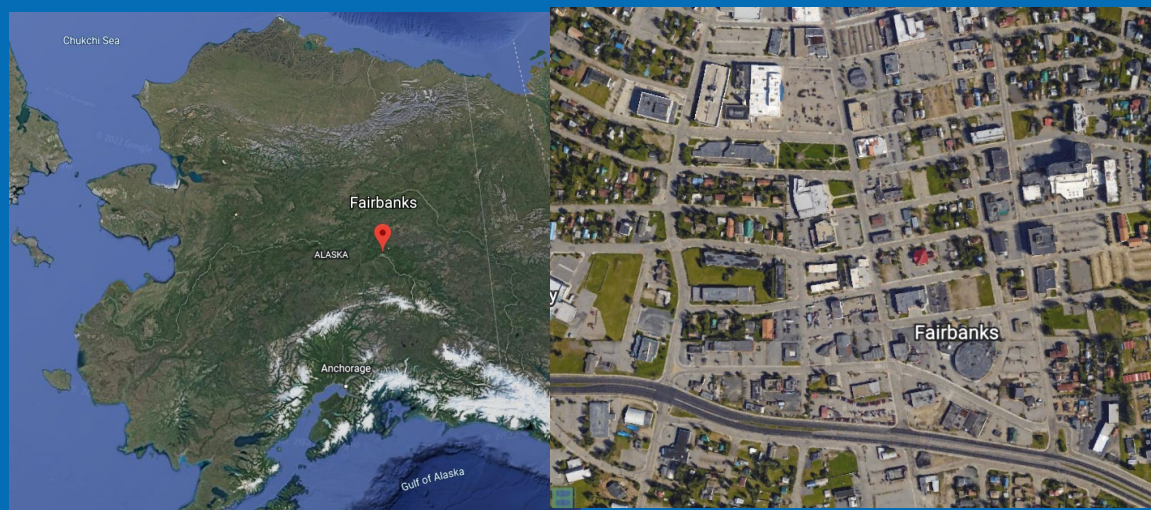


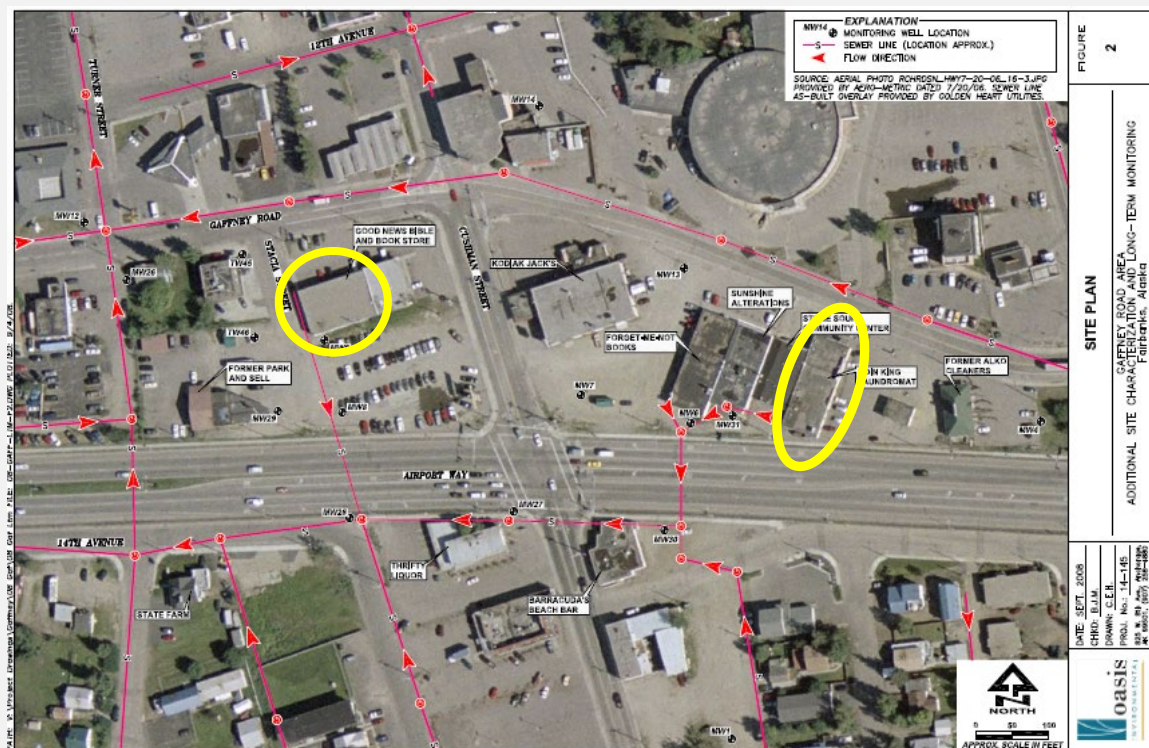
Example of a Potential Community for the 'Soil Gas Safe Community' Project

