




CITY OF TUCSON

MEMORANDUM

DATE: May 17, 2011

TO: Ryan Airfield Landfill File

FROM: **Molly Collins, R.G.**
Project Coordinator
Environmental Services Dept. 

SUBJECT: **Ryan Airfield Closed Landfill
Soil Gas Monitoring Report 2010 and 2011**

The City of Tucson-Environmental Services (COT-ES) conducted this soil gas monitoring event to verify soil gas concentrations observed during soil gas monitoring in December 2009. This memorandum documents the soil vapor sampling events conducted in late 2010 and early 2011 at the Ryan Air Field closed landfill (RAF) (Figure 1).

As discussed in the previous RAF monitoring report: *Ryan Airfield Closed Landfill Groundwater and Soil Gas Monitoring Report 2009*, dated November 4, 2010, COT-ES ended the groundwater monitoring program at the RAF based on a review of the trends for the previous 7 years of vapor phase data, and 3 years of groundwater VOC data. However, COT-ES performed this soil vapor sample event to verify the 2009 laboratory results of the vapor samples because sample results from all vapor probes were reported as non-detect for tetrachloroethene (PCE). The non-detect result was anomalous given historical trends in the vapor probes.

Scope of Work

- In December 2010, vapor samples were collected from vapor probes installed in R-114A, R-115A, R-116A and R-117A (Figure 2). Each well has three probes installed at varying depths (45, 95, 145 feet below land surface (ft BLS)). Vapor samples were submitted to Xenco Laboratories for analysis for volatile organic compounds (VOCs) by Method TO-15.
- In April 2011, a vapor sample was recollected from vapor probe R-116A depth 145' because the container in which the initial sample was collected had arrived at the laboratory with excess vacuum, indicating that no sample was collected.

Results

Soil Vapor Quality

Prior to sampling, the probes in each well were purged and landfill gas concentrations were measured using the Landtec GEM 2000 Gas Analyzer and Extraction Monitor (Table 1 and Attachment 2). Methane was not detected in any deep soil vapor probe during either the December 2010 and April 2011 events.

Tabulated summaries of soil vapor data for selected VOCs are provided on Table 2 for probes at R-114A, R-115A, R-116A, and R-117A. The latest event indicated a maximum PCE concentration were detected in probe R-115A depth 45' ft BLS at 0.4 µg/L. The maximum detection for trichloroethene (TCE) was reported as 0.007 µg/L in well R-114A at the 145 foot depth. Figures 3 and 4 show historical soil vapor concentrations of PCE and TCE, respectively, detected at all wells and probes. The trends indicate that PCE concentrations have been declining in the probes since 2006. The 2010 and 2011 sampling events show that continuing downward trend of PCE concentrations, except for in probes R-115 at 45' and 95', which had detected the highest concentrations seen for these probes with concentrations of 0.4 µg/L and 0.37 µg/L, respectively.

The lab results for all samples collected in 2009 were reported as nondetect for PCE which was anomalous to historic trends and would appear to be in error as the verification sampling event shows PCE being detected in every probe except one, R-116A 145'. The 2009 vapor results are considered suspect and were removed from the data set.

Although PCE and TCE have been detected in the vadose zone, these concentrations are low in comparison to the estimated groundwater protection levels (GPLs) established for soil vapor at the Ryan Landfill by Hargis+Associates in 2008¹ for VOC levels at the soil-groundwater level interface. The estimated site specific GPLs for the RAF Landfill are shown below. The maximum values observed at that site are also shown below. The maximum detected concentrations are significantly below the estimated GPLs which indicate there is little risk at this time of vapor phase VOC impacts to groundwater above Aquifer Water Quality Standards (AWQSs).

Compound	Ryan Landfill Maximum Detected Concentrations (µg/L) and Year Detected	Well ID and Depth of Screen (ft)	Ryan Landfill GPLs (µg/L)
PCE	2.4 (2006)	R-114A-145'	37
TCE	0.94 (2003)	R-114A-95'	15
Vinyl chloride	0.11 (2005)	R-117A-145'	454
Cis-1,2 dichloroethene	0.015 (2003)	R-116A-95'	172

ND = not detected

¹ *Soil Vapor Assessment at Los Reales, Prudence, Vincent Mullins, Irvington, Cottonwood, and Ryan Landfills*, EEC and Hargis + Associates, Inc, April 10, 2008

There are no soil vapor probes constructed in the vadose zone between 145 ft BLS and the top of the soil-groundwater interface at approximately 455 ft BLS. This leaves approximately 300 ft of vadose zone where soil vapors are not being monitored. Based on the maximum detected concentrations of VOCs in soil vapor, and the historic groundwater quality data (discussed in previous monitoring reports) from the three on-site wells, the lack of data from the lower-most 300 ft of vadose zone does not pose a significant data gap.

As discussed in the 2010 monitoring report, if the VOC levels in the soil vapor data collected during the resample event remained below their respective soil vapor GPLs and were consistent with past levels, COT-ES would discontinue soil vapor sampling at the site.

Proposed Changes to Monitoring.

