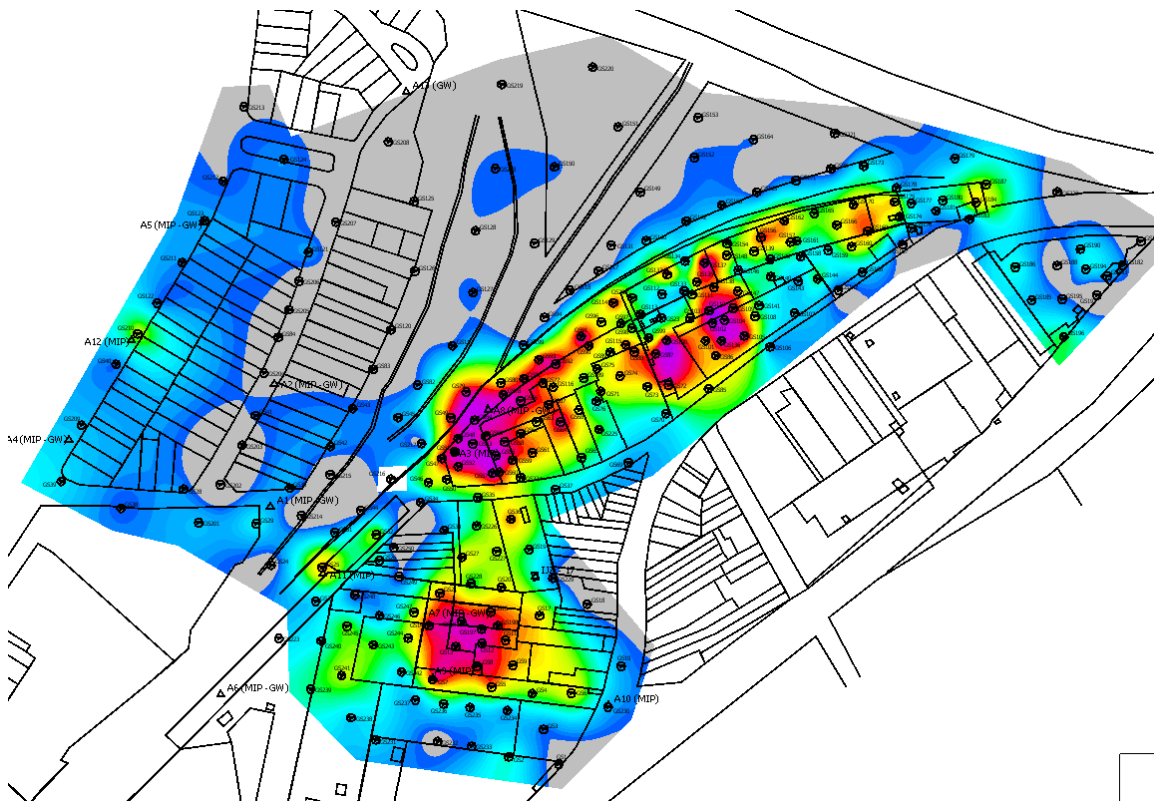


# Amplified Geochemical Imaging, LLC

## Environmental Services

**High Resolution Site Characterization (HRSC)**  
**Vapor Intrusion Investigations**  
**Long-Term & Remedial Monitoring**  
**Groundwater & Sediment Porewater Sampling**



## AGI Environmental Services “snapshot”



SAMPLE

ANALYZE

REPORT

### AGI Environmental Service Options

#### Screening

- Type 1 Sampler
- AGI Screening method\*
- Results as mass ( $\mu\text{g}$ )
- Applicable compounds

#### Concentration

- Type 8 Sampler
- AGI Screening method\*
- Results as mass ( $\mu\text{g}$ ) and concentrations ( $\mu\text{g}/\text{m}^3$ ;  $\mu\text{g}/\text{L}$ )
- Applicable compounds

#### DoD ELAP

- Type 8 Sampler
- US EPA 8260C method\*\* (modified)
- Results as mass ( $\mu\text{g}$ ) and concentrations ( $\mu\text{g}/\text{m}^3$ ;  $\mu\text{g}/\text{L}$ )
- Applicable compounds

**Note: Target compounds associated with each Service Option are provided on page 4.**

\*US EPA 8260 modified for external standard calibration

\*\*US EPA 8260C accredited by A2LA for meeting requirements of ISO17025, US DoD ELAP, and TNI.

