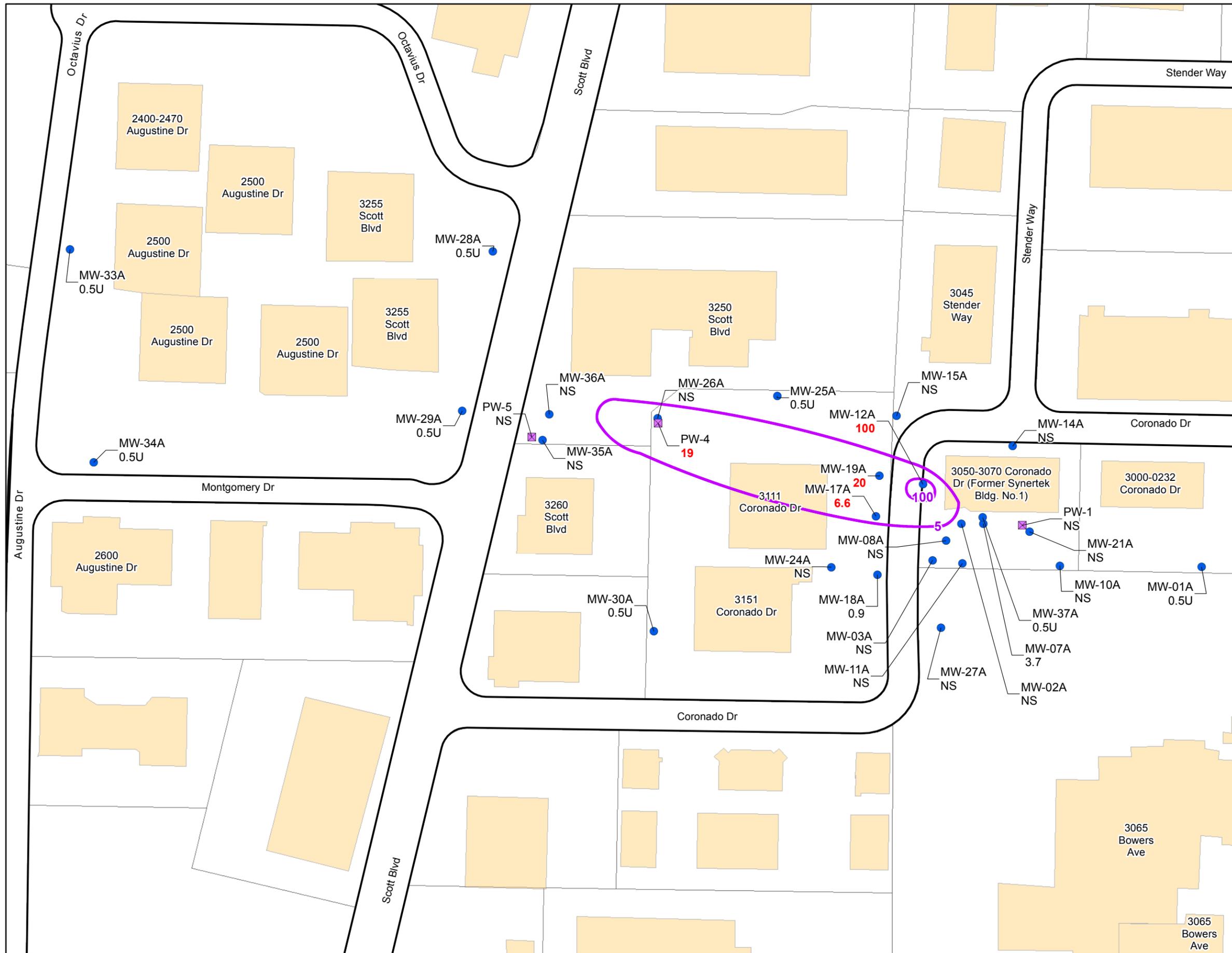
**Figures**

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**FIGURE 1**  
**Site Location Map**  
 Former Synertek Building 1 -  
 3050/3060/3070 Coronado Drive  
 Santa Clara, California



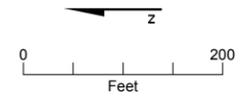
**LEGEND**

- A-Aquifer Monitoring Well
- ⊠ A-Aquifer Extraction Well (not active)
- ~ TCE Concentration Contour (Dashed Where Inferred)
- Edge of Road
- Buildings
- County Parcels

(<1.0) Not Detected (Detection limit indicated)  
 NS = Not Sampled

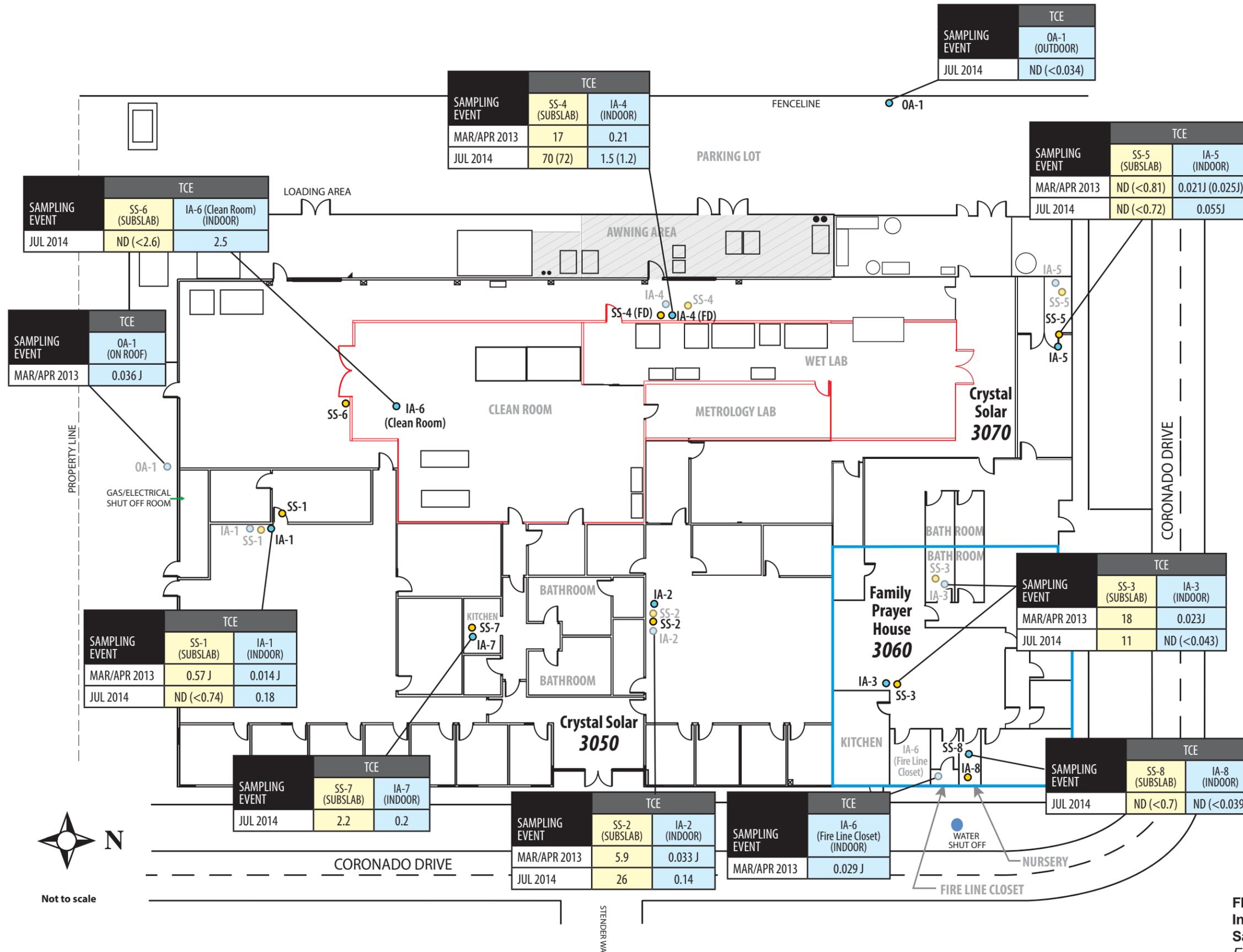
**Note:**  
 1. **RED** value denotes concentration exceeding final cleanup standard (5 µg/L)  
 2. TCE = trichloroethylene

**MW-12A** Well ID  
**100** TCE concentrations in µg/L; maximum of primary and duplicate samples during second quarter 2014



**FIGURE 2**  
**April/May 2014 TCE Distribution, A-Aquifer**  
 FORMER SYNERTEK BUILDING 1 - 3050/3060/3070 CORONADO DRIVE  
 SANTA CLARA, CALIFORNIA





**LEGEND**

MAR/APR 2013    JUL 2013

●    ● Indoor/Outdoor Air Sample Location

●    ● Subslab Sample Location

**NOTES**

- All results shown in micrograms per meter cubed ( $\mu\text{g}/\text{m}^3$ )
- Indoor/Outdoor air samples were analyzed by EPA Method TO-15SIM.
- Subslab samples were analyzed by EPA Method TO-15.

FD    Field duplicate  
 J    Estimated value  
 ND    Parameter is not detected at the reporting limit shown in parentheses

TCE    Trichloroethene  
 —    Clean room and wet lab  
 —    Family Prayer House

**SOURCE**  
 Base map from HMBP Site Map.

**FIGURE 4**  
**Indoor/Outdoor Air and Subslab Sampling Locations**  
 Former Synertek Building 1 –  
 3050/3060/3070 Coronado Drive  
 Santa Clara, California

**Attachment 1**  
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- Water Board (California Regional Water Quality Control Board, San Francisco Bay Region).2013a. *Requirement for a Work Plan for Additional Vapor Intrusion Evaluation, Synertek Building One Superfund Site, 3050 Coronado Drive, Santa Clara, Santa Clara County*. December 16.

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Water Board (California Regional Water Quality Control Board, San Francisco Bay Region).2013c. *Environmental Screening Levels (Interim Final—February 2013)*. [http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/esl.shtml](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml).

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**Attachment 2**  
**HVAC Survey**

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**Summary**

The **Crystal Solar facility** is split into two distinct zones. The west half of the building is open to the roof with no drop ceiling. The manufacturing cleanroom area is separated from the general space with its own wall and ceiling system. Four AHUs condition the air into the general space, and the cleanroom ceiling has fan-powered filter units which filter the conditioned air and pull it into the cleanroom. The air is then returned to the space via low wall return openings. There is also acid scrubber exhaust which exhausts air out from the cleanroom to a scrubber and fan outside of the building on the west side. The rooftop air handlers do not provide enough makeup air for the exhaust system, causing the building to be negatively pressurized, which was measured at -0.05" WC at the north entrance and -0.03" WC at the east entrance. The cleanroom area is positively pressurized relative to the adjacent space, measured at +0.05" WC at the south end of the reactor area. The cleanroom space is more or less neutral relative to outside. Makeup air also enters through rooftop attic ventilators and unsealed portions in the walls, and wherever else it finds a path.