VOC levels in the soil vapor data continue to be below the soil vapor GPLs and are consistent with past levels. COT-ES will discontinue annual soil vapor monitoring at the landfill. COT-ES will reevaluate conditions at the landfill annually to determine if additional groundwater or deep soil vapor monitoring is necessary.

In 2010, COT-ES initiated a program to inspect and maintain the landfill annually to correct problems such as wildcat dumping, erosion of soil cover, and vandalism of the wells². All groundwater and deep vapor monitoring wells will be inspected and repaired as needed to ensure they are secure and remain in proper working order.

Conclusions

- Vapor data showing PCE non-detected in all samples collected in December 2009 appears to be suspect and was removed from the data set. Verification sampling conducted and reported here show concentrations consistent with historic data.
- Concentrations of VOCs, particularly PCE and TCE, collected to date indicate that there are no impacts to the groundwater due to leachate or soil vapor migration from the waste.
- Since VOC levels in the soil vapor data are below their respective soil vapor GPLs and consistent with past levels, COT-ES will discontinue soil vapor sampling at the site.
- COT-ES will reevaluate the landfill conditions annually to determine if additional soil vapor and groundwater monitoring is necessary.
- All City owned landfills, including RAF, will be inspected and maintained to correct problems such as wildcat dumping, erosion of soil cover, and vandalism of the wells. All groundwater and deep vapor monitoring wells at this landfill will be inspected and repaired as needed to ensure they are secure and in proper working order. The results of the inspections will be documented annually to the files.

If you have any questions concerning this memorandum, please contact me at (520) 837-3703.

² *City of Tucson Closed Landfills Inspection and Maintenance Reporting and Procedures*, City of Tucson Environmental Services, March 2011

Enclosures and Attachments

ENCLOSURES

Figures

- 1: Ryan Airfield Landfill – Vicinity Location Map
- 2: Ryan Airfield Landfill – Site Map
- 3: Soil Vapor PCE Concentration by Probe Depth
- 4: Soil Vapor TCE Concentration by Probe Depths

Tables

- 1: Field Measurements for Landfill Gas
- 2: Vapor Probe Results – Selected VOCs Probes

ATTACHMENTS

- Attachment 1: Soil Vapor Analytical Sheets
- Attachment 2: Soil Gas Sample Form

cc: File copy—with all attachments

(With Figures only)

Fred Brinker, Tucson Airport Authority (Full Report)

(Full Report Email Link)

