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Environmental Law

Presented by the Cincinnati Bar Association Environmental Law Practice Group

Tuesday, December 11, 2018

August Mack ENVIRONMENTAL

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Remediation & Compliance Cost Modeling

A Discussion of the Rationale, Methods, and Results

1

Objectives

- Identify who can use information about future Environmental Costs
- Explain estimation theory
- Review current issues with estimating the cost of remediation
- Describe Monte-Carlo analysis

- Provide an alternative method for estimating remedial costs
- Discuss an example remedial cost estimate

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2

Why Are Future Environmental Costs Difficult to Estimate?

- Costs-to-closure for sites are often wanted early in a project life before extensive data has been collected.
- Decisions of regulators can dramatically impact the cost and length of time for closure.
- Investigating one known environmental concern may expose other, previously unknown, environmental concerns.
- Balancing closure speed and cost can be complex and difficult to evaluate.

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Who Needs to Understand Future Environmental Costs?

- **Responsible Parties**
  - Realistic reserves may need to be established to fund cleanup.
  - Long-term decision-making.
  - Appropriately value assets and liabilities.

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Who Needs to Understand Future Environmental Costs?

- **Insurance Carriers**
  - Carriers need reasonable estimates of project life costs to set reserves.
  - Carriers may want to "Buy Out" and an accurate assessment of future costs is needed to negotiate wisely.

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Who Needs to Understand Future Environmental Costs?

- **Brownfield Redevelopers**
  - Decisions regarding the potential of a site for redevelopment may depend on the cost of remediation.
  - Lending institutions will require documentation regarding site liabilities.
  - Remediation cost estimates are often needed early in the life cycle of the project.

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Who Needs to Understand Future Environmental Costs?

- **Legal Counsel**
  - Litigation: Decisions regarding environmental litigation strategies may be informed by projections of future environmental costs.
  - Transactional: Asset and stock deals with environmental components may require accounting for future environmental costs.
  - Compliance: Counseling a business on compliance options, whether remedial or prospective.

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Litigating Cost Recovery Actions

- The purpose of a cost recovery action is to recoup all of the investigation and remediation costs from parties responsible for the environmental contamination.
- See, e.g., CERCLA Section 107 (cost recovery) and Section 113 (contribution); insurance policy recovery, private cause of action, and Voluntary Action Program (ORC 3746.23(A)).

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Transactions: Accounting for Environmental Costs in the Deal

Quantifying environmental costs in an asset or stock acquisition to:

- Negotiate a reduction in purchase price
- Obtain environmental representations and warranties insurance
- Exclude certain assets from the deal
- Negotiate indemnification provisions
- Set aside funds for future remediation (escrow)

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Compliance: Counseling the Client on Environmental Compliance Options

Environmental cost projections and estimates to determine:

- prospective (proactive) environmental compliance options and decisions, i.e. staying ahead of the curve
- Remedial and corrective environmental compliance options, i.e. pursuant to agency actions
- Self-audit improvements and corrective actions, i.e. environmental hygiene

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Who Needs to Understand Future Environmental Costs?

- **Legal Counsel**
  - Real Estate: Cost estimates for remediation can be used to more accurately value real property.
  - Insurance: Ability or need to obtain insurance coverage (or pursue insurance claims) may be impacted by remediation cost estimates.
  - Expert Testimony: E.g., refuting the other side's consultant or the position(s) taken by regulators.

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What is an estimate?

- Approximation of project time and cost
  - May be refined through project life cycle
  - May be developed with a number of tools and techniques

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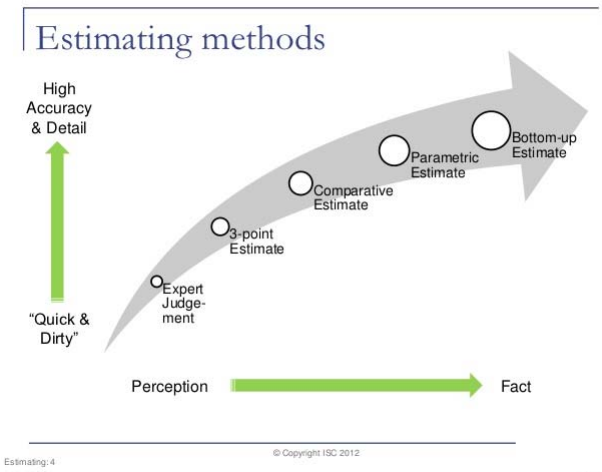
What is an estimate?



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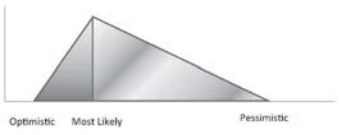
What is an estimate?

- Expert Judgement
  - A "guess" based on experience in the subject matter
- 3-Point Estimate
  - Realistic (most likely)
  - Best Case (optimistic)
  - Worst Case (pessimistic)



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What is an estimate?

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- Comparative Estimating
  - Uses actual costs of similar projects and make adjustments for differing conditions
  - Ex. If I can make 3 in 5 days I can make 6 in 9 days

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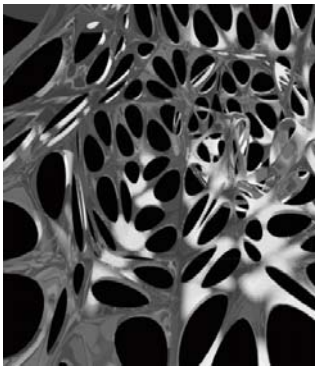
What is an estimate?

- Parametric Estimating
  - Based on historical averaged data and statistical relationships between factors
  - Ex. 10% of total project cost will be spent on project management
  - Ex. Every 1 hour spent in the field will require 3 office hours to document



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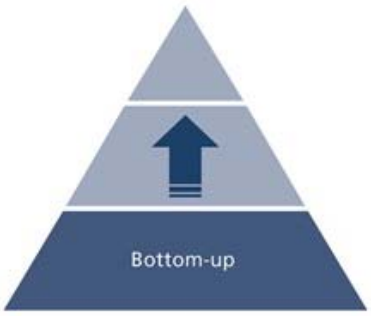
What is an estimate?



Bottom-up Estimating

- Uses detailed costs of components added together to derive total project cost
- Requires that all project components be accounted for

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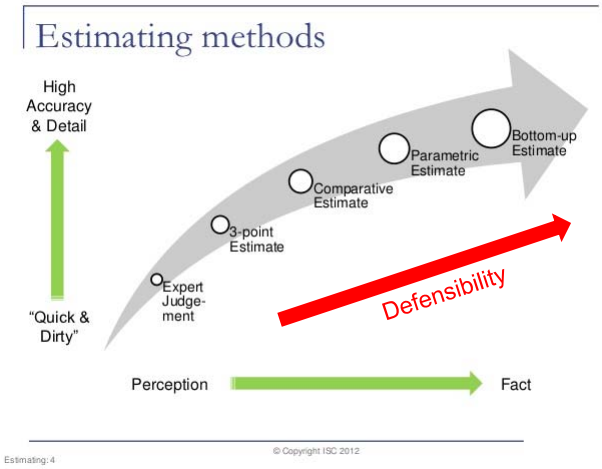
What is an estimate?



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Problems With Common Cost Estimation Methods

- Early in a project, cost-to-closure estimates are usually given in ranges; the earlier the estimate, the wider the range.
- Most cost estimations are only able to examine one, or at most, a few potential paths a project may follow to closure.

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Problems With Common Cost Estimation Methods

- Degree of uncertainty is undocumented and often overlooked.
- Miss low probability – high risk items
- Process is not very transparent – others often cannot look at the product and see how the numbers were derived.
- Lack of confidence

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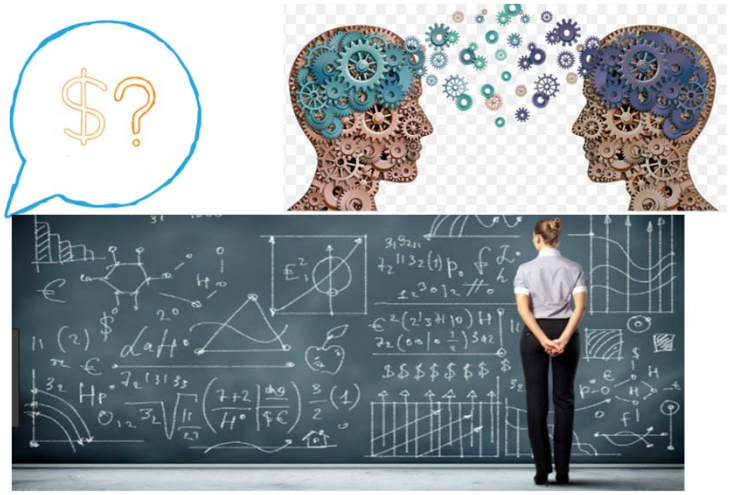
Problems With Common Cost Estimation Methods



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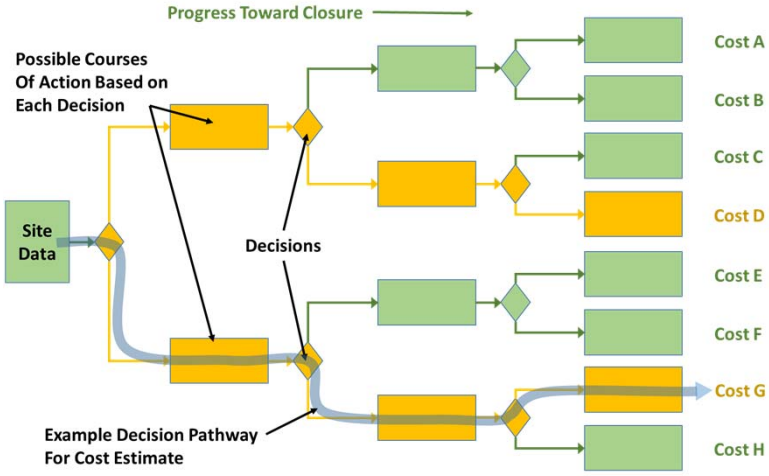
Traditional Cost Estimation Scenario



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What Would We Like to Be Able To Do?

- Simultaneously evaluate the results of multiple possible scenarios
- Account for a large number of dependent and independent variables

- Develop statistically defensible estimates of remedial costs
- Find a way to account for low-probability high value options
- Speed of 3-Point and the defensibility/ transparency of Bottom-up

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What is Monte Carlo Simulation?