### AGI Universal Passive Sampler Capabilities

#### Type 1

- No measured uptake rates
- Volatility range  $\text{C}_2$  to  $\text{C}_{20}$
- Vinyl chloride, 11DCE are reported

#### Type 8

- Measured uptake rates
- Volatility range  $\text{C}_4$  to  $\text{C}_{20}$
- Vinyl chloride, 11DCE **cannot** be reported

- 1) Select the AGI Environmental Service Option and number of samplers to meet your project objectives.
- 2) AGI samplers are shipped to you for deployment and retrieval.
- 3) AGI samplers are returned to AGI’s laboratory in Newark, Delaware, USA for analysis.
- 4) An AGI Laboratory Report is issued.
- 5) For soil gas surveys of 10 or more AGI field samplers, contour maps are prepared, and an AGI Mapping Report is issued.
  - The service cost includes the AGI Universal Passive Samplers, sampler analysis, reports with data tables and contour maps (as needed), and shipping to you (some restrictions apply).
  - A quotation can be prepared by completing the interactive questionnaire located on page 9.
  - Additional detailed service information is contained in the following pages.

**AGI Analytical Methods**

- 1) **AGI Screening Method<sup>(1)(2)</sup>**
  - a. Thermal desorption GC/MS
  - b. External standard calibration
  - c. Second source calibration checks/ reference standards
  - d. Method blanks, BFB tune checks
  
- 2) **US EPA 8260C Method<sup>(3)</sup>(modified; extended QC; accredited by A2LA)**
  - a. Thermal desorption GC/MS
  - b. Internal standard calibration with surrogate spikes
  - c. BFB MS Tune checks, method blanks, LCS/ LCSD samples
  - d. Method has ISO 17025 DoD ELAP accreditation<sup>(3)</sup>
  - e. EPA 8260C QC criteria



Testing Cert. #3062.01

<sup>(1)</sup>Method not listed on AGI's scope of accreditation  
<sup>(2)</sup>Type 8 sampler is required for concentration reporting. Mass data only for compounds not having measured or estimated sampling rates  
<sup>(3)</sup>Method listed on AGI's scope of accreditation for compounds listed

**All Service Options Include:**

- Survey design, pre- and post-survey consultation (as needed)
- AGI Universal Passive Samplers, trip blanks, outbound shipping(some restrictions apply)
- Chain of Custody and Installation/Retrieval e-Log
- Analysis, electronic data deliverable (EDD)<sup>(4)</sup>, Laboratory Report<sup>(4)</sup>
- Soil gas contour maps<sup>(4)</sup> (up to five) and a Mapping Report<sup>(4)</sup> for projects having at least 10 AGI field samplers<sup>(5)</sup>
- Data, reports, and maps provided electronically via secure ftp site
- Corks (small, default, see photo at right) – as applicable
- String, insertion rod, weights (for groundwater sampling) - as applicable



<sup>(4)</sup>Standard EDD format; CSV for data tables, PDF for contour maps and reports. Other formats may be available upon request and may incur additional cost.  
<sup>(5)</sup>For projects with <10 samplers, a fee is charged to provide contour maps and Mapping Report.

**Turn around time (TAT):**

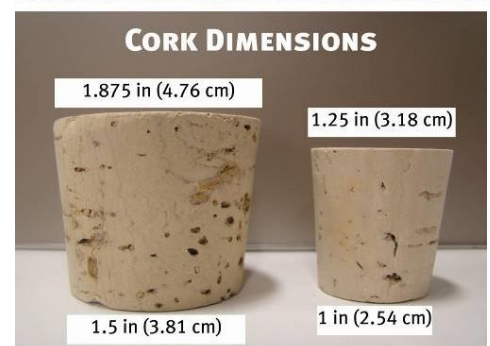
- TAT is a function of the number of samplers and the current laboratory capacity. Normal TAT is approximately 10-12 working days (≤ 50 samplers). TAT increases by two days for every additional 50 samplers.