Ralph Marra, Tucson Water

John Kmiec, Tucson Water

Jim Critchey, Fire Department

Andrew Quigley, Environmental Services

Nancy Petersen, Environmental Services

MC/le

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FIGURES

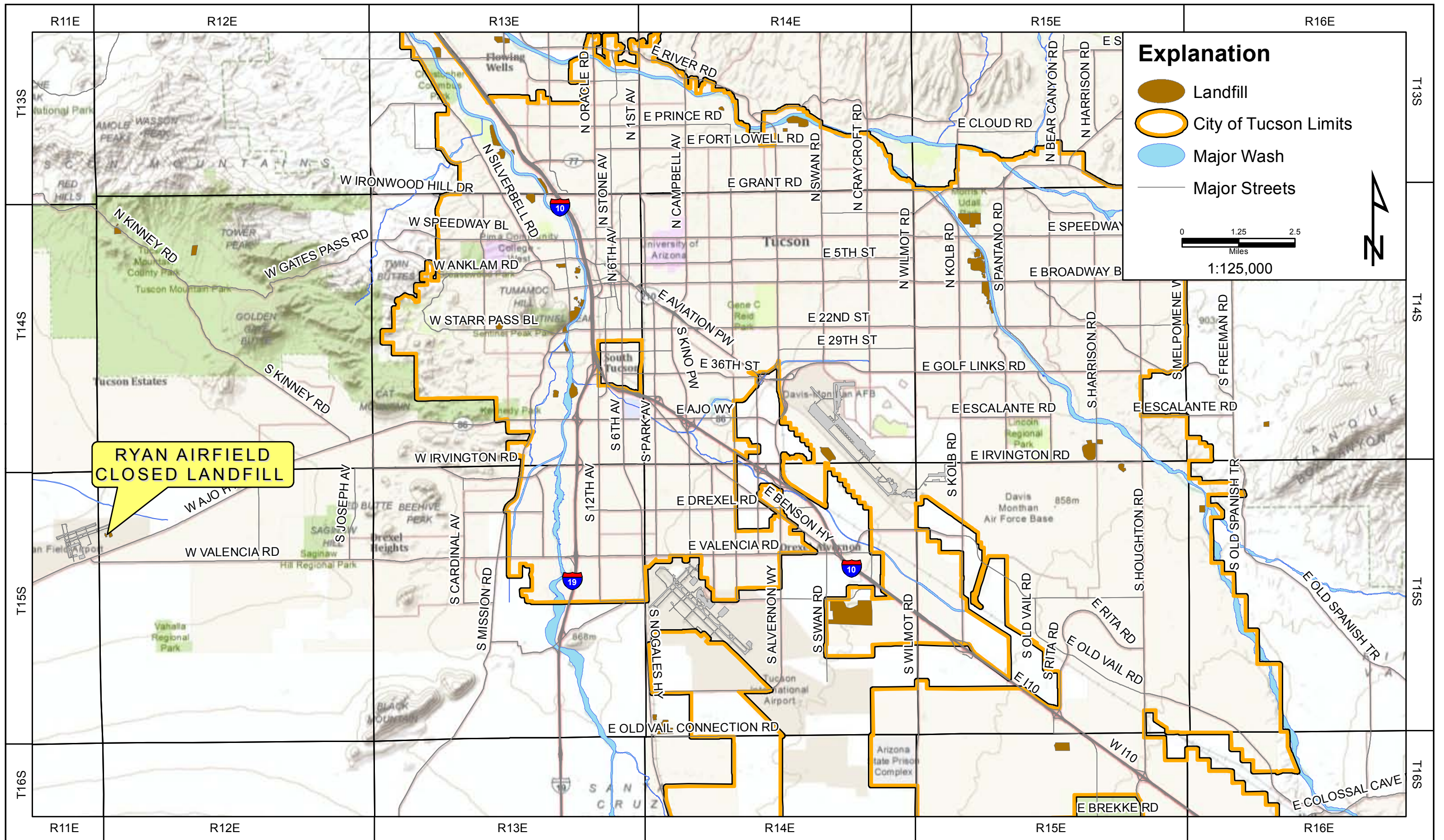





Figure 1
Location Map
Ryan Airfield Closed Landfill



Explanation

-  Soil Vapor Monitor Well
-  Groundwater Monitor Well
-  Approx. Landfill Boundary

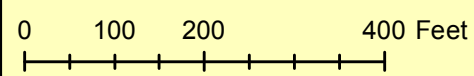
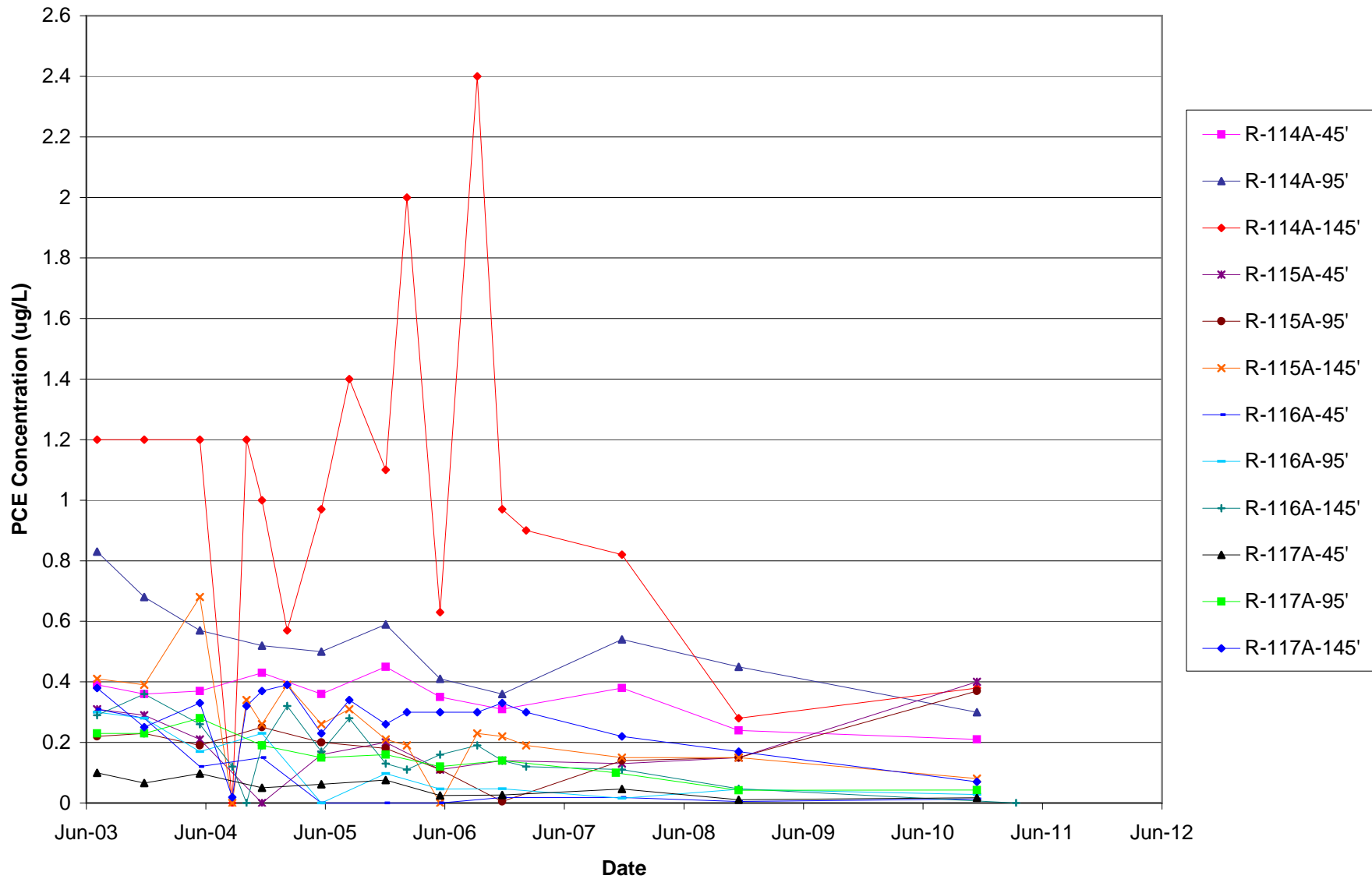