- Modern Computer methods developed at Los Alamos in 1940s
  - "Monte-Carlo" was the project code name
  - Developed to track neutrons
- Inspired by thinking about the card game solitaire

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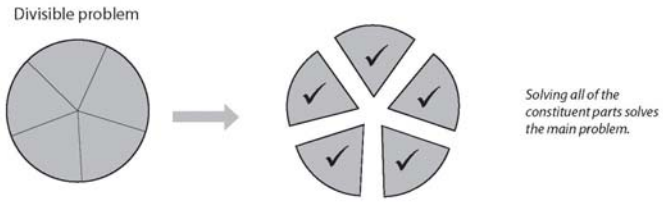
How Does Monte Carlo Simulation Work?

1. Problem is divided up into individual components (tasks) with known (estimated) uncertainty



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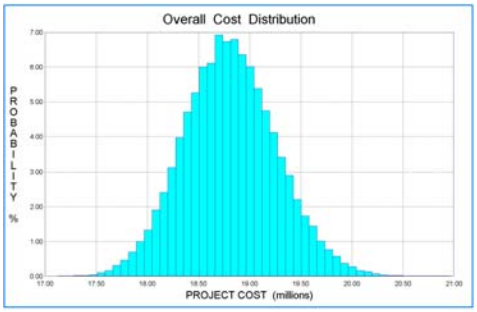
How Does Monte Carlo Simulation Work?

2. A range of values (costs) is defined for each component along with the probability of any single value being selected (probability distribution)



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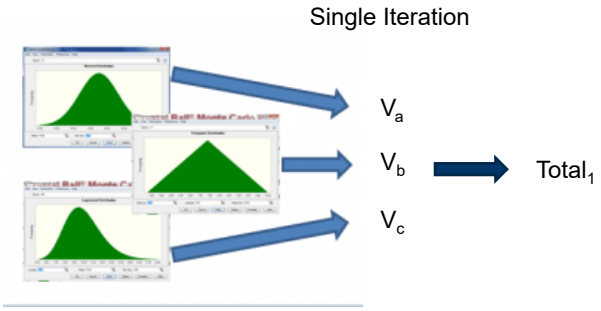
How Does Monte Carlo Simulation Work?

3. The simulation randomly selects a value from each probability distribution and combines them to create a possible outcome



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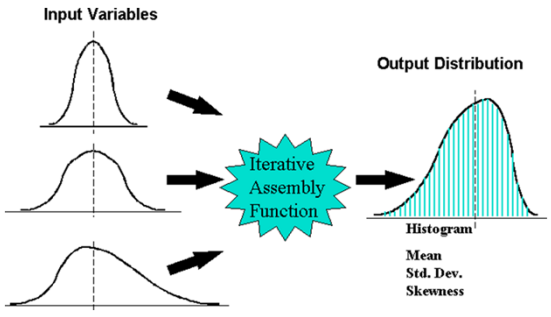
How Does Monte Carlo Simulation Work?

4. The simulation may be rerun thousands of times to create a probability distribution of possible outcomes



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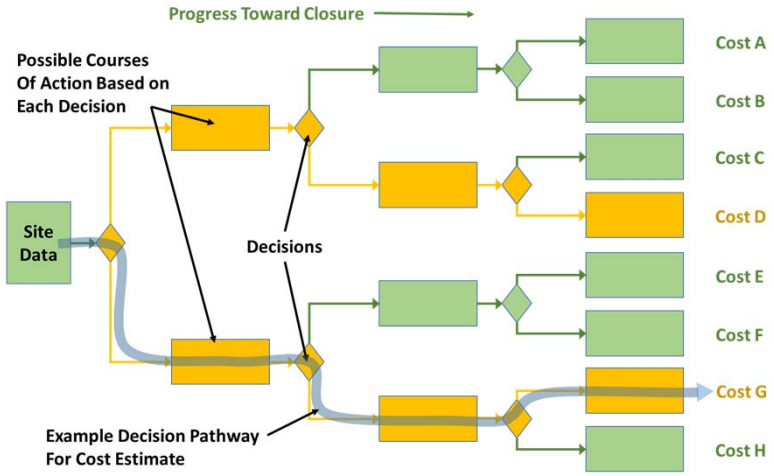
Traditional Cost Estimation Scenario



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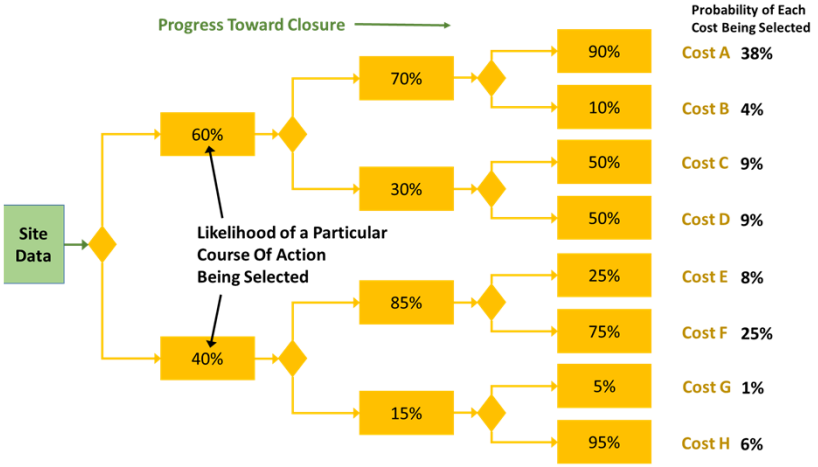

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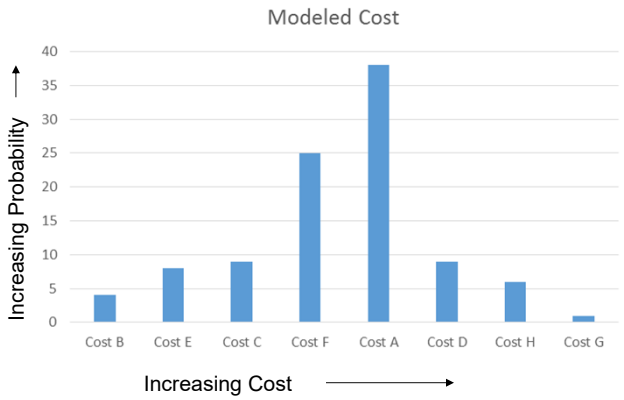
Environmental Cost Modeling



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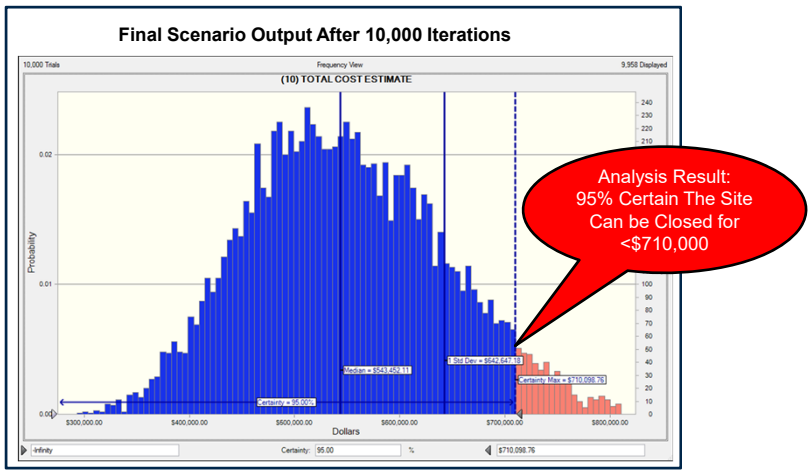
Example Site - Total Modeled Cost



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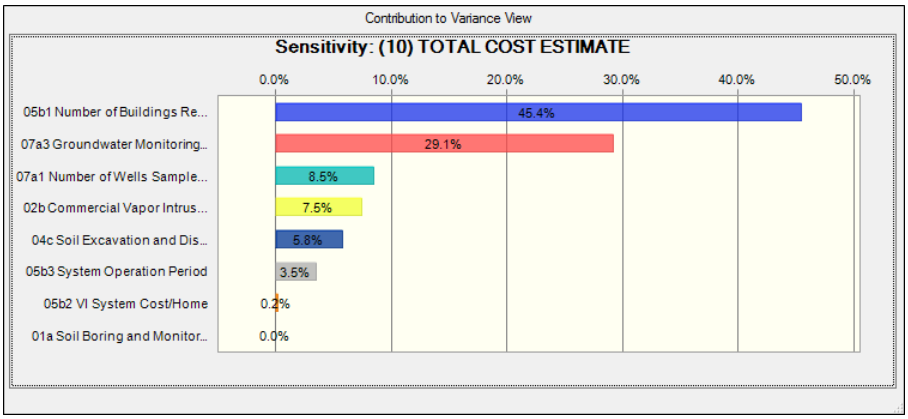
Example Site - Sensitivity Analysis



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Summary of Monte-Carlo Cost Estimation Method Discussion

- Monte-Carlo analysis can provide credible, defensible cost-to-closure estimates early in a project life.
- The analysis is spreadsheet-based and therefore costs only slightly more than traditional estimation techniques
- The technique is scalable from large industrial sites to small UST excavations

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34

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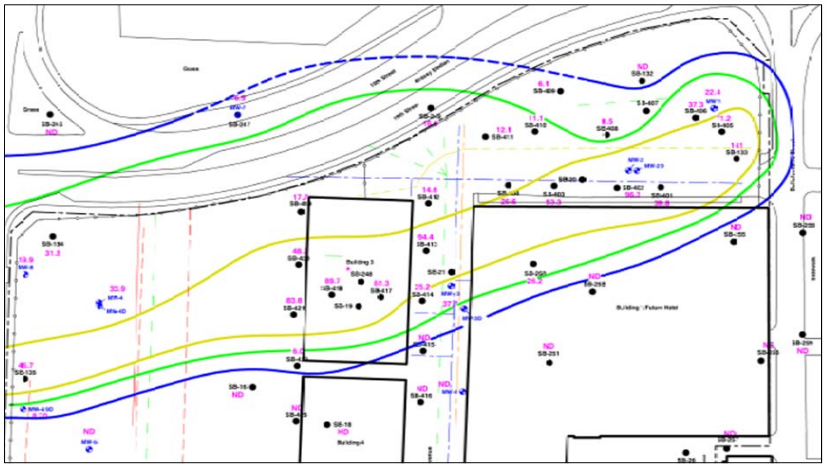
Example – Remediation