*John Zimmerman, Chris Lutes, James Fish,
Shawn Tisdell, Andrew Weller, Ben Martich,
Brian Cosky*



Gaffney Road, Fairbanks, AK

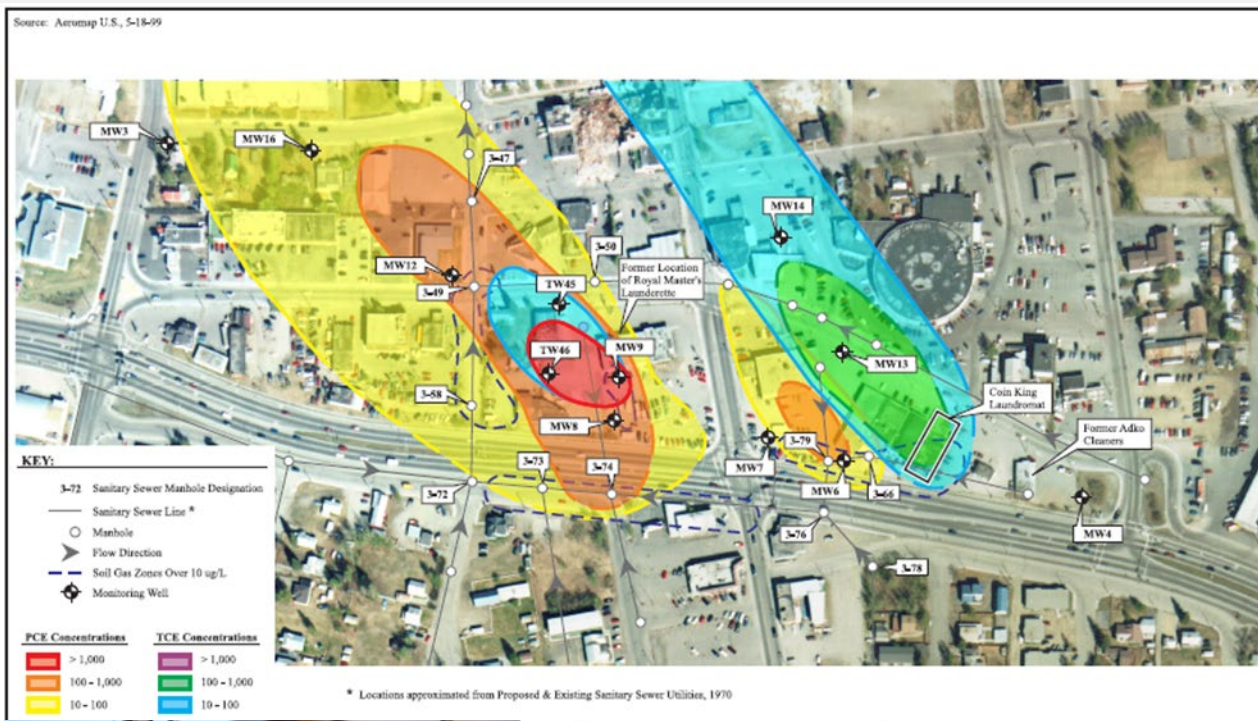
PCE Contamination



Former Dry Cleaners

- Eastern Sources
 - Coin King ~1959-2015
 - ADKO Cleaners ~ 1952-2002
- Western Sources
 - Royal Masters Laundrette ~ 1963-1980's
 - Wood Stave Sewer line transport

Gaffney EAST & WEST



- 1993 - PCE Discovery in Groundwater
- Late 1990's – Groundwater Investigations
- 2003–6 Initial VI Investigations
- 2007 – Source Investigation West: Soil, Groundwater & VI Evaluations
- 2008-9 – Source Investigation East: Soil, Groundwater & VI Evaluations
- 2010 – East/West