FIGURE 2
 Site Map
 Ryan Airfield Landfill

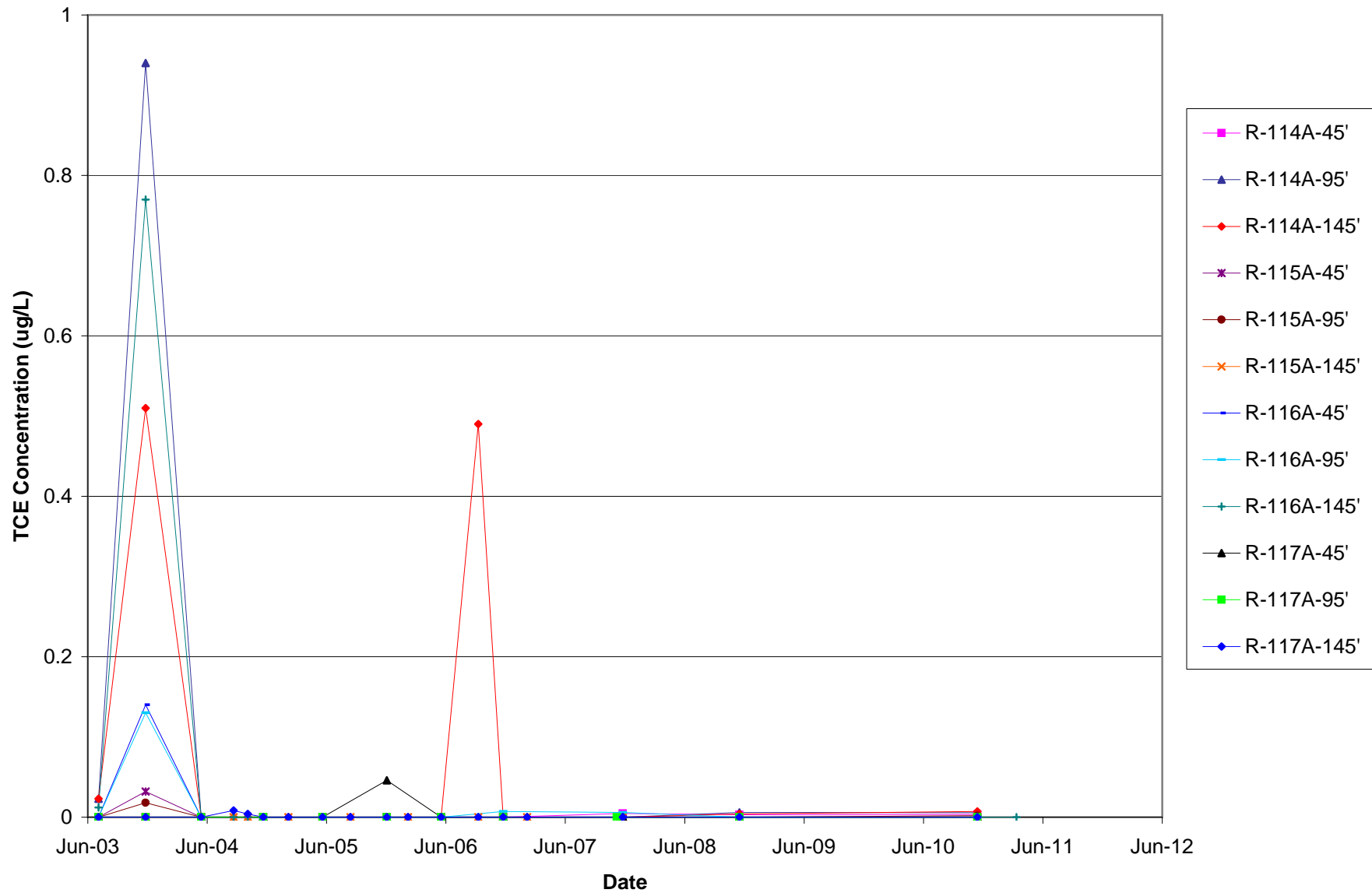
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Approved:	JD
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Figure 3
Ryan Airfield
Soil Vapor PCE Concentration by Probe Depth



Note: Vapor data showing PCE non-detect in all samples collected in December 2009 appears to be suspect and was removed from the data set.

Figure 4
Ryan Airfield
Soil Vapor TCE Concentration by Probe Depth



Note: Vapor data showing PCE non-detect in all samples collected in December 2009 appears to be suspect and was removed from the data set.