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Example – Remediation

Site Activity	Cost Estimate (USD $)	Probability of Selection	Notes	Total Project Cost
HISTORICAL INVESTIGATION WORK				
Is Buildings #12 VI Mitigation Installation Necessary?	**Answer**	**Probability**		
	Yes	0.10	YES = 1	
	No	0.90		
	-	**1.00**	**Total Probability**	
Installation of GeoVent mitigation system in building 12				
			Development footprint 10500 ft2	
Likely Lower Limit Cost	$ 111,000.00	0.50	$3/ft2	
Mid Range Cost	$ 175,000.00	0.40	$5/ft2	
Likely Upper Limit Cost	$ 271,000.00	0.10	$8/ft2	
08d: Total VI Mitigation Installation Costs Building 12	$ -	**1.00**	**Total Probability**	
09 Vapor Mitigation System Operation and Maintenance				$ -
Estimate of Costs for System Monitoring, Maintenance and Equipment Replacement- $5,500/Yr + Indoor Confirmation Sampling				
09a: Number of Years of on-Site Vapor Mitigation System Monitoring - Operation				
Likely Lower Limit Cost	5	0.70	5 years of O&M Operation	
Mid Range Cost	20	0.25	20 years of O&M Operation	
Likely Upper Limit Cost	50	0.05	50 years of O&M Operation	
Number of Years of O&M	-	**1.00**		
Total O&M Cost based on # of Years	$ -			
Estimate of Costs for Indoor Air Confirmation Sampling				
			Samples collected years 1, 2, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50	
			$30,000 for 20 Samples	
Number of Sampling Events	-			
Total Costs of Sampling Events	$ -			

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Example – Remediation

Site Activity	Cost Estimate (USD $)	Probability of Selection	Notes
16 Groundwater Sampling Program			
Quarterly groundwater sampling and Plume Stability monitoring			
Labor & Equipment cost/well/event	$850.00		
Laboratory cost/well/event	$130.00	Includes 10% additional for QA/QC	
Cost per well/event	**$980.00**	**Cost/sample**	
Number of Wells Available to be Sampled	**23**	From #15	Number Existing + Addnl Shallow + Addnl Deep
ASSUMPTION: All available wells will be sampled for the first 4 years of monitoring - the following percentage decreases in the number of wells monitored begins on Year 5			
16a Portion of Well Network Sampled Annually			
	Wells	**Probability**	
60% of Total Number of Wells	14	0.15	0.6 x Number of wells available to sample
80% of Total Number of Wells	19	0.60	0.8 x Number of wells available to sample
100% of Total Number of Wells	23	0.25	1.0 x Number of wells available to sample
Number of Wells Sampled Annually	**0**	**1.00**	**Total Probability**
16b Portion of Well Network Sampled Quarterly			
	Wells	**Probability**	
30% of Total Number of Wells	7	0.15	0.3 x Number of wells available to sample
40% of Total Number of Wells	10	0.60	0.4 x Number of wells available to sample
50% of Total Number of Wells	12	0.25	0.5 x Number of wells available to sample
Number of Wells Sampled Quarterly	**0**	**1.00**	**Total Probability**
DURATION OF MONITORING PERIOD			
16c Number of Quarters Monitoring - Post Remediation			
	Years	**Probability**	
Likely Lower Limit	4	0.10	4 years
Mid Range Cost	6	0.70	6 years
Likely Upper Limit	10	0.20	10 years
Post Remediation Years	**0**	**1.00**	**Total Probability**

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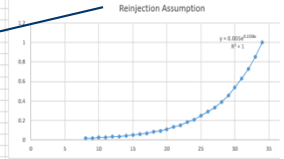
Example – Remediation

Site Activity	Cost Estimate (USD $)	Probability of Selection	Notes	Total Project Cost	# On-Site Injections				
ON-SITE GROUNDWATER REMEDIATION									
12 On-Site ISCR Treatment of Groundwater				$ 3,752,350	710				
Injection of ISCR for remediation of groundwater. Based on # of Injection Points									
12a: Section #1 & #2 Injection Costs			$5285/Injection Point		$ 5,285.00				
Likely Lower Limit Cost	$ 438,655.00	-	83 injection points on "34-ft grid		83	$ 438,655.00	$ 1,722,910.00	-	1.00
Mid Range Cost	$ 1,722,910.00	1.00	326 injection points on " 17-ft grid		326	$ 1,722,911.00	$ 7,251,020.00	1.00	-
Likely Upper Limit Cost	$ 7,251,020.00	-	1372 injection points on "8-ft grid		1372				
	$ 1,722,910	**1.00**	**Total Probability**						
Injection Spacing based on 8-foot grid	8	0.01				8.00	17.00	0.01	0.65
Injection Spacing based on 17-foot grid	17	0.65				17.00	34.00	0.65	0.34
Injection Spacing based on 34-foot grid	34	0.34							
Injection Spacing for Remaining Sections	**17.00**	**1.00**	**Total Probability**						
Number of Injection Points in Section 3	**57.00**								
Number of Injection Points in Section 4	**270.00**								
Number of Injection Points in Section 5	**17.00**								
	$ 2,029,440								
Total # of Injection Points	**710**								
ON-SITE REINJECTION GROUNDWATER REMEDIATION									
13 On-Site Re-injection Treatement of Groundwater				$ -					
Re-Injection of ISCR for remediation of groundwater. ASSUMPTION probability of re-inject based on grid spacing from above									
13a: Is On-Site Reinjection Necessary?	**Answer**	**Probability**							
As initial injection spacing gets wider the higher	Yes	0.071	YES = 1						
the probability of reinjection.	No	0.93							
	-	**1.00**	**Total Probability**						
13b: All on-Site Re-Injection Costs			$5285/Injection Point		$ 5,285.00				
Likely Lower Limit Cost	$ 528,500	0.50	100 injection points		100	$ 528,500.00	$ 792,750.00	0.50	0.45
Mid Range Cost	$ 792,750	0.45	150 injection points		150	$ 792,751.00	$ 1,057,000.00	0.45	0.05
Likely Upper Limit Cost	$ 1,057,000	0.05	200 injection points		200				
Total Probability	**$ -**	**1.00**							



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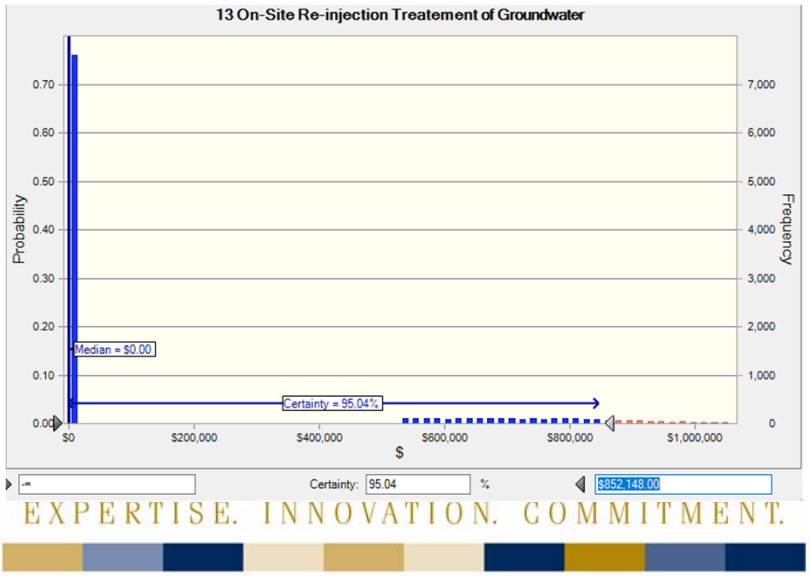
Example – Remediation



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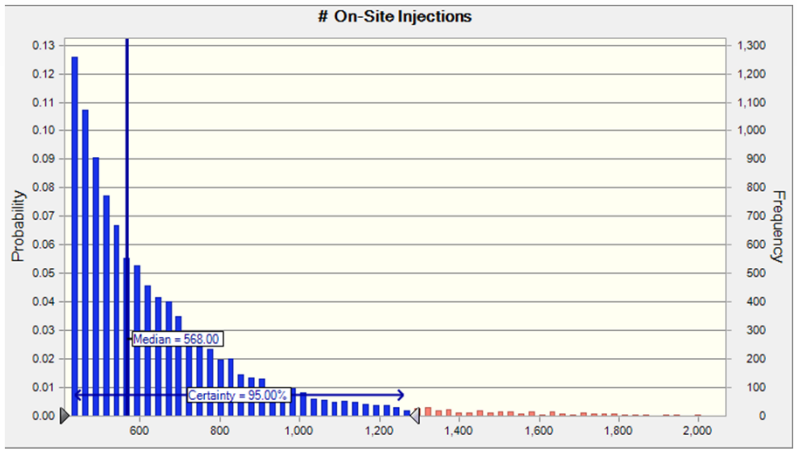
Example – Remediation



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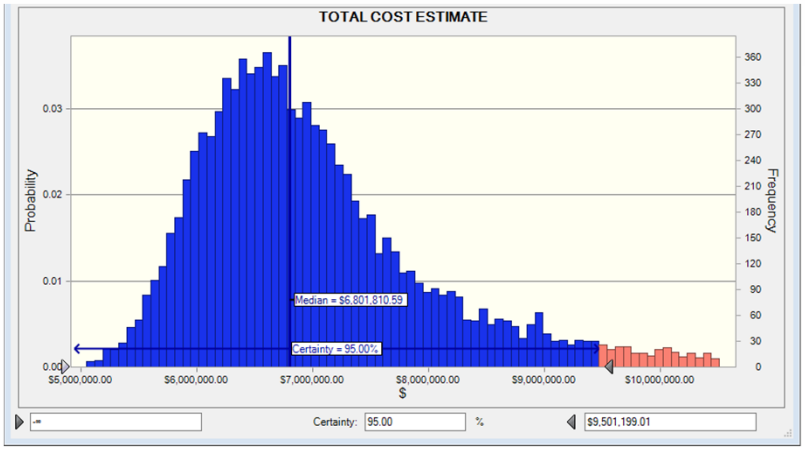
Example – Remediation