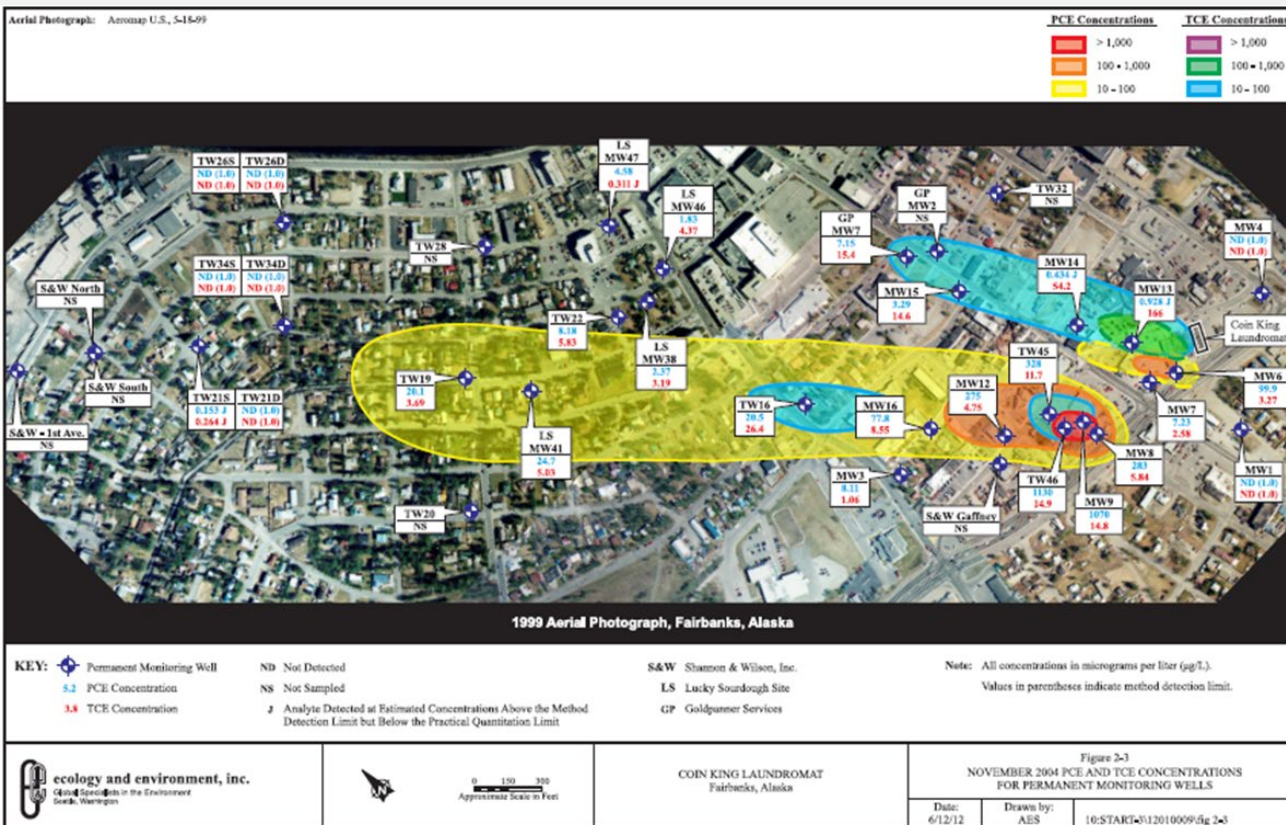


Gaffney WEST Source Area



- 2010 Remedial SVE/SSD System installed in Source area
 - (former dry cleaner, now an occupied commercial STRUCTURE)
- 2018 Modified to SSD-radon fan
- Ongoing Operation & GW/Soil Gas monitoring
 - Sewer line transport

• Gaffney WEST Source Area



- 2012 EPA Preliminary Assessment
- 2014 EPA Site Inspection
 - Source area confirmed
- Ongoing GW/Soil Gas monitoring

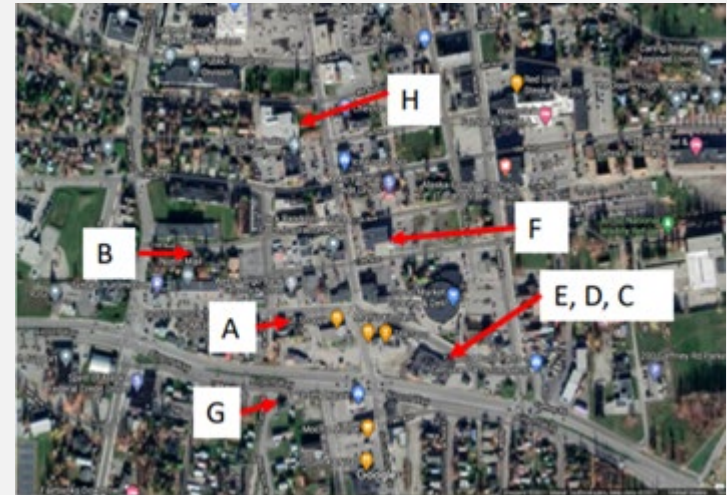
State-led Characterization & LTM



- ~ \$4+ Million
- Settlement Agreement with RP's - WEST
- Pending SOA ROW Acquisition – EAST
- Ongoing Oversight, Monitoring, and Outreach

Gaffney 2020 – Large Building VI Research

- 8 Building Selected
 - A. Real Estate (1,500,W)
 - B. Church (4,000,W)
 - C. Café (4,800, E)
 - D. Alterations Shop (4,000, E)
 - E. Council Building (5,200, Covid)
 - F. Fire Station (12,000, Covid)
 - G. Insurance Office (1500,W)
 - H. City Hall (17,000; Low Radon)



Gaffney 2020 – Large Building VI Research (Cont.)