**Not included:**

- Sampler field installation and retrieval costs
- Return shipping costs
- Taxes, duties, or VAT

**Terms:**

- Project-specific pricing quotation valid for 90 days
- Paid in full 30 days from invoice date
- Credit approval required
- Soil gas surveys may be subject to a minimum order fee



CAS No.	Screening Option Units: micrograms, µg	Concentration Option Units: µg; µg/m <sup>3</sup> or µg/L	DoD ELAP Option Units: µg; µg/m <sup>3</sup> or µg/L (included on AGI's Scope of accreditation)
75-01-4	Vinyl chloride**		
1634-04-4	Methyl tert-Butyl Ether	Methyl tert-Butyl Ether	Methyl tert-Butyl Ether
	BTEX (summed)	BTEX (summed)	BTEX (summed)
71-43-2	Benzene	Benzene	Benzene
108-88-3	Toluene	Toluene	Toluene
100-41-4	Ethylbenzene	Ethylbenzene	Ethylbenzene
108-38-3/106-42-3	m,p-xylene	m,p-xylene	m,p-xylene
95-47-6	o-xylene	o-xylene	o-xylene
111-65-9	Octane	Octane*	Octane*
1120-21-4	Undecane	Undecane*	Undecane*
629-50-5	Tridecane	Tridecane*	Tridecane*
629-62-9	Pentadecane	Pentadecane*	
108-67-6	1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene
95-63-6	1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene
91-20-3	Naphthalene	Naphthalene	Naphthalene
91-57-6	2-Methylnaphthalene	2-Methylnaphthalene	2-Methylnaphthalene
86-73-7	Fluorene	Fluorene*	
83-32-9	Acenaphthene	Acenaphthene*	
208-96-8	Acenaphthylene	Acenaphthylene*	
156-60-5	trans-1,2-Dichloroethene	trans-1,2-Dichloroethene	trans-1,2-Dichloroethene
156-59-2	cis-1,2-Dichloroethene	cis-1,2-Dichloroethene	cis-1,2-Dichloroethene
79-01-6	Trichloroethene	Trichloroethene	Trichloroethene
127-18-4	Tetrachloroethene	Tetrachloroethene	Tetrachloroethene
75-35-4	1,1-Dichloroethene**		
75-35-3	1,1-Dichloroethane	1,1-Dichloroethane	1,1-Dichloroethane
107-06-2	1,2-Dichloroethane	1,2-Dichloroethane	1,2-Dichloroethane
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroethane	1,1,2-Trichloroethane
71-55-6	1,1,1-Trichloroethane	1,1,1-Trichloroethane	1,1,1-Trichloroethane
79-34-5	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
630-20-6	1,1,1,2-Tetrachloroethane	1,1,1,2-Tetrachloroethane*	1,1,1,2-Tetrachloroethane*
67-66-3	Chloroform	Chloroform	Chloroform
56-23-5	Carbon tetrachloride	Carbon tetrachloride	Carbon tetrachloride
108-90-7	Chlorobenzene	Chlorobenzene	Chlorobenzene
95-50-1	1,2-Dichlorobenzene	1,2-Dichlorobenzene	1,2-Dichlorobenzene
541-73-1	1,3-Dichlorobenzene	1,3-Dichlorobenzene	1,3-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene	1,4-Dichlorobenzene	1,4-Dichlorobenzene
	TPH <sup>†</sup> GRPH <sup>††optional</sup> DRPH <sup>†optional</sup>	TPH <sup>††</sup> GRPH <sup>††optional</sup> DRPH <sup>††optional</sup>	Note: Some compounds listed above may be accredited for relative mass reporting only (listed as screening only) – see AGI's scope of accreditation for details

\* Concentrations based on estimated sampling rates

\*\* Not reportable for water sampling

† Uses undecane response for quantification

†† Uses octane response for quantification

**Note:** Vinyl chloride response is determined using a single point calibration. All other compound responses are determined using a minimum of five calibration levels, except as noted.

