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Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Please find attached the *Pilot Soil-Vapor Extraction System Shutdown Test Report, July 2016, Bulk Fuels Facility Spill, Solid Waste Management Unit ST-106/SS-111*, Kirtland Air Force Base, New Mexico. This report has been prepared to summarize the fieldwork associated with the soil vapor extraction (SVE) system shutdown test by evaluating hydrocarbon rebound and in-situ respiration capacity of residual fuel in the vadose zone at ST 106/SS-111.

If you have any question or concerns, please contact Mr. Wayne Bitner at (505) 853-3484 or at ludie.bitner@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment:
Pilot Soil-Vapor Extraction System Shutdown Test Report, BFF, July 2016; (2) Hard copies & (2) CDs

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Pilot Soil-Vapor Extraction System Shutdown Test

Bulk Fuels Facility
Solid Waste Management Unit ST-106/SS-111

July 2016

377 MSG/CEANR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

PILOT SOIL-VAPOR EXTRACTION SYSTEM SHUTDOWN TEST

BULK FUELS FACILITY SITE SOLID WASTE MANAGEMENT UNIT ST-106/SS-111

July 2016

Prepared for
U.S. Army Corps of Engineers
Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109

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Prepared by
CB&I Federal Services LLC
2440 Louisiana Blvd. NE, Suite 300
Albuquerque, New Mexico 87110

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This document summarizes the fieldwork associated with the soil vapor extraction (SVE) system shutdown test at the Kirtland Air Force Base Bulk Fuels Facility site. The purpose of test was to evaluate the hydrocarbon rebound and in-situ respiration capacity of residual fuel in the vadose zone after the SVE system was shutdown. Monitoring of hydrocarbons, including benzene and ethylene dibromide, oxygen, and carbon dioxide was used to identify potential areas of residual contamination and in-situ biodegradation.

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ERIC H. FROEHLICH, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release.

Athana Zuch
KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

PREFACE

This document summarizes the fieldwork and results associated with the soil vapor extraction system shutdown test. Sampling techniques, equipment, test preparation, and results of the shutdown test are summarized in the document. This work is being performed under the authority of U.S. Army Corps of Engineers, Contract No. W912DY-10-D-0014, Delivery Order 0002. Fieldwork was conducted from April 2015 through December 2015. Mr. Trent Simpler is the U.S. Army Corps of Engineers Albuquerque District Project Manager; Mr. Wayne Bitner, Jr. is the Kirtland Air Force Base Restoration Section Chief, and Dr. Michael Amdurer is the CB&I Federal Services LLC Project Manager. This document was prepared by Ms. Tara Kunkel.

Michael Amdurer, PG, PhD
CB&I Federal Services LLC
Project Manager

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ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
°F	degree Fahrenheit
%	percent
AFB	Air Force Base
AVGAS	aviation gasoline
a_w	water activity
BFF	Bulk Fuels Facility
bgs	below ground surface
CATOX	catalytic oxidizer
CB&I	CB&I Federal Services LLC
cm^3/cm^3	cubic centimeter per cubic centimeter
CO_2	carbon dioxide
COC	constituent of concern
EDB	1,2-dibromoethane/ethylene dibromide
ERH	relative humidity
EPA	U.S. Environmental Protection Agency
FFOR	Former Fuel Offloading Rack
FTA	Fire Training Area
g/cm^3	gram per cubic centimeter
HC	field-measured total hydrocarbon
JP-4	jet propellant fuel grade 4
JP-8	jet propellant fuel grade 8
KAFB	Kirtland AFB
LNAPL	light non-aqueous phase liquid
mg/kg/day	milligram per kilogram per day
O_2	oxygen
ppmv	part per million by volume
Q1	First Quarter 2015
Q3	Third Quarter 2015
Q4	Fourth Quarter 2015

ACRONYMS AND ABBREVIATIONS (concluded)

SVE	soil vapor extraction
SVEW	soil vapor extraction well
SVMP	soil-vapor monitoring point
SVMW	soil-vapor monitoring well
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound
VZWG	Vadose Zone Working Group

1. INTRODUCTION

1.1 Site History

The Bulk Fuels Facility (BFF) Site on Kirtland Air Force Base (AFB) in Albuquerque, New Mexico, was the location of a historical, accidental release of aviation gasoline (AVGAS) and jet propellant fuel grades 4 (JP-4) and 8 (JP-8).

AVGAS is a light petroleum distillate with an approximate boiling range of 35 degrees to 165 degrees Celsius (°C) (95 degrees to 330 degrees Fahrenheit [°F]) and is mainly comprised of hydrocarbon compounds falling in the C4 (four carbons per molecule) to C12 (12 carbons per molecule) range. JP-4 is a middle distillate mixture of a heavy naphtha fraction (like gasoline) and kerosene (50:50 blend), having an approximate boiling range of 35° to 315°C (95° to 600°F). JP-4 is comprised of paraffins (alkenes), cycloparaffins (cycloalkanes), aromatics, and olefins, from approximately C9 to C20. JP-8 is a 100 percent (%) kerosene blend with an approximate boiling range of 165° to 290°C (330° to 550°F). Like JP-4, JP-8 is a middle distillate containing similar hydrocarbon class compounds as JP-4, but without the lighter, more volatile and flammable compounds including benzene. Naphthalene is a constituent of all three fuels (Sonntag et al., 2003; Mattorano et al., 2004; Global Security, 2016). Ethylene dibromide (EDB) was an additive to AVGAS (but not to JP-4 or J-P8) at concentrations ranging between 300 and 600 milligrams per liter (Falta, 2004).

The fuels leaked undetected over approximately 3 to 4 decades at the Former Fuel Offloading Rack (FFOR) through several holes in an underground conveyance pipeline during fuel transfer. The released fuel migrated through the vadose zone to eventually reach the water table. The migration followed a disjointed, meandering path caused by subsurface heterogeneity, where frequent changes in the alluvial lithology and confining layers created preferential flow pathways. This resulted in non-uniform residual contamination in the vadose zone and measurable light non-aqueous phase liquid (LNAPL) on the surface of the underlying unconfined aquifer.

The historical water table in the vicinity of Kirtland AFB was estimated to be approximately 350 feet below ground surface (bgs) before extensive groundwater pumping from the regional aquifer occurred. Throughout the history of the BFF site, the water table has fallen due to groundwater pumping supplying drinking water to the residents of Albuquerque. The deepest depth to water, representing the lowest historical groundwater elevation, measured at groundwater wells in the BFF source area ranged from approximately 500 to 502 feet bgs in 2009. In recent years, the water table has been rising due to water-conservation efforts, and the current vadose zone at the BFF site is approximately 455 to 480 feet thick. The fall and rise of the water table may have impacted the vertical transport and subsequent distribution of LNAPL in the lower vadose zone, capillary fringe, and top of the unconfined aquifer.

BFF vadose zone remedial approaches implemented to date include soil excavation and soil vapor extraction (SVE). Three excavation events performed in the vicinity of the fuel leaks removed approximately 4,822 tons of contaminated soil to depths up to 20 feet bgs. Those excavations addressed shallow vadose zone contamination and removed the risk of worker exposure. SVE was implemented under various configurations and at different well locations between 2003 and 2015. During those 12 years, four internal combustion engine units and a catalytic oxidizer (CATOX) system were deployed. The operation of those systems contributed substantially to cleanup efforts throughout the vadose zone, and appeared to play a major role in removing the previously observed LNAPL from the water table. It was estimated that SVE had successfully removed/treated over 750,000 gallons of leaked fuel, and the measurable thicknesses of LNAPL had been reduced to very thin (less than approximately 0.1 foot) and sporadic detections. (It is noted that the rising water table may have played a role in the decreasing

LNAPL detections, and plans are in place to collect soil cores to determine if residual LNAPL remains below the current water table.)

During SVE system operation, induced flow patterns in the vadose zone transport volatile fuel compounds from the soil pore-spaces to vapor extraction wells, where the fuel vapors are brought above ground and thermally treated prior to atmospheric discharge of the vapor stream. The induced flow also pulls oxygen (O_2) through the vadose zone that can support aerobic microbial hydrocarbon degradation. Induced soil-vapor flow can mask areas of residual contamination in the vadose zone as less-contaminated vapor is being pulled through those areas at rates that exceed contaminant of concern (COC) volatilization rates. Induced flow patterns also can make clean zones appear contaminated if more highly-contaminated vapor is pulled through these areas towards the extraction wells. Continuous O_2 replenishment during SVE operation prohibits in-situ respiration monitoring, and potential inlets for atmospheric air in SVE infrastructure (well and conveyance piping) can underestimate biodegradation rates if ambient air is pulled into the system.

In July 2014, the Air Force Civil Engineer Center and the New Mexico Environment Department hosted several working groups to focus on specific portions of the BFF remedial program. The Vadose Zone Working Group (VZWG) was established to evaluate the soil, soil-vapor, and LNAPL data; to assess the performance of the remedial approaches described above; and to formulate recommendations for advancing the vadose zone remediation more efficiently and effectively. The VZWG reviewed the 12 years of SVE data and determined that the time was appropriate to conduct an SVE system shutdown test to assess residual vadose-zone contamination and in situ microbial biodegradation. CB&I Federal Services LLC (CB&I) prepared a comprehensive Work Plan that included a highly-controlled soil-vapor sampling technique tailored to the existing SVE monitoring infrastructure to obtain the necessary data to accurately monitor both COC concentration changes and O_2 utilization over time (U.S. Army Corps of Engineers [USACE], 2015). The Work Plan also described the data-reduction procedures to evaluate residual vadose zone contamination using both concentration-change trends and extents, and in situ microbial activity, by determining O_2 utilization rates to calculate associated hydrocarbon biodegradation rates as described in the U.S. Environmental Protection Agency (EPA) manual for *Bioventing Principles and Practice* document (1995).

Shutting down SVE operation allowed the vadose zone to return to natural conditions and provided the opportunity to evaluate hydrocarbon rebound and measure in-situ respiration in targeted areas of the vadose zone without the influence of induced air flow. Before and after turning off the CATOX SVE system, soil vapor was monitored for COCs, including field-measured total hydrocarbon vapor (HC) and individual compounds including EDB, benzene, and volatile organic compounds (VOCs), O_2, and carbon dioxide (CO_2) concentrations. The shutdown was originally scheduled to coincide with two quarterly sampling events (First Quarter 2015 [Q1] and Third Quarter 2015 [Q3]), which would provide data from the entire soil-vapor monitoring network. The test was later expanded to include Fourth Quarter 2015 (Q4) data, which allowed a more rigorous rebound assessment and provided additional data related to respiration and in-situ microbial activity. In 2016, the VZWG decided that additional trending analysis under natural conditions was needed; therefore, the shutdown will continue for at least four consecutive sampling events (Q3, Q4, Q1 2016, and Q2 2016) before pursuing any remediation decisions.

The SVE shutdown test was performed in accordance with the approved Pilot SVE Shutdown Test Work Plan (USACE, 2015). This Work Plan describes the SVE shutdown test methods, presents and discusses the results, includes conclusions drawn from the results, and provides recommendations for future vadose zone remedial activities.

1.2 SVE Shutdown Test Objectives

The objectives of the SVE shutdown test were two-fold.

1. Evaluate Rebound—Use HC and laboratory COC analyses to evaluate and monitor concentration changes over time to locate areas of residual vadose zone contamination that would benefit from additional active remediation.

2. Measure In-Situ Respiration—Use field O_2 and CO_2 soil-vapor concentrations to assess microbial activity relative to residual COCs, and determine if passive or engineered bioventing would be an appropriate SVE follow-on interim measure. If found appropriate, then identify vadose zone areas where such interim measures should be implemented.

2. TEST METHODS, PROTOCOLS, AND SCHEDULE

The Pilot SVE Shutdown Test Work Plan (USACE, 2015) provides test details and is provided in Appendix A for reference. The following sections summarize pertinent information from the Work Plan.

2.1 Soil-Vapor-Monitoring Network

BFF soil-vapor-monitoring network details, including the locations and construction details, are provided in Table 2-1. The network included 284 soil-vapor monitoring points (SVMPs) nested at 56 locations including the original thirteen inactive SVE wells. The locations of the SVMPs are shown on Figure 2-1.

SVMP nests contained between three and six discrete SVMPs screened at different depths within the same borehole. The SVMPs were constructed of Schedule 80 polyvinyl chloride, and were 0.5 inch, 0.75 inch, or 3 inches in diameter depending on the depth and location. Screen slot size was 0.05 inch, and screen lengths varied from 2.5 to 10 feet. The original thirteen SVE wells, now used as SVMPs, contained between one and two discrete SVMPs screened at different depths within the same borehole. These thirteen SVE SVMPs were constructed of Schedule 80 polyvinyl chloride, and were 2 inch or 4 inch in diameter depending on the depth and location. Screen slot size was 0.05 inch and screen lengths varied from 10 to 15 feet. The screens were set in filter pack and sealed with bentonite chip seals placed above and below the screened interval. All SVMPs were sealed with pneumatic quick-disconnect fittings to minimize effects of barometric pressure changes, and to facilitate representative soil-vapor sampling.

SVMP nomenclature indicates the nest location and the specific SVMP screen depths; for example, soil-vapor monitoring well (SVMW)-09-266 identifies an SVMP in nest location SVMW-09 with a bottom-of-screen depth of 266 feet bgs. Kirtland AFB (KAFB)-106128-350 refers to the SVMP at nest location KAFB-106128 with a bottom-of-screen depth of 350 feet bgs. SVE well nomenclature only identifies the location (e.g., SVEW-09-457) and the screen depths. However, the SVEWs have their own numerical designation even when located in the same borehole with another SVEW at a different depth, i.e. SVEW-02-60 and SVEW-03-160 are located in the same borehole with screen depths of 60 or 160 feet bgs, respectively.

2.2 Soil-Vapor Sample Collection and Analyses

CB&I developed a soil-vapor sampling technique to optimize sample collection and to ensure that the data obtained during the test were representative and of sufficient quality to assess rebound and to measure in-situ respiration. The technique was based on methods described in literature, and on experience gained during extensive BFF soil-vapor sampling. The sampling protocol was finalized based on input provided by the VZWG during a complex site investigation meeting on January 20 and 21, 2015. The protocol and materials used to sample are summarized in the Work Plan (USACE, 2015) and the protocol is also located in Appendix A.

2.2.1 Sampling System Design

CB&I designed a soil-vapor sampling system that minimized dead space by limiting the length and diameter of hose material used, ensuring air-tight integrity during sampling, and facilitating direct connection with the various instruments and sample containers to maintain sample representativeness (see photos in Appendix A as part of the sampling protocol). Sample-system integrity was verified through pressure testing each system prior to use and through routine checks of recovery against the instrument calibration gas as discussed in Section 2.2.2.1.

2.2.2 Sample Collection and Field Analyses

Prior to field analyses and sample collection, a single SVMP well-casing volume was purged using a low-flow vacuum pump. This consistent and small-volume purge ensured that the sample collected was representative of the vadose zone in the immediate vicinity of the screen interval. After purging, a portable air emissions analyzer (Horiba Model MEXA 584 L, hereafter referred to as the Horiba) was used to measure soil-vapor O_2, CO_2, and HC concentrations. HC results were used to assess contaminant rebound trends, extent, and stability. O_2 and CO_2 results were used to assess respiration rates.

Equilibrium relative humidity (ERH) measurements were added to the suite of field analyses after O_2 data indicated less microbial activity than anticipated. A humidity probe was used during select sample-collection events to measure the ERH and temperature of the soil-vapor in select SVMPs. ERH is an indirect measure of the water activity (a_w) in the vadose zone (Cameron et al., 1969), and the data were used to help explain the in-situ respiration results as discussed in Section 3.2.2.

2.2.2.1 Instrument Calibration

The Horiba was calibrated several times daily using a manufacturer-recommended calibration gas mixture consisting of 1,600 parts per million by volume (ppmv) propane, 13.0% CO_2, and nitrogen making up the remaining volume. The manufacturer's calibration procedure was applied every day the instrument was used (refer to Appendix A). The sample system also was verified by using the Horiba to pull a sample of calibration gas through the sample system, and the results were then compared to the calibrated measurements. During each day's use, the Horiba maintained calibration very well, and minimal parameter drift was observed.

ERH was measured using a psychrometer (Amprobe Model THWD-5) consisting of an ERH, temperature, and dew point meter with a flexible wet bulb probe. The probe was calibrated on each day of use following the manufacturer's guidelines. Saturated solutions of sodium chloride (NaCl) and magnesium chloride ($MgCl_2$), which provided equilibrium headspace RH values of ~75% and ~33%, respectively, were used to calibrate the humidity probe.

2.2.3 Sample Collection and Laboratory Analyses

During three 2015 quarterly BFF soil-vapor monitoring events, soil-vapor samples were collected from the entire soil-vapor monitoring network. Laboratory-certified pre-evacuated Bottle-Vac™ containers were securely connected directly to the sampling system to ensure 100% of the sample was drawn from the SVMPs (see photos in Appendix A). After sampling was complete, the Bottle-Vac™ containers were labeled, and the samples were recorded on a chain-of-custody form, then placed into sample containers and shipped to ALS Environmental, a Department of Defense-certified soil-vapor laboratory, for analysis.

Quarterly soil-vapor sampling and analysis is extensive, with many more parameters measured in the laboratory than are necessary for assessing hydrocarbon rebound or in-situ respiration. Therefore, the following constituents from the two quarterly soil-vapor sampling events were used as indicators to evaluate rebound and residual contamination at the site during the first six months following SVE shutdown.

- Benzene by EPA Method TO-15.
- EDB by California Air Resources Board Method 422Mod.
- Total petroleum hydrocarbon (TPH) splits by Massachusetts Department of Environmental Protection Method APH 1.0.

The Horiba's HC saturation concentration was 32,760 ppmv. For locations where the Horiba indicated saturation, the laboratory hydrocarbon split results were added together to calculate a TPH concentration, and the result was used to evaluate the vadose zone response to shutdown of the SVE system at these locations. Very few SVMPs were found to be at the saturation concentration of the field instrument, therefore very few laboratory TPH results were necessary to evaluate contamination at the site.

Horiba O_2 and CO_2 measurements were made in the field at a frequency that was much greater than the laboratory analyses, and the Horiba data were used to assess in-situ respiration. Additionally, the Horiba was calibrated to current atmospheric conditions in Albuquerque, as opposed to calibration of a laboratory instrument at a different elevation with different atmospheric conditions, and it provided "real-time" analysis, which was not subject to sample changes that could occur during handling and shipment to the analytical laboratory, and/or storage at the laboratory prior to analysis.

2.3 SVE Shutdown Test Sampling Schedule

SVE shutdown test monitoring included pre-shutdown, baseline, time-series, and long-term sampling events as described below.

2.3.1 Pre-Shutdown Sampling Events

Prior to turning the SVE system off to start the shutdown test, soil-vapor samples were collected from the entire soil-vapor monitoring network under the Q1 soil-vapor sampling event in March 2015. Soil-vapor HC, O_2, and CO_2 measurements were made in the field by connecting the Horiba directly to the sampling system immediately after SVMP purging. Upon disconnecting the Horiba from the sampling system, Bottle-Vac™ samplers were connected to the sampling system to collect and containerize soil-vapor samples for laboratory analyses as described in Section 2.2.3.

Data from this sampling event were used for two reasons: 1) to confirm the selection of SVMPs to monitor for rebound-trend and in-situ respiration and 2) to provide a complete "picture" of the BFF vadose zone prior to turning the SVE system off. Data from this sampling event were evaluated with data from the two other complete rounds of samples (Q3 and Q4) described below to provide a broad assessment of the longer-term COC rebound, or stabilization of hydrocarbon concentrations at various SVMPs and in-situ respiration, albeit with limited value for assessing short-term temporal trends as quarterly sampling events are approximately 3 months apart.

2.3.2 Baseline Sampling Events

An initial subset of 61 SVMPs was selected for high-frequency monitoring during the first 2 weeks of the shutdown test based on Q1 COC, O_2, and CO_2 concentrations, and on concentration trends over the course of the SVE operation. Because several weeks passed between the pre-shutdown sampling event described above and SVE shutdown, a baseline sampling event was conducted during the SVE operation on April 2, 2015, to more accurately represent the conditions at the time of shutdown. The 61 SVMPs selected for the initial time-series of sampling were purged, and soil vapor was analyzed with the Horiba as described above. The data were used as the starting point for assessing hydrocarbon rebound, O_2 utilization, and CO_2 production trends.

2.3.3 Time-Series Sampling Events

Time-series monitoring of the 61-point network began immediately after SVE shutdown on April 6, 2015. Two additional SVMPs determined to be of interest during the first few days of the test were added to the monitoring program to bring the total to 63 SVMPs on April 8, 2015. Soil vapor was analyzed using the

Horiba every few hours for the first 36 hours, then daily for the third, fourth, and fifth days of the test. No monitoring occurred on the weekend (days 6 and 7). During the second week of the test, monitoring occurred every other day at the 63 SVMPs for a total of three monitoring events during that period.

After the initial 2 weeks of shutdown, the monitoring network was decreased to 34 SVMPs. Based on previously collected soil-vapor data, 31 SVMPs were chosen to provide adequate lateral and vertical coverage of the vadose zone in the areas showing elevated levels of residual contamination. Three SVMPs with very low HC concentrations (i.e., less than or equal to10 ppmv) were chosen to represent background conditions. The locations of the 34 SVMPs are shown in yellow on Figure 2-2.

During the third week of shutdown, monitoring occurred every other day for a total of three monitoring events during the week. In weeks four through seven, monitoring was performed once per week. For weeks eight through twelve, the monitoring frequency decreased to every other week. The final time-series monitoring event was completed on July 6, 2015.

2.3.4 Long-Term Sampling Events

Two additional sampling events were conducted under the Q3 and Q4 vadose zone monitoring program and included sampling of all 284 SVMPs. The SVE system remained off during these sampling events. Q3 sampling represented the 3-month-post-shutdown event and occurred at the end of July and beginning of August 2015. Q4 sampling represented a 6-month post-shutdown event and occurred in late October and early November 2015. As previously discussed, Horiba measurements were made in the field during sampling, and soil-vapor samples were collected in Bottle-Vac™ containers and sent to the laboratory for the analyses described in Section 2.2.3. Data from these events were used to access longer-term rebound and respiration extents, and to determine if the vadose zone was reaching post-SVE shutdown equilibrium conditions.

3. RESULTS AND DISCUSSION

The SVE shutdown test objectives were to monitor rebound to determine where residual fuel constituents remained in the vadose zone, and to measure microbial respiration of the residual fuel in order to quantify the biodegradation capacity of the vadose zone. Turning the SVE system off eliminated the induced vapor flow in the vadose zone, under which conditions these assessments could not be made.

Evaluating rebound and in situ microbial activity included the following: 1) three quarterly vadose zone monitoring events (Q1, Q3, and Q4) during which soil vapor samples were collected from all 284 sampling points (Figure 2-1) for field and laboratory analyses; 2) short-term vapor sampling with field analyses at 63 selected SVMPs (Figure 2-2); and 3) longer-term sampling and field analyses of a 34-SVMP subset of the 63 SVMPs (shown in yellow on Figure 2-2). Data from those sampling events were used to monitor trends in, and the extent of, hydrocarbon rebound and biologically-mediated O_2 utilization from which to calculate hydrocarbon biodegradation rates. The rebound results identified vadose zone areas that would benefit from additional active remediation, and the respiration results revealed areas that were biologically active. The data set provided valuable information for moving BFF vadose zone remediation forward towards completion. The following sections present and discuss the results from the laboratory and field analyses relative to hydrocarbon rebound, followed by the HC, O_2, and CO_2 field analyses relative to in situ respiration and hydrocarbon biodegradation.

3.1 Soil Vapor Rebound Monitoring

Closely-spaced sampling with HC analyses was performed just prior to (baseline) and for 90 days following SVE shutdown. Rebound trends were assessed to determine where residual volatile hydrocarbons remained in the vadose zone, and to evaluate the behavior of vadose-zone hydrocarbon vapor. The combination of trend data and quarterly sampling hydrocarbon results quantified the hydrocarbon rebound extent under near or approaching equilibrium conditions.

3.1.1 Hydrocarbon Rebound Trends

Field HC concentrations measured at the 63 SVMPs during the first 3 months of the shutdown test are summarized in Table 3-1. Graphs showing the HC, O_2, and CO_2 time series data for each of the SVMPs are included in Appendix B. Baseline data represented the soil-vapor HC concentrations during SVE operation and just prior to shutdown, and those data served as the starting point against which rebound trends were assessed. Baseline HC distribution agreed with the pre-shutdown (Q1) results, and showed localized areas of higher contamination at shallower depths in proximity to the fuel release in the FFOR area, and low to moderate concentrations at greater depths to the east where LNAPL had previously been detected on the water table. Lower concentrations seen over the groundwater plume during SVE operation were due to the artificial flow fields. Baseline contaminant concentrations at the 63 SVMPs are summarized below by their respective depths.

- Five SVMPs screened at approximately 50 feet bgs were monitored. HC concentrations ranged from 7 to 30,520 ppmv; the highest concentration was measured in the FFOR area at SVMW-11-050.

- HC concentrations in eight SVMPs screened at approximately 100 feet bgs ranged from 3 to 28,310 ppmv; all concentrations greater than approximately 400 ppmv were measured in SVMPs in the FFOR area.

- Fourteen SVMPs screened at approximately 150 feet bgs were monitored. Two of the 14 wells were added after the test began, so the baseline values assigned to those wells were the Q1 pre-shutdown

HC measurements. HC concentrations at this depth ranged from 1 to 32,760 ppmv; all concentrations greater than 400 ppmv (with the exception of KAFB-106119-150) were measured in the FFOR area; KAFB-106119-150 was approximately 400 ppmv and was located 150 feet due east of the eastern end of the FFOR area.

- Ten SVMPs screened at approximately 250 feet bgs were monitored. HC concentrations at those points ranged from 3 to 27,720 ppmv, with all concentrations greater than approximately 4,000 ppmv measured in the FFOR area. HC concentrations between approximately 400 and 500 ppmv were detected in SVMPs located slightly east of the FFOR, which likely was along the fuel migration pathway.

- Twelve SVMPs screened from approximately 300 to 350 feet bgs were monitored. HC concentrations ranged from 0 to 14,180 ppmv. The highest HC concentration was observed at 300 feet bgs on the east side of the FFOR. Additional SVMPs with HC concentrations ranging between approximately 200 and 750 ppmv were located over the benzene plume to the east of the FFOR area.

- Fourteen SVMPs screened at approximately 450 feet bgs were monitored. HC concentrations ranged from 0 to 1,092 ppmv. HC concentrations greater than approximately 150 ppmv were measured in SVMPs located above or closely adjacent to the benzene plume, where LNAPL was previously observed on the water table, and to the east and south-east of the FFOR area.

During baseline sampling (or Q1 where applicable), 182 of the 284 SVMPs, representing 64% of the soil-vapor monitoring network, had background or low HC concentrations (non-detect to approximately 20 ppmv), and their concentrations remained steady through the Q4 sampling event. This indicated very little, if any, residual contamination remained in the vicinity of those points, and as such, those areas were deemed to be “clean” and not appropriate for further treatment. These areas include all depths in off-base SVMPs, shallow SVMPs over the on-base portion of the groundwater plume, all depths in SVMPs located on the far east, far west, and far south part of the site, and deep depth SVMPs beneath the FFOR area (see Figure 2-1 for general locations).

Several HC concentration trends were observed following SVE shutdown: increasing (indicative of rebound), decreasing (indicative of induced vapor transport during SVE operation and/or biodegradation), and unchanging (indicative of stability, which can occur either within or outside the influence of the SVE system). Figure 3-1 shows the increasing HC concentration trends that were observed in 15 of the 63 SVMPs over 3 months of the time-series field monitoring. The locations of these SVMPs are shown on Figures 3-3 through 3-9. The approximate range of concentration increases are as follows:

- SVMW-01-100—from 400 ppmv to 1,500 ppmv

- SVMW-03-100—from 80 to 7,500 ppmv

- SVMW-09-100—from 5,000 ppmv to 10,000 ppmv

- SVMW-13-150—from 100 ppmv to 900 ppmv

- SVMW-03-250—from 500 ppmv to 9,000 ppmv

- SVMW-04-250—from 4,000 ppmv to 8,000 ppmv

- SVMW-09-266—from 4,000 ppmv to 16,000 ppmv

- KAFB-106119-350—from non-detect to 400 ppmv
- KAFB-106128-350—from 500 ppmv to 1,500 ppmv
- KAFB-106112-450—from non-detect to 200 ppmv
- KAFB-106113-450—from 40 ppmv to 200 ppmv
- KAFB-106114-450—from non-detect to 700 ppmv
- KAFB-106116-450—from non-detect to 800 ppmv
- KAFB-106117-450—from non-detect to 1,600 ppmv
- KAFB-106128-450—from non-detect to 4,000 ppmv

Decreasing HC concentration trends were observed in three SVMPs over the 3-month time-series field monitoring as shown on Figure 3-2. The SVMPs and approximate range of concentration decreases are as follows:

- SVMW-02-150—from 450 ppmv to 120 ppmv
- KAFB-106119-150—from 450 ppmv to 50 ppmv
- KAFB-106111-350—from 720 ppmv to 300 ppmv

HC concentrations in the remaining 45 SVMPs remained stable over the 3 months of time-series monitoring.

The SVMPs that exhibited HC rebound to greater than or equal to 400 ppmv by Q4 were located in two areas: in and directly east of the FFOR area, and directly over or immediately adjacent to a portion of the benzene plume. Rebound in and directly east of the FFOR area occurred at sample depths between 50 and 300 feet bgs. Rebound farther to the southeast of the FFOR area and over the benzene plume occurred at approximately 450 feet bgs. The two areas showing rebound were consistent with the conceptual site model, which showed the released fuel migrating laterally (confined by the heterogeneous lithology) towards the east as it moved downward through the vadose zone to the water table.

Time-dependent patterns in HC concentration changes during rebound at select SVMPs during the 3-month time-series monitoring helped to locate areas of residual contamination in the vadose zone. Discrete rebound patterns included the following:

- S-shaped concentration curve trends suggested that the vapor source was distant from the SVMP. Upon SVE system shutdown, hydrocarbon diffused from source areas towards the SVMP where it eventually reached equilibrium. The S-shape evolved as the concentration-gradient-driven diffusion front moved though the soil profile where the HC interacted with the soil surfaces, soil organic matter, and pore water to establish rebound equilibrium conditions. Initially, concentrations increased slowly at the SVMP, then increased in a near linear phase, and finally began to slow as the HC concentration approached equilibrium. The majority of SVMPs that showed HC rebound followed the S-curve trend, which indicated that those SVMPs were located distant from the residual fuel responsible for the observed equilibrium HC concentration. S-curve rebound was observed at: SVMW-01-100, SVMW-03-250, SVMW-04-250, SVMW-09-266, KAFB-106119-350,

KAFB-106128-350, KAFB-106122-450, KAFB-106113-450, KAFB-106116-450, and KAFB-106117-450.

- Two-phase curves suggested that the soil vapor at a given SVMP was impacted by HC diffusion from two or more sources. During the first phase, initial rapid increase was caused by a source that was close to the SVMP, and the equilibrium concentration was reached in a relatively short period (i.e., on the order of days). The second rebound phase followed an S-curve trend, which indicated the impact of a more distant source from the SVMP that contributed higher vapor concentrations. SVMPs that demonstrated two-phased rebound included SVMW-03-100, SVMW-09-100, SVMW-13-150, KAFB-106114-450, and KAFB-106128-450.

Decreasing trends observed at SVMW-02-150, KAFB-106119-150, and KAFB-106111-350 indicated that these SVMPs were located in areas that were less contaminated than the soil-vapor HC concentrations measured during the SVE operation. This resulted when the induced vapor flow pulled soil vapor through higher HC concentration portions of the vadose zone. As the soil vapor migrated through the areas of higher concentrations, COCs were picked up and then transported passed the SVMP towards the extraction well. Upon shutdown, the SVE-induced flow was eliminated, and the hydrocarbons diffused away from the SVMP and/or were biodegraded. The net result was that soil-vapor HC concentrations re-equilibrated to the surrounding conditions as reflected in the decreasing concentration trend.

3.1.2 Extent of Rebound by Depth and Area

HC concentrations and laboratory EDB, benzene, and carbon-range data were obtained from the 284 SVMPs during three quarterly vadose zone monitoring events. The Q1 event was collected during normal SVE operation. Q3 and Q4 events were performed at approximately 3 and 6 months, respectively, after the SVE system was shut down.

The following sections illustrate the spatial distribution of COCs at the site subdivided by depth bgs. Changes observed over the 6 month period are summarized for each of the COCs. Overall, the data collected point to two areas that contain residual contamination. The area with the highest contamination is beneath the leak source area in the FFOR approximately 50 to 250 feet bgs. SVMPs such as SVMW-10 and SVMW-11 (which are located at the 90° bend of the former pipeline on the eastern end of the FFOR) appear to be situated near the highest residual contamination.

The second area of residual contamination is located over the dissolved-phase benzene plume where LNAPL had previously been observed on the aquifer. This residual contamination is approximately 450 feet bgs and was the most recent area at the site to be treated with SVE.

HC, EDB, and benzene data from the three events are provided in Table 3-2 for reference.

3.1.2.1 Extent of HC Rebound

Figures 3-3 through 3-9 are depth-specific maps showing the HC results from the three quarterly soil vapor monitoring events at 25, 50, 100, 150, 250, 350, and 450 feet bgs, respectively. The figures illustrate the following HC concentration trends:

- No increasing trends were observed at approximately 25 feet bgs (Figure 3-3). All SVMPs showed very low, stable, or decreasing HC concentrations over the 6-month period. The maximum HC concentration of 70 ppmv observed on base at KAFB-106125-025 in Q1 decreased to 11 ppmv by Q4. Decreases also were observed at KAFB-106116-25, KAFB-106121-25, KAFB-106122-25,

KAFB-106125-25, KAFB-106127-25, KAFB-106130-25, KAFB-106131-25, KAFB-106132-25, and KAFB-106140-25.

- HC data at approximately 50 feet bgs are shown on Figure 3-4. An increasing trend was observed in SVMW-08-050. Four SVMPs had relatively high HC concentrations ranging from 5,000 to 33,000 ppmv (SVMW-10-050, SVMW-11-050, SVEW-02-060, and SVEW-06-060). HC concentrations in these points remained stable or decreased after SVE shutdown. All HC concentrations greater than 342 ppmv were measured in SVMPs in the FFOR area; all SVMP outside this area were equal to, or below, this value.

- Figure 3-5 shows HC concentrations measured in the SVMPs screened at 100 feet bgs. Increases were observed in four of those SVMPs (SVMW-01-100, SVMW-09-100, SVMW-02-100, and SVMW-03-100). Three additional SVMPs had Q1 HC concentrations ranging from 20,000 to 48,000 ppmv (SVMW-04-100, SVMW-10-100, and SVMW-11-100). SVMW-04-100 showed a decreasing trend after shutdown. HC concentrations in SVMW-10-100 and SVMW-11-100 remained stable. All elevated HC concentrations greater than 600 ppmv (by Q4) at 100 feet bgs were measured in SVMPs in the FFOR area or immediately east of the eastern end.

- HC data for all SVMPs screened at approximately 150 feet bgs are shown on Figure 3-6. Increasing trends were observed in two SVMPs (SVEW-03-160 and SVMW-13-150). Two SVMPs (SVMW-10-150 and SVEW-07-160) measured HC concentrations ranging from 33,000 to 41,000 ppmv, respectively. HC in SVMW-10-150 exhibited a decreasing trend, while HC in SVEW-07-160 remained stable. The SVMPs with HC concentrations above approximately 700 ppmv (by Q4) were all located in the FFOR area. HC at SVMW-13-150, located approximately 550 feet east and outside the FFOR, was measured at approximately 700 ppmv.

- HC data for all SVMPs screened at approximately 250 feet bgs are shown on Figure 3-7. Increasing trends were observed in seven SVMPs (SVMW-04-250, SVMW-09-250, SVMW-03-250, SVMW-11-260, SVEW-01-260, SVMW-09-266, and KAFB-106111-250). After 6 months, HC concentrations rebounded to a range of approximately 7,000 to 20,000 ppmv with the exception of KAFB-106111-250, which rebounded to approximately 600 ppmv. All SVMPs that showed rebound were located in the FFOR area with the exception of KAFB-106111, which is located approximately 200 feet due south of the FFOR area. Four additional SVMPs with elevated HC concentrations (SVMW-06-252, SVMW-08-250, SVMW-10-250, and SVMW-11-250) were also located in the FFOR. HC concentrations in these points remained stable throughout the test.

- Figure 3-8 shows increasing HC concentration trends in three SVMPs with their screens ranging approximately 300 to 350 feet bgs (SVEW-04-313, KAFB-106119-350, and KAFB-106128-350). After 6 months following SVE shutdown, HC concentrations rebounded to a range of approximately 1,000 to 2,500 ppmv. One SVMP (SVMW-03-300) contained approximately 17,000 ppmv HC pre shutdown; concentrations at this SVMP decreased to 14,000 ppmv after shutdown. All the SVMPs with HC concentrations greater than approximately 500 ppmv with the exception of KAFB-106128-350 were located in the FFOR area. KAFB-106128-350 is located southeast of the FFOR and over the benzene plume.

- Figure 3-9 shows increasing HC concentration trends in five SVMPs screened at approximately 450 feet bgs (KAFB-106137-450, KAFB-106117-450, KAFB-106128-450, KAFB-106114-450, and KAFB-106116-450). Rebounded concentrations ranged from approximately 700 to 4,000 ppmv. Two additional SVMPs (KAFB-106115-450 and KAFB-106125-450) showed stable HC concentrations of approximately 400 and 900 ppmv through Q4. HC contamination at 450 feet bgs was located over or immediately adjacent to the benzene plume.

3.1.2.2 Extent of EDB Rebound

Laboratory EDB results for the three quarterly events are graphed on Figures 3-10 through 3-16. SVMPs are grouped on the figures by screen depth as described above. The following EDB trends were observed.

- Twenty-five out of the 35 SVMPs screened at 25 feet bgs had non-detect EDB concentrations in Q4. The remaining 10 SVMPs had very low and stable concentrations (less than approximately 0.002 ppmv by Q4) over the 6-month monitoring period. EDB data from SVMPs with screens set at approximately 25 feet bgs are shown on Figure 3-10.

- EDB concentrations measured at 50 feet bgs ranged from non-detect to 24 ppmv (Figure 3-11). EDB concentrations above 0.14 ppmv were observed in the FFOR area during Q1. The 24-ppmv maximum EDB concentration observed during SVE operation at SVMW-10-050 decreased to 12 ppmv by Q4. The EDB concentration increased from 2.7 to 5.5 ppmv in SVMW-11-50 by Q4. Low EDB concentrations (less than 0.0061 ppmv by Q4) were observed in all SVMPs outside of the FFOR area.

- Stable or decreasing EDB concentration trends were observed at 100 feet bgs (Figure 3-12). The maximum EDB concentration of 26 ppmv was measured during Q1 at SVMW-10-100, which decreased to 13 ppmv by Q4. SVMW-11-100 remained stable through the three quarters with concentrations of 15, 21, and 15 ppmv measured during Q1, Q3, and Q4, respectively. EDB concentrations in other SVMPs around the FFOR decreased slightly or remained stable.

- Stable or decreasing trends were observed at approximately 150 feet bgs (Figure 3-13). The 6.3-ppmv maximum EDB concentration was measured during Q1 at SVMW-10-150 and decreased to 2.2 ppmv by Q4. Stable or decreasing concentrations of less than 0.33 ppmv by Q4 were observed at two other SVMPs (SVEW-03-160 and SVEW-07-160) in the FFOR area. The remaining SVMPs at approximately 150 feet bgs, both within the FFOR area and throughout the rest of the site, had low concentrations (less than 0.021 ppmv by Q4) or non-detects.

- Stable or decreasing EDB concentration trends were observed in SVMPs at approximately 250 feet bgs (Figure 3-14). The 12-ppmv maximum EDB concentration measured during Q1 in SVMW-10-250 decreased to 6.5 ppmv by Q4. Stable EDB concentrations of approximately 1 to 4 ppmv were measured in the FFOR area in SVMW-09-266, SVMW-11-260, and SVMW-11-250. Stable or decreasing concentrations below 0.41 ppmv by Q4 were observed in SVMPs (SVMW-03-250, SVMW-9-250, and SVMW-08-250) located around the points listed above. Low concentrations (less than 0.071 ppmv by Q4) or non-detections were observed at this depth throughout the rest of the site.

- Stable or decreasing EDB concentration trends were observed at approximately 300 to 350 feet bgs (Figure 3-15). The 2.1-ppmv maximum EDB concentration measured during Q1 at SVMW-03-300, which was approximately 100 feet east of the eastern end of the FFOR area, decreased to 0.95 ppmv in Q3, and then increased to 1.5 ppmv in Q4. Stable EDB concentrations between approximately 0.01 to 0.1 ppmv were observed in SVMPs that were located over the benzene plume. Low concentrations (less than approximately 0.011 ppmv by Q4) or non-detections were observed throughout the rest of the site.

- Increasing EDB concentration trends were observed between approximately 410 to 460 feet bgs in SVMPs located over the benzene plume (Figure 3-16). The 0.18-ppmv maximum EDB concentration was measured in KAFB-106117-450 during Q4. EDB in KAFB-106128-450 initially rebounded from 0.015 ppmv in Q1 to 1.1 ppmv during Q3; the concentration subsequently decreased to 0.082 ppmv by Q4. Slight increases from Q1 to Q4 were observed at some of the SVMPs located over or

immediately adjacent to the benzene plume (KAFB-106115-450, KAFB-106117-450, KAFB-106119-450, KAFB-106131-450, KAFB-106133-450, KAFB-106134-450, and KAFB-106137-450).

3.1.2.3 Extent of Benzene Rebound

Laboratory benzene results for Q3 and Q4 are summarized by SVMP screen depth on Figures 3-17 through 3-23. Q1 laboratory results were not used to assess benzene rebound because high concentrations of acetone, methyl ethyl ketone, and tetrahydrofuran released from polyvinyl chloride glue used to seal the SVMPs required laboratory dilutions prior to analysis, which drove method detection limits up and "masked" VOC concentrations that would be measurable under non-diluted analyses. The net result was that some SVMPs that typically had very low concentrations of hydrocarbon COCs, near the undiluted detection limits, were diluted to the point of non-detection. Because of the underrepresentation of hydrocarbon compounds in the Q1 samples, Q1 benzene data were not shown on Figures 3-17 through 3-23. The following benzene trends were observed based on data collected during the Q3 and Q4 events.

- Benzene concentration data from approximately 25 feet bgs are shown on Figure 3-17. SVMPs had low, stable concentrations during Q3 and Q4. The maximum benzene concentration of 0.06 ppmv was measured during Q4 at KAFB-106134-025, which is located on Kirtland AFB.

- Figure 3-18 shows the benzene concentrations measured in SVMPs with the screens at approximately 50 feet bgs. Benzene concentrations above 0.11 ppmv were observed in the FFOR area and immediate vicinity. The maximum measured concentration was 270 ppmv at SVMW-10-050 during both Q3 and Q4. Stable benzene concentrations between approximately 45 to 240 ppmv were detected at SVMW-11-050, SVEW-02-060, and SVEW-06-060. An increase was observed at SVMW-08-050 with concentrations increasing from 0.56 to 6.6 ppmv. The remainder of the SVMPs at this depth had stable benzene concentrations below approximately 0.052 ppmv.

- Benzene concentrations measured in SVMPs with screens at approximately 100 feet bgs are shown on Figure 3-19. Increasing trends were observed in five SVMPs in the FFOR area. The maximum 840 ppmv benzene concentration was measured during Q4 at SVMW-11-100. Benzene at this SVMP increased from 610 ppmv in Q3. Increases also were observed at SVMW-01-100, SVMW-09-100, SVMW-02-100, and SVMW-03-100 with concentrations ranging from 16 to 230 ppmv during Q4. SVMW-04-100 and SVMW-10-100 showed elevated but stable benzene concentrations of 160 and 510 ppmv, respectively, during Q4. The remaining SVMPs around the FFOR at this depth contained low, stable (less than 0.35 ppmv) concentrations.

- Figure 3-20 shows benzene concentrations measured in SVMPs screened at approximately 150 feet bgs. Increases were observed in three of the SVMPs at this depth as follows. The 400 ppmv maximum benzene concentration at this depth was measured during Q4 at SVMW-10-150; the concentration had increased from 130 ppmv measured in Q3. Increases also were observed at SVEW-03-160 and SVEW-07-160 with concentrations of 89 and 250 ppmv, respectively, during Q4. Benzene concentrations below 0.56 ppmv, and 10 non-detections, were observed throughout the rest of the site during Q4.

- Increased benzene concentrations were observed in four SVMPs screened at approximately 250 feet bgs (Figure 3-21). The 390 ppmv maximum concentration was measured during Q4 at SVMW-09-266, and had increased from 170 ppmv measured in Q3. Increased benzene concentrations also were observed at SVMW-08-250, SVMW-10-250, and SVEW-01-260 with rebounded concentrations in Q4 ranging from 100 to 200 ppmv. Stable concentrations between approximately 11 to 260 ppmv were observed at six additional SVMPs in the FFOR area. A benzene

concentration decrease was observed at SVMW-03-250, as concentrations declined from 68 ppmv in Q3 to 36 ppmv in Q4. Two SVMPs had stable concentrations of approximately 1 ppmv through Q3 and Q4: KAFB-106111-250, located approximately 200 feet south of the FFOR, and SVMW-15-250, located over the benzene plume and close to the SVE wells that were active during Q1, 2015 (see extraction well locations on Figure 2-1). Benzene concentrations were below 0.74 ppmv and remained stable throughout the remainder of the site at this depth.

- Benzene concentrations in SVMPs screened at approximately 300 to 350 feet bgs are shown on Figure 3-22. The 120 ppmv maximum benzene concentration was measured during Q4 at SVMW-03-300, slightly east of the eastern end of the FFOR area. Benzene at that SVMP remained stable during the rebound period. Increased benzene concentrations were observed at SVMW-15-350, SVEW-04-313, KAFB-106119-350, and KAFB-106128-350 with Q4 concentrations ranging between 1.2 and 7.9 ppmv. All of these SVMPs were located over the benzene plume. Benzene concentrations ranged from non-detect to 0.54 ppmv by Q4 across the remainder of the site at this depth and remained stable over the 6-month rebound period.

- Benzene concentrations from SVMPs screened in the range of approximately 410 to 460 feet bgs are plotted on Figure 3-23. The maximum concentration of 17 ppmv, measured at KAFB-106137-450 during Q4, had decreased from the 26 ppmv maximum measured during Q3. Benzene at KAFB-106128-450 also decreased with the 17 ppmv concentration detected in Q3 declining to 1.8 ppmv in Q4. Benzene concentrations ranging from approximately 1 to 17 ppmv were measured in SVMPs located over the benzene plume, or immediately adjacent, and remained stable. Benzene in the remaining SVMPs throughout the site at this depth was at or below 0.62 ppmv and remained stable over the 6-month rebound period.

3.1.2.4 Extent of Rebound

The vadose zone was returning to an equilibrium state as the artificial vapor flow-field induced by the CATOX SVE system was replaced by natural low-energy flow patterns, including diffusion and barometric-pumping-driven advection. Q3 and Q4 provided the first complete soil-vapor data sets from the BFF site that were not under the influence of SVE. The majority of the site, including off-base and the far southern part of the site, showed stable, low concentrations of fuel constituents in soil vapor throughout 2015.

The areas and depths of HC, EDB, and benzene rebound agreed with the time-series HC monitoring and identified two areas of the site that contained residual fuel COCs. The first area is beneath the FFOR at approximately 50 to 250 feet bgs where HC concentrations remained elevated, ranging up to 40,853 ppmv during Q4, thus indicating that residual vadose zone fuel contamination remained. EDB and benzene concentrations in this area confirmed the residual fuel with EDB ranging up to 15 ppmv and benzene up to 840 ppmv during Q4. The second area, at approximately 450 feet bgs, is located over the benzene plume (to the east of the FFOR) and had HC concentrations up to 4,190 ppmv, EDB up to 0.18 ppmv, and benzene up to 17 ppmv by Q4, which suggested that a residual source of contamination remained at or near that depth.

3.2 In Situ Respiration Results

In situ respiration monitoring was conducted during the 90-day time-series field monitoring following SVE shutdown using the Horiba; O_2 and CO_2 were also analyzed in Q4 soil-vapor samples using the Horiba. Soil-vapor O_2 was monitored to assess biorespiration rates in the vadose zone; CO_2 levels were monitored as a secondary biorespiration indicator.

3.2.1 Oxygen Utilization

In situ respiration monitoring is an effective tool for assessing biodegradation of contaminants, including petroleum hydrocarbons. At fuel release sites, microbial activity causes aerobic biodegradation of the fuel constituents, which consumes O_2 and produces CO_2. Respiration monitoring at the BFF entailed collecting a baseline sample set from 63 SVMPs, while the SVE system was operating and the soil-vapor O_2 concentrations were at the maximum values, then turning off the SVE system and collecting a time series of samples from the 63 SVMPs over the first 2 weeks and measuring HC, O_2, and CO_2 using field instruments (described in Section 2.2.2). After the initial 2-week period, HC, O_2, and CO_2 monitoring continued at the reduced 34-SVMP network for the remaining 2½ months of the field test. The O_2 data were plotted over time to define the O_2 utilization rate on a percent-per-unit time basis, which was then used to calculate a hydrocarbon degradation rate (graphs in Appendix B).

Oxygen utilization, observed as decreasing O_2 concentrations with time, which is greater than the utilization rate observed in background locations (i.e., non-contaminated locations), is a direct measure of microbial degradation of the fuel contaminants (in the absence of other hydrocarbon sources). Carbon dioxide is monitored to confirm that the O_2 utilization is due to microbial respiration, and the correlation between total hydrocarbon concentrations and oxygen utilization confirms that the utilization is the result of hydrocarbon biodegradation.

SVMPs KAFB-106122-150, KAFB-106140-150, and SVMW-12-450 were included as background wells. These SVMPs have near zero HC concentrations and near atmospheric O_2 (~20.8%) and CO_2 (~0.04%) concentrations. These SVMPs remained at atmospheric O_2 and CO_2 concentrations for the duration of the test.

During the baseline measurement, 35 of the 63 SVMPs contained O_2 at concentrations of 19.0% or higher. Baseline O_2 measurements varied from 9.4% to 18.96% at the remaining SVMPs. Typically, higher hydrocarbon values were accompanied by lower O_2 values and CO_2 elevated above background, thus indicating degradation of fuel constituents by native bacteria. After the SVE shutdown, O_2 and CO_2 levels were measured at the frequency described in Section 2.3.3. Substantial decreases in O_2% were observed at 13 SVMPs over the 90-day time-series monitoring; locations; percent changes are summarized below. The Q3 O_2 values were used as the ending points for the SVMPs that were only monitored for the first 2 weeks of the test so that all of the 63 SVMPs could be evaluated:

- SVMW-11-050—decreased from 12.73% to 3.12%
- SVMW-03-100—decreased from 17.65% to 5.35%
- SVMW-10-150—decreased from 12.36% to 7.34%
- SVMW-13-150—decreased from 20.27% to 16.34%
- SVEW-03-160—decreased from 10.82% to 1.69%
- SVMW-03-250—decreased from 18.28% to 7.76%
- SVMW-11-250—decreased from 13.78% to 2.37%
- SVMW-10-250—decreased from 17.39% to 11.41%
- SVMW-09-266—decreased from 17.42% to 13.95%

- SVMW-03-300—decreased from 9.4% to 2.49%
- KAFB-106117-350—decreased from 17.72% to 14.47%
- KAFB-106117-450—decreased from 20.26% to 13.37%
- KAFB-106128-450—decreased from 18.44% to 15.08%

Seven additional SVMPs showed O_2 decreases of approximately 1% to 3% over the 90-day monitoring period. The remaining SVMPs had no discernible change in O_2% during the 90-day monitoring period.

During Q1, Q3, and Q4, O_2% was measured before collecting vapor samples for laboratory analysis. The O_2 data were used to assess biorespiration within the portion of vadose zone covered by the 284 SVMPs. In addition to the SVMPs identified above, the additional 16 points listed below displayed post-SVE shutdown drops in O_2 of greater than 3% for a total of 29 SVMPs showing decreases of greater than 3% over the 6-month period.

- SVMW-03-050—decreased from 20.26% to 8.77%
- SVMW-09-050—decreased from 18.15% to 12.42%
- SVMW-10-050—decreased from 16.35% to 7.99%
- SVEW-02-060—decreased from 12.86% to 0.53%
- SVEW-06-060—decreased from 9.41% to 5.82%
- SVMW-08-100—decreased from 18.43% to 11.89%
- SVMW-09-100—decreased from 13.79% to 10.16%
- SVMW-10-100—decreased from 14.99% to 8.91%
- SVMW-11-100—decreased from 11.7% to 2.8%
- SVMW-04-250—decreased from 18.81% to 15.59%
- SVMW-08-250—decreased from 12.64% to 9.64%
- SVMW-09-250—decreased from 18.06% to 12.52%
- KAFB-106128-250—decreased from 19.6% to 15.58%
- SVEW-01-260—decreased from 19.46% to 0.57%
- SVMW-11-260—decreased from 13.6% to 0.97%
- KAFB-106128-350—decreased from 19.74% to 16.38%

Numerous SVMPs also had O_2 reductions of 1% to 3% after shutdown. SVMPs that showed reductions in O_2 were located in areas where there is residual fuel contamination, mainly the FFOR area at approximately 50 to 250 feet bgs, and the southeastern and central part of the site at approximately 350 to 450 feet bgs over the benzene plume.

No SVMPs were below 5% O_2 during Q1 when the SVE system was operating. A total of 10 SVMPs, listed below, had O_2 below 5% during Q4, approximately 6 months after shut down.

- SVMW-11-050
- SVEW-02-060
- SVMW-03-100
- SVMW-11-100
- SVEW-03-160
- SVMW-03-250
- SVMW-11-250
- SVMW-11-260
- SVEW-01-260
- SVMW-03-300

O_2 is expected to continue to drop in some additional points as ambient O_2 is not being supplied at a high enough rate to overcome the O_2 utilization rate in these areas. O_2 utilization rates were calculated as the slope of the linear portion of the O_2 versus time curve, which extended from baseline measurements until the measured O_2 reached 5%, which was the rate-limiting O_2 concentration for hydrocarbon biodegradation. The results are provided in Table 3-3. O_2 utilization rates across the site varied from 0% to 3.15% per month, and the higher O_2 utilization rates were observed at SVMPs that were characterized with higher HC concentrations.

O_2 utilization rates were used to calculate the corresponding hydrocarbon biodegradation rates also shown in Table 3-3. Because the BFF contamination was mostly fuel hydrocarbons, hexane was used as the representative hydrocarbon, and the stoichiometric relationship below was used to calculate the biodegradation rates (EPA, 1995):

$$C_6H_{14} + 9.5O_2 \rightarrow 6CO_2 + 7H_2O \qquad \text{(Equation 1)}$$

Based on the above stoichiometry, 9.5 moles of O_2 are required to degrade 1 mole of hexane all the way to CO_2 and water. On mass equivalents, it takes 3.5 grams of O_2 to degrade 1 gram of hydrocarbon (hexane). The relationship does not include the portion of the organic molecule that would go into the production of new biomass, and therefore, the biodegradation rates listed in Table 3-3 are conservative.

The O_2 utilization rate was used to calculate the corresponding biodegradation rate using the following equation (EPA, 1995).

$$-k_b = \frac{-\frac{k_O}{100}\theta_a \frac{1L}{1{,}000cm^3}\rho_{O_2}C}{\rho_K\left\{\frac{1kg}{1{,}000g}\right\}} = \frac{-kO\theta_a\rho_{O_2}C(0.01)}{\rho_k} = 0.47k_0 \qquad \text{(Equation 2)}$$

Where:

k_b = biodegradation rate (milligrams/kilogram-day) shown in Table 3-3

k_o = oxygen utilization rate (percent/day) taken from Table 3-3

ρO_2 = density of oxygen (1,051.7 milligrams per liter at approximately 5,300 feet above mean sea level)

C = mass ratio of hydrocarbons to oxygen required for mineralization (1:3.5 from Equation 1)

ρ_k = soil bulk density (1.86 gram per cubic centimeter [g/cm^3])

θa = gas-filled pore space (volumetric content at the vapor phase, cubic meters gas/cubic centimeter soil)

$$\theta a = \theta - \theta w \qquad \text{(Equation 3)}$$

Where:

θ = total porosity (cubic centimeter per cubic centimeter [cm^3/cm^3])

θw = water-filled porosity (cm^3/cm^3)

$$\theta = 1 - \frac{\rho_k}{\rho_T} \qquad \text{(Equation 4)}$$

Where:

ρ_k = soil bulk density (1.86 g/cm^3)

ρ_T = soil density (2.65 g/cm^3)

$$\theta w = M\frac{\rho_k}{\rho_T} \qquad \text{(Equation 5)}$$

Where:

M = soil moisture (assumed to be 2% or 0.02 cm^3/cm^3)

The value for k_o was taken from Table 3-3. The remaining input values were based on data obtained from the site when available, or from industry standards and published literature. The value for θ_a was estimated in accordance with the steps outlined in the EPA manual for *Bioventing Principles and Practice* (EPA, 1995).

The in situ respiration test results confirmed that hydrocarbons were degrading in the vadose zone; however, microbial activity, as reflected by O_2 utilization and the biodegradation rates in Table 3-3, was much lower than expected.

The maximum biodegradation rate observed in the BFF vadose zone during the SVE shutdown test was 0.0753 milligram per kilogram per day (mg/kg/day) and was measured at SVMW-11-50 (located in the FFOR area). Biodegradation rates were observed at 29 other fuel release sites across the country during the early to mid-1990s as part of the Air Force Center for Environmental Excellence (the predecessor of the Air Force Civil Engineer Center) bioventing initiative, and the EPA bioremediation field initiative (EPA, 1995). The 29 sites contained residual benzene, toluene, ethylbenzene, and xylenes compounds ranging from 0.51 mg/kg/day to 91.39 mg/kg/day with an average degradation rate of 14.28 mg/kg/day (EPA, 1995). While the maximum biodegradation rate measured at the BFF was an order of magnitude lower than the lowest observed at fuel sites during the bioventing initiative and over two orders of magnitude lower than the average, the observed BFF maximum rate was comparable to the 0.061 mg/kg/day biodegradation rate measured at Kirtland AFB Fire Training Area (FTA) 13 under the initiative (EPA, 1995). Kirtland AFB FTA 14 also was tested under the initiative and yielded a 0.055 mg/kg/day biodegradation rate, which was within the range of the observed BFF rates, but lower than rates reported for other FTA sites across the country (EPA, 1995). Additionally, the residual contamination at FTA sites can be quite different than the contamination at fuel release sites as FTA sites can contain combusted fuel COCs and other non-fuel COCs used as part of training. Additionally, due to combustion and volatilization at the surface at FTAs, these sites will often have lower fractions of light weight fuel COCs such as residual benzene, toluene, ethylbenzene, and xylenes. For example, FTA 14 did not contain measurable quantities of these COCs.

3.2.2 Water-Activity Monitoring

O_2 utilization and resulting biodegradation rates were lower than expected, based on known rates observed at other fuel-contamination sites where in situ respiration tests had been performed as discussed above. A bioventing initiative site with a semi-arid climate at the Marine Corps Air Ground Combat Center, Twentynine Palms, California, showed similar results where high respiration rates were expected, but very low rates were observed. At this site, the low soil moisture content, ranging from 2% to 4% by weight, appeared to inhibit microbial activity. Although the site was contaminated with jet fuel, the typical reduction of O_2 concentrations during microbial respiration (until it reached the 5% O_2 limitation) was not observed. In fact, O_2 was not consumed to below approximately 12% over 4 months after venting was terminated (see Figure 3-24). At that concentration, O_2 diffusion became sufficient to meet the demand from the limited microbial activity. The site was irrigated to increase the water content, which resulted in dramatically increased microbial activity with O_2 concentrations in the vadose zone decreasing rapidly to below 1%. The increased respiration was in line with other sites with similar hydrocarbon contamination.

While the tests conducted at Twentynine Palms demonstrated that the microbial activity was water-content limited, it would be more accurate to conclude that the limitation was due to low a_w. Water activity is the ratio between the water contained in the fluid (soil-vapor) and the maximum water admissible by the fluid. Water activity is measured on a scale from 0 to 1, where 0 is a completely dry fluid and 1 is a fully saturated fluid via the relationship below.

$$a_w = P / P_0 \qquad \text{(Equation 6)}$$

Where:

P = is the partial pressure of water vapor found in the fluid at a known temperature

P_0 = is the saturated vapor pressure at the same temperature as "P"

Equilibrium relative humidity and a_w are related as follows (Barbosa-Cánovas and Juliano, 2007):

$$a_w = \%ERH / 100 \qquad \text{(Equation 7)}$$

To assess the potential for low a_w as the cause of the observed low O_2 utilization rates at the BFF, soil-vapor ERH was measured as a direct indicator of a_w in the vadose zone at the BFF site using the above equations. The majority of bacteria grow at greater than 0.90 a_w (Stevenson et. al., 2015). Water activity effects on microbial activity can be seen at 0.97 a_w, and a majority of bacteria become growth limited at 0.95 a_w including species of *Pseudomonas, Escherichia, Proteus, Shigella, Klebsiella*, and *Bacillus* (Tapia et. al., 2007; Wood, 2015). Growth of a limited number of salt-tolerant bacteria may occur at values as low as 0.90 or even 0.85 a_w. Highly halophilic bacteria have been shown to survive down to 0.75 a_w (Tapia et. al., 2007; Stevenson et. al., 2015). However, from a bioremediation perspective, less than 0.95 a_w would likely limit most degrading bacteria, and below that biodegradation will not occur optimally.

Soil-vapor ERH measurements were made at several of the SVMPs during the 90-day monitoring and at all 284 SVMPs during the Q4 sampling event. ERH values collected during April, May, and October 2015 are presented in Table 3-4 and are summarized below.

- April 9, 2015—ERH was measured at 9 SVMPs at depths of 100 to 450 feet bgs. ERH ranged from 21.4% to 57.1% (a_w of 0.21 to 0.57). There was no discernible pattern observed based on depth or location.

- April 17, 2015—ERH was measured at 11 SVMPs (the same as above and 2 additional SVMPs). ERH ranged from 52.7% to 99.9% (a_w of 0.53 to 0.99).

- May 12, 2015—ERH was measured at 62 SVMPs (the SVMPs included in the 90-day monitoring period with the exception of one port that was inaccessible due to vault design). ERH ranged from 49.9% to 82.5% (a_w of 0.5 to 0.83).

- Q4—ERH was measured at 265 SVMPs (the additional 19 ports were inaccessible due to vault design or access issues due to well location). ERH ranged from 36.2% to 99.9% (a_w of 0.36 to 0.99).

During the Q4 event, 81 SVMPs had a_w measurements of greater than or equal to 0.95, thus indicating that biorespiration would not be limited by a_w at these locations. However, 184 SVMPs had a_w measurements less than 0.95 which will limit biodegradation at the BFF site. In addition, 125 of those SVMPs had a_w measurements less than 0.80 which will severely limit biodegradation at these locations. These trends would be expected after 12 years of operating an SVE system at the site. The vadose zone near the SVM locations had become dehydrated and was negatively affecting bacterial activity.

4. CONCLUSIONS

The following conclusions were determined based on the data collected just prior to, and up to 6 months after SVE shutdown at the BFF site.

- The limited hydrocarbon concentrations in the shallow SVMPs (25 feet bgs or shallower) indicated that the residual fuel contamination likely does not pose a vapor risk nor a risk of exposure to on-site workers. This risk will be evaluated in the risk assessment attached to the Resource Conservation and Recovery Act Investigation Report, which will be submitted as a separate report to NMED for approval.

- Residual fuel contamination observed in proximity to the FFOR area on-base at depths of approximately 50 to 250 feet bgs, and in the deep vadose zone overlying the benzene plume at 450 feet bgs to the east and south of the FFOR, would benefit from additional interim remediation efforts.

- Rebound was nearing completion in the majority of the vadose zone after 6 months following SVE shutdown; however, continuing HC concentration increases at nine on-base SVMPs (SVMW-08-050, SVMW-01-100, SVMW-09-100, SVMW-04-250, SVMW-11-260, SVEW-01-260, SVMW-09-266, KAFB-106119-350, and KAFB-106128-350) indicated that equilibrium conditions had not been completely established throughout the BFF area.

- The SVE system maintained non-limiting aerobic conditions within the contaminated portions of the vadose zone (i.e., O_2 at all SVMPs was greater than 9% pre-shutdown).

- The vadose zone remained biologically active following SVE shutdown, and biodegradation continued to play a substantial role in remediating the residual fuel hydrocarbons.

- Low a_w was suppressing biological activity at suboptimal levels in portions of the vadose zone. Rebounding a_w indicated a natural propensity for some “rehydration” of lower a_w-portions of the vadose zone, with moisture moving from the water table and tighter soil strata that were not as severely desiccated by years of SVE operation.

- Concentration trends provided lines of evidence that EDB was degrading in the vadose zone under very low O_2 conditions. Lines of evidence included low O_2, (less than 4.5% at the 250-foot deep SVMP listed below and less than 1.5% at the other two) accompanied by decreasing or stable EDB concentrations and increasing or stable benzene and HC concentrations, such as observed at SVMW-03-100, SVMW-03-250 and SVMW-03-300. Anaerobic biological reductive debromination, abiotic reductive debromination, and/or hydrolysis were the more likely degradative processes.

5. RECOMMENDATIONS

The SVE shutdown test has provided valuable insight into the residual vadose zone contamination and the biodegradation capacity of the vadose zone. The following recommendations have been formulated based on the observations to date, and on information gleaned from the cited literature. These recommendations will facilitate both the monitoring and treatment of the remaining fuel hydrocarbon contaminant in the BFF vadose zone.

1. It is extremely valuable to understand how the vadose zone reacts under equilibrium or near steady state conditions. Vapor-phase hydrocarbons will rebound to the point where advective and diffusive transport of oxygen meets the demands imparted by hydrocarbon biodegradation kinetics. Because this is important for selecting and optimizing a technology such as bioventing, it is recommended to continue the SVE shutdown test at least two additional quarters, which would extend the test period to one year. Based on the rebound trends discussed above, the data collected during Q1 and Q2 2016 soil-vapor monitoring events will be sufficient to complete the rebound, and in situ respiration, assessments.