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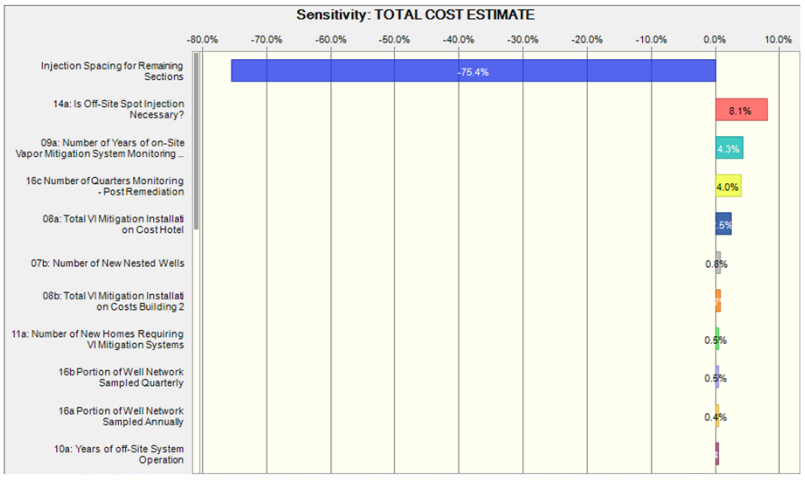
Example – Remediation



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Example – Cost to Litigate

LITIGATION BUDGET - DRAFT
ANYSITE
ANYWHERE
Revision on 12/2018
August Mack Project Number xxyyzz

Site Activity	Cost Estimate (USD $)	Probability of Selection	Notes	Total Project Cost
01/02: INITIAL WORK				$ -
01 Pre-litigation Negotiations (on-going)				
Likely Lower Limit Cost	$ 4,000.00	0.25		
Mid Range Cost	$ 6,000.00	0.50		
Likely Upper Limit Cost	$ 8,000.00	0.25		
SUB-TOTAL	$ -	1.00	Total Probability	
02 Meetings (include client meetings and site inspections)				
Likely Lower Limit Cost	$ 2,000.00	0.25		
Mid Range Cost	$ 3,000.00	0.50		
Likely Upper Limit Cost	$ 4,000.00	0.25		
SUB-TOTAL	$ -	1.00	Total Probability	
03: INITIAL PLEADINGS				$ -
03a Preparation of complaint/answer and related filings				
Likely Lower Limit Cost	$ 5,000.00	0.25		
Mid Range Cost	$ 7,000.00	0.50		
Likely Upper Limit Cost	$ 9,000.00	0.25		
SUB-TOTAL	$ -	1.00	Total Probability	
03b Initial motion practice				
Likely Lower Limit Cost	$ 5,000.00	0.25		
Mid Range Cost	$ 6,500.00	0.50		
Likely Upper Limit Cost	$ 8,000.00	0.25		
SUB-TOTAL	$ -	1.00	Total Probability	

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43

Example – Cost to Litigate

LITIGATION BUDGET - DRAFT
ANYSITE
ANYWHERE
Revision on 12/2018
August Mack Project Number xxyyzz

Site Activity	Cost Estimate (USD $)	Probability of Selection	Notes
4e Prepare for and take depositions			
Number of Depositions			
Likely Lower Limit	2	0.10	
Mid Range	5	0.50	
Likely Upper Limit	8	0.40	
04e1: Number of Depositions Taken	-	1.00	Total Probability
Cost Per Deposition			
Likely Lower Limit Cost	$ 3,750.00	0.10	
Mid Range Cost	$ 4,688.00	0.50	
Likely Upper Limit Cost	$ 5,625.00	0.40	
04e2: Cost of Each Deposition Taken	$ -	1.00	Total Probability
SUB-TOTAL	$ -		
4f Prepare for and defend depositions			
Cost Per Deposition			
Likely Lower Limit Cost	$ 3,750.00	0.10	
Mid Range Cost	$ 4,688.00	0.50	
Likely Upper Limit Cost	$ 5,625.00	0.40	
04f2: Cost of Each Deposition Taken	$ -	1.00	Total Probability
SUB-TOTAL	$ -		

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Example – Cost to Litigate

Crystal Ball Report - Custom
Simulation started on 12/4/2018 at 11:58 AM
Simulation stopped on 12/4/2018 at 11:58 AM

Run preferences:	
Number of trials run	30,000
Extreme speed	
Monte Carlo	
Random seed	
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	2.08
Trials/second (average)	14,446
Random numbers per sec	606,725
Crystal Ball data:	
Assumptions	42
Correlations	0
Correlation matrices	0
Decision variables	0
Forecasts	12

Statistics:	Forecast values
Trials	30,000
Base Case	$0.00
Mean	$341,409.09
Median	$341,794.67
Mode	—
Standard Deviation	$20,963.56
Variance	$439,470,942.58
Skewness	-0.0725
Kurtosis	2.67
Coeff. of Variation	0.0614
Minimum	$272,275.67
Maximum	$412,170.70
Range Width	$139,895.03
Mean Std. Error	$121.03

Percentiles:	Forecast values
5%	$306,171.54
95%	$375,205.65

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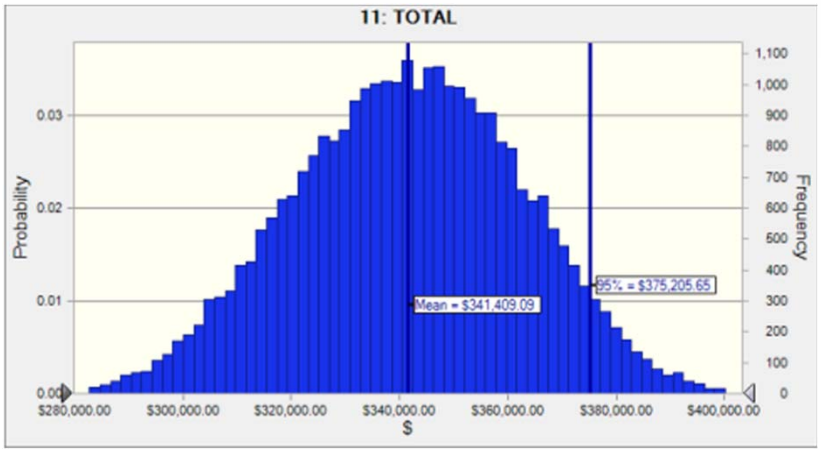
45

Example – Cost to Litigate



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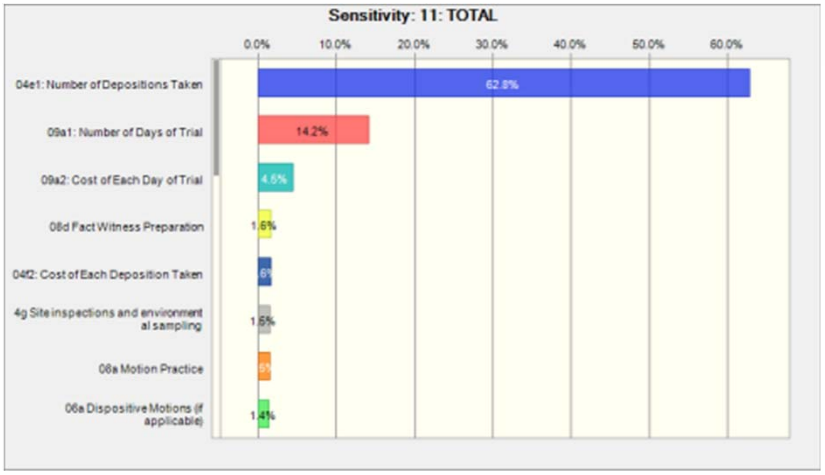
46

Example – Cost to Litigate



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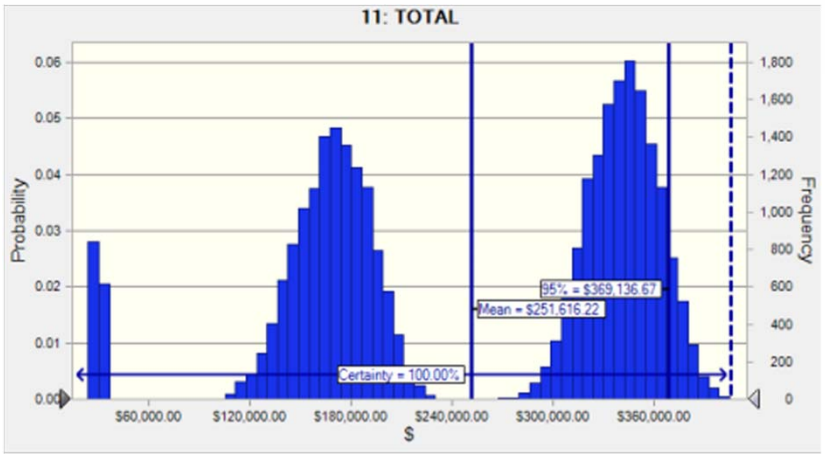
Example – Cost to Litigate



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48

Questions?

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49

Environmental Due Diligence Considerations for Purchasers and Lenders

Presented By Sarah Young and Fernando Diaz

1

The Impact of Real or Perceived Liabilities

- Decrease marketability and property values
- Complicate conventional financing options
- Delay and complicate site development and use
- Slow and potentially jeopardize future sale or development
- Introduce potential for regulatory and third party legal liabilities

2

Commercial Property Transaction

- Players involved
- Buyer
- Seller
- Lender
- Varying levels of environmental risk tolerance, typically driven by type of transaction

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Buyers

- Can become liable for environmental issues they purchase with the property.
- Desire to purchase property without ANY responsibility for pre-existing environmental contamination
- Need to satisfy lenders

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Sellers

- Already responsible for what environmental issues (known or unknown) exist at their site.
- Desire to sell property "as-is" with full releases and indemnification from purchaser with minimal impact on price

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Lenders

- Desire to make informed business decision
  - Is this a good deal?
  - Avoid loan losses due to environmental issues
- Comply with internal and external banking regulations
- Protect themselves as operator in workout and as owner in foreclosure

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Lender Exposure to Environmental Liability

- **Primary**: Environmental costs could impair borrower's ability to repay the loan and the value and marketability of the property could be diminished
- **Secondary**: Lender may be held liable for clean up costs and/or third party damage claims
  - Lenders have limited exposure to environmental liability due to 2 key federal liability protections:
    - Security Interest Exception
    - Asset Conservation, Lender Liability, and Deposit Insurance Protection Act

These liability protections are voided if lender participates in the management of the borrower.

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Environmental Due Diligence Tools Commonly Used

MOST STRINGENT

– All Appropriate Inquiry (AAI)/Phase I Environmental Site Assessment
  - Scope: ASTM 1527-13

– Transaction Screen Assessment
  - Scope: ASTM 1528-14

– Desktop Environmental Reviews
  - SBA Records Search with Risk Assessment

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What about a Phase I Update?