**Additional Analyte Groups**

- Compounds below are not included on AGI's scope of accreditation
- Can be added to any of the three service options
- Additional fee per AGI Universal Sampler per group
- Single point calibration, mass ( $\mu\text{g}$ ) data

**Explosive Breakdown**

Nitrobenzene  
2-Nitrotoluene  
3-Nitrotoluene  
4-Nitrotoluene  
1,3-Dinitrobenzene  
2,6-Dinitrotoluene  
2,4-Dinitrotoluene  
1,3,5-Trinitrobenzene  
2,4,6-Trinitrotoluene

**PCBs**

Monochlorobiphenyl  
Dichlorobiphenyl  
Trichlorobiphenyl  
Tetrachlorobiphenyl  
Pentachlorobiphenyl

**PAHs**

Phenanthrene  
Anthracene  
Fluoranthene  
Pyrene

**Chemical Agent Breakdown**

1,4-Dithiane  
1,4-Oxathiane  
Thiodiglycol  
Benzothiazole  
Dimethyldisulfide  
2-Chloroacetophenone  
4-Chloroacetophenone  
p-Chlorophenylmethylsulfide  
p-Chlorophenylmethylsulfone  
p-Chlorophenylmethylsulfoxide  
Diisopropylmethylphosphonate (DIMP)  
Dimethylmethylphosphonate (DMMP)

**Pesticides**

alpha BHC  
beta BHC  
gamma BHC  
delta BHC  
Heptachlor  
Aldrin  
Heptachlor Epoxide  
Endosulfan I  
4,4'-DDE  
Dieldrin  
Endrin  
4,4'-DDD  
Endosulfan II  
Endrin Aldehyde  
4,4'-DDT  
Endosulfan Sulfate  
Endrin Ketone  
Methoxychlor

**Additional non-standard target compounds for which detection and reporting capabilities have been confirmed.**

**Additional charges apply; mass ( $\mu\text{g}$ ) data**

1,2,3-Trichlorobenzene	3-Methylphenol	Dichlorofluoromethane (F-21)	Tetrachlorodifluoroethane (F-112)
1,2,3-Trichloropropane	4,4-Dichlorobenzophenone	Dichlorotetrafluoroethane (F-114)	Trichlorofluoromethane (F-11)
1,2,4-Trichlorobenzene	4-Aminobiphenyl	Dicyclopentadiene	Trichlorotrifluoroethane(F-113)
1,2-Dibromo-3-Chloropropane	4-Chloroaniline	Freon 123	Trifluoromethane (F-23)
1,2-Dibromoethane (EDB)	4-Isopropyltoluene	Freon 123A	
1,2-Dichloropropane	4-Methylphenol	Hexachlorobutadiene	
1,4-Dioxane	Acetone	Hexane	
2,2,4-Trimethylpentane	Aniline	2-Hexanone	
2,2-Dichloropropane	Bromodichloromethane	Methyl Ethyl Ketone	
2,3,4,5-Tetrachlorophenol	Bromoform	Methyl Isobutyl Ketone	
2,3,4,6-Tetrachlorophenol	Carbon Tetrafluoride (F-14)	Methylene Chloride	
2,3,5,6-Tetrachlorophenol	Chlorodifluoromethane (F-22)	Nitrobenzene	
2,4-Dichlorobenzophenone	Chlorotrifluoromethane (F-13)	o-Toluidine	
2,4-Dimethylphenol	Dibromochloromethane	Phenol	
2-Chlorotoluene	Dichlorodifluoromethane (F-12)	Styrene	