The **Family Prayer house** has a large main room for services and smaller offices and rooms along the north and east perimeters. The areas are served by packaged rooftop units, though the occupants say these are only used occasionally as required for comfort. Often fans are used instead.

Property	Zone (see sketch)	HVAC System Description by Area	Controls	Manufacturer and Model Numbers	Approximate area served by unit(s) (sq ft)	Approximate volume of space served by unit(s) (cu ft)	Air Changes per Hour (when units are running)	Ventilation Air CFM/sq ft (when units are running)	Comments/Observations
Crystal Solar 3050 Coronado St Santa Clara CA	West half of building	(4) Rooftop units condition the air into the warehouse-like space (most of this area is open to the roof.) The cleanroom area is separated by its own wall and ceiling system. Air is pulled into the cleanroom through fan-powered filter units on the cleanroom ceiling. The air is returned to the adjacent space through low-wall openings along the perimeter of the cleanroom. The cleanroom is positively pressurized to the adjacent space by about 0.05" WC. The space is served by (1) 20-ton rooftop packaged unit (AC14) with a 0-100% economizer, (1) 10-ton rooftop packaged (AC13) unit with a 0-100% economizer set to 50% minimum, (1) 7.5-ton rooftop packaged unit (AC9) with a 0-100% economizer set to 50% minimum, and (1) 3-ton rooftop packaged unit (AC6) with a 0-25% outside air damper set at 15%. Total airflow to space is 16200 CFM, with a minimum of 23% outside air. The clean room processes require acid scrubber exhaust, and there is a scrubber and fan sized for 30,000 CFM of exhaust.	Thermostats are mounted in the cleanrooms, adjusted by occupants as required.	AC14: Trane TCD240F400BA AC13: Trane YSC120E4RLB1300000D AC9: Trane YCD090C4L0BE AC6: Trane D2NP036N05646NXA	10,000	150000	1.49	0.37	Minimum economizer position on AC14 was not checked by Bayside since this unit is not in their service contract. Assumed to be 0 since it was not verified, but it likely is set to provide a minimum of 10%. AC13 and AC9 were running during time of observation (9AM).
	South-east cubicle area	(1) 5-ton packaged rooftop unit (AC8) with 0-25% outside air opening installed on underside of RA duct, set at 40%. Total airflow is 2000 CFM, with 10% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC060F4M0BH	1,900	19000	0.63	0.11	
	South-east perimeter offices	(1) 5-ton packaged rooftop unit (AC10) with 0-25% outside air opening installed on underside of RA duct, which is fully open. Total airflow is 2000 CFM, with 25% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Carrier 580DEV060074AAAA	1,300	13000	2.31	0.38	
	South conference room	(1) 2-ton packaged rooftop unit (AC11) with no outside air opening. Total airflow is 800 cfm.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC024F1L0BC	200	2000	0.00	0.00	AC11 running at time of observation (9AM). Ventilation air could be increased by installing an outside air damper
	Misc central rooms	(1) 5-ton packaged rooftop unit (AC12) with 0-25% outside air damper, which is fully open. Total airflow is 2000 CFM, with 25% outside air. According to Bayside Heating, the unit's compressor is bad, so the unit is not currently in use.	Wall-mounted thermostat., but not currently used	Trane TCD060C400BC	1,200	12000	0.00	0.00	
	East entrance and perimeter offices	(1) 4-ton packaged rooftop unit (AC7) with 0-25% outside air damper on RA duct, set at 60%. Total airflow is 1600 CFM with 15% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	York D2NP048N09046NX	1,100	11000	1.31	0.22	

Property	Zone (see sketch)	HVAC System Description by Area	Controls	Manufacturer and Model Numbers	Approximate area served by unit(s) (sq ft)	Approximate volume of space served by unit(s) (cu ft)	Air Changes per Hour (when units are running)	Ventilation Air CFM/sq ft (when units are running)	Comments/Observations
Crystal Solar 3050 Coronado St Santa Clara CA (cont.)	North-east cubicle area	(1) 7.5-ton packaged rooftop unit (AC5) with 0-25% outside air opening installed on underside of RA duct, set at 40%. Total airflow is 3000 CFM with 10% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCH090C4LOBE	1,800	18000	1.00	0.17	
	North-west entrance, storage, and	(1) 7.5-ton packaged rooftop unit (AC4) with 0-25% outside air opening installed on underside of RA duct, set at 30%. Total airflow is 3000 CFM with 7.5% outside air	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Carrier 48TJD008-621GA	1,000	10000	1.35	0.23	
Family Prayer House 3060 Coronado St Santa Clara CA	Main Room	(1) 15-ton packaged rooftop unit (AC3) with a broken economizer. The economizer is used as a manually set outside air damper, currently set to about 10%. Total airflow is 6000 CFM with 10% outside air	Wall-mounted thermostat. Adjusted by occupants as required for comfort. Large fans are used, and the rooftop units are only turned on when needed for occupant comfort	Trane SFCA-1504-LA	2,000	20000	1.80	0.30	AC3 is an old unit, manufactured circa 1980
	North entrance and offices	(1) 5-ton packaged rooftop unit (AC1) with an economizer capable of 100% outside air. The minimum position of the economizer is set to 50%. Total airflow is 2000 CFM with 50% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCH060C4LOBF	1,000	10000	6.00	1.00	
	East rooms	(1) 5-ton packaged rooftop unit (AC2) with a 25% outside air opening installed on the underside of the RA duct. Total airflow is 2000 CFM with 25% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC060F4M0BJ	1,000	10000	3.00	0.50	

Notes:

1. Air handler flow rates are nominal

Property	Zone (see sketch)	HVAC System Description by Area	Controls	Manufacturer and Model Numbers	Approximate ventilation air CFM	Approximate area served by unit(s) (sq ft)	Approximate volume of space served by unit(s) (cu ft)	Air Changes per Hour	Ventilation Air CFM/sq ft	Comments/Observations
Crystal Solar 3050 Coronado St Santa Clara CA	West half of building	(4) Rooftop units condition the air into the warehouse-like space (most of this area is open to the roof.) The cleanroom area is separated by its own wall and ceiling system. Air is pulled into the cleanroom through fan-powered filter units on the cleanroom ceiling. The air is returned to the adjacent space through low-wall openings along the perimeter of the cleanroom. The cleanroom is positively pressurized to the adjacent space by about 0.05" WC. The space is served by (1) 20-ton rooftop packaged unit (AC14) with a 0-100% economizer, (1) 10-ton rooftop packaged (AC13) unit with a 0-100% economizer set to 50% minimum, (1) 7.5-ton rooftop packaged unit (AC9) with a 0-100% economizer set to 50% minimum, and (1) 3-ton rooftop packaged unit (AC6) with a 0-25% outside air damper set at 15%. Total airflow to space is 16200 CFM, with a minimum of 23% outside air. The clean room processes require acid scrubber exhaust, and there is a scrubber and fan sized for 30,000 CFM of exhaust.	Thermostats are mounted in the cleanrooms, adjusted by occupants as required.	AC14: Trane TCD240F400BA AC13: Trane YSC120E4RLB1300000D AC9: Trane YCD090C4LOBE AC6: Trane D2NP036N05646NXA	3,726	10,000	150000	1.49	0.37	Minimum economizer position on AC14 was not checked by Bayside since this unit is not in their service contract. Assumed to be 0 since it was not verified, but it likely is set to provide a minimum of 10%. AC13 and AC9 were running during time of observation (9AM).
	South-east cubicle area	(1) 5-ton packaged rooftop unit (AC8) with 0-25% outside air opening installed on underside of RA duct, set at 40%. Total airflow is 2000 CFM, with 10% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC060F4M0BH	200	1,900	19000	0.63	0.11	
	South-east perimeter offices	(1) 5-ton packaged rooftop unit (AC10) with 0-25% outside air opening installed on underside of RA duct, which is fully open. Total airflow is 2000 CFM, with 25% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Carrier 580DEV060074AAAA	500	1,300	13000	2.31	0.38	
	South conference room	(1) 2-ton packaged rooftop unit (AC11) with no outside air opening. Total airflow is 800 cfm.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC024F1L0BC	0	200	2000	0.00	0.00	AC11 running at time of observation (9AM). Ventilation air could be increased by installing an outside air damper
	Misc central rooms	(1) 5-ton packaged rooftop unit (AC12) with 0-25% outside air damper, which is fully open. Total airflow is 2000 CFM, with 25% outside air. According to Bayside Heating, the unit's compressor is bad, so the unit is not currently in use.	Wall-mounted thermostat., but not currently used	Trane TCD060C400BC	0	1,200	12000	0.00	0.00	
	East entrance and perimeter offices	(1) 4-ton packaged rooftop unit (AC7) with 0-25% outside air damper on RA duct, set at 60%. Total airflow is 1600 CFM with 15% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	York D2NP048N09046NX	240	1,100	11000	1.31	0.22	
	North-east cubicle area	(1) 7.5-ton packaged rooftop unit (AC5) with 0-25% outside air opening installed on underside of RA duct, set at 40%. Total airflow is 3000 CFM with 10% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCH090C4LOBE	300	1,800	18000	1.00	0.17	
	North-west entrance, storage, and bathrooms	(1) 7.5-ton packaged rooftop unit (AC4) with 0-25% outside air opening installed on underside of RA duct, set at 30%. Total airflow is 3000 CFM with 7.5% outside air	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Carrier 48TJD008-621GA	225	1,000	10000	1.35	0.23	

Property	Zone (see sketch)	HVAC System Description by Area	Controls	Manufacturer and Model Numbers	Approximate ventilation air CFM	Approximate area served by unit(s) (sq ft)	Approximate volume of space served by unit(s) (cu ft)	Air Changes per Hour	Ventilation Air CFM/sq ft	Comments/Observations
Family Prayer House 3060 Coronado St Santa Clara CA	Main Room	(1) 15-ton packaged rooftop unit (AC3) with a broken economizer. The economizer is used as a manually set outside air damper, currently set to about 10%. Total airflow is 6000 CFM with 10% outside air	Wall-mounted thermostat. Adjusted by occupants as required for comfort. Large fans are used, and the rooftop units are only turned on when needed for occupant comfort	Trane SFCA-1504-LA	600	2,000	20000	1.80	0.30	AC3 is an old unit, manufactured circa 1980
	North entrance and offices	(1) 5-ton packaged rooftop unit (AC1) with an economizer capable of 100% outside air. The minimum position of the economizer is set to 50%. Total airflow is 2000 CFM with 50% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCH060C4L0BF	1,000	1,000	10000	6.00	1.00	
	East rooms	(1) 5-ton packaged rooftop unit (AC2) with a 25% outside air opening installed on the underside of the RA duct. Total airflow is 2000 CFM with 25% outside air.	Wall-mounted thermostat. Adjusted by occupants as required for comfort	Trane YCC060F4M0BJ	500	1,000	10000	3.00	0.50	