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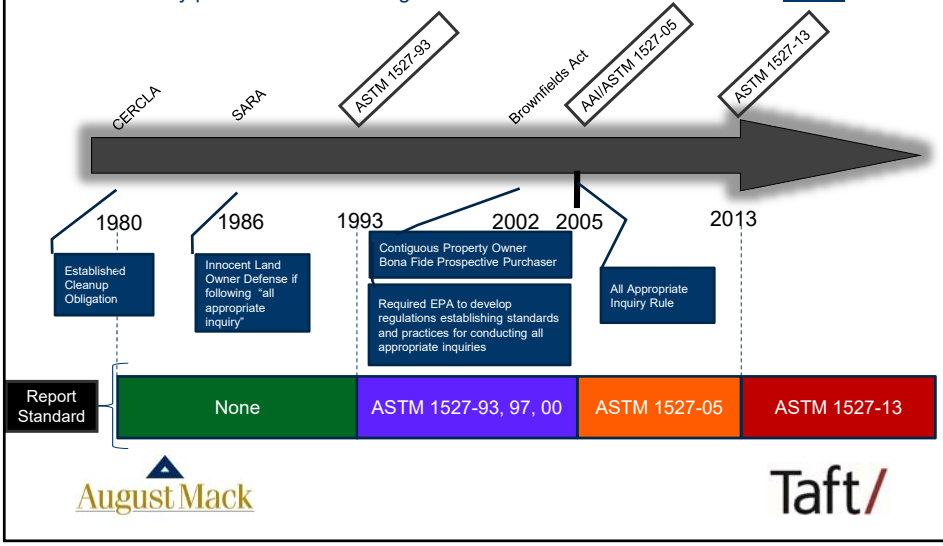
Understanding All Appropriate Inquiry & Phase I ESAs

Since 1993 the 1527 ASTM Standard has been considered "good commercial and customary practice for conducting an environmental site assessment" for Users.



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Purpose of an ASTM Phase I ESA

- **PURPOSE of the Site Assessment** is to permit a User to satisfy one of the requirements to qualify for one of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Limited Liability Protections (LLPs):
  - *innocent landowner*
  - *contiguous property owner*
  - *bona fide prospective purchaser*

In order to be maintained:

Phase I has to be completed "at the time of acquisition"

Recognized Environmental Conditions (RECs) identified in the Phase I need to be addressed

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Phase I Findings

- Phase I will identify the presence or absence of "Recognized Environmental Conditions" (RECs)
  - *The presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release or a material threat of release into the structures on the property or into the ground, groundwater or surface water of the property*
- These RECs can be Phase II triggers

Important thing to know is that REC determinations are professional opinions made by the consultant

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Addressing Environmental Due Diligence Findings

- Phase II Environmental Site Assessment may be the next step
- Add costs to environmental due diligence
- Scope of work varies and often includes:
  - Borings/soil and groundwater sampling
  - Building material sampling
  - Air quality sampling
- Designed to determine if contamination is present
- Not designed to determine the extent of contamination

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Strategies to Keep the Deal Moving

- Pursue Regulatory Closure
- Quantify Liability and Assign Responsibility
  - Escrow set asides
  - Purchase Price reduction
  - Indemnities and guarantees
- Evaluate Cost Recovery Potential
  - Old insurance policies

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Report Review

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Key Report Review Issues

- Use of Environmental Professional
- Shelf Life
- Reliance Language
- Findings/Opinions

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Environmental Professionals

Professional/Educational Qualifications	Relevant Experience
PE or PG license/registration	3 years
Federal or state license/certification to perform environmental inquiries	3 years
B.A./B.S. degree or higher in relevant discipline (engineering, environmental science or earth science)	5 years
B.A./B.S. degree or higher (grandfather clause)	10 years

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Shelf Life

- Make sure you understand the "shelf life" of your report by checking the date of **initial inquiry**.
- A report is considered "current" if **initial inquiry** was completed less than 180 days prior to the date of acquisition of the property.
- Reports with **initial inquiry** between 181 – 365 days will need to be "updated".
- Reports with **initial inquiry** older than 365 days cannot be updated and a new Phase is needed to be considered "current".

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Report Reliance

- "This assessment was performed utilizing methods and procedures consistent with good commercial and customary practices designed to conform to acceptable industry standards. The report may be relied on by ABC Realty, LLC, and XYZ Bank. Reliance on the information and conclusions presented in this report by any other party(ies) is not authorized by August Mack."
- Can save time and money by requesting reliance.

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Findings/Opinions

- This section should list out findings of environmental significance and the consultants opinion on whether the finding is a Recognized Environmental Condition.
- Phase I standard DOES NOT require recommendations

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Common Red Flags

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Common Red Flags

- Observed evidence of release
  - Visible leak, Stressed vegetation, Heavy staining
- Operations (drycleaner)
- Chemical storage and use
  - Solvents, large parts washers, ASTs
- Adjacent property use, current or historical
- Regulatory database listing
  - Spill, LUST
- Subsurface features or conduits
  - USTs, Hydraulic lifts
- Land filling from unknown source

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Examples

- Chemical Storage

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Examples

- Evidence of Release

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Examples

- Staining/Stressed Vegetation

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Examples

- Adjacent Property Use

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Examples

- Site Use

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Lender Due Diligence Policy

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Lender Due Diligence Policy

- Observations
  - All lenders have an internal policy for environmental due diligence on loans
  - Varies across the banking industry
    - Size of lender
    - Size of loan
    - Type of loan
  - Some lenders have in-house environmental staff.
  - Larger lenders often develop their own requirements to fit their risk tolerance.
  - Some lenders treat all loan sizes and types the same, others match the due diligence requirement with the need.
  - The variation in lender requirements affects costs.

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Lender Due Diligence Policy

- For SBA – NO OPTION
- **All other deals: There are options**

MOST STRINGENT

– All Appropriate Inquiry (AAI)/Phase I Environmental Site Assessment
  - Scope: ASTM 1527-13

– Transaction Screen Assessment
  - Scope: ASTM 1528-14

– Desktop Environmental Reviews
  - SBA Records Search with Risk Assessment

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Types of Assessments

- Desktop Environmental Review
  - Scope: Records review only, no site visit
- ASTM E 1528-14 Transaction Screen
  - Scope: ASTM 1528-14
  - Site Visit by either consultant OR user
- ASTME E 1527 Phase I ESA (All Appropriate Inquiry)
  - Scope: ASTM 1527-13 or AAI Rule
  - Provides CERCLA liability protection

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Types of Assessments

- Phase I ESA Update
  - Scope: Update prior Phase I with current government records data, historical data, interviews and site visit
  - In most cases, utilized for Phase I's that have exceeded their shelf life (180 days) but are under 1 year old

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Lender Environmental Policies

Lender Policy Example #1

- ≤ $1MM – Site Inspection Questionnaire (filled out by banker): **$300**
- > $1MM but ≤ $5MM – Bank developed hybrid standard of a transaction screen (Low Risk Properties): **$1,000 - $1,500**
- ≥ $500K but ≤ $5MM – Bank developed hybrid standard of a transaction screen for NAICS Environmentally Sensitive Properties: **$1,000 - $1,500**
- > $5MM – New Phase I ESA **$2,000 - $2,500**

Lender Policy Example #2

- ≤ $500k - Desk Top Environmental Review: **$800**
- > $500k - Phase I ESA: **$2,000 - $2,500**

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Lender Environmental Policies

- Recommendations:
  - Dust off the policy
  - Explore your options
  - Partner with a risk management expert to maintain balance between staying competitive and staying protected

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Questions?

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34

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ENVIRONMENTAL

Christopher Abel, CHMM
Program Development Manager
Senior Environmental Chemist

Mr. Abel has over twenty-seven years of experience in environmental engineering, chemistry and project management. He has extensive experience managing residential, commercial, and industrial site assessments, site investigation, and remediation system design, construction, operation and maintenance. I've performed a wide range of engineering and project management related work on hazardous and non-hazardous sites including retail chemical manufacturing plant, natural gas collection and compression stations, and a former nuclear weapons manufacturing site.

Specialized Experience

- Indiana Voluntary Remediation Program (VRP) Closure
- Leaking Underground Storage Tank (LUST) Closure
- Indiana State Cleanup Program Closure
- Excess Liability Trust Fund (ELTF) Cost Recovery
- Indiana Brownfields (Comfort Letters & Site Status Letters)
- Litigation Support / Testifying Expert
- U.S. EPA Contract Laboratory Protocol
- Spill Prevention, Control and Countermeasure (SPCC) Plans
- National Pollutant Discharge Elimination System (NPDES) Permits and Industrial Pretreatment Permitting
- Vapor Intrusion (VI) Evaluation
- Geological and Hydrogeological Investigations
- Investigation of Nature and Extent of Contamination
- Detailed Workplan Preparation
- Indiana Department of Environmental Management (IDEM) Negotiations
- Resource Conservation and Recovery Act (RCRA) Facility Investigations
- Remedial Planning and Estimating
- Due Diligence Investigations for Property Transactions
- Health-Based Risk Assessments
- Facility Closures
- Design and Implementation of Soil and Groundwater Remediation Strategies
- Waste Sampling, Characterization and Disposal

Representative Project Experience

Litigation Support

Marion County Superior Court: Kb Home Indiana Inc vs. Rockville Tbd Corp Cause No. 49D12-0706-PL-027065

Served as consulting expert in 2008 (by deposition) for dispute regarding a historic manufacturing operation that had been impacting a neighboring property. Evaluated the nature and extent of the impacts and appropriate remedial options. Gave and reviewed depositions and provided strategic support.

Marion County Superior Court: 5200 Keystone Limited Realty LLC, v. Filmcraft Laboratories, Inc., Eric J. Spicklemire, Portrait America, Inc., A.C. Demaree, Inc., Russ Dellen, Inc., Clean Car, Inc. and The Wax Museum & Auto Sales, Inc., Cause N. 49D07-0310-CT-003394

Served as consulting and testifying expert in 2013 (by deposition, expert opinion reports and trail support) for dispute regarding contributions at a historic dry cleaner and photo processing facility. Evaluated the nature and extent of the impacts, provided comment on timing, nature and causes of impacts at the Site. Assisted in establishing the defense strategy and assisted in developing examination and cross-examination questioning during the trial.