**Additional Services (fees may apply)**

- Single compound reporting (e.g., PCE only)
- Reporting a subset of the listed target compounds
- QA deliverables
  - BFB tune reports, calibration data, individual quantitation reports (samples and QC) with mass spectral comparisons to reference spectra (samples and blanks)
- Expedited analytical results
  - ≤ 50 AGI Universal Samplers, five working day TAT, starting from the day after sampler receipt
    - For example: Samplers are received on a Tuesday, the Laboratory Report will be issued no later than the following Tuesday.
    - For weeks that do not include US holidays or closure due to inclement weather
- Supplemental services – billed at an hourly rate, two hour minimum
- **Non-standard target compounds (fees apply)**
  - Can be added to any of the three service options, mass ( $\mu\text{g}$ ) data only
  - Up to five compounds by single point calibration (Dependent on availability of standards and method applicability)
  - Up to ten compounds, library search, estimated masses  $>0.1\mu\text{g}$

**Other Information**

- AGI Universal Passive Samplers returned unused cannot be placed back into inventory. A per-sampler fee is assessed for samplers not returned, returned unused, lost or damaged.
- Please use samplers within three months of sampler receipt.
- To ensure accuracy and applicability of sample results, please do not retain samplers or transfer them to other projects without discussion with, and approval by AGI.

## TECHNOLOGY REFERENCES

ASTM, *Standard Practice for Passive Soil Gas Sampling in the Vadose Zone for Source Identification, Spatial Variability Assessment, Monitoring, and Vapor Intrusion Evaluations*, ASTM D 7758-11.

ASTM, *Standard Guide for Deriving Equations for Calculating VOC and SVOC Concentrations in Soil Gas, Air, Water, and Porewater from the Mass Accumulated on Adsorbent-based Passive Samplers*, ASTM WK40037, in press.

Hewitt, Alan D., *Establishing a Relationship Between Passive Soil Vapor and Grab Sample Techniques for Determining Volatile Organic Compounds*, Special Report 96-14, US Army Corps of Engineers Cold Regions Research and Engineering Laboratory, Hanover, NH, September 1996.

Hodny, Jay W., Ph.D. and Teri A. Floyd, Ph.D. (2006) "Down by the River: Assessing Organic Compounds in Saturated Soils," in: Bruce M. Sass (Conference Chair), *Remediation of Chlorinated and Recalcitrant Compounds – 2006*. Proceedings of the Fifth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 22-25, 2006, Monterey, CA. ISBN 1-57477-157-4, published by Battelle Press, Columbus, OH, [www.battelle.org/bookstore](http://www.battelle.org/bookstore). Platform presentation.

Hodny, Jay W., Ph.D., James E. Whetzel, Jr., Harry S. Anderson, II, Dayna M. Cobb (2006) "The Use of Passive Samplers in Vapor Intrusion Investigations," Air and Waste Management Association Specialty Conference – Vapor Intrusion, September 13-15, 2006, Los Angeles, CA. Platform presentation and Proceedings paper.

Hodny, J. and J. Whetzel, (2007) "Soil Gas, Sub-slab Vapor and Air Sampling Using Passive Samplers," AWMA Annual Conference, June, Pittsburgh, PA, June 26-29, 2007, Air and Waste Management Association, Pittsburgh, PA.

Hodny, Jay W., Ph.D., James E. Whetzel, and Harry S. Anderson (2007) "Vapor Intrusion Investigations and Passive Sampling," AWMA Vapor Intrusion: Learning from the Challenges, September 26-28-2007, Providence, RI. Platform presentation.

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Hodny, Jay W., Ph.D., James E. Whetzel Jr., and Harry S. Anderson (2009) "Quantitative Passive Soil Gas and Air Sampling in Vapor Intrusion Investigations," Vapor Intrusion 2009, Air and Waste Management Association, January 27-20, 2009, San Diego, CA, Platform presentation, Proceedings paper.

Hodny, Jay W., James E. Whetzel, and Harry S. Anderson, II (2013) "Measuring Compound Concentrations Using Time-Integrated Passive Soil Gas Samplers," Continuous Soil Gas Measurements: Worst Case Risk Parameters, ASTM Symposium, Jacksonville, FL. Platform presentation.