Notes:

1. Air handler flow rates are nominal

	Unit Tag	Make	Model	Tonnage	Nominal CFM	OA cfm	Field notes	Model Notes
3060	AC1	Trane	YCH060C4L0BF	5 Tons	2,000	1,000	Economizer capable of 100% outside air. Minimum position set to approximately 50% on the potentiometer	L = low heat,
	AC2	Trane	YCC060F4M0BJ	5 Tons	2,000	500	~10"x10" fixed outside air intake on underside of RA duct (sliding cover could be placed over to reduce OA)	M = medium heat
	AC3	Trane	SFCA-1504-LA	15 Tons	6,000	600	Economizer is stuck and has to be manually adjusted. ~10% open (10% OA)	Gas heat
3050/3070	AC4	Carrier	48TJD008-621GA	7.5 Tons	3,000	225	~10"x10" outside air intake on underside of RA duct, sliding cover set to about 3"x10"	D = low heat
	AC5	Trane	YCH090C4L0BE	7.5 Tons	3,000	300	~10"x10" outside air intake on underside of RA duct, sliding cover set to about 4"x10"	L = low heat
	AC6	York	D2NP036N05646NXA	3 Tons	1200	180	0-25% outside air damper on RA duct, set to about 60% (15% outside air)	
	AC7	York	D2NP048N09046NX	4 Tons	1600	240	0-25% outside air damper on RA duct, set to about 60% (15% outside air)	
	AC8	Trane	YCC060F4M0BH	5 Tons	2,000	200	~10"x10" outside air intake on underside of RA duct, sliding cover set to about 4"x10"	M = medium heat
	AC9	Trane	YCD090C4L0BE	7.5 Tons	3,000	1,500	Economizer capable of 100% outside air. Minimum position set to approximately 50% on the potentiometer	L = Low heat
	AC10	Carrier (Bryan)	580DEV060074AAAA	5 Tons	2,000	500	~10"x10" fixed outside air intake on underside of RA duct (sliding cover could be placed over to reduce OA)	
	AC11	Trane	YCC024F1L0BC	2 Tons	800	0	No outside air	L = Low heat. Cooling only per Bayside eqpt notes
	AC12	Trane	TCD060C400BC	5 Tons	2,000	500	Bad compressor - not working. Has 0-25% outside air damper set fully open	Bad compressor - not operating
	AC13	Trane	YSC120E4RLB1300000D	10 Tons	4,000	0	No outside air	L = low heat.
	AC14	Trane	TCD240F400BA	20 Tons	8,000	800	Economizer capable of 100% outside air. Min set point assumed to be 25%, unchecked by Bayside since this unit is not part of their service contract	



**Attachment 3**  
**Building Survey**

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Preliminary Building Survey for Vapor Intrusion Investigation



CH2MHILL

Date: 6/26/14

Preparer: J. MCPRAE

Facility: CRYSTAL SOLAR / HONEYWELL SYNERTEK

Address: 3050 / 3070 CORONADO DRIVE FACILITY

Contact Person: ALLEN LOUIE

Phone Number: \_\_\_\_\_

e-mail address: \_\_\_\_\_

Building Description

Building or Room Identifier: CRYSTAL SOLAR FACILITY

Primary Activity within Building (select one):

- Manufacturing
  - Storage
  - Other
  - Chemical processing
  - Chemical Storage
  - Administrative
  - Instrumentation/Control
- PRODUCE TEST SAMPLES  
MINOR MANUFACTURING*

Historical Activities within Building (if different from above):

8AM - MIDNIGHT, STAGGERED HRS. ~10 HR DAYS  
25 PEOPLE WORKING. NO WORK SUNDAY. CAL SOLUTION IN OFFICE AREA

Notes:

STW DRAIN IN MEN'S ROOM, → GUES TO CITY SEWER  
JANITORS CLOSET, LADIES ROOM → NOTES CONT'D ON

Approximate floor space APPROX. 18,500 SQ FT PER GOOGLE EARTH

Number of floors 1

Multi-room building  or Single room

Ceiling height 10'-15' (10' IN OFFICE, 15' IN GARAGE / PRODUCTION IN-PROCESS WORK AREA)

Aboveground Construction  Wood  Concrete

Brick  Cinderblock

Other \_\_\_\_\_

Floor plan attached?  Yes  No

Notes: \_\_\_\_\_  
\_\_\_\_\_

Preliminary Building Survey for Vapor Intrusion Investigation

Evaluation of Potential Conduits from Soil

Floor/foundation description (check all that apply)

Wood  Concrete  
 Other \_\_\_\_\_

Elevated above grade?  
Feet above grade: \_\_\_\_\_  
 Below grade?  
Feet above grade: \_\_\_\_\_  
 Slab on grade?

Expansion joints present (if concrete floor)?  Yes  No  N/A  
Are expansion joints sealed?  Yes  No  N/A  
Are sumps or floor drains present?  Yes  No  N/A  
Are basements or subsurface vaults present?  Yes  No  N/A  
Are there subsurface drainage problems?  Yes  No  N/A

CONCRETE FLOOR COVERED BY CARPET OR LINOLEUM

Notes/Explanation for N/A responses: CONCRETE FLOOR IS COVERED BY CARPET OR LINOLEUM - JOINTS / CRACKS ARE UNABLE TO BE OBSERVED

# Preliminary Building Survey for Vapor Intrusion Investigation

Page 3 of 5

## Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise):

YES; POSITIVE PRESSURE IN CLEAN ROOM. NEGATIVE PRESSURE IN OTHER PARTS OF BLDG, LIKELY DUE TO CLEAN ROOM AIR CONTROL SYSTEM

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

Single zone     Multi-zone     Other \_\_\_\_\_

(building management may know; another tip-off is the presence of multiple thermostats = multiple

Sources of outdoor air

Mechanical (air handling unit)     Doors

Windows     Attic Fans

Are windows/doors left open routinely?     Yes     No

Notes:

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# Preliminary Building Survey for Vapor Intrusion Investigation

Page 4 of 5

## Evaluation of Potential Existing Chemical Sources Indoors

List principal solvent or VOC-containing products used (obtain MSDSs if available)

<u>ACETONE</u>	<u>TCE</u>
<u>ISOPROPANOL</u>	<u>PAINT</u>
<u>EPOXY</u>	<u>CITRIC ACID - OTHER ACIDS/BASES</u>

Are any of the target analytes used in this building/room?

Yes  No

TCE USED AND STORED IN CLEAN ROOM CABINET.  
USE ~2 GALLONS/YEAR

Are pesticides used indoors for pest control?

Yes  No

Names of pesticide products used?

N/A

Has there been a pesticide application within the past 6 months?

Yes  No

Is smoking permitted in the building?

Yes  No

Notes:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Preliminary Building Survey for Vapor Intrusion Investigation

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room?  Yes  No

Date of installation? N/A

Type of system?  Passive venting  Active subslab depressurization  
 Crack/crevice sealing  Dilution ventilation control  
 N/A

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Additional Notes

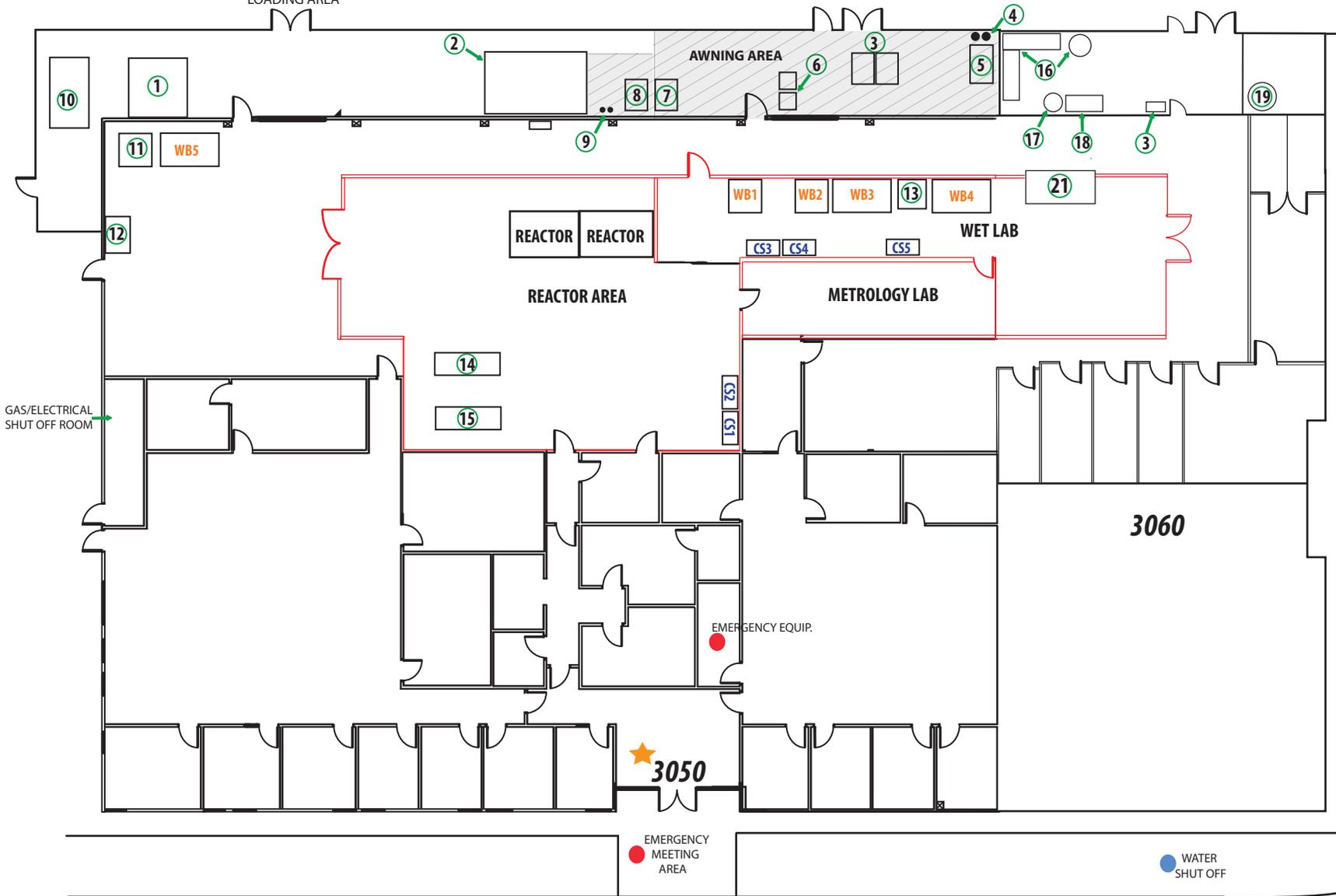
There is a caged area (approx. 15' x 10') in southeast corner of clean room w/ miscellaneous chemicals. Used for storage of all sorts of equipment, chemicals not used on a daily basis - not very well organized. Things found in caged storage: WD40, propane and propylene portable gas canisters, glues, wet patch material, epoxy, cutting oil, thinner, reagent ~~alcohol~~, lubricant, organic peroxide, etc.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PARKING LOT

LOADING AREA

AWNING AREA



PROPERTY LINE

GAS/ELECTRICAL SHUT OFF ROOM

CORONADO DRIVE

3060

3050

EMERGENCY MEETING AREA

WATER SHUT OFF

CORONADO DRIVE

STENDER WAY

HMBP SITE MAP

Crystal Solar Inc.  
3050 Coronado Drive  
Santa Clara, CA 95054

SCALE: 1/8" = 3ft.