- Weekly VOC and Continuous Radon Sampling, December 2020 – March 2022
 - Indoor Air, Subslab, Outdoor Air
- Two locations with Continuous VOC and Radon Sampling
 - Church (8/21 – Present)
 - Insurance Office (9/21 – Present)
- Two intensive sampling studies (Twice Daily for 8 days)
 - August 2021 (Warm)
 - January 2022 (Cold)



RadonEye



<http://radonftlab.com/radon-sensor-product/rd200/>

Indoor/outdoor radon
data collected every
hour

RAD7



<https://durrige.com/products/rad7-radon-detector/>

Subslab radon data
collected monthly

Gaffney 2020 – Large Building VI Research (Cont.)

Indoor air and soil gas target levels published by the Alaska
Department of Environmental Conservation (ADEC),
from Ahtna (2018)

Contaminant	Indoor Air ($\mu\text{g}/\text{m}^3$)		Soil Gas ($\mu\text{g}/\text{m}^3$)	
	Residential	Commercial	Residential	Commercial
PCE	41	41	410	1,800
TCE	2.0	2.2	20	84
cDCE	7.3 ¹	31 ¹	73 ¹	310 ¹
tDCE	790	790	790 ²	2,600 ¹
1,1-DCE	79	79	2,100	8,800
VC	1.7	28	17	280

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

PCE = tetrachloroethene

TCE = trichloroethene

cDCE = cis-1,2-dichloroethene

tDCE = trans-1,2-dichloroethene

1,1-DCE = 1,1-dichloroethene

VC = vinyl chloride

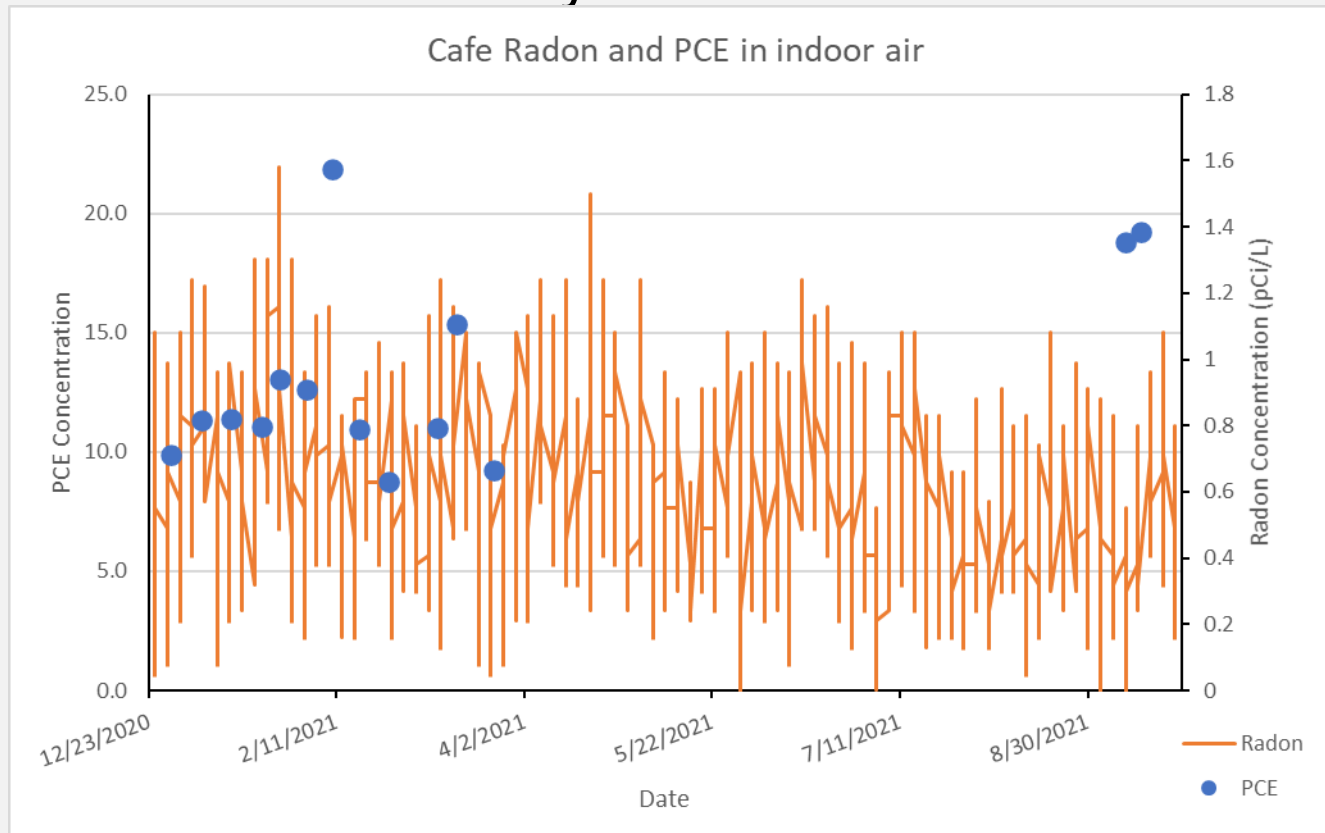
¹ Retained from ADEC VI Guidance, October 2012