2. The soil-vapor monitoring program at the BFF site should be optimized. Sixty-four percent of the 284 currently monitored SVMPs had non-detect to low HC concentrations (less than ~20 ppmv) and remained aerobic over the first 6 months of shutdown testing. The collected data suggest that the vadose zone has substantially been remediated, and a large portion of the SVMPs are located in clean soil. The vadose zone monitoring program is at the point where optimization to evaluate analytical suite, frequency, and size of the SVM network is warranted. The VZWG should be tasked with completing an optimization and submitting the outcomes for review and approval by NMED.

3. The in situ respiration test confirmed that biodegradation is occurring in the vadose zone and the localized residual contamination profile indicated that it would be appropriate to switch from SVE to a bioremediation-based approach. It is recommended that active aerobic bioventing be implemented as an interim measure to address residual hydrocarbon in the FFOR area on-base in the vadose zone. It is strongly recommended that the bioventing interim measure include hydration to increase vadose zone a_w to levels that support optimal hydrocarbon biodegradation. Previous bioventing efforts have shown dramatically-increased biodegradation when water was added in arid climates (see Section 3.2.2).

4. The residual hydrocarbon in the deep vadose zone to the east of the FFOR area over the benzene plume on-base would benefit from active remediation and the data discussed in this report indicate that a bioremediation approach is warranted. Because the contamination is close to the current water table, adding water might facilitate transport of contaminant from the vadose zone to the aquifer. As such, conventional bioventing with water management as recommended for the FFOR area, might not be appropriate. Therefore, it is recommended that an innovative approach that combines groundwater treatment with vadose zone treatment be considered. One such technology is a combined air-lift groundwater circulation with bioventing. The technology uses air lift to agitate groundwater in and around the well, air sparging then promotes transfer of hydrocarbons from the aqueous phase (i.e., groundwater) to the vapor phase (i.e., injected air) as the water and air rise in the well. The well is screened across the water table (i.e., partly in the aquifer, partly in the vadose zone). Groundwater in the well is air-sparged and air-lifted, and leaves the well at the top of the submerged portion of the screen to return to the aquifer. The hydrocarbon-laden vapor leaves the well from the unsubmerged screen section and enters the vadose zone. The groundwater continues to carry some residual hydrocarbon and elevated dissolved O_2, which circulate in the aquifer to support degradation of the aqueous and non-aqueous phase hydrocarbons. The vapor carrying the volatile hydrocarbons and

substantial moisture flows into the lower vadose zone and supports aerobic biodegradation. Additionally, the availability of primary substrates, such as toluene, can facilitate aerobic cometabolism of EDB in both the groundwater and vadose zone (Battelle, 1995).

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APPENDIX A

Soil-Vapor Sampling and Field Analysis Procedure

Soil-vapor Sampling and Field Analysis Procedure

1.1 Introduction

All field personnel collecting soil-vapor samples are required to be trained and fully understand the sampling procedure outlined in this document. Soil Vapor Monitoring Points (SVMPs) and Soil Vapor Extraction (SVE) wells at the BFF site have been capped and sealed to minimize barometric-pumping interferences on sampling and analyses. Sealing the points/wells was done by securing an air-tight cap onto each point/well head and adding a female pneumatic quick connect fitting to each point/well that will serve as a sampling port for ease of access and to ensure that an air-tight seal is maintained. Each well port will be examined by the field personnel to confirm the integrity of each fitting and to immediately address and mitigate any problems or replace any defective parts.

1.2 Pre-Sampling Steps

1.2.1 Horiba Model MEXA 584L Calibration

It should be noted that the Horiba instrument can effectively measure petroleum hydrocarbons, O_2 and CO_2, which are the three parameters of concern for monitoring the effectiveness of vadose zone remediation technologies such as SVE and bioventing. However, the Horiba is sold as an engine exhaust monitoring instrument and the use for soil-vapor monitoring is different that the manufacture's intended purpose. While not the primary selling point of the instrument, the Horiba's sampling ability and the non-dispersive infrared detector (NDIR) and chemical cell detector make it a good instrument for total soil-vapor hydrocarbons (reported as hydrocarbons (HC)), CO_2 and O_2 analyses.

Various engine exhaust and leak detection instruments are routinely used in the field for soil-vapor monitoring, but their use is often tailored to provide more representative data. CB&I evaluated the Horiba manufacturer's calibration procedure, which was developed for engine exhaust monitoring, and determined that a modified calibration method was in order to better ready the instrument for measuring soil-vapor petroleum hydrocarbon, O_2 and CO_2 concentrations. The manufacture's calibration procedure can be found in the instruction manual for the instrument. The modified calibration method will outperform the manufacture's process for soil-vapor monitoring, and includes a more representative calibration gas, more frequent calibration than specified by the manufacturer, frequent calibration checks (HC, O_2 and CO_2) during daily Horiba usage, and real-time data analysis to look for indicators of potential calibration deviations. At the start of each work day, the Horiba will be calibrated for petroleum hydrocarbons, O_2 and CO_2 against a calibration standard of known concentrations in a premixed gas cylinder. Additional calibrations as well as calibration checks, or bump tests, can also be performed throughout the day. The same calibration gas mixture will be used to calibrate every Horiba instrument to ensure consistent calibrations. The calibration gas consists of 1,600 ppmv propane, 13.0% CO_2, and the remaining volume will consist of nitrogen. This calibration gas mixture was selected to accurately calibrate the horiba for the gases that are present in the vadose zone during SV sampling and respiration/ rebound testing, specifically, CO_2 and HC (calibrated as propane).

The instrument will be calibrated by applying the premixed gas into the calibration port located on top of the instrument. The calibration steps listed in the Horiba manual for applying the calibration gas and the sequence of key strokes listed will be followed to complete calibration. After calibration, HC and CO_2 concentrations should be within 5% of the known calibration gas values.

The initial calibration will be done by following the procedure laid out in the Horiba Instruction Manual. This manual goes through the calibration of each compound. During the calibration of HC, the Horiba will display three numbers as shown in the Horiba Instruction Manual. The top number is the known value of the calibration gas (propane at 1,600 ppmv). The middle number will be constant for a particular instrument but will vary from instrument to instrument; this number is the factory calibration setting for

that instrument that corresponds to the input value of the calibration gas. The bottom number will change as the calibration gas is applied and read by the instrument. Both the middle and bottom numbers are reporting the gas as hexane rather than propane; hexane is the standard for HC for the Horiba instrument. The conversion between hexane and propane for the Horiba is approximately one half. Thus, a reading of 800 ppmv reported as Hexane by the detector is the equivalent of 1,600 ppmv as Propane. Once the gas is applied, the bottom HC number on the display should read within 5% of the middle number. A value of approximately 800 ppmv HC or slightly higher is expected after the Horiba instrument is calibrated. Complete the calibration process for CO_2 as outlined in the Manual using the calibration gas. Complete the calibration process for O_2 as outlined in the Manual to atmospheric oxygen.

After calibration is confirmed, the same calibration gas will be used to fill a 3L Tedlar® gas sampling bag. The customized sampling system shown in Figure 1 will be used to complete the calibration as follows.

Step 1 – Disconnect all quick connect pneumatic fittings from sampling system with the exception of the nylon hose. This ensures the system is sealed from all points except through the hose.
Step 2 – Visually check that the red drain separator O-ring (approximately 2-inches in diameter) is visible at the opening of the sample inlet port, which is located on the front of the Horiba and to the right of the screen display. Insert the male pneumatic fitting on the end of the Horiba sampling tube to the female quick connect on the sampling system and ensure a secure fit.
Step 3 - Ensure that the sampling system is purged according to the steps listed below under Section 1.2.2 Cross Contamination Purging for Sampling System.
Step 4 - Once within the given values, attach the Tedlar® bag to the male pneumatic fitting at the end of the braided stainless steel tubing.
Step 5 - Open the Tedlar® bag valve to allow the calibration gas to be pulled through the sampling system.
Step 6 – Record the instrument readouts when the instrument has stabilized and compare the results to the calibration gas concentrations.

If the values for HC, O_2 and CO_2 are within 5% of the calibration values made using the calibration port, the calibration process is complete. As stated previously, the Horiba readouts for HC are reported as Hexane. A value of approximately 800 ppmv HC is expected. All other gas composition values should match the calibration gas values. Note that O_2 will drop to approximately 0.0% since the calibration gas contains no O_2. If values are outside of this range, perform a leak check as described in Section 1.2.4 and follow the calibration process again.

If at any point during sampling, a reading for HC, O_2 or CO_2 reaches an unreasonable value (e.g., an O_2 concentration greater than 22%) or if a data value falls outside the trend indicated by previous readings at a given SVMP, a calibration check should be triggered. The expected range of values for HC is from 0 to 30,670 ppmv, 0% to 22% for percent O_2 and 0% to 12% for percent CO_2. If any readings are outside of this range, a calibration check must be made and if necessary the instrument will need to be recalibrated.

During respiration testing, O_2 readings could fall to near zero; however, tracking to 5% is all that is needed for calculating biodegradation rates.

1.2.2 Cross Contamination Purging for Sampling System

The sampling system must be purged with ambient air before being attached to a SVMP to minimize the potential for cross contamination between sample collections. To ensure the entire sample train is thoroughly purged, attach the pump to the setup and flush air through each quick connect port and the stainless steel tubing. All quick connect pneumatic fittings are to be opened during this process by placing a male end into the female fitting to allow flow. Monitor the purging effectiveness using the Horiba to ensure no contaminants are still present and ambient air is being read by the Horiba. Values for ambient air are less than 5 ppmv hydrocarbons, between 20% to 22% percent O_2, and approximately 0% CO_2. Purging the sample system must be done after sampling each SVMP.

1.2.3 Leak Check of Sample System

At the beginning of each day, the sampling system will be leak checked by using a pump to apply vacuum to the sampling system as follows.

Step 1. Cap the male pneumatic fitting on the end of the sample system with a vacuum/pressure gauge fitted with a female pneumatic fitting (see Figure 2).
Step 2. Connect the purging/sampling pump to one of the quick disconnect fittings on the sample system and evacuate the air from the sample system to establish a vacuum.
Step 3. Disconnect the pump and record the vacuum reading from the pressure/vacuum gauge.
Step 4. After approximately 10 minutes have elapsed, check and record the vacuum reading on the gauge.
Step 5. Verify that the starting and ending vacuum matches to ensure that the sampling system is not leaking.
Step 6. If the two vacuum readings do not match, check the conditions of the seals and repeat the leak test until the sampling system is confirmed to be air tight. Sample systems will need to be disassembled and cleaned periodically to remove dirt and other debris from the system and quick connects.

1.3 Sampling Procedures

1.3.1 Sample System Setup

The Horiba must be on and calibrated according to section above and then attached to the sampling system. The Horiba is turned on for the first time at the beginning of the day and then remains in the on position throughout the day. The Horiba can be plugged into the 12V DC outlet in the truck and the truck kept running throughout the day. All other equipment can be powered by generator and may be powered off in-between wells. The vacuum pump is attached and sealed to the sample system by a quick connect fitting. It is important that no pneumatic fittings besides the tubing to the well port (see Figure 3) be attached prior to turning on the pump.

1.3.2 Static Pressure Measurement

Before taking the static pressure reading, the manometer instrument must be zeroed to atmospheric pressure. The screen should read “0.00 in WC” after calibrating. After confirming that the manometer is zeroed, the following procedure is used to connect the sampling system to the SVMP, measure the static or baseline pressure, and to prepare for purging and sampling.

Step 1. Insert the male quick connect fitting on the end of the sample system to the female quick disconnect fitting on the top of the SVMP and ensure a secure connection.
Step 2. Verify that the manometer reads 0.00 in WC in atmosphere.
Step 3. Connect the manometer to one of the identical quick connects on the end of the sample train.
Step 4. Monitor the change in manometer readings over time and record the pressure/vacuum reading when the meter stabilizes. The manometer should stabilize quickly when attached to the SVMP.

Note: Static pressure readings at SVMP while the SVE system is off typically range from approximately +2.5 in WC (pressure) to -2.5 in WC (vacuum). Static pressures in SVMPs are heavily influenced by barometric pressure and fluctuate daily and seasonally whether or not an SVE system is operating.

1.3.3 Well Purging

Stagnant vapor is purged from the SVMPs as follows prior to field and laboratory sampling.

Step 1. Turn on the vacuum sampling pump, verify the operation of the flow rotameter, and check for potential leaks as necessary.
Step 2. Consult the Purge Table (see Attachment 1) for the initial purge volume for each individual SVMP.
Step 3. Connect the female quick disconnect on the terminal end of the sampling system to the male quick connect on the vacuum side of the sampling pump and start timing the purge cycle. Note the flow rate on the rotameter and use the pre-calculated purge volume to quickly calculate the exact purge length time. *
Step 4. After purging for the appropriate time, quickly disconnect the sampling system from the vacuum pump and attach the manometer to collect a post-purge static pressure reading. (**Note: the sampling system is to remain connected to the SVM point for the duration of sampling.**)
Step 5. Allow the manometer reading to return to within 0.05 in WC of the pre-purge static pressure reading before moving to the next step in the sampling procedure. Most wells should equilibrate very quickly. If a well does not equilibrate back to the pre-purge static pressure it could indicate a blockage in the well casing or screen.

*The purge time is determined by the well diameter (including the screen), well depth, and flow rate of the pump; all of which are known before sampling with the exception of the flowrate. The amount of vapor needed to be removed is based on one well casing volume. This is assuming laminar flow of air to remove stagnant vapor from the well casing.

1.3.4 Horiba Readings

Once the SVM point has been purged, the following procedure is used to take and record HC, O_2 and CO_2 measurements using the calibrated Horiba instrument.

Step 1. Ensure that the Horiba is turned on, calibrated, and functioning properly. The pump on the Horiba instrument should be audible before any recordings are made.
Step 2. Record the manometer reading for the post-purge pressure as described above.
Step 3. Insert the male quick connect fitting on the end of the Horiba instrument into the female quick connect fitting on the terminal side of the sampling system and ensure a tight connection. The Horiba should read the soil-gas concentrations fairly quickly.
Step 4. Observe the Horiba O_2 reading for stability or for a maximum of one minute, whichever comes first. Parameters for most wells will stabilize fairly quickly.
Step 5. Record the O_2, CO_2 and HC readings and quickly disconnect the Horiba.

1.3.5 Bottle-Vac™ Sampling

The following procedure will be used when collecting Bottle-Vac™ samples for laboratory analyses. Note: the sample system must still be connected to the SVM Point.

Step 1. Check the vacuum in a Bottle-Vac™ prior to sampling by taking a vacuum reading using a lab supplied vacuum gauge. The gauge is connected to the bottle through a lab-supplied quick connect set in the same way that the bottle is connected to the sampling system. (Note: Bottles are required to have between 24 and 26 inches of Mercury (in Hg) of vacuum. If a lower vacuum is measured, do not use the Bottle-Vac™ for sample collection.) Record the measured bottle pressure on the SCL.
Step 2. Connect the Bottle-Vac™ to the specialized female pneumatic connection on the sample system (see Figure 4); the sample container will begin to fill.
Step 3. Disconnect the Bottle-Vac™ after approximately two minutes and check the pressure in the sample container with the manometer. The manometer should read 0.0 in Hg of vacuum. If there is still a positive vacuum reading, re-attach the Bottle-Vac™ to the sampling system for two additional minutes before checking the pressure once more; repeat as necessary. Since the sample container is under vacuum, it should fill fairly quickly at most SVM points.

1.3.6 Optional Soil-gas humidity measurements

A humidity probe, such as the one in Figure 5, is used to collect soil-gas humidity and temperature measurements after SVM point purging and sample collection. The humidity probe should be calibrated each day it is used following the manufacturer instructions. The instrument is calibrated by inserting the probe into a closed container that has air headspace over a saturated salt solution. The first solution is NaCl (approximately 75% humidity) followed by $MgCl_2$ (approximately 35% humidity). The probe must be kept at a steady temperature while being calibrated.

Once calibrated, the humidity probe can be connected to a SVM point as shown in Figure 5 or by another similar device. The probe end of the instrument should be sealed so that only soil-gas humidity is being read. Once connected to the SVM point a vacuum pump will need to be connected to the top of the flow-through chamber via the female quick connect at the top of the chamber so that soil-gas is pulled past the probe. The instrument will not read as accurately in non-moving air. It is recommended to record both the temperature and relative humidity of the soil-gas.

Soil-gas humidity measurements can be used to evaluate the water activity potential in the vadose zone for the assessment of natural biodegradation conditions.

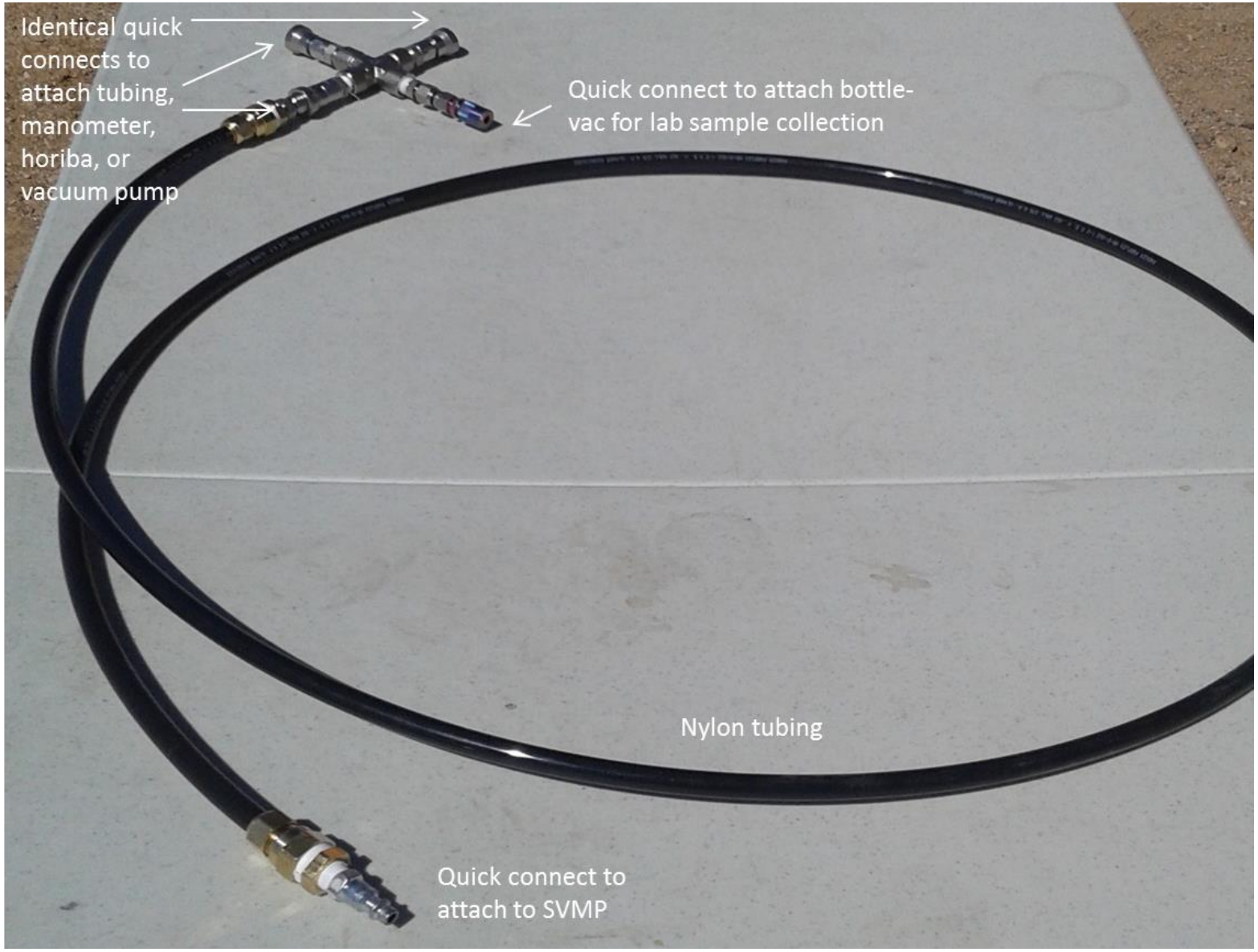


Figure 1: Soil-Vapor Sample System

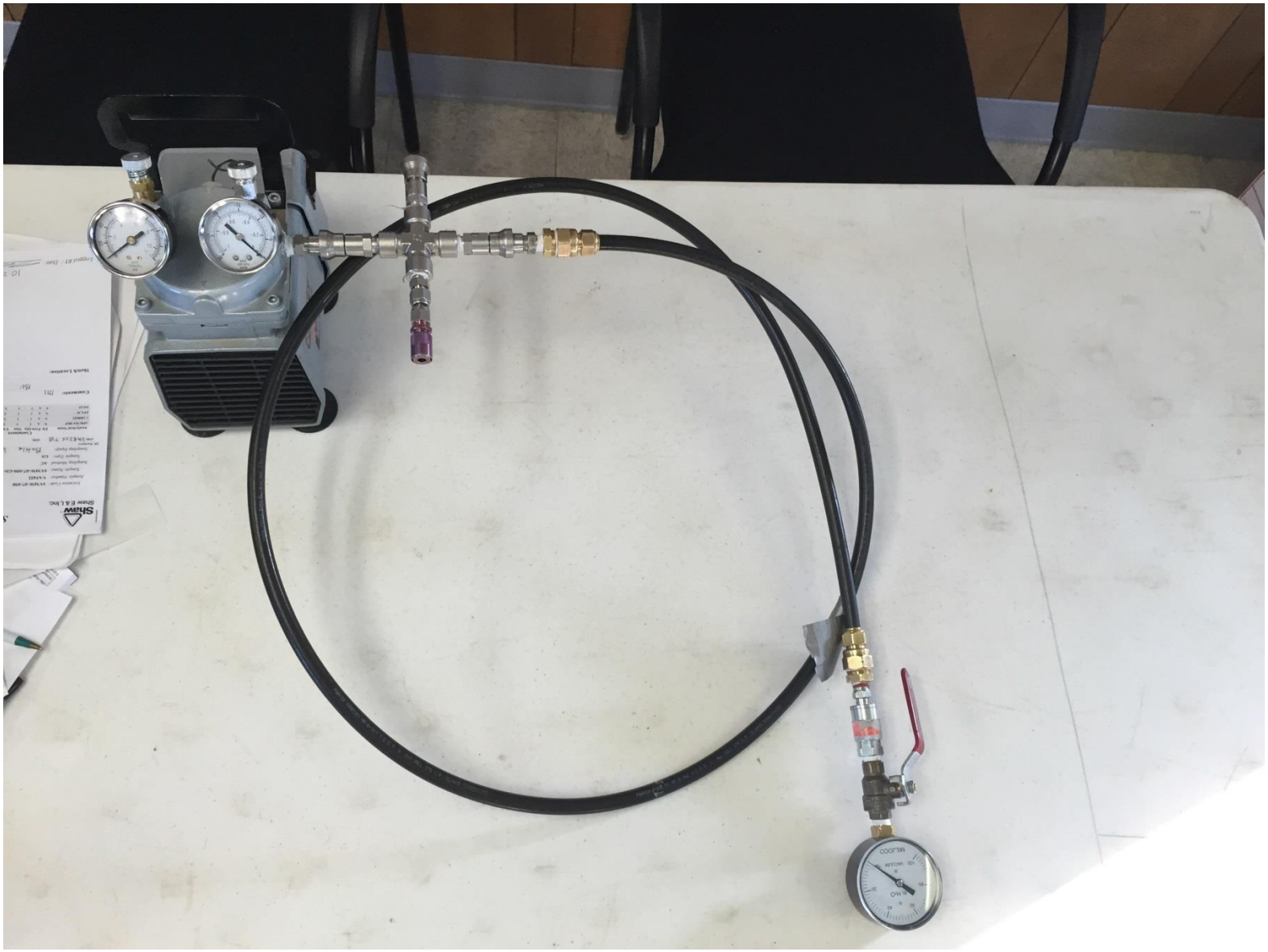


Figure 2: Vacuum gauge attached to sample system to perform leak test

Figure 3: Sample system connected to SVMP during casing purging

Figure 4. Collecting soil-vapor sample using sampling system connected to SVMP and Bottle-Vac

Figure 5: Humidity probe attached to SVM Point

Attachment 1. Pre-calculated Purge Volumes

Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
SVMW-01-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-01-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-01-250	250.7	253.2	1/2	0.00136	0.409	0.754
SVMW-01-300	308.5	310	1/2	0.00136	0.2454	0.668
SVMW-02-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-02-100	97	99.5	1/2	0.00136	0.409	0.545
SVMW-02-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-03-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-03-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-03-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-03-300	300	302.5	1/2	0.00136	0.409	0.821
SVMW-04-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-04-100	98	100.5	1/2	0.00136	0.409	0.546
SVMW-04-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-04-300	297.5	300	1/2	0.00136	0.409	0.818
SVMW-05-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-05-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-05-230	229.5	231	1/2	0.00136	0.2454	0.560
SVMW-05-290	287.5	290	1/2	0.00136	0.409	0.804
SVMW-06-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-06-100	99.5	102	1/2	0.00136	0.409	0.548
SVMW-06-252	252	254.5	1/2	0.00136	0.409	0.756
SVMW-06-302	302.5	305	1/2	0.00136	0.409	0.825
SVMW-07-050	49.5	52	1/2	0.00136	0.409	0.480
SVMW-07-100	95.5	98	1/2	0.00136	0.409	0.543
SVMW-07-150	147.5	150	1/2	0.00136	0.409	0.614
SVMW-08-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-08-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-08-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-08-266	266	268.5	1/2	0.00136	0.409	0.775
SVMW-09-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-09-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-09-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-09-266	266	268.5	1/2	0.00136	0.409	0.775
SVMW-10-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-10-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-10-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-10-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-11-050	50	52.5	1/2	0.00136	0.409	0.481
SVMW-11-100	100	102.5	1/2	0.00136	0.409	0.549
SVMW-11-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-11-260	260	262.5	1/2	0.00136	0.409	0.767
SVMW-12-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-12-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-12-350	350	352.5	1/2	0.00136	0.409	0.890
SVMW-12-450	450	452.5	1/2	0.00136	0.409	1.026
SVMW-13-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-13-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-13-350	350	352.5	1/2	0.00136	0.409	0.890
SVMW-13-450	450	452.5	1/2	0.00136	0.409	1.026
SVMW-14-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-14-250	250	252.5	1/2	0.00136	0.409	0.753
SVMW-14-350	350	352.5	1/2	0.00136	0.409	0.890
SVMW-14-450	450	452.5	1/2	0.00136	0.409	1.026
SVMW-15-150	150	152.5	1/2	0.00136	0.409	0.617
SVMW-15-250	250	252.5	1/2	0.00136	0.409	0.753

Attachment 1. Pre-calculated Purge Volumes

Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
SVMW-15-350	350	352.5	1/2	0.00136	0.409	0.890
SVMW-15-450	450	452.5	1/2	0.00136	0.409	1.026
KAFB-106028-150	148.75	151.25	1/2	0.00136	0.409	0.615
KAFB-106028-250	248.75	251.25	1/2	0.00136	0.409	0.752
KAFB-106028-350	348.75	351.25	1/2	0.00136	0.409	0.888
KAFB-106028-450	448.75	451.25	1/2	0.00136	0.409	1.024
SVEW-01-260	245	260	2	0.02182	2.454	8.126
SVEW-02-060	45	60	2	0.02182	2.454	3.763
SVEW-03-160	145	160	2	0.02182	2.454	5.945
SVEW-04-313	298	313	2	0.02182	2.454	9.283
SVEW-05-460	445	460	2	0.02182	2.454	12.490
SVEW-06-060	45	60	2	0.02182	2.454	3.763
SVEW-07-160	145	160	2	0.02182	2.454	5.945
SVEW-08-260	245	260	2	0.02182	2.454	8.126
SVEW-09-460	443	457	2	0.02182	2.2904	12.261
SVEW-10-410	400	410	2	0.02182	1.636	10.581
SVEW-11-410	400	410	2	0.02182	1.636	10.581
SVEW-12-410	400	410	2	0.02182	1.636	10.581
SVEW-13-410	400	410	2	0.02182	1.636	10.581
KAFB-106108-025	15.3	25.3	3/4	0.00307	1.636	1.714
KAFB-106108-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106108-150	140.2	150.2	3/4	0.00307	1.636	2.097
KAFB-106108-250	240.3	250.3	3/4	0.00307	1.636	2.404
KAFB-106108-350	340.3	350.3	3/4	0.00307	1.636	2.711
KAFB-106108-450	440	450	3	0.04909	1.636	23.725
KAFB-106109-025	15.2	25.2	3/4	0.00307	1.636	1.713
KAFB-106109-050	40.1	50.1	3/4	0.00307	1.636	1.790
KAFB-106109-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106109-250	240.2	250.2	3/4	0.00307	1.636	2.404
KAFB-106109-350	340.6	350.6	3/4	0.00307	1.636	2.712
KAFB-106109-450	440	450	3	0.04909	1.636	23.725
KAFB-106110-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106110-050	40.1	50.1	3/4	0.00307	1.636	1.790
KAFB-106110-150	140.3	150.3	3/4	0.00307	1.636	2.097
KAFB-106110-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106110-350	340.2	350.2	3/4	0.00307	1.636	2.710
KAFB-106110-450	440	450	3	0.04909	1.636	23.725
KAFB-106111-025	15.2	25.2	3/4	0.00307	1.636	1.713
KAFB-106111-050	40.1	50.1	3/4	0.00307	1.636	1.790
KAFB-106111-150	140.3	150.3	3/4	0.00307	1.636	2.097
KAFB-106111-250	240.3	250.3	3/4	0.00307	1.636	2.404
KAFB-106111-350	340.4	350.4	3/4	0.00307	1.636	2.711
KAFB-106111-450	440.3	450.3	3	0.04909	1.636	23.740
KAFB-106112-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106112-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106112-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106112-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106112-350	339	349	3/4	0.00307	1.636	2.707
KAFB-106112-450	439	449	3	0.04909	1.636	23.676
KAFB-106113-020	10	20	3/4	0.00307	1.636	1.697
KAFB-106113-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106113-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106113-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106113-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106113-450	440	450	3	0.04909	1.636	23.725
KAFB-106114-025	15	25	3/4	0.00307	1.636	1.713

Attachment 1. Pre-calculated Purge Volumes

Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
KAFB-106114-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106114-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106114-250	235	245	3/4	0.00307	1.636	2.388
KAFB-106114-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106114-450	439.6	449.6	3	0.04909	1.636	23.706
KAFB-106115-025	14.6	24.6	3/4	0.00307	1.636	1.711
KAFB-106115-050	39.6	49.6	3/4	0.00307	1.636	1.788
KAFB-106115-150	144.6	154.6	3/4	0.00307	1.636	2.110
KAFB-106115-250	239.6	249.6	3/4	0.00307	1.636	2.402
KAFB-106115-350	339.6	349.6	3/4	0.00307	1.636	2.709
KAFB-106115-450	439.6	449.6	3	0.04909	1.636	23.706
KAFB-106116-025	10	19.45	3/4	0.00307	1.54602	1.606
KAFB-106116-050	40	49.45	3/4	0.00307	1.54602	1.698
KAFB-106116-150	140	149.45	3/4	0.00307	1.54602	2.005
KAFB-106116-250	240	249.45	3/4	0.00307	1.54602	2.311
KAFB-106116-350	340	349.45	3/4	0.00307	1.54602	2.618
KAFB-106116-450	440	448.95	3	0.04909	1.46422	23.502
KAFB-106117-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106117-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106117-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106117-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106117-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106117-450	440	450	3	0.04909	1.636	23.725
KAFB-106118-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106118-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106118-160	150	160	3/4	0.00307	1.636	2.127
KAFB-106118-265	255	265	3/4	0.00307	1.636	2.449
KAFB-106118-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106118-450	440	450	3	0.04909	1.636	23.725
KAFB-106119-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106119-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106119-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106119-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106119-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106119-450	440	450	3	0.04909	1.636	23.725
KAFB-106120-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106120-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106120-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106120-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106120-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106120-450	434	444	3	0.04909	1.636	23.431
KAFB-106121-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106121-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106121-145	135	145	3/4	0.00307	1.636	2.081
KAFB-106121-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106121-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106121-440	434	444	3	0.04909	1.636	23.431
KAFB-106122-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106122-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106122-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106122-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106122-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106122-450	434	444	3	0.04909	1.636	23.431
KAFB-106123-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106123-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106123-150	140	150	3/4	0.00307	1.636	2.096

Attachment 1. Pre-calculated Purge Volumes

Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
KAFB-106123-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106123-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106123-450	432	442	3	0.04909	1.636	23.333
KAFB-106124-025	15.1	25	3/4	0.00307	1.61964	1.696
KAFB-106124-050	40.1	50	3/4	0.00307	1.61964	1.773
KAFB-106124-150	140.1	150	3/4	0.00307	1.61964	2.080
KAFB-106124-250	240.1	250	3/4	0.00307	1.61964	2.387
KAFB-106124-350	340.1	350	3/4	0.00307	1.61964	2.693
KAFB-106124-450	440.1	450	3	0.04909	1.61964	23.709
KAFB-106125-025	15.2	25	3/4	0.00307	1.60328	1.680
KAFB-106125-050	40.2	50	3/4	0.00307	1.60328	1.757
KAFB-106125-150	140.2	150	3/4	0.00307	1.60328	2.063
KAFB-106125-250	240.2	250	3/4	0.00307	1.60328	2.370
KAFB-106125-350	340.2	350	3/4	0.00307	1.60328	2.677
KAFB-106125-450	440.2	450	3	0.04909	1.60328	23.693
KAFB-106126-025	15.1	25	3/4	0.00307	1.61964	1.696
KAFB-106126-050	40.1	50	3/4	0.00307	1.61964	1.773
KAFB-106126-150	140.1	150	3/4	0.00307	1.61964	2.080
KAFB-106126-250	240.1	250	3/4	0.00307	1.61964	2.387
KAFB-106126-350	340.1	350	3/4	0.00307	1.61964	2.693
KAFB-106126-450	440.2	450	3	0.04909	1.60328	23.693
KAFB-106127-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106127-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106127-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106127-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106127-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106127-450	440	450	3	0.04909	1.636	23.725
KAFB-106128-025	15.04	25.04	3/4	0.00307	1.636	1.713
KAFB-106128-050	40.07	50.07	3/4	0.00307	1.636	1.790
KAFB-106128-150	140.19	150.19	3/4	0.00307	1.636	2.097
KAFB-106128-250	240.29	250.29	3/4	0.00307	1.636	2.404
KAFB-106128-350	340.39	350.39	3/4	0.00307	1.636	2.711
KAFB-106128-450	440.06	450.06	3	0.04909	1.636	23.728
KAFB-106129-025	15.1	25.1	3/4	0.00307	1.636	1.713
KAFB-106129-050	39.7	49.7	3/4	0.00307	1.636	1.788
KAFB-106129-150	140.2	150.2	3/4	0.00307	1.636	2.097
KAFB-106129-250	240.1	250.1	3/4	0.00307	1.636	2.403
KAFB-106129-350	337.4	347.4	3/4	0.00307	1.636	2.702
KAFB-106129-450	440.7	450.7	3	0.04909	1.636	23.760
KAFB-106130-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106130-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106130-150	150	160	3/4	0.00307	1.636	2.127
KAFB-106130-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106130-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106130-450	440	450	3	0.04909	1.636	23.725
KAFB-106131-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106131-055	45	55	3/4	0.00307	1.636	1.805
KAFB-106131-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106131-245	235	245	3/4	0.00307	1.636	2.388
KAFB-106131-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106131-450	430	440	3	0.04909	1.636	23.234
KAFB-106132-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106132-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106132-175	164	174	3/4	0.00307	1.636	2.170
KAFB-106132-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106132-350	340	350	3/4	0.00307	1.636	2.710

Attachment 1. Pre-calculated Purge Volumes

Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
KAFB-106132-450	440	450	3	0.04909	1.636	23.725
KAFB-106133-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106133-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106133-170	160	170	3/4	0.00307	1.636	2.158
KAFB-106133-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106133-350	339	349	3/4	0.00307	1.636	2.707
KAFB-106133-450	439	449	3	0.04909	1.636	23.676
KAFB-106134-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106134-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106134-170	160	170	3/4	0.00307	1.636	2.158
KAFB-106134-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106134-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106134-450	440	450	3	0.04909	1.636	23.725
KAFB-106135-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106135-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106135-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106135-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106135-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106135-450	440	450	3	0.04909	1.636	23.725
KAFB-106136-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106136-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106136-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106136-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106136-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106136-450	440	450	3	0.04909	1.636	23.725
KAFB-106137-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106137-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106137-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106137-250	240.1	250.1	3/4	0.00307	1.636	2.403
KAFB-106137-350	340.5	350.5	3/4	0.00307	1.636	2.711
KAFB-106137-450	440	450	3	0.04909	1.636	23.725
KAFB-106138-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106138-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106138-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106138-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106138-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106138-450	440	450	3	0.04909	1.636	23.725
KAFB-106139-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106139-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106139-150	140	150	3/4	0.00307	1.636	2.096
KAFB-106139-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106139-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106139-450	440	450	3	0.04909	1.636	23.725
KAFB-106140-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106140-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106140-150	141.8	151.8	3/4	0.00307	1.636	2.102
KAFB-106140-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106140-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106140-450	440	450	3	0.04909	1.636	23.725
KAFB-106141-025	15	25	3/4	0.00307	1.636	1.713
KAFB-106141-050	50	60	3/4	0.00307	1.636	1.820
KAFB-106141-170	160	170	3/4	0.00307	1.636	2.158
KAFB-106141-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106141-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106141-450	440	450	3	0.04909	1.636	23.725
KAFB-106142-030	20	30	3/4	0.00307	1.636	1.728

Attachment 1. Pre-calculated Purge Volumes

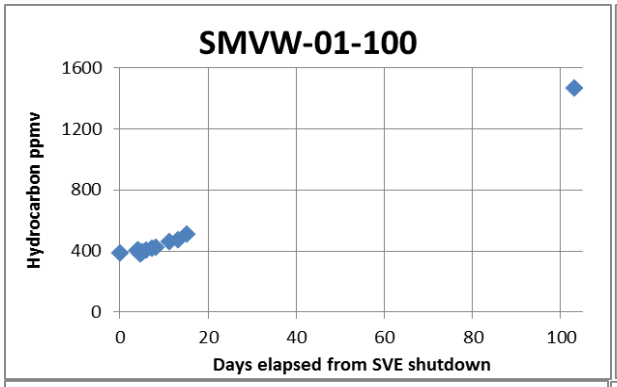
Unique Database ID	Screened Interval (ft)		Well Diameter (in)	Casing Area (sq ft)	Filter Pack Volume (cu ft) *	Purge Volume (cu ft)
	Top	Bottom				
KAFB-106142-050	40	50	3/4	0.00307	1.636	1.789
KAFB-106142-170	160	170	3/4	0.00307	1.636	2.158
KAFB-106142-250	240	250	3/4	0.00307	1.636	2.403
KAFB-106142-350	340	350	3/4	0.00307	1.636	2.710
KAFB-106142-450	440	450	3	0.04909	1.636	23.725
KAFB-106160-530	490	525	6	0.19635	5.726	108.809
KAFB-106161-530	490	525	6	0.19635	5.726	108.809
KAFB-106149-250	24	194	3	0.04909	27.812	37.335
KAFB-106149-350	199	349	3	0.04909	24.54	41.671
KAFB-106149-484	354	484	3	0.04909	21.268	45.026
KAFB-106150-250	25	200	3	0.04909	28.63	38.447
KAFB-106150-350	206	350	3	0.04909	23.5584	40.739
KAFB-106150-484	355	484	3	0.04909	21.1044	44.863
KAFB-106154-250	28	197	3	0.04909	27.6484	37.319
KAFB-106154-350	201	350	3	0.04909	24.3764	41.557
KAFB-106154-484	355	484	3	0.04909	21.1044	44.863

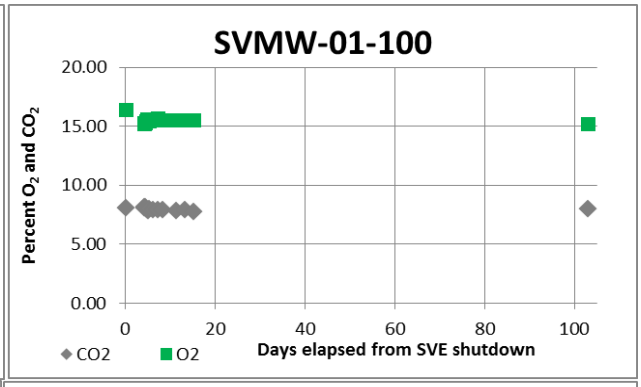
***the borehole casing factor = (((10 inch diameter/12 inches)^2)(3.14159/4))(0.3 porosity) = 0.1636**