Revised on 07/25/13

20

- |                            |  |                                   |                           |  |
|----------------------------|--|-----------------------------------|---------------------------|--|
| ★ = Crystal Solar          | ① = Cooling Tower                        | ⑧ = Emergency Generator           | ⑬ = MTS Dryer             | ⑳ = Liquid Hydrogen Tank, CRY., FLG. (4) |
| ▨ = Awning Roof            | ② = Gas Bunker                           | ⑨ = Liquid Propane Tanks, FLG (2) | ⑭ = ExperTech Furnice     | ㉑ = ScienTech Tool                       |
| CS1-CS5 = Chemical Storage | ③ = Chem. Waste Cabs.                    | ⑩ = Liquid N2 Tank, CRY ICG (4)   | ⑮ = POCL Furnice          |  |
| WB1-WB5 = Wet Bench        | ④ = Sulfuric Acid/ Sodium Hydroxide, COR | ⑪ = Dicing Tool                   | ⑯ = RO/DI Water System    |  |
| — = Cleanroom              | ⑤ = Acid Waste Neutralization            | ⑫ = Lamination Station            | ⑰ = 200g Collection Tank  |  |
| — = Outline                | ⑥ = P.O.U Scrubber                       |                                   | ⑱ = Scrubber              |  |
|                            | ⑦ = Air Compressor                       |                                   | ⑲ = 6000g Collection Tank |  |

Preliminary Building Survey for Vapor Intrusion Investigation

Page 1 of 5



CH2MHILL

Date: 6/26/14

Preparer: JM CRAE

Facility: FAMILY PRAYER HOUSE / HONEYWELL SYNERTEK

Address: 3060 CORONADO DRIVE

FACILITY

Contact Person: CEEJAY WILSON

Phone Number: \_\_\_\_\_

e-mail address: \_\_\_\_\_

**Building Description**

Building or Room Identifier: \_\_\_\_\_

Primary Activity within Building (select one):

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Manufacturing       | <input type="checkbox"/> Storage                 | <input checked="" type="checkbox"/> Other |
| <input type="checkbox"/> Chemical processing | <input type="checkbox"/> Chemical Storage        |   |
| <input type="checkbox"/> Administrative      | <input type="checkbox"/> Instrumentation/Control |   |

Historical Activities within Building (if different from above):

CHURCH - RELIGIOUS SERVICES. MOVED <sup>IN</sup> APPROX. 1 YEAR AGO

Notes: \_\_\_\_\_

Approximate floor space APPROX. 4000 SQ. FT PER GOOGLE EARTH

Number of floors 1

Multi-room building  or Single room

Ceiling height 10\* FT

Aboveground Construction  Wood  Concrete  
 Brick  Cinderblock  
 Other \_\_\_\_\_

Floor plan attached?  Yes  No

Notes: \_\_\_\_\_

Preliminary Building Survey for Vapor Intrusion Investigation

Evaluation of Potential Conduits from Soil

Floor/foundation description (check all that apply)

Wood     Concrete  
 Other \_\_\_\_\_

Elevated above grade?  
Feet above grade: \_\_\_\_\_  
 Below grade?  
Feet above grade: \_\_\_\_\_  
 Slab on grade?

Expansion joints present (if concrete floor)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Are expansion joints sealed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A
Are sumps or floor drains present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Are basements or subsurface vaults present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Are there subsurface drainage problems?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A

Notes/Explanation for N/A responses: CONCRETE FLOOR IS COVERED BY CARPET OR LINOLEUM - JOINTS/CRACKS ARE UNABLE TO BE OBSERVED

# Preliminary Building Survey for Vapor Intrusion Investigation

## Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise):

NONE. HVAC IS NOT USED CONSISTENTLY, BUT THEY HAVE LARGE <sup>PORTABLE</sup> FANS THAT MAY BE USED INSTEAD OF HVAC AC

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

Single zone     Multi-zone     Other \_\_\_\_\_

(building management may know; another tip-off is the presence of multiple thermostats = multiple

Sources of outdoor air

Mechanical (air handling unit)     Doors

Windows     Attic Fans

Are windows/doors left open routinely?     Yes     No

Notes:

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Preliminary Building Survey for Vapor Intrusion Investigation

Evaluation of Potential Existing Chemical Sources Indoors

List principal solvent or VOC-containing products used (obtain MSDSs if available)

STAPLES \_\_\_\_\_  
DRY-ERASE MARKERS \_\_\_\_\_  
\_\_\_\_\_

Are any of the target analytes used in this building/room?

Yes  No

\_\_\_\_\_  
\_\_\_\_\_

Are pesticides used indoors for pest control?

Yes  No

Names of pesticide products used?

ONLY USED WHEN TENANT FIRST MOVED  
IN. USED IN LOCALIZED AREA (KITCHEN) FOR ANTS

Has there been a pesticide application within the past 6 months?

Yes  No

Is smoking permitted in the building?

Yes  No

Notes:

CARPET WAS CLEANED ~4 MONTHS AGO w/ANOTHER CLEANING  
SCHEDULED IN AUGUST

Preliminary Building Survey for Vapor Intrusion Investigation

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room?  Yes  No

Date of installation? N/A

Type of system?  Passive venting  Active subslab depressurization  
 Crack/crevice sealing  Dilution ventilation control  
 N/A

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

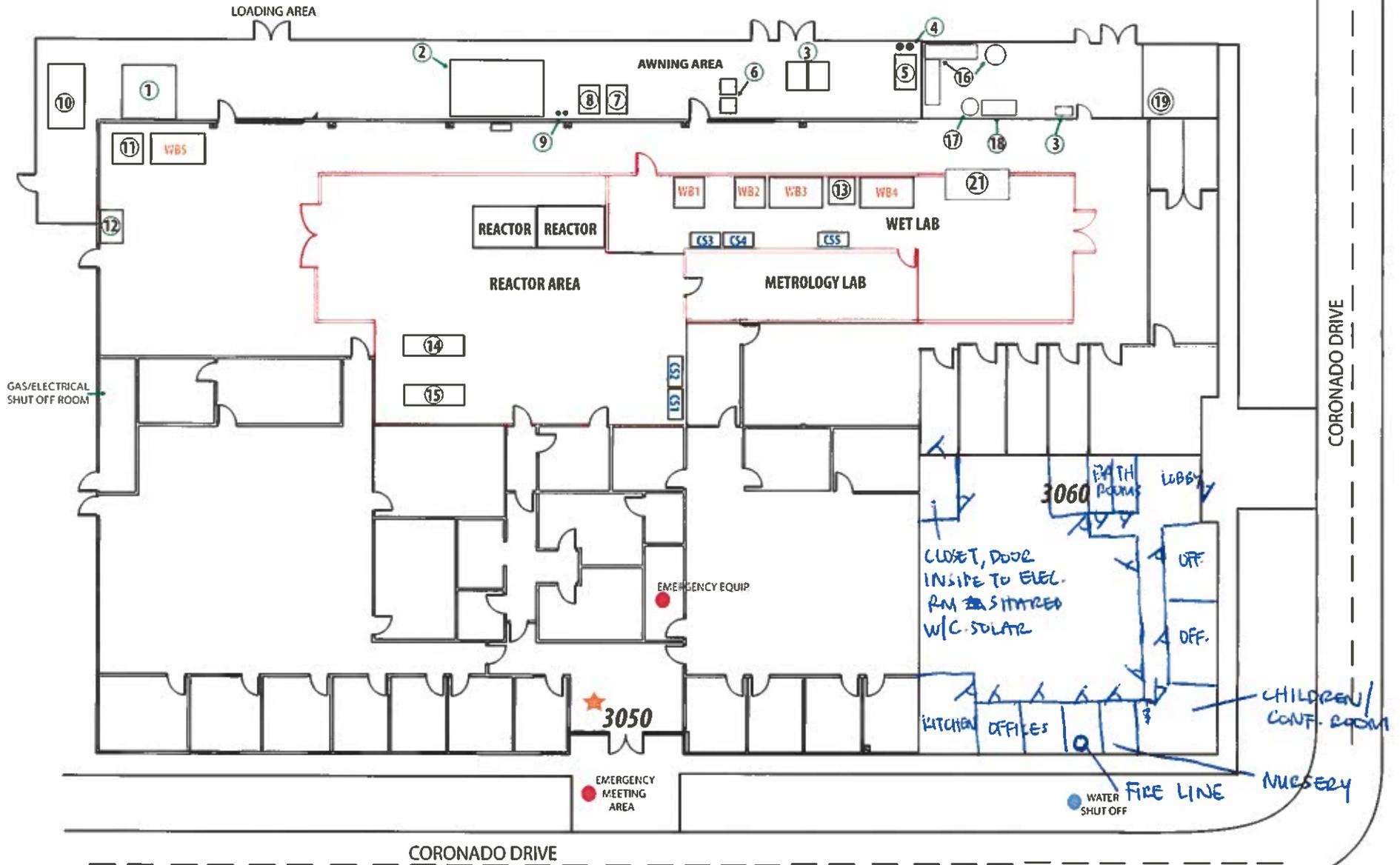
Additional Notes

1-2 STAFF ARE IN BLDG UP TO 12 HRS/WK ON TUES-THURS.  
CHURCH SERVICES <sup>ARE</sup> ON WED NIGHT (7PM-9PM) AND  
SUNDAYS (11AM-1:30PM). 50-100 PEOPLE ATTEND SERVICE ON  
SUNDAYS W/LESS ON WED. USUALLY 2-3 BABIES AND UP TO  
30 CHILDREN (0-17 YEARS OLD). CHURCH HAS SPECIAL EVENTS  
ABOUT EVERY OTHER MONTH THAT LAST ~5 HOURS.