² Value shown is the residential indoor air target level

Historical Sampling Data

Business	Time Period	No. of Sampling Events	No. of Events per Season	Types and Number of Samples		Max PCE Concentration ($\mu\text{g}/\text{m}^3$)	Median PCE Concentration ($\mu\text{g}/\text{m}^3$)	Max TCE Concentration ($\mu\text{g}/\text{m}^3$)	Median TCE Concentration ($\mu\text{g}/\text{m}^3$)
Café	2009 - 2014	7	Winter: 2	Sub-slab:	14	17,000	970	85	9.45
			Spring: 1	Indoor:	8	41	18.5	0.61	0.53
			Summer: 2	Long-term Passive:	2	11	10.05	0.16	0.135
			Fall: 2	Crawl Space:	0	--	--	--	--
				Exterior Soil Gas:	2	1,600	1,055	64	ND (32)

Summary of Current Data

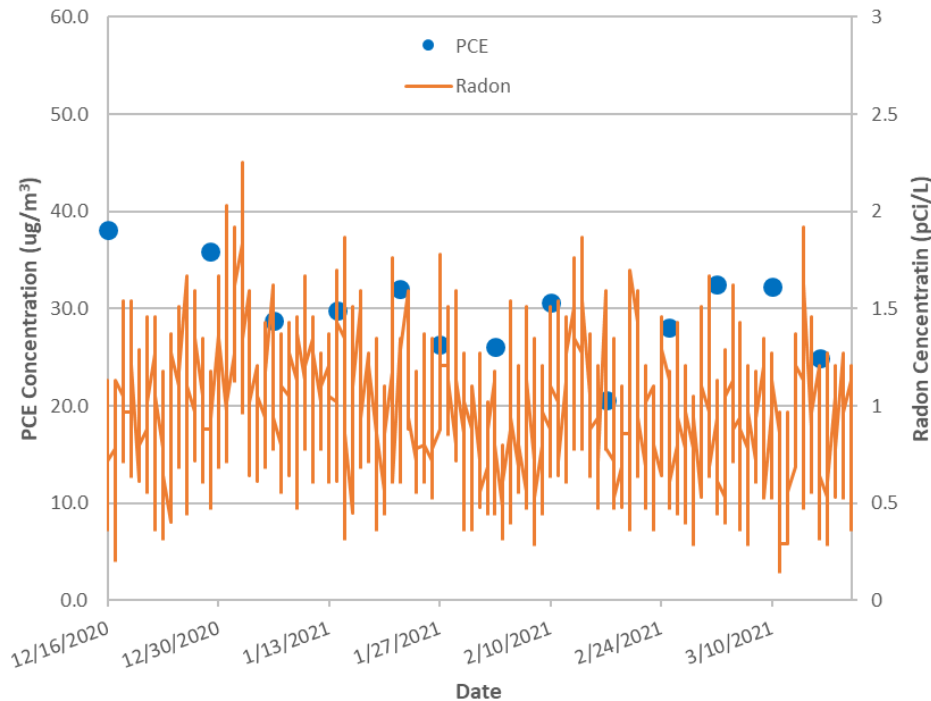


Gaffney Alterations Shop

Historical Sampling Data

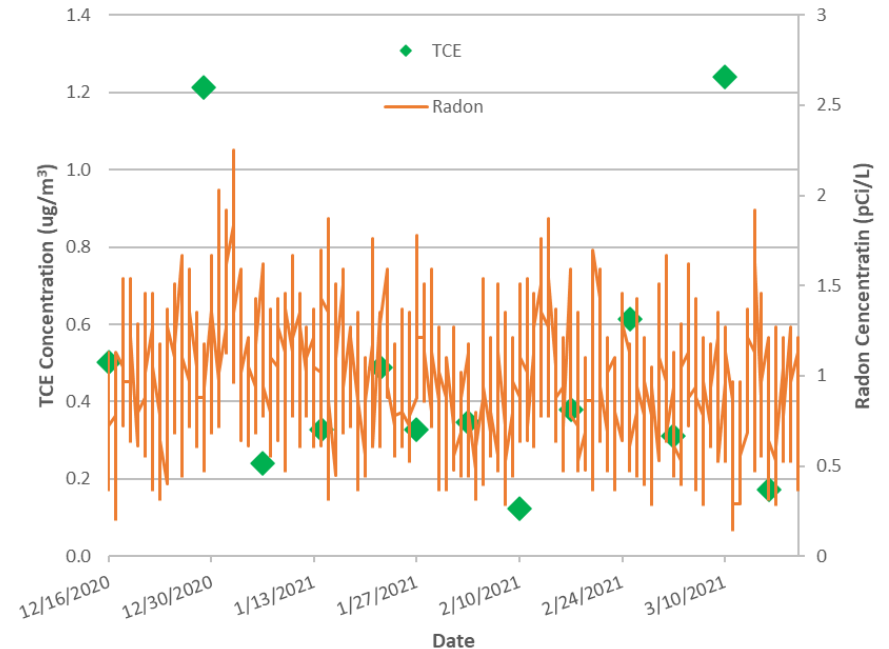
Business	Time Period	No. of Sampling Events	No. of Events per Season	Types and Number of Samples	Max PCE Concentration ($\mu\text{g}/\text{m}^3$)	Median PCE Concentration ($\mu\text{g}/\text{m}^3$)	Max TCE Concentration ($\mu\text{g}/\text{m}^3$)	Median TCE Concentration ($\mu\text{g}/\text{m}^3$)
Alterations Shop	2009 - 2011	6	Winter: 2	Sub-slab: 14	44,000	8,950	1,500	200
			Spring: 1	Indoor: 7	8,500	68	140	2
			Summer: 1	Long-term Passive: 0	--	--	--	--
			Fall: 2	Crawl Space: 0	--	--	--	--
				Exterior Soil Gas: 4	29,000	11,100	2,000	260