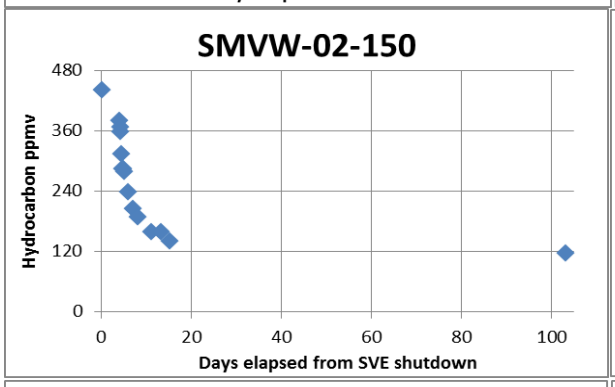
APPENDIX B

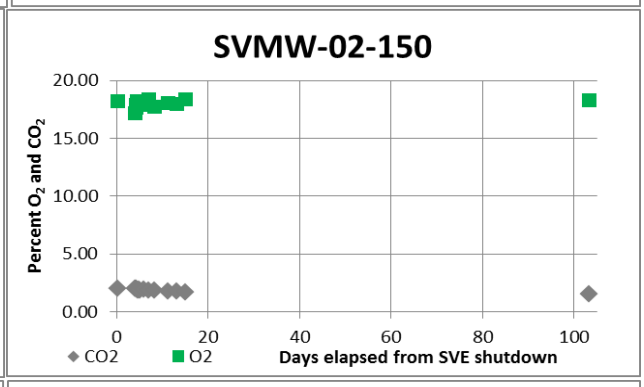
Time-Series Graphs

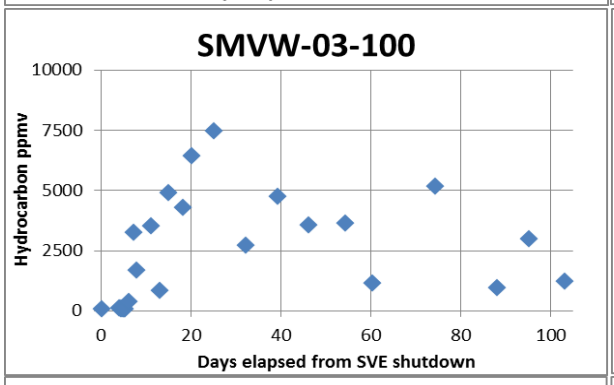
Appendix B. Time-series Graphs

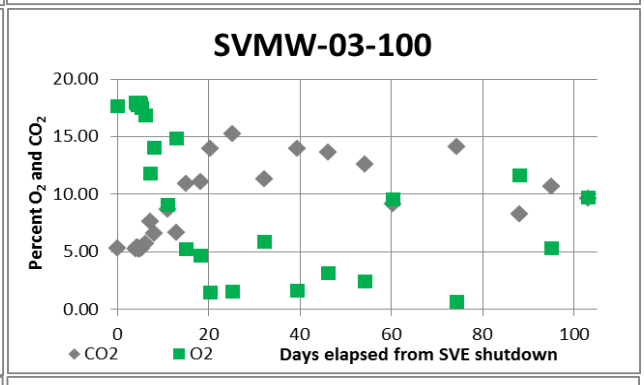


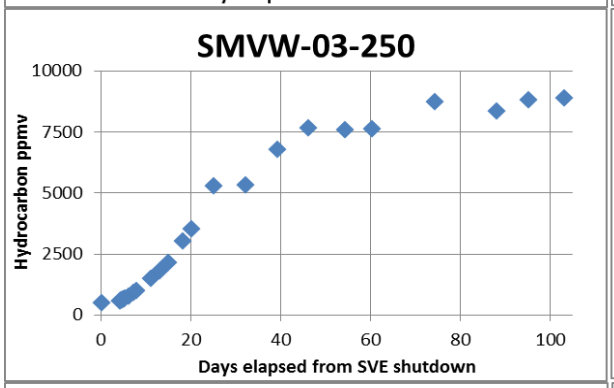


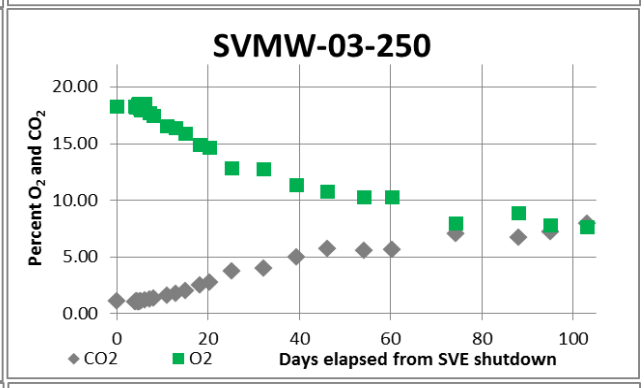


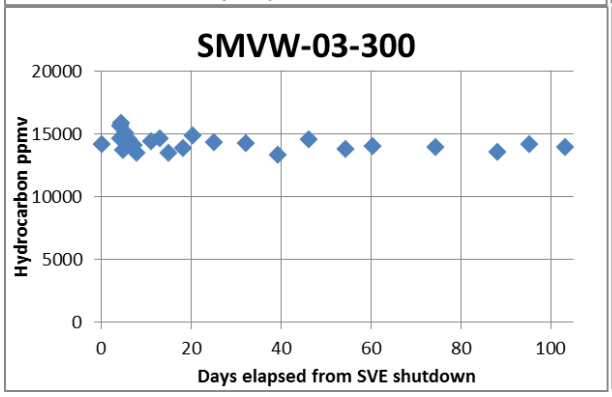


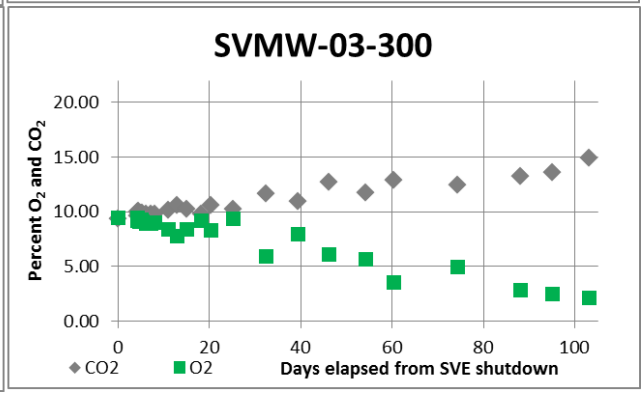




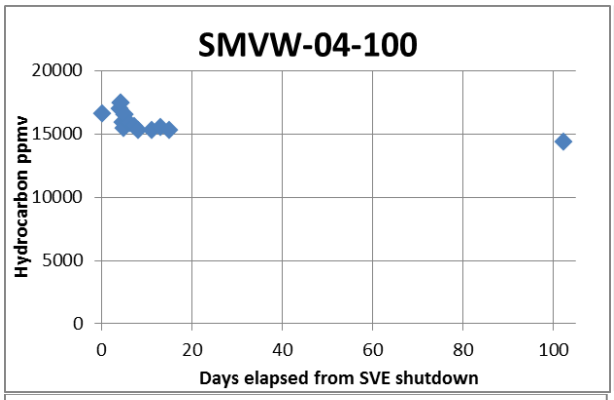


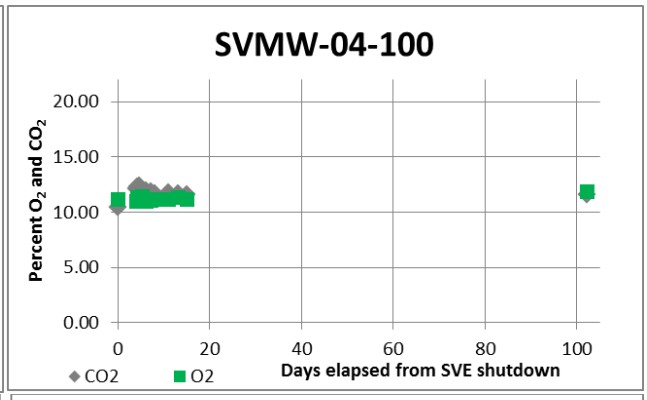


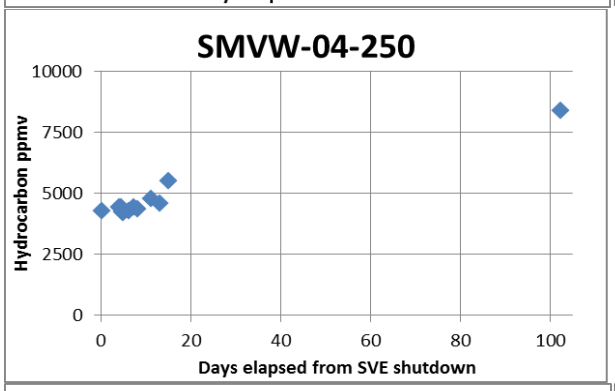


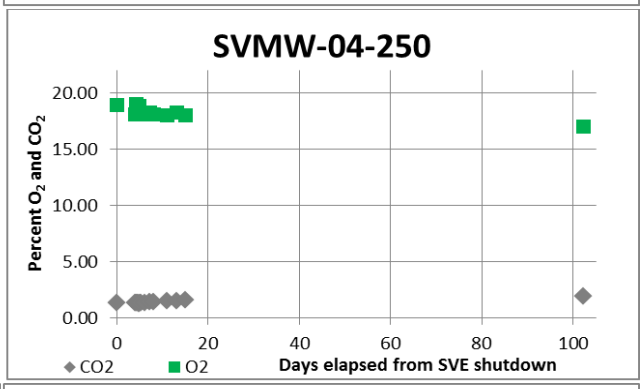


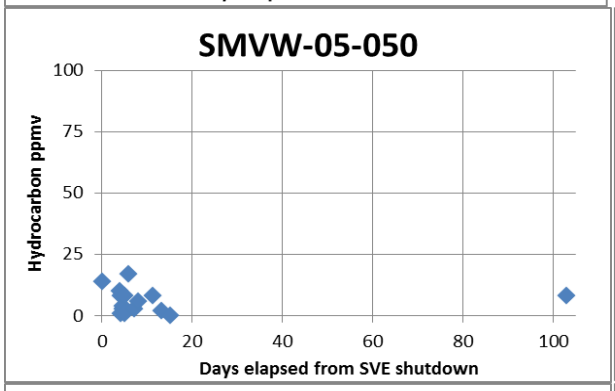
Appendix B. Time-series Graphs

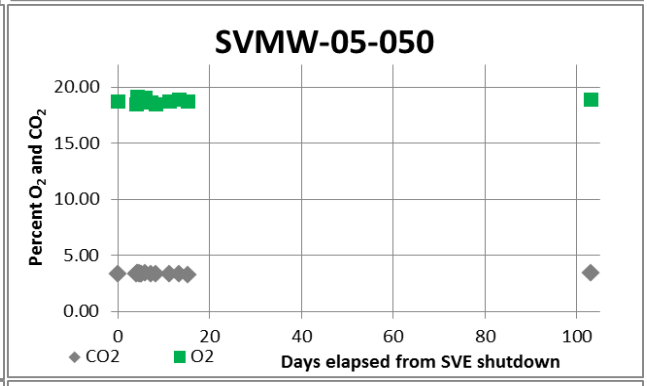


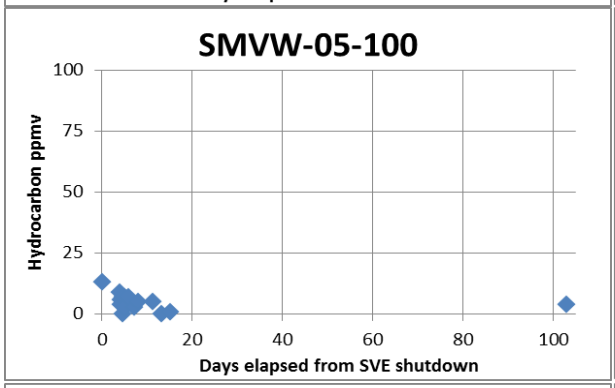


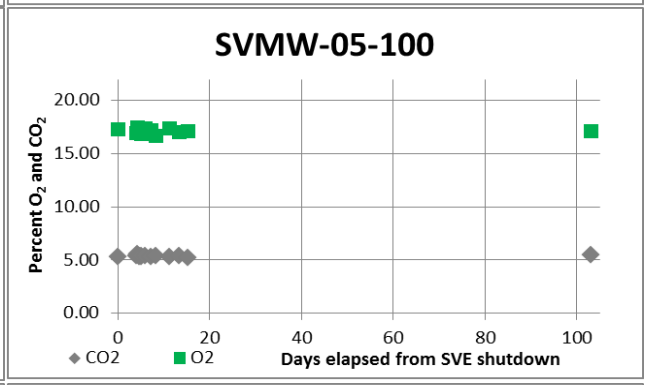


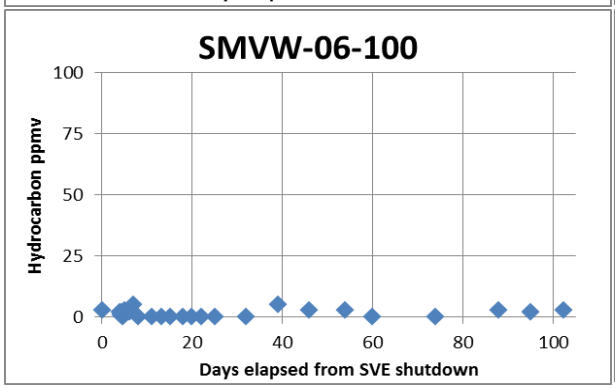


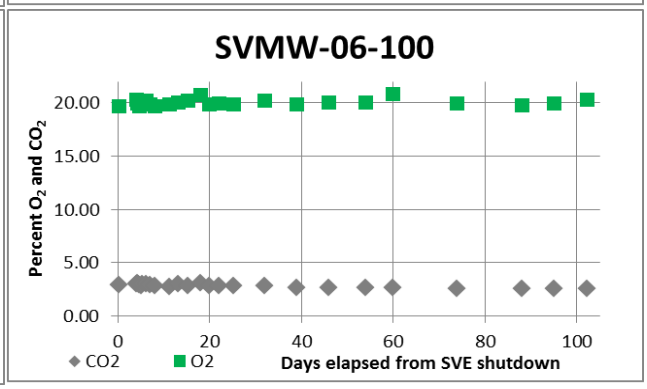




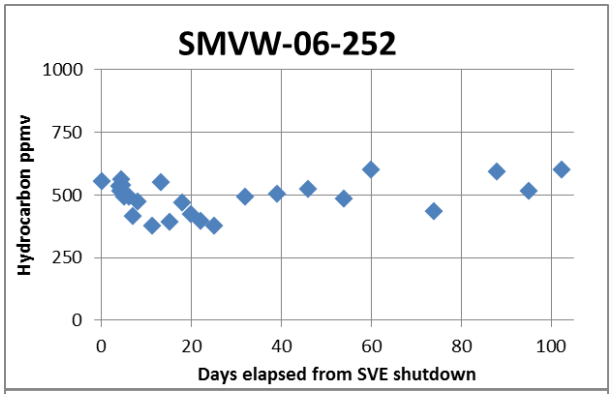


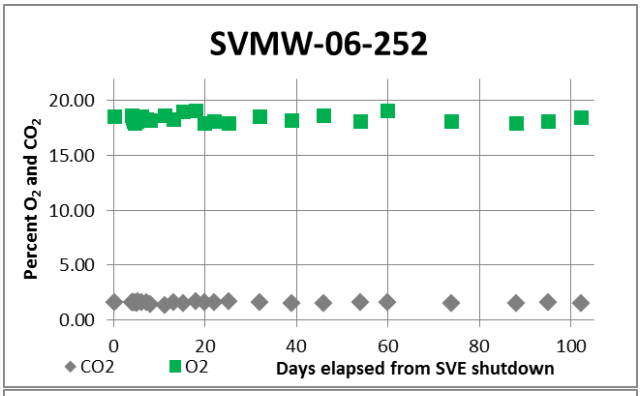


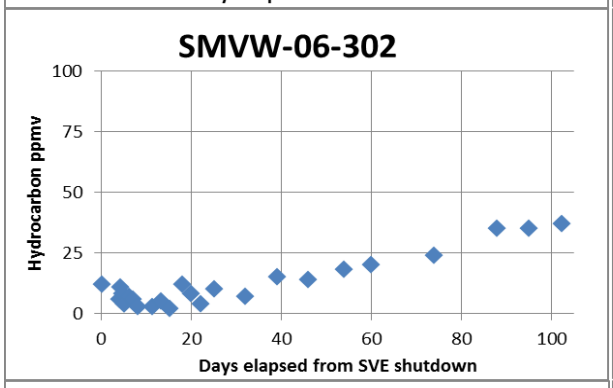


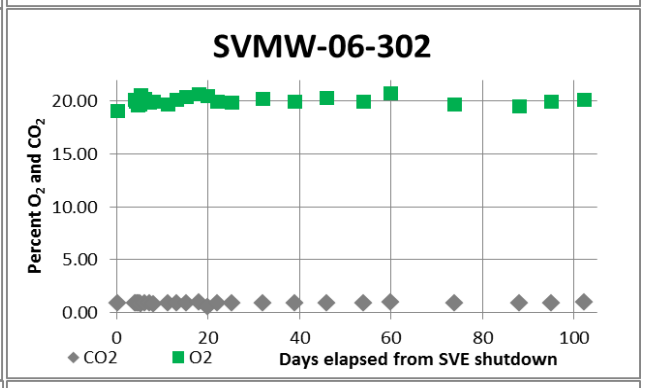


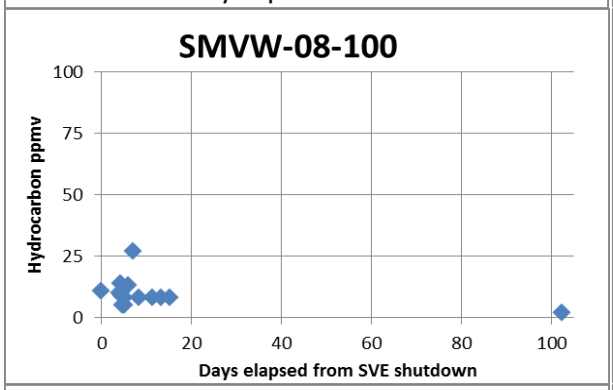
Appendix B. Time-series Graphs

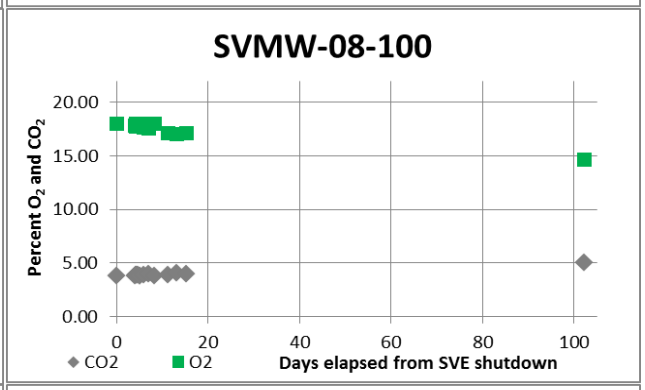


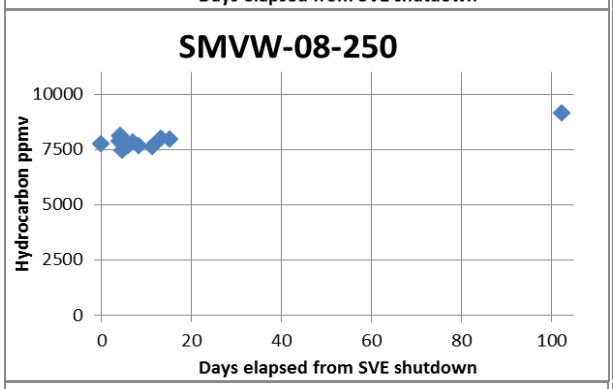


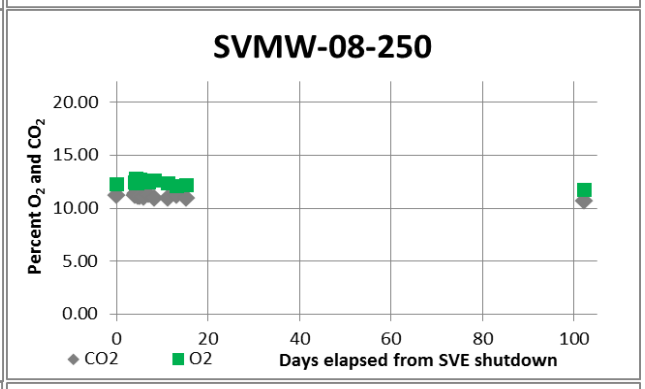


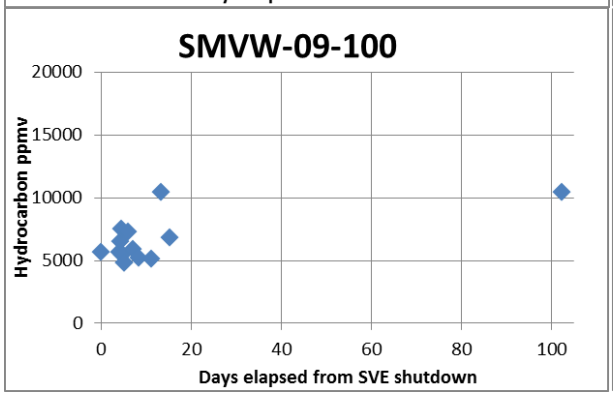


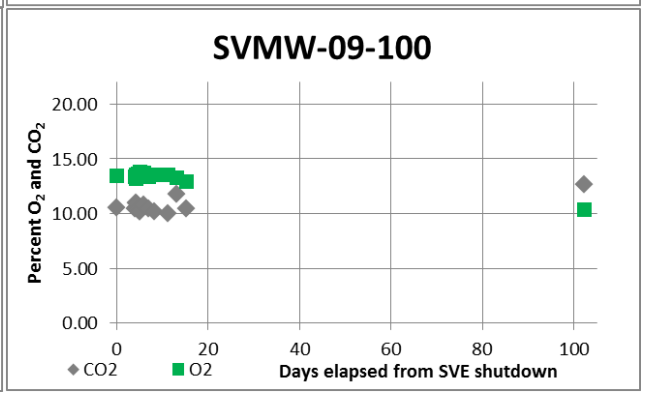




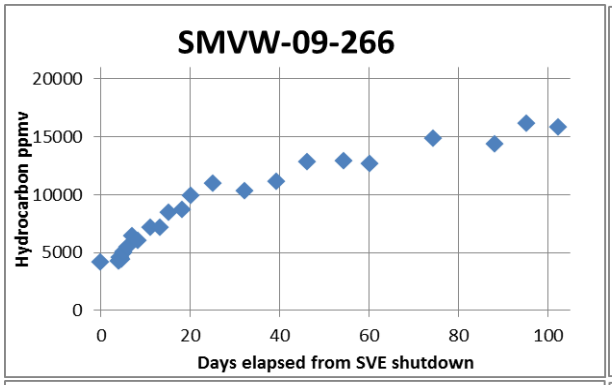


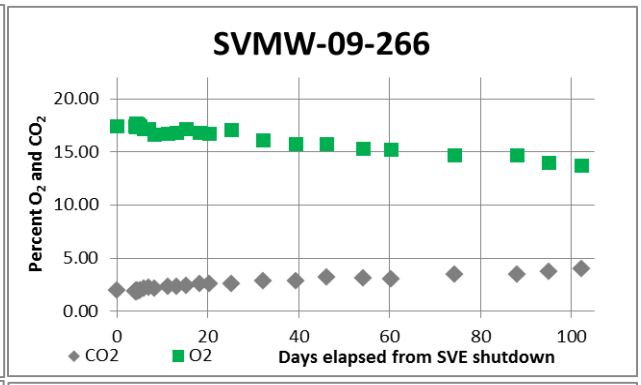


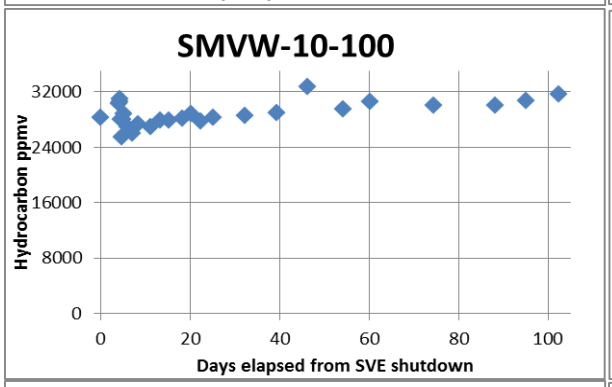


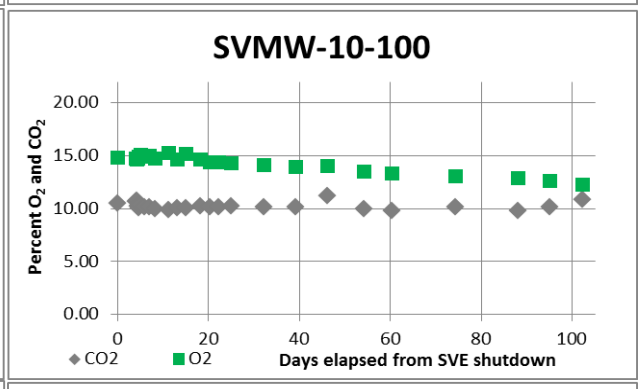


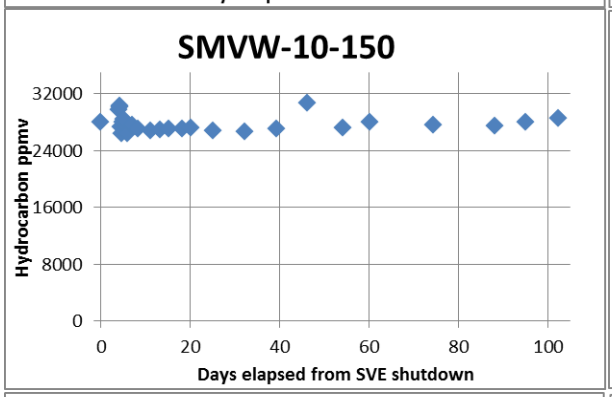
Appendix B. Time-series Graphs

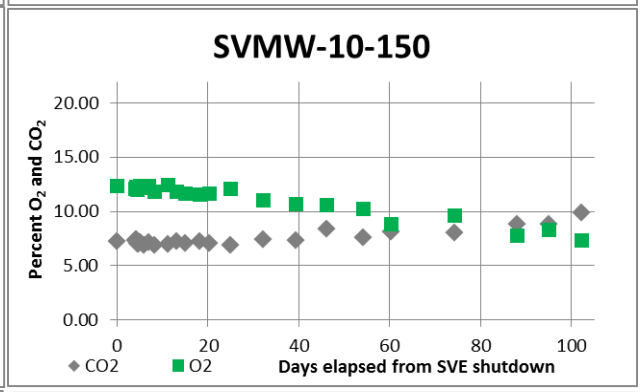


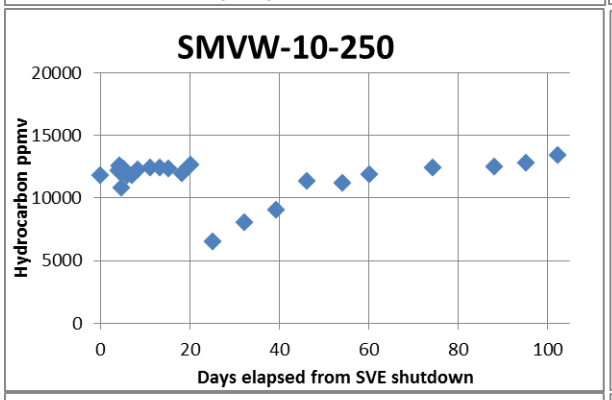


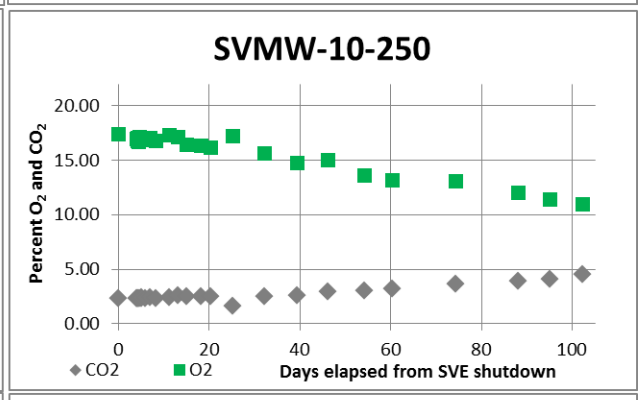


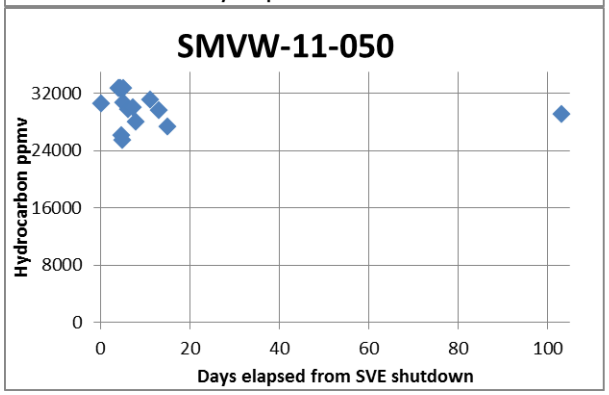


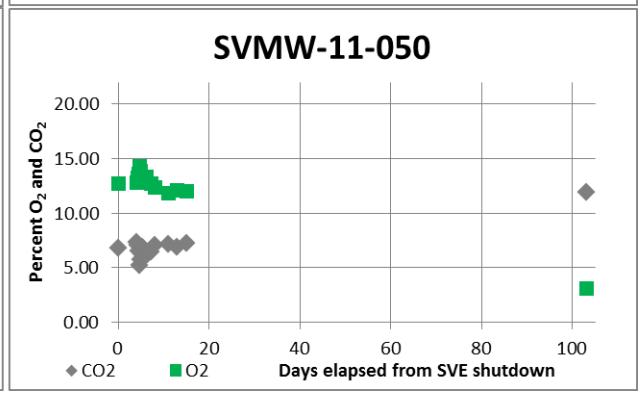




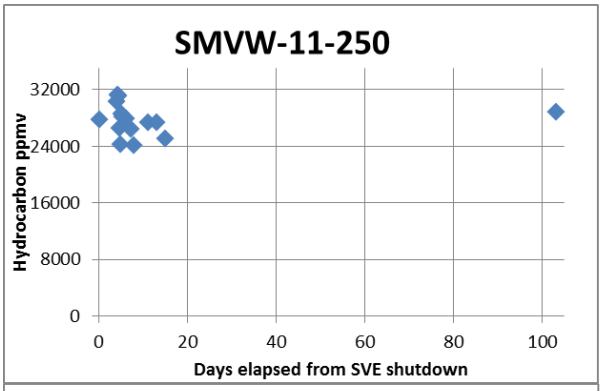


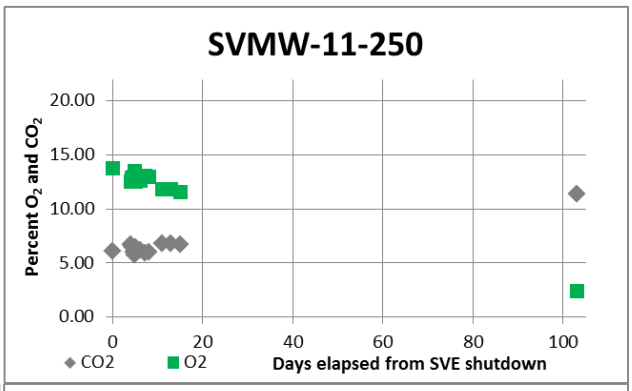


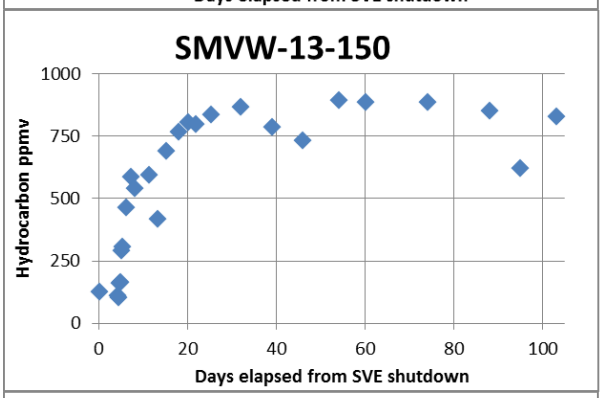


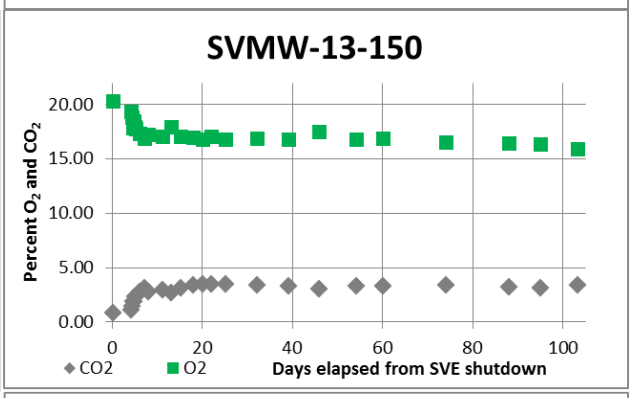


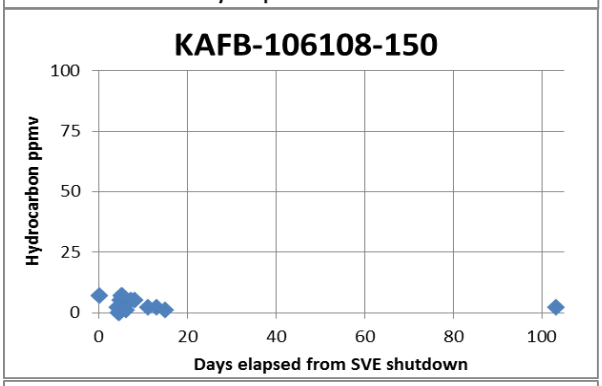
Appendix B. Time-series Graphs

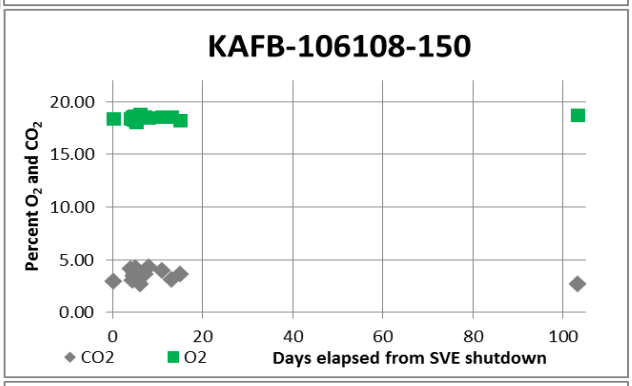


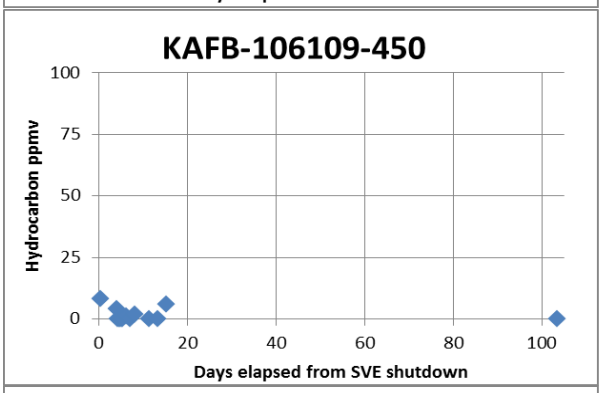


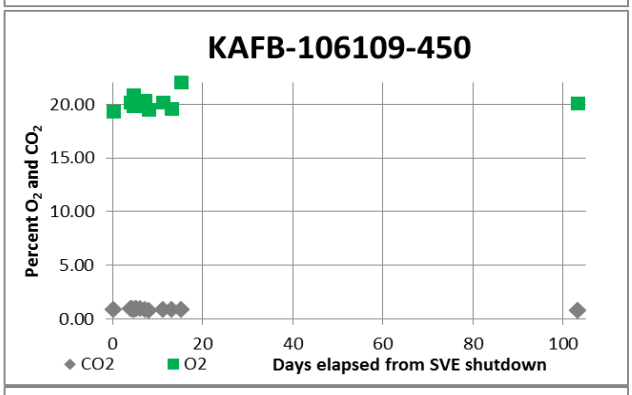


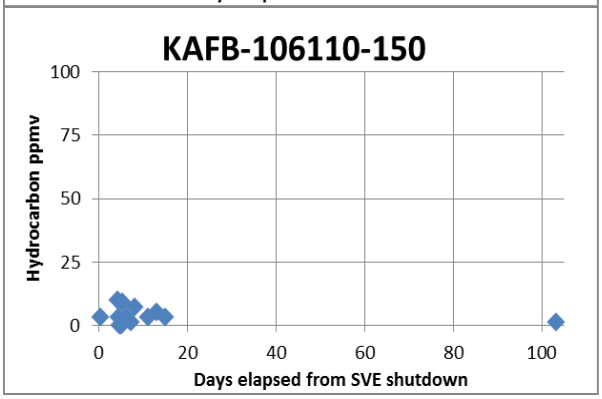


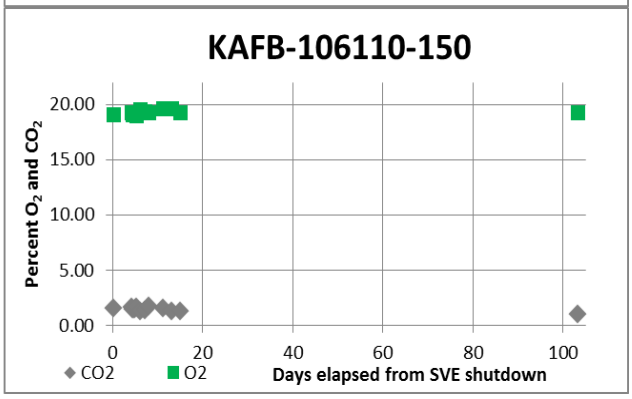




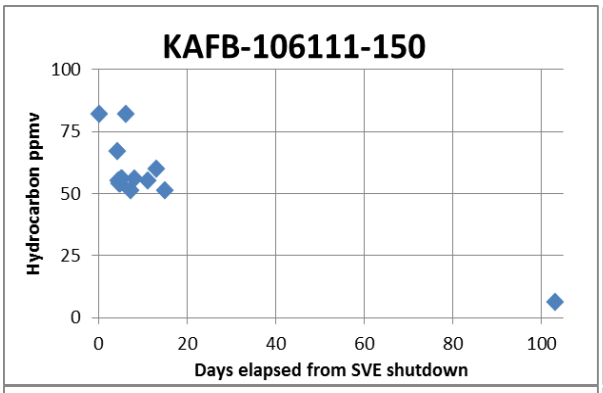


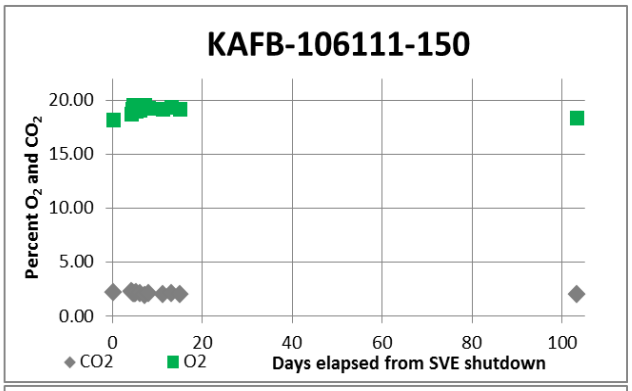


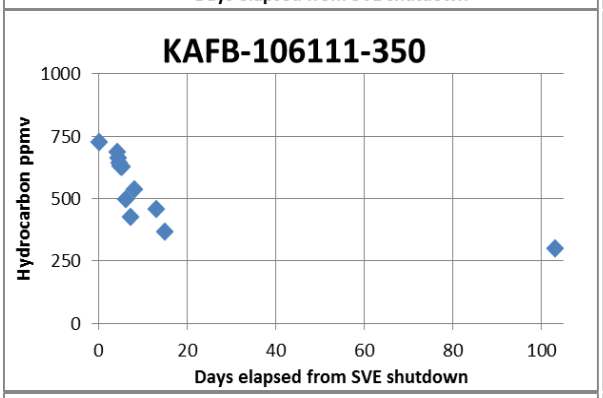


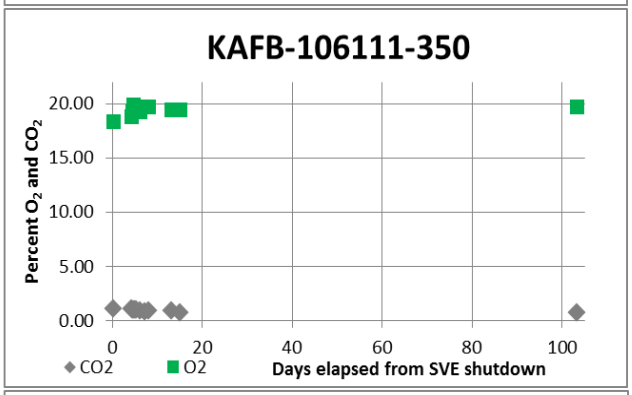


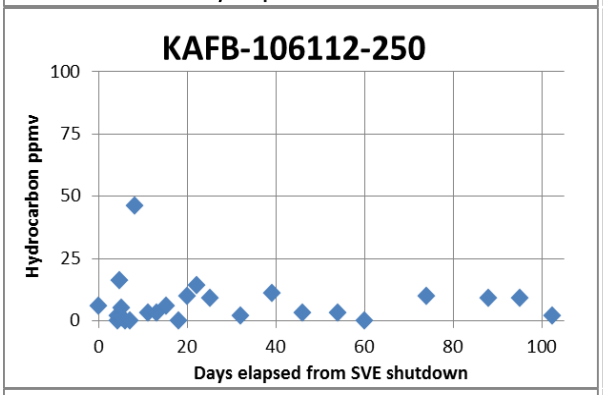
Appendix B. Time-series Graphs

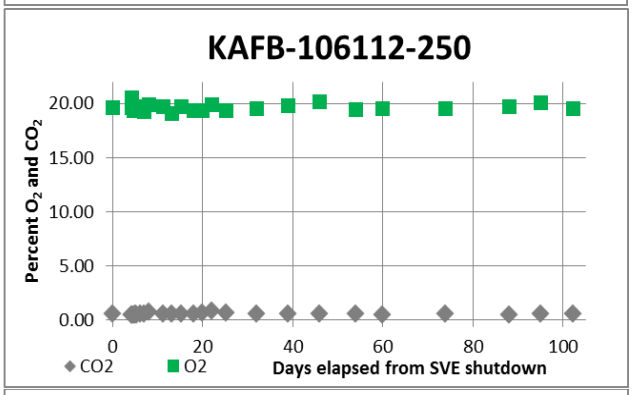


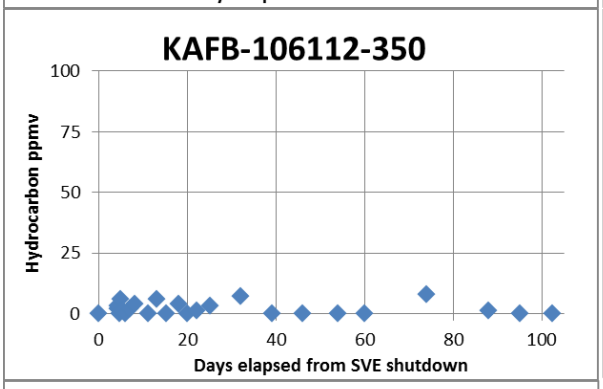


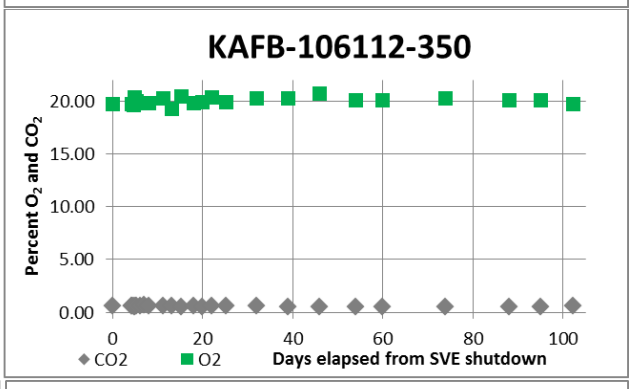


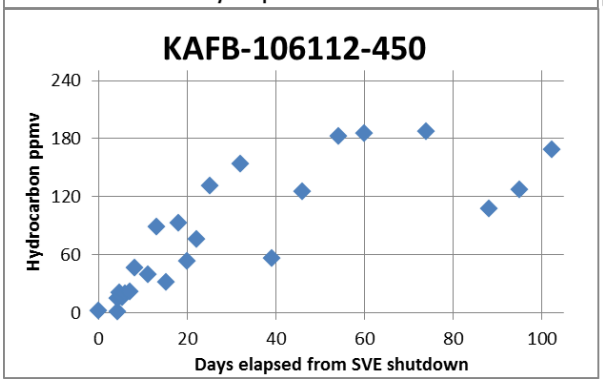


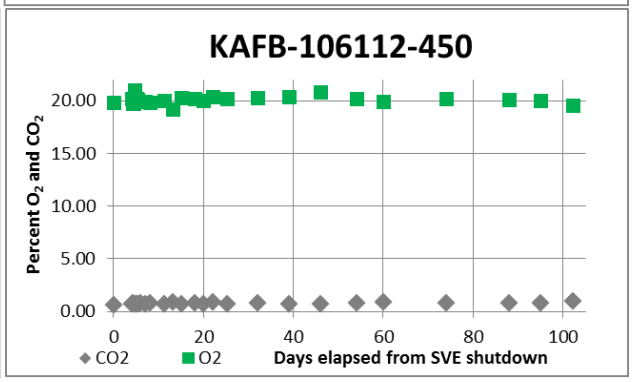




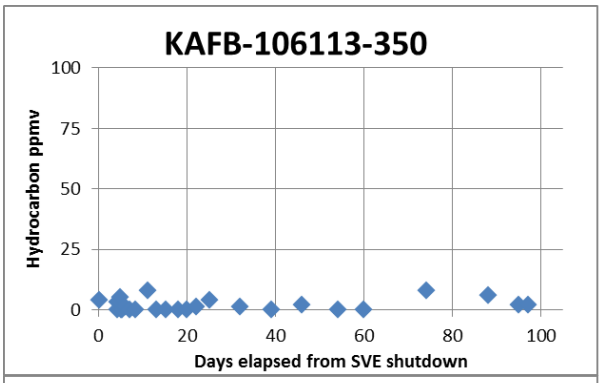


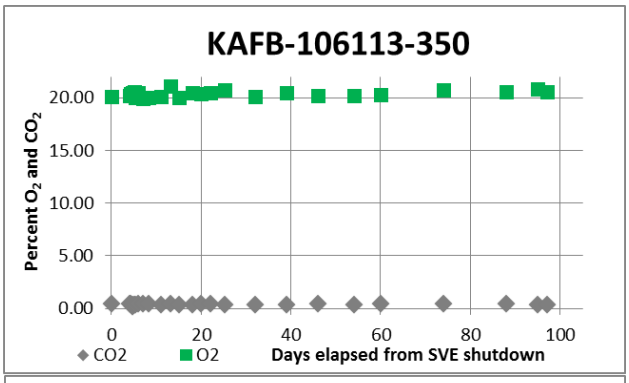


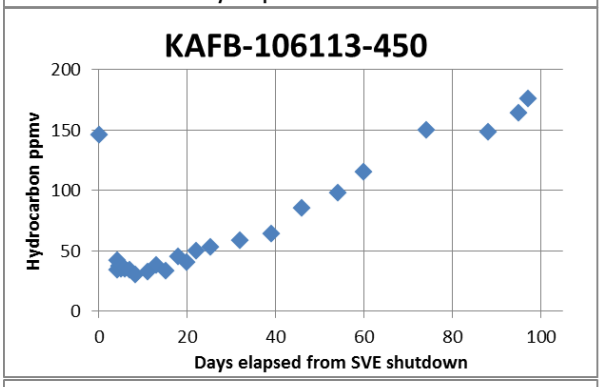


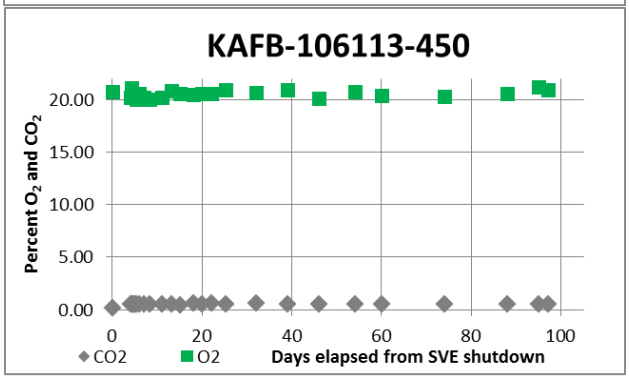


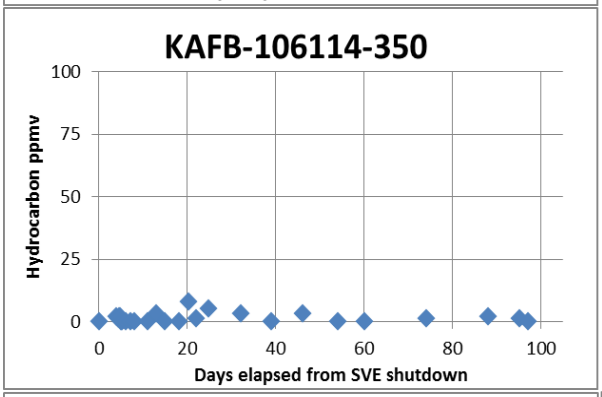
Appendix B. Time-series Graphs

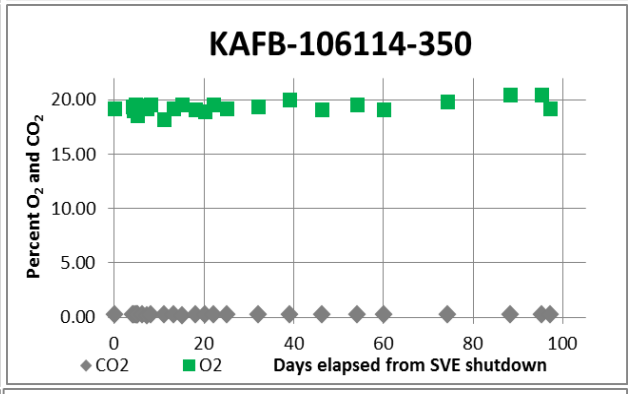


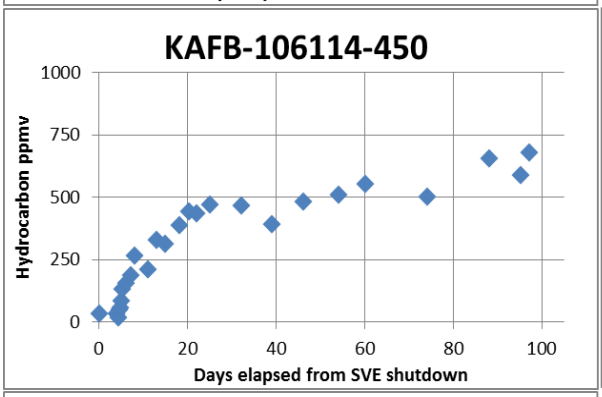


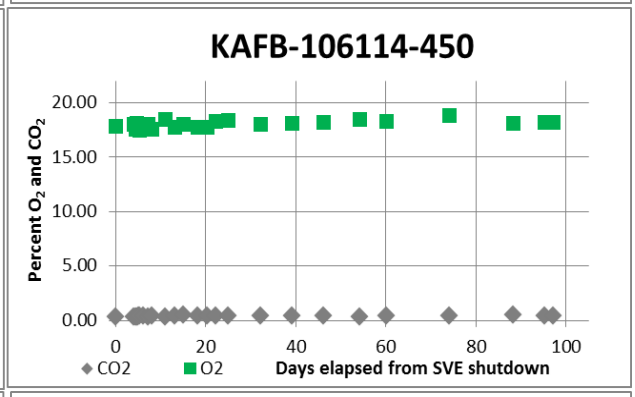


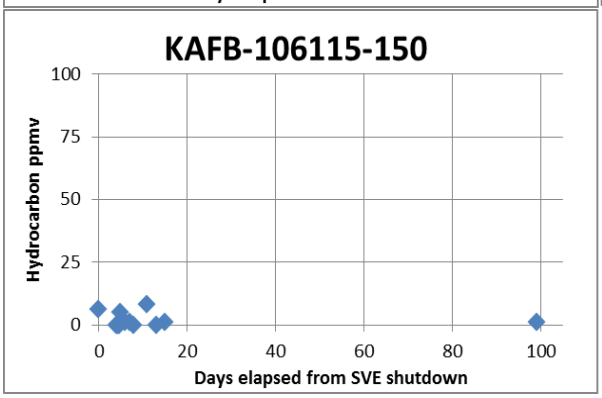


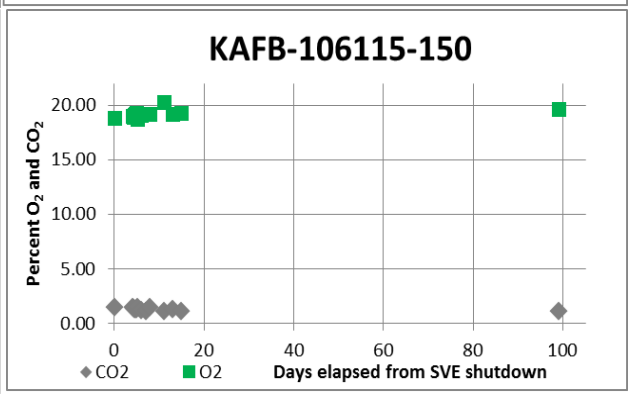












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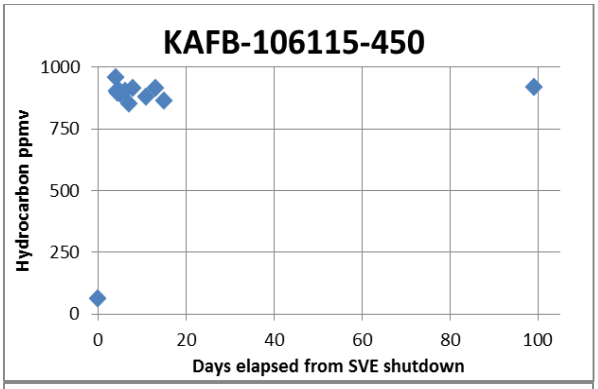
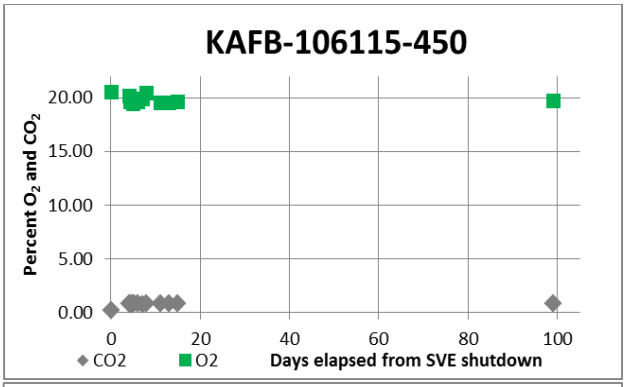
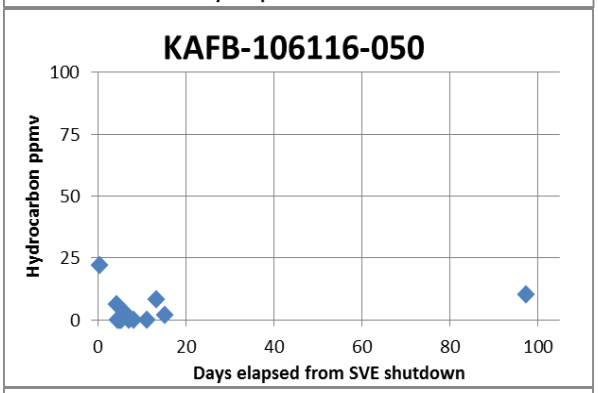
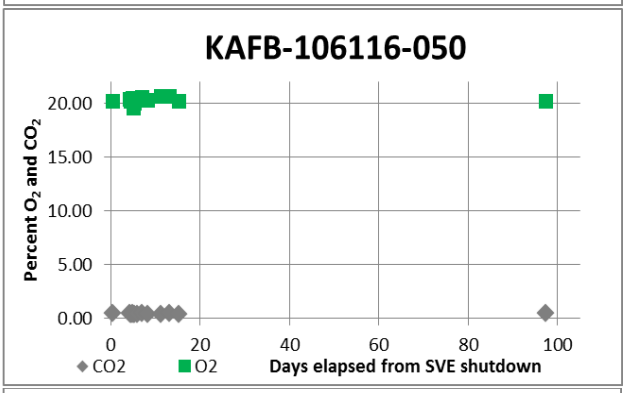
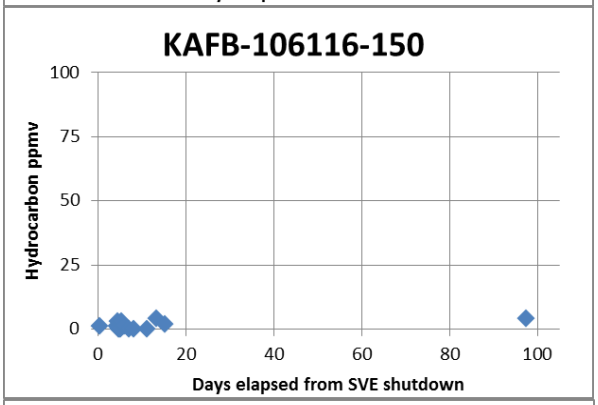
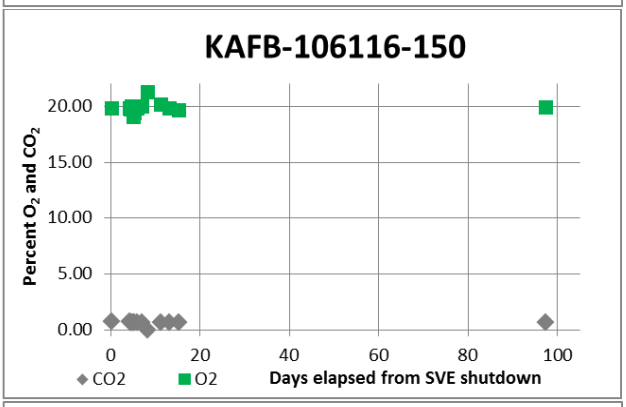


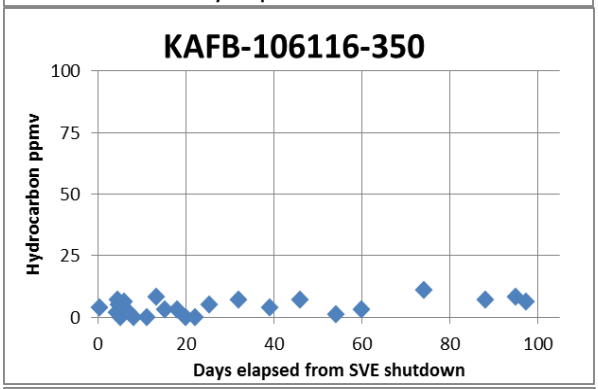


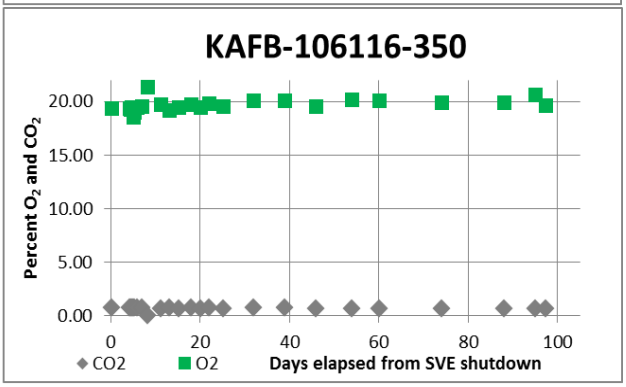


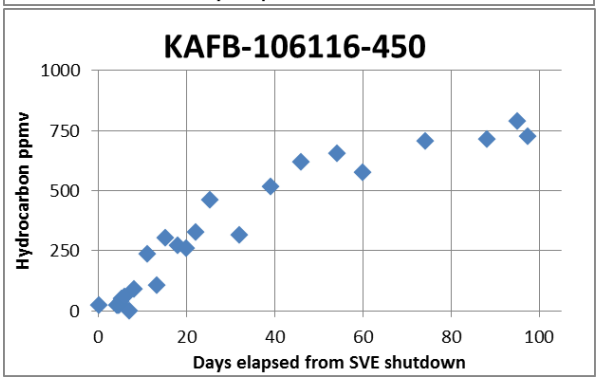


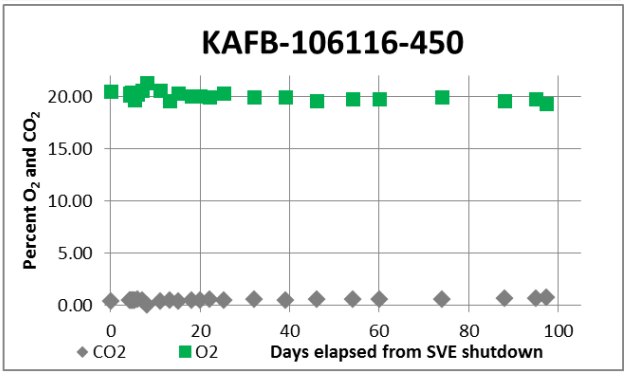




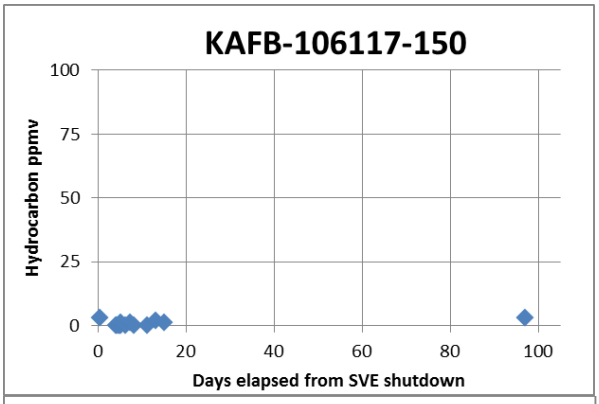


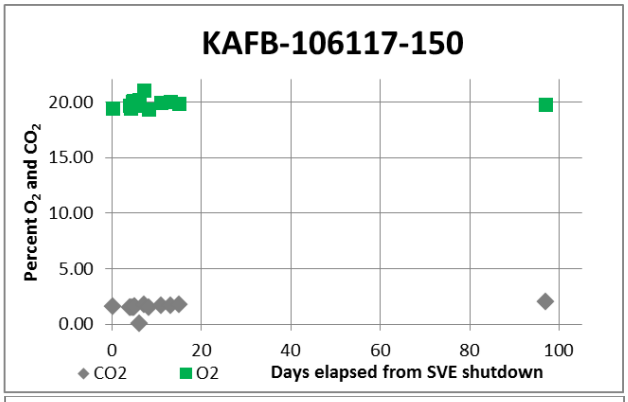


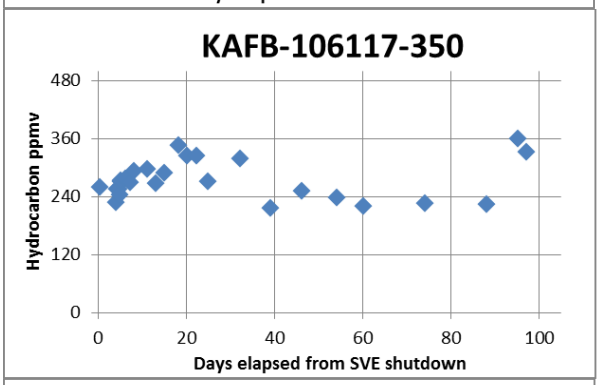


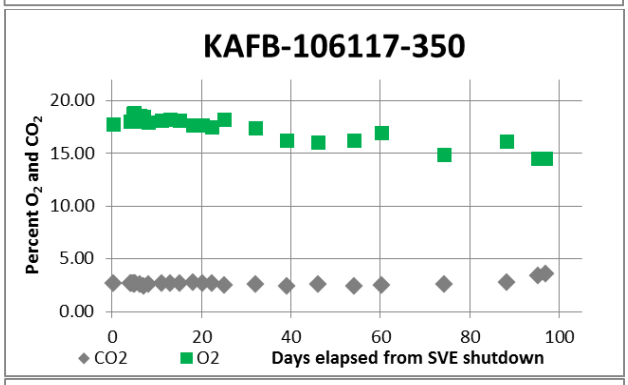


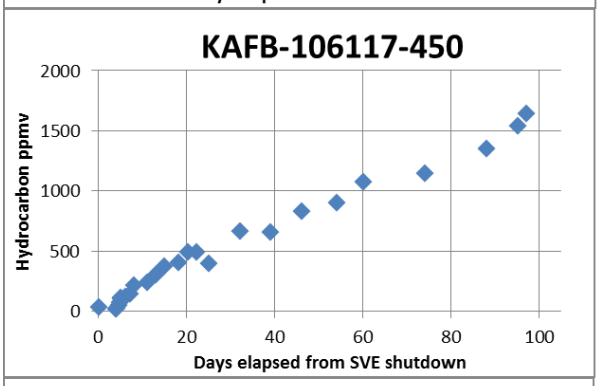
Appendix B. Time-series Graphs

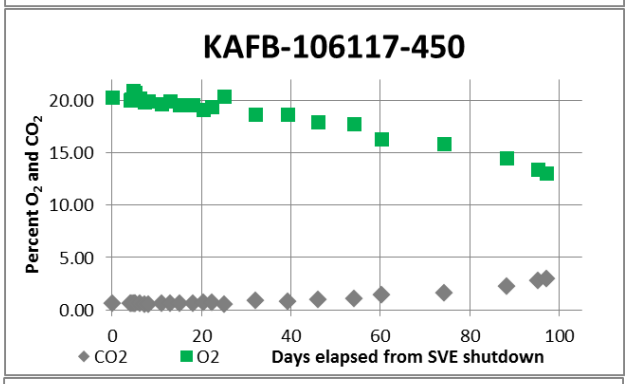


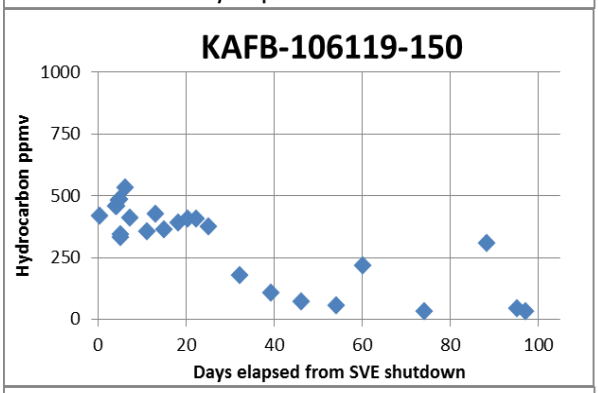


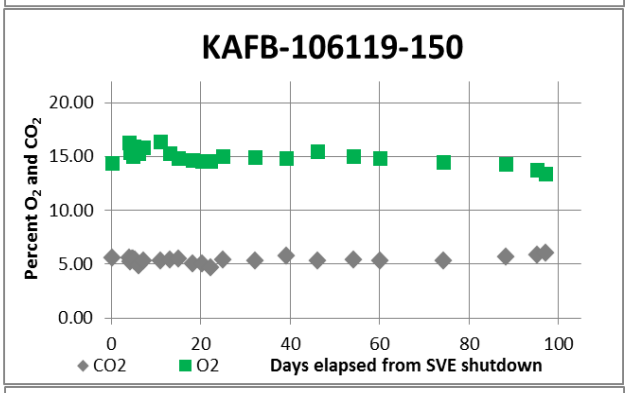


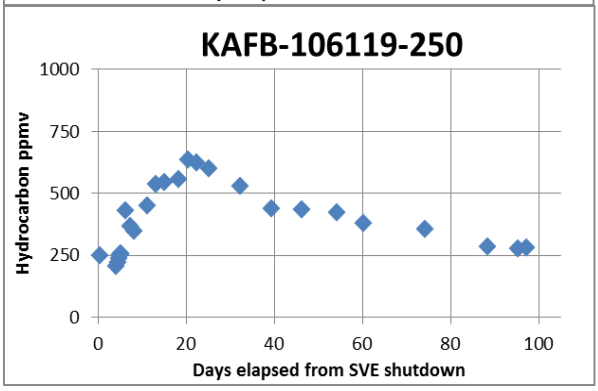


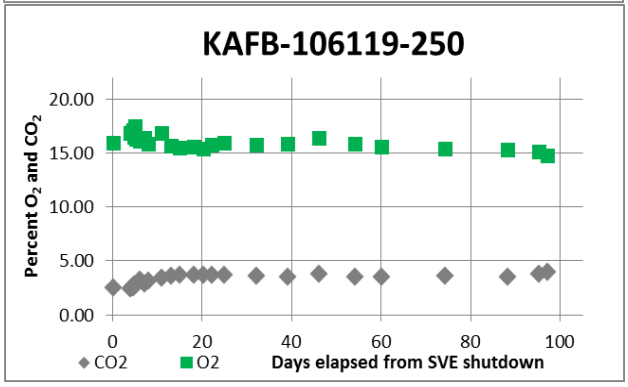




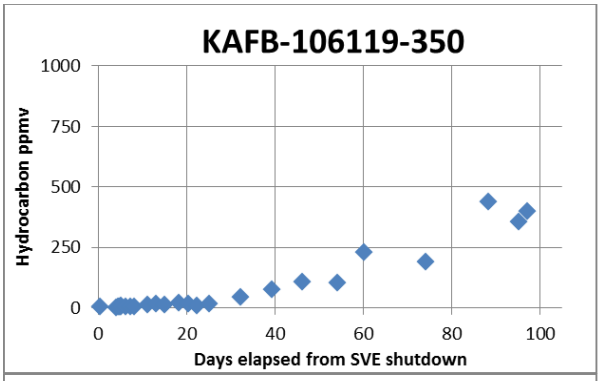


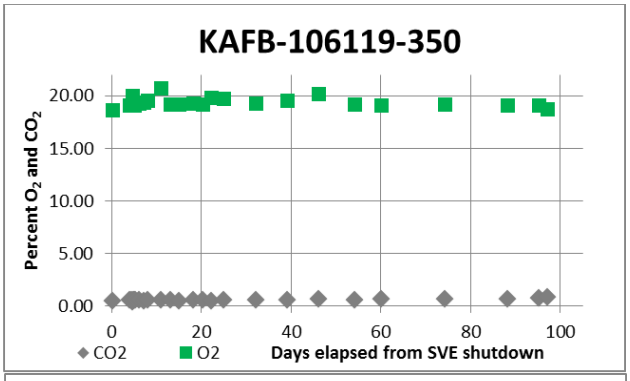


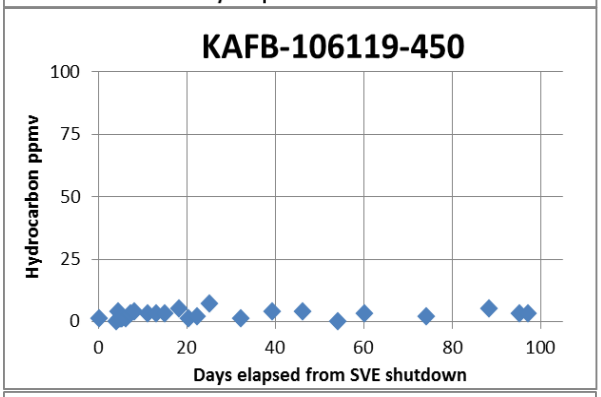


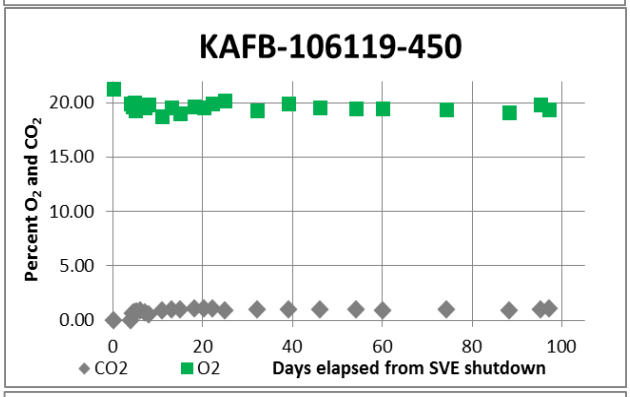


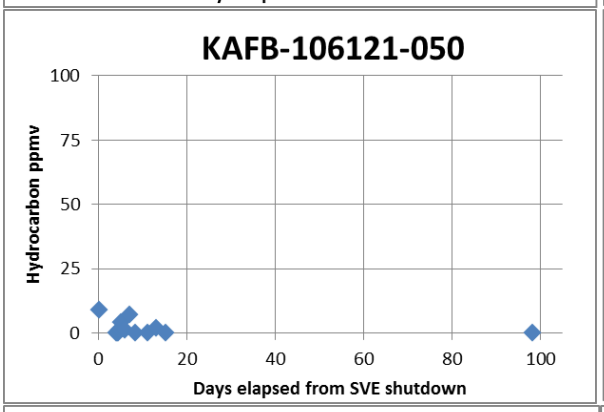
Appendix B. Time-series Graphs

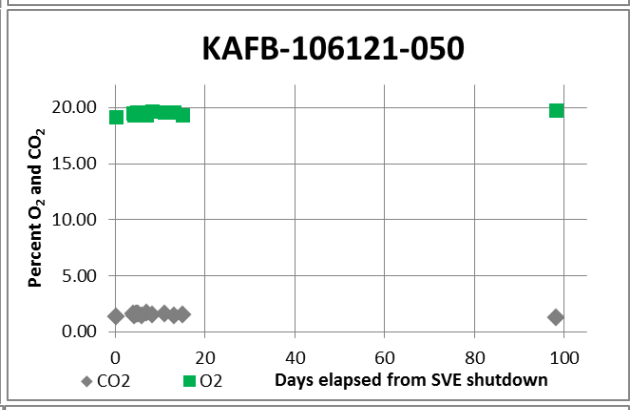


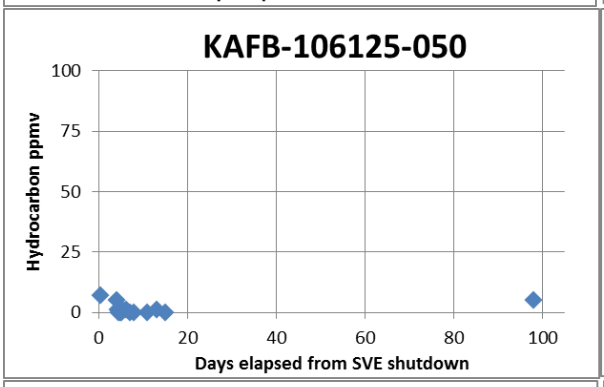


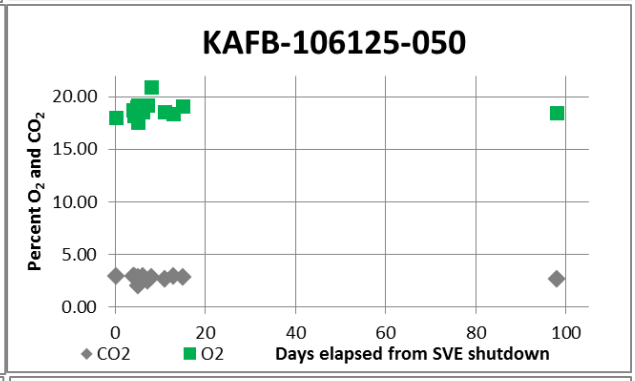


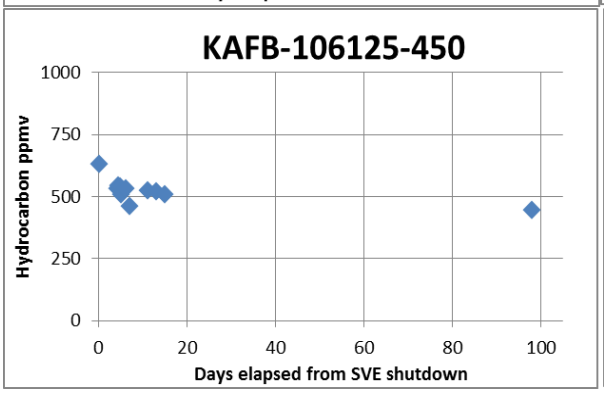


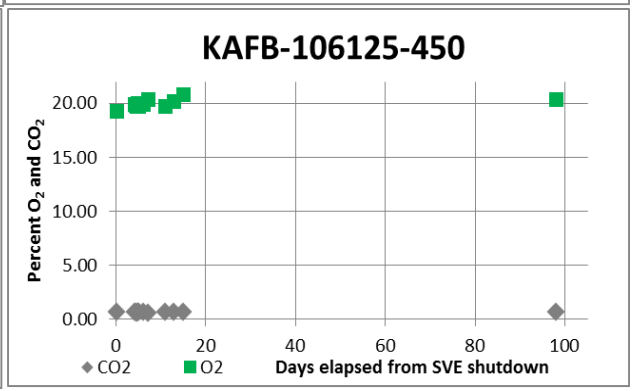




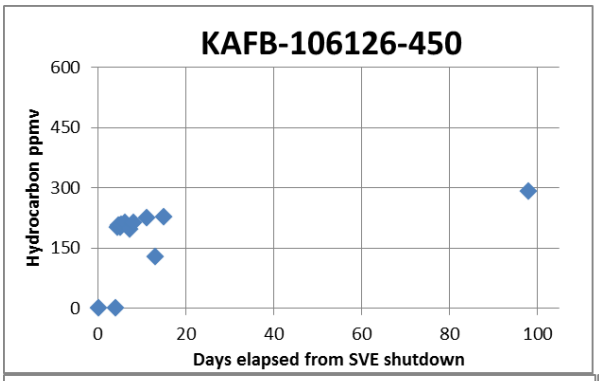


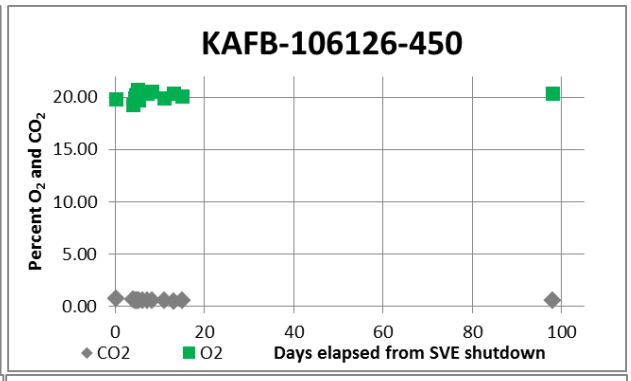


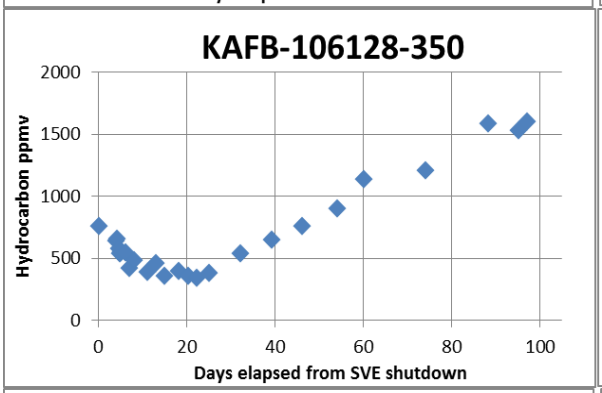


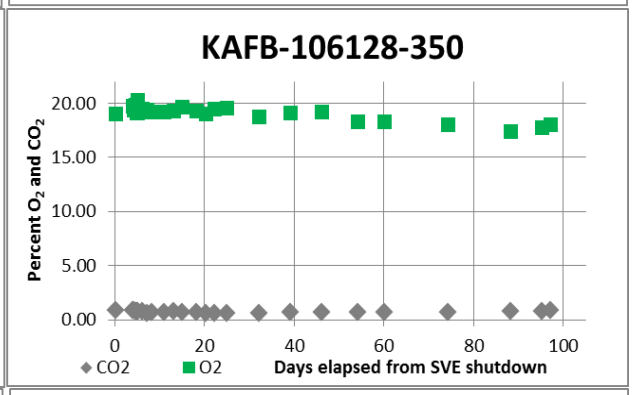


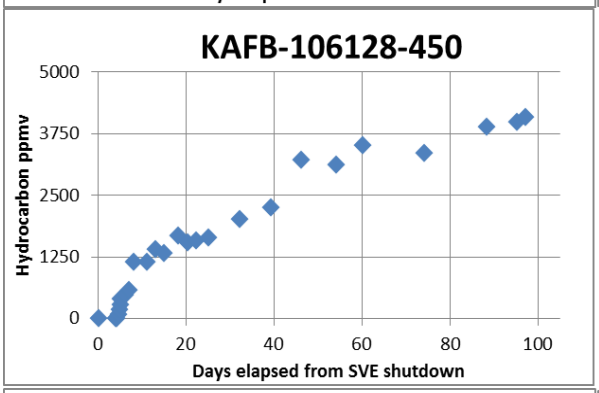
Appendix B. Time-series Graphs

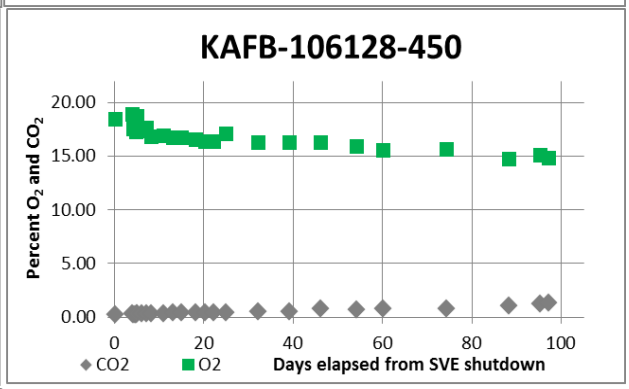


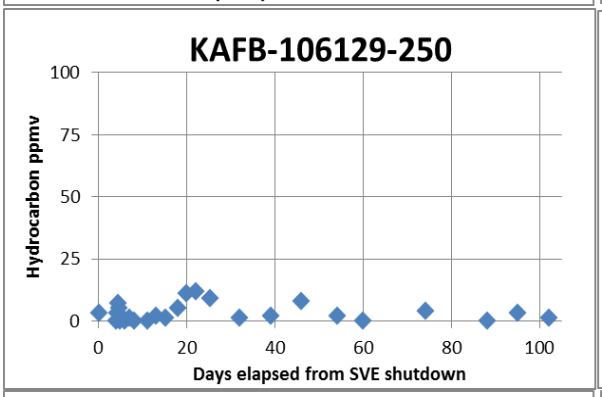


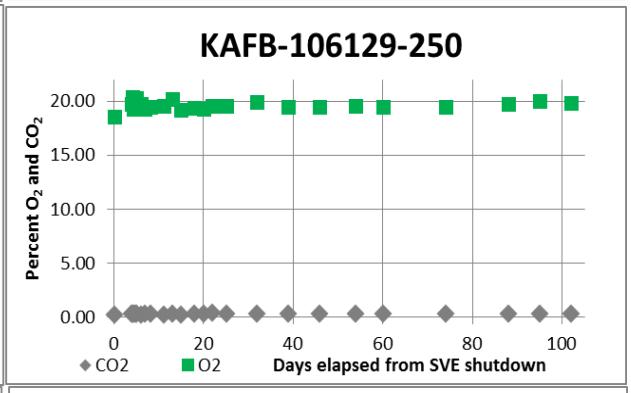


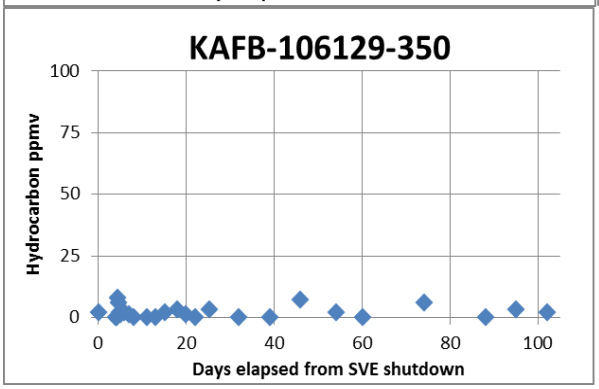


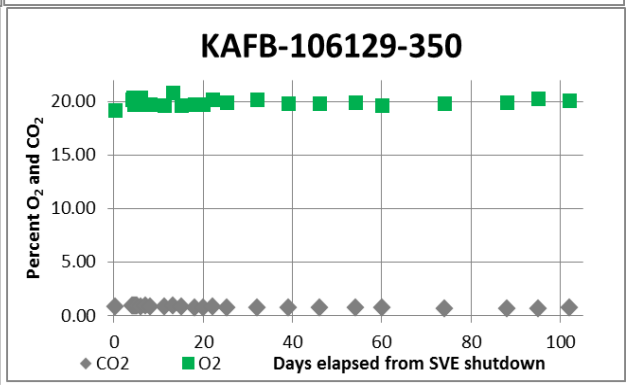




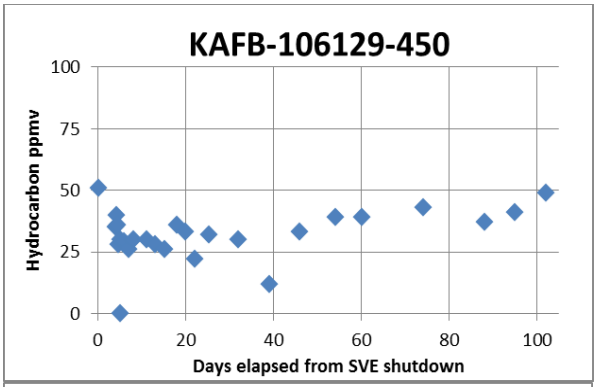


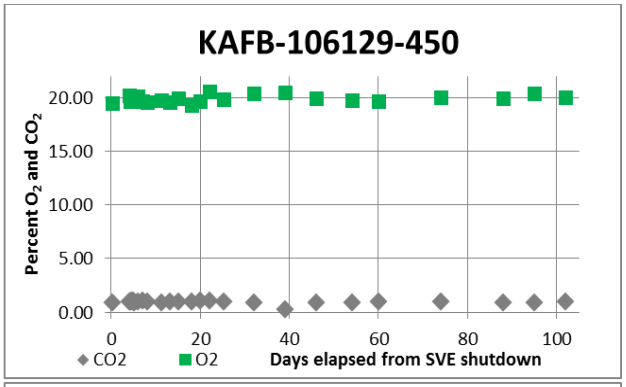


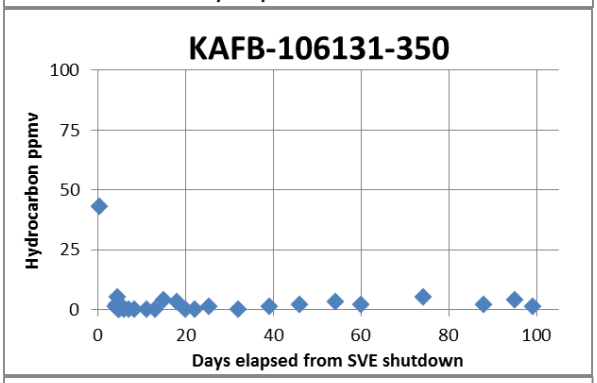


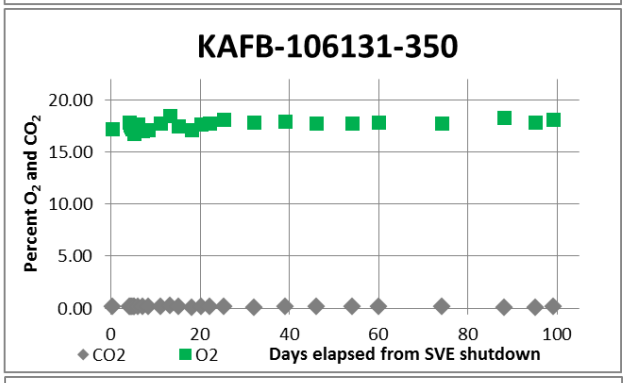


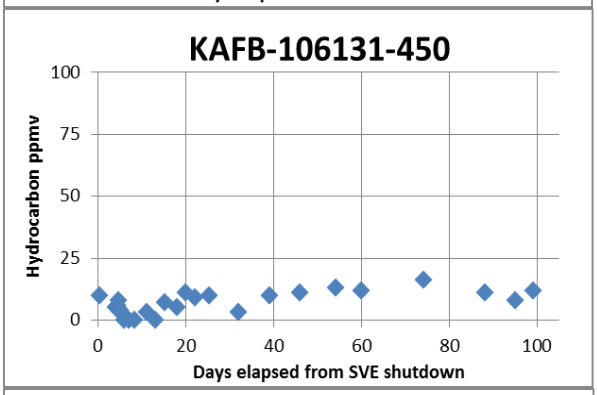
Appendix B. Time-series Graphs

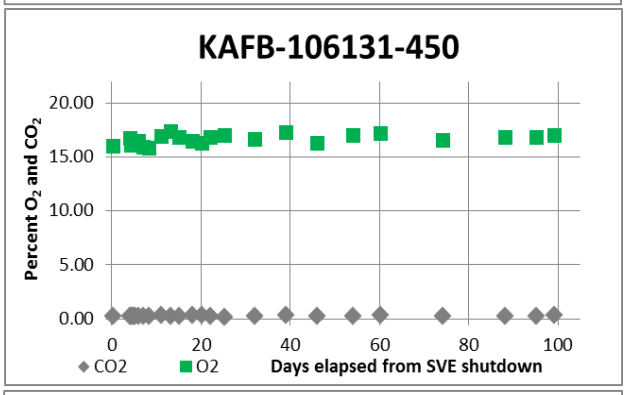


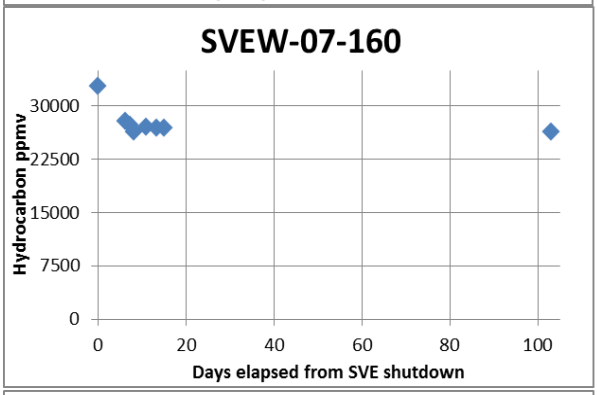


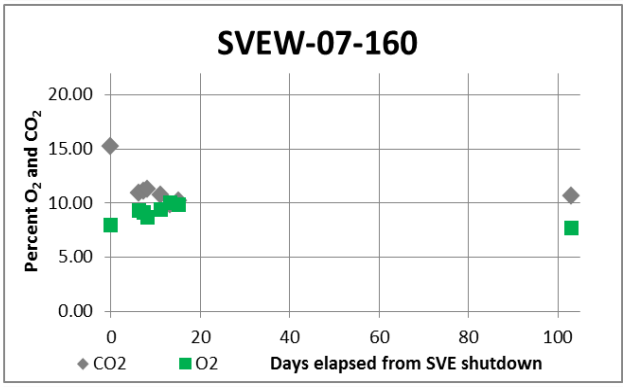


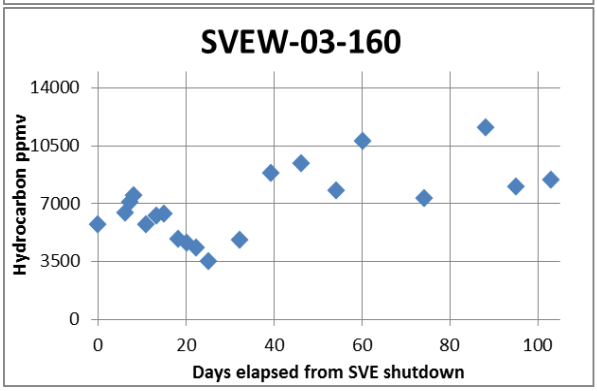


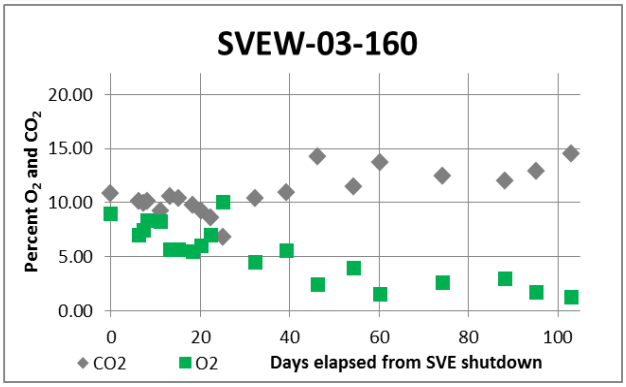




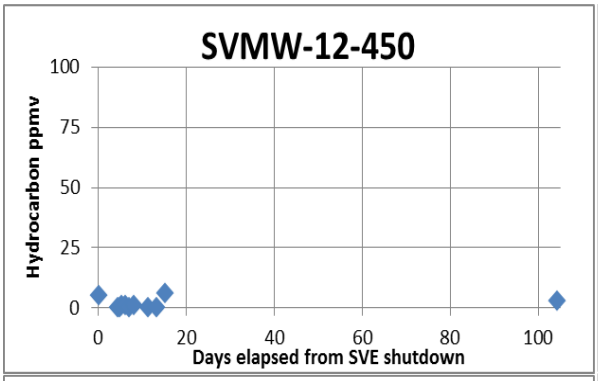


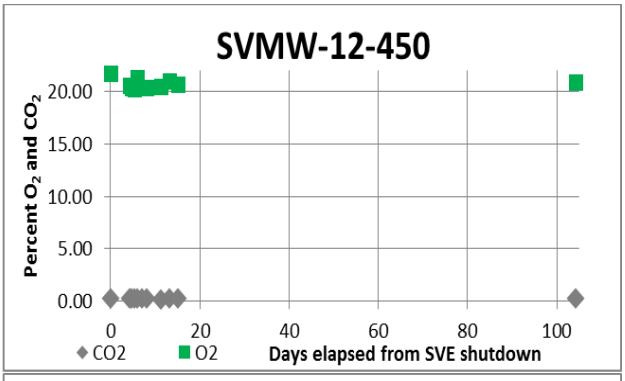


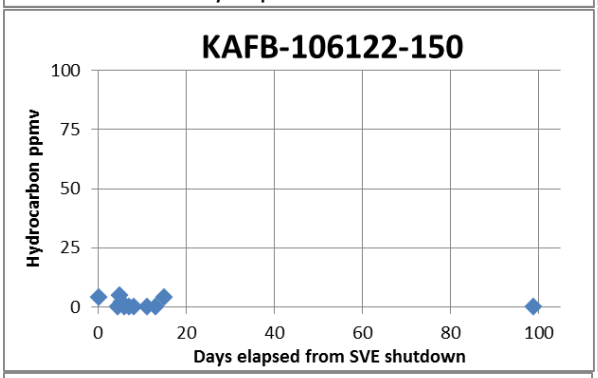


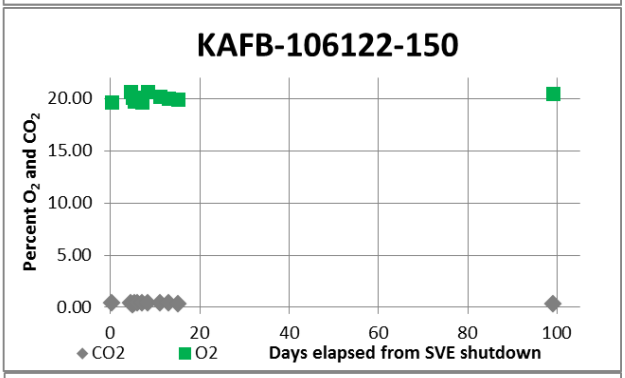


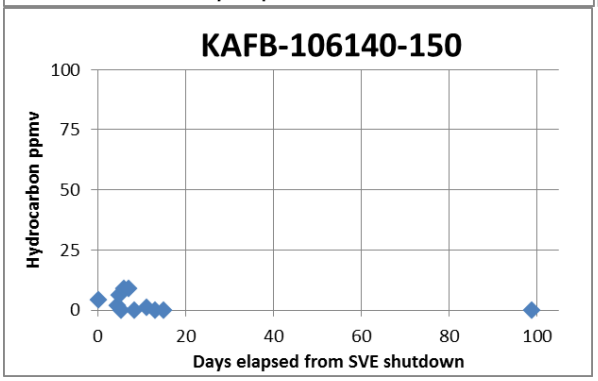
Appendix B. Time-series Graphs

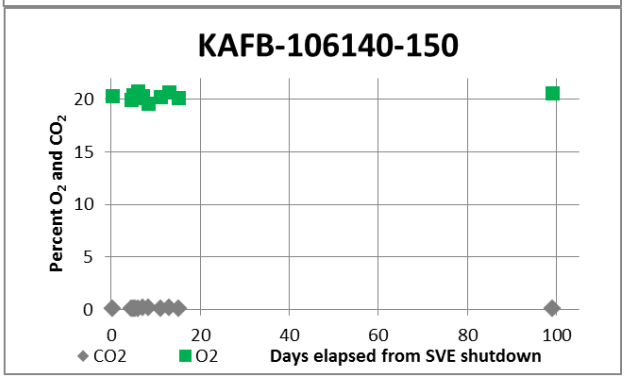




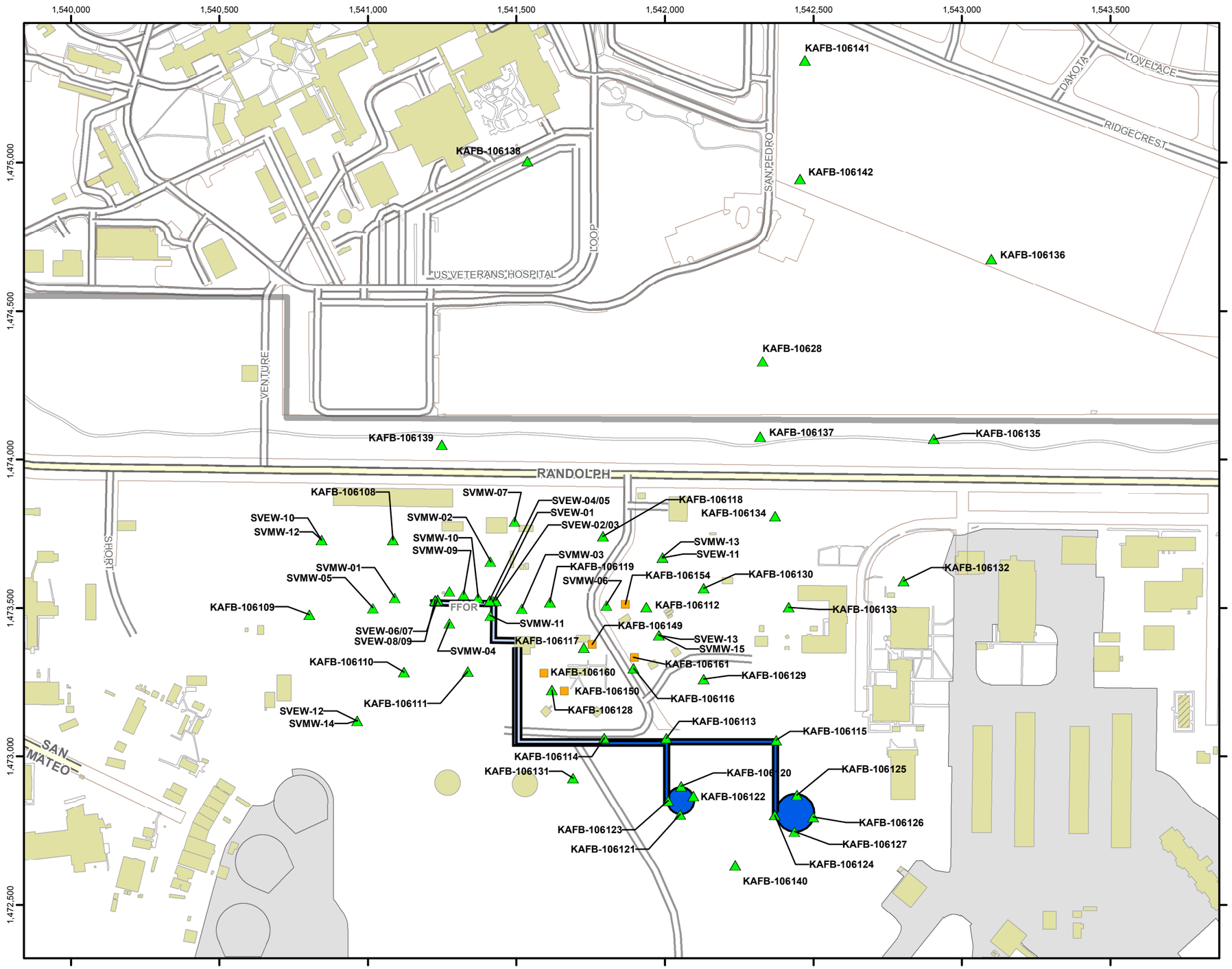








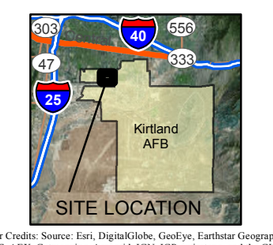
FIGURES



Legend

- SVM Location
- SVE Wells Active During Q1, 2015
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area
(approximate leak source zone)