HVAC DOES NOT RUN ON A SET SCHEDULE. SEEMS LIKE HVAC  
ONLY RUNS DURING SERVICE SESSIONS. THEY TURN ON/OFF  
AS NEEDED BUT USUALLY OFF. HVAC WAS OFF AT TIME  
OF BLDG SURVEY.

PARKING LOT

PROPERTY LINE



CORONADO DRIVE

CORONADO DRIVE

STENDER WAY

LEGEND:			
★	Crystal Solar	⑧	Emergency Generator
①	Cooling Tower	⑨	Liquid Propane Tanks, FLG (2)
②	Gas Bunker	⑩	Liquid N2 Tank, CRY
③	Chem. Waste Cabs.	⑪	Dining Tool
④	Sulfuric Acid/Sodium Hydroxide, COR	⑫	Lamination Station
⑤	Acid Waste Neutralization	⑬	MTS Dryer
⑥	P.O.U Scrubber	⑭	ExperTech Furnice
⑦	Air Compressor	⑮	POCL Furnice
CS1-CSS	Chemical Storage	⑯	RO/DI Water System
WB1-WB3	Wet Bench	⑰	200g Collection Tank
—	Cleanroom Outline	⑱	Scrubber
		⑲	6000g Collection Tank
		⑳	Liquid Hydrogen Tank, CRY., FLG. (4)
		㉑	ScienTech Tool

**HMBP SITE MAP**  
 Crystal Solar Inc.  
 3050 Coronado Drive  
 Santa Clara, CA 95054  
 SCALE: 1/8" = 3ft.



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# Crystal Solar Inc.

## Chemical Inventory

Updated by: KWM 05/24/12

Legend: Gal=Gallon; G=Grams; L=Liter; P=Pin; Lbs=Pounds; Oz: Ounce

Ref. No.	Rm. No.	Chemical Name & Concentration	Synonym	Components (For Mixtures Only)	CAS No.	Material Form	Justification	Vendor	Part No.	CBC Class		Qty. Stored (approved cab)	Quantity in Use		Unit Meas	Comments	MSDS (filename.PDF)
										Physical	Health		Open	Closed			
1	1	1,4-Cyclohexanediol, 98% (a.k.a. CHX powder)	CHX	-	556-48-9	S	Flash Point: 65°C (closed cup) Boiling Point: 150°C This chemical is non-sensitizing, and non-irritant.	Alfa Aesar	B20446	FLS	-	0	0	0.22	lbs.	CHX powder is a very common dispersant used in formulation of foodstuffs to oil-spill dispersion sol'n.	X:\Safety\MSDS\1,4-Cyclohexanediol.pdf
2	1	1:1 Ratio 30% H2SO4/30% HNO3 Mixture		Sulfuric Acid, Nitric Acid	7664-93-9 7697-37-2	L				WR1	COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
3	1	1:1 Ratio 49% Hydrofluoric Acid/ 30% Hydrogen Peroxide Mixture		Hydrogen Peroxide, Hydrofluoric Acid	7722-84-1 7664-39-3	L				OXY1	COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
4	1	20% Ammonium Hydroxide/ 30% Hydroxide Peroxide Mixture		Ammonium Hydroxide, Hydrogen Peroxide	7722-84-1 1336-21-6	L				OXY2	COR	0	0	1.5	gal.	Mixture: prepared at point of use	
5	1	Acetic Acid, 99%	Methane Carboxylic Acid; Ethanoic Acid	-	64-19-7	L	Flash Point: 40° Auto-Ignition: 400° Boiling: 118-119 °C LD <sub>50</sub> : 3.31 g/kg, oral (rat)	Lab Pro	ZA0072-128	CL2	COR	6	0	1	gal.		X:\Safety\MSDS\VACETIC ACID GLACIAL.mht
6	1	Acetone	Dimethylketone; 2-Propanone; Dimethylketal	-	64-64-1	L	Flash Point: -17° Auto-Ignition: 465° Boiling: 56-57 °C LD <sub>50</sub> : >2000 mg/kg, oral (rat)	Lab Pro	ZA0100-128	FL1B	IRR	4	0.5	0	gal.		X:\Safety\MSDS\VACETONE.mht
7	5	Air Compressed	Compressed Air; CDA, Compressed Dry Air	-	132259-10-0	G	Moderate physical hazard from sudden release of high pressure gas.	Praxair Dist.	P-4560-J	Compressed Gas	-	498	498	0	cu. ft.	High-pressure compressed air cylinders, used as "breathing air". Also, Compressed Dry Air (CDA) produced by our air compressor.	X:\Safety\MSDS\Air_Compressed.pdf
8																	kwm: removed a duplicate
9	1	Ammonium Hydroxide, 29%	-	-	1336-21-6	L	Not Flammable Vapor Pressure: 0.75 bar (21°C)	Lab Pro	ZA1300-128	-	COR TOX	6	0	1	gal.		X:\Safety\MSDS\Ammonium Hydroxide.pdf
10	1	Amyl Acetate	Amyl Acetic Ester	-	628-63-7	L		Lab Pro	ZA1438-16	FL1C	IRR	2.2	0.01	0	lbs.		
11	1	Anhydrous Ammonia	Ammonia; NH <sub>3</sub>	-	7664-41-7	L	Auto-Ignition: 651.1°C Inhalation Hazard	Lab Pro		FLG	COR	65	0	65	lbs.		X:\Safety\MSDS\Ammonia-Anhydrous.pdf
12	5	Argon/ 4% Hydrogen		Argon Hydrogen	7440-37-01 1333-74-0	G	Not Flammable	Praxair Dist.		-	-	200	0	200	cu. ft.	kwm: Needs a better MSDS	X:\Safety\MSDS\Argon_4%-Hydrogen_gas.pdf
13	1	Buffer Oxide Etch, Ultra Etch NP (6:1), with Surfactant (KMG Item No. 408-040889)	Aqueous NH <sub>4</sub> -HF Etchant Solutions	Ammonium Fluoride, Hydrogen Fluoride, Water	12125-01-8 7664-39-3 7732-18-5	L		Lab Pro	ZB1690-128	WR 1	COR TOX	4	1	0	gal.		X:\Safety\MSDS\BOE_etchant.pdf
14	4	Butyl-Benzyl-Phthalate-5-160 (plasticizer)	-	-	-	-		-	-	-	-	4	4	0	gal.	kwm: make sure that all of this has been removed from facility	
15	1	Chromium Trioxide	Chromium Oxide; Chromic Acid; Chromic Anhydride	-	1333-82-0	S	Hexa-valent Carcinogenic, Mutagenic Corrosive to skin & eye Very Strong Oxidizer LD <sub>50</sub> : 80 mg/kg, oral (rat)	-	-	OXY3	TOX SENS	0	0	0.22	lbs.		X:\Safety\MSDS\Chromium Trioxide.pdf

# Crystal Solar Inc.

## Chemical Inventory

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Legend: Gal=Gallon; G=Grams; L=Liter; P=Pin; Lbs=Pounds; Oz: Ounce

Ref. No.	Rm No.	Chemical Name & Concentration	Synonym	Components (For Mixtures Only)	CAS No.	Material Form	Justification	Vendor	Part No.	CBC Class		Qty. Stored (approved cab)	Quantity in Use		Unit Meas	Comments	MSDS (filename.PDF)
										Physical	Health		Open	Closed			
16	1	Cupric Nitrate (trihydrate powder)	Cupric Nitrate Hemipentahydrate; Copper II Nitrate Hemihydrate	-	10031-43-3	S	Skin & eye irritant. LD <sub>50</sub> : 940 mg/kg, oral (rat)	-		OXY1	IRR SENS	0	0	0.22	lbs.		X:\Safety\MSDS\Cupric Nitrate Trihydrate.pdf
17	3	Diborane 1% in Hydrogen	-	-	19287-45-7	G		Praxair Elec.		FLG WR2	HTOX	0	0	1	lbs.	Management of the Mat'l Requires Specific Worker Training Use with Flow Limiting Orifice	X:\Safety\MSDS\Diborane Compressed-Gas.pdf
18	3	Diborane 2% in Hydrogen	-	-	19287-45-7	G		Praxair Elec.		FLG WR2	HTOX	0	0	1	lbs.	Management of the Mat'l Requires Specific Worker Training Use with Flow Limiting Orifice	X:\Safety\MSDS\Diborane Compressed-Gas.pdf
19	1	Ethanol	Ethyl Alcohol	-	64-17-5	L	Flash Point: 13-14 °C Auto-Ignition: 362°C Boiling: 77.1°C LD <sub>50</sub> : 5628mg/kg, oral (rat)	Lab Pro	ZE0280-128	FL1B	IRR	12	0	1	gal.		X:\Safety\MSDS\Ethanol pure kosher 200.pdf
20	1	Ethylene Glycol	Glycol Alcohol; Monoethylene Glycol	-	107-21-1	L	Flash Point: 111°C Auto-Ignition: 410°C Boiling: 197.3°C LD <sub>50</sub> : 4700mg kg-1, oral (rat)	Lab Pro	ZE0565-128	CL3B	IRR TOX	0	0	1	gal.		X:\Safety\MSDS\Ethylene Glycol.pdf
21	5	Helium	Helium Gas, Gaseous Helium, Balloon Gas	-	7440-59-7	G	Inert Gas	Praxair Dist.	-	ICG	-	0	0	1,308	cu. ft.		X:\Safety\MSDS\Helium gas.pdf
22	1	Hydrochloric Acid, 37%	Hydrochloric Acid; Muriatic Acid	-	7647-01-0	L	Corrosive, Inhalation Hazard, NOT Flammable Boiling Point: 57°C Vapor Press: 93.23mm Hg Contact with metals, evolves hydrogen. Acute Inhalation: LC <sub>50</sub> (rat) 3124 mg/l/hr	Lab Pro	ZH0601-128	WR1	COR TOX	6	0	1	gal.		X:\Safety\MSDS\Hydrochloric Acid.pdf
23	1	Hydrochloric Acid/ Hydrogen Peroxide Mixture		Hydrochloric Acid Hydrogen Peroxide Water	7647-01-0 7722-84-1 7732-18-5	L					COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
24	1	Hydrofluoric Acid, 49%	Hydrogen Fluoride; HF; Fluorohydric Acid; Fluoric Acid; HF in Aqueous Solution	-	7664-39-3	L	Very Toxic on skin contact. Boiling Point: 108°C Vapor Press: 10.02 mmHg LD <sub>50</sub> : 5628mg/kg, oral (rat)	Lab Pro	ZH0620-128		COR TOX	12	0	1	gal.		X:\Safety\MSDS\Hydrofluoric Acid.pdf
25	1	Hydrofluoric Acid/ Ethanol Mixture		Hydrofluoric Acid Ethyl Alcohol Water	7664-39-3 64-17-5 7732-18-5	L					TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
26	1	Hydrofluoric Acid/ Hydrochloric Acid Mixture		Hydrofluoric Acid Hydrochloric Acid Water	7664-39-3 7647-21-0 7732-18-5	L					COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
27	1	Hydrofluoric Acid/ Nitric Acid Mixture		Hydrofluoric Acid Nitric Acid	7664-39-3 7697-37-3	L					COR TOX	0	0	10	gal.	Mixture: prepared at point of use	