Hendricks County Superior Court: Stapp Properties v. Bud Carson Ford Sales, Inc., Carson Ford Sales, Inc. Carson Realty, Inc., Raceway Ford, Inc., Brown & Fini, Inc., and Bill Estes Ford, Inc. Cause No. 32D03-1309-CC-941

Served as testifying expert in 2017 (by expert opinion reports) for dispute regarding reasonableness of remedial activities at a historic auto dealership and maintenance facility. Evaluated the nature and extent of the impacts, provided comment on timing, nature, causes of impacts and appropriate remedial actions taken at the Site. Reviewed depositions, historical and expert reports and provided strategic support.

Vanderburgh County Superior Court: Lake County Trust No #1460 Llp., D/B/A West Side vs. Robert Geier Cause No. 82D03-1211-CT-05443

Served as consulting expert in 2017 & 2018 (by expert report and deposition support) for dispute regarding reasonableness and timing of investigation activities at a historic dry cleaner facility. Evaluated the nature and extent of the impacts, provided comment on investigative techniques, appropriateness and timing of investigation activities. Reviewed depositions, historical and expert reports and provided strategic support.

U.S. District Court for the Northern District of Indiana Fort Wayne Division: Opal Millman, on behalf of herself and all others similarly situated, v. United Technologies Corporation, Lear Corporation EEDS and Interiors, as successor to United Technologies Automotive, Inc., Andrews Dairy Store, Inc., and L.D. Williams, Inc. Cause No. 1:16-cv-00312-TLS-SLC

Served as consulting expert in 2017 & 2018 (by deposition support) for dispute regarding a historic manufacturing operation (source of PCE, TCE) in addition to a service station (source of petroleum) that had been impacting a neighboring property. Evaluated the nature and extent of the impacts and appropriate remedial options. Reviewed depositions, historical and expert reports and provided strategic support

Indoor Air Quality

- Potential vapor intrusion concerns were identified in an Indianapolis neighborhood where contaminated groundwater containing chlorinated volatile organic compounds had migrated below approximately 50 homes in a residential subdivision. Investigative protocols were developed based on IDEM Draft Vapor Intrusion Pilot Program Guidance and various US EPA guidance documents. Mr. Abel managed the investigation which involved collecting and analyzing twenty-two soil vapor, eleven sub-slab vapor, six ambient air and seventeen indoor air samples and evaluating contaminant levels to determine if the vapor intrusion exposure pathway was complete.
- Potential vapor intrusion concerns were identified in a rural Delaware Indiana neighborhood where contaminated groundwater containing chlorinated volatile organic compounds had migrated below approximately 20 homes in a residential subdivision. Investigative protocols were developed based on IDEM Draft Vapor Intrusion Pilot Program Guidance and various US EPA guidance documents. Mr. Abel managed the investigation which involved collecting and analyzing sub-slab vapor, ambient air and indoor air samples and evaluating contaminant levels to determine if the vapor intrusion exposure pathway was complete.
- Indoor air quality concerns were identified in a Denver Colorado neighborhood where contaminated groundwater containing chlorinated volatile organic compounds had migrated below numerous homes and several large apartment buildings. Mr. Abel managed an investigation for the Colorado Department of Transportation where the project involved collecting and analyzing several thousand soil vapor air samples and determining the potential exposure routes of contaminated soil gas through the existing community infrastructure. (i.e. utility lines, paved roads, parking lots, building types and construction practices.)
- Potential vapor intrusion concerns were identified in a commercial strip-mall undergoing redevelopment. Contaminated soil and groundwater containing chlorinated volatile organic compounds had migrated below a proposed commercial structure. Mr. Abel managed the design and installation of a vapor mitigation system utilizing a vapor barrier with an active vapor removal system. The combination of active vapor removal and the vapor barrier has minimized vapor intrusion issues within the building. Follow-up indoor air samples indicate COC concentrations below IDEM and US EPA levels.
- Potential vapor intrusion concerns were identified in several stand-alone pharmacy facilities undergoing construction in Central Indiana. Contaminated soil and/or groundwater containing chlorinated volatile organic compounds were discovered below the proposed commercial structures. Mr. Abel managed the design and installation of a vapor mitigation system utilizing a vapor barrier with an active vapor removal system. The combination of active vapor removal and the vapor barrier has minimized vapor intrusion issues within the building. Follow-up indoor air samples indicate COC concentrations below IDEM and US EPA levels.

Remediation and Construction

- Managed VRP investigations, remediation and regulatory/stakeholder interactions for a chlorinated solvent plume beneath a former dry cleaning facility in central Indiana. Developed and managed the implementation of soil, groundwater, and vapor intrusion investigations to define nature and extent of impacts. Mr. Abel was responsible for the evaluation of multiple remediation techniques with extensive communications with regulatory and stakeholder representatives. The corrective action included the use of Electric Resistive Heating (ERH) to treat an area of approximately 9,400 square feet to depths of up to 25 feet below surface. The ERH system included the continuous operation with rigorous safety controls of 47 co-located electrodes and vapor recovery wells in addition to soil vapor and groundwater recover and treatment equipment. Remedial objectives of 99.96% reduction in cVOC concentrations in soil were reached following ~190 days of active treatment.
- Currently managing investigations, remediation and regulatory/stakeholder interactions for a chlorinated solvent plume emanating from a former dry cleaning facility in a shallow unconfined aquifer beneath approximately 30 residential and commercial properties in southern Indiana. Developed and managed the implementation of soil, groundwater, and vapor intrusion investigations to define nature and extent of impacts. Mr. Abel is responsible for the evaluation of multiple remediation techniques with extensive communications with regulatory and stakeholder representatives. The corrective action will include the use of Electric Resistive Heating (ERH) to treat an area of ~ 12,000 square feet to depths of up to 30 feet below surface. The ERH system will include the continuous operation with rigorous safety controls of up to 76 electrodes and up to 30 vapor recovery wells in addition to soil vapor and groundwater recover and treatment equipment. The design calls for a system operation of ~180 days to reach the proposed source remedial objectives of 99.9% reduction in cVOC concentrations in groundwater.
- Managed VRP investigations and regulatory interactions at ~25 acre Manufactured Gas Plant within the 1-yr travel time of municipal well field. Developed and managed implementation of soil, groundwater, and air investigations to define nature and extent of impacts. Subsurface investigations included sample collection and installation of monitoring wells at depths up to ~110 feet below surface.
- Managed VRP investigations and regulatory interactions for a chlorinated solvent plume beneath a former dry cleaning facility. Developed and managed implementation of soil, groundwater, and air investigations to define nature and extent of impacts. Subsurface investigations included sample collection and installation of monitoring wells within bedrock at depths up to ~60 feet below surface.
- Remediation of soil and groundwater contamination from an approximate 2,000 foot long dissolved phase trichloroethene (TCE) plume present in a shallow unconfined aquifer beneath approximately 50 residential homes in suburban Indianapolis, Indiana. Mr. Abel was responsible for the site delineation of the soil, groundwater and vapor intrusion on and off-site. Mr. Abel was responsible for the remediation system design, detailed construction plans, equipment specifications, system installation and operation and management during operation. The groundwater and soil vapor plume will be remediated through an active soil vapor extraction / air sparge (SVE/AS) remediation system utilizing 61 extraction and 87 injection wells distributed throughout the plume. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.

- Remediation of soil and groundwater contamination from a dissolved phase chlorinated solvent plume present in a shallow unconfined aquifer beneath a commercial strip mall in suburban Indianapolis, Indiana. Mr. Abel was responsible for the site delineation of the soil, groundwater and vapor intrusion on and off-site. Mr. Abel was responsible for the remediation design and implementation. The corrective action included the removal and off-Site disposal of impacted soil under a contained-in exemption, followed by the injection of approximately 7,500 pounds of dechlorination compounds in a 200 point grid.
- Remediation of soil and groundwater contamination at a bulk fuel storage and distribution facility that had operated since the 1960's. Approximately 6,500 gallons of unleaded gasoline had been released due to a valve break. The release impacted sewer water from a nearby sanitary sewer line and explosive vapors had entered surrounding buildings.
- Remediation of soil and groundwater contamination caused by petroleum hydrocarbons leaking from underground storage tanks at five Village Pantry gas station in Central Indiana. Mr. Abel was responsible for the site delineation of the soil and groundwater on and off-site. Mr. Abel was responsible for the remediation system design, detailed construction plans, equipment specifications and obtaining permits during building construction, electrical construction and the air emissions. This remediation system incorporated the use of air sparging (AS) and multi-phase vapor extraction (MPVE) to remove the subsurface contamination. Treated groundwater was discharged to a re-injection gallery on-site to further 'flush' impacted soil. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.
- Remediation of soil and groundwater contamination caused by petroleum hydrocarbons leaking from underground storage tanks at five Village Pantry gas station in Central Indiana. Mr. Abel was responsible for the continued operation and maintenance of the remediation systems, project coordination, sampling, and reporting. The remediation systems consist of vertical multi-phase vapor extraction (MPVE) wells connected to positive displacement blowers and/or liquid ring pumps to remediate both groundwater and soil contamination that had migrated at the site. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.
- Remediation of soil and groundwater contamination caused by petroleum hydrocarbons leaking from underground storage tanks at a gas station in New Paris, Indiana. Mr. Abel was responsible for the remediation system design, detailed construction plans, equipment specifications and obtaining permits building construction, electrical construction and the air emissions. The remediation system consisted of vertical air sparge and soil vapor extraction wells to remediate both groundwater and soil contamination that had migrated from the UST pit at the site. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.