Radon and PCE Values in Alterations Shop



Summary of Current Data

Radon and TCE Values in Alterations Shop

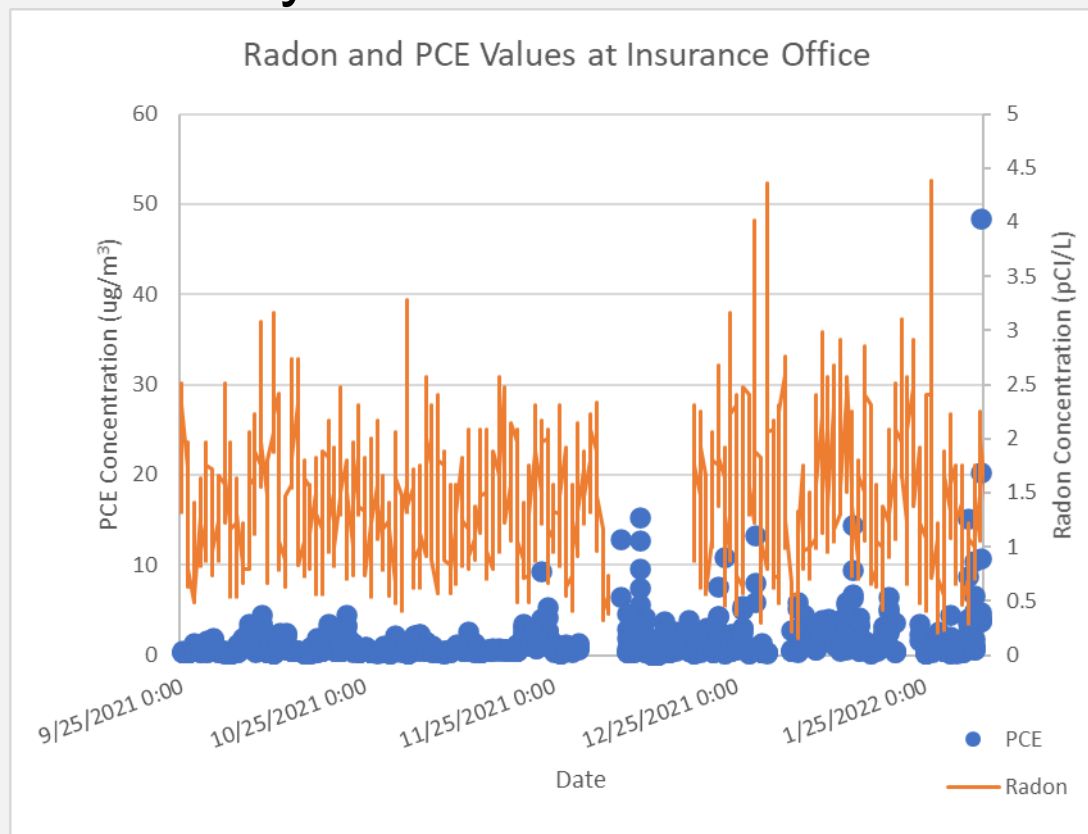


Gaffney Insurance Office

Historical Sampling

Business	Time Period	No. of Sampling Events	No. of Events per Season	Types and Number of Samples		Max PCE Concentration ($\mu\text{g}/\text{m}^3$)	Median PCE Concentration ($\mu\text{g}/\text{m}^3$)	Max TCE Concentration ($\mu\text{g}/\text{m}^3$)	Median TCE Concentration ($\mu\text{g}/\text{m}^3$)
Insurance Office	2008-2011	9	Winter: 3	Sub-slab: 18		19,000	7,300	860	335
			Spring: 2	Indoor: 11		4.3	1.7	0.19	ND (0.18)
			Summer: 1	Long-term Passive: 0		--	--	--	--
			Fall: 3	Crawl Space: 0		--	--	--	--
				Exterior Soil Gas: 2		5,900	5,150	400	355