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/21/16

N

0 175 350 700

Feet
1 inch = 350 feet

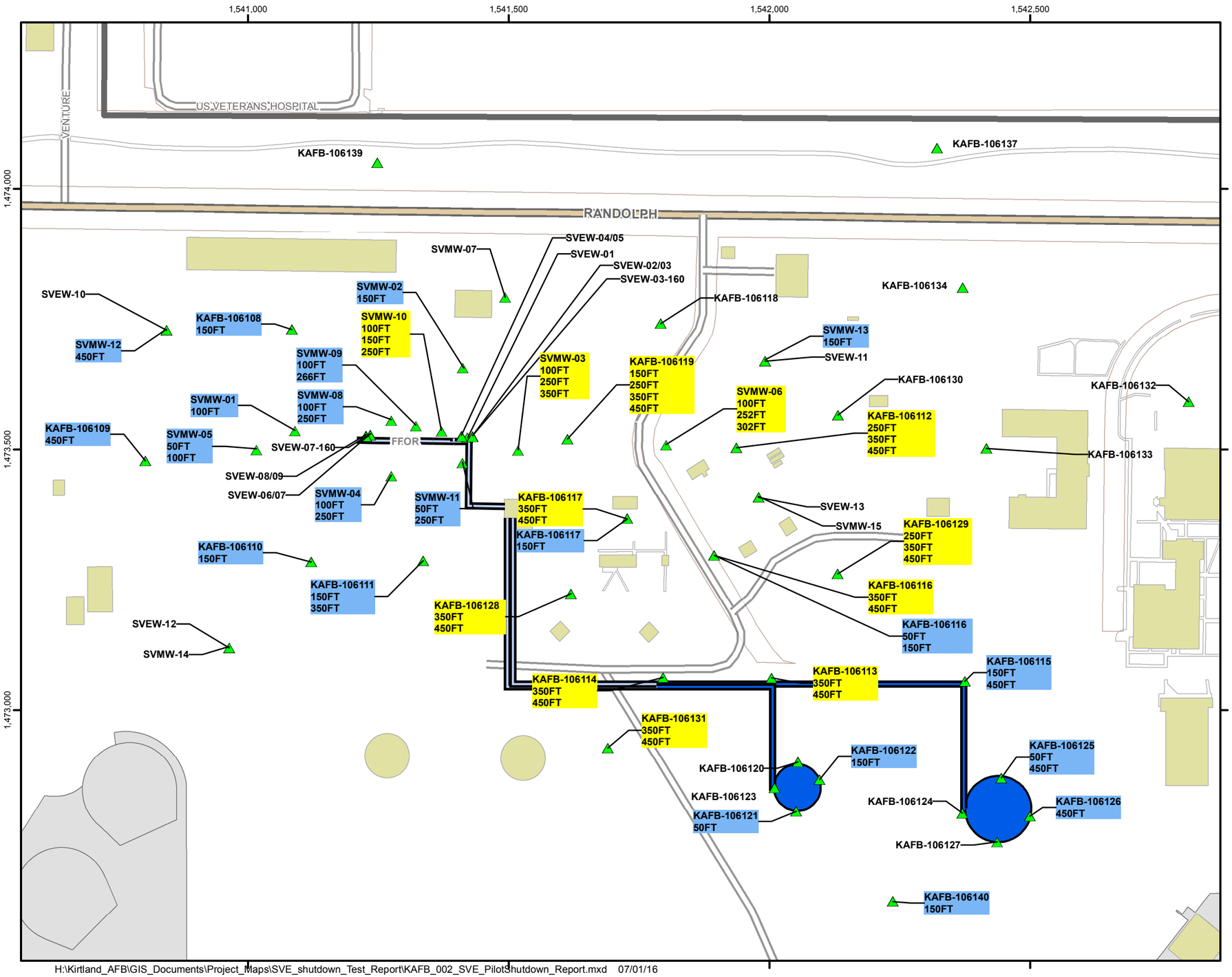
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-1

SVM LOCATIONS

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_001_SVE_loc.mxd 07/21/16



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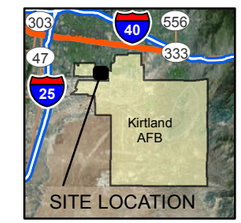
Legend

- SVM Locations
- Paved Road
- Unpaved Road
- Structure
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)

SVMW-03 100 FT 250 FT 350 FT — Selected Well Location IDs and Proposed Monitoring Depths

SVMW-13 150 FT — Newly Selected Well Location IDs and Proposed Monitoring Depths based on Q1, 2015 Sampling Event



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 100 200 400
Feet
1 inch = 200 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-2

SVM LOCATIONS SELECTED FOR RESPIRATION, SHORT-TERM AND LONG-TERM REBOUND TESTING

Figure 3-1. Increasing HC Trends

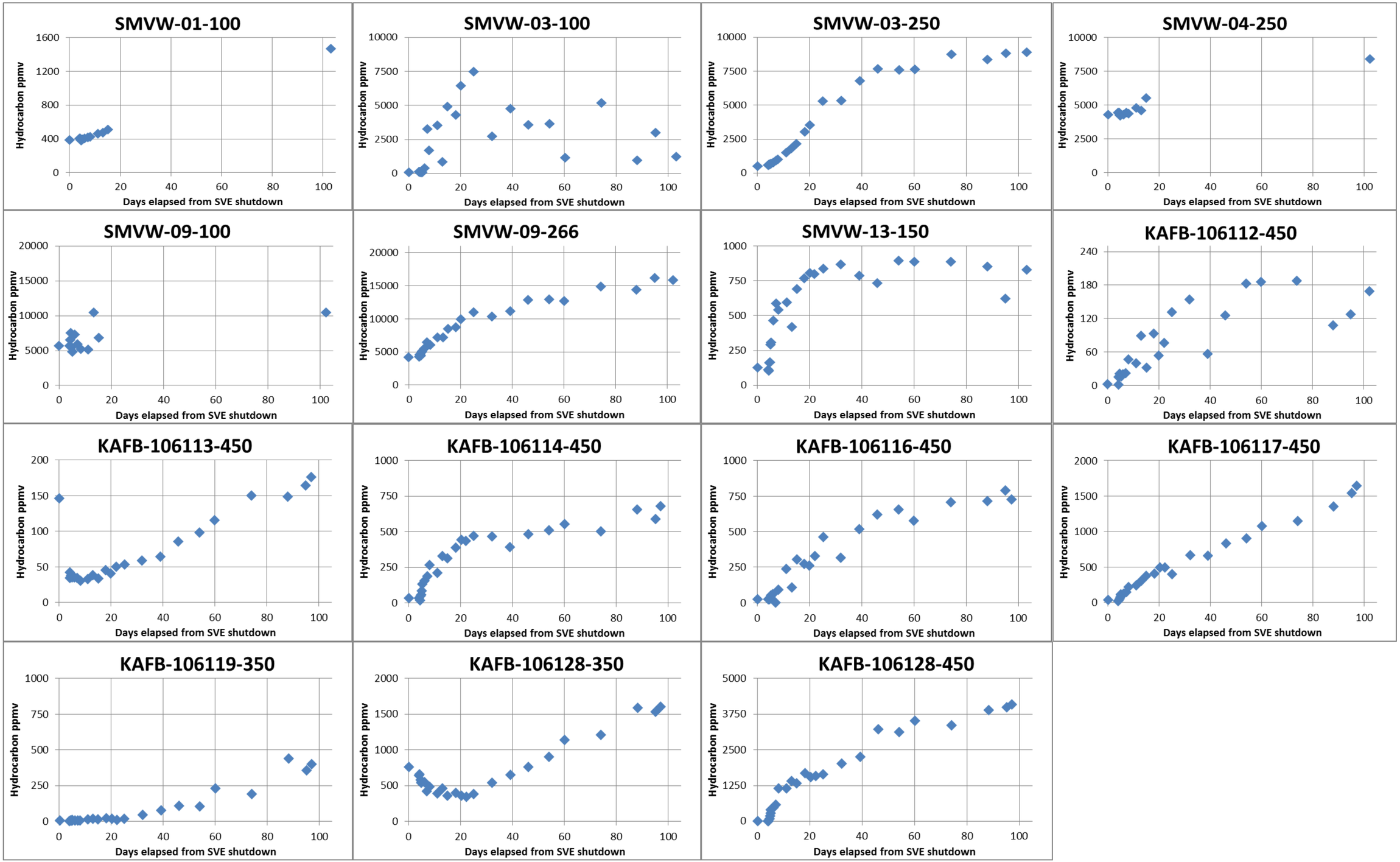
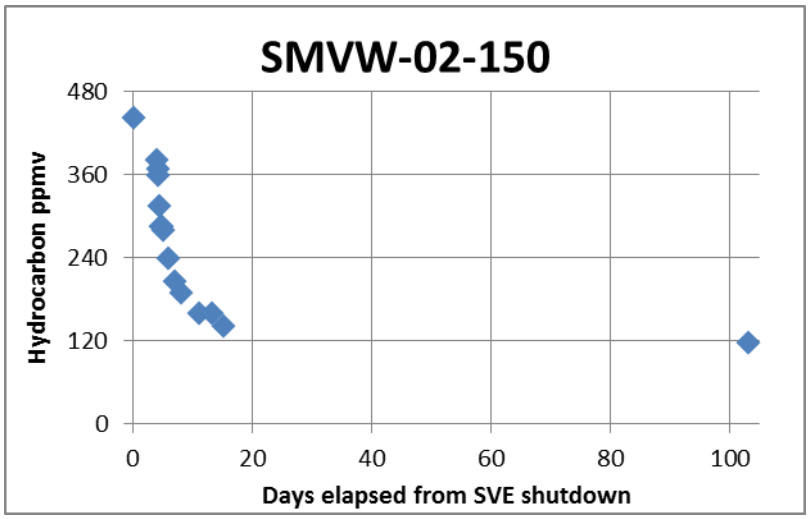
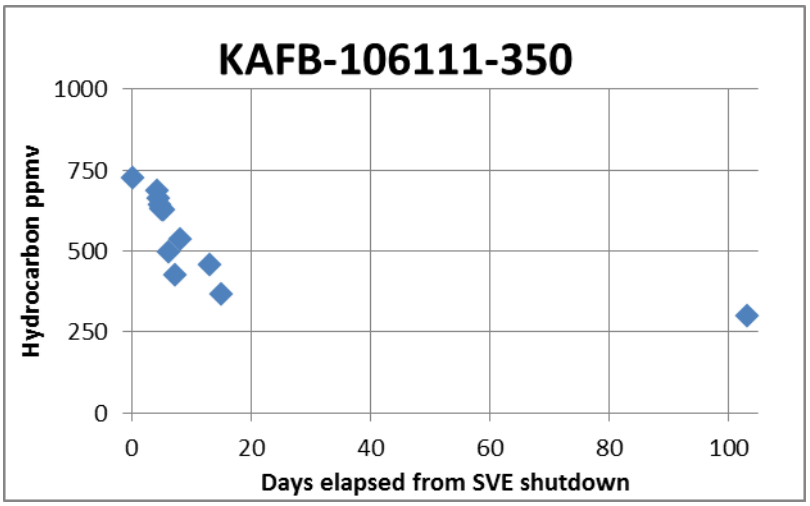
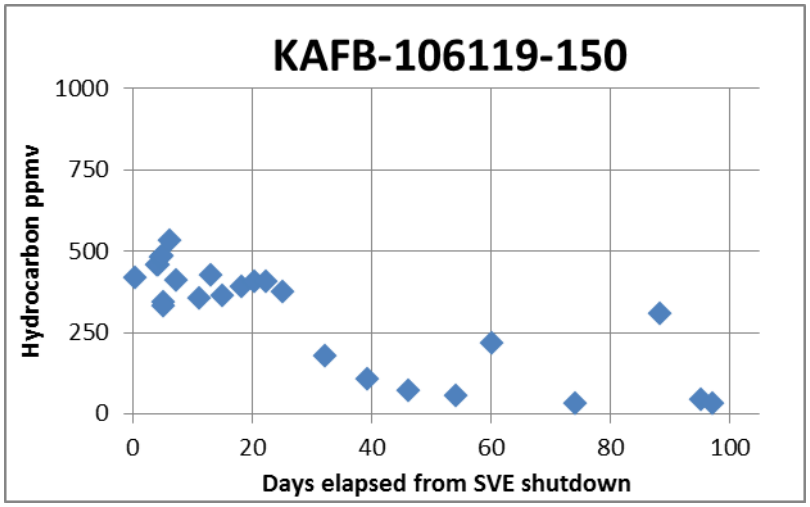
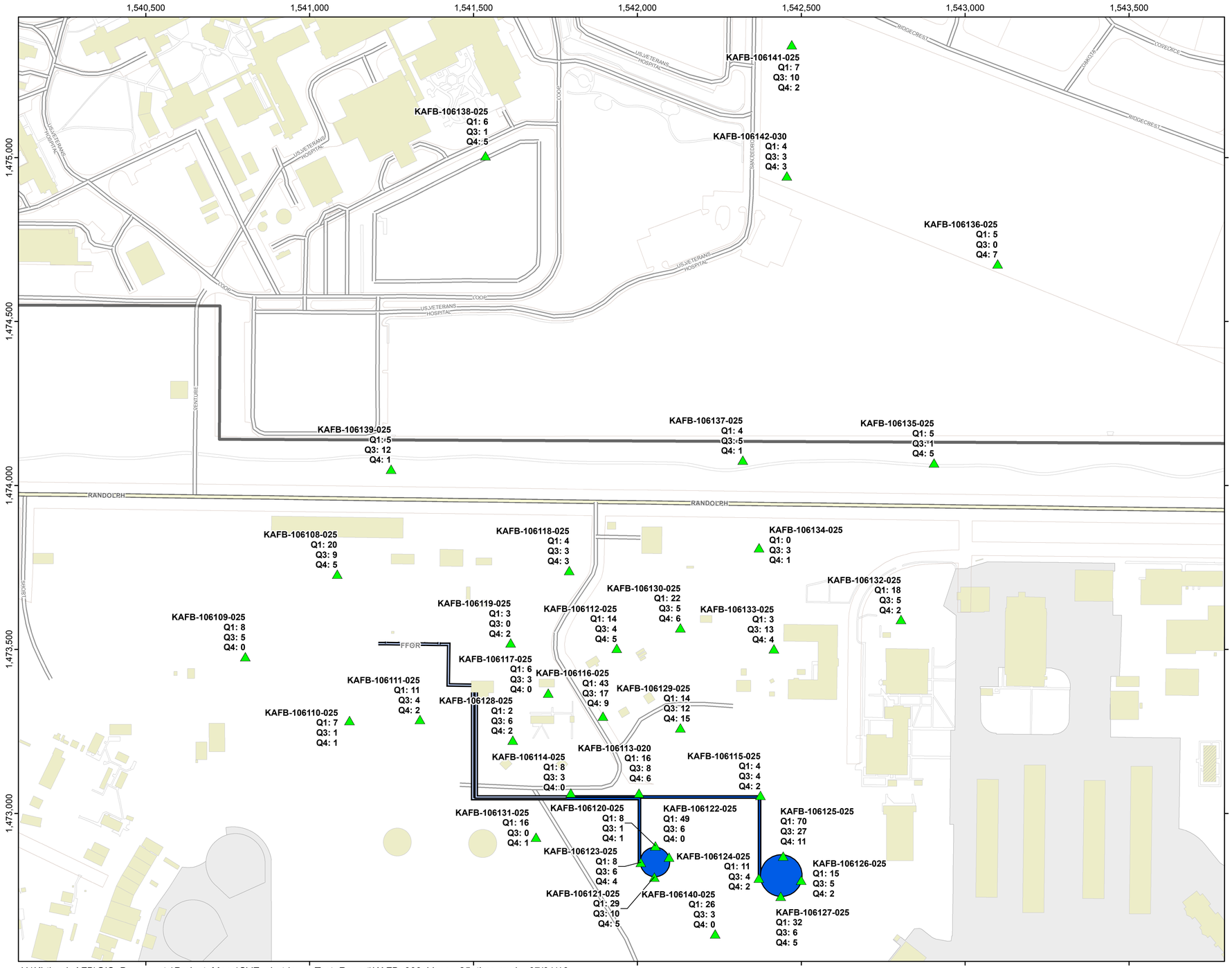


Figure 3-2. Decreasing HC Trends









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Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

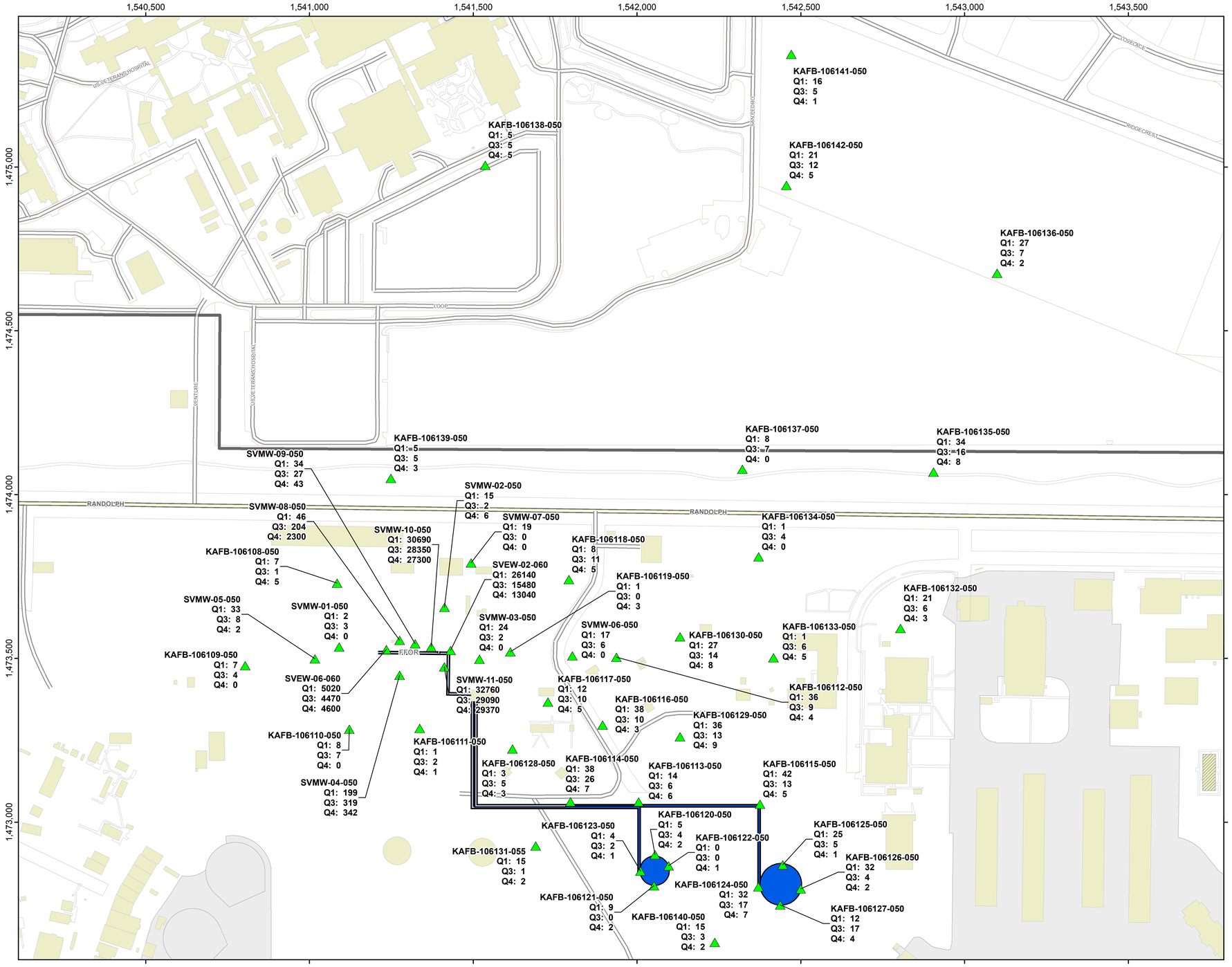
0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-3

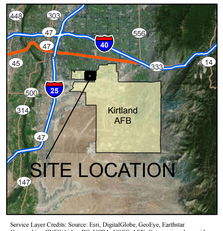
TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 25 FEET



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-4

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 50 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_004_Vapor_50_time.mxd 06/30/16

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_005_Vapor_100_time.mxd 06/30/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

*Concentrations at this point for Q1, Q3 and Q4, 2015 are laboratory analytical carbon range sums due to field instrurment detector saturation limit.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

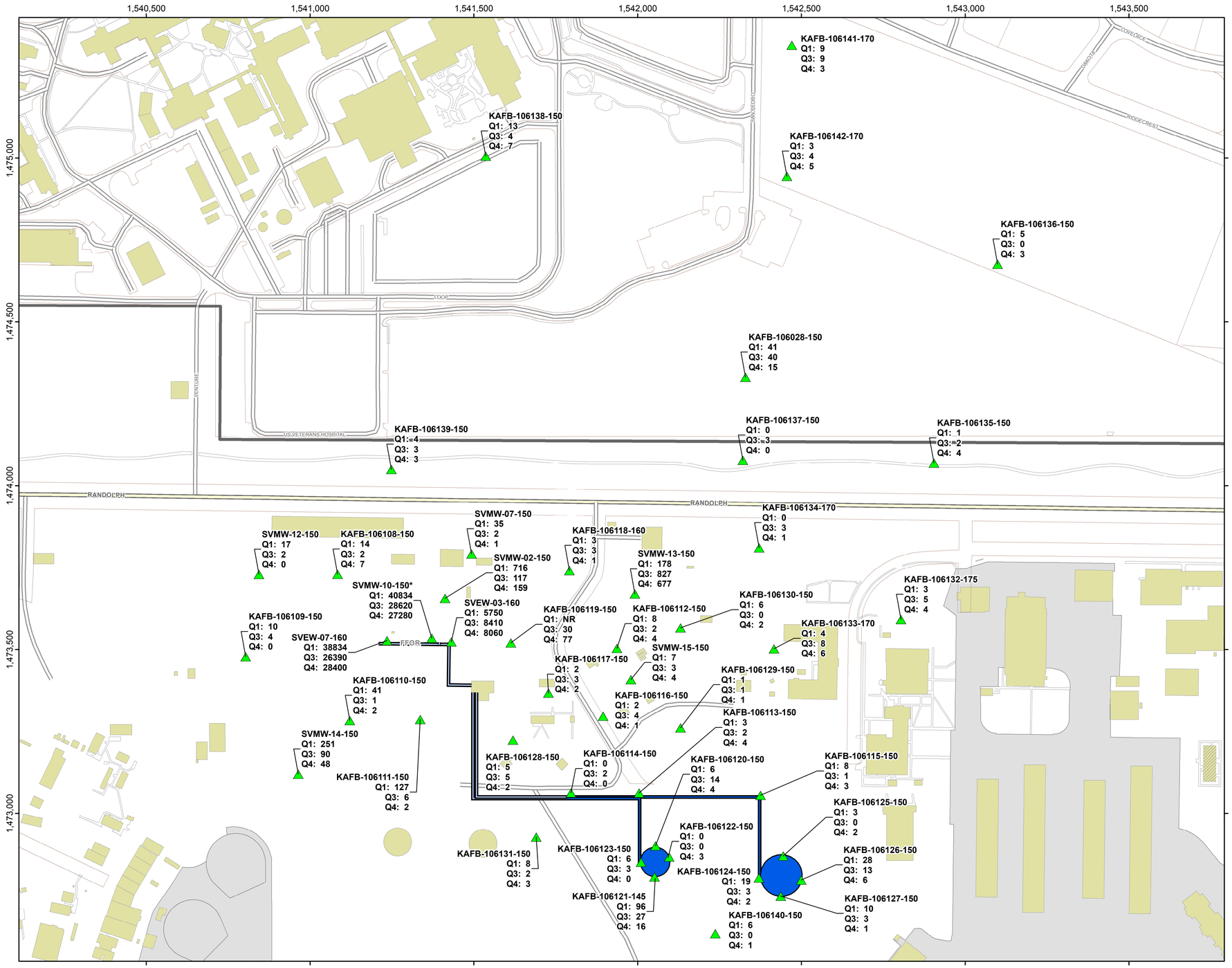
0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-5

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 100 FEET



Legend

- SVM Locations
- Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

*Concentrations at this point for Q1, 2015 are laboratory analytical carbon range sums due to field instrurment detector saturation limit.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 160 320 640

Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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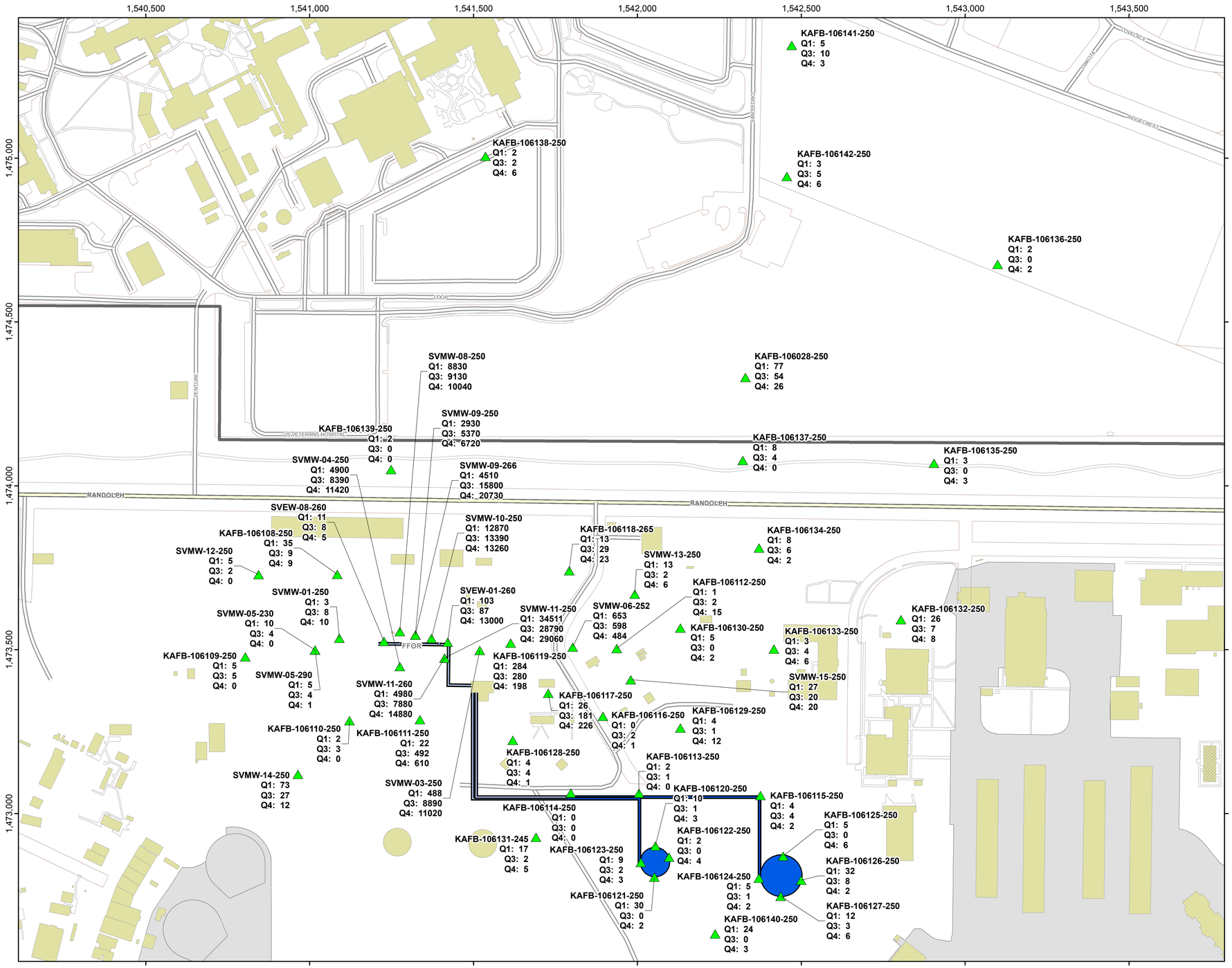
FIGURE 3-6

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH AT 150 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_006_Vapor_150_time.mxd 07/01/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

*Concentrations at this point for Q1, 2015 are laboratory analytical carbon range sums due to field instrurment detector saturation limit.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
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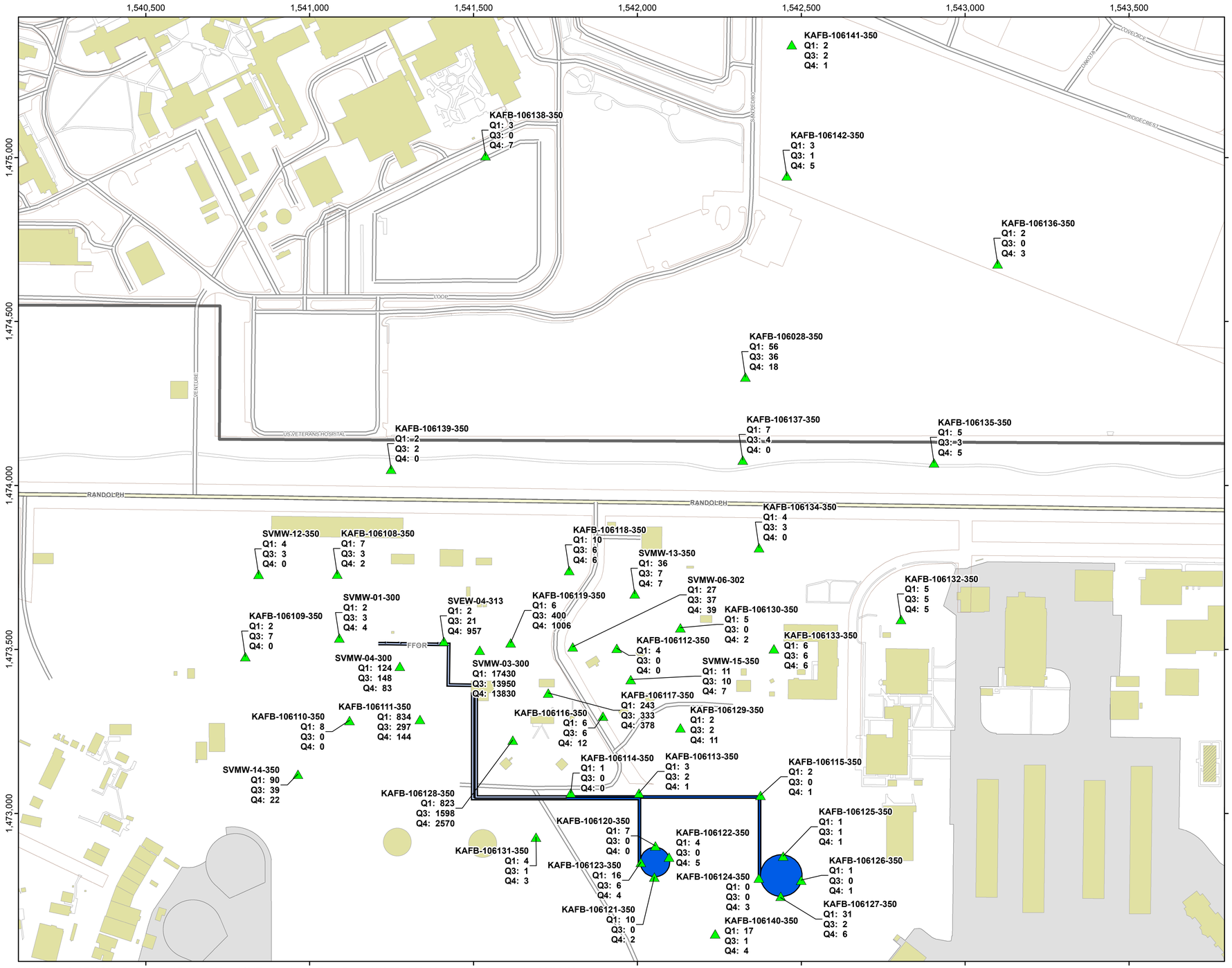
FIGURE 3-7

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 250 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_007_Vapor_250_time.mxd 06/30/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

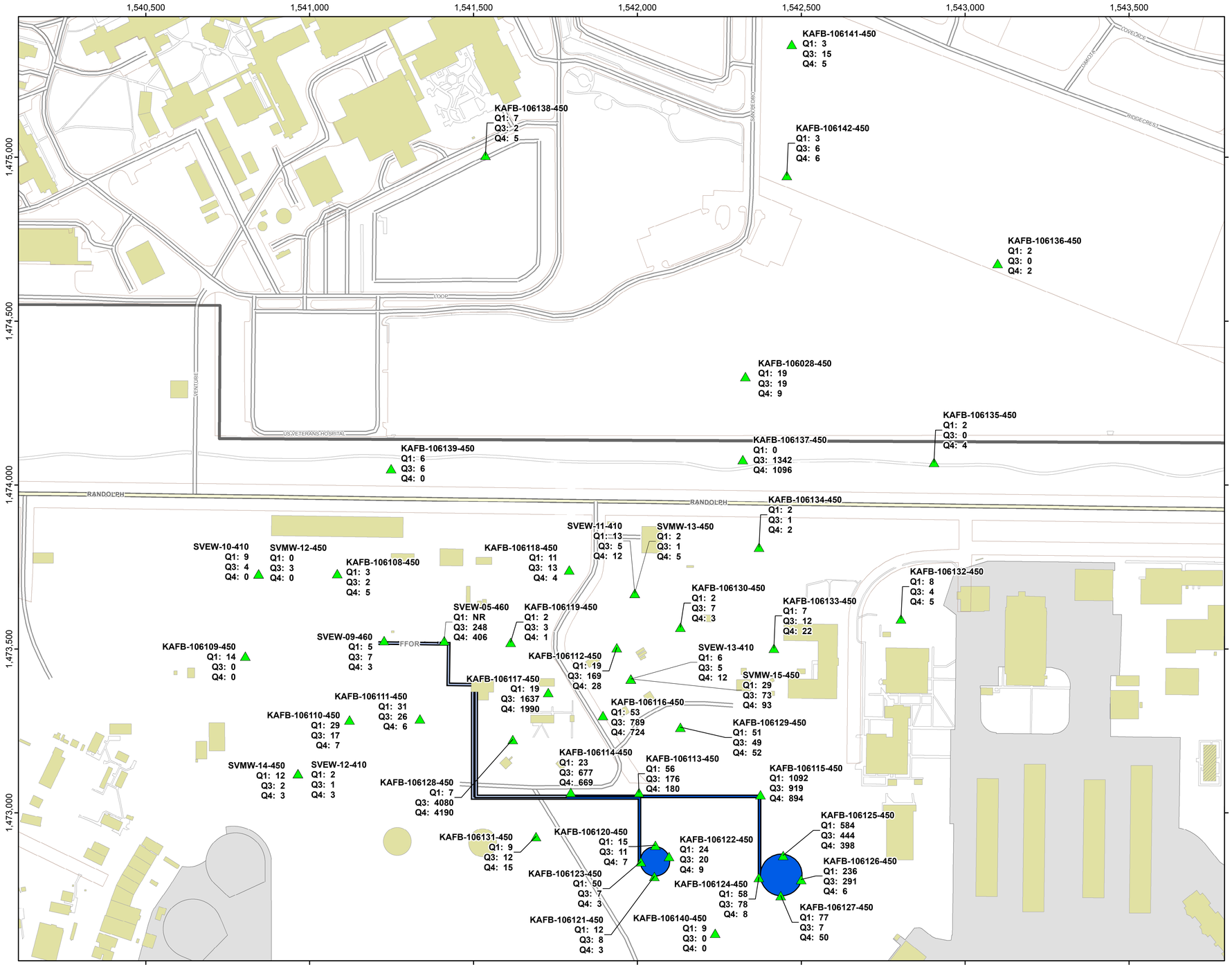
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-8

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 350 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_008_Vapor_350_time.mxd 06/30/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

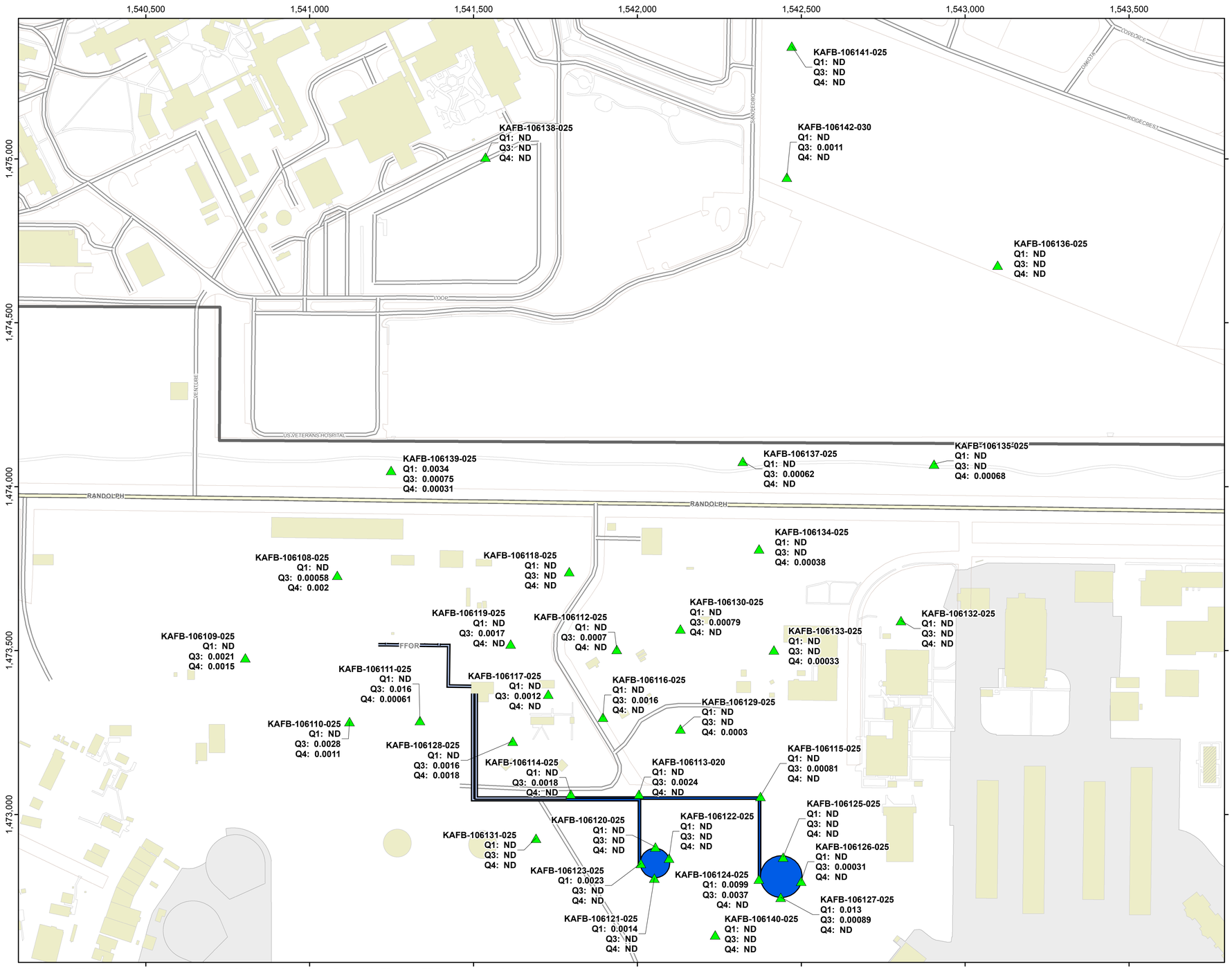
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-9

TOTAL FIELD HYDROCARBON CONCENTRATIONS THROUGH TIME AT 450 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_009_Vapor_450_time.mxd 06/30/16



Legend

- SVM Location
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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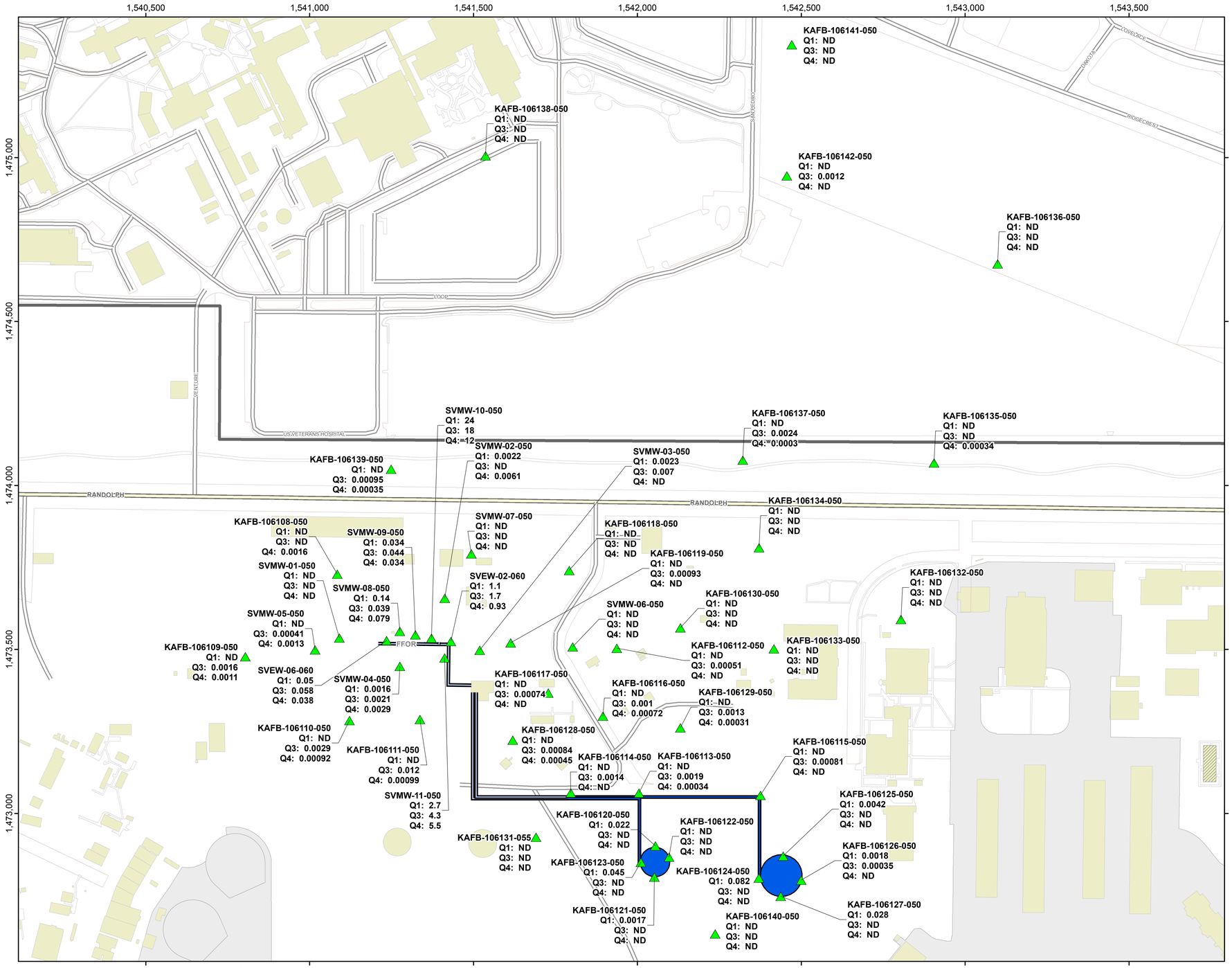
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-10

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 25 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_010_EDB_time.mxd 06/30/16



H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_011_EDB_50_time.mxd 07/05/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/05/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-11

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 50 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_012_EDB_100_time.mxd 06/30/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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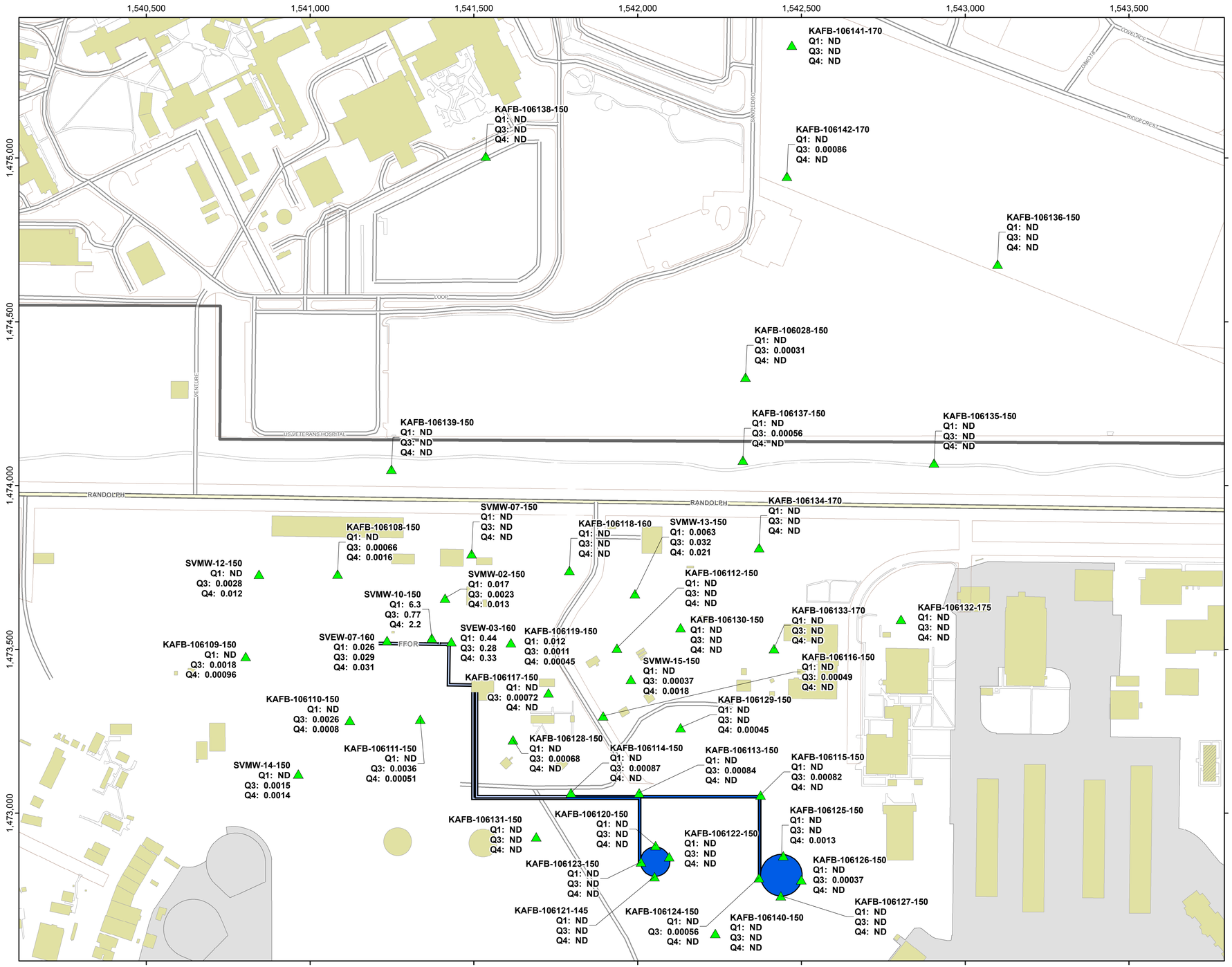
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-12

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 100 FEET



Legend

- SVM Locations
- Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640

Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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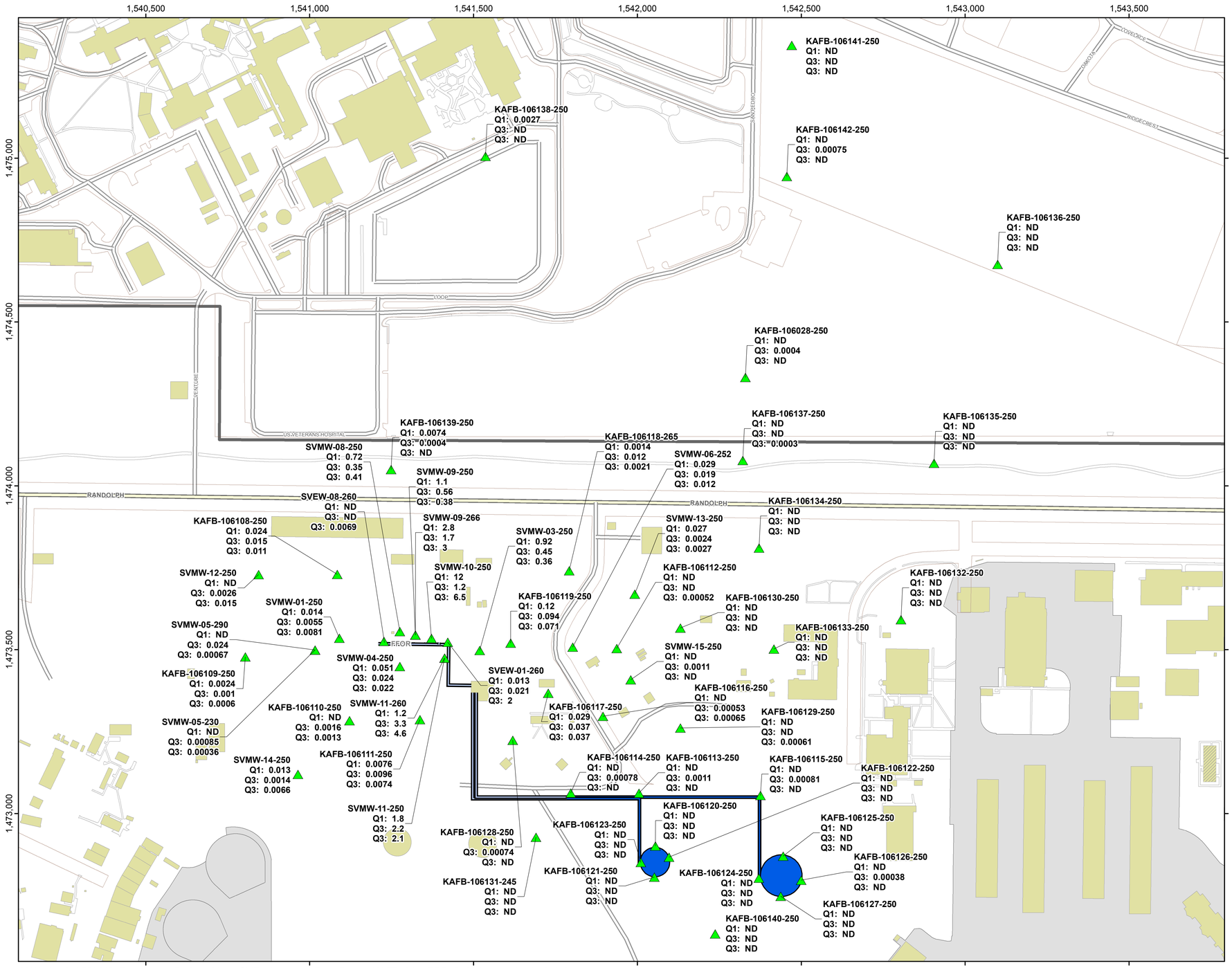
FIGURE 3-13

TOTAL FIELD EDB CONCENTRATIONS THROUGH AT 150 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_013_EDB_150_time.mxd 06/30/16



H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_014_EDB_250_time.mxd 07/05/16

Legend

- SVM Locations
- Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/05/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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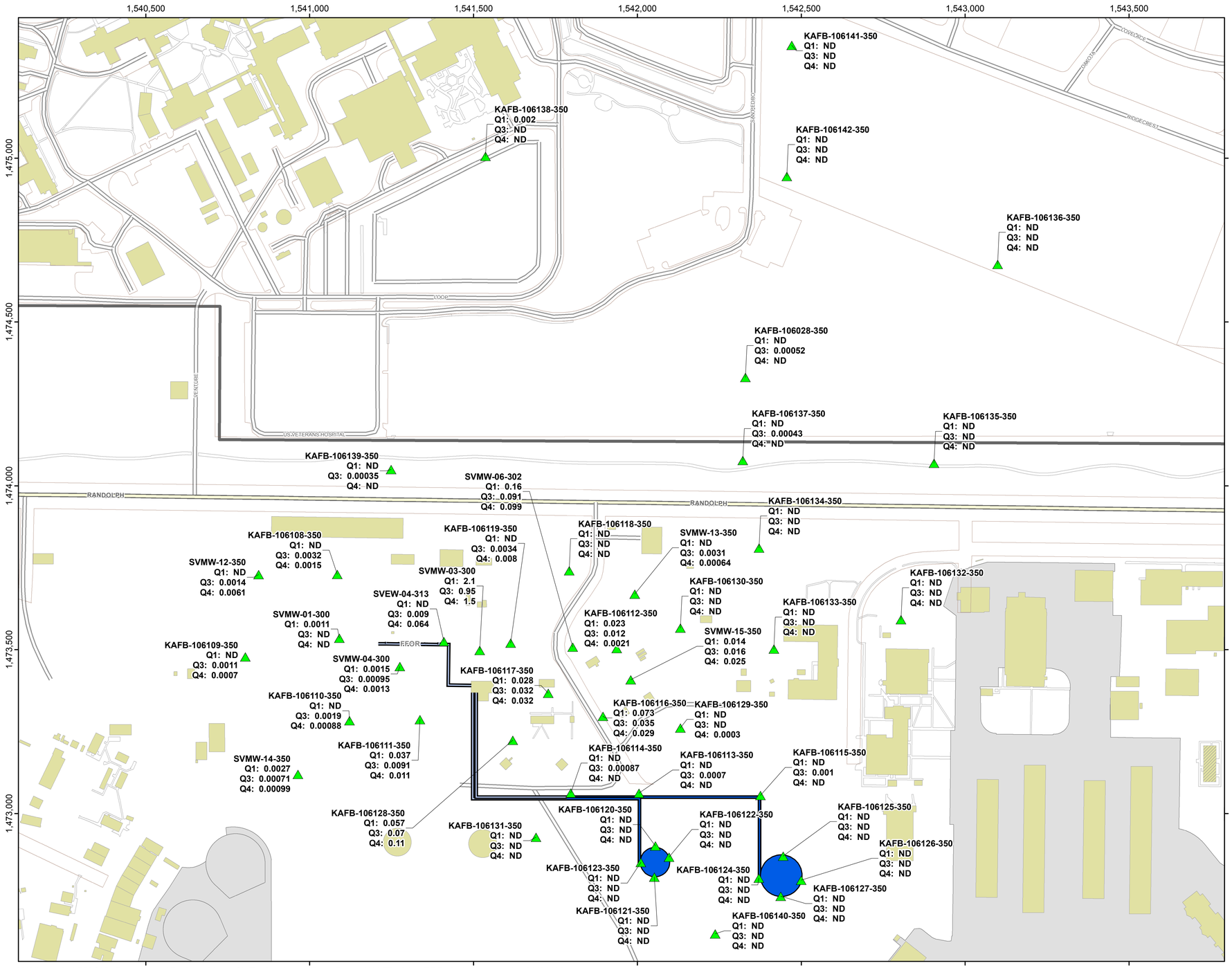
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-14

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 250 FEET



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 06/30/16

N

0 160 320 640
Feet

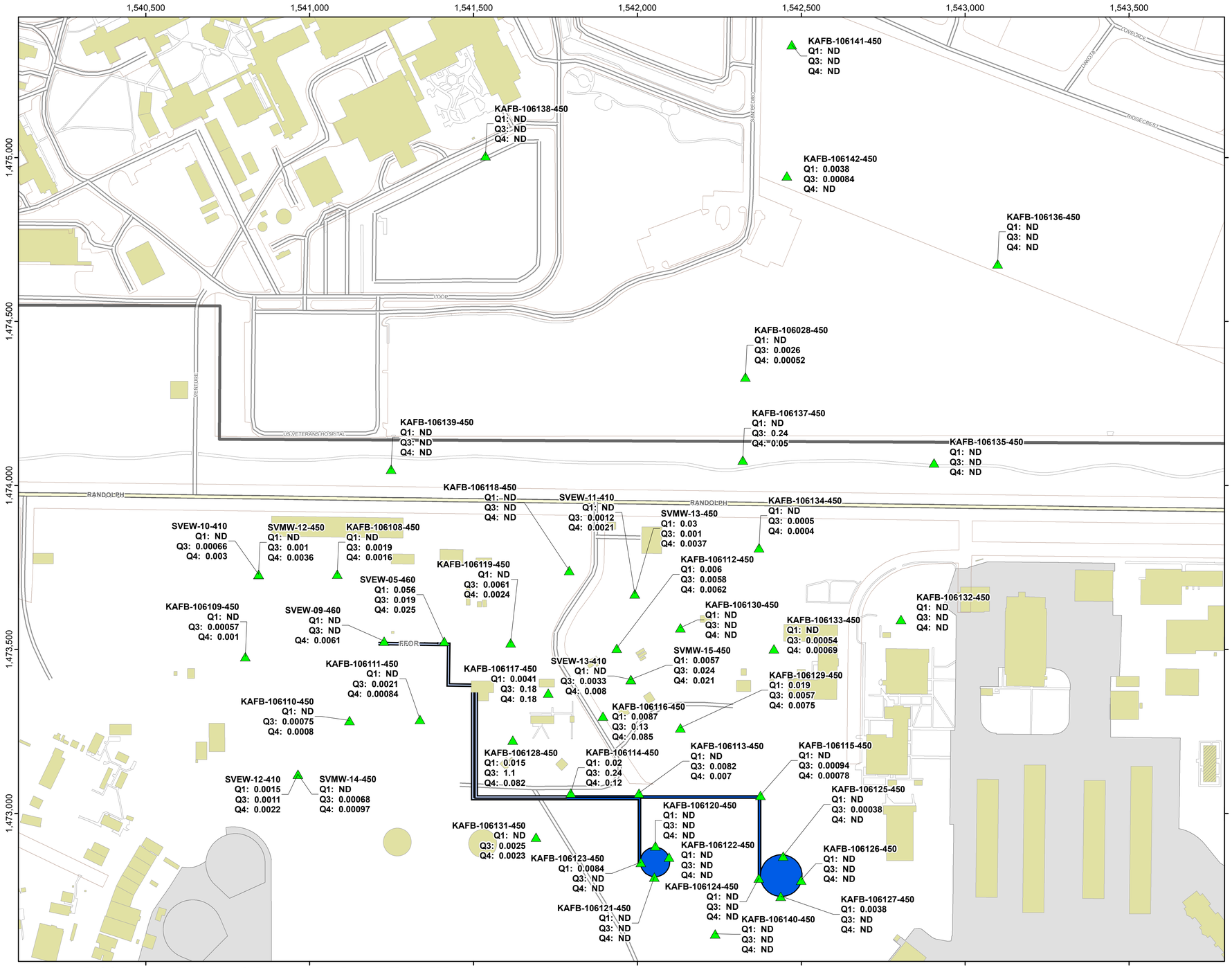
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-15