- Remediation of soil and groundwater contamination caused by petroleum hydrocarbons leaking from underground storage tanks at a gas station in Plymouth, Indiana. Mr. Abel was responsible for the remediation system design, detailed construction plans, equipment specifications and obtaining permits building construction, electrical construction and the air emissions. The remediation system consisted of vertical multi-phase vapor extraction (MPVE) wells connected to a liquid ring pump to remediate both groundwater and soil contamination that had migrated at the site. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.
- Site remediation of four natural gas collection, separation and compression stations located in Eastern Colorado for Panhandle Eastern Pipeline Company. Produced water is separated from natural gas and natural gas liquids onsite and is stored within in-ground sumps. The produced water, which contains petroleum hydrocarbons, is routinely collected and disposed. In the past, equipment malfunctions have resulted in the overflow of produced water from the sumps. These events contributed to the presence of petroleum hydrocarbons in the soil and groundwater beneath the site. Mr. Abel was the lead designer and managed the installation and start-up of four remediation systems for removal of petroleum hydrocarbons from the subsurface. These systems incorporated the use of air sparging (AS) and soil vapor extraction (SVE) to remove the subsurface contamination. Due to the variable geologic and hydrologic characteristics of the sites the use of horizontal AS and SVE wells was employed. Extensive field-testing and computer modeling was done to ensure accurate airflow along the well lengths. The systems were designed for continuous unattended operation and involved safety controls to shut down the systems automatically in the event of equipment malfunction.
- Remediation of soil and groundwater contamination caused by petroleum hydrocarbons leaking from two underground storage tanks at a Texaco gas station in Boulder Colorado. Mr. Abel was responsible for the remediation system design, detailed construction plans, equipment specifications and obtaining permits building construction, electrical construction and the air emissions. The remediation system consisted of horizontal and nested vertical air sparge and soil vapor extraction wells to remediate both groundwater and soil contamination that had migrated under several buildings around the site. The system was designed for continuous unattended operation and involved safety controls to shut down the system automatically in the event of equipment malfunction.

Environmental Consulting

- Mr. Abel managed a three (3)-month mobile laboratory project in the Boston area for Monsanto Chemical Company. Mr. Abel supported an active bioremediation process incorporating the use of three (3) 10,000-liter bioreactors to remediate high concentrations of a manufactured plasticizer from contaminated soil.
- Mr. Abel managed a two (2)-month laboratory study for Chevron, where soil contaminated with heavy waste oil was analyzed and manipulated to determine the bioremediation treatability potential of the soil. The study determined that soil contaminated with heavy waste oil could be remediated to below action levels by bioremediation.
- Mr. Abel managed a six (6)-week laboratory study for the Japanese Research Institute, where soil contaminated with trichloroethene (TCE) was analyzed and manipulated to determine the bioremediation treatability potential of the soil. The study determined that soil contaminated with TCE could be remediated to below action levels by bioremediation.

- Mr. Abel managed a four (4)-week laboratory study for a potato chip factory in Washington State, where there was an unknown contamination of the plants biological degradation process. The study isolated the contamination and was able to recommend various process alternatives to reduce the contamination in the future.

Professional Experience

August Mack Environmental, Inc.
Program Development Manager / Chemist, 2018 to Present
August Mack Environmental, Inc.
Closure Manager / Chemist, 2017 to 2018
August Mack Environmental, Inc.
Senior Manager / Chemist, 2012 to 2017
Alt & Witzig Engineering
Senior Project Engineer / Chemist, 2000 to 2012
Walsh Environmental
Laboratory Manager to a Project Engineer, 1994 to 2000
Environmental Science & Engineering
Group Leader - GS / MS Section, 1991 to 1994

Education & Certifications

Master of Science, Colorado School of Mines,
1997 Environmental Science and Engineering
Bachelor of Science, Butler University,
1991 Chemistry and Environmental Studies
40 Hour HAZWOPER,
Alliance of Hazardous Materials Professionals,
Certified Hazardous Materials Manager, Master Level,
Mid-States Environmental Consultants Association (MSECA),
Professional Environmental Scientist, CO

Publications & Presentations

- "What Ethical Guidelines Govern Environmental Consultants," Indiana Bar Association Continuing Legal Education Course, December 2016.
- "Use of Monte-Carlo Analysis to Estimate Cost to Closure for Environmental Sites," The Association for Environmental Health & Sciences Foundation, Inc. 32nd Annual International Conference on Soils, Sediments, Water and Energy, October 2016.
- "Closure Cost and Time Frame Estimating (Crystal Ball)," August Mack Environmental Legal CLE Program, 2016, 2017, 2018
- "Electric Resistance Heating Case Study", August Mack Environmental Legal CLE Program, 2018
- "Vapor Intrusion Preemptive Mitigation vs. Long-Term Sampling", August Mack Environmental Legal CLE Program, 2018
- "Injections – In Situ Remediation Solution", August Mack Environmental Legal CLE Program, 2018
- "Strategies for Completing Deals on Environmentally Impaired Property", August Mack Environmental Legal CLE Program, 2018
- "Challenges Related to Risk Based Cleanup," August Mack Environmental Legal CLE Program, 2016.
- "What is Investigative Derived Waste? What do You Mean Contained-In Determination? (Indiana Specific)," August Mack Environmental Webinar Program, 2016.
- "Taking Control: An Alternative Approach to Environmental Site Closure," August Mack Environmental Webinar Program, 2015.
- "Environmental Analytical Chemistry," August Mack Environmental's Webinar Program, 2013.
- "Taking Control: An Alternative Approach to Environmental Site Closure," August Mack Environmental's Monthly Newsletter, 2013.
- "Horizontal Wells Address Indoor Air Quality," American Society of Engineers, 2000.

Fernando L. Diaz

ASSOCIATE / CINCINNATI
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Fernando focuses his practice on a wide range of environmental issues relating to regulatory compliance assistance, transactional guidance and litigation. He also routinely advises clients in matters relating to California Proposition 65 (commonly known as “Prop 65”). Fernando’s environmental litigation experience includes governmental enforcement defense, private party claims defense, insurance coverage litigation for policyholders, cost recovery claims and complex litigation.

Prior to joining Taft, Fernando was an associate at Plews Shadley Racher & Braun LLP in Indianapolis. Prior to law school, Fernando worked as the business development manager at a mass tort litigation firm specializing in representing businesses and municipalities in connection with the Deepwater Horizon oil spill.

Fernando earned his J.D., *cum laude*, from the University of Illinois College of Law, where he was an editor of the *Journal of Law, Technology & Policy*, Moot Court finalist and Rickert Award Winner for excellence in legal writing.

Speeches and Publications

"Trolling & The First Amendment: Protecting Internet Speech in the Era of Cyberbullies and Internet Defamation," 2016 U. Ill. J.L. Tech. & Pol'y 135 (2016)

Professional Affiliations

- Indianapolis Bar Association
  Member, Young Lawyers Division (2016-2018)
- Indiana State Bar Association
  Member, Public Relations Committee (2017-2018)
- Indianapolis American Inn of Court
  (2017-2018)

Practices

Environmental
Environmental Litigation
Environmental Regulatory
Environmental Transactional Services
Class Action, Derivative and Multi-Party Litigation

Industries

Industrial Manufacturing
Chemical Processing
Pesticide Manufacturing and Formulation
Utilities
Insurance Coverage and Recovery

Education

University of Illinois College of Law (2016)
University of Florida (2010)

Admissions

State - Indiana
State - Not licensed to practice in Ohio

E. Chase Dressman

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F: (513) 381-0205

As a member of Taft's Environmental and Litigation practices, Chase provides clients with a full range of environmental services, including regulatory compliance assistance, environmental transactional guidance and all facets of environmental litigation. Chase meets the legal needs of a diverse range of clients, including chemical manufacturers and processors (with particular experience in the pesticide industry), retail and wholesale distributors, utilities, industrial manufacturers, and automotive and transportation businesses.

Legal services that Chase routinely provides include: (i) advising clients regarding compliance with state and federal environmental laws and regulations (e.g., RCRA, Clean Water Act, Clean Air Act, TSCA, EPCRA, FIFRA); (ii) environmental due diligence and negotiations as part of corporate and real estate transactions; (iii) drafting and negotiating contracts; (iv) preparing for, responding to and defending regulatory inspections and enforcement actions; and (v) prosecuting and defending private party lawsuits involving environmental claims (including litigation under CERCLA and equivalent state laws). As an experienced litigator, Chase has represented clients at trial in federal and state court, in arbitration proceedings and during administrative proceedings (including EPA and state civil enforcement proceedings).

A significant portion of Chase's practice involves representing companies in the pesticide industry, including manufacturers and distributors of agricultural, conventional and anti-microbial pesticide products. He routinely helps clients with their legal needs related to the production, packaging, labeling, distribution, marketing and development of pesticide products (governed by the Federal Insecticide, Fungicide and Rodenticide Act), including: (i) contract manufacturing, toll formulation, repackaging and supplemental distribution agreements; (ii) product labeling, record-keeping, distribution and formulation issues; (iii) transportation and disposal issues; and (iv) data compensation and cost-sharing negotiations and

Practices

Environmental
Environmental Litigation
Environmental Transactional Services
Crisis Management
Environmental Regulatory
Workplace Safety and Health

Industries

Chemical Processing
Pesticide Manufacturing and Formulation
Utilities
Industrial Manufacturing
Automotive and Transportation
Energy and Regulated Industries
Insurance
Insurance Coverage and Recovery

Education

University of Kentucky College of Law (2010)
Xavier University (2007)

Admissions

Federal - Southern District of Ohio
Federal - Eastern District of Kentucky
State - Ohio
State - Kentucky

disputes.

Chase is currently serving his third consecutive term as chair of the Cincinnati Bar Association's Environmental Law Committee.

Chase remains active as a leader in his community. He is the 2018 chair and 2017 vice-chair of the Northern Kentucky Chamber of Commerce's Regional Youth Leadership program, which teaches local high school students leadership skills during monthly seminars. He has also served as chair and co-chair of Law Day for Regional Youth Leadership since 2011 and is an alumnus of Leadership Northern Kentucky (Class of 2013) and Cincinnati Academy of Leadership for Lawyers (Class 21).

Chase received his undergraduate degree, *cum laude*, with honors, from Xavier University and earned his J.D., *cum laude*, from the University of Kentucky College of Law, where he was a member of the *Kentucky Law Journal*, Moot Court, and the National Moot Court team. Chase is a life-long resident of Northern Kentucky, where he lives with his wife and four children.

Awards

- Honoree, Environmental Litigation – Ohio *Super Lawyers* Rising Stars (2015-present)

Professional Affiliations

- Cincinnati Academy of Leadership for Lawyers (CALL) Class 21
- Leadership Northern Kentucky Class of 2013
- Cincinnati Bar Association Member; Chair of Environmental Law Committee (2016-2018)
- Kentucky Bar Association Member
- Ohio State Bar Association Member
- Potter Stewart Inn of Court Member

Community Involvement

- Northern Kentucky Chamber of Commerce Regional Youth Leadership Chair (2018); Vice-Chair (2017); Steering Committee Member and Chair of Law Day 2011 - present

August Mack ENVIRONMENTAL

Sarah E. Young, CHMM
Senior Manager

Ms. Young has over eighteen years of experience in environmental consulting. She has experience managing residential, commercial, and industrial due diligence site assessments, site investigation, vapor intrusion studies, and remediation activities. She has performed a wide range of project management related work on hazardous and non-hazardous sites including commercial gas stations, dry cleaning facilities, machine shops, and a former manufactured gas plant. Ms. Young is familiar with the State of Indiana's Voluntary Remediation Program (VRP), the State Cleanup Program (SCP), the Underground Storage Tank (UST) program, the Excess Liability Trust Fund (ELTF), the Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closures (RISC), and the IDEM Remediation Closure Guide (RCG).