Summary of Current Real-Time Data

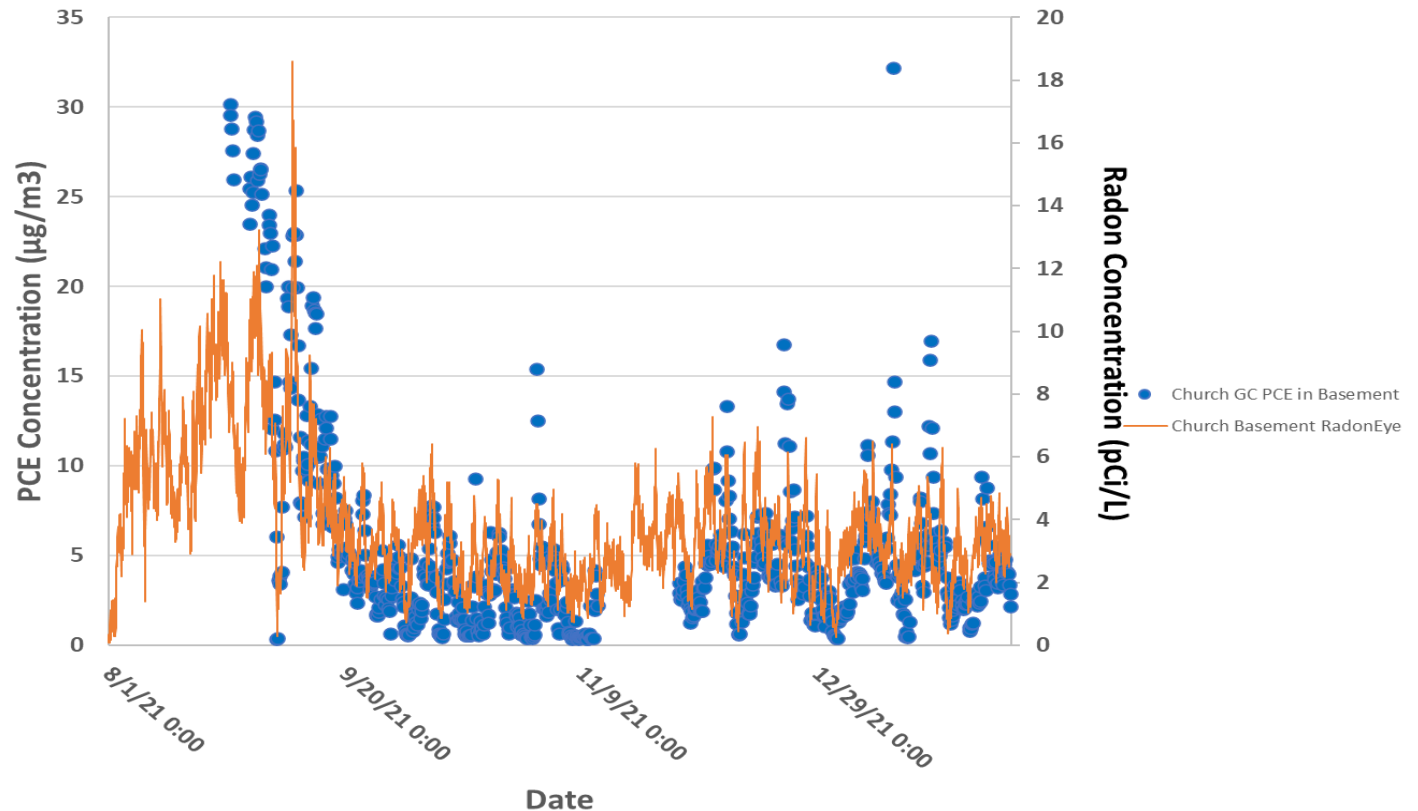


Gaffney Church

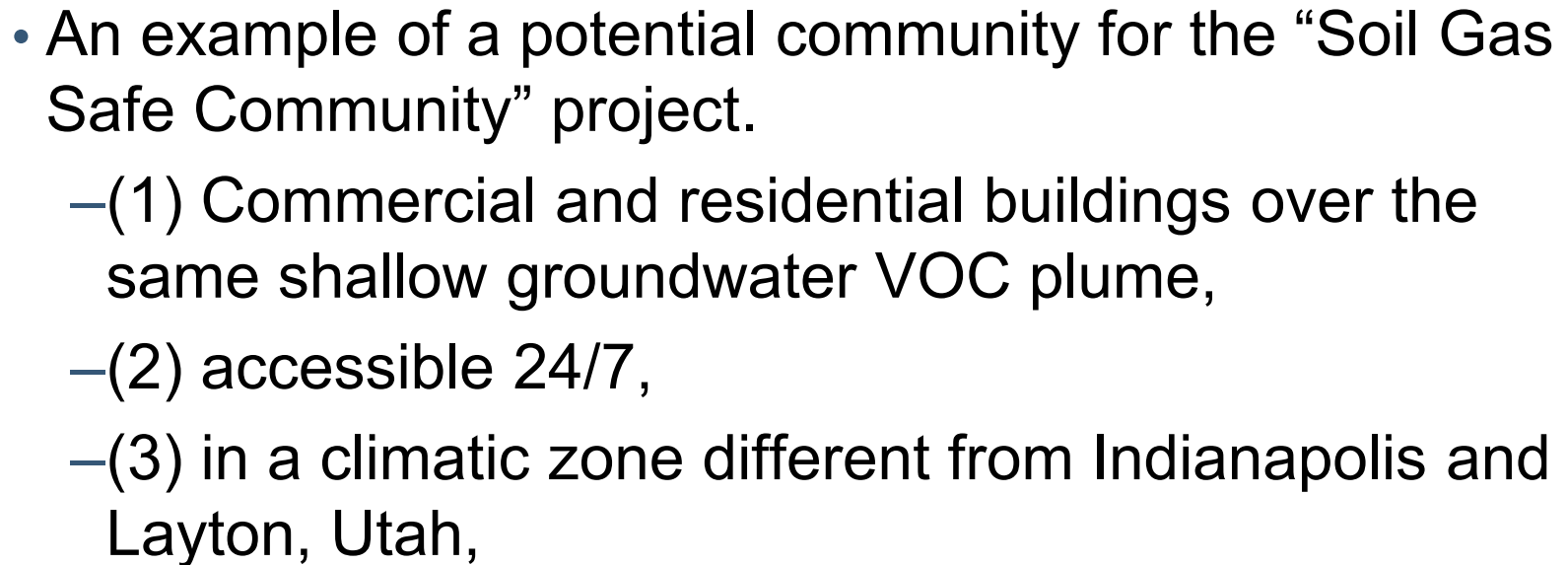
Historical Sampling

Business	Time Period	No. of Sampling Events	No. of Events per Season	Types and Number of Samples	Max PCE Concentration ($\mu\text{g}/\text{m}^3$)	Median PCE Concentration ($\mu\text{g}/\text{m}^3$)	Max TCE Concentration ($\mu\text{g}/\text{m}^3$)	Median TCE Concentration ($\mu\text{g}/\text{m}^3$)
Northern Church	2007	1	Winter: 0	Sub-slab: 3	1,700	34	ND (2.6)	ND (2.6)
			Spring: 0	Indoor: 1	0.68	0.68	ND (0.14)	ND (0.14)
			Summer: 1	Long-term Passive: 0	--	--	--	--
			Fall: 0	Crawl Space: 0	--	--	--	--
				Exterior Soil Gas: 0	--	--	--	--

Fairbanks Church Basement GC PCE and Radon in Indoor Air



Summary
of Current
Real-Time
Data



Gaffney 2020 – Large Building Research (Cont.)

- Journal Articles in Preparation
 - Pulsed Vapor Intrusion During Summer and Winter Intensive Sampling Events
 - Seasonal and Spatial Variability of Indoor Radon and VOC Concentrations Due to Vapor Intrusion

Notice

- Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy. Mention of trade names and commercial products does not constitute endorsement or recommendation for use.

References

- <https://dec.alaska.gov/spar/csp/sites/gaffney/>
- <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/25573>
- Ahtna Engineering Services, LLC. (2018). *Final Gaffney West, State Fiscal Year 2018 Remediation System Operations, Maintenance, and Monitoring Report.*



Questions?