# Crystal Solar Inc.

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Ref. No.	Rm. No.	Chemical Name & Concentration	Synonym	Components (For Mixtures Only)	CAS No.	Material Form	Justification	Vendor	Part No.	CBC Class		Qty. Stored (approved cab)	Quantity in Use		Unit Meas	Comments	MSDS (filename.PDF)
										Physical	Health		Open	Closed			
28	6	Hydrogen, compressed gas	Hydrogen	-	1333-74-0	G	Flammable Gas, Separate Hydrogen from oxygen, chlorine, and oxidizers. Auto-Ignition: 500°C	Praxair Dist.		FLG	-	0	0	1,500	cu. ft.		X:\Safety\MSDS\Hydrogen_Compres sed-Gas.pdf
29	4	Hydrogen, cryogenic liquid	Liquid Hydrogen		1333-74-0	L		Praxair Dist.		CRY FLG	-	0	0	0			X:\Safety\MSDS\Hydrogen_Cryoge nic-Liquid.pdf
30	3	Hydrogen Chloride, Anhydrous	Hydrogen Chloride	-	7647-01-0	G	Extreme Inhalation Hazard IDHL: 50 ppm Vapor Press: 628 psig (20°C)	Praxair Dist.		-	COR HTOX	0	0	60	lbs.		X:\Safety\MSDS\Hydrogen-Chloride_Anhydrous_Compres sed-Gas.pdf
31	1	Hydrogen Peroxide, 30%			7722-84-1	L	Oxidizing, reacts violently with alkalines, alcohols, reducing agents. Boiling: 106°C PEL: 1 ppm	Lab Pro	ZH0632-128	OXY1	COR TOX	4	0	1	gal.		X:\Safety\MSDS\Hydrogen Peroxide.pdf
32	1	Iodine Passivation Sol'n (10 g Iodine (a.r.) in 1 l of absolute ETOH)	Tincture of Iodine	Iodine, Ethyl Alcohol	7553-56-2 64-17-5	L		Semilab USA	WT-04C	FL1B	IRR	0	0.25	0	gal.	Very similar to "Tincture of Iodine", which is available at your local pharmacy. When the ethanol evaporates, the residue (pure iodine) is strongly oxidizing.	X:\Safety\MSDS\Iodine Tincture.pdf
33	1	Isopropyl Alcohol	Isopropanol; 2-propanol; IPA	-	67-63-0	L	Boiling Point: 82.55°C Flash Point: 12°C Auto-Ignition: 399°C Vapor Press: 33.08 mmHg PEL: 400 ppm (980 mg/m <sup>3</sup> ) LD <sub>50</sub> : 5050 mg/kg, oral (rat)	Lab Pro	ZP1830-128	FL1B	IRR	6	0.5	0	gal.		X:\Safety\MSDS\Isopropyl Alcohol.pdf
34	1	Methanol Alcohol	Wood Alcohol; Methanol; Carbinol	-	67-56-1	L	Skin & eye irritant. Incompatible with peroxide, metals, strong acids & bases (especially nitric acid). Boiling Point: 65°C Flash Point: 11°C (closed cup) Auto-Ignition: 240°C Vapor Press: 12.3 kPa (20°C) PEL: 200 ppm (260 mg/m <sup>3</sup> ) LD <sub>50</sub> : 5628 mg/kg, oral (rat)	Lab Pro (KMG)	ZM0450-128	FL1B	IRR	6	0.5	0	gal.		X:\Safety\MSDS\Methanol.pdf
35	1	Methyl Isobutyl Ketone	4-Methyl-2-pentanone	-	108-10-1	L				FL1B	IRR	0.26	0	0	gal.		X:\Safety\MSDS\Methyl Isobutyl Ketone.pdf
36	1	Nitric Acid (70%)	Aqua Fortis; Azotic Acid; Nitric 50%; Nitric Acid 65%; Nitric Acid 69-70%	-	7697-37-2	L		Lab Pro (KMG)	ZN0402-80	OXY2	COR	12	0	1	gal.		X:\Safety\MSDS\Nitric Acid.pdf
37	2	Nitrogen, compressed gas	Nitrogen Gas; Gaseous Nitrogen; GAN	-	7727-37-9	G		Praxair Dist.		ICG	-	12	0	1	cu. ft.		X:\Safety\MSDS\Nitrogen_Compres sed-Gas.pdf
38	2	Nitrogen, cryogenic liquid	Liquid Nitrogen, LN			L	Cryogenic Liquid	Praxair Dist.		CRY ICG		0	0	2000	L		X:\Safety\MSDS\Nitrogen_Cryogeni c-Liquid.pdf

# Crystal Solar Inc.

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Ref. No.	Rm. No.	Chemical Name & Concentration	Synonym	Components (For Mixtures Only)	CAS No.	Material Form	Justification	Vendor	Part No.	CBC Class		Qty. Stored (approved cab)	Quantity in Use		Unit Meas	Comments	MSDS (filename.PDF)
										Physical	Health		Open	Closed			
39	3	Nitrogen/ 10% Helium		Nitrogen Gas Helium Gas	7727-37-9 7440-59-7	G		Praxair Dist.		ICG	-	200	0	200	cu. ft.	Mixture: use MSDS for "Nitrogen Compressed" until an MSDS for the mixture can be found.	
40	1	Nitrogen Trifluoride	Nitrogen Fluoride	-	7783-54-2	G	Oxidizing Gas Irritant			OxCG	IRR	0	0	0	cu. ft.	NOT ON SITE (May 2012)	X:\Safety\MSDS\Nitrogen-Trifluoride_Gas.pdf
41	5	Nitrous Oxide	"laughing gas" "sweet air"	-	10024-97-2	G	Oxidizing Gas Boiling Point: -90.86 °C Vapor Pressure: 5150 kPa (20 °C)	Praxair	NS 5.5SP	OxCG	-	0	0	60	cu. ft.	Although nitrous oxide is an oxidizer, at room temperature it does not promote combustion. It is a greenhouse gas (never "waste" to atmosphere). DOT Class 2.2 & 5.1.	X:\Safety\MSDS\Nitrous-Oxide_Gas.pdf
42	5	Oxygen	Oxygen Gas; Gaseous Oxygen; GOX	-	7782-44-7	G		Praxair Dist.		OxCG	-	249	0	249	cu. ft.		X:\Safety\MSDS\Oxygen_Compres sed-Gas.pdf
43	1	Phenolphthalein Solution	-	Phenolphthalein Ethyl Alcohol Water	77-09-8 64-17-5 7732-18-5	L	Slight skin & eye irritant. Flash Point: 13°C (open cup) Auto-Ignition: 363°C			FL1A	IRR	0	0.26	0	gal.	Mixture	X:\Safety\MSDS\Phenolphthalein T est-Solution.pdf
44	3	Phosphine 0.25% in Hydrogen	Phosphine; Hydrogen Phosphide; Phosphorated Hydrogen	-	7803-51-2	G	Highly Toxic Pyrophoric Flammable Gas Mixture LC50: 20ppm	Praxair Dist.	-	HToxCG FLG PYRO	HTOX	0	0	0	lbs.	<b>Management of the Mat'l Requires Specific Worker Training Use with Flow Limiting Orifice DOT Class UN1953</b>	X:\Safety\MSDS\Phosphine.pdf
	3	Phosphine 2% in Hydrogen	Phosphine; Hydrogen Phosphide; Phosphorated Hydrogen	-	7803-51-2	G	Highly Toxic Pyrophoric Flammable Gas Mixture LC50: 20ppm	Praxair Dist.	PN: EV 70755 Cyl: D-UCK	HToxCG FLG PYRO	HTOX	0	0	1.3	lbs.	Gas is colorless, might give off a slight garlic odor. Pyrophoric, producing white phosphorus pentoxide, causing pulmonary edema.	X:\Safety\MSDS\Phosphine.pdf
45	2	Phosphoric Acid, 85%	Phosphoric Acid; Orthophosphoric Acid	-	7664-38-2	L	Reacts violently with water. Corrosive to skin. PEL: 1 mg/m <sup>3</sup> LD50: 2740 mg/kg, dermal (rabbit) Boiling: 146°C Vapor Press: 0.03 mmHg (20°C) pH: 1	Lab Pro	ZP0995-128	WR2	COR TOX	0	0	1	gal.		X:\Safety\MSDS\Phosphoric Acid.pdf
46	1	Phosphoryl Chloride	POCl, Phosphoryl Chloride, Trichlorophosphor us Oxide, Phosphorus Trichloride Oxide	-	10025-87-3	L	IDLH: 0.96 ppm LC50: 96 ppm PEL: 0.1 ppm Vapor Press: 25mmHg (20°C) Boiling: 107°C Reacts violently with Water.	Air Products	10799	WR2 OXY1	HTOX	0	0	0.39	gal.	<b>Management of the Mat'l Requires Specific Worker Training -- See the excellent handling reference from Air Products:</b> <a href="http://www.airproducts.com/en/industries/Semiconductors/phosphorus-oxvchloride-pocl3-safe-handling.aspx">http://www.airproducts.com/en/industries/Semiconductors/phosphorus-oxvchloride-pocl3-safe-handling.aspx</a>	X:\Safety\MSDS\POCl3.pdf