TABLES

TABLE 1
Soil Vapor Monitor Wells
Field Measurements for Landfill Gas
Ryan Airfield

Well ID	Depth (ft)	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)
R-114A	45	3/3/2006	0	6.3	14.4
	95		0	9.2	10.8
	145		0	11.4	8.4
	45	6/12/2006	0	5.3	14.7
	95		0	6.5	13.2
	145		0	11.1	8.4
	45	10/4/2006	0	5.7	14.2
	95		0	8.4	11
	145		0	11.5	7.6
	45	12/19/2006	0	5.9	15.1
	95		0	7.3	13.3
	145		0	11.1	8.6
	45	3/2/2007	0	6.2	14.3
	95		0	7.8	12.5
	145		0	11.6	8.1
	45	12/20/2007	0	7.4	13
	95		0	9.9	10.5
	145		0	12.2	8.1
	45	12/10/2008	0	6	14.7
	95		0	6.8	13.7
	145		0	9.4	10.6
	45	12/14/2009	0	7.1	15.1
	95		0	7.3	12.8
	145		0	8.7	11.1
	45	12/8/2010	0	6.1	14.7
	95		0	8.5	11.4
	145		0	10.9	8.8

TABLE 1
Soil Vapor Monitor Wells
Field Measurements for Landfill Gas
Ryan Airfield

Well ID	Depth (ft)	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)
R-115A	45	3/3/2006	0	9.2	12.3
	95		0	10.4	11.2
	145		0	10.1	11.4
	45	6/12/2006	0	8.3	12.7
	95		0	8.7	12.3
	145		0	10.4	10.9
	45	10/4/2006	0	8.9	12
	95		0	9.6	11.6
	145		0	11.1	10
	45	12/9/2006	0	9.1	12.6
	95		0	9.3	12.3
	145		0	10.7	11
	45	3/2/2007	0	8.9	12.4
	95		0	9.4	12.1
	145		0	11	10.4
	45	12/20/2007	0	10.4	11.7
	95		0	10.8	11.2
	145		0	11.4	10.8
	45	12/10/2008	0	9.4	12
	95		0	9.5	11.5
	145		0	10.6	10.9
	45	12/14/2009	0	8.1	11.9
	95		0	8.8	12.1
	145		0	9.7	19.9
	45	12/8/2010	0	9.5	12.2
	95		0	9.5	12
	145		0	10.6	10.9

TABLE 1
Soil Vapor Monitor Wells
Field Measurements for Landfill Gas
Ryan Airfield

Well ID	Depth (ft)	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)
R-116A	45	3/3/2006	0	4.6	16.9
	95		0	10.4	11.4
	145		0	13.6	8.2
	45	6/12/2006	0	1.2	19.7
	95		0	2.4	18.9
	145		0	9.9	13.8
	45	10/4/2006	0	3.6	16.8
	95		0	7.4	14.6
	145		0	13.7	6.8
	45	12/19/2006	0	2.9	19
	95		0	3.8	18.5
	145		0	9.6	12.3
	45	3/2/2007	0	4.6	17.5
	95		0	4.6	17.5
	145		0	9.5	10.6
	45	12/20/2007	0	5.3	15.2
	95		0	10.2	11.2
	145		0	12.6	8.6
	45	12/10/2008	0	1.2	19.8
	95		0	1.7	18.7
	145		0	3.8	17.6
	45	12/17/2009	0	2.2	18.3
	95		0	3.2	17.4
	145		0	4.3	16.2
	45	12/8/2010	0	4.3	16.2
	95		0	6.7	14.2
	145		0	10.8	9.7
	145	4/6/2011	0	11.8	7.9

TABLE 1
Soil Vapor Monitor Wells
Field Measurements for Landfill Gas
Ryan Airfield

Well ID	Depth (ft)	Date	CH ₄ (%)	CO ₂ (%)	O ₂ (%)
R-117A	45	3/3/2006	0	6.1	15.7
	95		0	9.7	11.4
	145		0	12.2	8.5
	45	6/12/2006	0	3.2	17.8
	95		0	7.5	13.5
	145		0	11.7	9.3
	45	10/4/2006	0	5.1	16
	95		0	9.1	11.6
	145		0	12.1	8.8
	45	12/19/2006	0	3.4	18
	95		0	7.4	13.5
	145		0	11.4	9.8
	45	3/2/2007	0	4.1	17.1
	95		0	8	12.7
	145		0	11.8	9.3
	45	12/20/2007	0	6.7	14.1
	95		0	9.3	11.6
	145		0	12.2	9.8
	45	12/10/2008	0	2.6	18
	95		0	5.2	14.9
	145		0	10.3	10.9
	45	12/14/2009	0	1.9	17.6
	95		0	6.3	13.7
	145		0	11.7	9.8
	45	12/8/2010	0	5.4	15.5
	95		0	8.6	12.4
	145		0	11.4	9.9