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 350 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_015_EDB_350_time.mxd 06/30/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/05/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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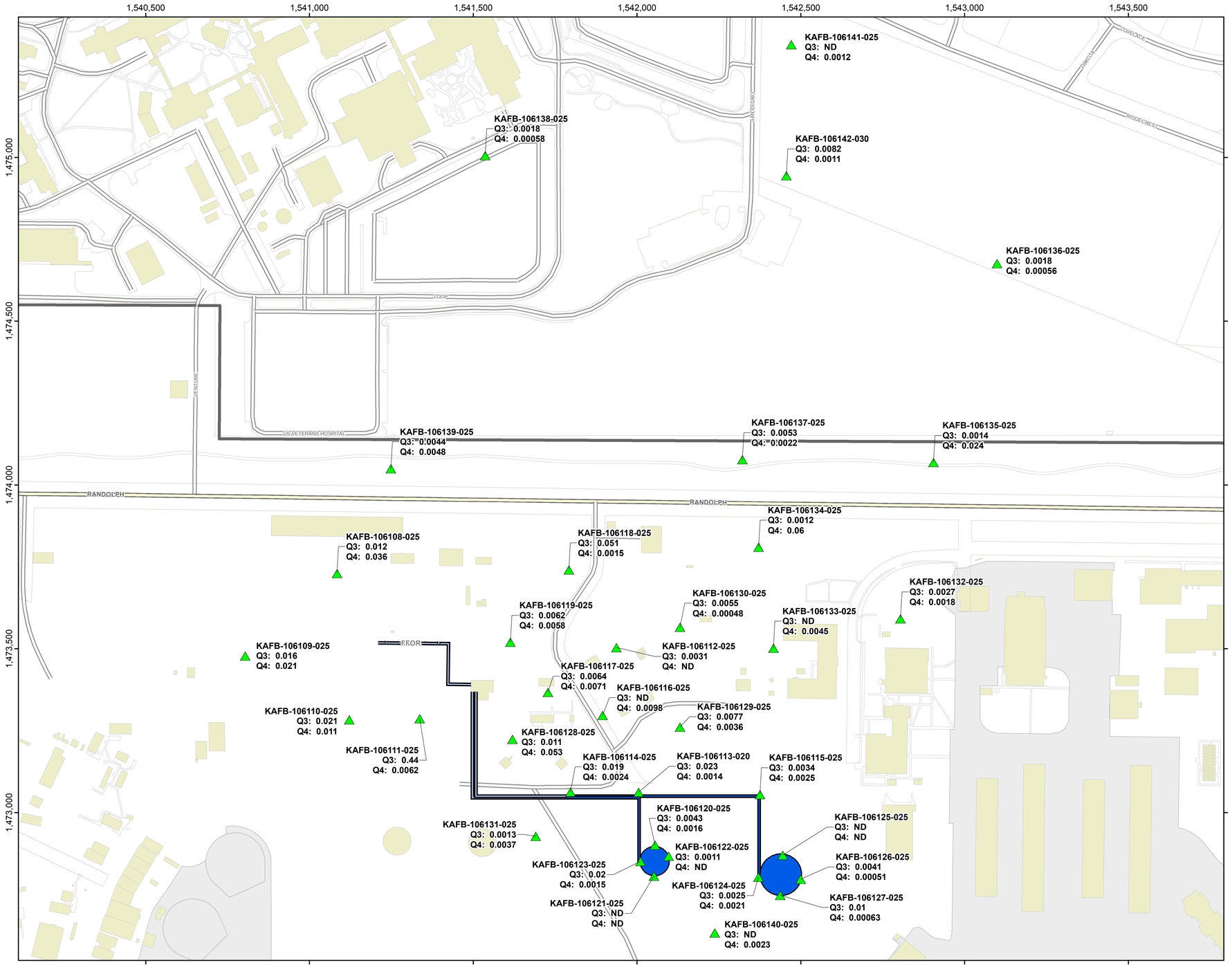
FIGURE 3-16

TOTAL FIELD EDB
CONCENTRATIONS THROUGH TIME
AT 450 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_016_EDB_450_time.mxd 07/05/16



H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_017_benz_25_time.mxd 07/01/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

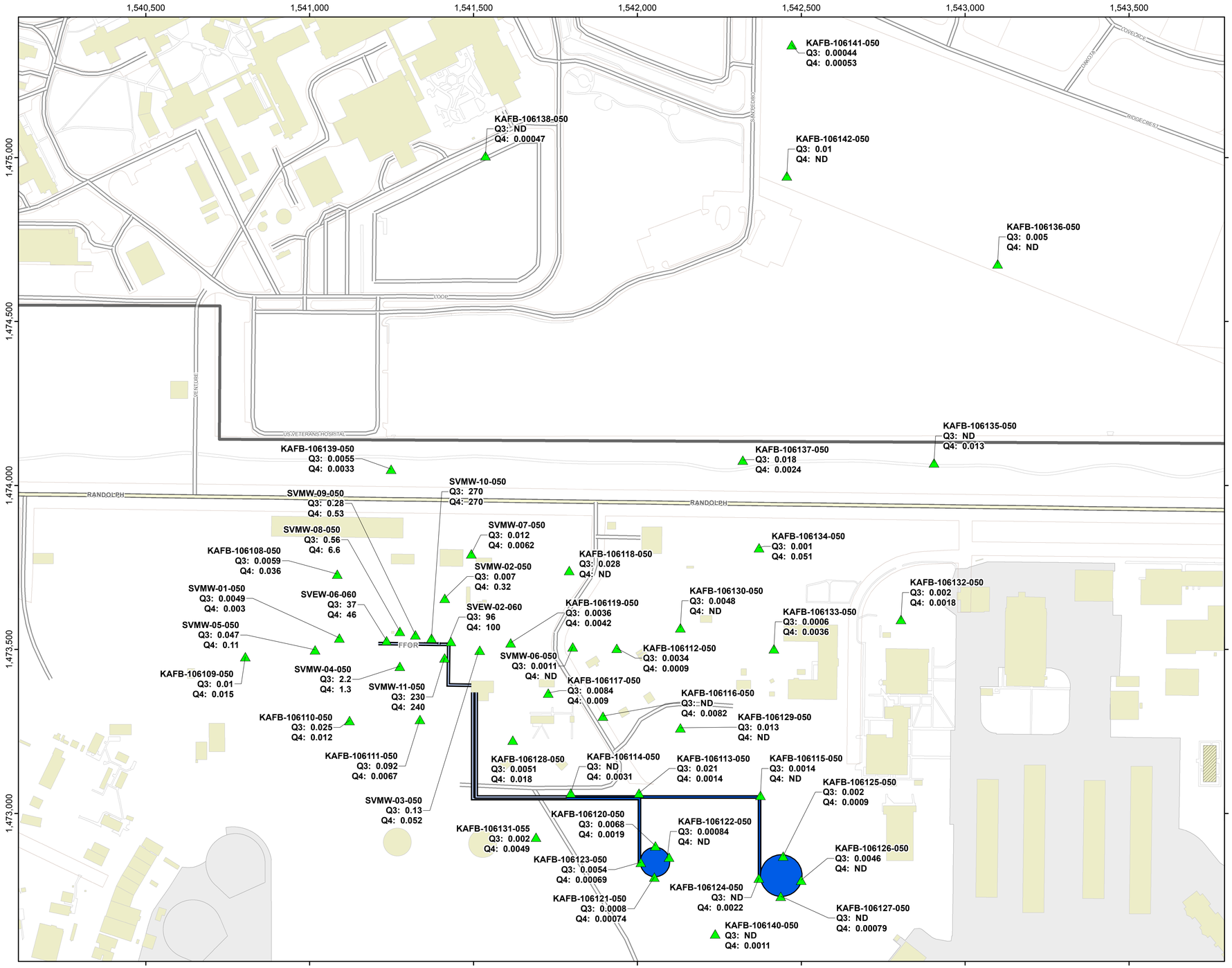
0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-17

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH TIME AT 25 FEET



H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_018_benz_50_time.mxd 07/01/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-18

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH TIME AT 50 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_019_benz_100_time.mxd 07/01/16

Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

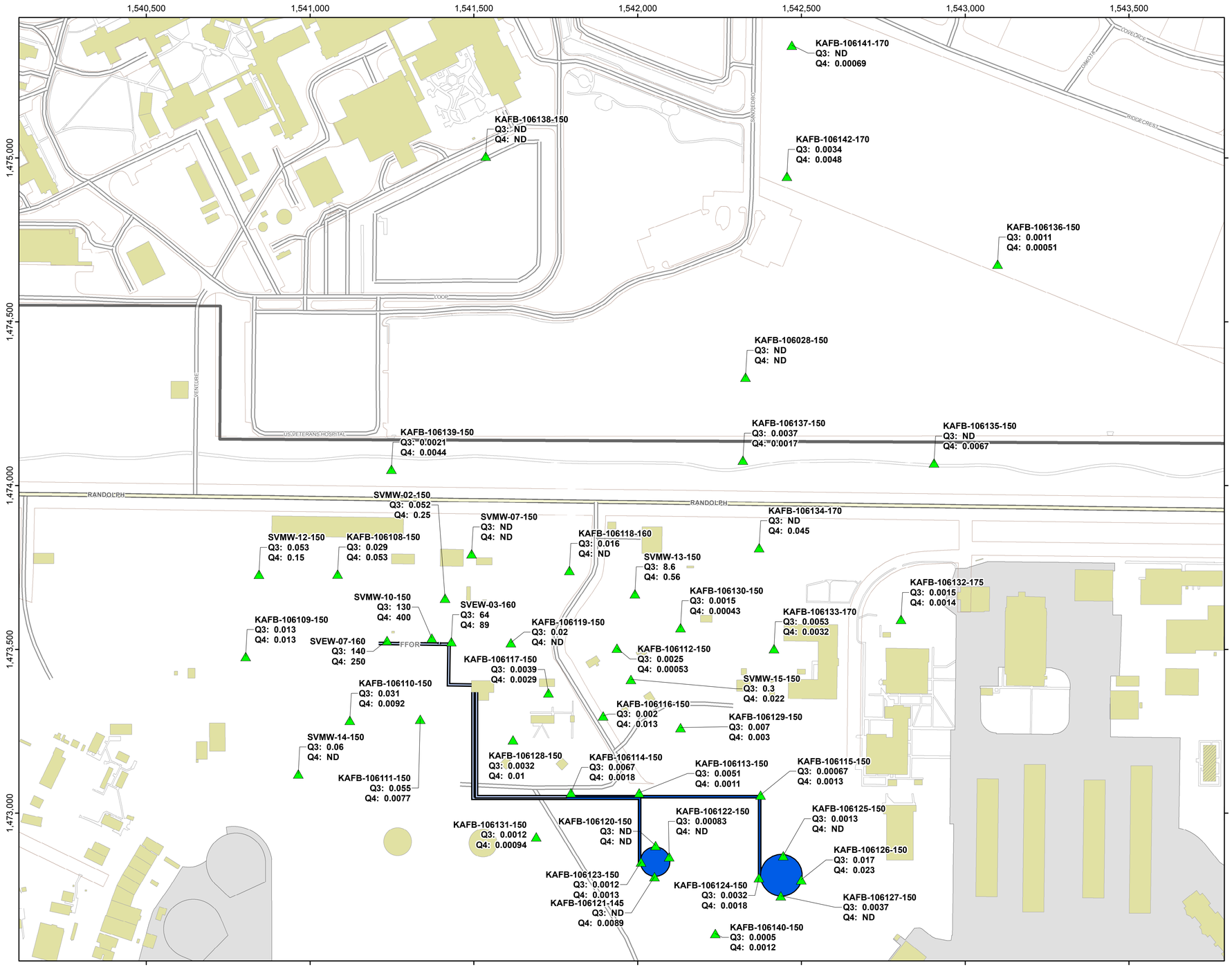
0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-19

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH TIME AT 100 FEET



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/05/16

N

0 160 320 640
Feet

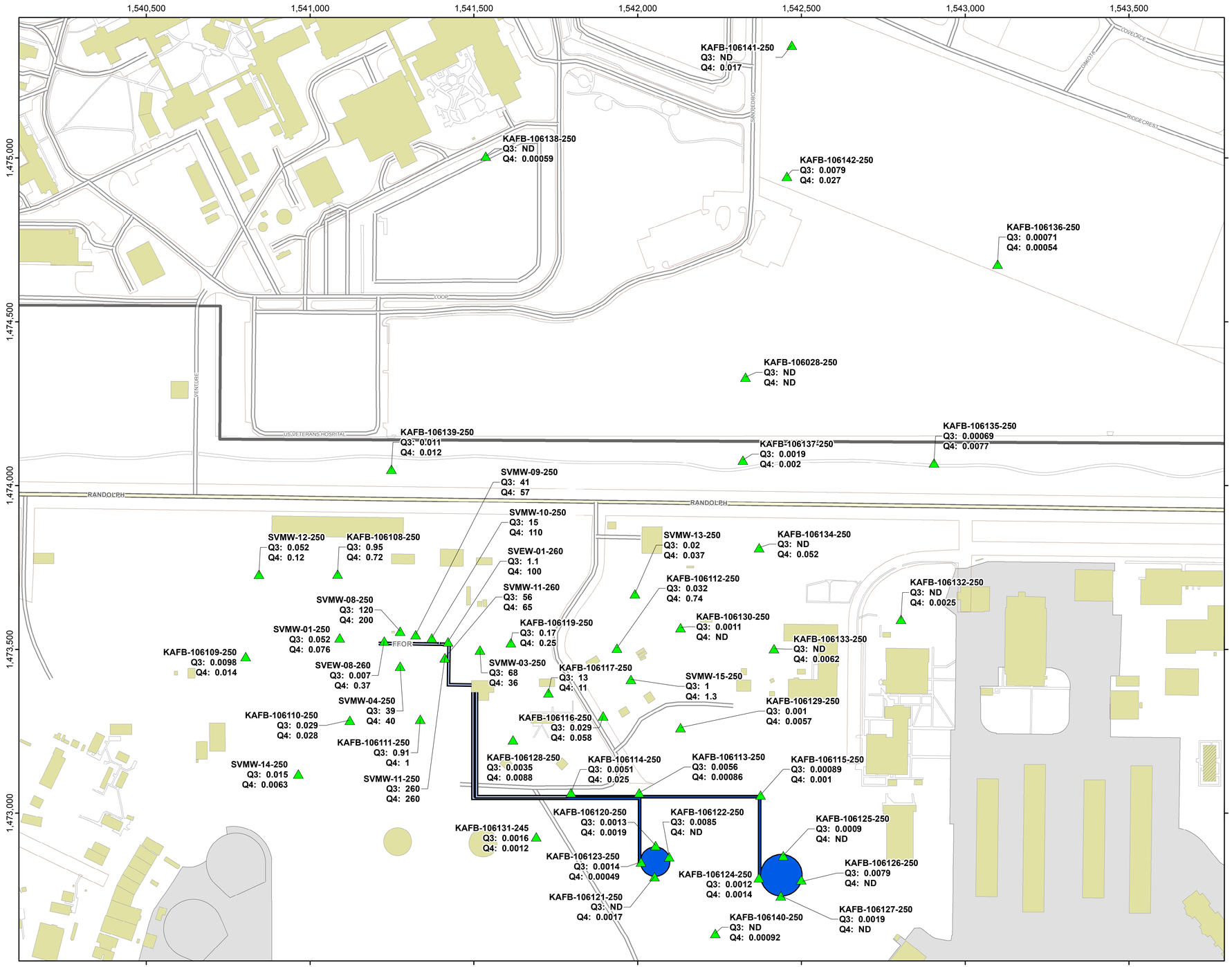
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-20

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH AT 150 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_020_benz_150_time.mxd 07/05/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 160 320 640
Feet

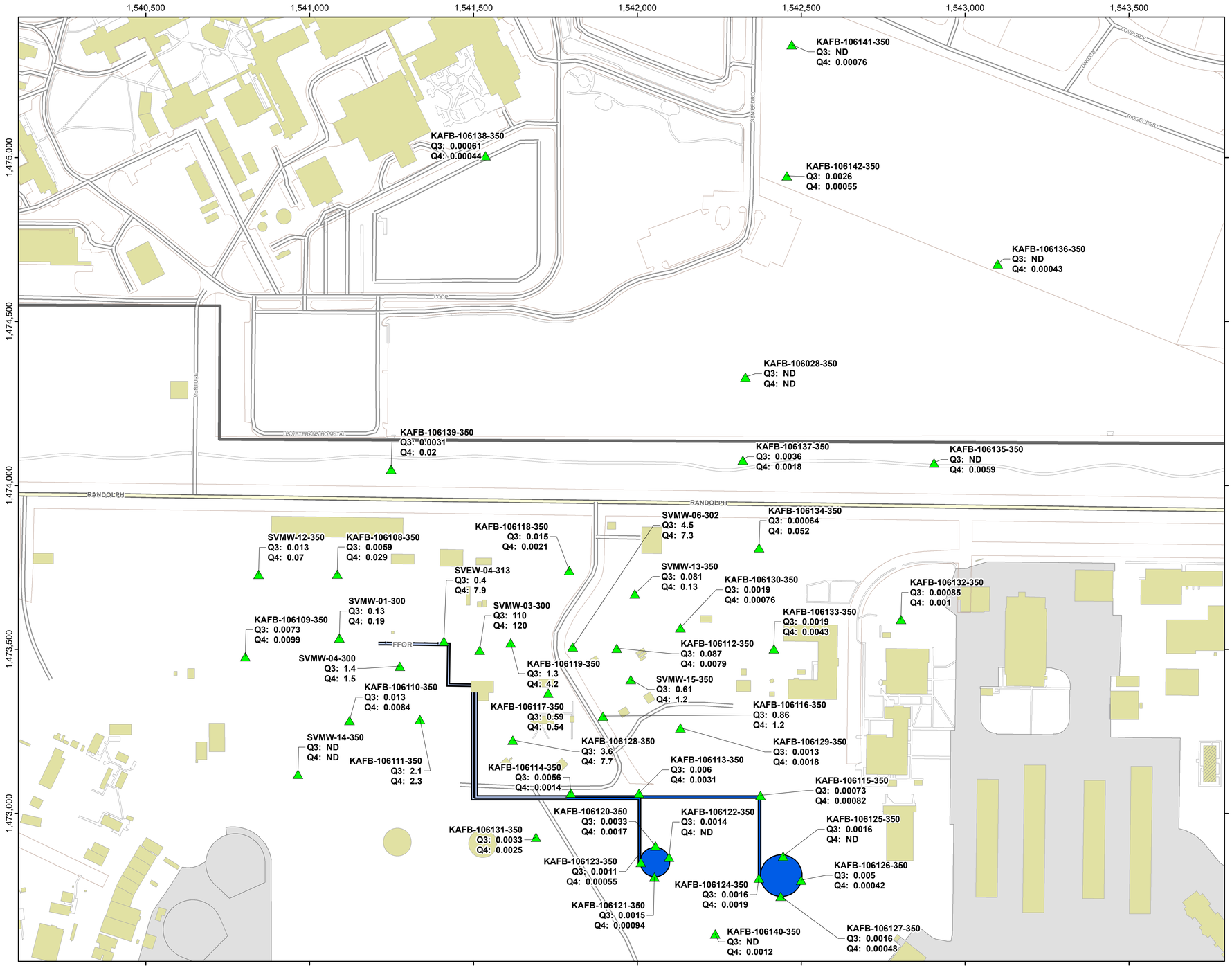
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-21

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH AT 250 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_021_benz_250_time.mxd 07/01/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 160 320 640
Feet

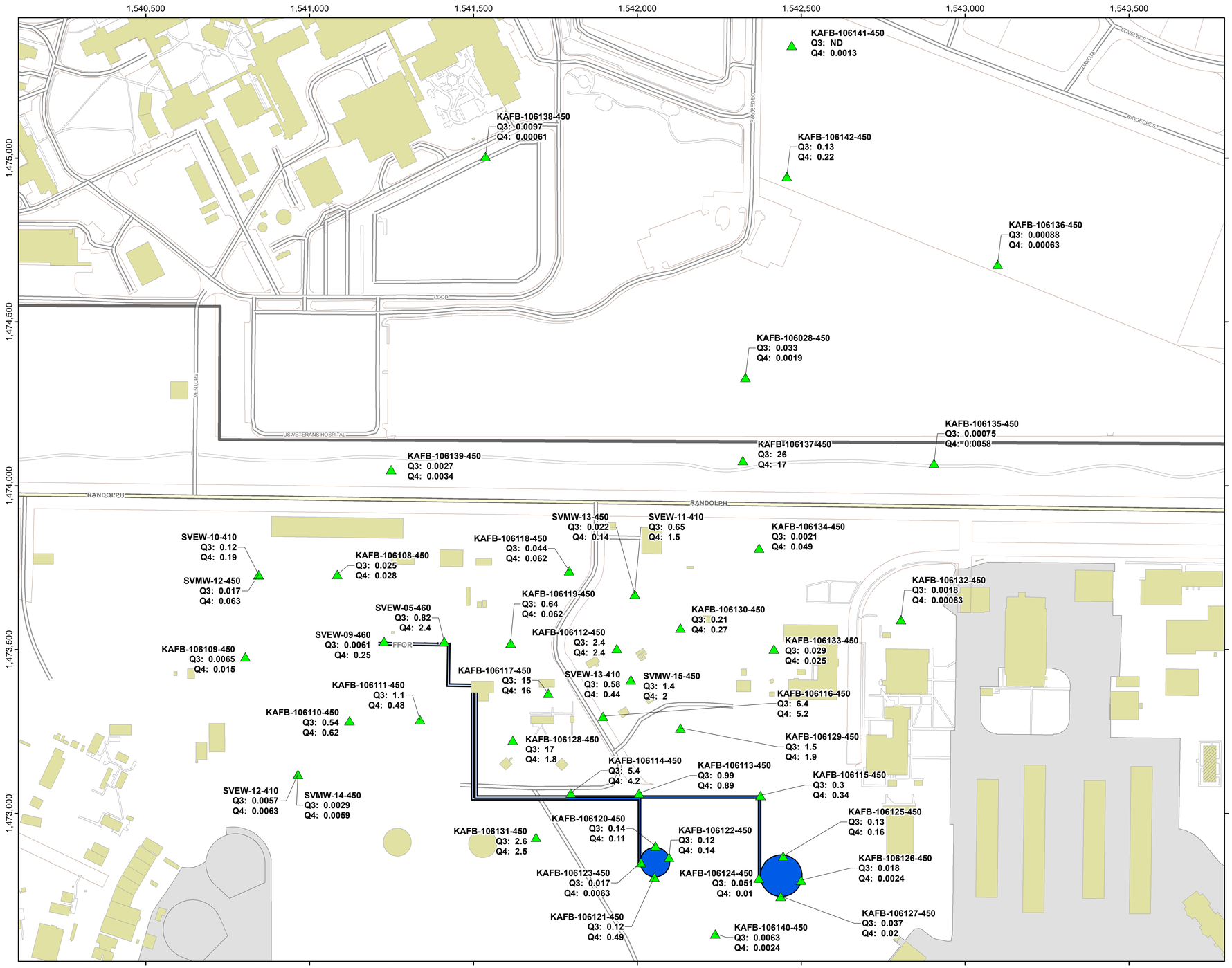
Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-22

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH TIME AT 350 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_022_BENZ_350_time222.mxd 07/01/16



Legend

- SVM Locations
  Vapor results are in ppmv
- Former Aboveground Fuel Transfer Lines
- Former Underground Fuel Transfer Lines
- Installation Boundary

Note:
FFOR = Former Fuel Offloading Rack Area (approximate leak source zone)
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
ND = not detected.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 07/01/16

N

0 160 320 640
Feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PILOT SVE SHUTDOWN TEST REPORT
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-23

TOTAL FIELD BENZENE CONCENTRATIONS THROUGH TIME AT 450 FEET

H:\Kirtland_AFB\GIS_Documents\Project_Maps\SVE_shutdown_Test_Report\KAFB_023_benz_450_time.mxd 07/01/16

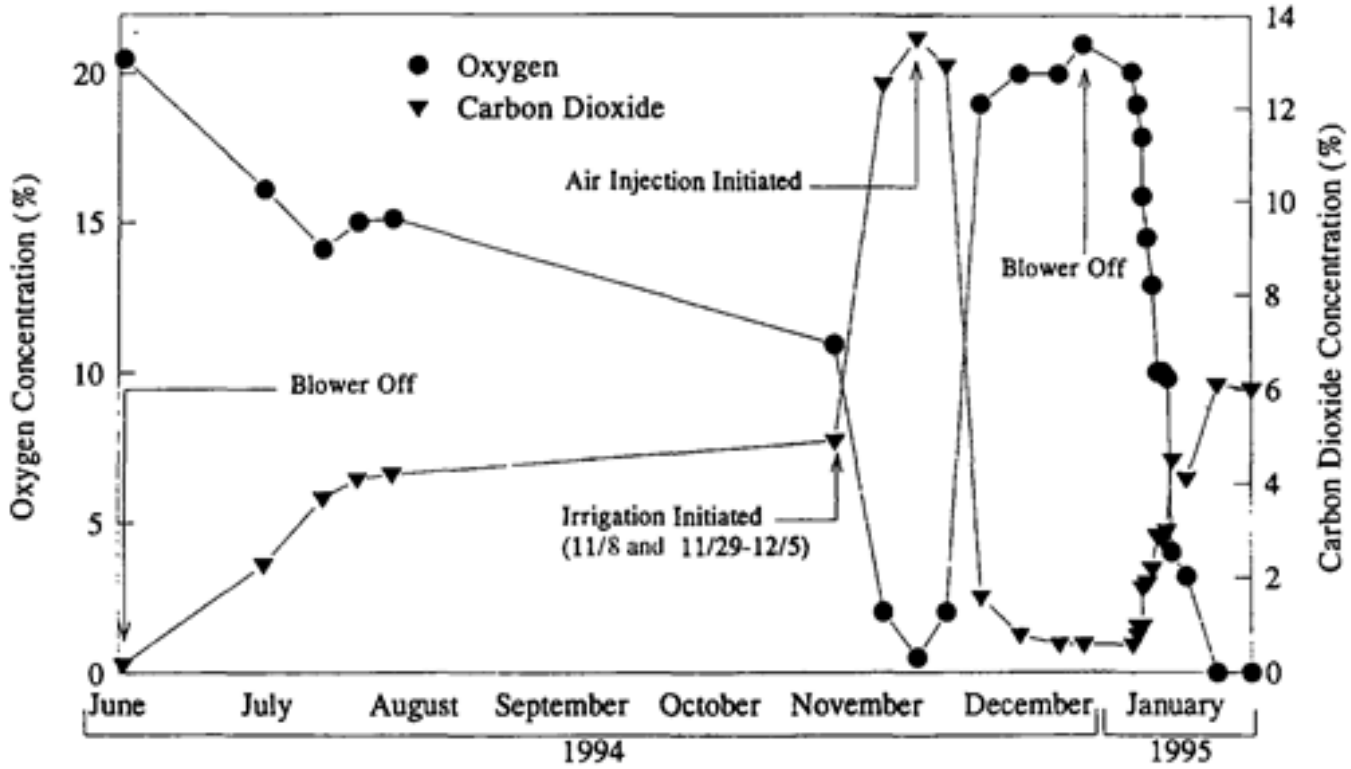


Figure 3-24. Oxygen and Carbon Dioxide Concentrations Before and After Irrigation at Twentynine Palms, California

TABLES

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
KAFB-10628-150	1542329.384	1474330.291	5348.86	5348.57	150	5/16/2010	SVMP	11.75	0.75	5201.86	5198.86	147	150	0.01	3	138.5	158.5
KAFB-10628-250	1542329.434	1474330.515	5348.86	5348.44	250	5/16/2010	SVMP	11.75	0.75	5101.86	5098.86	247	250	0.01	3	238.5	258.5
KAFB-10628-350	1542329.693	1474330.541	5348.86	5348.33	350	5/16/2010	SVMP	11.75	0.75	5001.86	4998.86	347	350	0.01	3	338.5	358.5
KAFB-10628-450	1542329.786	1474330.686	5348.86	5348.37	450	5/16/2010	SVMP	11.75	0.75	4901.86	4898.86	447	450	0.01	3	438.5	458.5
KAFB-106108-025	1541083.873	1473729.708	5341.9	5341.5	25	2/18/2011	SVMP	11.75	0.75	5326.9	5316.9	15	25	0.05	10	14	26
KAFB-106108-050	1541083.741	1473729.472	5341.9	5341.48	50	2/18/2011	SVMP	11.75	0.75	5301.9	5291.9	40	50	0.05	10	38	52
KAFB-106108-150	1541083.96	1473729.28	5341.9	5341.48	150	2/18/2011	SVMP	9.625	0.75	5201.9	5191.9	140	150	0.05	10	139	152
KAFB-106108-250	1541084.209	1473729.417	5341.9	5341.46	250	2/18/2011	SVMP	9.625	0.75	5101.9	5091.9	240	250	0.05	10	239	252
KAFB-106108-350	1541084.141	1473729.721	5341.9	5341.53	350	2/18/2011	SVMP	9.625	0.75	5001.9	4991.9	340	350	0.05	10	337	352
KAFB-106108-450	1541083.988	1473730.111	5341.9	5341.53	450	2/18/2011	SVMP	9.625	3	4901.9	4891.9	440	450	0.05	10	437	458
KAFB-106109-025	1540803.708	1473477.615	5338.67	5338.36	25	2/9/2011	SVMP	11.75	0.75	5323.67	5313.67	15	25	0.05	10	14	26
KAFB-106109-050	1540803.893	1473477.829	5338.67	5338.33	50	2/9/2011	SVMP	11.75	0.75	5298.67	5288.67	40	50	0.05	10	38	51
KAFB-106109-150	1540803.715	1473478.113	5338.67	5338.29	150	2/9/2011	SVMP	9.625	0.75	5198.67	5188.67	140	150	0.05	10	138	152
KAFB-106109-250	1540803.427	1473478.025	5338.67	5338.43	250	2/9/2011	SVMP	9.625	0.75	5098.67	5088.67	240	250	0.05	10	238	251
KAFB-106109-350	1540803.418	1473477.7	5338.67	5338.39	350	2/9/2011	SVMP	9.625	0.75	4998.67	4988.67	340	350	0.05	10	338	351
KAFB-106109-450	1540803.649	1473477.953	5338.67	5338.41	450	2/9/2011	SVMP	9.625	3	4898.67	4888.67	440	450	0.05	10	436	458
KAFB-106110-025	1541121.576	1473283.478	5340.45	5340.12	25	2/24/2011	SVMP	11.75	0.75	5325.45	5315.45	15	25	0.05	10	16	26
KAFB-106110-050	1541121.342	1473283.257	5340.45	5340.12	50	2/24/2011	SVMP	11.75	0.75	5300.45	5290.45	40	50	0.05	10	39	51
KAFB-106110-150	1541121.492	1473283.022	5340.45	5340.09	150	2/24/2011	SVMP	9.625	0.75	5200.45	5190.45	140	150	0.05	10	138	151
KAFB-106110-250	1541121.745	1473283.066	5340.45	5340.1	250	2/24/2011	SVMP	9.625	0.75	5100.45	5090.45	240	250	0.05	10	238	251
KAFB-106110-350	1541121.804	1473283.349	5340.45	5340.11	350	2/24/2011	SVMP	9.625	0.75	5000.45	4990.45	340	350	0.05	10	338	351
KAFB-106110-450	1541121.596	1473283.809	5340.45	5340.14	450	2/24/2011	SVMP	9.625	3	4900.45	4890.45	440	450	0.05	10	437	457
KAFB-106111-025	1541335.959	1473286.168	5341.42	5340.99	25	3/4/2011	SVMP	11.75	0.75	5326.42	5316.42	15	25	0.05	10	13	26
KAFB-106111-050	1541336.143	1473285.951	5341.42	5341.07	50	3/4/2011	SVMP	11.75	0.75	5301.42	5291.42	40	50	0.05	10	39	51
KAFB-106111-150	1541336.402	1473286.06	5341.42	5341.1	150	3/4/2011	SVMP	9.625	0.75	5201.42	5191.42	140	150	0.05	10	137	152
KAFB-106111-250	1541336.379	1473286.316	5341.42	5341.13	250	3/4/2011	SVMP	9.625	0.75	5101.42	5091.42	240	250	0.05	10	238	252
KAFB-106111-350	1541336.078	1473286.395	5341.42	5341.05	350	3/4/2011	SVMP	9.625	0.75	5001.42	4991.42	340	350	0.05	10	337	352
KAFB-106111-450	1541336.131	1473286.632	5341.42	5341.04	450	3/4/2011	SVMP	9.625	3	4901.42	4891.42	440	450	0.05	10	437	460
KAFB-106112-025	1541936.537	1473503.091	5347.68	5347.24	25	2/24/2011	SVMP	11.75	0.75	5332.68	5322.68	15	25	0.05	10	13	26
KAFB-106112-050	1541936.696	1473502.847	5347.68	5347.22	50	2/24/2011	SVMP	11.75	0.75	5307.68	5297.68	40	50	0.05	10	38	52
KAFB-106112-150	1541936.98	1473502.945	5347.68	5347.25	150	2/24/2011	SVMP	9.625	0.75	5207.68	5197.68	140	150	0.05	10	137	152
KAFB-106112-250	1541937.008	1473503.218	5347.68	5347.26	250	2/24/2011	SVMP	9.625	0.75	5107.68	5097.68	240	250	0.05	10	235	252
KAFB-106112-350	1541936.724	1473503.344	5347.68	5347.27	350	2/24/2011	SVMP	9.625	0.75	5007.68	4997.68	340	350	0.05	10	337	352
KAFB-106112-450	1541936.797	1473503.676	5347.68	5347.29	450	2/24/2011	SVMP	9.625	3	4908.68	4898.68	439	449	0.05	10	438	460
KAFB-106113-020	1542004.37	1473062.154	5345.84	5345.5	20	2/8/2011	SVMP	11.75	0.75	5335.84	5325.84	10	20	0.05	10	8	21
KAFB-106113-050	1542004.233	1473061.844	5345.84	5345.49	50	2/8/2011	SVMP	11.75	0.75	5305.84	5295.84	40	50	0.05	10	38	51
KAFB-106113-150	1542004.477	1473061.645	5345.84	5345.49	150	2/8/2011	SVMP	9.625	0.75	5205.84	5195.84	140	150	0.05	10	138	151
KAFB-106113-250	1542004.788	1473061.798	5345.84	5345.51	250	2/8/2011	SVMP	9.625	0.75	5105.84	5095.84	240	250	0.05	10	238	251
KAFB-106113-350	1542004.698	1473062.067	5345.84	5345.55	350	2/8/2011	SVMP	9.625	0.75	5005.84	4995.84	340	350	0.05	10	337	351
KAFB-106113-450	1542004.505	1473062.009	5345.84	5345.59	450	2/8/2011	SVMP	9.625	3	4905.84	4895.84	440	450	0.05	10	438	457
KAFB-106114-025	1541796.487	1473062.352	5344.835	5344.6	25	3/1/2011	SVMP	11.75	0.75	5334.835	5324.835	10	20	0.05	10	13	26
KAFB-106114-050	1541796.245	1473062.134	5344.835	5344.6	50	3/1/2011	SVMP	11.75	0.75	5304.835	5294.835	40	50	0.05	10	38	51
KAFB-106114-150	1541796.374	1473061.844	5344.835	5344.62	150	3/1/2011	SVMP	9.625	0.75	5204.835	5194.835	140	150	0.05	10	138	151
KAFB-106114-250	1541796.679	1473061.865	5344.835	5344.57	250	3/1/2011	SVMP	9.625	0.75	5109.835	5099.835	235	245	0.05	10	233	246
KAFB-106114-350	1541796.712	1473062.174	5344.835	5344.59	350	3/1/2011	SVMP	9.625	0.75	5004.835	4994.835	340	350	0.05	10	338	351
KAFB-106114-450	1541796.542	1473062.625	5344.835	5344.64	450	3/1/2011	SVMP	9.625	3	4904.835	4894.835	440	450	0.05	10	438	451
KAFB-106115-025	1542375.31	1473054.864	5348.01	5347.63	25	2/20/2011	SVMP	11.75	0.75	5338.01	5328.01	10	20	0.05	10	13	26
KAFB-106115-050	1542375.128	1473054.622	5348.01	5347.6	50	2/20/2011	SVMP	11.75	0.75	5308.01	5298.01	40	50	0.05	10	38	51
KAFB-106115-150	1542374.863	1473054.656	5348.01	5347.63	150	2/20/2011	SVMP	9.625	0.75	5203.01	5193.01	145	155	0.05	10	143	156
KAFB-106115-250	1542374.827	1473054.944	5348.01	5347.65	250	2/20/2011	SVMP	9.625	0.75	5113.01	5103.01	235	245	0.05	10	238	251
KAFB-106115-350	1542375.104	1473055.004	5348.01	5347.69	350	2/20/2011	SVMP	9.625	0.75	5008.01	4998.01	340	350	0.05	10	338	351
KAFB-106115-450	1542375.074	1473055.207	5348.01	5347.67	450	2/20/2011	SVMP	9.625	3	4908.01	4898.01	440	450	0.05	10	438	455
KAFB-106116-025	1541894.583	1473296.419	5346.17	5346.01	25	3/10/2011	SVMP	11.75	0.75	5336.17	5326.17	10	20	0.05	10	8	22
KAFB-106116-050	1541894.896	1473296.44	5346.17	5346.03	50	3/10/2011	SVMP	11.75	0.75	5306.17	5296.17	40	50	0.05	10	37	52
KAFB-106116-150	1541894.467	1473296.67	5346.17	5346.02	150	3/10/2011	SVMP	9.625	0.75	5201.17	5191.17	145	155	0.05	10	137	156

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
KAFB-106116-250	1541894.691	1473296.883	5346.17	5346.02	250	3/10/2011	SVMP	9.625	0.75	5111.17	5101.17	235	245	0.05	10	238	252
KAFB-106116-350	1541894.974	1473296.724	5346.17	5346.01	350	3/10/2011	SVMP	9.625	0.75	5006.17	4996.17	340	350	0.05	10	338	353
KAFB-106116-450	1541894.692	1473296.724	5346.17	5346.01	450	3/10/2011	SVMP	9.625	3	4906.17	4896.17	440	450	0.05	10	437	456
KAFB-106117-025	1541727.842	1473366.336	5345.29	5344.75	25	3/15/2011	SVMP	11.75	0.75	5330.29	5320.29	15	25	0.05	10	13	26
KAFB-106117-050	1541727.981	1473366.558	5345.29	5344.79	50	3/15/2011	SVMP	11.75	0.75	5305.29	5295.29	40	50	0.05	10	38	51
KAFB-106117-150	1541727.791	1473366.811	5345.29	5344.76	150	3/15/2011	SVMP	9.625	0.75	5200.29	5190.29	145	155	0.05	10	137	151
KAFB-106117-250	1541727.522	1473366.703	5345.29	5344.77	250	3/15/2011	SVMP	9.625	0.75	5110.29	5100.29	235	245	0.05	10	238	251
KAFB-106117-350	1541727.535	1473366.419	5345.29	5344.75	350	3/15/2011	SVMP	9.625	0.75	5005.29	4995.29	340	350	0.05	10	338	351
KAFB-106117-450	1541727.759	1473366.678	5345.29	5344.79	450	3/15/2011	SVMP	9.625	3	4905.29	4895.29	440	450	0.05	10	438	460
KAFB-106118-025	1541791.34	1473740.738	5345.83	5345.47	25	3/7/2011	SVMP	11.75	0.75	5330.83	5320.83	15	25	0.05	10	13	26
KAFB-106118-050	1541791.435	1473741.027	5345.83	5345.44	50	3/7/2011	SVMP	11.75	0.75	5305.83	5295.83	40	50	0.05	10	37	52
KAFB-106118-160	1541791.542	1473740.552	5345.83	5345.44	160	3/7/2011	SVMP	9.625	0.75	5195.83	5185.83	150	160	0.05	10	147	162
KAFB-106118-265	1541791.758	1473741.001	5345.83	5345.45	265	3/7/2011	SVMP	9.625	0.75	5090.83	5080.83	255	265	0.05	10	250	265
KAFB-106118-350	1541791.826	1473740.652	5345.83	5345.45	350	3/7/2011	SVMP	9.625	0.75	5005.83	4995.83	340	350	0.05	10	336	351
KAFB-106118-450	1541791.641	1473741.335	5345.83	5345.44	450	3/7/2011	SVMP	9.625	3	4905.83	4895.83	440	450	0.05	10	437	459
KAFB-106119-025	1541613.06	1473519.569	5343.55	5343.22	25	3/6/2011	SVMP	11.75	0.75	5328.55	5318.55	15	25	0.05	10	13	26
KAFB-106119-050	1541613.231	1473519.323	5343.55	5343.17	50	3/6/2011	SVMP	11.75	0.75	5303.55	5293.55	40	50	0.05	10	38	52
KAFB-106119-150	1541613.504	1473519.413	5343.55	5343.17	150	3/6/2011	SVMP	9.625	0.75	5193.55	5183.55	150	160	0.05	10	138	152
KAFB-106119-250	1541613.545	1473519.676	5343.55	5343.17	250	3/6/2011	SVMP	9.625	0.75	5103.55	5093.55	240	250	0.05	10	237	252
KAFB-106119-350	1541613.266	1473519.789	5343.55	5343.19	350	3/6/2011	SVMP	9.625	0.75	5003.55	4993.55	340	350	0.05	10	338	352
KAFB-106119-450	1541613.238	1473520.21	5343.55	5343.17	450	3/6/2011	SVMP	9.625	3	4903.55	4893.55	440	450	0.05	10	438	460
KAFB-106120-025	1542054.981	1472900.303	5343.38	5343.08	25	6/9/2011	SVMP	11.75	0.75	5328.38	5318.38	15	25	0.05	10	12	27
KAFB-106120-050	1542055.075	1472900.485	5343.38	5343.08	50	6/9/2011	SVMP	11.75	0.75	5303.38	5293.38	40	50	0.05	10	36	53
KAFB-106120-150	1542054.965	1472900.735	5343.38	5343.1	150	6/9/2011	SVMP	9.625	0.75	5203.38	5193.38	140	150	0.05	10	137	153
KAFB-106120-250	1542054.633	1472900.515	5343.38	5343.1	250	6/9/2011	SVMP	9.625	0.75	5103.38	5093.38	240	250	0.05	10	237	252
KAFB-106120-350	1542054.795	1472900.276	5343.38	5343.09	350	6/9/2011	SVMP	9.625	0.75	5003.38	4993.38	340	350	0.05	10	336	352
KAFB-106120-450	1542054.858	1472900.629	5343.38	5343.1	450	6/9/2011	SVMP	9.625	3	4909.38	4899.38	434	444	0.05	10	431	447
KAFB-106121-025	1542051.527	1472805.846	5343.78	5343.48	25	5/25/2011	SVMP	11.75	0.75	5328.78	5318.78	15	25	0.05	10	11	27
KAFB-106121-050	1542051.779	1472805.669	5343.78	5343.48	50	5/25/2011	SVMP	11.75	0.75	5303.78	5293.78	40	50	0.05	10	37	52
KAFB-106121-145	1542051.252	1472805.624	5343.78	5343.5	145	5/25/2011	SVMP	9.625	0.75	5208.78	5198.78	135	145	0.05	10	131	149
KAFB-106121-250	1542051.373	1472805.363	5343.78	5343.47	250	5/25/2011	SVMP	9.625	0.75	5103.78	5093.78	240	250	0.05	10	237	252
KAFB-106121-350	1542051.749	1472805.382	5343.78	5343.45	350	5/25/2011	SVMP	9.625	0.75	5003.78	4993.78	340	350	0.05	10	335	356
KAFB-106121-450	1542051.478	1472805.669	5343.78	5343.5	450	5/25/2011	SVMP	9.625	3	4913.78	4903.78	430	440	0.05	10	428	448
KAFB-106122-025	1542096.331	1472866.327	5343.86	5343.57	25	6/18/2011	SVMP	11.75	0.75	5328.86	5318.86	15	25	0.05	10	12	27
KAFB-106122-050	1542096.267	1472866.632	5343.86	5343.54	50	6/18/2011	SVMP	11.75	0.75	5303.86	5293.86	40	50	0.05	10	37	52
KAFB-106122-150	1542095.988	1472866.689	5343.86	5343.54	150	6/18/2011	SVMP	9.625	0.75	5203.86	5193.86	140	150	0.05	10	137	151
KAFB-106122-250	1542095.879	1472866.4	5343.86	5343.57	250	6/18/2011	SVMP	9.625	0.75	5103.86	5093.86	240	250	0.05	10	237	252
KAFB-106122-350	1542096.098	1472866.192	5343.86	5343.57	350	6/18/2011	SVMP	9.625	0.75	5003.86	4993.86	340	350	0.05	10	336	352
KAFB-106122-450	1542096.085	1472866.532	5343.86	5343.57	450	6/18/2011	SVMP	9.625	3	4909.86	4899.86	434	444	0.05	10	431	448
KAFB-106123-025	1542010.825	1472850.413	5344.095	5343.7	25	5/31/2011	SVMP	11.75	0.75	5329.095	5319.095	15	25	0.05	10	12	27
KAFB-106123-050	1542010.697	1472850.677	5344.095	5343.75	50	5/31/2011	SVMP	11.75	0.75	5304.095	5294.095	40	50	0.05	10	37	52
KAFB-106123-150	1542010.343	1472850.661	5344.095	5343.75	150	5/31/2011	SVMP	9.625	0.75	5204.095	5194.095	140	150	0.05	10	137	152
KAFB-106123-250	1542010.282	1472850.345	5344.095	5343.77	250	5/31/2011	SVMP	9.625	0.75	5104.095	5094.095	240	250	0.05	10	237	252
KAFB-106123-350	1542010.56	1472850.168	5344.095	5343.74	350	5/31/2011	SVMP	9.625	0.75	5004.095	4994.095	340	350	0.05	10	337	353
KAFB-106123-450	1542010.512	1472850.555	5344.095	5343.72	450	5/31/2011	SVMP	9.625	3	4912.095	4902.095	432	442	0.05	10	429	442
KAFB-106124-025	1542370.424	1472802.583	5345.58	5345.48	25	6/27/2011	SVMP	11.75	0.75	5330.58	5320.58	15	25	0.05	10	12	27
KAFB-106124-050	1542370.112	1472802.601	5345.58	5345.49	50	6/27/2011	SVMP	11.75	0.75	5305.58	5295.58	40	50	0.05	10	37	52
KAFB-106124-150	1542369.98	1472802.336	5345.58	5345.46	150	6/27/2011	SVMP	9.625	0.75	5205.58	5195.58	140	150	0.05	10	137	152
KAFB-106124-250	1542370.224	1472802.141	5345.58	5345.45	250	6/27/2011	SVMP	9.625	0.75	5105.58	5095.58	240	250	0.05	10	237	252
KAFB-106124-350	1542370.46	1472802.275	5345.58	5345.44	350	6/27/2011	SVMP	9.625	0.75	5005.58	4995.58	340	350	0.05	10	335	352
KAFB-106124-450	1542370.242	1472802.495	5345.58	5345.48	450	6/27/2011	SVMP	9.625	3	4905.58	4895.58	440	450	0.05	10	436	458
KAFB-106125-025	1542445.016	1472869.676	5345.6	5345.52	25	7/10/2011	SVMP	11.75	0.75	5330.6	5320.6	15	25	0.05	10	2	27
KAFB-106125-050	1542444.728	1472869.746	5345.6	5345.49	50	7/10/2011	SVMP	11.75	0.75	5305.6	5295.6	40	50	0.05	10	37	53
KAFB-106125-150	1542444.565	1472869.516	5345.6	5345.5	150	7/10/2011	SVMP	9.625	0.75	5205.6	5195.6	140	150	0.05	10	136	152

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
KAFB-106125-250	1542444.761	1472869.254	5345.6	5345.5	250	7/10/2011	SVMP	9.625	0.75	5105.6	5095.6	240	250	0.05	10	236	252
KAFB-106125-350	1542445.034	1472869.338	5345.6	5345.51	350	7/10/2011	SVMP	9.625	0.75	5005.6	4995.6	340	350	0.05	10	337	351
KAFB-106125-450	1542444.804	1472869.614	5345.6	5345.52	450	7/10/2011	SVMP	9.625	3	4905.6	4895.6	440	450	0.05	10	436	457
KAFB-106126-025	1542499.978	1472796.184	5345.81	5345.57	25	7/14/2011	SVMP	11.75	0.75	5330.81	5320.81	15	25	0.05	10	12	27
KAFB-106126-050	1542499.95	1472796.469	5345.81	5345.51	50	7/14/2011	SVMP	11.75	0.75	5305.81	5295.81	40	50	0.05	10	37	52
KAFB-106126-150	1542499.661	1472796.557	5345.81	5345.51	150	7/14/2011	SVMP	9.625	0.75	5205.81	5195.81	140	150	0.05	10	137	152
KAFB-106126-250	1542499.489	1472796.32	5345.81	5345.54	250	7/14/2011	SVMP	9.625	0.75	5105.81	5095.81	240	250	0.05	10	237	252
KAFB-106126-350	1542499.675	1472796.017	5345.81	5345.57	350	7/14/2011	SVMP	9.625	0.75	5005.81	4995.81	340	350	0.05	10	336	353
KAFB-106126-450	1542499.729	1472796.399	5345.81	5345.55	450	7/14/2011	SVMP	9.625	3	4905.81	4895.81	440	450	0.05	10	437	458
KAFB-106127-025	1542437.032	1472747.066	5345.93	5345.78	25	7/26/2011	SVMP	11.75	0.75	5330.93	5320.93	15	25	0.05	10	12	27
KAFB-106127-050	1542436.77	1472747.213	5345.93	5345.77	50	7/26/2011	SVMP	11.75	0.75	5305.93	5295.93	40	50	0.05	10	37	53
KAFB-106127-150	1542436.538	1472747.027	5345.93	5345.77	150	7/26/2011	SVMP	9.625	0.75	5205.93	5195.93	140	150	0.05	10	137	153
KAFB-106127-250	1542436.691	1472746.706	5345.93	5345.73	250	7/26/2011	SVMP	9.625	0.75	5105.93	5095.93	240	250	0.05	10	235	253
KAFB-106127-350	1542436.992	1472746.749	5345.93	5345.74	350	7/26/2011	SVMP	9.625	0.75	5005.93	4995.93	340	350	0.05	10	337	352
KAFB-106127-450	1542436.847	1472747.065	5345.93	5345.76	450	7/26/2011	SVMP	9.625	3	4905.93	4895.93	440	450	0.05	10	437	458
KAFB-106128-025	1541619.606	1473223.25	5343.8	5343.58	25	3/8/2011	SVMP	11.75	0.75	5328.8	5318.8	15	25	0.05	10	15	26
KAFB-106128-050	1541619.495	1473222.984	5343.8	5343.57	50	3/8/2011	SVMP	11.75	0.75	5303.8	5293.8	40	50	0.05	10	39	51
KAFB-106128-150	1541619.72	1473222.779	5343.8	5343.55	150	3/8/2011	SVMP	9.625	0.75	5193.8	5183.8	150	160	0.05	10	139	152
KAFB-106128-250	1541619.985	1473222.923	5343.8	5343.6	250	3/8/2011	SVMP	9.625	0.75	5103.8	5093.8	240	250	0.05	10	236	251
KAFB-106128-350	1541619.921	1473223.251	5343.8	5343.57	350	3/8/2011	SVMP	9.625	0.75	5003.8	4993.8	340	350	0.05	10	338	351
KAFB-106128-450	1541619.722	1473223.146	5343.8	5343.57	450	3/8/2011	SVMP	9.625	3	4903.8	4893.8	440	450	0.05	10	437	458
KAFB-106129-025	1542130.544	1473260.767	5348.46	5348.07	25	3/6/2011	SVMP	11.75	0.75	5333.46	5323.46	15	25	0.05	10	13	26
KAFB-106129-050	1542130.824	1473260.633	5348.46	5348.15	50	3/6/2011	SVMP	11.75	0.75	5308.46	5298.46	40	50	0.05	10	38	51
KAFB-106129-150	1542131.039	1473260.868	5348.46	5348.11	150	3/6/2011	SVMP	9.625	0.75	5198.46	5188.46	150	160	0.05	10	137	151
KAFB-106129-250	1542130.92	1473261.134	5348.46	5348.05	250	3/6/2011	SVMP	9.625	0.75	5108.46	5098.46	240	250	0.05	10	238	251
KAFB-106129-350	1542130.629	1473261.105	5348.46	5348.01	350	3/6/2011	SVMP	9.625	0.75	5011.46	5001.46	337	347	0.05	10	335	348
KAFB-106129-450	1542130.758	1473261.385	5348.46	5348.16	450	3/6/2011	SVMP	9.625	3	4908.46	4898.46	440	450	0.05	10	437	460
KAFB-106130-025	1542130.889	1473565.674	5349.055	5348.71	25	2/21/2011	SVMP	11.75	0.75	5334.055	5324.055	15	25	0.05	10	12	26
KAFB-106130-050	1542131.103	1473565.536	5349.055	5348.72	50	2/21/2011	SVMP	11.75	0.75	5309.055	5299.055	40	50	0.05	10	38	53
KAFB-106130-150	1542131.369	1473565.64	5349.055	5348.67	150	2/21/2011	SVMP	9.625	0.75	5199.055	5189.055	150	160	0.05	10	147	162
KAFB-106130-250	1542131.319	1473565.923	5349.055	5348.7	250	2/21/2011	SVMP	9.625	0.75	5109.055	5099.055	240	250	0.05	10	238	251
KAFB-106130-350	1542131.052	1473566.005	5349.055	5348.73	350	2/21/2011	SVMP	9.625	0.75	5009.055	4999.055	340	350	0.05	10	338	352
KAFB-106130-450	1542131.272	1473566.262	5349.055	5348.78	450	2/21/2011	SVMP	9.625	3	4909.055	4899.055	440	450	0.05	10	438	455
KAFB-106131-025	1541690.397	1472926.919	5344.495	5344.32	25	3/7/2011	SVMP	11.75	0.75	5329.495	5319.495	15	25	0.05	10	13	26
KAFB-106131-055	1541690.618	1472926.743	5344.495	5344.31	55	3/7/2011	SVMP	11.75	0.75	5299.495	5289.495	45	55	0.05	10	43	56
KAFB-106131-150	1541690.518	1472927.227	5344.495	5344.31	150	3/7/2011	SVMP	9.625	0.75	5204.495	5194.495	140	150	0.05	10	138	151
KAFB-106131-245	1541690.893	1472926.904	5344.495	5344.33	245	3/7/2011	SVMP	9.625	0.75	5109.495	5099.495	235	245	0.05	10	233	246
KAFB-106131-350	1541690.789	1472927.189	5344.495	5344.35	350	3/7/2011	SVMP	9.625	0.75	5004.495	4994.495	340	350	0.05	10	338	351
KAFB-106131-450	1541690.573	1472927.584	5344.495	5344.28	450	3/7/2011	SVMP	9.625	3	4914.495	4904.495	430	440	0.05	10	428	450
KAFB-106132-025	1542804.301	1473591.313	5353	5352.71	25	2/17/2011	SVMP	11.75	0.75	5338	5328	15	25	0.05	10	13	27
KAFB-106132-050	1542803.805	1473591.404	5353	5352.72	50	2/17/2011	SVMP	11.75	0.75	5313	5303	40	50	0.05	10	38	51
KAFB-106132-175	1542804.127	1473591.059	5353	5352.73	175	2/17/2011	SVMP	9.625	0.75	5188	5178	165	175	0.05	10	163	182
KAFB-106132-250	1542803.82	1473591.092	5353	5352.69	250	2/17/2011	SVMP	9.625	0.75	5113	5103	240	250	0.05	10	238	252
KAFB-106132-350	1542804.076	1473591.519	5353	5352.69	350	2/17/2011	SVMP	9.625	0.75	5013	5003	340	350	0.05	10	338	352
KAFB-106132-450	1542804.139	1473591.722	5353	5352.66	450	2/17/2011	SVMP	9.625	3	4913	4903	440	450	0.05	10	437	460
KAFB-106133-025	1542416.132	1473501.591	5352.015	5351.58	25	2/16/2011	SVMP	11.75	0.75	5337.015	5327.015	15	25	0.05	10	13	26
KAFB-106133-050	1542416.049	1473501.865	5352.015	5351.58	50	2/16/2011	SVMP	11.75	0.75	5312.015	5302.015	40	50	0.05	10	38	52
KAFB-106133-170	1542416.291	1473502.091	5352.015	5351.52	170	2/16/2011	SVMP	9.625	0.75	5192.015	5182.015	160	170	0.05	10	158	172
KAFB-106133-250	1542416.533	1473501.928	5352.015	5351.52	250	2/16/2011	SVMP	9.625	0.75	5112.015	5102.015	240	250	0.05	10	238	252
KAFB-106133-350	1542416.481	1473501.615	5352.015	5351.55	350	2/16/2011	SVMP	9.625	0.75	5012.015	5002.015	340	350	0.05	10	338	352
KAFB-106133-450	1542416.26	1473502.382	5352.015	5351.57	450	2/16/2011	SVMP	9.625	3	4912.015	4902.015	440	450	0.05	10	438	460
KAFB-106134-025	1542371.258	1473809.912	5347.78	5347.49	25	2/23/2011	SVMP	11.75	0.75	5332.78	5322.78	15	25	0.05	10	13	26
KAFB-106134-050	1542370.981	1473809.941	5347.78	5347.51	50	2/23/2011	SVMP	11.75	0.75	5307.78	5297.78	40	50	0.05	10	38	52
KAFB-106134-170	1542371.37	1473810.193	5347.78	5347.46	170	2/23/2011	SVMP	9.625	0.75	5187.78	5177.78	160	170	0.05	10	158	171

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
KAFB-106134-250	1542371.168	1473810.383	5347.78	5347.43	250	2/23/2011	SVMP	9.625	0.75	5107.78	5097.78	240	250	0.05	10	238	251
KAFB-106134-350	1542370.87	1473810.216	5347.78	5347.47	350	2/23/2011	SVMP	9.625	0.75	5007.78	4997.78	340	350	0.05	10	338	351
KAFB-106134-450	1542371.221	1473810.705	5347.78	5347.51	450	2/23/2011	SVMP	9.625	3	4907.78	4897.78	440	450	0.05	10	438	460
KAFB-106135-025	1542905.054	1474068.941	5351.06	5350.88	25	2/5/2011	SVMP	11.75	0.75	5336.06	5326.06	15	25	0.05	10	13	27
KAFB-106135-050	1542905.255	1474068.73	5351.06	5350.87	50	2/5/2011	SVMP	11.75	0.75	5311.06	5301.06	40	50	0.05	10	37	52
KAFB-106135-150	1542905.123	1474068.42	5351.06	5350.9	150	2/5/2011	SVMP	9.625	0.75	5211.06	5201.06	140	150	0.05	10	138	152
KAFB-106135-250	1542904.788	1474068.535	5351.06	5350.94	250	2/5/2011	SVMP	9.625	0.75	5111.06	5101.06	240	250	0.05	10	238	252
KAFB-106135-350	1542904.802	1474068.825	5351.06	5350.88	350	2/5/2011	SVMP	9.625	0.75	5011.06	5001.06	340	350	0.05	10	338	352
KAFB-106135-450	1542904.979	1474068.804	5351.06	5350.93	450	2/5/2011	SVMP	9.625	3	4911.06	4901.06	440	450	0.05	10	437	460
KAFB-106136-025	1543098.947	1474675.706	5351.68	5351.16	25	7/6/2011	SVMP	11.75	0.75	5336.68	5326.68	15	25	0.05	10	13	27
KAFB-106136-050	1543098.894	1474676.02	5351.68	5351.13	50	7/6/2011	SVMP	11.75	0.75	5311.68	5301.68	40	50	0.05	10	38	52
KAFB-106136-150	1543098.593	1474676.04	5351.68	5351.12	150	7/6/2011	SVMP	9.625	0.75	5211.68	5201.68	140	150	0.05	10	137	152
KAFB-106136-250	1543098.45	1474675.789	5351.68	5351.13	250	7/6/2011	SVMP	9.625	0.75	5111.68	5101.68	240	250	0.05	10	236	253
KAFB-106136-350	1543098.682	1474675.539	5351.68	5351.16	350	7/6/2011	SVMP	9.625	0.75	5011.68	5001.68	340	350	0.05	10	337	352
KAFB-106136-450	1543098.748	1474675.924	5351.68	5351.27	450	7/6/2011	SVMP	9.625	3	4911.68	4901.68	440	450	0.05	10	437	457
KAFB-106137-025	1542321.637	1474077.365	5347.28	5346.86	25	1/25/2011	SVMP	11.75	0.75	5332.28	5322.28	15	25	0.05	10	13	26
KAFB-106137-050	1542321.392	1474077.545	5347.28	5346.76	50	1/25/2011	SVMP	11.75	0.75	5307.28	5297.28	40	50	0.05	10	38	52
KAFB-106137-150	1542321.117	1474077.358	5347.28	5346.75	150	1/25/2011	SVMP	9.625	0.75	5207.28	5197.28	140	150	0.05	10	138	152
KAFB-106137-250	1542321.254	1474077.088	5347.28	5346.91	250	1/25/2011	SVMP	9.625	0.75	5107.28	5097.28	240	250	0.05	10	238	251
KAFB-106137-350	1542321.597	1474077.094	5347.28	5346.9	350	1/25/2011	SVMP	9.625	0.75	5007.28	4997.28	340	350	0.05	10	338	351
KAFB-106137-450	1542321.462	1474079.392	5347.28	5346.94	450	1/25/2011	SVMP	9.625	3	4907.28	4897.28	440	450	0.05	10	438	460
KAFB-106138-025	1541536.737	1475005.676	5347.43	5347.17	25	4/7/2011	SVMP	11.75	0.75	5332.43	5322.43	15	25	0.05	10	12	26
KAFB-106138-050	1541536.397	1475005.572	5347.43	5347.15	50	4/7/2011	SVMP	11.75	0.75	5307.43	5297.43	40	50	0.05	10	37	52
KAFB-106138-150	1541536.374	1475005.28	5347.43	5347.13	150	4/7/2011	SVMP	9.625	0.75	5207.43	5197.43	140	150	0.05	10	138	152
KAFB-106138-250	1541536.653	1475005.169	5347.43	5347.15	250	4/7/2011	SVMP	9.625	0.75	5107.43	5097.43	240	250	0.05	10	238	251
KAFB-106138-350	1541536.869	1475005.42	5347.43	5347.24	350	4/7/2011	SVMP	9.625	0.75	5007.43	4997.43	340	350	0.05	10	338	351
KAFB-106138-450	1541536.573	1475005.508	5347.43	5347.16	450	4/7/2011	SVMP	9.625	3	4907.43	4897.43	440	450	0.05	10	438	460
KAFB-106139-025	1541248.329	1474049.853	5341.27	5341.07	25	1/8/2011	SVMP	11.75	0.75	5326.27	5316.27	15	25	0.05	10	13	26
KAFB-106139-050	1541248.534	1474049.412	5341.27	5341.04	50	1/8/2011	SVMP	11.75	0.75	5301.27	5291.27	40	50	0.05	10	38	51
KAFB-106139-150	1541248.26	1474049.295	5341.27	5341.04	150	1/8/2011	SVMP	9.625	0.75	5201.27	5191.27	140	150	0.05	10	137	152
KAFB-106139-250	1541248.117	1474049.605	5341.27	5341.02	250	1/8/2011	SVMP	9.625	0.75	5101.27	5091.27	240	250	0.05	10	236	252
KAFB-106139-350	1541248.603	1474049.746	5341.27	5341.02	350	1/8/2011	SVMP	9.625	0.75	5001.27	4991.27	340	350	0.05	10	338	353
KAFB-106139-450	1541248.522	1474050.079	5341.27	5341.01	450	1/8/2011	SVMP	9.625	3	4901.27	4891.27	440	450	0.05	10	438	460
KAFB-106140-025	1542236.625	1472632.544	5345.29	5345.02	25	1/12/2011	SVMP	11.75	0.75	5330.29	5320.29	15	25	0.05	10	13	26
KAFB-106140-050	1542236.961	1472632.408	5345.29	5345.02	50	1/12/2011	SVMP	11.75	0.75	5305.29	5295.29	40	50	0.05	10	38	51
KAFB-106140-150	1542236.662	1472632.873	5345.29	5345.04	150	1/12/2011	SVMP	9.625	0.75	5203.29	5193.29	142	152	0.05	10	138	153
KAFB-106140-250	1542236.964	1472632.932	5345.29	5345.03	250	1/12/2011	SVMP	9.625	0.75	5105.29	5095.29	240	250	0.05	10	237	256
KAFB-106140-350	1542237.193	1472632.682	5345.29	5345.13	350	1/12/2011	SVMP	9.625	0.75	5005.29	4995.29	340	350	0.05	10	338	352
KAFB-106140-450	1542236.889	1472632.752	5345.29	5344.99	450	1/12/2011	SVMP	9.625	3	4905.29	4895.29	440	450	0.05	10	437	458
KAFB-106141-025	1542470.875	1475343.425	5334.41	5334.18	25	4/15/2011	SVMP	11.75	0.75	5319.41	5309.41	15	25	0.05	10	12	27
KAFB-106141-050	1542471.001	1475343.685	5334.41	5334.24	50	4/15/2011	SVMP	11.75	0.75	5284.41	5274.41	50	60	0.05	10	47	60
KAFB-106141-170	1542470.84	1475343.905	5334.41	5334.21	170	4/15/2011	SVMP	9.625	0.75	5174.41	5164.41	160	170	0.05	10	158	173
KAFB-106141-250	1542470.553	1475343.813	5334.41	5334.23	250	4/15/2011	SVMP	9.625	0.75	5094.41	5084.41	240	250	0.05	10	237	253
KAFB-106141-350	1542470.58	1475343.526	5334.41	5334.24	350	4/15/2011	SVMP	9.625	0.75	4994.41	4984.41	340	350	0.05	10	336	353
KAFB-106141-450	1542470.778	1475343.761	5334.41	5334.23	450	4/15/2011	SVMP	9.625	3	4894.41	4884.41	440	450	0.05	10	437	458
KAFB-106142-030	1542455.676	1474944.031	5349.19	5349.15	25	4/21/2011	SVMP	11.75	0.75	5329.19	5319.19	20	30	0.05	10	17	31
KAFB-106142-050	1542455.427	1474944.161	5349.19	5349.16	50	4/21/2011	SVMP	11.75	0.75	5309.19	5299.19	40	50	0.05	10	37	52
KAFB-106142-170	1542455.217	1474943.936	5349.19	5349.14	170	4/21/2011	SVMP	9.625	0.75	5189.19	5179.19	160	170	0.05	10	157	173
KAFB-106142-250	1542455.371	1474943.664	5349.19	5349.18	250	4/21/2011	SVMP	9.625	0.75	5109.19	5099.19	240	250	0.05	10	237	252
KAFB-106142-350	1542455.672	1474943.748	5349.19	5349.17	350	4/21/2011	SVMP	9.625	0.75	5009.19	4999.19	340	350	0.05	10	338	357
KAFB-106142-450	1542455.491	1474944.004	5349.19	5349.16	450	4/21/2011	SVMP	9.625	3	4909.19	4899.19	440	450	0.05	10	437	460
SVEW-01-260	1541421.404	1473522.618	5343.25	5343.42	260	2/25/2003	SVEW used as SVMP	11.75	4	5098.25	5083.25	245	260	0.05	15	240	265
SVEW-02-60	1541430.976	1473524.869	5343.43	5343.6	60	9/9/2003	SVEW used as SVMP	11.75	2	5298.43	5283.43	45	60	0.05	15	40	60
SVEW-03-160	1541431.051	1473523.75	5343.43	5343.62	160	9/9/2003	SVEW used as SVMP	11.75	2	5198.43	5183.43	145	160	0.05	15	139	160