# Crystal Solar Inc.

## Chemical Inventory

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										Physical	Health		Open	Closed			
47	1	Poly Ethylene Glycol (200)	PEG-4	-	25322-68-3	L	Mild skin irritant. Slightly flammable. Flash Point: 231°C (open cup) Melting Point: -65°C LD <sub>50</sub> : 4000 mg/kg, oral (rat)	Lab Pro	ZP1283-16	CL3B	IRR	2.2	0	0.01	lbs.		<a href="#">X:\Safety\MSDS\PEG(200).pdf</a>
48	1	Poly Ethylene Glycol (400)	PEG-8; PEG 400	-	25322-68-3	L	Mild skin irritant. Slightly flammable. Flash Point: 231°C (open cup) Melting Point: 4°C PEG 400 is strongly hydrophilic. LD <sub>50</sub> : 30200 mg/kg, oral (rat)	Lab Pro		CL3B	IRR	0.25	0	0	gal.		<a href="#">X:\Safety\MSDS\PEG(400).pdf</a>
49	1	Potassium Hydroxide, Liquid 45%	Caustic Potash; Potassium Hydrate	-	1310-58-3	L	Corrosive to skin & eyes. Incompatible with bases. LD <sub>50</sub> : 273 mg/kg, oral (rat)	Lab Pro	ZP1488-128	WR1	COR TOX	4	0	0	gal.		<a href="#">X:\Safety\MSDS\Potassium Hydroxide.pdf</a>
50	2	Potassium Hydroxide, Solid	Caustic Potash; Potassium Hydrate, Lye	-	1310-58-3	S	Corrosive to skin & eyes. Incompatible with water, acids, alcohols. Deliquescent. LD <sub>50</sub> : 273 mg/kg, oral (rat) Melting Point: 406°C Solubility in Water: 1210 g/L (25 °C)	Lab Pro	ZP1480-450	WR1	COR TOX	5	0	0	lbs.		<a href="#">X:\Safety\MSDS\Potassium Hydroxide - solid.pdf</a>
51	3	Propane	(LPG) Dimethyl Methane; Liquefied Petroleum Gas	-	74-98-6	L	PEL: 1000 ppm IDLH: 2100 ppm Boiling: -42.02°C Flash Point: -104°C (TCC) Vapor Press: 109.7 psig (21.1°C) Auto-Ignition: 450°C	Suburban Propane		LPG	-	0	90	0	lbs.		<a href="#">X:\Safety\MSDS\Propane.pdf</a>
52	3	Silane	Silicon Tetrahydride; Monosilane; Silicane	-	7803-62-5	G		Praxair Elec.		PYRO	Other Health Haz.	0	0	0	lbs.	NOT ON SITE (July 2011)	
53	1	Silicon Etch Solution, 1:1:1		Ethyl Alcohol Hydrofluoric Acid Water	64-17-5 7664-39-3 7732-18-5	L				FL1B	COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
54	4	Sodium Acetate (trihydrate powder)						Lab Pro				4	0	0	lb.		
55	4	Sodium Acetate Soln (45% w/v in water) [150 g per liter]						Lab Pro				4	0	0	lb.		
56	2	Sodium Hydroxide, 50%	Caustic Soda	-	1310-73-2	L	Incompatible with aluminum, water, acids, metal oxides. Causes severe skin & eye burns. PEL: 2 mg/m <sup>3</sup>	Lab Pro (KMG)	ZS0609-128	WR1	COR	0	0	200	gal.	Semiconductor Grade	<a href="#">X:\Safety\MSDS\Sodium Hydroxide, 50%.pdf</a>
57	1	Sodium Hydroxide, 50%	Caustic Soda	-	1310-73-2	L	Incompatible with aluminum, water, acids, metal oxides. Causes severe skin & eye burns. PEL: 2 mg/m <sup>3</sup>	Lab Pro		WR1	COR	0	0	1	lbs.	Low quality -- Used for the AWN system.	<a href="#">X:\Safety\MSDS\Sodium Hydroxide, 50%.pdf</a>
58	2	Sodium Hydroxide, Powder	Caustic Soda	-	1310-73-2	S		Lab Pro		WR-2	COR	5	0	0	lbs.	kwm: Not on site.	

# Crystal Solar Inc.

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										Physical	Health		Open	Closed			
59	3	Sulfuric Acid 36%	Oil of Vitriol	-	7664-93-9	L				WR1	COR	0	6	200	gal.	kwm: do not need separate MSDS for the 36% concentration.	
60	1	Sulfuric Acid 98%	Oil of Vitriol	-	7664-93-9	L	Reacts violently with water. Causes severe skin & eye burns. Melting Point: -15°C Boiling Point: 290°C Vapor Press: <1 mmHg LD <sub>50</sub> : 2140 mg/kg, oral (rat)	Lab Pro	ZS1241-128	WR1	COR	6	0	1	gal.		X:\Safety\MSDS\Sulfuric Acid_96%.pdf
61	1	Sulfuric Acid, Hydrogen Peroxide Mixture	Piranha Etch	Sulfuric Acid, Hydrogen Peroxide	7664-93-9 7722-84-1	L				-	COR TOX	0	0	1.5	gal.	Mixture: prepared at point of use	
	5	Sulfur Hexafluoride (SF6)			2551-62-4	G	Chemically inert unless exposed to extreme temperature. Boiling Point: -68°C 2.9 MPa (at 21.1°C)	Praxair	SH 4.5SP	Compressed Gas	-	0	172	0	cu. ft.	Colorless, odorless, nonflammable, liquefied gas, Simple asphyxiant (sometimes abused), potent greenhouse gas (never "waste" to atmosphere), DOT Class 2.2	X:\Safety\MSDS\Sulfur_Hexafluoride-gas.pdf
		SunSource 68	Silicon Solar Cell Texture Promoter, Sun Source	Proprietary Mixture containing organic ~5% acid	none	L	Non-combustible, clear liquid, with no discernible odor, LD <sub>50</sub> : 7500 mg/kg, oral (rat), Concentrate causes eye and skin irritation, not a listed carcinogen	Air Products		-	IRR	8		1	gal.	Use in a well ventilated area, wear goggles and prevent skin contact. If ingested, call Air Products Emergency Telephone Number: 800-523-9374	X:\Safety\MSDS\SunSource_68_AirProducts.pdf
62	1	Tetramethylammonium Hydroxide 25%	TMAH	-	75-59-2	L	Causes skin & eye burns. Toxic Incompatible with acids, peroxides. pH >13 Flash Point: >93.3°C Boiling Point: 102°C	Lab Pro		-	COR TOX	1	0	0	gal.		X:\Safety\MSDS\Tetramethylammonium Hydroxide.pdf
63	3	Trichloroethylene	Trichloroethene; TCE	-	79-01-6	L	Skin & eye irritant. Incompatible with aluminum. Auto-Ignition: 420°C Boiling Point: 86.7°C Vapor Press: 58 mmHg (20°C) LD <sub>50</sub> : 5650 mg/kg, oral (rat)	Lab Pro	ZT1095-128	FL1C	IRR	1	0	0	gal.	TCE is constantly confused with 1,1,1-Trichloroethane (TCA), or sometimes confused with Carbon Tetrachloride, or even the dry cleaning solvent Tetrachloroethylene. Like most (all?) chlorinated hydrocarbons, TCE is a central nervous system	X:\Safety\MSDS\Trichloroethylene.pdf
64	1	Triton X-100 (nonionic surfactant)	-	-		L	Mild skin irritation. Severe eye damage. pH 9.7 Melting Point: 6°C Boiling Point: >200°C Flash Point: 251°C (closed cup) LD <sub>50</sub> : 500 mg/kg, oral (rat)	Sigma-Aldrich	X-100	CL3B	IRR	0.1	0	0	gal.		X:\Safety\MSDS\Triton X-100.pdf
65	3	Trichlorosilane	Silicoclchloroform; Silicon Trichloride; Trichloromonosilane	-	10025-78-2	L		Praxair Electronic Chemicals		FL1A WR2 UR2	COR	0	0	550	lbs.	<b>Management of the Mat'l Requires Specific Worker Training Use with Flow Limiting Orifice See Footnote #2</b>	X:\Safety\MSDS\Trichlorosilane_p4_823f.pdf

# Crystal Solar Inc. Chemical Inventory

Updated by: KWM 05/24/12

Legend: Gal=Gallon; G=Grams; L=Liter; P=Pint; Lbs=Pounds; Oz: Ounce

Ref. No.	Rm No.	Chemical Name & Concentration	Synonym	Components (For Mixtures Only)	CAS No.	Material Form	Justification	Vendor	Part No.	CBC Class		Qty. Stored (approved cab)	Quantity in Use		Unit Meas	Comments	MSDS (filename.PDF)
										Physical	Health		Open	Closed			
64	3	Simple Green All-purpose Cleaner	Concentrated Cleaner/Degreaser/Deodorizer	Contains <4% of 2-butoxyethanol	111-76-2	L	Prolonged exposure of undiluted solution may cause dry skin. Mild eye irritant. Expect a mild sassafras odor. No heavy metals, but ionic content includes Ba, P, S.	Sunshine Makers, Inc.	13005	-	IRR	1	0.02	0	gal.	Concentrated solution contains 0.3 formula% phosphorus (probably 7320-34-5), and 0.6 wt% sulfur, and <5 formula% sodium citrate, and <1% ammonium. <u>Dilute 1:30 with DI water before use</u>	X:\Safety\MSDS\Simple-Green All-Purpose-Cleaner.pdf

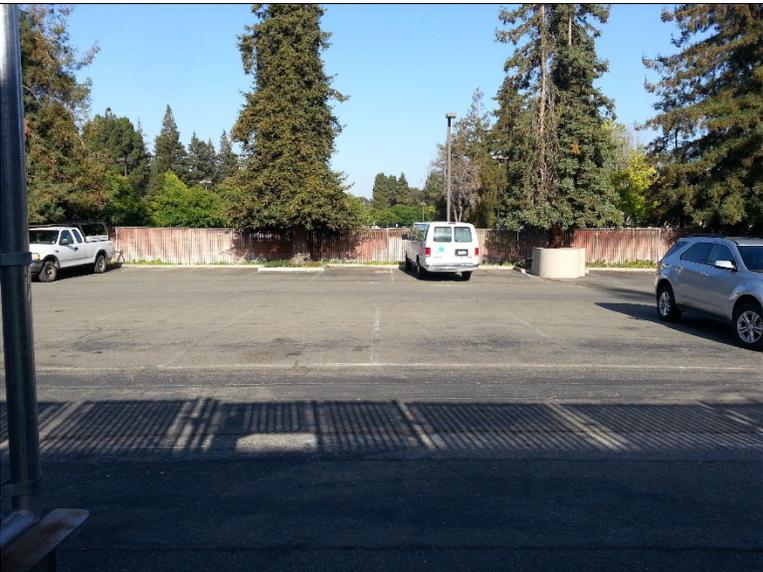


**Attachment 4**  
**HAPSITE Photo Log**

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# HAPSITE Investigation Photo Log