All measurements collected by COT-ES with Landtec Gas Analyzer

TABLE 2
Vapor Probe Results - Selected VOCs in ug/L
Ryan Airfield

Well	Date	Depth	PCE	TCE	cis-1,2-DCE	VC	TCFM
R-114A-45'	7/31/2003	45'	0.39	ND	ND	ND	0.54
R-114A-45'	12/22/2003	45'	0.36	ND	ND	ND	0.46
R-114A-45'	6/9/2004	45'	0.37	ND	ND	ND	0.55
R-114A-45'	12/15/2004	45'	0.43	ND	ND	ND	0.57
R-114A-45'	6/15/2005	45'	0.4	ND	ND	ND	0.4
R-114A-45'	12/28/2005	45'	0.45	ND	ND	ND	0.63
R-114A-45'	6/12/2006	45'	0.35	ND	ND	ND	0.47
R-114A-45'	12/19/2006	45'	0.31	ND	ND	ND	0.43
R-114A-45'	12/20/2007	45'	0.38	0.0047	ND	ND	0.49
R-114A-45'	12/10/2008	45'	0.24	0.003	ND	ND	0.34
R-114A-45'	12/8/2010	45'	0.21	0.0034	ND	ND	0.34
R-114A-95'	7/31/2003	95'	0.83	0.023	ND	ND	1.1
R-114A-95'	12/22/2003	95'	0.68	0.94	ND	ND	0.8
R-114A-95'	6/9/2004	95'	0.57	ND	ND	ND	0.8
R-114A-95'	12/15/2004	95'	0.52	ND	ND	ND	0.63
R-114A-95'	6/15/2005	95'	0.5	ND	ND	ND	0.6
R-114A-95'	12/28/2005	95'	0.59	ND	ND	ND	0.68
R-114A-95'	6/12/2006	95'	0.41	ND	ND	ND	0.49
R-114A-95'	12/19/2006	95'	0.36	ND	ND	ND	0.39
R-114A-95'	12/20/2007	95'	0.54	ND	ND	ND	0.75
R-114A-95'	12/10/2008	95'	0.45	0.006	ND	ND	0.47
R-114A-95'	12/8/2010	95'	0.3	0.0056	ND	ND	0.51
R-114A-145'	7/31/2003	145'	1.2	0.023	ND	ND	1.0
R-114A-145'	12/22/2003	145'	1.2	0.51	ND	ND	1.3
R-114A-145'	6/9/2004	145'	1.2	ND	ND	ND	1.4
R-114A-145'	9/16/2004	145'	ND	ND	ND	ND	ND
R-114A-145'	10/29/2004	145'	1.2	ND	ND	ND	1.8
R-114A-145'	12/15/2004	145'	1.0	ND	ND	ND	1.1
R-114A-145'	3/2/2005	145'	0.57	ND	ND	ND	0.63
R-114A-145'	6/15/2005	145'	0.97	ND	ND	ND	0.86
R-114A-145'	9/8/2005	145'	1.40	ND	ND	ND	1.10
R-114A-145'	12/28/2005	145'	1.10	ND	ND	ND	1.10
R-114A-145'	3/3/2006	145'	2.00	ND	ND	ND	1.50
R-114A-145'	6/12/2006	145'	0.63	ND	ND	ND	0.57
R-114A-145'	10/4/2006	145'	2.40	0.49	ND	ND	1.10
R-114A-145'	12/19/2006	145'	0.97	ND	ND	ND	1.00
R-114A-145'	3/2/2007	145'	0.90	ND	ND	ND	0.97
R-114A-145'	12/20/2007	145'	0.82	ND	ND	ND	0.90
R-114A-145'	12/10/2008	145'	0.28	0.0039	ND	ND	0.40
R-114A-145'	12/8/2010	145'	0.38	0.007	ND	ND	0.53