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
SVEW-04-313	1541409.393	1473525.032	5343.42	5343.6	313	9/17/2003	SVEW used as SVMP	11.75	2	5045.42	5030.42	298	313	0.05	15	293	313
SVEW-05-460	1541410.277	1473525.103	5343.42	5343.58	460	9/17/2003	SVEW used as SVMP	11.75	2	4898.42	4883.42	445	460	0.05	15	440	460
SVEW-06-60	1541234.398	1473527.221	5343.4	5343.56	60	8/25/2003	SVEW used as SVMP	11.75	2	5298.4	5283.4	45	60	0.05	15	40	60
SVEW-07-160	1541235.064	1473527.179	5343.4	5343.55	160	8/25/2003	SVEW used as SVMP	11.75	2	5198.4	5183.4	145	160	0.05	15	139	160
SVEW-08-260	1541226.527	1473525.871	5343.36	5343.68	260	8/27/2003	SVEW used as SVMP	11.75	2	5098.36	5083.36	245	260	0.05	15	240	260
SVEW-09-457	1541226.901	1473525.531	5343.36	5343.63	457	8/27/2003	SVEW used as SVMP	11.75	2	4900.36	4886.36	443	457	0.05	14	430	457
SVEW-10-410	1540843.94	1473728.871	5340.15	5339.83	410	2/27/2004	SVEW used as SVMP	11.75	2	4940.15	4930.15	400	410	0.05	10	395	410
SVEW-11-410	1541991.99	1473669.486	5347.58	5347.63	410	2/27/2004	SVEW used as SVMP	11.75	2	4947.58	4937.58	400	410	0.05	10	395	410
SVEW-12-410	1540964.197	1473119.642	5338.89	5338.68	410	2/27/2004	SVEW used as SVMP	11.75	2	4938.89	4928.89	400	410	0.05	10	395	410
SVEW-13-410	1541979.856	1473408.105	5346.96	5346.48	410	2/27/2004	SVEW used as SVMP	11.75	2	4946.96	4936.96	400	410	0.05	10	395	410
SVMW-01-050	1541090.086	1473534.432	5343.05	5342.55	52.5	7/23/2004	SVMP	11.75	0.5	5293.05	5290.55	50	52.5	0.05	2.5	41.25	61.25
SVMW-01-100	1541090.406	1473534.787	5343.05	5342.55	102.5	7/23/2004	SVMP	11.75	0.5	5243.05	5240.55	100	102.5	0.05	2.5	91.25	111.25
SVMW-01-250	1541090.392	1473534.428	5343.05	5342.54	253.2	7/23/2004	SVMP	11.75	0.5	5092.35	5089.85	250.7	253.2	0.05	2.5	241.95	261.95
SVMW-01-300	1541090.127	1473534.881	5343.05	5342.62	310	7/23/2004	SVMP	11.75	0.5	5034.55	5033.05	308.5	310	0.05	1.5	299.25	319.25
SVMW-02-050	1541412.027	1473655.884	5341.5	5341.24	52.5	2/3/2005	SVMP	11.75	0.5	5291.5	5289	50	52.5	0.05	2.5	41.25	61.25
SVMW-02-100	1541412.134	1473655.742	5341.5	5341.19	99.5	2/3/2005	SVMP	11.75	0.5	5244.5	5242	97	99.5	0.05	2.5	88.25	108.25
SVMW-02-150	1541412.177	1473656.011	5341.5	5341.1	152.5	2/3/2005	SVMP	11.75	0.5	5191.5	5189	150	152.5	0.05	2.5	141.25	161.25
SVMW-03-050	1541518.372	1473497.385	5343.58	5343.33	52.5	2/3/2005	SVMP	11.75	0.5	5293.58	5291.08	50	52.5	0.05	2.5	41.25	61.25
SVMW-03-100	1541518.509	1473497.728	5343.58	5343.18	102.5	2/3/2005	SVMP	11.75	0.5	5243.58	5241.08	100	102.5	0.05	2.5	91.25	111.25
SVMW-03-250	1541518.705	1473497.526	5343.58	5343.26	252.5	2/3/2005	SVMP	11.75	0.5	5093.58	5091.08	250	252.5	0.05	2.5	241.25	261.25
SVMW-03-300	1541518.594	1473497.248	5343.58	5343.23	302.5	2/3/2005	SVMP	11.75	0.5	5043.58	5041.08	300	302.5	0.05	2.5	291.25	311.25
SVMW-04-050	1541274.852	1473448.5	5341.26	5340.67	52.5	7/26/2004	SVMP	11.75	0.5	5291.26	5288.76	50	52.5	0.05	2.5	41.25	61.25
SVMW-04-100	1541274.488	1473448.642	5341.26	5340.71	100.5	7/26/2004	SVMP	11.75	0.5	5243.26	5240.76	98	100.5	0.05	2.5	89.25	109.25
SVMW-04-250	1541274.494	1473448.375	5341.26	5340.67	252.5	7/26/2004	SVMP	11.75	0.5	5091.26	5088.76	250	252.5	0.05	2.5	241.25	261.25
SVMW-04-300	1541274.664	1473448.072	5341.26	5340.64	300	7/26/2004	SVMP	11.75	0.5	5043.76	5041.26	297.5	300	0.05	2.5	288.75	308.75
SVMW-05-050	1541016.028	1473498.346	5342.86	5342.16	52.5	3/2/2001	SVMP	11.75	0.5	5292.86	5290.36	50	52.5	0.05	2.5	41.25	61.25
SVMW-05-100	1541015.741	1473498.617	5342.86	5342.18	102.5	3/2/2001	SVMP	11.75	0.5	5242.86	5240.36	100	102.5	0.05	2.5	91.25	111.25
SVMW-05-230	1541016.165	1473498.684	5342.86	5342.2	231	3/2/2001	SVMP	11.75	0.5	5113.86	5111.86	229	231	0.05	2	220	240
SVMW-05-290	1541015.937	1473498.758	5342.86	5342.26	290	3/2/2001	SVMP	11.75	0.5	5055.86	5052.86	287	290	0.05	3	278.5	298.5
SVMW-06-050	1541802.498	1473507.443	5346.21	5345.96	52.5	3/12/2001	SVMP	11.75	0.5	5296.21	5293.71	50	52.5	0.05	2.5	41.25	61.25
SVMW-06-100	1541802.956	1473507.307	5346.21	5345.94	102	3/12/2001	SVMP	11.75	0.5	5247.21	5244.21	99	102	0.05	3	90.5	110.5
SVMW-06-252	1541802.717	1473507.663	5346.21	5345.89	254.5	3/12/2001	SVMP	11.75	0.5	5094.21	5091.71	252	254.5	0.05	2.5	243.25	263.25
SVMW-06-302	1541802.644	1473507.131	5346.21	5345.94	305	3/12/2001	SVMP	11.75	0.5	5044.21	5041.21	302	305	0.05	3	293.5	313.5
SVMW-07-050	1541493.331	1473791.087	5342.41	5341.81	52	3/27/2001	SVMP	11.75	0.5	5292.91	5290.41	49.5	52	0.05	2.5	40.75	60.75
SVMW-07-100	1541493.029	1473791.208	5342.41	5341.85	98	3/27/2001	SVMP	11.75	0.5	5246.91	5244.41	95.5	98	0.05	2.5	86.75	106.75
SVMW-07-150	1541493.229	1473791.431	5342.41	5341.84	149.5	3/27/2001	SVMP	11.75	0.5	5195.41	5192.91	147	149.5	0.05	2.5	138.25	158.25
SVMW-08-050	1541274.691	1473555.057	5342.75	5342.4	52.5	7/16/2004	SVMP	11.75	0.5	5292.75	5290.25	50	52.5	0.05	2.5	41.25	61.25
SVMW-08-100	1541274.737	1473555.255	5342.75	5342.46	100	7/16/2004	SVMP	11.75	0.5	5242.75	5240.25	100	102.5	0.05	2.5	90	110
SVMW-08-250	1541274.766	1473555.026	5342.75	5342.28	252.5	7/16/2004	SVMP	11.75	0.5	5092.75	5090.25	250	252.5	0.05	2.5	241.25	261.25
SVMW-09-050	1541322.726	1473544.259	5342.96	5342.6	52.5	7/16/2004	SVMP	11.75	0.5	5292.96	5290.46	50	52.5	0.05	2.5	41.25	61.25
SVMW-09-100	1541322.633	1473544.24	5342.96	5342.56	102.5	7/16/2004	SVMP	11.75	0.5	5242.96	5240.46	100	102.5	0.05	2.5	91.25	111.25
SVMW-09-250	1541322.418	1473544.508	5342.96	5342.52	252.5	7/16/2004	SVMP	11.75	0.5	5092.96	5090.46	250	252.5	0.05	2.5	241.25	261.25
SVMW-09-266	1541322.155	1473544.429	5342.96	5342.73	268.5	7/16/2004	SVMP	11.75	0.5	5076.96	5074.46	266	268.5	0.05	2.5	257.25	277.25
SVMW-10-050	1541371.144	1473534.123	5343.12	5342.57	52.5	2/12/2003	SVMP	11.75	0.5	5293.12	5290.62	50	52.5	0.05	2.5	41.25	61.25
SVMW-10-100	1541371.121	1473534.601	5343.12	5342.6	102.5	2/12/2003	SVMP	11.75	0.5	5243.12	5240.62	100	102.5	0.05	2.5	91.25	111.25
SVMW-10-150	1541371.441	1473534.334	5343.12	5342.62	152.5	2/12/2003	SVMP	11.75	0.5	5193.12	5190.62	150	152.5	0.05	2.5	141.25	161.25
SVMW-10-250	1541371.03	1473534.219	5343.12	5342.5	252.5	2/12/2003	SVMP	11.75	0.5	5093.12	5090.62	250	252.5	0.05	2.5	241.25	261.25
SVMW-11-050	1541411.737	1473473.489	5343.11	5342.48	52.5	2/22/2003	SVMP	11.75	0.5	5293.11	5290.61	50	52.5	0.05	2.5	41.25	61.25
SVMW-11-100	1541411.897	1473473.849	5343.11	5342.4	102.5	2/22/2003	SVMP	11.75	0.5	5243.11	5240.61	100	102.5	0.05	2.5	91.25	111.25
SVMW-11-250	1541411.366	1473473.852	5343.11	5342.36	252.5	2/22/2003	SVMP	11.75	0.5	5093.11	5090.61	250	252.5	0.05	2.5	241.25	261.25
SVMW-11-260	1541411.521	1473474.072	5343.11	5342.28	262.5	2/22/2003	SVMP	11.75	0.5	5083.11	5080.61	260	262.5	0.05	2.5	251.25	271.25
SVMW-12-150	1540843.947	1473728.452	5340.15	5339.58	152.5	2/2/2004	SVMP	11.75	0.5	5190.15	5187.65	150	152.5	0.05	2.5	141.25	161.25
SVMW-12-250	1540844.195	1473728.604	5340.15	5339.68	252.5	2/2/2004	SVMP	11.75	0.5	5090.15	5087.65	250	252.5	0.05	2.5	241.25	261.25
SVMW-12-350	1540843.86	1473729.028	5340.15	5339.72	352.5	2/2/2004	SVMP	11.75	0.5	4990.15	4987.65	350	352.5	0.05	2.5	341.25	361.25

Table 2-1. SVMP Construction Details

Well Name [a]	Easting [b]	Northing [b]	Ground Elevation [c]	PVC Inner Casing Elevation	PVC Inner Casing approx. depth bgs	Installation Date	Well Type	Boring Diameter	PVC Casing Diameter	Top of Screen Elevation	Bottom of Screen Elevation	Top of Screen depth bgs	Bottom of Screen depth bgs	Screen Slot Size	Screen Length	Top of Sand Pack depth bgs	Bottom of Sand Pack depth bgs
SVMW-12-450	1540843.599	1473728.803	5340.15	5339.7	452.5	2/2/2004	SVMP	11.75	0.5	4890.15	4887.65	450	452.5	0.05	2.5	441.25	461.25
SVMW-13-150	1541991.839	1473669.7	5347.58	5347.39	152.5	1/27/2004	SVMP	11.75	0.5	5197.58	5195.08	150	152.5	0.05	2.5	141.25	161.25
SVMW-13-250	1541991.504	1473669.696	5347.58	5347.35	252.5	1/27/2004	SVMP	11.75	0.5	5097.58	5095.08	250	252.5	0.05	2.5	241.25	261.25
SVMW-13-350	1541991.585	1473669.481	5347.58	5347.26	352.5	1/27/2004	SVMP	11.75	0.5	4997.58	4995.08	350	352.5	0.05	2.5	341.25	361.25
SVMW-13-450	1541991.705	1473669.235	5347.58	5347.34	452.5	1/27/2004	SVMP	11.75	0.5	4897.58	4895.08	450	452.5	0.05	2.5	441.25	461.25
SVMW-14-150	1540963.964	1473119.416	5338.89	5338.76	152.5	1/7/2004	SVMP	11.75	0.5	5188.89	5186.39	150	152.5	0.05	2.5	141.25	161.25
SVMW-14-250	1540963.696	1473119.543	5338.89	5338.79	252.5	1/7/2004	SVMP	11.75	0.5	5088.89	5086.39	250	252.5	0.05	2.5	241.25	261.25
SVMW-14-350	1540963.747	1473119.187	5338.89	5338.8	352.5	1/7/2004	SVMP	11.75	0.5	4988.89	4986.39	350	352.5	0.05	2.5	341.25	361.25
SVMW-14-450	1540964.192	1473119.181	5338.89	5338.78	452.5	1/7/2004	SVMP	11.75	0.5	4888.89	4886.39	450	452.5	0.05	2.5	441.25	461.25
SVMW-15-150	1541979.781	1473407.891	5346.96	5346.35	152.5	1/20/2004	SVMP	11.75	0.5	5196.96	5194.46	150	152.5	0.05	2.5	141.25	161.25
SVMW-15-250	1541980.29	1473407.963	5346.96	5346.27	252.5	1/20/2004	SVMP	11.75	0.5	5096.96	5094.46	250	252.5	0.05	2.5	241.25	261.25
SVMW-15-350	1541979.964	1473407.691	5346.96	5346.23	352.5	1/20/2004	SVMP	11.75	0.5	4996.96	4994.46	350	352.5	0.05	2.5	341.25	361.25
SVMW-15-450	1541979.96	1473408.247	5346.96	5346.37	452.5	1/20/2004	SVMP	11.75	0.5	4896.96	4894.46	450	452.5	0.05	2.5	441.25	461.25

All length measurements are given in feet

[a] All wells were drilled and installed with Air Rotary Casing Hammer methods, all inner casing material is Schedule 80 PVC

[b] Survey coordinates are in NM_NAD83_ST_PL_Central_FIPS_3002_Feet

[c] Survey elevations are in NAVD88

bgs = below ground surface
KAFB = Kirtland Air Force Base
PVC = poly vinyl chloride
SVEW = soil-vapor extraction well
SVMP = soil-vapor monitoring point

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-01-100	3/19/15 9:30 AM	441	15.63	9.20	NR	Q1
	4/2/15 10:06 AM	386	16.33	8.04	NR	Baseline
	4/6/15 11:06 AM	404	15.24	8.06	NR	day 1, round 1
	4/6/15 1:54 PM	399	15.20	8.12	NR	day 1, round 2
	4/6/15 4:38 PM	401	15.27	8.12	NR	day 1, round 3
	4/6/15 10:29 PM	385	15.40	7.96	NR	night 1, round 1
	4/7/15 2:56 AM	380	15.59	7.90	NR	night 1, round 2
	4/7/15 9:44 AM	391	15.58	7.84	NR	day 2, round 1
	4/7/15 1:09 PM	392	15.39	7.98	NR	day 2, round 2
	4/8/15 9:26 AM	404	15.52	7.90	NR	day 3
	4/9/15 2:10 PM	414	15.67	7.88	NR	day 4
	4/10/15 1:22 PM	423	15.45	7.88	NR	day 5
	4/13/15 3:07 PM	461	15.51	7.84	NR	day 8
	4/15/15 2:38 PM	471	15.47	7.86	NR	day 10
	4/17/15 12:46 PM	509	15.51	7.76	NR	day 12
	5/12/15 3:17 PM	NR	NR	NR	64.6	No other measurements recorded
	7/14/15 9:10 AM	1464	15.15	7.94	NR	Q3
	10/12/2015	2460	14.76	8.00	76.5	Q4
SVMW-02-150	3/19/15 8:28 AM	716	18.26	2.26	NR	Q1
	4/2/15 12:59 PM	442	18.16	1.98	NR	Baseline
	4/6/15 9:20 AM	381	17.17	2.00	NR	day 1, round 1
	4/6/15 12:46 PM	368	17.88	1.98	NR	day 1, round 2
	4/6/15 3:35 PM	358	17.65	1.98	NR	day 1, round 3
	4/6/15 8:46 PM	315	18.16	1.94	NR	night 1, round 1
	4/7/15 1:13 AM	285	17.96	1.84	NR	night 1, round 2
	4/7/15 8:17 AM	285	18.04	1.96	NR	day 2, round 1
	4/7/15 11:57 AM	279	18.15	1.88	NR	day 2, round 2
	4/8/15 8:22 AM	238	17.85	1.90	NR	day 3
	4/9/15 8:52 AM	206	18.36	1.86	NR	day 4
	4/10/15 1:47 PM	189	17.74	1.82	NR	day 5
	4/13/15 1:54 PM	159	18.04	1.76	NR	day 8
	4/15/15 2:36 PM	160	17.95	1.76	NR	day 10
	4/17/15 11:50 AM	140	18.37	1.70	NR	day 12
	5/14/15 11:30 AM	NR	NR	NR	51.5	No other measurements recorded
	7/14/15 2:15 PM	117	18.29	1.50	NR	Q3
	10/22/2015	159	18.03	1.54	92.8	Q4
SVMW-03-100	3/19/15 11:53 AM	81	18.10	6.00	NR	Q1
	4/2/15 11:40 AM	72	17.65	5.32	NR	Baseline
	4/6/15 12:10 PM	82	17.94	5.26	NR	day 1, round 1
	4/6/15 2:54 PM	82	17.85	5.36	NR	day 1, round 2
	4/6/15 5:52 PM	81	17.75	5.36	NR	day 1, round 3
	4/7/15 12:24 AM	84	17.81	5.26	NR	night 1, round 1
	4/7/15 5:56 AM	80	17.95	5.20	NR	night 1, round 2
	4/7/15 10:39 AM	80	17.79	5.28	NR	day 2, round 1
	4/7/15 2:27 PM	80	17.49	5.30	NR	day 2, round 2
	4/8/15 12:55 PM	367	16.82	5.74	NR	day 3
	4/9/15 3:04 PM	3250	11.77	7.60	NR	day 4
	4/10/15 8:33 AM	1664	14.02	6.56	NR	day 5
	4/13/15 10:13 AM	3530	9.08	8.70	NR	day 8
	4/15/15 9:17 AM	818	14.87	6.66	NR	day 10
	4/17/15 8:15 AM	4900	5.26	10.94	NR	day 12
	4/20/15 3:21 PM	4280	4.69	11.08	NR	day 15
	4/22/15 3:07 PM	6420	1.45	13.94	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 12:13 PM	7490	1.56	15.24	NR	day 22
	5/4/15 3:45 PM	2720	5.89	11.28	NR	day 29
	5/11/15 4:01 PM	4760	1.59	13.98	NR	day 36
	5/12/15 11:17 AM	NR	NR	NR	77.8	No other measurements recorded

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-03-100 (Continued)	5/18/15 2:01 PM	3540	3.19	13.64	NR	day 43
	5/26/15 3:07 PM	3630	2.41	12.60	NR	day 51
	6/1/15 3:20 PM	1134	9.57	9.14	NR	day 57
	6/15/15 4:25 PM	5170	0.63	14.10	NR	day 71
	6/29/15 12:26 PM	945	11.64	8.26	NR	day 85
	7/6/15 11:37 AM	2990	5.35	10.66	NR	day 92
	7/14/15 10:45 AM	1228	9.74	9.62	NR	Q3
	10/20/2015	6320	1.03	14.16	79.3	Q4
SVMW-03-250	3/19/15 11:47 AM	488	18.76	1.16	NR	Q1
	4/2/15 11:35 AM	499	18.28	1.08	NR	Baseline
	4/6/15 12:15 PM	545	18.25	1.06	NR	day 1, round 1
	4/6/15 2:59 PM	564	18.21	1.12	NR	day 1, round 2
	4/6/15 5:58 PM	585	18.31	1.12	NR	day 1, round 3
	4/7/15 12:18 AM	612	18.41	1.06	NR	night 1, round 1
	4/7/15 5:52 AM	620	18.55	1.02	NR	night 1, round 2
	4/7/15 10:45 AM	654	18.14	1.12	NR	day 2, round 1
	4/7/15 2:32 PM	672	17.95	1.14	NR	day 2, round 2
	4/8/15 12:59 PM	771	18.55	1.22	NR	day 3
	4/9/15 3:08 PM	896	17.68	1.26	NR	day 4
	4/10/15 8:27 AM	989	17.48	1.34	NR	day 5
	4/13/15 10:17 AM	1467	16.57	1.58	NR	day 8
	4/15/15 9:26 AM	1774	16.34	1.78	NR	day 10
	4/17/15 8:21 AM	2150	15.91	2.04	NR	day 12
	4/20/15 3:25 PM	3010	14.91	2.48	NR	day 15
	4/22/15 3:18 PM	3530	14.61	2.74	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 12:18 PM	5300	12.81	3.78	NR	day 22
	5/4/15 3:50 PM	5340	12.72	4.00	NR	day 29
	5/11/15 4:09 PM	6780	11.34	4.98	NR	day 36
	5/12/15 11:18 AM	NR	NR	NR	77.7	No other measurements recorded
	5/18/15 2:05 PM	7650	10.75	5.70	NR	day 43
	5/26/15 3:10 PM	7590	10.29	5.60	NR	day 51
	6/1/15 3:25 PM	7610	10.23	5.64	NR	day 57
	6/15/15 4:28 PM	8740	7.99	7.02	NR	day 71
	6/29/15 12:29 PM	8370	8.85	6.74	NR	day 85
	7/6/15 11:40 AM	8830	7.76	7.24	NR	day 92
	7/14/15 10:50 AM	8890	7.60	7.98	NR	Q3
	10/20/2015	11020	4.13	10.76	80.0	Q4
SVMW-03-300	3/19/15 11:39 AM	17430	9.57	11.06	NR	Q1
	4/2/15 11:25 AM	14180	9.40	9.38	NR	Baseline
	4/6/15 12:20 PM	14660	9.42	9.62	NR	day 1, round 1
	4/6/15 3:04 PM	15660	9.14	10.00	NR	day 1, round 2
	4/6/15 6:03 PM	15850	9.14	10.06	NR	day 1, round 3
	4/7/15 12:20 AM	14570	9.06	9.76	NR	night 1, round 1
	4/7/15 5:42 AM	13690	9.20	9.60	NR	night 1, round 2
	4/7/15 10:50 AM	14890	9.25	9.86	NR	day 2, round 1
	4/7/15 2:37 PM	15080	9.08	9.86	NR	day 2, round 2
	4/8/15 1:05 PM	14540	8.91	9.80	NR	day 3
	4/9/15 3:12 PM	14120	8.91	9.80	NR	day 4
	4/10/15 8:16 AM	13440	9.01	9.76	NR	day 5
	4/13/15 10:21 AM	14420	8.37	10.12	NR	day 8
	4/15/15 9:33 AM	14640	7.74	10.54	NR	day 10
	4/17/15 8:27 AM	13480	8.37	10.26	NR	day 12
	4/20/15 3:28 PM	13840	9.16	9.76	NR	day 15
	4/22/15 3:23 PM	14820	8.25	10.56	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 12:24 PM	14340	9.39	10.22	NR	day 22
	5/4/15 3:55 PM	14270	5.90	11.66	NR	day 29

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-03-300 (Continued)	5/11/15 4:09 PM	13340	7.97	10.92	NR	day 36
	5/12/15 11:19 AM	NR	NR	NR	79.6	No other measurements recorded
	5/18/15 2:08 PM	14520	6.05	12.68	NR	day 43
	5/26/15 3:13 PM	13820	5.63	11.70	NR	day 51
	6/1/15 3:27 PM	14050	3.52	12.84	NR	day 57
	6/15/15 4:31 PM	13940	4.93	12.42	NR	day 71
	6/29/15 12:31 PM	13570	2.84	13.26	NR	day 85
	7/6/15 11:43 AM	14200	2.49	13.56	NR	day 92
	7/14/15 10:55 AM	13950	2.13	14.94	NR	Q3
	10/20/2015	13830	1.23	15.02	75.9	Q4
SVMW-04-100	3/19/15 11:05 AM	20670	11.38	14.56	NR	Q1
	4/2/15 10:36 AM	16630	11.19	12.12	NR	Baseline
	4/6/15 11:24 AM	17020	11.02	12.12	NR	day 1, round 1
	4/6/15 2:17 PM	17460	10.98	12.34	NR	day 1, round 2
	4/6/15 5:17 PM	17480	11.29	12.38	NR	day 1, round 3
	4/6/15 11:03 PM	15900	11.01	11.94	NR	night, round 1
	4/7/15 4:51 AM	15450	11.34	11.86	NR	night, round 2
	4/7/15 10:01 AM	16510	10.95	12.00	NR	day 2, round 1
	4/7/15 1:44 PM	16530	11.40	11.94	NR	day 2, round 2
	4/8/15 12:32 PM	15830	10.97	11.82	NR	day 3
	4/9/15 2:31 PM	15570	11.05	11.72	NR	day 4
	4/10/15 9:18 AM	15280	11.16	11.78	NR	day 5
	4/13/15 9:50 AM	15310	11.15	11.70	NR	day 8
	4/15/15 9:47 AM	15490	11.36	11.60	NR	day 10
	4/17/15 9:16 AM	15320	11.11	11.62	NR	day 12
	5/12/15 3:35 PM	NR	NR	NR	59.3	No other measurements recorded
	7/13/15 3:44 PM	14370	11.84	10.54	NR	Q3
	10/20/2015	14050	11.47	10.48	67.4	Q4
SVMW-04-250	3/19/15 10:58 AM	4900	18.81	1.58	NR	Q1
	4/2/15 10:31 AM	4260	18.96	1.36	NR	Baseline
	4/6/15 11:34 AM	4420	18.07	1.36	NR	day 1, round 1
	4/6/15 2:25 PM	4410	19.00	1.32	NR	day 1, round 2
	4/6/15 5:25 PM	4450	18.24	1.36	NR	day 1, round 3
	4/6/15 10:57 PM	4220	18.21	1.32	NR	night, round 1
	4/7/15 4:46 AM	4210	18.84	1.30	NR	night, round 2
	4/7/15 10:10 AM	4270	18.16	1.32	NR	day 2, round 1
	4/7/15 1:52 PM	4280	18.20	1.34	NR	day 2, round 2
	4/8/15 12:27 PM	4280	18.10	1.38	NR	day 3
	4/9/15 2:40 PM	4430	18.25	1.40	NR	day 4
	4/10/15 9:12 AM	4350	18.12	1.46	NR	day 5
	4/13/15 9:45 AM	4780	18.05	1.52	NR	day 8
	4/15/15 10:00 AM	4600	18.23	1.52	NR	day 10
	4/17/15 9:32 AM	5500	17.98	1.62	NR	day 12
	5/12/15 3:36 PM	NR	NR	NR	54.2	No other measurements recorded
	7/13/15 3:51 PM	8390	16.99	1.94	NR	Q3
	10/20/2015	11420	15.59	2.60	64.1	Q4
SVMW-05-050	3/19/15 10:17 AM	33	19.45	3.68	NR	Q1
	4/2/15 10:18 AM	14	18.73	3.40	NR	Baseline
	4/6/15 11:13 AM	10	18.45	3.38	NR	day 1, round 1
	4/6/15 1:59 PM	8	19.18	3.42	NR	day 1, round 2
	4/6/15 5:04 PM	1	18.79	3.42	NR	day 1, round 3
	4/6/15 10:44 PM	3	18.78	3.42	NR	night, round 1
	4/7/15 3:15 AM	4	18.98	3.34	NR	night, round 2
	4/7/15 9:49 AM	8	18.81	3.36	NR	day 2, round 1
	4/7/15 1:17 PM	1	18.63	3.38	NR	day 2, round 2
	4/8/15 9:33 AM	17	19.10	3.42	NR	day 3
	4/9/15 2:24 PM	3	18.66	3.34	NR	day 4
	4/10/15 1:31 PM	6	18.44	3.34	NR	day 5

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-05-050 (Continued)	4/13/15 3:14 PM	8	18.76	3.36	NR	day 8
	4/15/15 2:43 PM	2	18.87	3.34	NR	day 10
	4/17/15 12:51 PM	0	18.76	3.30	NR	day 12
	5/12/15 3:20 PM	NR	NR	NR	68.3	No other measurements recorded
	7/14/15 8:46 AM	8	18.87	3.42	NR	Q3
	10/20/2015	2	18.41	3.42	85.5	Q4
SVMW-05-100	3/19/15 10:11 AM	42	17.80	5.64	NR	Q1
	4/2/15 10:13 AM	13	17.27	5.32	NR	Baseline
	4/6/15 11:15 AM	9	16.89	5.34	NR	day 1, round 1
	4/6/15 2:02 PM	6	17.46	5.46	NR	day 1, round 2
	4/6/15 5:07 PM	4	16.91	5.52	NR	day 1, round 3
	4/6/15 10:40 PM	7	17.10	5.40	NR	night, round 1
	4/7/15 3:05 AM	0	17.26	5.32	NR	night, round 2
	4/7/15 9:53 AM	7	17.25	5.30	NR	day 2, round 1
	4/7/15 1:21 PM	3	16.83	5.34	NR	day 2, round 2
	4/8/15 9:37 AM	7	17.39	5.40	NR	day 3
	4/9/15 2:28 PM	3	17.23	5.26	NR	day 4
	4/10/15 1:35 PM	5	16.65	5.38	NR	day 5
	4/13/15 3:18 PM	5	17.36	5.26	NR	day 8
	4/15/15 2:46 PM	0	17.01	5.42	NR	day 10
	4/17/15 12:55 PM	1	17.09	5.22	NR	day 12
	5/12/15 3:20 PM	NR	NR	NR	72.2	No other measurements recorded
	7/14/15 8:51 AM	4	17.15	5.44	NR	Q3
	10/20/2015	1	16.63	6.00	82.7	Q4
SVMW-06-100	3/19/15 1:04 PM	1	20.06	3.20	NR	Q1
	4/2/15 12:07 PM	3	19.69	2.90	NR	Baseline
	4/6/15 11:31 AM	2	20.31	2.98	NR	day 1, round 1
	4/6/15 3:41 PM	1	19.95	3.06	NR	day 1, round 2
	4/6/15 10:16 PM	2	19.99	2.96	NR	night, round 1
	4/7/15 3:01 AM	0	19.65	2.90	NR	night, round 2
	4/7/15 9:34 AM	1	19.84	2.86	NR	day 2, round 1
	4/7/15 1:42 PM	3	20.02	2.96	NR	day 2, round 2
	4/8/15 10:59 AM	2	20.19	2.96	NR	day 3
	4/9/15 11:20 AM	5	19.83	2.94	NR	day 4
	4/10/15 12:26 PM	0	19.66	2.80	NR	day 5
	4/13/15 2:29 PM	0	19.80	2.74	NR	day 8
	4/15/15 1:43 PM	0	20.02	2.96	NR	day 10
	4/17/15 1:30 PM	0	20.18	2.86	NR	day 12
	4/20/15 8:49 AM	0	20.71	3.06	NR	day 15
	4/22/15 8:22 AM	0	19.82	2.82	NR	day 17
	4/24/15 10:51 AM	0	19.92	2.86	NR	day 19
	4/27/15 1:20 PM	0	19.86	2.78	NR	day 22
	5/4/15 8:46 AM	0	20.21	2.82	NR	day 29
	5/11/15 8:47 AM	5	19.88	2.68	NR	day 36
	5/12/15 11:21 AM	NR	NR	NR	76.9	No other measurements recorded
	5/18/15 8:56 AM	3	20.06	2.68	NR	day 43
	5/26/15 9:02 AM	3	20.04	2.64	NR	day 51
	6/1/15 8:34 AM	0	20.83	2.64	NR	day 57
	6/15/15 8:00 AM	0	19.93	2.56	NR	day 71
	6/29/15 8:43 AM	3	19.79	2.54	NR	day 85
	7/6/15 8:50 AM	2	19.97	2.54	NR	day 92
	7/13/15 2:41 PM	3	20.28	2.60	NR	Q3
	10/20/2015	0	20.12	2.48	69.1	Q4
SVMW-06-252	3/19/15 12:58 PM	653	18.40	1.72	NR	Q1
	4/2/15 12:02 PM	552	18.54	1.58	NR	Baseline
	4/6/15 11:38 AM	534	18.63	1.60	NR	day 1, round 1
	4/6/15 3:48 PM	513	18.38	1.62	NR	day 1, round 2
	4/6/15 10:23 PM	561	18.05	1.62	NR	night, round 1

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-06-252 (Continued)	4/7/15 3:06 AM	537	17.87	1.58	NR	night, round 2
	4/7/15 9:43 AM	490	18.10	1.54	NR	day 2, round 1
	4/7/15 1:51 PM	500	18.20	1.64	NR	day 2, round 2
	4/8/15 10:53 AM	492	18.51	1.58	NR	day 3
	4/9/15 11:25 AM	413	18.28	1.60	NR	day 4
	4/10/15 12:22 PM	473	18.20	1.40	NR	day 5
	4/13/15 2:34 PM	377	18.65	1.36	NR	day 8
	4/15/15 1:47 PM	550	18.23	1.60	NR	day 10
	4/17/15 1:35 PM	391	18.99	1.50	NR	day 12
	4/20/15 8:53 AM	466	19.01	1.66	NR	day 15
	4/22/15 8:27 AM	420	17.90	1.62	NR	day 17
	4/24/15 10:56 AM	394	18.11	1.58	NR	day 19
	4/27/15 1:24 PM	374	17.92	1.64	NR	day 22
	5/4/15 8:53 AM	490	18.55	1.56	NR	day 29
	5/11/15 8:53 AM	503	18.21	1.54	NR	day 36
	5/12/15 11:22 AM	NR	NR	NR	78.2	No other measurements recorded
	5/18/15 9:00 AM	523	18.65	1.46	NR	day 43
	5/26/15 9:08 AM	484	18.11	1.58	NR	day 51
	6/1/15 8:39 AM	599	19.03	1.56	NR	day 57
	6/15/15 8:03 AM	432	18.07	1.50	NR	day 71
	6/29/15 8:46 AM	592	17.93	1.50	NR	day 85
	7/6/15 8:52 AM	516	18.07	1.60	NR	day 92
	7/13/15 2:49 PM	598	18.45	1.54	NR	Q3
	10/20/2015	484	18.01	1.70	79.0	Q4
SVMW-06-302	3/19/15 12:52 PM	27	20.13	0.96	NR	Q1
	4/2/15 11:54 AM	12	19.06	0.88	NR	Baseline
	4/6/15 11:49 AM	6	20.13	0.88	NR	day 1, round 1
	4/6/15 3:55 PM	11	19.97	0.88	NR	day 1, round 2
	4/6/15 10:29 PM	6	19.75	0.88	NR	night, round 1
	4/7/15 3:11 AM	8	19.55	0.84	NR	night, round 2
	4/7/15 9:49 AM	4	19.70	0.86	NR	day 2, round 1
	4/7/15 2:00 PM	4	20.57	0.80	NR	day 2, round 2
	4/8/15 10:43 AM	7	20.19	0.86	NR	day 3
	4/9/15 11:24 AM	6	19.87	0.92	NR	day 4
	4/10/15 12:16 PM	3	19.89	0.82	NR	day 5
	4/13/15 2:40 PM	3	19.71	0.84	NR	day 8
	4/15/15 1:52 PM	5	20.15	0.86	NR	day 10
	4/17/15 1:39 PM	2	20.34	0.84	NR	day 12
	4/20/15 8:57 AM	12	20.64	1.00	NR	day 15
	4/22/15 8:30 AM	8	20.42	0.52	NR	day 17
	4/24/15 11:02 AM	4	19.90	0.90	NR	day 19
	4/27/15 1:28 PM	10	19.81	0.88	NR	day 22
	5/4/15 8:58 AM	7	20.18	0.92	NR	day 29
	5/11/15 8:56 AM	15	19.89	0.88	NR	day 36
	5/12/15 11:25 AM	NR	NR	NR	82.4	No other measurements recorded
	5/18/15 9:03 AM	14	20.30	0.84	NR	day 43
	5/26/15 9:11 AM	18	19.93	0.88	NR	day 51
	6/1/15 8:42 AM	20	20.73	0.94	NR	day 57
	6/15/15 8:06 AM	24	19.63	0.86	NR	day 71
	6/29/15 8:49 AM	35	19.49	0.90	NR	day 85
	7/6/15 8:55 AM	35	19.94	0.92	NR	day 92
	7/13/15 2:53 PM	37	20.07	0.94	NR	Q3
	10/20/2015	39	19.91	0.98	80.6	Q4
SVMW-08-100	3/25/15 11:17 AM	9	18.43	4.20	NR	Q1
	4/2/15 9:55 AM	11	18.00	3.82	NR	Baseline
	4/6/15 10:52 AM	10	17.82	3.76	NR	day 1, round 1
	4/6/15 1:38 PM	14	17.69	3.88	NR	day 1, round 2
	4/6/15 4:26 PM	10	18.01	3.92	NR	day 1, round 3

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-08-100 (Continued)	4/6/15 10:19 PM	9	17.83	3.90	NR	night, round 1
	4/7/15 2:44 AM	5	17.98	3.84	NR	night, round 2
	4/7/15 9:33 AM	8	17.95	3.78	NR	day 2, round 1
	4/7/15 12:46 PM	5	17.98	3.80	NR	day 2, round 2
	4/8/15 9:12 AM	13	17.62	3.90	NR	day 3
	4/9/15 9:54 AM	27	17.55	4.00	46.9	day 4
	4/10/15 3:06 PM	8	17.99	3.78	NR	day 5
	4/13/15 2:45 PM	8	17.14	3.90	NR	day 8
	4/15/15 2:25 PM	8	17.05	4.02	NR	day 10
	4/17/15 12:36 PM	8	17.15	3.98	73.8	day 12
	5/12/15 3:12 PM	NR	NR	NR	62.8	No other measurements recorded
	7/13/15 3:14 PM	2	14.63	5.04	NR	Q3
	10/20/2015	4	11.89	6.64	86.4	Q4
SVMW-08-250	3/25/15 10:58 AM	8830	12.64	12.74	NR	Q1
	4/2/15 9:47 AM	7730	12.26	11.20	NR	Baseline
	4/6/15 10:57 AM	7890	12.46	11.24	NR	day 1, round 1
	4/6/15 1:43 PM	8070	12.35	11.38	NR	day 1, round 2
	4/6/15 4:31 PM	8140	12.81	11.42	NR	day 1, round 3
	4/6/15 10:11 PM	7780	12.39	11.26	NR	night, round 1
	4/7/15 2:36 AM	7440	12.68	11.10	NR	night, round 2
	4/7/15 9:37 AM	7710	12.71	11.08	NR	day 2, round 1
	4/7/15 12:50 PM	7740	12.73	11.08	NR	day 2, round 2
	4/8/15 9:16 AM	7670	12.47	11.06	NR	day 3
	4/9/15 9:58 AM	7830	12.46	11.26	25.9	day 4
	4/10/15 3:11 PM	7650	12.58	10.96	NR	day 5
	4/13/15 2:49 PM	7620	12.39	10.92	NR	day 8
	4/15/15 2:29 PM	8010	12.07	11.20	NR	day 10
	4/17/15 12:40 PM	7960	12.21	10.90	73.6	day 12
	5/12/15 3:13 PM	NR	NR	NR	58.1	No other measurements recorded
	7/13/15 3:18 PM	9130	11.77	10.64	NR	Q3
	10/20/2015	10040	9.64	11.60	96.5	Q4
SVMW-09-100	3/24/15 2:16 PM	5020	13.79	11.42	NR	Q1
	4/2/15 9:39 AM	5650	13.45	10.50	NR	Baseline
	4/6/15 10:35 AM	5620	13.37	10.44	NR	day 1, round 1
	4/6/15 1:23 PM	5620	13.51	10.54	NR	day 1, round 2
	4/6/15 4:12 PM	6490	13.20	10.94	NR	day 1, round 3
	4/6/15 9:59 PM	7470	13.34	10.88	NR	night, round 1
	4/7/15 2:23 AM	5420	13.65	10.40	NR	night, round 2
	4/7/15 9:14 AM	4800	13.62	10.16	NR	day 2, round 1
	4/7/15 12:33 PM	4780	13.78	10.18	NR	day 2, round 2
	4/8/15 8:58 AM	7290	13.71	10.78	NR	day 3
	4/9/15 9:40 AM	5900	13.38	10.42	57.1	day 4
	4/10/15 2:49 PM	5160	13.55	10.20	NR	day 5
	4/13/15 2:27 PM	5090	13.55	9.98	NR	day 8
	4/15/15 2:12 PM	10410	13.28	11.74	NR	day 10
	4/17/15 12:25 PM	6800	12.95	10.42	83.6	day 12
	5/12/15 3:09 PM	NR	NR	NR	64.6	No other measurements recorded
	7/13/15 4:05 PM	10410	10.36	12.66	NR	Q3
	10/22/2015	19160	10.16	11.94	91.0	Q4
SVMW-09-266	3/24/15 2:08 PM	4510	17.80	2.08	NR	Q1
	4/2/15 9:31 AM	4190	17.42	1.92	NR	Baseline
	4/6/15 10:43 AM	4240	17.40	1.84	NR	day 1, round 1
	4/6/15 1:28 PM	4290	17.71	1.82	NR	day 1, round 2
	4/6/15 4:19 PM	4570	17.33	1.96	NR	day 1, round 3
	4/6/15 9:49 PM	4570	17.51	1.92	NR	night, round 1
	4/7/15 2:13 AM	4420	17.65	1.88	NR	night, round 2
	4/7/15 9:20 AM	4940	17.46	1.92	NR	day 2, round 1
	4/7/15 12:40 PM	5090	17.43	1.96	NR	day 2, round 2

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-09-266 (Continued)	4/8/15 9:03 AM	5480	17.21	2.12	NR	day 3
	4/9/15 9:47 AM	6460	17.19	2.26	48.1	day 4
	4/10/15 2:54 PM	6060	16.65	2.10	NR	day 5
	4/13/15 2:33 PM	7130	16.75	2.32	NR	day 8
	4/15/15 2:19 PM	7180	16.82	2.30	NR	day 10
	4/17/15 12:31 PM	8420	17.16	2.40	80.0	day 12
	4/20/15 3:08 PM	8690	16.79	2.58	NR	day 15
	4/22/15 3:01 PM	9900	16.72	2.56	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 12:06 PM	10980	17.08	2.60	NR	day 22
	5/4/15 3:28 PM	10330	16.10	2.86	NR	day 29
	5/11/15 3:53 PM	11080	15.77	2.84	NR	day 36
	5/12/15 11:40 AM	NR	NR	NR	71.8	No other measurements recorded
	5/18/15 1:45 PM	12780	15.75	3.18	NR	day 43
	5/26/15 3:01 PM	12940	15.27	3.12	NR	day 51
	6/1/15 3:13 PM	12670	15.19	3.00	NR	day 57
	6/15/15 4:16 PM	14880	14.67	3.48	NR	day 71
	6/29/15 12:20 PM	14380	14.71	3.48	NR	day 85
	7/6/15 11:31 AM	16100	13.95	3.72	NR	day 92
	7/13/15 4:24 PM	15800	13.71	3.98	NR	Q3
	10/22/2015	20730	11.22	5.04	92.8	Q4
SVMW-10-100	3/24/15 8:25 AM	32760	14.99	12.68	NR	Q1
	4/2/15 9:12 AM	28310	14.83	10.46	NR	Baseline
	4/6/15 9:34 AM	30240	14.70	10.70	NR	day 1, round 1
	4/6/15 12:57 PM	30550	14.75	10.68	NR	day 1, round 2
	4/6/15 3:47 PM	30940	14.66	10.74	NR	day 1, round 3
	4/6/15 9:31 PM	28080	14.73	10.24	NR	night, round 1
	4/7/15 1:54 AM	25520	14.93	10.04	NR	night, round 2
	4/7/15 8:22 AM	27980	14.87	10.38	NR	day 2, round 1
	4/7/15 12:10 PM	28870	15.04	10.32	NR	day 2, round 2
	4/8/15 8:33 AM	26890	14.88	10.16	NR	day 3
	4/9/15 9:02 AM	26000	14.98	10.10	38.9	day 4
	4/10/15 2:25 PM	27320	14.72	9.98	NR	day 5
	4/13/15 2:03 PM	26930	15.28	9.90	NR	day 8
	4/15/15 1:45 PM	27860	14.65	10.08	NR	day 10
	4/17/15 11:57 AM	27850	15.17	10.02	68.0	day 12
	4/20/15 2:47 PM	28170	14.61	10.24	NR	day 15
	4/22/15 2:37 PM	28830	14.36	10.14	NR	day 17
	4/24/15 4:25 PM	27710	14.37	10.16	NR	day 19
	4/27/15 10:55 AM	28280	14.27	10.20	NR	day 22
	5/4/15 3:06 PM	28510	14.10	10.10	NR	day 29
	5/11/15 3:28 PM	29000	13.93	10.12	NR	day 36
	5/12/15 11:43 AM	NR	NR	NR	73.7	No other measurements recorded
	5/18/15 1:27 PM	32760	13.98	11.24	NR	day 43
	5/26/15 2:28 PM	29440	13.49	9.94	NR	day 51
	6/1/15 2:56 PM	30510	13.29	9.78	NR	day 57
	6/15/15 4:00 PM	29980	13.09	10.12	NR	day 71
	6/29/15 12:02 PM	30100	12.89	9.82	NR	day 85
	7/6/15 11:15 AM	30750	12.59	10.14	NR	day 92
	7/13/15 3:30 PM	31690	12.30	10.84	NR	Q3
	10/22/2015	30580	8.91	11.42	95.3	Q4
SVMW-10-150	3/24/15 8:15 AM	32760	11.69	9.16	NR	Q1
	4/2/15 9:00 AM	28030	12.36	7.26	NR	Baseline
	4/6/15 10:02 AM	29810	12.04	7.36	NR	day 1, round 1
	4/6/15 1:08 PM	30240	12.16	7.42	NR	day 1, round 2
	4/6/15 3:55 PM	30180	12.30	7.38	NR	day 1, round 3
	4/6/15 9:21 PM	27350	11.97	7.02	NR	night, round 1
	4/7/15 1:40 AM	26390	12.22	6.98	NR	night, round 2

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-10-150 (Continued)	4/7/15 8:51 AM	28030	12.16	7.14	NR	day 2, round 1
	4/7/15 12:18 PM	28390	12.32	7.12	NR	day 2, round 2
	4/8/15 8:42 AM	26410	12.16	6.92	NR	day 3
	4/9/15 9:13 AM	27610	12.38	7.16	54.7	day 4
	4/10/15 2:34 PM	27090	11.83	6.90	NR	day 5
	4/13/15 2:11 PM	26750	12.43	6.94	NR	day 8
	4/15/15 1:58 PM	26890	11.85	7.20	NR	day 10
	4/17/15 12:10 PM	27080	11.62	7.06	66.4	day 12
	4/20/15 2:54 PM	27060	11.56	7.24	NR	day 15
	4/22/15 2:42 PM	27260	11.67	7.06	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 11:02 AM	26870	12.08	6.86	NR	day 22
	5/4/15 3:12 PM	26680	11.02	7.40	NR	day 29
	5/11/15 3:39 PM	27110	10.71	7.30	NR	day 36
	5/12/15 11:45 AM	NR	NR	NR	82.5	No other measurements recorded
	5/18/15 1:33 PM	30660	10.61	8.42	NR	day 43
	5/26/15 2:36 PM	27260	10.19	7.58	NR	day 51
	6/1/15 3:00 PM	28030	8.83	8.12	NR	day 57
	6/15/15 4:04 PM	27590	9.63	8.04	NR	day 71
	6/29/15 12:07 PM	27520	7.73	8.82	NR	day 85
	7/6/15 11:20 AM	28000	8.25	8.80	NR	day 92
	7/13/15 3:38 PM	28620	7.34	9.86	NR	Q3
	10/22/2015	27280	6.90	10.02	99.9	Q4
SVMW-10-250	3/24/15 8:03 AM	12870	17.62	2.68	NR	Q1
	4/2/15 8:49 AM	11830	17.39	2.34	NR	Baseline
	4/6/15 10:18 AM	12200	16.91	2.34	NR	day 1, round 1
	4/6/15 1:15 PM	12550	16.75	2.32	NR	day 1, round 2
	4/6/15 4:02 PM	12600	17.04	2.36	NR	day 1, round 3
	4/6/15 9:02 PM	12020	16.71	2.32	NR	night, round 1
	4/7/15 1:27 AM	10800	17.08	2.28	NR	night, round 2
	4/7/15 9:02 AM	12160	16.99	2.38	NR	day 2, round 1
	4/7/15 12:26 PM	12300	16.90	2.32	NR	day 2, round 2
	4/8/15 8:50 AM	11810	16.82	2.34	NR	day 3
	4/9/15 9:29 AM	11790	17.07	2.44	NR	day 4
	4/10/15 2:42 PM	12260	16.78	2.36	NR	day 5
	4/13/15 2:20 PM	12380	17.33	2.42	NR	day 8
	4/15/15 2:05 PM	12440	17.14	2.56	NR	day 10
	4/17/15 12:18 PM	12300	16.45	2.50	NR	day 12
	4/20/15 3:01 PM	11980	16.30	2.50	NR	day 15
	4/22/15 2:56 PM	12670	16.12	2.52	NR	day 17
	NR	NR	NR	NR	NR	day 19, not recorded, stop work for lightning
	4/27/15 12:36 PM	6530	17.18	1.62	NR	day 22
	5/4/15 3:20 PM	8000	15.63	2.46	NR	day 29
	5/11/15 3:45 PM	9050	14.73	2.60	NR	day 36
	5/12/15 11:47 AM	NR	NR	NR	73.5	No other measurements recorded
	5/18/15 1:38 PM	11330	15.03	2.96	NR	day 43
	5/26/15 2:41 PM	11210	13.64	3.00	NR	day 51
	6/1/15 3:03 PM	11850	13.15	3.22	NR	day 57
	6/15/15 4:10 PM	12380	13.04	3.62	NR	day 71
	6/29/15 12:15 PM	12510	12.02	3.92	NR	day 85
	7/6/15 11:26 AM	12780	11.41	4.04	NR	day 92
	7/13/15 3:44 PM	13390	10.97	4.56	NR	Q3
	10/22/2015	13260	6.26	6.94	99.9	Q4
SVMW-11-050	3/18/15 4:05 PM	32760	12.82	8.78	NR	Q1
	4/2/15 11:02 AM	30520	12.73	6.78	NR	Baseline
	4/6/15 11:43 AM	32760	12.75	7.36	NR	day 1, round 1
	4/6/15 2:30 PM	32760	13.19	7.02	NR	day 1, round 2
	4/6/15 5:34 PM	32760	13.61	6.54	NR	day 1, round 3

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-11-050 (Continued)	4/6/15 11:40 PM	26100	14.31	5.18	NR	night, round 1
	4/7/15 5:22 AM	25450	13.83	5.76	NR	night, round 2
	4/7/15 10:17 AM	30680	13.17	6.26	NR	day 2, round 1
	4/7/15 2:01 PM	32760	12.99	6.84	NR	day 2, round 2
	4/8/15 12:47 PM	29800	13.33	6.08	NR	day 3
	4/9/15 2:46 PM	30000	12.67	6.46	NR	day 4
	4/10/15 8:56 AM	28030	12.39	7.04	NR	day 5
	4/13/15 10:05 AM	31150	11.86	7.18	NR	day 8
	4/15/15 8:40 AM	29570	12.12	6.86	NR	day 10
	4/17/15 8:39 AM	27330	12.01	7.20	NR	day 12
	5/12/15 3:39 PM	NR	NR	NR	61.3	No other measurements recorded
	7/14/15 11:17 AM	29090	3.12	11.90	NR	Q3
	10/22/2015	29370	0.39	14.40	98.6	Q4
SVMW-11-250	3/18/15 3:59 PM	32760	12.70	8.20	NR	Q1
	4/2/15 10:49 AM	27720	13.78	6.08	NR	Baseline
	4/6/15 11:55 AM	30340	12.48	6.68	NR	day 1, round 1
	4/6/15 2:41 PM	31270	12.91	6.56	NR	day 1, round 2
	4/6/15 5:43 PM	31090	12.61	6.48	NR	day 1, round 3
	4/6/15 11:22 PM	26520	12.97	5.96	NR	night, round 1
	4/7/15 5:07 AM	24290	13.47	5.72	NR	night, round 2
	4/7/15 10:28 AM	28560	12.52	6.46	NR	day 2, round 1
	4/7/15 2:10 PM	28210	12.98	6.02	NR	day 2, round 2
	4/8/15 12:39 PM	27820	12.64	6.20	NR	day 3
	4/9/15 2:53 PM	26470	13.01	5.94	NR	day 4
	4/10/15 8:45 AM	24080	12.96	6.00	NR	day 5
	4/13/15 9:52 AM	27410	11.79	6.78	NR	day 8
	4/15/15 8:58 AM	27380	11.78	6.76	NR	day 10
	4/17/15 8:54 AM	25000	11.54	6.74	NR	day 12
	5/12/15 3:42 PM	NR	NR	NR	59.6	No other measurements recorded
	7/14/15 11:33 AM	28790	2.37	11.38	NR	Q3
	10/22/2015	29060	0.13	13.80	96.5	Q4
SVMW-13-150	3/17/15 9:45 AM	178	19.87	0.90	NR	Q1
	4/2/15 12:28 PM	126	20.27	0.86	NR	Baseline
	4/6/15 2:10 PM	108	19.33	1.12	NR	day 1, round 1
	4/6/15 6:17 PM	101	18.83	1.42	NR	day 1, round 2
	4/7/15 12:32 AM	161	17.84	1.86	NR	night, round 1
	4/7/15 4:44 AM	164	18.41	1.86	NR	night, round 2
	4/7/15 12:00 PM	292	17.89	2.34	NR	day 2, round 1
	4/7/15 4:10 PM	305	17.77	2.30	NR	day 2, round 2
	4/8/15 11:47 AM	463	17.32	2.74	NR	day 3
	4/9/15 12:36 PM	586	16.90	3.08	21.4	day 4
	4/10/15 10:30 AM	539	17.22	2.78	NR	day 5
	4/13/15 3:17 PM	593	17.04	2.96	NR	day 8
	4/15/15 2:04 PM	416	17.87	2.66	NR	day 10
	4/17/15 1:48 PM	688	17.01	3.14	55.9	day 12
	4/20/15 11:03 AM	766	16.98	3.42	NR	day 15
	4/22/15 10:43 AM	806	16.73	3.46	NR	day 17
	4/24/15 8:36 AM	798	17.05	3.48	NR	day 19
	4/27/15 3:45 PM	834	16.79	3.46	NR	day 22
	5/4/15 11:08 AM	866	16.85	3.34	NR	day 29
	5/11/15 11:25 AM	785	16.78	3.32	NR	day 36
	5/12/15 11:53 AM	NR	NR	NR	68.3	No other measurements recorded
	5/18/15 8:48 AM	730	17.47	3.04	NR	day 43
	5/26/15 11:30 AM	893	16.75	3.28	NR	day 51
	6/1/15 10:56 AM	884	16.82	3.26	NR	day 57
	6/15/15 10:31 AM	885	16.47	3.36	NR	day 71
	6/29/15 10:51 AM	850	16.42	3.20	NR	day 85
	7/6/15 10:40 AM	621	16.34	3.10	NR	day 92

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
SVMW-13-150 (Continued)	7/14/15 3:28 PM	827	15.90	3.38	NR	Q3
	10/22/2015	677	15.92	3.18	99.3	Q4
KAFB-106108-150	3/17/15 8:16 AM	14	17.79	5.26	NR	Q1
	4/2/15 2:34 PM	7	18.33	2.94	NR	Baseline
	4/6/15 12:15 PM	2	18.39	4.10	NR	day 1, round 1
	4/6/15 7:04 PM	0	18.52	2.98	NR	day 1, round 2
	4/7/15 2:29 AM	0	18.29	3.42	NR	night, round 1
	4/7/15 6:40 AM	5	18.60	3.70	NR	night, round 2
	4/7/15 11:36 AM	7	18.21	4.22	NR	day 2, round 1
	4/7/15 3:22 PM	7	17.99	4.04	NR	day 2, round 2
	4/8/15 1:47 PM	1	18.75	2.70	NR	day 3
	4/9/15 2:02 PM	5	18.54	3.60	NR	day 4
	4/10/15 11:51 AM	5	18.42	4.28	NR	day 5
	4/13/15 11:53 AM	2	18.52	3.96	NR	day 8
	4/15/15 12:00 PM	2	18.49	3.06	NR	day 10
	4/17/15 11:04 AM	1	18.19	3.60	NR	day 12
	5/14/15 11:37 AM	NR	NR	NR	60.3	No other measurements recorded
	7/14/15 2:46 PM	2	18.67	2.64	NR	Q3
	10/23/2015	7	19.10	1.98	99.9	Q4
KAFB-106109-450	3/16/15 2:16 PM	14	19.90	0.88	NR	Q1
	4/2/15 4:25 PM	8	19.29	0.80	NR	Baseline
	4/6/15 12:09 PM	4	20.19	0.92	NR	day 1, round 1
	4/6/15 4:12 PM	0	20.19	0.88	NR	day 1, round 2
	4/6/15 10:51 PM	0	19.81	0.86	NR	night, round 1
	4/7/15 3:25 AM	0	20.80	0.82	NR	night, round 2
	4/7/15 10:07 AM	0	19.83	0.88	NR	day 2, round 1
	4/7/15 2:20 PM	0	20.08	0.88	NR	day 2, round 2
	4/8/15 11:28 AM	1	20.23	0.88	NR	day 3
	4/9/15 12:22 PM	0	20.35	0.80	NR	day 4
	4/10/15 10:56 AM	2	19.44	0.78	NR	day 5
	4/13/15 2:59 PM	0	20.17	0.82	NR	day 8
	4/15/15 2:38 PM	0	19.56	0.80	NR	day 10
	4/17/15 2:12 PM	6	22.00	0.80	NR	day 12
	5/14/15 11:57 AM	NR	NR	NR	60.5	-
	7/14/15 4:28 PM	0	20.10	0.72	NR	Q3
	10/23/2015	0	20.46	0.72	99.9	Q4
KAFB-106110-150	3/16/15 12:14 PM	41	19.05	2.86	NR	Q1
	4/2/15 4:06 PM	3	19.09	1.60	NR	Baseline
	4/6/15 12:22 PM	10	19.20	1.68	NR	day 1, round 1
	4/6/15 6:44 PM	3	19.07	1.48	NR	day 1, round 2
	4/7/15 2:44 AM	0	19.17	1.46	NR	night, round 1
	4/7/15 6:48 AM	0	19.26	1.46	NR	night, round 2
	4/7/15 11:17 AM	0	19.03	1.54	NR	day 2, round 1
	4/7/15 3:04 PM	9	19.01	1.66	NR	day 2, round 2
	4/8/15 1:55 PM	3	19.53	1.28	NR	day 3
	4/9/15 2:08 PM	1	19.35	1.36	NR	day 4
	4/10/15 12:03 PM	7	19.24	1.74	NR	day 5
	4/13/15 11:58 AM	3	19.56	1.54	NR	day 8
	4/15/15 12:07 PM	5	19.57	1.30	NR	day 10
	4/17/15 11:12 AM	3	19.21	1.28	NR	day 12
	5/14/15 12:05 PM	NR	NR	NR	59.0	No other measurements recorded
	7/14/15 3:11 PM	1	19.23	1.02	NR	Q3
	10/23/2015	2	19.66	0.80	99.9	Q4
KAFB-106111-150	3/16/15 9:42 AM	127	19.19	2.32	NR	Q1
	4/2/15 3:07 PM	82	18.16	2.24	NR	Baseline
	4/6/15 12:28 PM	67	18.68	2.30	NR	day 1, round 1
	4/6/15 6:53 PM	55	19.14	2.22	NR	day 1, round 2
	4/7/15 2:56 AM	54	19.49	2.10	NR	night, round 1

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106111-150 (Continued)	4/7/15 6:56 AM	54	19.38	2.10	NR	night, round 2
	4/7/15 11:21 AM	56	18.95	2.14	NR	day 2, round 1
	4/7/15 3:11 PM	56	18.99	2.20	NR	day 2, round 2
	4/8/15 2:02 PM	82	19.04	2.12	NR	day 3
	4/9/15 2:15 PM	51	19.50	1.94	NR	day 4
	4/10/15 12:11 PM	56	19.22	2.14	NR	day 5
	4/13/15 12:05 PM	55	19.11	2.06	NR	day 8
	4/15/15 12:14 PM	60	19.30	2.10	NR	day 10
	4/17/15 11:17 AM	51	19.13	2.04	NR	day 12
	5/14/15 12:10 PM	NR	NR	NR	69.7	No other measurements recorded
	7/14/15 2:11 PM	6	18.34	2.06	NR	Q3
	10/23/2015	2	18.60	2.16	99.9	Q4
KAFB-106111-350	3/16/15 9:17 AM	834	19.59	1.16	NR	Q1
	4/2/15 2:59 PM	724	18.29	1.08	NR	Baseline
	4/6/15 12:32 PM	687	18.83	1.14	NR	day 1, round 1
	4/6/15 6:56 PM	660	19.27	1.04	NR	day 1, round 2
	4/7/15 3:01 AM	641	19.86	1.00	NR	night, round 1
	4/7/15 7:00 AM	632	19.25	1.04	NR	night, round 2
	4/7/15 11:27 AM	627	19.20	1.04	NR	day 2, round 1
	4/7/15 3:14 PM	627	19.29	1.04	NR	day 2, round 2
	4/8/15 2:10 PM	495	19.24	0.96	NR	day 3
	4/9/15 2:18 PM	423	19.70	0.84	NR	day 4
	4/10/15 12:17 PM	535	19.73	0.96	NR	day 5
	4/13/15 12:15 PM	NA	NA	NA	NR	leaked atmosphere during purging
	4/15/15 12:19 PM	457	19.39	0.90	NR	day 10
	4/17/15 11:20 AM	365	19.42	0.76	NR	day 12
	5/14/15 12:12 PM	NR	NR	NR	61.0	No other measurements recorded
	7/14/15 2:23 PM	297	19.71	0.76	NR	Q3
	10/23/2015	144	19.95	0.68	99.9	Q4
KAFB-106112-250	3/19/15 2:43 PM	1	19.93	0.54	NR	Q1
	4/2/15 9:17 AM	6	19.59	0.56	NR	Baseline
	4/6/15 12:26 PM	2	20.50	0.52	NR	day 1, round 1
	4/6/15 4:30 PM	0	19.58	0.50	NR	day 1, round 2
	4/6/15 11:10 PM	16	19.37	0.52	NR	night, round 1
	4/7/15 3:41 AM	1	19.69	0.46	NR	night, round 2
	4/7/15 10:23 AM	5	19.53	0.54	NR	day 2, round 1
	4/7/15 2:40 PM	1	19.48	0.50	NR	day 2, round 2
	4/8/15 10:32 AM	0	19.40	0.54	NR	day 3
	4/9/15 10:49 AM	0	19.28	0.60	NR	day 4
	4/10/15 11:50 AM	46	19.83	0.78	NR	day 5
	4/13/15 2:02 PM	3	19.66	0.54	NR	day 8
	4/15/15 11:55 AM	3	19.02	0.58	NR	day 10
	4/17/15 12:46 PM	6	19.68	0.56	NR	day 12
	4/20/15 9:05 AM	0	19.37	0.60	NR	day 15
	4/22/15 8:38 AM	10	19.31	0.64	NR	day 17
	4/24/15 9:18 AM	14	19.87	0.82	NR	day 19
	4/27/15 1:36 PM	9	19.32	0.70	NR	day 22
	5/4/15 9:07 AM	2	19.52	0.58	NR	day 29
	5/11/15 9:05 AM	11	19.74	0.62	NR	day 36
	5/12/15 12:04 PM	NR	NR	NR	76.0	No other measurements recorded
	5/18/15 9:10 AM	3	20.17	0.56	NR	day 43
	5/26/15 9:24 AM	3	19.39	0.56	NR	day 51
	6/1/15 8:51 AM	0	19.53	0.52	NR	day 57
	6/15/15 8:15 AM	10	19.51	0.60	NR	day 71
	6/29/15 8:56 AM	9	19.67	0.52	NR	day 85
	7/6/15 9:01 AM	9	20.03	0.62	NR	day 92
	7/13/15 2:39 PM	2	19.50	0.54	NR	Q3
	10/19/2015	15	19.63	0.60	99.9	Q4