Specialized Experience

- Environmental due diligence studies for residential, commercial and industrial properties
- Site Investigations and remedial activities associated with residential, commercial and industrial properties
- Chlorinated solvent and petroleum plume investigation and remediation
- Manage remedial activities including underground storage tank (UST) closure assessments, excavation and in-situ bio-augmentation approaches
- Vapor Intrusion studies including determining sampling locations, sub-slab port installation, sample collection, interpreting analytical results and communicating results to clients
- Coordinate sub-slab depressurization system installation and operation
- Coordinate Air Sparge (AS)/Soil Vapor Extraction (SVE) system installation and operation
- Manage projects with IDEM oversight in the VRP, SCP, LUST, ELTF and the Indiana Brownfields Program
- Manage projects with oversight of the Ohio Bureau of Underground Storage Tank Regulations (BUSTR)
- Voluntary Action Program (VAP) training through the Ohio Environmental Protection Agency (EPA)

Representative Project Experience

Remediation and Construction

- Due to the migration of an approximate 2,000-foot long trichloroethene plume beneath a residential subdivision from a former adjoining manufacturing facility, Ms. Young was responsible for coordinating the installation and continued operation and maintenance of an air sparge (AS)/soil vapor extraction (SVE) system within the undeveloped and partially within the developed lots of a residential subdivision. Project activities required coordination with the Senior Project Manager and Field Technicians, homeowners, attorneys, the client, and the IDEM VRP Project Manager.
- As a result of a historical on-Site dry cleaning facility, a tetrachloroethene plume existed on-Site and migrated to an off-Site commercial facility. Ms. Young was responsible for coordinating the excavation of contaminated soil under a contained-in exemption followed by coordinating the installation of a multi-phase extraction remediation system. Project activities required coordination with the Senior Project Manager and Field Technicians, the property owner, the client and the IDEM SCP Project Manager.
- As a result of a historical on-Site dry cleaning facility, a tetrachloroethene plume existed on-Site and migrated to an off-Site commercial facility. Ms. Young was responsible for coordinating the investigation to characterize the plume on- and off-site within the bedrock geology, the excavation of contaminated soil within and outside of the building footprint, the design and installation of a sub-slab depressurization system, and on- and off-site vapor intrusion investigations within structures and utility corridors following by coordination and oversight of the design and implementation of in-situ injections of zero-valent iron (iron) into the bedrock geology for remediation purposes. Project activities required coordination with the Project Manager and Field Technicians, the property owner, the client, the insurance company, the attorney, and the IDEM SCP Project Manager.
- A petroleum plume was present beneath a former gasoline station property undergoing redevelopment in rural Tippecanoe, Indiana. Ms. Young was responsible for managing contaminant delineation, the excavation of approximately 1,000-tons of impacted soil, placement and mixing of Oxygen Release Compound (ORC) within the excavation, the removal of a 1,000-gallon underground storage tank (UST) encountered during excavation activities, ORC injections outside of the excavation area, monitoring well installation and quarterly groundwater monitoring activities until No Further Action (NFA) was achieved. This project involved coordination with the property owner and the Indiana Brownfields Program Project Manager.
- A petroleum plume was present beneath a former auto service facility with planned redevelopment of the Site into a recreational park in Gary, Indiana. Ms. Young was responsible for managing contaminant delineation, building demolition oversight, the removal of two 5,000-gallon gasoline USTs, one 1,000-gallon waste oil UST, one 10,000-gallon hydraulic oil UST and two in-ground hydraulic lifts. Following removal activities, ORC injections were performed in a petroleum-impacted area followed by monitoring well installation and long-term monitoring until NFA was achieved. This project involved coordination with the property owner and the Indiana Brownfields Program Project Manager.
- A petroleum plume was present beneath a former service station property planned for redevelopment in Batesville, Indiana. Ms. Young was responsible for managing underground storage tank system removals, contaminant delineation, monitoring well installation, vapor intrusion investigation within utility corridors, design and implementation of Regen-Ox and Oxygen Release Compound (ORC) in the on-site treatment area, and quarterly groundwater

monitoring activities to achieve No Further Action (NFA). In addition, this project involved collaboration with the City of Batesville and the Indiana Office of Community and Rural Affairs so the City could obtain a Community Development Block Grant. Once the grant was obtained, Ms. Young provided coordination and oversight for bid specification preparation, contractor selection, asbestos survey completion, universal waste survey and removal, building demolition, closed-in-place underground storage tank removal, in-ground hydraulic lift removal and sampling, and oil/water separator and sampling. This project involved coordination with the City of Batesville, the Indiana Office of Community and Rural Affairs, the contractor, and the Project Manager and Field Technicians.

Due Diligence and Subsurface Investigation

- Project Manager responsible for performing the soil and groundwater investigations and coordinating access and long-term monitoring of an approximate 2,000-foot long trichloroethene plume present in a shallow unconfined aquifer beneath approximately 50 homes.
- Project Manager responsible for performing the soil and groundwater investigations and coordinating access and long-term monitoring of a chlorinated solvent plume present in a shallow unconfined aquifer beneath a former dry cleaning facility. Field activities required coordination during building demolition and Site redevelopment.
- Managed all aspects of investigation and long-term monitoring for a former gasoline station via the Indiana Excess Liability Trust Fund. Coordinated off-Site access with property owners and the local municipalities for utility corridor investigations.
- Lead Project Manager for investigation activities and long-term monitoring for various petroleum-contaminated properties through the Indiana Brownfields Program. These projects involved coordination with property owners and the Program Managers as well as complying with the American Reinvestment and Recovery Act budget.
- Responsible for managing the Phase I and Phase II investigations, cultural resource surveys, archaeological reconnaissance, asbestos surveys and water well closings for 20 property owners within an 1,800-acre proposed mixed-use development. This involved coordination with the property owners, subcontractors and other project managers from the environmental division to meet client deadlines in a practicable and timely manner.
- Responsible for coordinating all aspects of projects (Phase I ESA, subsurface investigations, vapor intrusion mitigation, soil management plans, establishing continuing obligations) with the Indiana Brownfields Program and clients (i.e. attorneys, developers) to aid in establishing the Bona-Fide Prospective Purchaser (BFPP) defense to CERCLA liability.

Vapor Intrusion

- Potential vapor intrusion concerns were identified in an Indianapolis neighborhood where contaminated groundwater containing trichloroethene had migrated below approximately 50 homes in a residential subdivision from a former adjoining manufacturing facility. Investigative protocols were developed based on IDEM Draft Vapor Intrusion Pilot Program Guidance and various US EPA guidance documents. Ms. Young performed the investigation which involved conducting pre-investigation surveys, sub-slab sample port installations, collecting and analyzing twenty-two soil vapor, eleven sub-slab vapor, six ambient air and seventeen indoor air samples and data interpretation. The project involved coordination with homeowners, the client, attorneys and the IDEM VRP Project Manager.
- Potential vapor intrusion concerns were identified in a rural Delaware Indiana neighborhood where contaminated groundwater containing trichloroethene had migrated below approximately 20 homes in a residential subdivision from a former adjoining landfill. Investigative protocols were developed based on IDEM Draft Vapor Intrusion Pilot Program Guidance and various US EPA guidance documents. Ms. Young managed the investigation which involved conducting pre-investigation surveys, collecting and analyzing sub-slab vapor, ambient air and indoor air samples and data interpretation. The project involved coordination with homeowners, the client, attorneys and the IDEM SCP Project Manager.
- Contaminated soil and groundwater containing tetrachloroethene existed beneath a former dry cleaning facility within a multi-tenant commercial building. Existing commercial structures were located within 50 feet of the former facility and the former multi-tenant building was slated for demolition and redevelopment. Ms. Young performed the investigation which involved conducting pre-investigation surveys, sub-slab sample port installation, collecting and analyzing sub-slab vapor, ambient air and indoor air samples and data interpretation. The project involved coordination with property owners, tenants, the client, attorneys and the IDEM VRP Project Manager.
- Ms. Young managed the installation of vapor mitigation systems associated with development of various pharmacy facilities throughout Indiana. Vapor mitigation systems were required in order to eliminate the potential inhalation exposure pathway associated with the historical Site uses as gasoline station and dry cleaning facilities. These projects involved coordination with the Senior Project Manager and Field Technicians, property owner/client, attorneys and the general contractors.

Professional Experience

August Mack Environmental, Inc.
Senior Manager, 2016 to Present
August Mack Environmental, Inc.
Senior Project Manager, 2014 to 2016
August Mack Environmental, Inc.
Project Manager, 2012 to 2016
Alt & Witzig Consulting Services
Senior Project Manager, 2008 to 2012
Alt & Witzig Consulting Services
Project Manager, 2003 to 2008
RP Consultants, Inc.
Field Scientist, 2000 to 2003

Education & Certifications

Bachelor of Science, Indiana University, Environmental Management
40-Hour Hazardous Waste Site Operations (HAZWOPER) Training as required by OSHA 29 CFR 1910.120,
8-Hour Hazardous Waste Site Operations (HAZWOPER) Refresher Training,
Asbestos Awareness Training,
Certified Hazardous Materials Manager (CHMM),

Membership & Appointments

Indiana Association of Environmental Professionals, Member
Commercial Real Estate Women, Cleveland and Greater Akron Chapters

Publications & Presentations

- "Emerging Contaminants and What We Know About Them," August Mack Environmental Webinar Program, 2017.
- "Emerging Contaminants and What We Know About Them," August Mack Environmental Newsletter, 2016.
- "Managing Investigation Derived Waste and the Contained-In Policy," August Mack Environmental Newsletter, 2016.
- "Environmental Liability and Insurance Recovery," August Mack Environmental Webinar Program, 2014.
- "Environmental Liability Protection for Commercial and Industrial Property Transactions," August Mack Environmental Webinar Program, 2014.
- "Environmental Liability Protection for Commercial and Industrial Property Transactions," August Mack Environmental Monthly Newsletter, 2013.
- "Environmental Liability and Insurance Recovery," August Mack Environmental Monthly Newsletter, 2013.