TABLE 2
Vapor Probe Results - Selected VOCs in ug/L
Ryan Airfield

Well	Date	Depth	PCE	TCE	cis-1,2-DCE	VC	TCFM
R-115A-45'	7/31/2003	45'	0.31	ND	ND	ND	0.048
R-115A-45'	12/22/2003	45'	0.29	0.032	ND	ND	0.05
R-115A-45'	6/9/2004	45'	0.21	ND	ND	ND	0.049
R-115A-45'	12/15/2004	45'	ND	ND	ND	ND	ND
R-115A-45'	6/15/2005	45'	0.16	ND	ND	ND	0.032
R-115A-45'	12/28/2005	45'	0.2	ND	ND	ND	0.05
R-115A-45'	6/12/2006	45'	0.11	ND	ND	ND	0.033
R-115A-45'	12/19/2006	45'	0.14	ND	ND	ND	0.051
R-115A-45'	12/20/2007	45'	0.13	ND	ND	ND	0.034
R-115A-45'	12/10/2008	45'	0.15	ND	ND	ND	0.026
R-115A-45'	12/8/2010	45'	0.4	ND	ND	ND	0.03
R-115A-95'	7/31/2003	95'	0.22	ND	ND	ND	0.030
R-115A-95'	12/22/2003	95'	0.23	0.018	ND	ND	0.042
R-115A-95'	6/9/2004	95'	0.19	ND	ND	ND	ND
R-115A-95'	12/15/2004	95'	0.25	ND	ND	ND	0.074
R-115A-95'	6/15/2005	95'	0.2	ND	ND	ND	ND
R-115A-95'	12/28/2005	95'	0.18	ND	ND	ND	0.049
R-115A-95'	6/12/2006	95'	0.11	ND	ND	ND	0.034
R-115A-95'	12/19/2006	95'	0.0046	ND	ND	ND	0.003
R-115A-95'	12/20/2007	95'	0.14	ND	ND	ND	0.046
R-115A-95'	12/10/2008	95'	0.15	ND	ND	ND	0.027
R-115A-95'	12/8/2010	95'	0.37	0.0019	ND	ND	0.039
R-115A-145'	7/31/2003	145'	0.41	ND	ND	ND	0.086
R-115A-145'	12/22/2003	145'	0.39	ND	ND	ND	0.074
R-115A-145'	6/9/2004	145'	0.68	ND	ND	ND	0.08
R-115A-145'	9/16/2004	145'	ND	ND	ND	ND	ND
R-115A-145'	10/29/2004	145'	0.34	ND	ND	ND	0.074
R-115A-145'	12/15/2004	145'	0.26	ND	ND	ND	0.080
R-115A-145'	3/2/2005	145'	0.39	ND	ND	ND	0.13
R-115A-145'	6/15/2005	145'	0.26	ND	ND	ND	0.074
R-115A-145'	9/8/2005	145'	0.31	ND	ND	ND	0.08
R-115A-145'	12/28/2005	145'	0.21	ND	ND	ND	0.068
R-115A-145'	3/3/2006	145'	0.19	ND	ND	ND	0.068
R-115A-145'	6/12/2006	145'	ND	ND	ND	ND	ND
R-115A-145'	10/4/2006	145'	0.23	ND	ND	ND	0.097
R-115A-145'	12/19/2006	145'	0.22	ND	ND	ND	0.074
R-115A-145'	3/2/2007	145'	0.19	ND	ND	ND	0.074
R-115A-145'	12/20/2007	145'	0.15	ND	ND	ND	0.062
R-115A-145'	12/10/2008	145'	0.15	ND	ND	ND	0.046
R-115A-145'	12/8/2010	145'	0.081	ND	ND	ND	0.014

TABLE 2
Vapor Probe Results - Selected VOCs in ug/L
Ryan Airfield

Well	Date	Depth	PCE	TCE	cis-1,2-DCE	VC	TCFM
R-116A-45'	7/31/2003	45'	0.31	ND	ND	ND	0.10
R-116A-45'	12/22/2003	45'	0.28	0.14	ND	ND	0.12
R-116A-45'	6/9/2004	45'	0.12	ND	ND	ND	0.08
R-116A-45'	12/15/2004	45'	0.15	ND	ND	ND	0.074
R-116A-45'	6/15/2005	45'	ND	ND	ND	ND	ND
R-116A-45'	12/28/2005	45'	ND	ND	ND	ND	0.063
R-116A-45'	6/12/2006	45'	ND	ND	ND	ND	ND
R-116A-45'	12/19/2006	45'	0.018	ND	ND	ND	0.015
R-116A-45'	12/20/2007	45'	0.018	ND	ND	ND	0.051
R-116A-45'	12/10/2008	45'	0.005	ND	ND	ND	0.0065
R-116A-45'	12/8/2010	45'	0.013	ND	ND	ND	0.062
R-116A-95'	7/31/2003	95'	0.30	ND	0.15	ND	0.13
R-116A-95'	12/22/2003	95'	0.28	0.13	ND	ND	0.13
R-116A-95'	6/9/2004	95'	0.17	ND	ND	ND	0.097
R-116A-95'	12/15/2004	95'	0.23	ND	ND	ND	0.13
R-116A-95'	6/15/2005	95'	ND	ND	ND	ND	ND
R-116A-95'	12/28/2005	95'	0.097	ND	ND	ND	0.08
R-116A-95'	6/12/2006	95'	0.046	ND	ND	ND	0.015
R-116A-95'	12/19/2006	95'	0.047	0.0072	ND	ND	0.019
R-116A-95'	12/20/2007	95'	0.016	0.006	ND	ND	0.078
R-116A-95'	12/10/2008	95'	0.045	ND	ND	ND	0.014
R-116A-95'	12/8/2010	95'	0.028	ND	ND	ND	0.06
R-116A-145'	7/31/2003	145'	0.29	0.012	ND	ND	0.17
R-116A-145'	12/22/2003	145'	0.36	0.77	ND	ND	0.18
R-116A-145'	6/9/2004	145'	0.26	ND	ND	ND	0.13
R-116A-145'	9/16/2004	145'	0.12	ND	ND	0.07	0.086
R-116A-145'	10/29/2004	145'	ND	ND	ND	0.078	ND
R-116A-145'	12/15/2004	145'	0.19	ND	ND	ND	0.097
R-116A-145'	3/2/2005	145'	0.32	ND	ND	ND	0.18
R-116A-145'	6/15/2005	145'	0.17	ND	ND	ND	ND
R-116A-145'	9/8/2005	145'	0.28	ND	ND	ND	0.14
R-116A-145'	12/28/2005	145'	0.13	ND	ND	0.075	0.091
R-116A-145'	3/3/2006	145'	0.11	ND	ND	ND	0.091
R-116A-145'	6/12/2006	145'	0.16	ND	ND	ND	0.039
R-116A-145'	10/4/2006	145'	0.19	ND	ND	ND	0.17
R-116A-145'	12/19/2006	145'	0.14	ND	ND	ND	0.063
R-116A-145'	3/2/2007	145'	0.12	ND	ND	ND	0.08
R-116A-145'	12/20/2007	145'	0.11	ND	ND	ND	0.11
R-116A-145'	12/10/2008	145'	0.047	ND	ND	ND	0.014
R-116A-145'	4/6/2011	145'	ND	ND	ND	ND	ND