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106112-350	3/19/15 2:36 PM	4	20.25	0.62	NR	Q1
	4/2/15 9:07 AM	3	19.69	0.60	NR	Baseline
	4/6/15 12:36 PM	0	19.74	0.58	NR	day 1, round 1
	4/6/15 4:40 PM	2	19.68	0.60	NR	day 1, round 2
	4/6/15 11:16 PM	3	19.62	0.58	NR	night, round 1
	4/7/15 3:45 AM	0	20.33	0.56	NR	night, round 2
	4/7/15 10:34 AM	6	19.92	0.64	NR	day 2, round 1
	4/7/15 2:50 PM	1	19.97	0.60	NR	day 2, round 2
	4/8/15 10:28 AM	1	19.82	0.62	NR	day 3
	4/9/15 10:52 AM	0	19.80	0.66	NR	day 4
	4/10/15 11:55 AM	2	19.82	0.62	NR	day 5
	4/13/15 2:06 PM	4	20.22	0.62	NR	day 8
	4/15/15 11:59 AM	0	19.29	0.62	NR	day 10
	4/17/15 12:49 PM	6	20.47	0.56	NR	day 12
	4/20/15 9:09 AM	0	19.83	0.64	NR	day 15
	4/22/15 8:42 AM	4	19.87	0.54	NR	day 17
	4/24/15 9:23 AM	0	20.37	0.64	NR	day 19
	4/27/15 1:39 PM	1	19.87	0.60	NR	day 22
	5/4/15 9:11 AM	3	20.21	0.58	NR	day 29
	5/11/15 9:10 AM	7	20.28	0.56	NR	day 36
	5/12/15 12:06 PM	NR	NR	NR	77.8	No other measurements recorded
	5/18/15 9:15 AM	0	20.71	0.54	NR	day 43
	5/26/15 9:28 AM	0	20.09	0.54	NR	day 51
	6/1/15 8:55 AM	0	20.03	0.52	NR	day 57
	6/15/15 8:20 AM	0	20.25	0.52	NR	day 71
	6/29/15 8:59 AM	8	20.02	0.56	NR	day 85
	7/6/15 9:05 AM	1	20.03	0.56	NR	day 92
	7/13/15 2:47 PM	0	19.70	0.62	NR	Q3
	10/19/2015	0	19.88	0.64	99.9	Q4
KAFB-106112-450	3/19/15 2:28 PM	19	20.18	0.84	NR	Q1
	4/2/15 8:54 AM	2	19.80	0.64	NR	Baseline
	4/6/15 12:46 PM	1	20.15	0.70	NR	day 1, round 1
	4/6/15 4:51 PM	15	19.66	0.76	NR	day 1, round 2
	4/6/15 11:25 PM	21	19.72	0.72	NR	night, round 1
	4/7/15 3:53 AM	17	20.93	0.70	NR	night, round 2
	4/7/15 10:45 AM	18	20.15	0.72	NR	day 2, round 1
	4/7/15 3:06 PM	16	20.09	0.74	NR	day 2, round 2
	4/8/15 10:24 AM	20	19.91	0.78	NR	day 3
	4/9/15 11:03 AM	22	19.92	0.68	NR	day 4
	4/10/15 11:50 AM	46	19.83	0.78	NR	day 5
	4/13/15 2:16 PM	39	19.97	0.70	NR	day 8
	4/15/15 12:10 PM	89	19.12	0.88	NR	day 10
	4/17/15 1:00 PM	32	20.26	0.70	NR	day 12
	4/20/15 9:23 AM	93	20.11	0.80	NR	day 15
	4/22/15 8:46 AM	53	20.01	0.72	NR	day 17
	4/24/15 9:38 AM	76	20.35	0.86	NR	day 19
	4/27/15 1:52 PM	131	20.16	0.72	NR	day 22
	5/4/15 9:26 AM	154	20.25	0.82	NR	day 29
	5/11/15 9:21 AM	56	20.29	0.68	NR	day 36
	5/12/15 12:17 PM	NR	NR	NR	80.2	No other measurements recorded
	5/18/15 9:25 AM	125	20.80	0.72	NR	day 43
	5/26/15 9:41 AM	182	20.19	0.78	NR	day 51
	6/1/15 9:08 AM	185	19.86	0.86	NR	day 57
	6/15/15 8:34 AM	187	20.12	0.80	NR	day 71
	6/29/15 9:13 AM	107	20.10	0.76	NR	day 85
	7/6/15 9:16 AM	127	19.96	0.78	NR	day 92
	7/13/15 3:05 PM	169	19.55	0.96	NR	Q3
	10/19/2015	28	20.16	0.66	90.0	Q4

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106113-350	3/11/15 10:38 AM	3	20.21	0.40	NR	Q1
	4/2/15 10:40 AM	4	20.08	0.42	NR	Baseline
	4/6/15 12:56 PM	3	20.14	0.42	NR	day 1, round 1
	4/6/15 4:59 PM	0	20.31	0.40	NR	day 1, round 2
	4/6/15 11:40 PM	3	20.45	0.12	NR	night, round 1
	4/7/15 4:00 AM	5	20.43	0.36	NR	night, round 2
	4/7/15 11:00 AM	0	20.55	0.32	NR	day 2, round 1
	4/7/15 3:23 PM	0	19.97	0.38	NR	day 2, round 2
	4/8/15 9:14 AM	1	20.39	0.40	NR	day 3
	4/9/15 9:45 AM	0	19.84	0.42	NR	day 4
	4/10/15 2:23 PM	0	20.01	0.42	NR	day 5
	4/13/15 12:29 PM	8	20.03	0.36	NR	day 8
	4/15/15 11:15 AM	0	21.06	0.44	NR	day 10
	4/17/15 12:08 PM	0	19.98	0.34	NR	day 12
	4/20/15 9:31 AM	0	20.47	0.38	NR	day 15
	4/22/15 9:06 AM	0	20.30	0.40	NR	day 17
	4/24/15 9:45 AM	1	20.46	0.42	NR	day 19
	4/27/15 2:01 PM	4	20.67	0.38	NR	day 22
	5/4/15 9:35 AM	1	20.03	0.38	NR	day 29
	5/11/15 9:32 AM	0	20.43	0.38	NR	day 36
	5/12/15 12:24 PM	NR	NR	NR	69.1	No other measurements recorded
	5/18/15 10:19 AM	2	20.12	0.40	NR	day 43
	5/26/15 9:56 AM	0	20.15	0.32	NR	day 51
	6/1/15 9:17 AM	0	20.25	0.42	NR	day 57
	6/15/15 11:28 AM	8	20.68	0.42	NR	day 71
	6/29/15 9:21 AM	6	20.55	0.44	NR	day 85
	7/6/15 9:24 AM	2	20.81	0.38	NR	day 92
	7/8/15 1:27 PM	2	20.51	0.38	NR	Q3
	10/13/2015	1	20.21	0.40	NR	Q4
KAFB-106113-450	3/11/15 10:28 AM	56	20.44	0.56	NR	Q1
	4/2/15 10:27 AM	146	20.67	0.16	NR	Baseline
	4/6/15 1:12 PM	42	20.16	0.54	NR	day 1, round 1
	4/6/15 5:20 PM	34	21.04	0.50	NR	day 1, round 2
	4/6/15 11:49 PM	37	20.36	0.52	NR	night, round 1
	4/7/15 4:09 AM	37	20.41	0.48	NR	night, round 2
	4/7/15 11:11 AM	35	20.18	0.52	NR	day 2, round 1
	4/7/15 3:34 PM	37	19.99	0.52	NR	day 2, round 2
	4/8/15 9:10 AM	35	20.50	0.54	NR	day 3
	4/9/15 9:57 AM	34	20.19	0.54	NR	day 4
	4/10/15 2:19 PM	30	20.01	0.54	NR	day 5
	4/13/15 12:41 PM	32	20.18	0.50	NR	day 8
	4/15/15 11:26 AM	38	20.80	0.56	NR	day 10
	4/17/15 12:18 PM	33	20.50	0.46	NR	day 12
	4/20/15 9:44 AM	45	20.39	0.58	NR	day 15
	4/22/15 9:21 AM	40	20.54	0.56	NR	day 17
	4/24/15 10:01 AM	50	20.52	0.58	NR	day 19
	4/27/15 2:14 PM	53	20.92	0.50	NR	day 22
	5/4/15 9:52 AM	58	20.57	0.58	NR	day 29
	5/11/15 9:44 AM	64	20.85	0.54	NR	day 36
	5/12/15 12:37 PM	NR	NR	NR	72.8	No other measurements recorded
	5/18/15 10:30 AM	85	20.04	0.54	NR	day 43
	5/26/15 10:11 AM	98	20.72	0.52	NR	day 51
	6/1/15 9:32 AM	115	20.34	0.52	NR	day 57
	6/15/15 11:40 AM	150	20.25	0.54	NR	day 71
	6/29/15 9:36 AM	148	20.48	0.54	NR	day 85
	7/6/15 9:35 AM	164	21.13	0.54	NR	day 92
	7/8/15 1:39 PM	176	20.89	0.52	NR	Q3
	10/13/2015	180	20.46	0.54	50.6	Q4

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106114-350	3/12/15 9:01 AM	1	20.14	0.24	NR	Q1
	4/2/15 11:17 AM	0	19.16	0.22	NR	Baseline
	4/6/15 11:36 AM	2	19.31	0.20	NR	day 1, round 1
	4/6/15 6:01 PM	1	19.00	0.22	NR	day 1, round 2
	4/7/15 1:18 AM	2	19.54	0.20	NR	night, round 1
	4/7/15 5:49 AM	2	19.12	0.20	NR	night, round 2
	4/7/15 10:37 AM	0	18.55	0.20	NR	day 2, round 1
	4/7/15 2:25 PM	0	18.86	0.20	NR	day 2, round 2
	4/8/15 12:59 PM	0	19.41	0.22	NR	day 3
	4/9/15 1:23 PM	0	19.14	0.16	NR	day 4
	4/10/15 11:19 AM	0	19.50	0.20	NR	day 5
	4/13/15 11:00 AM	0	18.13	0.20	NR	day 8
	4/15/15 11:14 AM	3	19.17	0.22	NR	day 10
	4/17/15 9:13 AM	0	19.48	0.18	NR	day 12
	4/20/15 12:25 PM	0	19.04	0.20	NR	day 15
	4/22/15 3:56 PM	8	18.91	0.22	NR	day 17
	4/24/15 1:30 PM	1	19.48	0.20	NR	day 19
	4/27/15 8:27 AM	5	19.18	0.20	NR	day 22
	5/4/15 11:43 AM	3	19.33	0.20	NR	day 29
	5/11/15 12:33 PM	0	19.97	0.20	NR	day 36
	5/12/15 12:40 PM	NR	NR	NR	75.0	No other measurements recorded
	5/18/15 1:03 PM	3	19.10	0.20	NR	day 43
	5/26/15 12:08 PM	0	19.56	0.20	NR	day 51
	6/1/15 12:28 PM	0	19.03	0.20	NR	day 57
	6/15/15 1:07 PM	1	19.78	0.20	NR	day 71
	6/29/15 1:31 PM	2	20.45	0.24	NR	day 85
	7/6/15 12:40 PM	1	20.46	0.24	NR	day 92
	7/8/15 10:48 AM	0	19.14	0.22	NR	Q3
	10/13/2015	0	18.68	0.20	45.7	Q4
KAFB-106114-450	3/12/15 8:52 AM	23	17.90	0.36	NR	Q1
	4/2/15 11:06 AM	33	17.87	0.34	NR	Baseline
	4/6/15 11:49 AM	32	18.02	0.34	NR	day 1, round 1
	4/6/15 6:13 PM	16	17.60	0.30	NR	day 1, round 2
	4/7/15 1:34 AM	48	18.09	0.34	NR	night, round 1
	4/7/15 6:05 AM	56	17.86	0.34	NR	night, round 2
	4/7/15 10:50 AM	84	17.55	0.38	NR	day 2, round 1
	4/7/15 2:38 PM	129	17.47	0.38	NR	day 2, round 2
	4/8/15 1:11 PM	152	17.67	0.38	NR	day 3
	4/9/15 1:35 PM	184	18.05	0.34	NR	day 4
	4/10/15 11:37 AM	263	17.54	0.42	NR	day 5
	4/13/15 11:13 AM	208	18.49	0.34	NR	day 8
	4/15/15 11:27 AM	328	17.77	0.42	NR	day 10
	4/17/15 9:27 AM	313	18.05	0.48	NR	day 12
	4/20/15 12:38 PM	388	17.74	0.44	NR	day 15
	4/22/15 4:16 PM	443	17.73	0.44	NR	day 17
	4/24/15 1:33 PM	433	18.31	0.46	NR	day 19
	4/27/15 8:53 AM	471	18.36	0.46	NR	day 22
	5/4/15 11:58 AM	467	17.97	0.38	NR	day 29
	5/11/15 12:46 PM	392	18.12	0.42	NR	day 36
	5/12/15 12:54 PM	NR	NR	NR	73.6	No other measurements recorded
	5/18/15 1:16 PM	482	18.18	0.44	NR	day 43
	5/26/15 12:21 PM	508	18.43	0.30	NR	day 51
	6/1/15 12:43 PM	550	18.24	0.44	NR	day 57
	6/15/15 1:20 PM	500	18.78	0.42	NR	day 71
	6/29/15 1:42 PM	656	18.06	0.48	NR	day 85
	7/6/15 12:53 PM	588	18.22	0.46	NR	day 92
	7/8/15 11:03 AM	677	18.15	0.46	NR	Q3
	10/13/2015	669	17.70	0.48	45.5	Q4

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106115-150	3/11/15 3:45 PM	8	19.72	1.92	NR	Q1
	4/2/15 10:00 AM	6	18.76	1.50	NR	Baseline
	4/6/15 9:30 AM	0	18.94	1.44	NR	day 1, round 1
	4/6/15 3:27 PM	0	18.85	1.38	NR	day 1, round 2
	4/6/15 9:59 PM	0	19.06	1.32	NR	night, round 1
	4/7/15 3:28 AM	0	19.15	1.26	NR	night, round 2
	4/7/15 8:12 AM	5	19.24	1.32	NR	day 2, round 1
	4/7/15 12:18 PM	1	18.70	1.52	NR	day 2, round 2
	4/8/15 10:41 AM	1	19.10	1.18	NR	day 3
	4/9/15 11:07 AM	1	19.14	1.10	NR	day 4
	4/10/15 8:32 AM	0	19.12	1.44	NR	day 5
	4/13/15 8:59 AM	8	20.22	1.12	NR	day 8
	4/15/15 8:47 AM	0	19.15	1.32	NR	day 10
	4/17/15 8:14 AM	1	19.21	1.08	NR	day 12
	5/14/15 9:50 AM	NR	NR	NR	75.8	No other measurements recorded
	7/10/15 10:13 AM	1	19.62	1.08	NR	Q3
	10/13/2015	3	19.29	1.12	58.5	Q4
KAFB-106115-450	3/11/15 3:15 PM	1092	19.28	0.86	NR	Q1
	4/2/15 9:47 AM	62	20.49	0.18	NR	Baseline, all parameters verified against photo
	4/6/15 9:43 AM	959	20.15	0.86	NR	round 1 shutdown
	4/6/15 3:42 PM	903	19.56	0.78	NR	round 2 shutdown
	4/6/15 8:18 PM	895	19.66	0.84	NR	night, round 1
	4/7/15 3:41 AM	899	19.85	0.78	NR	night, round 2
	4/7/15 8:33 AM	902	19.38	0.84	NR	day 2, round 1
	4/7/15 12:31 PM	892	19.70	0.82	NR	day 2, round 2
	4/8/15 10:53 AM	902	19.63	0.86	NR	day 3
	4/9/15 11:19 AM	852	19.90	0.78	NR	day 4
	4/10/15 8:45 AM	914	20.45	0.88	NR	day 5
	4/13/15 9:12 AM	877	19.51	0.82	NR	day 8
	4/15/15 9:06 AM	914	19.52	0.86	NR	day 10
	4/17/15 8:28 AM	864	19.63	0.82	NR	day 12
	5/14/15 10:03 AM	NR	NR	NR	71.7	No other measurements recorded
	7/10/15 10:33 AM	919	19.69	0.82	NR	Q3
	10/13/2015	894	19.47	0.84	43.0	Q4
KAFB-106116-050	3/12/15 2:14 PM	38	19.85	0.48	NR	Q1
	4/2/15 4:51 PM	22	20.18	0.46	NR	Baseline
	4/6/15 1:23 PM	6	20.30	0.48	NR	day 1, round 1
	4/6/15 5:36 PM	0	20.17	0.44	NR	day 1, round 2
	4/6/15 11:59 PM	0	20.27	0.44	NR	night, round 1
	4/7/15 4:20 AM	0	20.40	0.46	NR	night, round 2
	4/7/15 11:21 AM	0	19.54	0.42	NR	day 2, round 1
	4/7/15 3:46 PM	0	19.92	0.44	NR	day 2, round 2
	4/8/15 9:43 AM	3	20.42	0.44	NR	day 3
	4/9/15 10:05 AM	0	20.52	0.46	NR	day 4
	4/10/15 1:30 PM	0	20.24	0.40	NR	day 5
	4/13/15 12:51 PM	0	20.57	0.40	NR	day 8
	4/15/15 1:10 PM	8	20.63	0.48	NR	day 10
	4/17/15 1:05 PM	2	20.15	0.44	NR	day 12
	5/14/15 9:41 AM	NR	NR	NR	76.4	No other measurements recorded
	7/8/15 3:53 PM	10	20.15	0.48	NR	Q3
	10/13/2015	3	20.24	0.42	58.8	Q4
KAFB-106116-150	3/12/15 2:03 PM	2	19.44	0.74	NR	Q1
	4/2/15 4:46 PM	1	19.81	0.72	NR	Baseline
	4/6/15 1:30 PM	1	19.85	0.74	NR	day 1, round 1
	4/6/15 5:45 PM	3	19.74	0.70	NR	day 1, round 2
	4/7/15 12:04 AM	0	20.00	0.68	NR	night, round 1
	4/7/15 4:24 AM	0	19.86	0.70	NR	night, round 2
	4/7/15 11:30 AM	0	19.01	0.66	NR	day 2, round 1

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106116-150 (Continued)	4/7/15 3:51 PM	3	19.42	0.68	NR	day 2, round 2
	4/8/15 9:39 AM	1	19.84	0.68	NR	day 3
	4/9/15 10:08 AM	0	19.96	0.68	NR	day 4
	4/10/15 1:27 PM	0	21.27	0.00	NR	day 5, sample system checked again and
	4/13/15 12:54 PM	0	20.15	0.66	NR	day 8
	4/15/15 1:14 PM	4	19.85	0.66	NR	day 10
	4/17/15 1:08 PM	2	19.68	0.66	NR	day 12
	5/14/15 9:45 AM	NR	NR	NR	76.6	No other measurements recorded
	7/8/15 3:56 PM	4	19.93	0.64	NR	Q3
	10/13/2015	1	20.02	0.60	47.8	Q4
KAFB-106116-350	3/12/15 1:48 PM	6	19.21	0.82	NR	Q1
	4/2/15 4:41 PM	4	19.33	0.78	NR	Baseline
	4/6/15 1:40 PM	2	19.33	0.76	NR	day 1, round 1
	4/6/15 5:56 PM	7	19.25	0.76	NR	day 1, round 2
	4/7/15 12:10 AM	5	19.42	0.78	NR	night, round 1
	4/7/15 4:28 AM	2	19.43	0.76	NR	night, round 2
	4/7/15 11:39 AM	0	18.51	0.74	NR	day 2, round 1
	4/7/15 3:54 PM	5	18.94	0.72	NR	day 2, round 2
	4/8/15 9:35 AM	6	19.38	0.76	NR	day 3
	4/9/15 10:11 AM	2	19.53	0.78	NR	day 4
	4/10/15 1:22 PM	0	21.33	0.00	NR	day 5, tested sample system, no leak, verified
	4/13/15 12:57 PM	0	19.68	0.64	NR	day 8
	4/15/15 1:17 PM	8	19.14	0.72	NR	day 10
	4/17/15 1:11 PM	3	19.43	0.66	NR	day 12
	4/20/15 9:50 AM	3	19.72	0.80	NR	day 15
	4/22/15 9:30 AM	0	19.42	0.70	NR	day 17
	4/24/15 10:30 AM	0	19.78	0.76	NR	day 19
	4/27/15 2:33 PM	5	19.53	0.68	NR	day 22
	5/4/15 9:59 AM	7	20.02	0.76	NR	day 29
	5/11/15 9:50 AM	4	20.06	0.72	NR	day 36
	5/12/15 1:02 PM	NR	NR	NR	69.5	No other measurements recorded
	5/18/15 9:33 AM	7	19.49	0.66	NR	day 43
	5/26/15 10:20 AM	1	20.16	0.66	NR	day 51
	6/1/15 9:41 AM	3	20.09	0.66	NR	day 57
	6/15/15 10:41 AM	11	19.91	0.64	NR	day 71
	6/29/15 9:42 AM	7	19.83	0.68	NR	day 85
	7/6/15 9:42 AM	8	20.61	0.66	NR	day 92
	7/8/15 4:03 PM	6	19.59	0.66	NR	Q3
	10/13/2015	12	19.66	0.66	NR	Q4
KAFB-106116-450	3/12/15 1:40 PM	53	20.70	0.52	NR	Q1
	4/2/15 11:41 AM	18	20.38	0.36	NR	Baseline
	4/6/15 1:52 PM	24	20.21	0.46	NR	day 1, round 1
	4/6/15 6:07 PM	24	20.05	0.46	NR	day 1, round 2
	4/7/15 12:20 AM	23	20.36	0.46	NR	night, round 1
	4/7/15 4:37 AM	23	20.22	0.46	NR	night, round 2
	4/7/15 11:47 AM	28	20.19	0.48	NR	day 2, round 1
	4/7/15 4:02 PM	37	19.57	0.46	NR	day 2, round 2
	4/8/15 9:29 AM	50	20.16	0.54	NR	day 3
	4/9/15 10:21 AM	56	20.48	0.48	NR	day 4
	4/10/15 1:10 PM	0	21.21	0.00	NR	day 5, bump tested horiba, tested sample
	4/13/15 1:11 PM	90	20.48	0.38	NR	day 8
	4/15/15 1:29 PM	235	19.49	0.50	NR	day 10
	4/17/15 1:22 PM	105	20.22	0.38	NR	day 12
	4/20/15 10:03 AM	304	19.93	0.52	NR	day 15
	4/22/15 9:43 AM	271	19.92	0.52	NR	day 17
	4/24/15 10:44 AM	261	19.86	0.56	NR	day 19
	4/27/15 2:46 PM	328	20.21	0.50	NR	day 22
	5/4/15 10:13 AM	462	19.88	0.56	NR	day 29

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106116-450 (Continued)	5/11/15 10:03 AM	315	19.91	0.50	NR	day 36
	5/12/15 1:15 PM	NR	NR	NR	68.4	No other measurements recorded
	5/18/15 9:45 AM	514	19.55	0.56	NR	day 43
	5/26/15 10:33 AM	618	19.68	0.58	NR	day 51
	6/1/15 9:53 AM	652	19.71	0.60	NR	day 57
	6/15/15 10:55 AM	573	19.86	0.60	NR	day 71
	6/29/15 9:57 AM	706	19.54	0.66	NR	day 85
	7/6/15 9:55 AM	714	19.72	0.66	NR	day 92
	7/8/15 4:16 PM	789	19.26	0.78	NR	Q3
	10/13/2015	724	19.36	0.68	36.2	Q4
KAFB-106117-150	3/12/15 12:31 PM	2	19.88	2.12	NR	Q1
	4/2/15 3:44 PM	3	19.38	1.48	NR	Baseline
	4/6/15 11:08 AM	0	19.60	1.56	NR	day 1, round 1
	4/6/15 4:49 PM	0	19.40	1.52	NR	day 1, round 2
	4/6/15 11:40 PM	0	19.96	1.52	NR	night, round 1
	4/7/15 4:50 AM	0	20.07	1.52	NR	night, round 2
	4/7/15 9:39 AM	0	19.87	1.48	NR	day 2, round 1
	4/7/15 1:22 PM	1	19.60	1.58	NR	day 2, round 2
	4/8/15 12:07 PM	0	20.17	1.56	NR	day 3
	4/9/15 12:32 PM	1	20.97	0.02	NR	appears that atmosphere was measured based
	4/10/15 1:35 PM	0	19.32	1.76	NR	day 5
	4/13/15 10:06 AM	0	19.90	1.52	NR	day 8
	4/15/15 10:12 AM	2	19.94	1.66	NR	day 10
	4/17/15 10:03 AM	1	19.80	1.64	NR	day 12
	5/14/15 9:26 AM	NR	NR	NR	74.3	No other measurements recorded
	7/8/15 9:37 AM	3	19.76	1.74	NR	Q3
	10/12/2015	2	18.37	1.98	46.8	Q4
KAFB-106117-350	3/12/15 12:13 PM	243	18.66	2.78	NR	Q1
	4/2/15 3:37 PM	259	17.72	2.70	NR	Baseline
	4/6/15 11:12 AM	227	18.04	2.70	NR	day 1, round 1
	4/6/15 4:56 PM	256	17.99	2.68	NR	day 1, round 2
	4/6/15 11:45 PM	256	18.70	2.66	NR	night, round 1
	4/7/15 4:54 AM	243	18.64	2.64	NR	night, round 2
	4/7/15 9:43 AM	272	18.84	2.62	NR	day 2, round 1
	4/7/15 1:25 PM	274	18.01	2.64	NR	day 2, round 2
	4/8/15 12:12 PM	277	18.59	2.62	NR	day 3
	4/9/15 12:36 PM	269	18.48	2.40	NR	day 4
	4/10/15 1:40 PM	293	17.93	2.60	NR	day 5
	4/13/15 10:09 AM	296	18.11	2.64	NR	day 8
	4/15/15 10:16 AM	267	18.23	2.64	NR	day 10
	4/17/15 10:07 AM	288	18.10	2.68	NR	day 12
	4/20/15 12:44 PM	346	17.66	2.72	NR	day 15
	4/22/15 2:28 PM	324	17.66	2.64	NR	day 17
	4/24/15 2:46 PM	325	17.46	2.66	NR	day 19
	4/27/15 8:51 AM	272	18.18	2.50	NR	day 22
	5/4/15 12:13 PM	318	17.38	2.60	NR	day 29
	5/11/15 12:54 PM	216	16.17	2.40	NR	day 36
	5/12/15 1:17 PM	NR	NR	NR	64.4	No other measurements recorded
	5/18/15 12:21 PM	252	15.99	2.58	NR	day 43
	5/26/15 12:30 PM	237	16.25	2.42	NR	day 51
	6/1/15 12:51 PM	220	16.93	2.48	NR	day 57
	6/15/15 1:29 PM	225	14.86	2.56	NR	day 71
	6/29/15 1:50 PM	223	16.16	2.80	NR	day 85
	7/6/15 12:58 PM	360	14.47	3.38	NR	day 92
	7/8/15 9:49 AM	333	14.53	3.54	NR	Q3
	10/12/2015	378	12.37	6.60	39.3	Q4
KAFB-106117-450	3/12/15 12:02 PM	19	20.00	0.66	NR	Q1
	4/2/15 12:02 PM	28	20.26	0.64	NR	Baseline

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106117-450 (Continued)	4/6/15 11:25 AM	12	20.01	0.58	NR	day 1, round 1
	4/6/15 5:08 PM	20	20.08	0.60	NR	day 1, round 2
	4/7/15 12:05 AM	48	20.89	0.58	NR	night, round 1
	4/7/15 5:07 AM	69	20.57	0.58	NR	night, round 2
	4/7/15 9:57 AM	99	20.67	0.62	NR	day 2, round 1
	4/7/15 1:45 PM	113	19.97	0.62	NR	day 2, round 2
	4/8/15 12:23 PM	118	20.17	0.60	NR	day 3
	4/9/15 12:48 PM	143	19.75	0.54	NR	day 4
	4/10/15 1:53 PM	214	19.87	0.56	NR	day 5
	4/13/15 10:23 AM	233	19.63	0.64	NR	day 8
	4/15/15 10:33 AM	302	19.91	0.62	NR	day 10
	4/17/15 10:25 AM	370	19.52	0.64	NR	day 12
	4/20/15 12:57 PM	404	19.52	0.64	NR	day 15
	4/22/15 5:09 PM	487	19.03	0.66	NR	day 17
	4/24/15 3:04 PM	485	19.31	0.68	NR	day 19
	4/27/15 9:08 AM	391	20.30	0.50	NR	day 22
	5/4/15 12:30 PM	659	18.65	0.84	NR	day 29
	5/11/15 1:06 PM	657	18.63	0.78	NR	day 36
	5/12/15 1:34 PM	NR	NR	NR	73.4	No other measurements recorded
	5/18/15 12:34 PM	827	17.89	0.98	NR	day 43
	5/26/15 12:43 PM	901	17.68	1.08	NR	day 51
	6/1/15 1:04 PM	1072	16.25	1.38	NR	day 57
	6/15/15 1:41 PM	1146	15.79	1.62	NR	day 71
	6/29/15 2:01 PM	1346	14.44	2.22	NR	day 85
	7/6/15 1:09 PM	1536	13.37	2.74	NR	day 92
	7/8/15 10:04 AM	1637	12.97	2.98	NR	Q3
	10/12/2015	1990	10.72	4.36	41.1	Q4
KAFB-106119-150	3/17/15 4:28 PM	62	16.07	5.90	NR	Q1
	4/2/15 4:31 PM	418	14.34	5.34	NR	Baseline
	4/6/15 10:35 AM	457	16.22	5.58	NR	day 1, round 1
	4/6/15 5:20 PM	456	15.35	5.60	NR	day 1, round 2
	4/7/15 12:31 AM	482	15.56	5.26	NR	night, round 1
	4/7/15 5:18 AM	484	14.97	5.50	NR	night, round 2
	4/7/15 10:04 AM	341	15.87	5.52	NR	day 2, round 1
	4/7/15 1:52 PM	330	15.55	5.34	NR	day 2, round 2
	4/8/15 12:32 PM	532	15.24	5.44	NR	day 3
	4/9/15 12:56 PM	411	15.82	4.82	NR	day 4
	4/10/15 10:43 AM	NR	NR	NR	NR	day 5, horiba reset during reading of well gas
	4/13/15 10:31 AM	353	16.36	5.30	NR	day 8
	4/15/15 10:40 AM	425	15.26	5.34	NR	day 10
	4/17/15 10:32 AM	362	14.79	5.38	NR	day 12
	4/20/15 1:03 PM	391	14.59	5.46	NR	day 15
	4/22/15 5:22 PM	406	14.57	5.06	NR	day 17
	4/24/15 3:10 PM	405	14.57	5.04	NR	day 19
	4/27/15 9:17 AM	373	15.03	4.66	NR	day 22
	5/4/15 12:46 PM	176	14.94	5.38	NR	rechecked as well, verified correct.
	5/11/15 1:32 PM	105	14.82	5.32	NR	day 36
	5/12/15 1:39 PM	NR	NR	NR	62.5	No other measurements recorded
	5/18/15 11:58 AM	69	15.43	5.72	NR	day 43
	5/26/15 12:51 PM	54	15.03	5.28	NR	day 51
	6/1/15 1:13 PM	215	14.82	5.36	NR	day 57
	6/15/15 1:50 PM	31	14.48	5.34	NR	photo. HC looked low.
	6/29/15 2:38 PM	307	14.28	5.34	NR	day 85
	7/6/15 1:18 PM	45	13.73	5.68	NR	day 92
	7/8/15 2:06 PM	30	13.38	5.84	NR	Q3
	10/13/2015	77	13.99	6.00	NR	Q4
KAFB-106119-250	3/17/15 4:15 PM	284	16.70	2.76	NR	Q1
	4/2/15 4:23 PM	248	15.93	2.50	NR	Baseline

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106119-250 (Continued)	4/6/15 10:40 AM	205	16.80	2.40	NR	day 1, round 1
	4/6/15 5:32 PM	220	16.86	2.62	NR	day 1, round 2
	4/7/15 12:36 AM	236	17.12	2.52	NR	night, round 1
	4/7/15 5:21 AM	252	16.47	2.78	NR	night, round 2
	4/7/15 10:07 AM	254	17.42	2.78	NR	day 2, round 1
	4/7/15 1:56 PM	256	16.29	2.82	NR	day 2, round 2
	4/8/15 12:36 PM	428	16.11	3.20	NR	day 3
	4/9/15 12:59 PM	368	16.31	2.84	NR	day 4
	4/10/15 10:50 AM	345	15.80	3.12	NR	day 5
	4/13/15 10:35 AM	449	16.82	3.38	NR	day 8
	4/15/15 10:46 AM	536	15.62	3.58	NR	day 10
	4/17/15 10:38 AM	543	15.47	3.66	NR	day 12
	4/20/15 1:07 PM	557	15.51	3.70	NR	day 15
	4/22/15 5:26 PM	633	15.32	3.70	NR	day 17
	4/24/15 3:50 PM	622	15.75	3.70	NR	day 19
	4/27/15 9:22 AM	598	15.91	3.64	NR	day 22
	5/4/15 12:50 PM	528	15.69	3.60	NR	day 29
	5/11/15 1:36 PM	438	15.83	3.52	NR	day 36
	5/12/15 1:41 PM	NR	NR	NR	65.1	No other measurements recorded
	5/18/15 12:01 PM	432	16.33	3.74	NR	day 43
	5/26/15 12:55 PM	423	15.82	3.48	NR	day 51
	6/1/15 1:16 PM	377	15.51	3.48	NR	day 57
	6/15/15 1:53 PM	354	15.32	3.62	NR	day 71
	6/29/15 2:41 PM	284	15.25	3.50	NR	day 85
	7/6/15 1:22 PM	277	15.08	3.76	NR	day 92
	7/8/15 2:12 PM	280	14.75	3.92	NR	Q3
	10/13/2015	198	14.28	4.14	42.7	Q4
KAFB-106119-350	3/17/15 3:54 PM	6	20.24	0.62	NR	Q1
	4/2/15 4:16 PM	4	18.57	0.46	NR	Baseline
	4/6/15 10:45 AM	1	19.05	0.54	NR	day 1, round 1
	4/6/15 5:37 PM	5	19.04	0.54	NR	day 1, round 2
	4/7/15 12:40 AM	3	19.95	0.38	NR	night, round 1
	4/7/15 5:25 AM	5	19.29	0.54	NR	night, round 2
	4/7/15 10:14 AM	6	19.06	0.54	NR	day 2, round 1
	4/7/15 1:58 PM	2	19.21	0.54	NR	day 2, round 2
	4/8/15 12:39 PM	2	19.24	0.54	NR	day 3
	4/9/15 1:03 PM	5	19.29	0.48	NR	day 4
	4/10/15 10:54 AM	5	19.47	0.54	NR	day 5
	4/13/15 10:38 AM	10	20.68	0.56	NR	day 8
	4/15/15 10:51 AM	14	19.19	0.56	NR	day 10
	4/17/15 10:42 AM	12	19.17	0.52	NR	day 12
	4/20/15 1:10 PM	19	19.23	0.56	NR	day 15
	4/22/15 5:30 PM	16	19.15	0.54	NR	day 17
	4/24/15 3:54 PM	9	19.74	0.52	NR	day 19
	4/27/15 9:27 AM	15	19.69	0.54	NR	day 22
	5/4/15 12:53 PM	43	19.25	0.56	NR	day 29
	5/11/15 1:39 PM	75	19.49	0.62	NR	day 36
	5/12/15 1:44 PM	NR	NR	NR	66.5	No other measurements recorded
	5/18/15 12:04 PM	106	20.14	0.68	NR	day 43
	5/26/15 1:00 PM	104	19.14	0.60	NR	day 51
	6/1/15 1:20 PM	228	19.07	0.70	NR	day 57
	6/15/15 1:56 PM	190	19.14	0.70	NR	day 71
	6/29/15 2:45 PM	436	19.06	0.70	NR	day 85
	7/6/15 1:25 PM	354	19.09	0.74	NR	day 92
	7/8/15 2:17 PM	400	18.73	0.82	NR	Q3
	10/13/2015	1006	18.22	1.14	43.9	Q4
KAFB-106119-450	3/17/15 3:38 PM	2	20.43	0.62	NR	Q1
	4/2/15 12:20 PM	1	21.24	0.00	NR	Baseline

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106119-450 (Continued)	4/6/15 10:59 AM	0	19.90	0.00	NR	day 1, round 1
	4/6/15 5:50 PM	4	19.58	0.62	NR	day 1, round 2
	4/7/15 12:57 AM	1	19.69	0.66	NR	night, round 1
	4/7/15 5:38 AM	1	19.93	0.70	NR	night, round 2
	4/7/15 10:28 AM	1	19.26	0.72	NR	day 2, round 1
	4/7/15 2:16 PM	1	19.77	0.78	NR	day 2, round 2
	4/8/15 12:52 PM	1	19.64	0.84	NR	day 3
	4/9/15 1:15 PM	3	19.53	0.70	NR	day 4
	4/10/15 11:08 AM	4	19.83	0.50	NR	day 5
	4/13/15 10:52 AM	3	18.72	0.86	NR	day 8
	4/15/15 11:06 AM	3	19.56	0.96	NR	day 10
	4/17/15 10:56 AM	3	19.02	1.00	NR	day 12
	4/20/15 1:24 PM	5	19.57	1.02	NR	day 15
	4/22/15 5:41 PM	1	19.48	1.02	NR	day 17
	4/24/15 4:08 PM	2	19.86	1.04	NR	day 19
	4/27/15 9:41 AM	7	20.15	0.92	NR	day 22
	5/4/15 1:07 PM	1	19.26	1.00	NR	day 29
	5/11/15 1:51 PM	4	19.88	0.98	NR	day 36
	5/12/15 1:55 PM	NR	NR	NR	70.0	No other measurements recorded
	5/18/15 12:15 PM	4	19.49	0.98	NR	day 43
	5/26/15 1:12 PM	0	19.45	0.96	NR	day 51
	6/1/15 1:49 PM	3	19.45	0.88	NR	day 57
	6/15/15 2:11 PM	2	19.34	0.98	NR	day 71
	6/29/15 2:56 PM	5	19.08	0.90	NR	day 85
	7/6/15 1:36 PM	3	19.76	1.00	NR	day 92
	7/8/15 2:30 PM	3	19.30	1.04	NR	Q3
	10/13/2015	1	20.48	0.00	50.0	Q4
KAFB-106121-050	3/11/15 12:06 PM	9	19.80	1.96	NR	Q1
	4/2/15 2:05 PM	9	19.15	1.34	NR	Baseline
	4/6/15 9:41 AM	0	19.48	1.60	NR	day 1, round 1
	4/6/15 2:23 PM	0	19.34	1.44	NR	day 1, round 2
	4/6/15 8:42 PM	0	19.35	1.50	NR	night, round 1
	4/7/15 2:00 AM	1	19.42	1.62	NR	night, round 2
	4/7/15 8:10 AM	1	19.59	1.62	NR	day 2, round 1
	4/7/15 12:27 PM	4	19.56	1.58	NR	day 2, round 2
	4/8/15 8:32 AM	1	19.32	1.42	NR	day 3
	4/9/15 9:15 AM	7	19.33	1.68	NR	day 4
	4/10/15 2:30 PM	0	19.62	1.52	NR	day 5
	4/13/15 11:52 AM	0	19.59	1.58	NR	day 8
	4/15/15 10:33 AM	2	19.54	1.42	NR	day 10
	4/17/15 11:29 AM	0	19.28	1.50	NR	day 12
	5/14/15 10:38 AM	NR	NR	NR	67.1	No other measurements recorded
	7/9/15 2:34 PM	0	19.71	1.28	NR	Q3
	10/14/2015	2	18.67	1.62	56.5	Q4
KAFB-106125-050	3/10/15 1:24 PM	25	17.98	2.90	NR	Q1
	4/2/15 4:00 PM	7	17.97	2.96	NR	Baseline
	4/6/15 9:51 AM	5	18.70	2.92	NR	day 1, round 1
	4/6/15 3:50 PM	1	18.15	2.96	NR	day 1, round 2
	4/6/15 8:35 PM	0	18.23	2.88	NR	night, round 1
	4/7/15 3:51 AM	0	18.97	2.78	NR	night, round 2
	4/7/15 8:41 AM	2	17.56	2.84	NR	day 2, round 1
	4/7/15 12:38 PM	0	19.19	2.00	NR	day 2, round 2
	4/8/15 11:02 AM	1	18.53	2.90	NR	day 3
	4/9/15 11:24 AM	0	19.16	2.46	NR	day 4
	4/10/15 8:57 AM	0	20.86	2.84	NR	day 5
	4/13/15 9:19 AM	0	18.49	2.70	NR	day 8
	4/15/15 9:14 AM	1	18.33	2.96	NR	day 10
	4/17/15 8:36 AM	0	19.02	2.86	NR	day 12

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106125-050 (Continued)	5/14/15 10:49 AM	NR	NR	NR	66.3	No other measurements recorded
	7/9/15 9:13 AM	5	18.46	2.68	NR	Q3
	10/20/2015	1	18.65	2.76	99.9	Q4
KAFB-106125-450	3/10/15 12:39 PM	584	19.98	0.68	NR	Q1
	4/2/15 1:15 PM	630	19.26	0.68	NR	Baseline
	4/6/15 7:12 PM	545	19.82	0.68	NR	day 1, round 1
	4/6/15 4:08 PM	532	19.88	0.68	NR	day 1, round 2
	4/6/15 10:48 PM	534	19.73	0.62	NR	night, round 1
	4/7/15 4:03 AM	538	20.00	0.64	NR	night, round 2
	4/7/15 9:00 AM	519	19.95	0.64	NR	day 2, round 1
	4/7/15 12:52 PM	509	19.72	0.68	NR	day 2, round 2
	4/8/15 11:14 AM	530	19.89	0.68	NR	day 3
	4/9/15 11:37 AM	460	20.36	0.54	NR	day 4
	4/10/15 9:12 AM	NR	NR	NR	NR	day 5, connection to horiba not made
	4/13/15 9:32 AM	522	19.68	0.70	NR	day 8
	4/15/15 9:31 AM	519	20.14	0.68	NR	day 10
	4/17/15 8:50 AM	508	20.80	0.70	NR	day 12
	5/14/15 11:02 AM	NR	NR	NR	66.4	No other measurements recorded
	7/9/15 9:38 AM	444	20.32	0.66	NR	Q3
	10/20/2015	398	20.27	0.64	75.5	Q4
KAFB-106126-450	3/10/15 11:07 AM	236	19.90	0.56	NR	Q1
	4/2/15 12:56 PM	0	19.79	0.74	NR	Baseline
	4/6/15 12:06 PM	1	19.28	0.68	NR	day 1, round 1
	4/6/15 6:30 PM	201	19.84	0.58	NR	day 1, round 2
	4/7/15 2:14 AM	205	20.11	0.58	NR	night, round 1
	4/7/15 6:30 AM	206	20.26	0.54	NR	night, round 2
	4/7/15 11:06 AM	202	20.70	0.58	NR	day 2, round 1
	4/7/15 2:54 PM	208	19.71	0.62	NR	day 2, round 2
	4/8/15 1:33 PM	213	20.36	0.58	NR	day 3
	4/9/15 1:52 PM	197	20.29	0.54	NR	day 4
	4/10/15 1:03 PM	213	20.55	0.60	NR	day 5
	4/13/15 11:30 AM	224	19.87	0.58	NR	day 8
	4/15/15 11:50 AM	128	20.34	0.46	NR	day 10
	4/17/15 9:05 AM	228	20.01	0.56	NR	day 12
	5/14/15 11:16 AM	NR	NR	NR	62.8	-
	7/9/15 8:44 AM	291	20.29	0.56	NR	Q3
	10/19/2015	6	19.21	1.22	86.1	Q4
KAFB-106128-350	3/12/15 10:39 AM	823	19.74	1.08	NR	Q1
	4/2/15 2:08 PM	760	18.96	0.84	NR	Baseline
	4/6/15 10:13 AM	639	19.69	0.90	NR	day 1, round 1
	4/6/15 4:28 PM	656	19.35	0.84	NR	day 1, round 2
	4/6/15 11:09 PM	576	19.84	0.80	NR	night, round 1
	4/7/15 4:21 AM	537	19.06	0.78	NR	night, round 2
	4/7/15 9:16 AM	541	20.31	0.78	NR	day 2, round 1
	4/7/15 1:00 PM	555	19.06	0.80	NR	day 2, round 2
	4/8/15 11:25 AM	540	19.48	0.80	NR	day 3
	4/9/15 11:45 AM	417	19.40	0.62	39.6	day 4
	4/10/15 1:13 PM	477	19.22	0.70	NR	day 5
	4/13/15 9:40 AM	387	19.20	0.68	NR	day 8
	4/15/15 9:40 AM	461	19.24	0.82	NR	day 10
	4/17/15 9:35 AM	358	19.66	0.70	92.1	day 12
	4/20/15 12:30 PM	395	19.29	0.70	NR	day 15
	4/22/15 5:47 PM	357	18.98	0.64	NR	day 17
	4/24/15 2:22 PM	340	19.47	0.60	NR	day 19
	4/27/15 9:50 AM	375	19.52	0.56	NR	day 22
	5/4/15 1:15 PM	539	18.69	0.64	NR	day 29
	5/11/15 2:00 PM	649	19.10	0.66	NR	day 36
	5/12/15 2:02 PM	NR	NR	NR	65.0	No other measurements recorded

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106128-350 (Continued)	5/18/15 12:43 PM	753	19.14	0.68	NR	day 43
	5/26/15 1:20 PM	895	18.26	0.66	NR	day 51
	6/1/15 1:55 PM	1135	18.31	0.72	NR	day 57
	6/15/15 2:18 PM	1208	17.98	0.68	NR	day 71
	6/29/15 3:15 PM	1588	17.39	0.80	NR	day 85
	7/6/15 1:41 PM	1530	17.78	0.82	NR	day 92
	7/8/15 12:35 PM	1598	18.00	0.90	NR	Q3
	10/12/2015	2570	16.38	1.30	52.0	Q4
KAFB-106128-450	3/12/15 10:31 AM	7	17.75	0.22	NR	Q1
	4/2/15 2:00 PM	1	18.44	0.24	NR	Baseline
	4/6/15 10:27 AM	9	18.92	0.34	NR	day 1, round 1
	4/6/15 4:40 PM	8	17.50	0.20	NR	day 1, round 2
	4/6/15 11:24 PM	77	18.24	0.22	NR	night, round 1
	4/7/15 4:35 AM	183	17.28	0.22	NR	night, round 2
	4/7/15 9:28 AM	277	18.68	0.30	NR	day 2, round 1
	4/7/15 1:16 PM	401	17.43	0.30	NR	day 2, round 2
	4/8/15 11:38 AM	467	17.36	0.32	NR	day 3
	4/9/15 11:57 AM	574	17.63	0.32	57.1	day 4
	4/10/15 1:27 PM	1148	16.77	0.32	NR	day 5
	4/13/15 9:56 AM	1145	16.90	0.34	NR	day 8
	4/15/15 10:05 AM	1409	16.69	0.42	NR	day 10
	4/17/15 9:56 AM	1323	16.71	0.40	99.9	day 12
	4/20/15 1:42 PM	1674	16.49	0.42	NR	day 15
	4/22/15 6:00 PM	1539	16.33	0.40	NR	day 17
	4/24/15 2:39 PM	1581	16.37	0.40	NR	day 19
	4/27/15 10:05 AM	1643	17.09	0.42	NR	day 22
	5/4/15 1:27 PM	2020	16.23	0.50	NR	day 29
	5/11/15 2:10 PM	2250	16.30	0.50	NR	day 36
	5/12/15 2:14 PM	NR	NR	NR	72.7	No other measurements recorded
	5/18/15 12:55 PM	3220	16.27	0.76	NR	day 43
	5/26/15 1:32 PM	3110	15.93	0.70	NR	day 51
	6/1/15 2:10 PM	3510	15.55	0.78	NR	day 57
	6/15/15 2:31 PM	3350	15.64	0.80	NR	day 71
	6/29/15 3:27 PM	3890	14.69	1.04	NR	day 85
	7/6/15 1:55 PM	3980	15.08	1.24	NR	day 92
	7/8/15 12:49 PM	4080	14.78	1.34	NR	Q3
	10/12/2015	4190	13.42	1.90	42.9	Q4
KAFB-106129-250	3/12/15 3:41 PM	4	18.59	0.32	NR	Q1
	4/2/15 2:49 PM	3	18.55	0.26	NR	Baseline
	4/6/15 10:11 AM	0	19.66	0.30	NR	day 1, round 1
	4/6/15 2:43 PM	3	20.35	0.28	NR	day 1, round 2
	4/6/15 9:01 PM	7	19.27	0.32	NR	night, round 1
	4/7/15 2:15 AM	5	19.43	0.32	NR	night, round 2
	4/7/15 8:36 AM	0	19.45	0.28	NR	day 2, round 1
	4/7/15 12:40 PM	2	20.22	0.30	NR	day 2, round 2
	4/8/15 10:08 AM	0	19.69	0.26	NR	day 3
	4/9/15 10:29 AM	1	19.21	0.34	NR	day 4
	4/10/15 2:00 PM	0	19.41	0.30	NR	day 5
	4/13/15 1:37 PM	0	19.55	0.26	NR	day 8
	4/15/15 11:32 AM	2	20.16	0.34	NR	day 10
	4/17/15 12:24 PM	1	19.11	0.24	NR	day 12
	4/20/15 10:10 AM	5	19.35	0.28	NR	day 15
	4/22/15 9:50 AM	11	19.28	0.32	NR	day 17
	4/24/15 8:49 AM	12	19.48	0.40	NR	day 19
	4/27/15 2:56 PM	9	19.53	0.34	NR	day 22
	5/4/15 10:20 AM	1	19.83	0.30	NR	day 29
	5/11/15 10:11 AM	2	19.43	0.32	NR	day 36
	5/12/15 2:21 PM	NR	NR	NR	57.4	No other measurements recorded

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106129-250 (Continued)	5/18/15 9:53 AM	8	19.41	0.32	NR	day 43
	5/26/15 10:42 AM	2	19.53	0.32	NR	day 51
	6/1/15 10:03 AM	0	19.38	0.28	NR	day 57
	6/15/15 11:01 AM	4	19.46	0.30	NR	day 71
	6/29/15 10:05 AM	0	19.68	0.28	NR	day 85
	7/6/15 10:01 AM	3	19.97	0.28	NR	day 92
	7/13/15 9:35 AM	1	19.74	0.30	NR	Q3
	10/13/2015	12	19.27	0.36	61.7	Q4
KAFB-106129-350	3/12/15 3:33 PM	2	19.14	1.00	NR	Q1
	4/2/15 2:42 PM	2	19.19	0.88	NR	Baseline
	4/6/15 10:26 AM	0	20.10	0.90	NR	day 1, round 1
	4/6/15 2:52 PM	0	20.30	0.90	NR	day 1, round 2
	4/6/15 9:10 PM	8	19.73	0.94	NR	night, round 1
	4/7/15 2:19 AM	6	20.17	0.96	NR	night, round 2
	4/7/15 8:49 AM	2	19.73	0.92	NR	day 2, round 1
	4/7/15 12:49 PM	1	19.72	0.90	NR	day 2, round 2
	4/8/15 10:04 AM	2	20.30	0.88	NR	day 3
	4/9/15 10:32 AM	1	19.72	0.94	NR	day 4
	4/10/15 1:56 PM	0	19.71	0.88	NR	day 5
	4/13/15 1:43 PM	0	19.60	0.84	NR	day 8
	4/15/15 11:36 AM	0	20.78	0.90	NR	day 10
	4/17/15 12:28 PM	2	19.57	0.84	NR	day 12
	4/20/15 10:13 AM	3	19.71	0.78	NR	day 15
	4/22/15 9:55 AM	1	19.70	0.80	NR	day 17
	4/24/15 8:54 AM	0	20.10	0.82	NR	day 19
	4/27/15 2:59 PM	3	19.91	0.76	NR	day 22
	5/4/15 10:24 AM	0	20.16	0.76	NR	day 29
	5/11/15 10:16 AM	0	19.79	0.76	NR	day 36
	5/12/15 2:23 PM	NR	NR	NR	59.6	No other measurements recorded
	5/18/15 9:57 AM	7	19.75	0.76	NR	day 43
	5/26/15 10:46 AM	2	19.86	0.72	NR	day 51
	6/1/15 10:07 AM	0	19.61	0.72	NR	day 57
	6/15/15 11:06 AM	6	19.81	0.70	NR	day 71
	6/29/15 10:08 AM	0	19.85	0.68	NR	day 85
	7/6/15 10:04 AM	3	20.25	0.64	NR	day 92
	7/13/15 9:43 AM	2	20.07	0.72	NR	Q3
	10/13/2015	11	19.47	0.70	61.6	Q4
KAFB-106129-450	3/12/15 3:24 PM	51	19.70	1.10	NR	Q1
	4/2/15 2:32 PM	51	19.43	0.92	NR	Baseline
	4/6/15 10:40 AM	35	20.15	1.00	NR	day 1, round 1
	4/6/15 3:03 PM	40	19.58	1.00	NR	day 1, round 2
	4/6/15 9:27 PM	36	19.69	1.02	NR	night, round 1
	4/7/15 2:30 AM	28	19.75	0.96	NR	night, round 2
	4/7/15 8:59 AM	30	19.82	1.02	NR	day 2, round 1
	4/7/15 12:59 PM	0	19.74	0.88	NR	photo
	4/8/15 9:59 AM	29	20.05	0.98	NR	day 3
	4/9/15 10:42 AM	26	19.62	1.04	NR	day 4
	4/10/15 1:51 PM	30	19.48	1.00	NR	day 5
	4/13/15 1:54 PM	30	19.68	0.92	NR	day 8
	4/15/15 11:47 AM	28	19.55	1.00	NR	day 10
	4/17/15 12:38 PM	26	19.84	0.94	NR	day 12
	4/20/15 10:26 AM	36	19.25	0.94	NR	day 15
	4/22/15 10:09 AM	33	19.59	1.02	NR	day 17
	4/24/15 9:10 AM	22	20.48	1.04	NR	day 19
	4/27/15 3:11 PM	32	19.75	0.94	NR	day 22
	5/4/15 10:39 AM	30	20.30	0.92	NR	day 29
	5/11/15 10:28 AM	12	20.41	0.24	NR	day 36
	5/12/15 2:35 PM	NR	NR	NR	70.6	No other measurements recorded

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106129-450 (Continued)	5/18/15 10:10 AM	33	19.84	0.92	NR	day 43
	5/26/15 10:59 AM	39	19.70	0.92	NR	day 51
	6/1/15 10:21 AM	39	19.65	0.94	NR	day 57
	6/15/15 11:19 AM	43	19.99	0.96	NR	day 71
	6/29/15 10:22 AM	37	19.91	0.92	NR	day 85
	7/6/15 10:16 AM	41	20.36	0.88	NR	day 92
	7/13/15 10:03 AM	49	20.00	0.98	NR	Q3
	10/13/2015	52	19.60	0.96	46.9	Q4
KAFB-106131-350	3/18/15 1:13 PM	4	17.48	0.20	NR	Q1
	4/2/15 3:48 PM	43	17.17	0.18	NR	Baseline
	4/6/15 11:03 AM	1	17.77	0.16	NR	day 1, round 1
	4/6/15 3:16 PM	2	17.56	0.18	NR	day 1, round 2
	4/6/15 9:49 PM	5	17.37	0.14	NR	night, round 1
	4/7/15 2:45 AM	0	17.19	0.12	NR	night, round 2
	4/7/15 9:13 AM	0	17.21	0.16	NR	day 2, round 1
	4/7/15 1:15 PM	2	16.70	0.18	NR	day 2, round 2
	4/8/15 8:55 AM	0	17.66	0.18	NR	day 3
	4/9/15 9:29 AM	0	17.01	0.16	NR	day 4
	4/10/15 3:11 PM	0	17.08	0.14	NR	day 5
	4/13/15 12:11 PM	0	17.67	0.12	NR	day 8
	4/15/15 10:54 AM	0	18.41	0.22	NR	day 10
	4/17/15 11:51 AM	4	17.43	0.14	NR	day 12
	4/20/15 10:33 AM	3	17.06	0.06	NR	day 15
	4/22/15 10:21 AM	0	17.64	0.16	NR	day 17
	4/24/15 10:08 AM	0	17.73	0.18	NR	day 19
	4/27/15 3:24 PM	1	18.06	0.16	NR	day 22
	5/4/15 10:47 AM	0	17.82	0.08	NR	day 29
	5/11/15 10:44 AM	1	17.89	0.18	NR	day 36
	5/12/15 2:41 PM	NR	NR	NR	68.3	No other measurements recorded
	5/18/15 10:38 AM	2	18.08	0.16	NR	day 43
	5/26/15 11:07 AM	3	17.67	0.14	NR	day 51
	6/1/15 10:29 AM	2	17.75	0.14	NR	day 57
	6/15/15 11:45 AM	5	17.76	0.16	NR	day 71
	6/29/15 10:30 AM	2	17.73	0.10	NR	day 85
	7/6/15 10:20 AM	4	18.25	0.10	NR	day 92
	7/10/15 11:10 AM	1	17.76	0.14	NR	Q3
	10/13/2015	3	17.65	0.16	53.4	Q4
KAFB-106131-450	3/18/15 1:05 PM	9	16.43	0.28	NR	Q1
	4/2/15 3:41 PM	10	16.00	0.24	NR	Baseline
	4/6/15 11:16 AM	5	16.73	0.26	NR	day 1, round 1
	4/6/15 3:29 PM	5	16.09	0.26	NR	day 1, round 2
	4/6/15 10:00 PM	6	16.22	0.22	NR	night, round 1
	4/7/15 2:53 AM	8	16.26	0.22	NR	night, round 2
	4/7/15 9:24 AM	4	16.24	0.24	NR	day 2, round 1
	4/7/15 1:25 PM	3	16.31	0.24	NR	day 2, round 2
	4/8/15 8:51 AM	0	16.48	0.24	NR	day 3
	4/9/15 9:39 AM	0	15.86	0.26	NR	day 4
	4/10/15 3:02 PM	0	15.85	0.24	NR	day 5
	4/13/15 12:22 PM	3	16.89	0.20	NR	day 8
	4/15/15 11:07 AM	0	17.32	0.34	NR	day 10
	4/17/15 12:01 PM	7	16.84	0.24	NR	day 12
	4/20/15 10:45 AM	5	16.41	0.26	NR	day 15
	4/22/15 10:35 AM	11	16.27	0.30	NR	day 17
	4/24/15 10:22 AM	9	16.84	0.34	NR	day 19
	4/27/15 3:35 PM	10	17.02	0.26	NR	day 22
	5/4/15 11:01 AM	3	16.62	0.18	NR	day 29
	5/11/15 10:56 AM	10	17.25	0.26	NR	day 36
	5/12/15 2:52 PM	NR	NR	NR	73.3	No other measurements recorded

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106131-450 (Continued)	5/18/15 10:54 AM	11	16.28	0.30	NR	day 43
	5/26/15 11:20 AM	13	16.96	0.26	NR	day 51
	6/1/15 10:47 AM	12	17.19	0.26	NR	day 57
	6/15/15 12:00 PM	16	16.56	0.30	NR	day 71
	6/29/15 10:42 AM	11	16.84	0.22	NR	day 85
	7/6/15 10:32 AM	8	16.83	0.26	NR	day 92
	7/10/15 11:22 AM	12	16.99	0.28	NR	Q3
	10/13/2015	15	16.92	0.30	49.0	Q4
SVEW-07-160	3/16/15 11:27 AM	32760	7.93	15.24	NR	Q1
	4/8/15 2:24 PM	27810	9.31	10.96	NR	day 3, well added after test began
	4/9/15 2:01 PM	27360	9.09	11.08	NR	day 4
	4/10/15 9:41 AM	26340	8.67	11.26	NR	day 5
	4/13/15 9:34 AM	26980	9.37	10.76	NR	day 8
	4/15/15 3:04 PM	26900	9.98	9.82	NR	day 10
	4/17/15 9:56 AM	26950	9.83	10.24	85.2	day 12
	5/12/15 3:50 PM	NR	NR	NR	77.3	No other measurements recorded
	7/14/15 10:03 AM	26390	7.68	10.62	NR	Q3
	10/22/2015	28400	7.85	10.48	85.7	Q4
SVEW-03-160	3/16/15 3:33 PM	5750	8.90	10.82	NR	Q1
	4/8/15 2:02 PM	6420	6.98	10.10	NR	day 3, well added after test began
	4/9/15 1:40 PM	7080	7.40	9.96	NR	day 4
	4/10/15 10:11 AM	7470	8.30	10.08	NR	day 5
	4/13/15 9:07 AM	5730	8.26	9.24	NR	day 8
	4/15/15 2:22 PM	6230	5.60	10.54	NR	day 10
	4/17/15 10:20 AM	6370	5.62	10.38	80.4	day 12
	4/20/15 3:17 PM	4840	5.43	9.72	NR	day 15
	4/22/15 2:31 PM	4600	6.02	9.22	NR	day 17
	4/24/15 4:19 PM	4320	6.98	8.60	NR	day 19
	4/27/15 10:43 AM	3490	10.05	6.82	NR	previous, O2 higher than previous
	5/4/15 3:00 PM	4760	4.45	10.40	NR	horiba, verified correct
	5/11/15 3:09 PM	8810	5.50	10.96	NR	day 36
	5/12/15 3:00 PM	NR	NR	NR	75.6	No other measurements recorded
	5/18/15 1:53 PM	9410	2.36	14.26	NR	day 43
	5/26/15 2:18 PM	7800	3.88	11.50	NR	day 51
	6/1/15 2:50 PM	10790	1.51	13.68	NR	day 57
	6/15/15 2:50 PM	7280	2.61	12.42	NR	day 71
	6/29/15 11:55 AM	11570	2.90	11.98	NR	day 85
	7/6/15 11:11 AM	8030	1.69	12.86	NR	day 92
	7/14/15 9:24 AM	8410	1.21	14.52	NR	Q3
	10/22/2015	8060	1.21	13.94	85.3	Q4
SVMW-12-450	3/25/15 3:27 PM	0	20.30	0.20	NR	Q1, background well
	4/2/15 12:46 PM	5	21.64	0.28	NR	Baseline
	4/6/15 6:38 PM	0	20.50	0.20	NR	day 1
	4/7/15 4:56 AM	0	20.26	0.20	NR	day 2 early AM
	4/7/15 4:20 PM	1	20.16	0.22	NR	day 2, PM
	4/8/15 11:37 AM	1	21.23	0.22	NR	day 3
	4/9/15 12:28 PM	0	20.34	0.22	28.6	day 4
	4/10/15 10:43 AM	1	20.33	0.22	NR	day 5
	4/13/15 3:06 PM	0	20.36	0.18	NR	day 8
	4/15/15 2:17 PM	0	20.88	0.20	NR	day 10
	4/17/15 1:58 PM	6	20.56	0.24	52.7	day 12
	5/14/15 11:43 AM	NR	NR	NR	49.9	No other measurements recorded
	7/15/15 2:19 PM	3	20.82	0.20	NR	Q3
	10/22/2015	0	20.82	0.16	92.3	Q4
KAFB-106122-150	3/11/15 2:10 PM	0	20.14	0.50	NR	Q1, background well
	4/2/15 2:17 PM	4	19.64	0.42	NR	Baseline
	4/6/15 6:51 PM	0	20.66	0.36	NR	day 1
	4/7/15 5:09 AM	5	20.10	0.26	NR	day 2 early AM

Table 3-1. Time-series Field Measurements at Shutdown Test Wells

Sample Location	Date and Time	HC ppmv	O2%	CO2%	RH %	Notes
KAFB-106122-150 (Continued)	4/7/15 4:27 PM	2	19.75	0.40	NR	day 2, PM
	4/8/15 8:38 AM	0	20.12	0.36	NR	day 3
	4/9/15 9:21 AM	0	19.65	0.36	NR	day 4
	4/10/15 2:37 PM	0	20.64	0.44	NR	day 5
	4/13/15 12:01 PM	0	20.14	0.36	NR	day 8
	4/15/15 10:38 AM	0	20.00	0.40	NR	day 10
	4/17/15 11:36 AM	4	19.90	0.34	NR	day 12
	5/14/15 10:31 AM	NR	NR	NR	67.4	No other measurements recorded
	7/10/15 9:36 AM	0	20.42	0.32	NR	Q3
	10/15/2015	3	19.91	0.38	43.7	Q4
KAFB-106140-150	3/18/15 11:57 AM	6	20.66	0.18	NR	Q1, background well
	4/2/15 1:54 PM	4	20.26	0.12	NR	Baseline
	4/6/15 7:02 PM	2	19.95	0.12	NR	day 1
	4/7/15 5:20 AM	6	20.36	0.1	NR	day 2 early AM
	4/7/15 4:32 PM	0	20.11	0.12	NR	day 2, PM
	4/8/15 8:20 AM	9	20.78	0.04	NR	day 3
	4/9/15 9:09 AM	9	20.27	0.16	NR	day 4
	4/10/15 2:47 PM	0	19.58	0.14	NR	day 5
	4/13/15 11:49 AM	1	20.17	0.12	NR	day 8
	4/15/15 10:45 AM	0	20.63	0.18	NR	day 10
	4/17/15 11:43 AM	0	20.12	0.12	NR	day 12
	5/14/15 10:43 AM	NR	NR	NR	59.2	No other measurements recorded
	7/10/15 9:02 AM	0	20.61	0.12	NR	Q3
	10/19/2015	1	20.51	0.14	62.6	Q4