Interstate Technology Regulatory Council, *Vapor Intrusion Pathway: A Practical Guideline*, 2007. Washington, DC.

Interstate Technology Regulatory Council, *Vapor Intrusion Pathway: Investigative Approaches for Typical Scenarios*, 2007. Washington, DC.

Parker, Louise, Richard Willey, Timothy McHale, William Major, Tommie Hall, Ron Bailey, Kelsey Gagnon, and Gordon Gooch, *Demonstration of the AGI Universal Samplers (F.K.A. the GORE® Modules) for Passive Sampling of Groundwater* (ERDC\CRREL TR-14-4), Environmental Security Technology Certification Program (ESTCP), Project ER-200921, US Army Corps of Engineers Cold Regions Research and Engineering Laboratory, Hanover, NH, March 2014.

USEPA, *Soil Gas Sampling Technology*, W. L. Gore & Associates, Inc., GORE-SORBBER Screening Survey. US EPA Environmental Technology Verification Report, EPA/600/R-98/095, August 1998

Valle, Paulo, Pieter Dijkshoorn, and Jay W. Hodny, Ph.D. (2008) "Combining Soil Gas Sampling and MIP Investigation to Optimize a Conceptual Site Model," in: Bruce M. Sass (Conference Chair), Remediation of Chlorinated and Recalcitrant Compounds – 2008. Proceedings of the Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 19-21, 2008, Monterey, CA. ISBN 1-57477-163-9, published by Battelle, Columbus, OH, [www.battelle.org.chlorcon](http://www.battelle.org.chlorcon). Poster presentation by Pieter Dijkshoorn.

**ADDITIONAL AMPLIFIED GEOCHEMICAL IMAGING, LLC'S REFERENCES  
(available on request)**

- Case Studies
- Concentration Method Summary for AGI Samplers
- Descriptions of Service
- General Guidelines for Survey Design and Sample Spacing - Soil Gas and Subslab Soil Gas Sampling
- How to Install AGI Universal Samplers for Soil Gas Sampling (includes sub-slab sampling)

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AGI strives to present an accurate, cost-saving quotation for services. To help us ensure its accuracy, please take a moment and provide information for the following.

**Complete the form and email to:**  
[orders@agisurveys.net](mailto:orders@agisurveys.net)

**Contact Information (your name, company, phone, email)**

**Date quote is needed:**

**Anticipated field sampling start date**

**Address for sampler shipment (street address, city, state, zip code, country):**

**Address for invoicing (street address, city, state, zip code, country):**

**Project objective:** *Indicate if the AGI Environmental Survey in support of site assessment, source identification, vapor intrusion, plume delineation, groundwater sampling, etc.*

**Project reference:** *Name of site or project for referencing on project related correspondence and reporting.*

**Project city, state, country:**

**Service option:**

Screening

Concentration

US DoD

**Additional compound lists**

Add'l PAHs

PCBs

Pesticides

Explosive Breakdown

Chemical Agent Breakdown

Other Non-standard compounds (pending lab approval):

**Media sampled:**

Air

Soil Gas

Ground water

Sediment porewater

Other

*Complete additional forms for separate matrices to be sampled*

**Enter AGI Universal Sampler count<sup>(1)</sup> for field deployment**

**Enter Cork\*\* count:** Small, 1.0 inch\*

**Enter Cork\*\* count:** Large, 1.5 inch\*

**Optional - dependent on QAPP requirements**

**Enter Laboratory duplicate count<sup>(2)</sup> (analysis of second set of adsorbents)**

1 - AGI adds an appropriate number of samplers as trip blanks at no additional cost

2 - Client specifies which samplers will have the duplicate adsorbent analyzed, to be noted on the Installation and Retrieval e-Log

\* - Diameter of narrow end of tapered cork

\*\* - We are striving to reduce waste by sending only the cork sizes and counts required. If the cork size is unknown presently, we will ask at the time the order is placed, or ship small corks (default choice).