TABLE 2
Vapor Probe Results - Selected VOCs in ug/L
Ryan Airfield

Well	Date	Depth	PCE	TCE	cis-1,2-DCE	VC	TCFM
R-117A-45'	7/31/2003	45'	0.1	ND	ND	ND	0.18
R-117A-45'	12/22/2003	45'	0.066	ND	ND	ND	0.11
R-117A-45'	6/9/2004	45'	0.097	ND	ND	ND	0.14
R-117A-45'	12/15/2004	45'	0.05	ND	ND	ND	0.091
R-117A-45'	6/15/2005	45'	0.062	ND	ND	ND	0.055
R-117A-45'	12/28/2005	45'	0.076	0.046	ND	ND	ND
R-117A-45'	6/12/2006	45'	0.025	ND	ND	ND	0.027
R-117A-45'	12/19/2006	45'	0.026	ND	ND	ND	0.028
R-117A-45'	12/20/2007	45'	0.046	ND	ND	ND	0.11
R-117A-45'	12/10/2008	45'	0.011	ND	ND	ND	0.017
R-117A-45'	12/8/2010	45'	0.017	ND	ND	ND	0.045
R-117A-95'	7/31/2003	95'	0.23	ND	ND	ND	0.44
R-117A-95'	12/22/2003	95'	0.23	ND	ND	ND	0.36
R-117A-95'	6/9/2004	95'	0.28	ND	ND	ND	0.38
R-117A-95'	12/15/2004	95'	0.19	ND	ND	ND	0.30
R-117A-95'	6/15/2005	95'	0.15	ND	ND	ND	0.22
R-117A-95'	12/28/2005	95'	0.16	ND	ND	ND	0.21
R-117A-95'	6/12/2006	95'	0.12	ND	ND	ND	0.12
R-117A-95'	12/19/2006	95'	0.14	ND	ND	ND	0.13
R-117A-95'	12/1/2007	95'	0.1	ND	ND	ND	0.18
R-117A-95'	12/10/2008	95'	0.042	ND	ND	ND	0.05
R-117A-95'	12/8/2010	95'	0.043	ND	ND	ND	0.093
R-117A-145'	7/31/2003	145'	0.38	ND	ND	ND	0.50
R-117A-145'	12/22/2003	145'	0.25	ND	ND	ND	0.32
R-117A-145'	6/9/2004	145'	0.33	ND	ND	ND	0.44
R-117A-145'	9/16/2004	145'	0.019	0.0083	ND	ND	ND
R-117A-145'	10/29/2004	145'	0.32	0.0039	ND	ND	0.51
R-117A-145'	12/15/2004	145'	0.37	ND	ND	ND	0.43
R-117A-145'	3/2/2005	145'	0.39	ND	ND	ND	0.44
R-117A-145'	6/15/2005	145'	0.23	ND	ND	ND	0.28
R-117A-145'	9/8/2005	145'	0.34	ND	ND	ND	0.3
R-117A-145'	12/28/2005	145'	0.26	ND	ND	0.11	0.35
R-117A-145'	3/3/2006	145'	0.3	ND	ND	ND	0.35
R-117A-145'	6/12/2006	145'	0.3	ND	ND	ND	0.34
R-117A-145'	10/4/2006	145'	0.3	ND	ND	ND	0.36
R-117A-145'	12/19/2006	145'	0.33	ND	ND	ND	0.30
R-117A-145'	3/2/2007	145'	0.3	ND	ND	ND	0.32
R-117A-145'	12/20/2007	145'	0.22	ND	ND	ND	0.27
R-117A-145'	12/10/2008	145'	0.17	ND	ND	ND	0.20
R-117A-145'	12/8/2010	145'	0.07	ND	ND	ND	0.13

NA = Not Analyzed
 ND = Non-Detect
 PCE = Tetrachloroethene
 TCE= Trichloroethene
 cis-1,2-DCE = cis-1,2-Dichloroethene
 VC = Vinyl Chloride
 TCFM = Trichlorofluoromethane
 Only selected compounds are shown.
 All samples analyzed using Method TO-15

Note: Vapor data showing PCE non-detect in all samples collected in December 2009 appears to be suspect and was removed from the data set.