<b>Photo No.</b>	1	<b>Date</b>	07/5/14	<b>View Direction</b>	West
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Fence line: Location of Outdoor Air Sample



<b>Photo No.</b>	2	<b>Date</b>	07/05/14	<b>View Direction</b>	East
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Interior of Crystal Solar men's bathroom at North end of building



<b>Photo No.</b>	3	<b>Date</b>	07/05/14	<b>View Direction</b>	East
Interior of Crystal Solar women's bathroom, at North end of building					



<b>Photo No.</b>	4	<b>Date</b>	07/05/14	<b>View Direction</b>	East
Interior of utility room					



<b>Photo No.</b>	5	<b>Date</b>	07/05/14	<b>View Direction</b>	North
Interior of men's bathroom by reception area					



<b>Photo No.</b>	6	<b>Date</b>	07/05/14	<b>View Direction</b>	North
Interior of janitorial/utility room within men's bathroom near reception area					



<b>Photo No.</b>	7	<b>Date</b>	07/5/14	<b>View Direction</b>	North
Interior women's bathroom near reception area					



<b>Photo No.</b>	8	<b>Date</b>	07/05/14	<b>View Direction</b>	Southeast
Server room within conference room at south end of building					



<b>Photo No.</b>	9	<b>Date</b>	07/05/14	<b>View Direction</b>	North
West conference room in office area at south end of building					



<b>Photo No.</b>	10	<b>Date</b>	07/05/14	<b>View Direction</b>	West
East conference/quality inspection room in office area at south end of building					



<b>Photo No.</b>	11	<b>Date</b>	07/05/14	<b>View Direction</b>	Northeast
Reception area					



<b>Photo No.</b>	12	<b>Date</b>	07/05/14	<b>View Direction</b>	East
Fire water main within meeting room in Family Prayer House					



<b>Photo No.</b>	13	<b>Date</b>	07/05/14	<b>View Direction</b>	West
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Men's bathroom within Family Prayer House



<b>Photo No.</b>	14	<b>Date</b>	07/05/14	<b>View Direction</b>	West
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Women's bathroom within Family Prayer House



<b>Photo No.</b>	15	<b>Date</b>	07/05/14	<b>View Direction</b>	East
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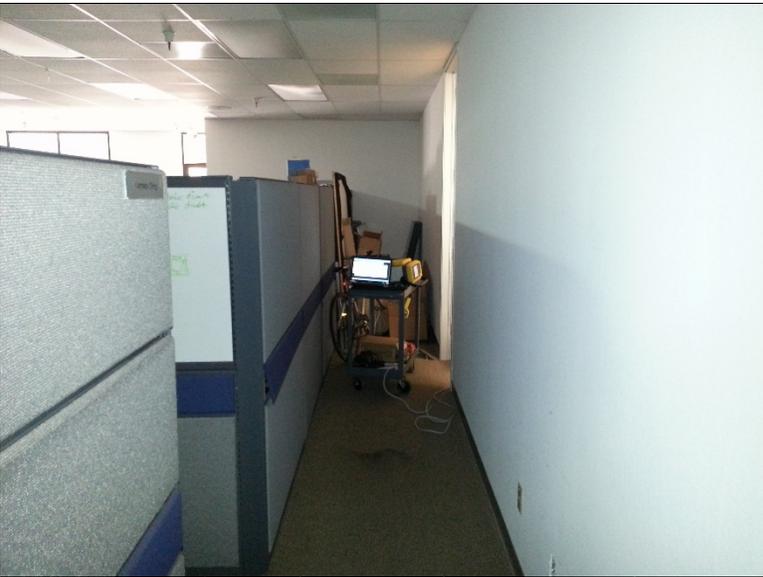
Nursery within Family Prayer House



<b>Photo No.</b>	16	<b>Date</b>	07/05/14	<b>View Direction</b>	East
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Sanctuary within Family Prayer House

					
<b>Photo No.</b>	17	<b>Date</b>	07/05/14	<b>View Direction</b>	South
Office area northwest of reception					

					
<b>Photo No.</b>	18	<b>Date</b>	07/05/14	<b>View Direction</b>	South
Hallway between office area and conference room at south end of building					



<b>Photo No.</b>	19	<b>Date</b>	07/05/14	<b>View Direction</b>	North
Back hallway running behind clean room on west side of building					



<b>Photo No.</b>	20	<b>Date</b>	07/05/14	<b>View Direction</b>	North
Interior of clean room. Site where duplicate samples were taken to verify TCE detect.					



<b>Photo No.</b>	20	<b>Date</b>	07/05/14	<b>View Direction</b>	North
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Two bottles of TCE removed from the Clean room.



**Attachment 5**  
**Data Quality Evaluation**

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# Honeywell – Synertek Soil Vapor and Air Monitoring - July 2014 Data Quality Evaluation Report

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## Introduction

The objective of this data quality evaluation (DQE) report is to assess the data quality of analytical results for soil vapor and air samples collected at the Honeywell Synertek Site. Samples were collected and analyzed in the effort to continue providing a framework for long-term monitoring of the soil vapor samples. The data may also be used to support future activities such as feasibility studies, risk assessments, fate and transport modeling and remedial actions. Individual method requirements and guidelines from the USEPA Contract Laboratory National Functional Guidelines (NFG) for Organic Data Review, October 2004, *Former Synertek Building No.1, Sampling Analysis Plan and Quality Assurance Project Plan* (CH2M HILL, 2014) were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

## Analytical Data

This DQE report covers eight normal indoor air samples, one outdoor air sample, eight normal soil gas samples, one indoor air field duplicate (FD) and one soil gas field duplicate (FD). Samples were collected on July 5, 2014. A list of samples and collection dates is included in Attachment A at the end of this report. These sample results were reported under one sample delivery group presented in Table 1. The samples were analyzed for volatile organic compounds by Methods TO-15 and TO-15 SIM. Samples were collected and shipped by courier to Curtis & Tompkins Laboratory in Berkeley, California. Samples were subcontracted and the analyses were performed by ALS Environmental in Simi Valley, California.

TABLE 1  
Sample Delivery Groups

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The assessment of data includes a review of: (1) the chain-of-custody documentation; (2) holding-time compliance; (3) the required quality control (QC) samples at the specified frequencies; (4) flagging for method blanks; (5) laboratory control samples (LCS); and, (6) surrogate spike recoveries.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags are assigned according to the NFG. These flags, as well as the reason for each flag, are entered into the electronic database. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes blank sample impacts.

The data flags are those listed in the NFG and are defined below:

- J = Analyte was present but the reported value may not be accurate or precise (estimated). The result was estimated due to either being less than the referenced reporting limit but greater than the method detection limit or due to a QC exceedance.
- R = The result was unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
- U = Analyte was not detected at the specified detection limit.

- UJ = Analyte was not detected and the specified detection limit may not be accurate or precise (estimated).

## Findings

The overall summaries of the data validation findings are contained in the following sections and in Attachment B.

### Holding Times

All holding-time criteria were met.

### Calibration

Initial and continuing calibration data were not supplied in the data packages and were not part of the routine validation performed. The laboratory did not report any exceedances in the case narrative.

### Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination.

### Field Blanks

Field blanks were not collected with this event.

### Field Duplicates

Two FD sets were collected with this dataset and all precision criteria were met.

### Surrogates

Surrogate spikes were analyzed in each sample as required. All acceptance criteria were met.

### Internal Standards

Internal standard information was not supplied in the data packages and was not part of the routine validation performed. The laboratory reported no exceedances in the case narratives.

### Laboratory Control Samples

LCSs were analyzed as required. All accuracy criteria were met.

### Chain of Custody

No discrepancies were noted.

### Sample Integrity

The canister for sample SYN-SS-FD-140705 was found to have a leaking valve after initial pressurization at the laboratory. The canister was re-pressurized, analyzed, and the results reported. Field records show that this canister did not leak before or after sampling or in transit to the laboratory. As this sample was a FD and the results matched the native sample, no results were qualified.

The canisters for samples SYN-IA-3-140705 and SYN-IA-5-140705 were subslab canisters that were inadvertently used for indoor air samples. The canisters were certified to the standard reporting limits not down to SIM levels required for air samples. Any results below the 0.5 µg/m<sup>3</sup> concentrations were qualified as estimated and flagged "J".

## Overall Assessment

The final activity in the data quality evaluation is an assessment of whether the data meets the data quality objectives (DQO). The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decisionmaking process. The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness objectives were met.
2. No data were qualified because of low-level blank contamination.
3. Four detections in two indoor air samples were qualified as estimated because samples were collected in canisters certified for soil vapor.
4. The precision and accuracy of the data, as measured by laboratory QC indicators, suggest that the DQOs were met.



ATTACHMENT A

# Sample Associated with DQE

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Field Sample ID	Sample Date	Sample Purpose
SYN-IA1-140705	7/5/2014	REG
SYN-IA2-140705	7/5/2014	REG
SYN-IA3-140705	7/5/2014	REG
SYN-IA4-140705	7/5/2014	REG
SYN-IA5-140705	7/5/2014	REG
SYN-IA6-140705	7/5/2014	REG
SYN-IA7-140705	7/5/2014	REG
SYN-IA8-140705	7/5/2014	REG
SYN-OA1-140705	7/5/2014	REG
SYN-SS1-140705	7/5/2014	REG
SYN-SS2-140705	7/5/2014	REG
SYN-SS3-140705	7/5/2014	REG
SYN-SS4-140705	7/5/2014	REG
SYN-SS5-140705	7/5/2014	REG
SYN-SS6-140705	7/5/2014	REG
SYN-SS7-140705	7/5/2014	REG
SYN-SS8-140705	7/5/2014	REG
SYN-IA-FD-140705	7/5/2014	FD
SYN-SS-FD-140705	7/5/2014	FD

Notes:

FD = field duplicate

REG = regular sample



ATTACHMENT B

# Validation Findings

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Field Sample ID	Method	Analyte	Final Result	Units	Final Flag	Reason Codes
SYN-IA3-140705	TO-15-SIM	1,2-Dichloroethane	0.26	ug/m3	J	SP
SYN-IA5-140705	TO-15-SIM	1,2-Dichloroethane	0.11	ug/m3	J	SP
SYN-IA5-140705	TO-15-SIM	cis-1,2-Dichloroethene	0.039	ug/m3	J	SP
SYN-IA5-140705	TO-15-SIM	Trichloroethene	0.055	ug/m3	J	SP

Notes:

SP = Sample collection does not meet requirements