Long-term test well (monitored for 3 months)
Short-term test well (monitored for 2 weeks)
% = percent
CO2 = carbon dioxide
HC = hydrocarbon
NR = not recorded
O2 = oxygen
ppmv = part per million volume
Q1 = first quarter, 2015 soil-vapor sampling event
Q3 = third quarter, 2015 soil-vapor sampling event
Q4 = fourth quarter, 2015 soil-vapor sampling event
RH = relative humidity

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
SVMW-01-050	**50**	2	3	0	18.26	17.75	18.35	5.54	4.82	4.9	ND	ND	ND	0.0049	0.003
SVMW-01-100	**100**	441	1464	2460	15.63	15.15	14.76	9.20	7.94	8	0.00087	0.00038	0.00066	12	18
SVMW-01-250	**250**	3	8	10	19.66	19.41	19.50	0.48	0.42	0.3	0.014	0.0055	0.0081	0.052	0.076
SVMW-01-300	**300**	2	3	4	20.03	19.69	19.84	0.36	0.34	0.3	0.0011	ND	ND	0.13	0.19
SVMW-02-050	**50**	15	2	6	20.00	19.27	19.12	1.98	2	2.32	0.0022	ND	0.0061	0.007	0.32
SVMW-02-100	**100**	87	197	643	18.04	18.10	17.75	5.82	4.72	4.86	0.37	0.3	0.38	9.4	16
SVMW-02-150	**150**	716	117	159	18.26	18.29	18.03	2.26	1.5	1.54	0.017	0.0023	0.013	0.052	0.25
SVMW-03-050	**50**	24	2	0	20.26	13.47	8.77	1.12	2.66	5.48	0.0023	0.007	ND	0.13	0.052
SVMW-03-100	**100**	81	1228	6320	18.10	9.74	1.03	6.00	9.62	14.16	1	0.33	0.42	0.15	30
SVMW-03-250	**250**	488	8890	11020	18.76	7.60	4.13	1.16	7.98	10.76	0.92	0.45	0.36	68	36
SVMW-03-300	**300**	17430	13950	13830	9.57	2.13	1.23	11.06	14.94	15.02	2.1	0.95	1.5	110	120
SVMW-04-050	**50**	199	319	342	14.04	13.36	12.65	7.04	6.28	6.72	0.0016	0.0021	0.0029	2.2	1.3
SVMW-04-100	**100**	20670	14370	14050	11.38	11.84	11.47	14.56	10.54	10.48	0.77	0.33	0.38	120	160
SVMW-04-250	**250**	4900	8390	11420	18.81	16.99	15.59	1.58	1.94	2.6	0.051	0.024	0.022	39	40
SVMW-04-300	**300**	124	148	83	19.89	19.53	19.33	0.60	0.5	0.44	0.0015	0.00095	0.0013	1.4	1.5
SVMW-05-050	**50**	33	8	2	19.45	18.87	18.41	3.68	3.42	3.42	ND	0.00041	0.0013	0.047	0.11
SVMW-05-100	**100**	42	4	1	17.80	17.15	16.63	5.64	5.44	6	ND	ND	0.00049	0.06	0.062
SVMW-05-230	**230**	10	4	0	19.70	19.52	19.11	0.28	0.26	0.26	ND	0.00085	0.00036	0.037	0.044
SVMW-05-290	**290**	5	4	1	19.70	19.72	19.48	0.46	0.42	0.38	ND	0.024	0.00067	0.012	0.054
SVMW-06-050	**50**	17	6	0	20.55	20.56	20.34	0.60	0.58	0.62	ND	ND	ND	0.0011	ND
SVMW-06-100	**100**	1	3	0	20.06	20.28	20.12	3.20	2.6	2.48	ND	ND	ND	0.00067	0.00044
SVMW-06-252	**252**	653	598	484	18.40	18.45	18.01	1.72	1.54	1.7	0.029	0.019	0.012	120	130
SVMW-06-302	**302**	27	37	39	20.13	20.07	19.91	0.96	0.94	0.98	0.16	0.091	0.099	4.5	7.3
SVMW-07-050	**50**	19	0	0	18.70	19.21	18.97	1.28	1.18	1.18	ND	ND	ND	0.012	0.0062
SVMW-07-100	**100**	46	14	4	17.95	18.07	18.43	5.32	4.34	4.22	0.0026	0.0016	0.0014	0.27	0.35
SVMW-07-150	**150**	35	2	1	19.10	18.88	18.89	3.22	2.88	3	ND	ND	ND	ND	ND
SVMW-08-050	**50**	46	204	2300	19.46	18.37	16.73	0.60	0.68	1.44	0.14	0.039	0.079	0.56	6.6
SVMW-08-100	**100**	9	2	4	18.43	14.63	11.89	4.20	5.04	6.64	0.0014	0.00063	0.0016	0.079	0.037
SVMW-08-250	**250**	8830	9130	10040	12.64	11.77	9.64	12.74	10.64	11.6	0.72	0.35	0.41	120	200
SVMW-09-050	**50**	34	27	43	18.15	15.35	12.42	3.82	4.3	5.48	0.034	0.044	0.034	0.28	0.53
SVMW-09-100	**100**	5020	10410	19160	13.79	10.36	10.16	11.42	12.66	11.94	2.5	1.2	2.5	120	230
SVMW-09-250	**250**	2930	5370	6720	18.06	15.14	12.52	1.62	2.42	3.48	1.1	0.56	0.38	41	57
SVMW-09-266	**266**	4510	15800	20730	17.80	13.71	11.22	2.08	3.98	5.04	2.8	1.7	3	170	390
SVMW-10-050	**50**	30690	28350	27300	16.35	11.92	7.99	7.98	7.6	8.92	24	18	12	270	270
SVMW-10-100	**100**	32760 *	31690	30580	14.99	12.30	8.91	12.68	10.84	11.42	26	20	13	440	510
SVMW-10-150	**150**	40834	28620	27280	11.69	7.34	6.90	9.16	9.86	10.02	6.3	0.77	2.2	130	400
SVMW-10-250	**250**	12870	13390	13260	17.62	10.97	6.26	2.68	4.56	6.94	12	1.2	6.5	15	110
SVMW-11-050	**50**	32760 *	29090	29370	12.82	3.12	0.39	8.78	11.9	14.4	2.7	4.3	5.5	230	240
SVMW-11-100	**100**	48084	36828	40853	11.70	6.53	2.80	15.92	14.9	15.96	15	21	15	610	840
SVMW-11-250	**250**	34511	28790	29060	12.70	2.37	0.13	8.20	11.38	13.8	1.8	2.2	2.1	260	260
SVMW-11-260	**260**	4980	7880	14880	13.60	4.38	0.97	7.26	10.94	13.52	1.2	3.3	4.6	56	65
SVMW-12-150	**150**	17	2	0	19.85	19.89	19.49	0.14	0.14	0.1	ND	0.0028	0.012	0.053	0.15
SVMW-12-250	**250**	5	2	0	19.66	20.21	19.88	0.18	0.18	0.18	ND	0.0026	0.015	0.052	0.12
SVMW-12-350	**350**	4	3	0	20.09	20.79	20.43	0.72	0.48	0.5	ND	0.0014	0.0061	0.013	0.07
SVMW-12-450	**450**	0	3	0	20.30	20.82	20.82	0.20	0.2	0.16	ND	0.001	0.0036	0.017	0.063

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
SVMW-13-150	**150**	178	827	677	19.87	15.90	15.92	0.90	3.38	3.18	0.0063	0.032	0.021	8.6	0.56
SVMW-13-250	**250**	13	2	6	20.12	20.14	20.37	0.64	0.54	0.6	0.027	0.0024	0.0027	0.02	0.037
SVMW-13-350	**350**	36	7	7	20.39	19.73	20.21	0.56	0.44	0.52	ND	0.0031	0.00064	0.081	0.13
SVMW-13-450	**450**	2	1	5	20.23	20.24	20.49	0.78	0.6	0.64	0.03	0.001	0.0037	0.022	0.14
SVMW-14-150	**150**	251	90	48	18.99	19.67	19.83	0.24	0.2	0.2	ND	0.0015	0.0014	0.06	ND
SVMW-14-250	**250**	73	27	12	19.02	19.78	19.92	0.22	0.22	0.2	0.013	0.0014	0.0066	0.015	0.0063
SVMW-14-350	**350**	90	39	22	19.89	20.34	20.27	0.18	0.2	0.18	0.0027	0.00071	0.00099	ND	ND
SVMW-14-450	**450**	12	2	3	20.27	20.64	20.17	1.18	0.78	1.04	ND	0.00068	0.00097	0.0029	0.0059
SVMW-15-150	**150**	7	3	4	21.22	20.40	20.43	0.40	0.42	0.38	ND	0.00037	0.0018	0.3	0.022
SVMW-15-250	**250**	27	20	20	20.16	19.77	20.01	0.44	0.46	0.44	ND	0.0011	ND	1	1.3
SVMW-15-350	**350**	11	10	7	19.92	20.17	20.46	0.76	0.66	0.56	0.014	0.016	0.025	0.61	1.2
SVMW-15-450	**450**	29	73	93	20.53	20.56	20.49	0.66	0.66	0.62	0.0057	0.024	0.021	1.4	2
KAFB-106028-150	**150**	41	40	15	18.99	18.96	19.00	0.10	0.12	0.1	ND	0.00031	ND	ND	ND
KAFB-106028-250	**250**	77	54	26	20.35	20.00	19.82	0.24	0.36	0.32	ND	0.0004	ND	ND	ND
KAFB-106028-350	**350**	56	36	18	20.35	20.12	19.97	0.28	0.44	0.4	ND	0.00052	ND	ND	ND
KAFB-106028-450	**450**	19	19	9	20.37	20.05	19.43	0.40	0.6	0.88	ND	0.0026	0.00052	0.033	0.0019
SVEW-01-260	**260**	103	87	13000	19.46	15.06	0.57	1.14	4.82	12.54	0.013	0.021	2	1.1	100
SVEW-02-060	**60**	26140	15480	13040	12.86	0.77	0.53	10.42	15.34	14.62	1.1	1.7	0.93	96	100
SVEW-03-160	**160**	5750	8410	8060	8.90	1.21	1.21	10.82	14.52	13.94	0.44	0.28	0.33	64	89
SVEW-04-313	**313**	2	21	957	20.94	20.68	18.15	0.00	0.04	0.9	ND	0.009	0.064	0.4	7.9
SVEW-05-460	**460**	NR	248	406	19.71	19.96	17.37	2.50	0.36	2.02	0.056	0.019	0.025	0.82	2.4
SVEW-06-060	**60**	5020	4470	4600	9.41	7.00	5.82	10.40	9.98	10.78	0.05	0.058	0.038	37	46
SVEW-07-160	**160**	32834	26390	28400	7.93	7.68	7.85	15.24	10.62	10.48	0.026	0.029	0.031	140	250
SVEW-08-260	**260**	11	8	5	19.28	19.67	17.52	0.80	0.66	1.22	ND	ND	0.0069	0.007	0.37
SVEW-09-460	**460**	5	7	3	21.04	19.46	20.01	0.14	0.7	0.52	ND	ND	0.0061	0.0061	0.25
SVEW-10-410	**410**	9	4	0	20.41	21.13	20.61	0.10	0.16	0.1	ND	0.00066	0.003	0.12	0.19
SVEW-11-410	**410**	13	5	12	20.21	20.12	20.38	0.68	0.52	0.64	ND	0.0012	0.0021	0.65	1.5
SVEW-12-410	**410**	2	1	3	20.30	20.12	20.28	0.24	0.24	0.18	0.0015	0.0011	0.0022	0.0057	0.0063
SVEW-13-410	**410**	6	5	12	20.31	20.85	20.77	0.78	0.44	0.58	ND	0.0033	0.008	0.58	0.44
KAFB-106108-025	**25**	20	9	5	20.46	19.73	20.35	0.28	1.26	0.72	ND	0.00058	0.002	0.012	0.036
KAFB-106108-050	**50**	7	1	5	20.15	19.21	19.37	1.82	2.4	2.52	ND	ND	0.0016	0.0059	0.036
KAFB-106108-150	**150**	14	2	7	17.79	18.67	19.10	5.26	2.64	1.98	ND	0.00066	0.0016	0.029	0.053
KAFB-106108-250	**250**	35	9	9	19.66	19.51	19.66	0.46	0.48	0.54	0.024	0.015	0.011	0.95	0.72
KAFB-106108-350	**350**	7	3	2	20.48	19.91	19.92	0.28	0.22	0.22	ND	0.0032	0.0015	0.0059	0.029
KAFB-106108-450	**450**	3	2	5	20.61	20.33	20.24	0.54	0.42	0.48	ND	0.0019	0.0016	0.025	0.028
KAFB-106109-025	**25**	8	5	0	20.34	20.07	20.52	0.64	0.6	0.74	ND	0.0021	0.0015	0.016	0.021
KAFB-106109-050	**50**	7	4	0	19.49	19.87	20.31	1.08	0.96	1	ND	0.0016	0.0011	0.01	0.015
KAFB-106109-150	**150**	10	4	0	19.36	19.50	19.93	0.16	0.1	0.18	ND	0.0018	0.00096	0.013	0.013
KAFB-106109-250	**250**	5	5	0	19.20	19.53	20.19	0.20	0.18	0.26	0.0024	0.001	0.0006	0.0098	0.014
KAFB-106109-350	**350**	2	7	0	20.91	20.27	20.74	0.22	0.12	0.22	ND	0.0011	0.0007	0.0073	0.0099
KAFB-106109-450	**450**	14	0	0	19.90	20.10	20.46	0.88	0.72	0.72	ND	0.00057	0.001	0.0065	0.015
KAFB-106110-025	**25**	7	1	1	20.85	19.86	20.48	0.50	0.92	0.68	ND	0.0028	0.0011	0.021	0.011
KAFB-106110-050	**50**	8	7	0	20.51	19.72	20.22	0.82	1.16	1.04	ND	0.0029	0.00092	0.025	0.012
KAFB-106110-150	**150**	41	1	2	19.05	19.23	19.66	2.86	1.02	0.8	ND	0.0026	0.0008	0.031	0.0092
KAFB-106110-250	**250**	2	3	0	19.54	19.41	19.71	0.42	0.34	0.34	ND	0.0016	0.0013	0.029	0.028

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
KAFB-106110-350	**350**	8	0	0	20.03	20.06	20.33	0.32	0.24	0.22	ND	0.0019	0.00088	0.013	0.0084
KAFB-106110-450	**450**	29	17	7	19.87	20.35	20.10	0.26	0.38	0.4	ND	0.00075	0.0008	0.54	0.62
KAFB-106111-025	**25**	11	4	2	20.91	20.55	20.00	0.00	0.24	0.46	ND	0.016	0.00061	0.44	0.0062
KAFB-106111-050	**50**	1	2	1	20.63	20.25	18.59	0.20	0.98	1.74	ND	0.012	0.00099	0.092	0.0067
KAFB-106111-150	**150**	127	6	2	19.19	18.34	18.60	2.32	2.06	2.16	ND	0.0036	0.00051	0.055	0.0077
KAFB-106111-250	**250**	22	492	610	19.86	18.37	17.86	0.44	0.88	1.26	0.0076	0.0096	0.0074	0.91	1
KAFB-106111-350	**350**	834	297	144	19.59	19.71	19.95	1.16	0.76	0.68	0.037	0.0091	0.011	2.1	2.3
KAFB-106111-450	**450**	31	26	6	20.16	20.12	19.99	0.34	0.34	0.48	ND	0.0021	0.00084	1.1	0.48
KAFB-106112-025	**25**	14	4	5	20.73	20.73	21.07	0.06	0.1	0.16	ND	0.0007	ND	0.0031	ND
KAFB-106112-050	**50**	36	9	4	20.63	20.73	20.47	0.18	0.18	0.22	ND	0.00051	ND	0.0034	0.0009
KAFB-106112-150	**150**	8	2	4	20.44	19.88	19.99	0.68	0.62	0.66	ND	ND	ND	0.0025	0.00053
KAFB-106112-250	**250**	1	2	15	19.93	19.50	19.63	0.54	0.54	0.6	ND	ND	0.00052	0.032	0.74
KAFB-106112-350	**350**	4	0	0	20.25	19.70	19.88	0.62	0.62	0.64	0.023	0.012	0.0021	0.087	0.0079
KAFB-106112-450	**450**	19	169	28	20.18	19.55	20.16	0.84	0.96	0.66	0.006	0.0058	0.0062	2.4	2.4
KAFB-106113-020	**20**	16	8	6	20.70	20.53	20.25	0.18	0.28	0.44	ND	0.0024	ND	0.023	0.0014
KAFB-106113-050	**50**	14	6	6	20.79	20.53	20.27	0.44	0.52	0.54	ND	0.0019	0.00034	0.021	0.0014
KAFB-106113-150	**150**	3	2	4	19.64	20.03	19.78	0.80	0.46	0.6	ND	0.00084	ND	0.0051	0.0011
KAFB-106113-250	**250**	2	1	0	20.01	20.20	19.52	0.34	0.38	0.48	ND	0.0011	ND	0.0056	0.00086
KAFB-106113-350	**350**	3	2	1	20.21	20.51	20.21	0.40	0.38	0.4	ND	0.0007	ND	0.006	0.0031
KAFB-106113-450	**450**	56	176	180	20.44	20.89	20.46	0.56	0.52	0.54	ND	0.0082	0.007	0.99	0.89
KAFB-106114-025	**25**	8	3	0	20.82	20.39	19.95	0.10	0.3	0.3	ND	0.0018	ND	0.019	0.0024
KAFB-106114-050	**50**	38	26	7	20.98	20.14	19.94	0.24	0.46	0.4	ND	0.0014	ND	ND	0.0031
KAFB-106114-150	**150**	0	2	0	21.03	19.85	19.51	0.50	0.46	0.44	ND	0.00087	ND	0.0067	0.0018
KAFB-106114-250	**250**	0	0	0	21.09	19.74	19.37	0.32	0.32	0.36	ND	0.00078	ND	0.0051	0.025
KAFB-106114-350	**350**	1	0	0	20.14	19.14	18.68	0.24	0.22	0.2	ND	0.00087	ND	0.0056	0.0014
KAFB-106114-450	**450**	23	677	669	17.90	18.15	17.70	0.36	0.46	0.48	0.02	0.24	0.12	5.4	4.2
KAFB-106115-025	**25**	4	4	2	20.36	20.88	20.44	0.52	0.36	0.42	ND	ND	ND	0.0034	0.0025
KAFB-106115-050	**50**	42	13	5	20.77	20.89	20.47	0.52	0.48	0.5	ND	ND	ND	0.0014	ND
KAFB-106115-150	**150**	8	1	3	19.72	19.62	19.29	1.92	1.08	1.12	ND	ND	ND	0.00067	0.0013
KAFB-106115-250	**250**	4	4	2	20.78	20.44	20.04	0.28	0.24	0.24	ND	ND	ND	0.00089	0.001
KAFB-106115-350	**350**	2	0	1	20.22	21.26	20.64	0.24	0.22	0.22	ND	ND	ND	0.00073	0.00082
KAFB-106115-450	**450**	1092	919	894	19.28	19.69	19.47	0.86	0.82	0.84	ND	0.00094	0.00078	0.3	0.34
KAFB-106116-025	**25**	43	17	9	21.15	19.92	20.72	0.10	0.22	0.4	ND	0.0016	ND	ND	0.0098
KAFB-106116-050	**50**	38	10	3	19.85	20.15	20.24	0.48	0.48	0.42	ND	0.001	0.00072	ND	0.0082
KAFB-106116-150	**150**	2	4	1	19.44	19.93	20.02	0.74	0.64	0.6	ND	0.00049	ND	0.002	0.013
KAFB-106116-250	**250**	0	2	1	19.21	19.66	19.68	0.50	0.46	0.52	ND	0.00053	0.00065	0.029	0.058
KAFB-106116-350	**350**	6	6	12	19.21	19.59	19.66	0.82	0.66	0.66	0.073	0.035	0.029	0.86	1.2
KAFB-106116-450	**450**	53	789	724	20.70	19.26	19.36	0.52	0.78	0.68	0.0087	0.13	0.085	6.4	5.2
KAFB-106117-025	**25**	6	3	0	20.53	20.00	19.47	0.04	0.2	0.42	ND	0.0012	ND	0.0064	0.0071
KAFB-106117-050	**50**	12	10	5	20.42	20.15	18.80	0.28	0.64	0.86	ND	0.00074	ND	0.0084	0.009
KAFB-106117-150	**150**	2	3	2	19.88	19.76	18.37	2.12	1.74	1.98	ND	0.00072	ND	0.0039	0.0029
KAFB-106117-250	**250**	26	181	226	17.98	17.28	16.05	4.88	3.94	4.02	0.029	0.037	0.037	13	11
KAFB-106117-350	**350**	243	333	378	18.66	14.53	12.37	2.78	3.54	6.6	0.028	0.032	0.032	0.59	0.54
KAFB-106117-450	**450**	19	1637	1990	20.00	12.97	10.72	0.66	2.98	4.36	0.0041	0.18	0.18	15	16
KAFB-106118-025	**25**	4	3	3	21.20	20.66	20.84	0.12	0.3	0.5	ND	ND	ND	0.051	0.0015

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
KAFB-106118-050	**50**	8	11	5	21.19	20.61	20.99	0.30	0.56	0.64	ND	ND	ND	0.028	ND
KAFB-106118-160	**160**	3	3	1	20.29	20.10	19.80	1.26	1.04	1	ND	ND	ND	0.016	ND
KAFB-106118-265	**265**	13	29	23	20.99	20.16	19.85	0.76	0.88	0.9	0.0014	0.012	0.0021	3.3	0.44
KAFB-106118-350	**350**	10	6	6	20.91	20.22	20.10	0.64	0.58	0.58	ND	ND	ND	0.015	0.0021
KAFB-106118-450	**450**	11	13	4	20.33	20.17	20.09	0.58	0.48	0.74	ND	ND	ND	0.044	0.062
KAFB-106119-025	**25**	3	0	2	20.66	20.34	20.59	0.04	0.28	0.16	ND	0.0017	ND	0.0062	0.0058
KAFB-106119-050	**50**	1	0	3	20.70	20.27	20.32	0.66	0.84	0.7	ND	0.00093	ND	0.0036	0.0042
KAFB-106119-150	**150**	NR	30	77	16.07	13.38	13.99	5.90	5.84	6	0.012	0.0011	0.00045	0.02	ND
KAFB-106119-250	**250**	284	280	198	16.70	14.75	14.28	2.76	3.92	4.14	0.12	0.094	0.071	0.17	0.25
KAFB-106119-350	**350**	6	400	1006	20.24	18.73	18.22	0.62	0.82	1.14	ND	0.0034	0.008	1.3	4.2
KAFB-106119-450	**450**	2	3	1	20.43	19.30	20.48	0.62	1.04	0	ND	0.0061	0.0024	0.64	0.062
KAFB-106120-025	**25**	8	1	1	20.24	19.54	19.91	0.38	0.76	1.02	ND	ND	ND	0.0043	0.0016
KAFB-106120-050	**50**	5	4	2	18.61	19.24	18.86	2.44	1.96	2.18	0.022	ND	ND	0.0068	0.0019
KAFB-106120-150	**150**	6	14	4	20.23	19.64	20.05	0.64	0.38	0.58	ND	ND	ND	ND	ND
KAFB-106120-250	**250**	10	1	3	20.32	19.69	20.14	0.24	0.2	0.32	ND	ND	ND	0.0013	0.0019
KAFB-106120-350	**350**	7	0	0	20.67	20.20	20.28	0.30	0.24	0.24	ND	ND	ND	0.0033	0.0017
KAFB-106120-450	**450**	15	11	7	20.26	20.33	20.59	0.40	0.44	0.5	ND	ND	ND	0.14	0.11
KAFB-106121-025	**25**	29	10	5	19.43	19.61	18.56	1.96	1.42	1.82	0.0014	ND	ND	ND	ND
KAFB-106121-050	**50**	9	0	2	19.80	19.71	18.67	1.96	1.28	1.62	0.0017	ND	ND	0.0008	0.00074
KAFB-106121-150	**150**	96	27	16	20.11	20.25	19.66	0.54	0.28	0.36	ND	ND	ND	ND	0.0089
KAFB-106121-250	**250**	30	0	2	20.08	19.95	19.49	0.22	0.14	0.18	ND	ND	ND	ND	0.0017
KAFB-106121-350	**350**	10	0	2	20.47	20.77	20.06	0.26	0.16	0.2	ND	ND	ND	0.0015	0.00094
KAFB-106121-440	**440**	12	8	3	21.13	19.77	20.11	0.58	0.44	0.42	ND	ND	ND	0.12	0.49
KAFB-106122-025	**25**	49	6	0	21.19	20.62	20.03	0.44	0.6	1.26	ND	ND	ND	0.0011	ND
KAFB-106122-050	**50**	0	0	1	19.43	19.40	18.72	1.62	1.6	1.62	ND	ND	ND	0.00084	ND
KAFB-106122-150	**150**	0	0	3	20.14	20.42	19.91	0.50	0.32	0.38	ND	ND	ND	0.00083	ND
KAFB-106122-250	**250**	2	0	4	19.82	20.31	19.81	0.18	0.22	0.24	ND	ND	ND	0.0085	ND
KAFB-106122-350	**350**	4	0	5	20.35	20.77	20.44	0.28	0.3	0.3	ND	ND	ND	0.0014	ND
KAFB-106122-450	**450**	24	20	9	20.28	20.55	20.11	0.54	0.44	0.48	ND	ND	ND	0.12	0.14
KAFB-106123-025	**25**	8	6	4	20.48	19.55	19.94	0.48	1	0.94	0.0023	ND	ND	0.02	0.0015
KAFB-106123-050	**50**	4	2	1	19.85	19.37	19.35	1.58	1.48	1.4	0.045	ND	ND	0.0054	0.00069
KAFB-106123-150	**150**	6	3	0	19.98	20.08	20.26	0.50	0.3	0.28	ND	ND	ND	0.0012	0.0013
KAFB-106123-250	**250**	9	2	3	19.75	19.86	19.47	0.22	0.22	0.22	ND	ND	ND	0.0014	0.00049
KAFB-106123-350	**350**	16	6	4	20.48	20.35	19.94	0.28	0.26	0.28	ND	ND	ND	0.0011	0.00055
KAFB-106123-450	**450**	50	7	3	20.24	19.61	19.15	0.60	1.1	1.26	0.0084	ND	ND	0.017	0.0063
KAFB-106124-025	**25**	11	4	2	20.28	20.46	20.62	0.62	0.26	0.22	0.0099	0.0037	ND	0.0025	0.0021
KAFB-106124-050	**50**	32	17	7	19.65	19.60	19.17	1.38	1.2	1.24	0.082	ND	ND	ND	0.0022
KAFB-106124-150	**150**	19	3	2	19.47	19.59	19.29	0.56	0.3	0.48	ND	0.00056	ND	0.0032	0.0018
KAFB-106124-250	**250**	5	1	2	19.87	20.06	19.57	0.16	0.14	0.18	ND	ND	ND	0.0012	0.0014
KAFB-106124-350	**350**	0	0	3	20.28	20.85	20.27	0.20	0.2	0.24	ND	ND	ND	0.0016	0.0019
KAFB-106124-450	**450**	58	78	8	20.52	20.45	19.37	0.32	0.46	0.78	ND	ND	ND	0.051	0.01
KAFB-106125-025	**25**	70	27	11	19.37	18.89	18.55	1.56	1.72	2.2	ND	ND	ND	ND	ND
KAFB-106125-050	**50**	25	5	1	17.98	18.46	18.65	2.90	2.68	2.76	0.0042	ND	ND	0.002	0.0009
KAFB-106125-150	**150**	3	0	2	19.37	19.21	19.08	0.78	0.36	0.38	ND	ND	0.0013	0.0013	ND
KAFB-106125-250	**250**	5	0	6	20.08	20.03	19.77	0.20	0.16	0.2	ND	ND	ND	0.0009	ND

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
KAFB-106125-350	**350**	1	1	1	20.73	20.69	20.30	0.24	0.2	0.22	ND	ND	ND	0.0016	ND
KAFB-106125-450	**450**	584	444	398	19.98	20.32	20.27	0.68	0.66	0.64	ND	0.00038	ND	0.13	0.16
KAFB-106126-025	**25**	15	5	2	19.90	18.65	19.58	0.90	1.52	1.62	ND	0.00031	ND	0.0041	0.00051
KAFB-106126-050	**50**	32	4	2	19.53	19.30	19.59	1.38	1.24	1.24	0.0018	0.00035	ND	0.0046	ND
KAFB-106126-150	**150**	28	13	6	19.01	19.44	19.89	0.44	0.22	0.22	ND	0.00037	ND	0.017	0.023
KAFB-106126-250	**250**	32	8	2	19.70	19.75	20.17	0.16	0.16	0.14	ND	0.00038	ND	0.0079	ND
KAFB-106126-350	**350**	1	0	1	20.34	20.53	20.50	0.20	0.18	0.2	ND	ND	ND	0.005	0.00042
KAFB-106126-450	**450**	236	291	6	19.90	20.29	19.21	0.56	0.56	1.22	ND	ND	ND	0.018	0.0024
KAFB-106127-025	**25**	32	6	5	20.23	19.50	19.85	0.64	0.72	0.98	0.013	0.00089	ND	0.01	0.00063
KAFB-106127-050	**50**	12	17	4	20.68	19.70	20.05	0.82	0.7	0.76	0.028	ND	ND	ND	0.00079
KAFB-106127-150	**150**	10	3	1	19.79	19.51	19.59	0.42	0.24	0.24	ND	ND	ND	0.0037	ND
KAFB-106127-250	**250**	12	3	6	20.03	19.62	20.00	0.18	0.16	0.18	ND	ND	ND	0.0019	ND
KAFB-106127-350	**350**	31	2	6	20.14	20.33	20.93	0.22	0.2	0.24	ND	ND	ND	0.0016	0.00048
KAFB-106127-450	**450**	77	7	50	20.02	20.61	20.76	0.50	0.1	0.52	0.0038	ND	ND	0.037	0.02
KAFB-106128-025	**25**	2	6	2	20.45	20.36	19.98	0.04	0.26	0.2	ND	0.0016	0.0018	0.011	0.053
KAFB-106128-050	**50**	3	5	3	20.44	20.18	19.15	0.40	0.76	0.9	ND	0.00084	0.00045	0.0051	0.018
KAFB-106128-150	**150**	5	5	2	20.43	19.76	18.91	2.10	1.46	1.6	ND	0.00068	ND	0.0032	0.01
KAFB-106128-250	**250**	4	4	1	19.60	17.78	15.58	0.60	0.68	1.18	ND	0.00074	ND	0.0035	0.0088
KAFB-106128-350	**350**	823	1598	2570	19.74	18.00	16.38	1.08	0.9	1.3	0.057	0.07	0.11	3.6	7.7
KAFB-106128-450	**450**	7	4080	4190	17.75	14.78	13.42	0.22	1.34	1.9	0.015	1.1	0.082	17	1.8
KAFB-106129-025	**25**	14	12	15	20.58	20.50	20.66	0.14	0.16	0.22	ND	ND	0.0003	0.0077	0.0036
KAFB-106129-050	**50**	36	13	9	20.71	20.44	20.21	0.16	0.14	0.18	ND	0.0013	0.00031	0.013	ND
KAFB-106129-150	**150**	1	1	1	19.51	20.32	19.94	0.16	0.16	0.18	ND	ND	0.00045	0.007	0.003
KAFB-106129-250	**250**	4	1	12	18.59	19.74	19.27	0.32	0.3	0.36	ND	ND	0.00061	0.001	0.0057
KAFB-106129-350	**350**	2	2	11	19.14	20.07	19.47	1.00	0.72	0.7	ND	ND	0.0003	0.0013	0.0018
KAFB-106129-450	**450**	51	49	52	19.70	20.00	19.60	1.10	0.98	0.96	0.019	0.0057	0.0075	1.5	1.9
KAFB-106130-025	**25**	22	5	6	20.67	20.85	20.55	0.12	0.12	0.14	ND	0.00079	ND	0.0055	0.00048
KAFB-106130-050	**50**	27	14	8	20.55	20.92	20.72	0.14	0.14	0.2	ND	ND	ND	0.0048	ND
KAFB-106130-150	**150**	6	0	2	20.59	20.21	20.18	0.30	0.26	0.36	ND	ND	ND	0.0015	0.00043
KAFB-106130-250	**250**	5	0	2	20.08	19.77	19.79	0.52	0.48	0.52	ND	ND	ND	0.0011	ND
KAFB-106130-350	**350**	5	0	2	20.47	20.25	20.22	0.70	0.62	0.64	ND	ND	ND	0.0019	0.00076
KAFB-106130-450	**450**	2	7	3	20.31	20.64	20.35	0.56	0.04	0.28	ND	ND	ND	0.21	0.27
KAFB-106131-025	**25**	16	0	1	20.34	20.28	19.68	0.30	0.34	0.42	ND	ND	ND	0.0013	0.0037
KAFB-106131-055	**55**	15	1	2	20.27	20.45	19.95	0.22	0.26	0.24	ND	ND	ND	0.002	0.0049
KAFB-106131-150	**150**	8	2	3	19.98	19.75	19.74	0.28	0.2	0.24	ND	ND	ND	0.0012	0.00094
KAFB-106131-245	**245**	17	2	5	19.82	19.64	19.64	0.30	0.24	0.3	ND	ND	ND	0.0016	0.0012
KAFB-106131-350	**350**	4	1	3	17.48	17.76	17.65	0.20	0.14	0.16	ND	ND	ND	0.0033	0.0025
KAFB-106131-450	**450**	9	12	15	16.43	16.99	16.92	0.28	0.28	0.3	ND	0.0025	0.0023	2.6	2.5
KAFB-106132-025	**25**	18	5	2	19.62	18.60	18.79	1.50	1.7	1.8	ND	ND	ND	0.0027	0.0018
KAFB-106132-050	**50**	21	6	3	19.36	18.91	18.23	1.84	1.64	1.68	ND	ND	ND	0.002	0.0018
KAFB-106132-175	**175**	3	5	4	18.79	18.85	18.49	0.92	1.02	0.96	ND	ND	ND	0.0015	0.0014
KAFB-106132-250	**250**	26	7	8	20.03	19.76	19.43	0.44	0.4	0.4	ND	ND	ND	ND	0.0025
KAFB-106132-350	**350**	5	5	5	20.34	20.77	20.20	0.46	0.52	0.52	ND	ND	ND	0.00085	0.001
KAFB-106132-450	**450**	8	4	5	20.22	20.16	19.80	1.28	0.76	1	ND	ND	ND	0.0018	0.00063
KAFB-106133-025	**25**	3	13	4	19.54	19.17	19.17	1.60	1.78	1.6	ND	ND	0.00033	ND	0.0045

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
KAFB-106133-050	**50**	1	6	5	19.35	19.42	19.24	1.66	1.54	1.46	ND	ND	ND	0.0006	0.0036
KAFB-106133-170	**170**	4	8	6	18.51	18.84	19.09	0.84	0.58	0.56	ND	ND	ND	0.0053	0.0032
KAFB-106133-250	**250**	3	4	6	18.59	19.42	19.48	0.58	0.56	0.58	ND	ND	ND	ND	0.0062
KAFB-106133-350	**350**	6	6	6	20.22	20.61	20.58	0.84	0.74	0.74	ND	ND	ND	0.0019	0.0043
KAFB-106133-450	**450**	7	12	22	19.96	20.03	20.28	1.44	1.2	1.28	ND	0.00054	0.00069	0.029	0.025
KAFB-106134-025	**25**	0	3	1	20.68	20.54	20.62	0.18	0.2	0.26	ND	ND	0.00038	0.0012	0.06
KAFB-106134-050	**50**	1	4	0	20.55	20.71	20.63	0.24	0.2	0.2	ND	ND	ND	0.001	0.051
KAFB-106134-170	**170**	0	3	1	20.10	20.25	19.95	0.22	0.2	0.22	ND	ND	ND	ND	0.045
KAFB-106134-250	**250**	8	6	2	20.00	19.90	20.19	0.34	0.26	0.26	ND	ND	ND	ND	0.052
KAFB-106134-350	**350**	4	3	0	20.61	20.39	20.73	0.58	0.48	0.48	ND	ND	ND	0.00064	0.052
KAFB-106134-450	**450**	2	1	2	20.35	20.08	20.65	0.72	0.56	0.72	ND	0.0005	0.0004	0.0021	0.049
KAFB-106135-025	**25**	5	1	5	20.84	20.05	20.39	0.26	0.32	0.46	ND	ND	0.00068	0.0014	0.024
KAFB-106135-050	**50**	34	16	8	20.54	20.00	20.37	0.34	0.32	0.38	ND	ND	0.00034	ND	0.013
KAFB-106135-150	**150**	1	2	4	20.28	19.90	20.18	0.14	0.14	0.2	ND	ND	ND	ND	0.0067
KAFB-106135-250	**250**	3	0	3	20.76	20.29	20.28	0.22	0.18	0.24	ND	ND	ND	0.00069	0.0077
KAFB-106135-350	**350**	5	3	5	20.99	20.46	20.86	0.26	0.26	0.32	ND	ND	ND	ND	0.0059
KAFB-106135-450	**450**	2	0	4	20.62	20.54	21.00	0.36	0.22	0.4	ND	ND	ND	0.00075	0.0058
KAFB-106136-025	**25**	5	0	7	20.18	20.31	21.07	0.32	0.28	0.4	ND	ND	ND	0.0018	0.00056
KAFB-106136-050	**50**	27	7	2	20.07	20.22	20.02	0.26	0.26	0.24	ND	ND	ND	0.005	ND
KAFB-106136-150	**150**	5	0	3	20.02	20.36	20.08	0.12	0.12	0.1	ND	ND	ND	0.0011	0.00051
KAFB-106136-250	**250**	2	0	2	20.73	20.58	20.29	0.18	0.16	0.14	ND	ND	ND	0.00071	0.00054
KAFB-106136-350	**350**	2	0	3	20.55	20.72	20.39	0.18	0.16	0.16	ND	ND	ND	ND	0.00043
KAFB-106136-450	**450**	2	0	2	20.52	20.69	20.39	0.20	0.18	0.14	ND	ND	ND	0.00088	0.00063
KAFB-106137-025	**25**	4	5	1	21.16	20.41	20.28	0.26	0.38	0.4	ND	0.00062	ND	0.0053	0.0022
KAFB-106137-050	**50**	8	7	0	20.94	20.34	20.09	0.32	0.4	0.36	ND	0.0024	0.0003	0.018	0.0024
KAFB-106137-150	**150**	0	3	0	20.53	20.28	19.88	0.20	0.26	0.22	ND	0.00056	ND	0.0037	0.0017
KAFB-106137-250	**250**	8	4	0	21.34	20.41	20.02	0.28	0.32	0.28	ND	ND	0.0003	0.0019	0.002
KAFB-106137-350	**350**	7	4	0	21.27	20.62	20.38	0.30	0.36	0.32	ND	0.00043	ND	0.0036	0.0018
KAFB-106137-450	**450**	0	1342	1096	20.86	20.01	19.86	0.32	1.66	1.12	ND	0.24	0.05	26	17
KAFB-106138-025	**25**	6	1	5	18.09	17.35	16.58	3.14	3.84	4	ND	ND	ND	0.0018	0.00058
KAFB-106138-050	**50**	5	5	5	17.38	17.44	17.10	2.90	2.84	2.66	ND	ND	ND	ND	0.00047
KAFB-106138-150	**150**	13	4	7	18.65	19.47	19.42	0.28	0.24	0.26	ND	ND	ND	ND	ND
KAFB-106138-250	**250**	2	2	6	20.02	19.88	19.77	0.36	0.3	0.3	0.0027	ND	ND	ND	0.00059
KAFB-106138-350	**350**	3	0	7	20.22	20.41	20.25	0.30	0.28	0.26	0.002	ND	ND	0.00061	0.00044
KAFB-106138-450	**450**	7	2	5	20.28	20.57	19.91	0.28	0.26	0.24	ND	ND	ND	0.0097	0.00061
KAFB-106139-025	**25**	5	12	1	20.40	20.31	20.15	0.60	0.6	0.6	0.0034	0.00075	0.00031	0.0044	0.0048
KAFB-106139-050	**50**	5	5	3	20.46	19.81	19.84	0.86	0.72	0.74	ND	0.00095	0.00035	0.0055	0.0033
KAFB-106139-150	**150**	4	3	3	18.91	19.04	19.09	0.66	0.5	0.52	ND	ND	ND	0.0021	0.0044
KAFB-106139-250	**250**	2	0	0	19.47	19.44	19.25	0.56	0.48	0.48	0.0074	0.0004	ND	0.011	0.012
KAFB-106139-350	**350**	2	2	0	19.64	19.77	19.68	0.48	0.4	0.38	ND	0.00035	ND	0.0031	0.02
KAFB-106139-450	**450**	6	6	0	20.39	20.25	20.21	0.72	0.43	0.5	ND	ND	ND	0.0027	0.0034
KAFB-106140-025	**25**	26	3	0	21.01	21.05	21.06	0.20	0.12	0.2	ND	ND	ND	ND	0.0023
KAFB-106140-050	**50**	15	3	2	20.92	21.05	20.54	0.20	0.14	0.14	ND	ND	ND	ND	0.0011
KAFB-106140-150	**150**	6	0	1	20.66	20.61	20.51	0.18	0.12	0.14	ND	ND	ND	0.0005	0.0012
KAFB-106140-250	**250**	24	0	3	20.05	20.12	20.12	0.20	0.16	0.18	ND	ND	ND	ND	0.00092

Table 3-2. Quarterly Sampling Event Field Parameters and Select Analytical Results

Sample Location	Depth	HC (ppmv) Q1	HC (ppmv) Q3	HC (ppmv) Q4	O_2 % Q1	O_2 % Q3	O_2 % Q4	CO2 % Q1	CO2 % Q3	CO2 % Q4	EDB (ppmv) Q1	EDB (ppmv) Q3	EDB (ppmv) Q4	Benzene (ppmv) Q3	Benzene (ppmv) Q4
KAFB-106140-350	**350**	17	1	4	20.79	20.94	20.95	0.24	0.18	0.24	ND	ND	ND	ND	0.0012
KAFB-106140-450	**450**	9	0	0	20.60	20.77	19.81	0.42	0.34	0.16	ND	ND	ND	0.0063	0.0024
KAFB-106141-025	**25**	7	10	2	19.87	18.50	18.16	0.38	0.36	0.48	ND	ND	ND	ND	0.0012
KAFB-106141-050	**50**	16	5	1	19.52	19.09	19.03	0.16	0.16	0.14	ND	ND	ND	0.00044	0.00053
KAFB-106141-170	**170**	9	9	3	20.10	19.64	19.41	0.14	0.16	0.14	ND	ND	ND	ND	0.00069
KAFB-106141-250	**250**	5	10	3	20.10	19.68	19.41	0.16	0.18	0.16	ND	ND	ND	ND	0.017
KAFB-106141-350	**350**	2	2	1	20.44	19.94	19.64	0.08	0.1	0.16	ND	ND	ND	ND	0.00076
KAFB-106141-450	**450**	3	15	5	20.60	20.03	20.05	0.02	0.04	0.14	ND	ND	ND	ND	0.0013
KAFB-106142-030	**30**	4	3	3	20.28	20.12	20.82	0.34	0.3	0.32	ND	0.0011	ND	0.0082	0.0011
KAFB-106142-050	**50**	21	12	5	20.04	20.01	20.70	0.32	0.3	0.28	ND	0.0012	ND	0.01	ND
KAFB-106142-170	**170**	3	4	5	20.33	20.55	20.86	0.16	0.16	0.16	ND	0.00086	ND	0.0034	0.0048
KAFB-106142-250	**250**	3	5	6	20.25	20.46	20.90	0.16	0.16	0.18	ND	0.00075	ND	0.0079	0.027
KAFB-106142-350	**350**	3	1	5	20.18	20.08	20.97	0.18	0.18	0.2	ND	ND	ND	0.0026	0.00055
KAFB-106142-450	**450**	3	6	6	20.56	20.61	21.33	0.22	0.22	0.26	0.0038	0.00084	ND	0.13	0.22

Lab TPH sum used in place of field HC due to field instrument detector saturation

* Field instrument detection saturated, but lab TPH sum was lower than field maximum detection so field HC is still provided

% = percent

CO2 = carbon dioxide

EDB = ethylene dibromide

HC = hydrocarbon

ND = not detected

NR = not recorded

O2 = oxygen

ppmv = parts per million volume

Q1 = first quarter, 2015 soil-vapor sampling event

Q3 = third quarter, 2015 soil-vapor sampling event

Q4 = fourth quarter, 2015 soil-vapor sampling event

Table 3-3. In Situ Microbial Activity and Relevant Q4 Soil-Vapor Concentrations

SVMP ID	HC (ppmv)	EDB (ppmv)	Benzene (ppmv)	O_2 Utilization Rate (%/day)	Biodegradation Rate (mg/kg/day)
SVMW-01-100	2,460	0.00066	18	-0.0035	-0.0016
SVMW-02-150	159	0.013	0.25	0.0011	0.0005
SVMW-03-100	6,320	0.42	30	-0.0773	-0.0363
SVMW-03-250	11,020	0.36	36	-0.0878	-0.0413
SVMW-03-300	13,830	1.5	120	-0.0655	-0.0308
SVMW-04-100	14,050	0.38	160	0.0027	0.0013
SVMW-04-250	11,420	0.022	40	-0.0138	-0.0065
SVMW-05-050	2	0.0013	0.11	-0.0015	-0.0007
SVMW-05-100	1	0.00049	0.062	-0.002	-0.0009
SVMW-06-100	0	ND	0.00044	0.001	0.0005
SVMW-06-252	484	0.012	130	-0.0014	-0.0006
SVMW-06-302	39	0.099	7.3	-0.0009	-0.0004
SVMW-08-100	4	0.41	200	-0.0305	-0.0143
SVMW-08-250	10,040	3	390	-0.0135	-0.0064
SVMW-09-100	19,160	13	510	-0.0196	-0.0092
SVMW-09-266	20,730	2.2	400	-0.0332	-0.0156
SVMW-10-100	30,580	6.5	110	-0.0287	-0.0135
SVMW-10-150	27,280	5.5	240	-0.035	-0.0164
SVMW-10-250	13,260	2.1	260	-0.0576	-0.0271
SVMW-11-050	29,370	0.021	0.56	-0.1603	-0.0753
SVMW-11-250	29,060	0.0016	0.053	-0.1269	-0.0597
SVMW-13-150	677	0.001	0.015	-0.0123	-0.0058
KAFB-106108-150	7	0.0008	0.0092	0.0034	0.0016
KAFB-106109-450	0	0.00051	0.0077	0.001	0.0005
KAFB-106110-150	2	0.011	2.3	0.0017	0.0008
KAFB-106111-150	2	0.00052	0.74	-0.0038	-0.0018
KAFB-106111-350	144	0.0021	0.0079	0.003	0.0014
KAFB-106112-250	15	0.0062	2.4	0.0007	0.0003
KAFB-106112-350	0	ND	0.0031	0.0005	0.0002
KAFB-106112-450	28	0.007	0.89	0.0001	0
KAFB-106113-350	1	ND	0.0014	0.0011	0.0005
KAFB-106113-450	180	0.12	4.2	0.0018	0.0009
KAFB-106114-350	0	ND	0.0013	0.0024	0.0011
KAFB-106114-450	669	0.00078	0.34	0.0017	0.0008
KAFB-106115-150	3	0.00072	0.0082	0.0017	0.0008
KAFB-106115-450	894	ND	0.013	-0.0014	-0.0006
KAFB-106116-050	3	0.029	1.2	-0.0002	-0.0001
KAFB-106116-150	1	0.085	5.2	0.0008	0.0004
KAFB-106116-350	12	ND	0.0029	0.0035	0.0016
KAFB-106116-450	724	0.032	0.54	-0.0059	-0.0028
KAFB-106117-150	2	0.18	16	-0.007	-0.0033
KAFB-106117-350	378	0.00045	ND	-0.0351	-0.0165
KAFB-106117-450	1,990	0.071	0.25	-0.0598	-0.0281
KAFB-106119-150	77	0.008	4.2	-0.0116	-0.0054
KAFB-106119-250	198	0.0024	0.062	-0.0128	-0.006
KAFB-106119-350	1006	0.008	4.2	-0.0056	-0.0026
KAFB-106119-450	1	0.0024	0.062	0.0019	0.0009
KAFB-106121-050	2	ND	0.00074	-0.003	-0.0014
KAFB-106125-050	1	ND	0.0009	-0.0009	-0.0004
KAFB-106125-450	398	ND	0.16	0.002	0.0009
KAFB-106126-450	6	ND	0.0024	-0.0035	-0.0017
KAFB-106128-350	2,570	0.11	7.7	-0.0182	-0.0085
KAFB-106128-450	4,190	0.082	1.8	-0.0252	-0.0118
KAFB-106129-250	12	0.00061	0.0057	-0.0006	-0.0003
KAFB-106129-350	11	0.0003	0.0018	-0.0014	-0.0007

Table 3-3. In Situ Microbial Activity and Relevant Q4 Soil-Vapor Concentrations

SVMP ID	HC (ppmv)	EDB (ppmv)	Benzene (ppmv)	O_2 Utilization Rate (%/day)	Biodegradation Rate (mg/kg/day)
KAFB-106129-450	52	0.0075	1.9	0.0009	0.0004
KAFB-106131-350	3	ND	0.0025	0.0031	0.0015
KAFB-106131-450	15	0.0023	2.5	0.004	0.0019
SVEW-07-160	28,400	0.031	250	-0.0093	-0.0044
SVEW-03-160	8,060	0.33	89	-0.0419	-0.0197
SVMW-12-450	0	0.0022	0.0063	0.0019	0.0009
KAFB-106122-150	3	ND	ND	-0.0004	-0.0002
KAFB-106140-150	1	ND	0.0012	0.002	0.0009

%/day = percent per day
EDB = ethylene dibromide
HC = Hydrocarbon
ID = Identification
mg/kg/day = milligrams per kilogram per day
ND = not detected
O_2 = oxygen
ppmv = parts per million volume
SVMP = soil vapor monitoring point

Table 3-4. Soil-vapor Equilibrium Relative Humidity Measurements

SVMP ID	4-9-2015 %ERH	4-17-2015 %ERH	5-12-15 %ERH	Q4 %ERH
SVMW-01-050	NR	NR	NR	67.4
SVMW-01-100	NR	NR	64.6	76.5
SVMW-01-250	NR	NR	NR	60.5
SVMW-01-300	NR	NR	NR	48.6
SVMW-02-050	NR	NR	NR	92.1
SVMW-02-100	NR	NR	NR	88.1
SVMW-02-150	NR	NR	51.5	92.8
SVMW-03-050	NR	NR	NR	75.5
SVMW-03-100	NR	NR	77.8	79.3
SVMW-03-250	NR	NR	77.7	80
SVMW-03-300	NR	NR	79.6	75.9
SVMW-04-050	NR	NR	NR	74.8
SVMW-04-100	NR	NR	59.3	67.4
SVMW-04-250	NR	NR	54.2	64.1
SVMW-04-300	NR	NR	NR	61.6
SVMW-05-050	NR	NR	68.3	85.5
SVMW-05-100	NR	NR	72.2	82.7
SVMW-05-230	NR	NR	NR	66.2
SVMW-05-290	NR	NR	NR	66.3
SVMW-06-050	NR	NR	NR	86.4
SVMW-06-100	NR	NR	76.9	69.1
SVMW-06-252	NR	NR	78.2	79
SVMW-06-302	NR	NR	82.4	80.6
SVMW-07-050	NR	NR	NR	NR
SVMW-07-100	NR	NR	NR	NR
SVMW-07-150	NR	NR	NR	NR
SVMW-08-050	NR	NR	NR	NR
SVMW-08-100	46.9	73.8	62.8	86.4
SVMW-08-250	NR	NR	NR	96.5
SVMW-09-050	NR	NR	NR	85.3
SVMW-09-100	57.1	83.6	64.6	91
SVMW-09-250	NR	NR	NR	NR
SVMW-09-266	48.1	80.0	71.8	92.8
SVMW-10-050	NR	NR	NR	88.9
SVMW-10-100	38.9	68.0	73.7	95.3
SVMW-10-150	54.7	66.4	82.5	99.9
SVMW-10-250	NR	NR	73.5	99.9
SVMW-11-050	NR	NR	61.3	98.6
SVMW-11-100	NR	NR	NR	NR
SVMW-11-250	NR	NR	59.6	96.5
SVMW-11-260	NR	NR	NR	99.9
SVMW-12-150	NR	NR	NR	91.3
SVMW-12-250	NR	NR	NR	NR
SVMW-12-350	NR	NR	NR	89.1
SVMW-12-450	28.6	52.7	49.9	92.3
SVMW-13-150	21.4	55.9	68.3	99.3
SVMW-13-250	NR	NR	NR	96.7
SVMW-13-350	NR	NR	NR	99.9
SVMW-13-450	NR	NR	NR	99.9
SVMW-14-150	NR	NR	NR	99.2
SVMW-14-250	NR	NR	NR	95.6
SVMW-14-350	NR	NR	NR	87.7
SVMW-14-450	NR	NR	NR	82.2
SVMW-15-150	NR	NR	NR	NR
SVMW-15-250	NR	NR	NR	96
SVMW-15-350	NR	NR	NR	97.7
SVMW-15-450	NR	NR	NR	97
KAFB-106028-150	NR	NR	NR	69.5
KAFB-106028-250	NR	NR	NR	74.8

Table 3-4. Soil-vapor Equilibrium Relative Humidity Measurements

SVMP ID	4-9-2015 %ERH	4-17-2015 %ERH	5-12-15 %ERH	Q4 %ERH
KAFB-106028-350	NR	NR	NR	65.8
KAFB-106028-450	NR	NR	NR	78.2
SVEW-01-260	NR	NR	NR	82.80
SVEW-02-060	NR	NR	NR	76.00
SVEW-03-160	NR	80.4	75.6	85.30
SVEW-04-313	NR	NR	NR	54.50
SVEW-05-460	NR	NR	NR	72.50
SVEW-06-060	NR	NR	NR	87.40
SVEW-07-160	NR	85.2	77.3	85.70
SVEW-08-260	NR	NR	NR	86.10
SVEW-09-460	NR	NR	NR	86.00
SVEW-10-410	NR	NR	NR	86.5
SVEW-11-410	NR	NR	NR	98.6
SVEW-12-410	NR	NR	NR	85.9
SVEW-13-410	NR	NR	NR	94.8
KAFB-106108-025	NR	NR	NR	99.9
KAFB-106108-050	NR	NR	NR	99.9
KAFB-106108-150	NR	NR	60.3	99.9
KAFB-106108-250	NR	NR	NR	99.9
KAFB-106108-350	NR	NR	NR	99.9
KAFB-106108-450	NR	NR	NR	86.5
KAFB-106109-025	NR	NR	NR	99.9
KAFB-106109-050	NR	NR	NR	99.9
KAFB-106109-150	NR	NR	NR	99.9
KAFB-106109-250	NR	NR	NR	99.9
KAFB-106109-350	NR	NR	NR	99.9
KAFB-106109-450	NR	NR	60.5	99.9
KAFB-106110-025	NR	NR	NR	99.9
KAFB-106110-050	NR	NR	NR	99.9
KAFB-106110-150	NR	NR	59.0	99.9
KAFB-106110-250	NR	NR	NR	99.9
KAFB-106110-350	NR	NR	NR	99.9
KAFB-106110-450	NR	NR	NR	99.9
KAFB-106111-025	NR	NR	NR	99.9
KAFB-106111-050	NR	NR	NR	99.9
KAFB-106111-150	NR	NR	69.7	99.9
KAFB-106111-250	NR	NR	NR	99.9
KAFB-106111-350	NR	NR	61.0	99.9
KAFB-106111-450	NR	NR	NR	99.9
KAFB-106112-025	NR	NR	NR	99.9
KAFB-106112-050	NR	NR	NR	99.9
KAFB-106112-150	NR	NR	NR	99.9
KAFB-106112-250	NR	NR	76.0	99.9
KAFB-106112-350	NR	NR	77.8	99.9
KAFB-106112-450	NR	NR	80.2	90
KAFB-106113-020	NR	NR	NR	78.9
KAFB-106113-050	NR	NR	NR	64.6
KAFB-106113-150	NR	NR	NR	59.1
KAFB-106113-250	NR	NR	NR	NR
KAFB-106113-350	NR	NR	69.1	NR
KAFB-106113-450	NR	NR	72.8	50.6
KAFB-106114-025	NR	NR	NR	75.7
KAFB-106114-050	NR	NR	NR	74.3
KAFB-106114-150	NR	NR	NR	52
KAFB-106114-250	NR	NR	NR	51.5
KAFB-106114-350	NR	NR	75.0	45.7
KAFB-106114-450	NR	NR	73.6	45.5
KAFB-106115-025	NR	NR	NR	63.5
KAFB-106115-050	NR	NR	NR	63.1

Table 3-4. Soil-vapor Equilibrium Relative Humidity Measurements

SVMP ID	4-9-2015 %ERH	4-17-2015 %ERH	5-12-15 %ERH	Q4 %ERH
KAFB-106115-150	NR	NR	75.8	58.5
KAFB-106115-250	NR	NR	NR	NR
KAFB-106115-350	NR	NR	NR	NR
KAFB-106115-450	NR	NR	71.7	43
KAFB-106116-025	NR	NR	NR	67.1
KAFB-106116-050	NR	NR	76.4	58.8
KAFB-106116-150	NR	NR	76.6	47.8
KAFB-106116-250	NR	NR	NR	41
KAFB-106116-350	NR	NR	69.5	NR
KAFB-106116-450	NR	NR	68.4	36.2
KAFB-106117-025	NR	NR	NR	43.9
KAFB-106117-050	NR	NR	NR	58.1
KAFB-106117-150	NR	NR	74.3	46.8
KAFB-106117-250	NR	NR	NR	43.5
KAFB-106117-350	NR	NR	64.4	39.3
KAFB-106117-450	NR	NR	73.4	41.1
KAFB-106118-025	NR	NR	NR	86.2
KAFB-106118-050	NR	NR	NR	91.1
KAFB-106118-160	NR	NR	NR	86.9
KAFB-106118-265	NR	NR	NR	75.8
KAFB-106118-350	NR	NR	NR	95.6
KAFB-106118-450	NR	NR	NR	68.5
KAFB-106119-025	NR	NR	NR	50.3
KAFB-106119-050	NR	NR	NR	NR
KAFB-106119-150	NR	NR	62.5	NR
KAFB-106119-250	NR	NR	65.1	42.7
KAFB-106119-350	NR	NR	66.5	43.9
KAFB-106119-450	NR	NR	70.0	50
KAFB-106120-025	NR	NR	NR	57.5
KAFB-106120-050	NR	NR	NR	41.5
KAFB-106120-150	NR	NR	NR	51.8
KAFB-106120-250	NR	NR	NR	65.9
KAFB-106120-350	NR	NR	NR	42.4
KAFB-106120-450	NR	NR	NR	43.3
KAFB-106121-025	NR	NR	NR	NR
KAFB-106121-050	NR	NR	67.1	56.5
KAFB-106121-150	NR	NR	NR	60.8
KAFB-106121-250	NR	NR	NR	62.7
KAFB-106121-350	NR	NR	NR	NR
KAFB-106121-440	NR	NR	NR	45.2
KAFB-106122-025	NR	NR	NR	68.2
KAFB-106122-050	NR	NR	NR	43.4
KAFB-106122-150	NR	NR	67.4	43.7
KAFB-106122-250	NR	NR	NR	42.2
KAFB-106122-350	NR	NR	NR	39.3
KAFB-106122-450	NR	NR	NR	39
KAFB-106123-025	NR	NR	NR	57
KAFB-106123-050	NR	NR	NR	52.4
KAFB-106123-150	NR	NR	NR	37.5
KAFB-106123-250	NR	NR	NR	52.6
KAFB-106123-350	NR	NR	NR	54.2
KAFB-106123-450	NR	NR	NR	56.4
KAFB-106124-025	NR	NR	NR	65.6
KAFB-106124-050	NR	NR	NR	64.4
KAFB-106124-150	NR	NR	NR	63.8
KAFB-106124-250	NR	NR	NR	40.3
KAFB-106124-350	NR	NR	NR	37.3
KAFB-106124-450	NR	NR	NR	44.5
KAFB-106125-025	NR	NR	NR	99.9

Table 3-4. Soil-vapor Equilibrium Relative Humidity Measurements

SVMP ID	4-9-2015 %ERH	4-17-2015 %ERH	5-12-15 %ERH	Q4 %ERH
KAFB-106125-050	NR	NR	66.3	99.9
KAFB-106125-150	NR	NR	NR	88.9
KAFB-106125-250	NR	NR	NR	83.5
KAFB-106125-350	NR	NR	NR	81.6
KAFB-106125-450	NR	NR	66.4	75.5
KAFB-106126-025	NR	NR	NR	89.5
KAFB-106126-050	NR	NR	NR	88.8
KAFB-106126-150	NR	NR	NR	97.5
KAFB-106126-250	NR	NR	NR	98
KAFB-106126-350	NR	NR	NR	77.4
KAFB-106126-450	NR	NR	62.8	86.1
KAFB-106127-025	NR	NR	NR	91.5
KAFB-106127-050	NR	NR	NR	96.7
KAFB-106127-150	NR	NR	NR	NR
KAFB-106127-250	NR	NR	NR	84.2
KAFB-106127-350	NR	NR	NR	73.1
KAFB-106127-450	NR	NR	NR	69.4
KAFB-106128-025	NR	NR	NR	48
KAFB-106128-050	NR	NR	NR	41.2
KAFB-106128-150	NR	NR	NR	40.6
KAFB-106128-250	NR	NR	NR	38.1
KAFB-106128-350	39.6	92.1	65.0	52
KAFB-106128-450	57.1	99.9	72.7	42.9
KAFB-106129-025	NR	NR	NR	76.9
KAFB-106129-050	NR	NR	NR	75.8
KAFB-106129-150	NR	NR	NR	49.9
KAFB-106129-250	NR	NR	57.4	61.7
KAFB-106129-350	NR	NR	59.6	61.6
KAFB-106129-450	NR	NR	70.6	46.9
KAFB-106130-025	NR	NR	NR	NR
KAFB-106130-050	NR	NR	NR	87.7
KAFB-106130-150	NR	NR	NR	63
KAFB-106130-250	NR	NR	NR	62
KAFB-106130-350	NR	NR	NR	60
KAFB-106130-450	NR	NR	NR	62.8
KAFB-106131-025	NR	NR	NR	64.6
KAFB-106131-055	NR	NR	NR	60.3
KAFB-106131-150	NR	NR	NR	48.4
KAFB-106131-245	NR	NR	NR	64.6
KAFB-106131-350	NR	NR	68.3	53.4
KAFB-106131-450	NR	NR	73.3	49
KAFB-106132-025	NR	NR	NR	79.7
KAFB-106132-050	NR	NR	NR	72.5
KAFB-106132-175	NR	NR	NR	66.3
KAFB-106132-250	NR	NR	NR	81.4
KAFB-106132-350	NR	NR	NR	65.8
KAFB-106132-450	NR	NR	NR	68.2
KAFB-106133-025	NR	NR	NR	87.7
KAFB-106133-050	NR	NR	NR	80.4
KAFB-106133-170	NR	NR	NR	86.2
KAFB-106133-250	NR	NR	NR	69.1
KAFB-106133-350	NR	NR	NR	72.2
KAFB-106133-450	NR	NR	NR	66
KAFB-106134-025	NR	NR	NR	99.9
KAFB-106134-050	NR	NR	NR	99.9
KAFB-106134-170	NR	NR	NR	99.9
KAFB-106134-250	NR	NR	NR	99.9
KAFB-106134-350	NR	NR	NR	99.9
KAFB-106134-450	NR	NR	NR	99.9

Table 3-4. Soil-vapor Equilibrium Relative Humidity Measurements

SVMP ID	4-9-2015 %ERH	4-17-2015 %ERH	5-12-15 %ERH	Q4 %ERH
KAFB-106135-025	NR	NR	NR	96.6
KAFB-106135-050	NR	NR	NR	99.9
KAFB-106135-150	NR	NR	NR	94.3
KAFB-106135-250	NR	NR	NR	94.5
KAFB-106135-350	NR	NR	NR	94.5
KAFB-106135-450	NR	NR	NR	95.8
KAFB-106136-025	NR	NR	NR	94.3
KAFB-106136-050	NR	NR	NR	97.6
KAFB-106136-150	NR	NR	NR	94.5
KAFB-106136-250	NR	NR	NR	96.1
KAFB-106136-350	NR	NR	NR	96.5
KAFB-106136-450	NR	NR	NR	92.3
KAFB-106137-025	NR	NR	NR	99.9
KAFB-106137-050	NR	NR	NR	99.9
KAFB-106137-150	NR	NR	NR	99.9
KAFB-106137-250	NR	NR	NR	99.5
KAFB-106137-350	NR	NR	NR	99.9
KAFB-106137-450	NR	NR	NR	95.5
KAFB-106138-025	NR	NR	NR	77.1
KAFB-106138-050	NR	NR	NR	84.6
KAFB-106138-150	NR	NR	NR	77.6
KAFB-106138-250	NR	NR	NR	63.8
KAFB-106138-350	NR	NR	NR	60.9
KAFB-106138-450	NR	NR	NR	82.7
KAFB-106139-025	NR	NR	NR	99.9
KAFB-106139-050	NR	NR	NR	99.9
KAFB-106139-150	NR	NR	NR	99.9
KAFB-106139-250	NR	NR	NR	99.9
KAFB-106139-350	NR	NR	NR	99.9
KAFB-106139-450	NR	NR	NR	99.9
KAFB-106140-025	NR	NR	NR	89.8
KAFB-106140-050	NR	NR	NR	85.4
KAFB-106140-150	NR	NR	59.2	62.6
KAFB-106140-250	NR	NR	NR	70.7
KAFB-106140-350	NR	NR	NR	73
KAFB-106140-450	NR	NR	NR	56.2
KAFB-106141-025	NR	NR	NR	87.4
KAFB-106141-060	NR	NR	NR	91.6
KAFB-106141-170	NR	NR	NR	87
KAFB-106141-250	NR	NR	NR	86.6
KAFB-106141-350	NR	NR	NR	72.1
KAFB-106141-450	NR	NR	NR	53.2
KAFB-106142-030	NR	NR	NR	96.5
KAFB-106142-050	NR	NR	NR	97.4
KAFB-106142-170	NR	NR	NR	99.9
KAFB-106142-250	NR	NR	NR	96
KAFB-106142-350	NR	NR	NR	95.7
KAFB-106142-450	NR	NR	NR	98.3

% = percent
ERH = equilibrium relative humidity
ID = identification
NR = not recorded
Q4 = Quarter 4 2015
SVMP = soil vapor monitoroing point