

# Phase II Investigations: A Comparative Data and Cost Analysis

14th Annual Gatekeeper Regulatory Roundup

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Engineering and Science, Inc.*



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# Why is Phase II Data Important?



# Why is Phase II Data Important?



# Questions We Asked

**How often is contamination found during a Phase II?  
(soil, groundwater, soil gas both above and below regulatory  
thresholds)**

Is there a correlation between age of feature and presence of  
contamination? (soil, groundwater, soil gas both above and below  
regulatory thresholds)

Three years of Phase II data were analyzed for the following features/property types :

**1. Hydraulic Lifts**

2. Oil Water Separators

3. Heating Oil USTs

4. Historical Manufacturing (with potential use of solvents)

5. Funeral Homes

6. General Auto Service and Repair

7. Drycleaners

8. Off-site Issues

# The following data was obtained for a total 1167 Phase II Environmental Site Assessments in 45 states:

## Presence of contamination

Presence of contamination above regulatory standards

Was groundwater encountered in the investigation?

Presence of contamination in groundwater above regulatory standards

Was a soil gas survey performed?

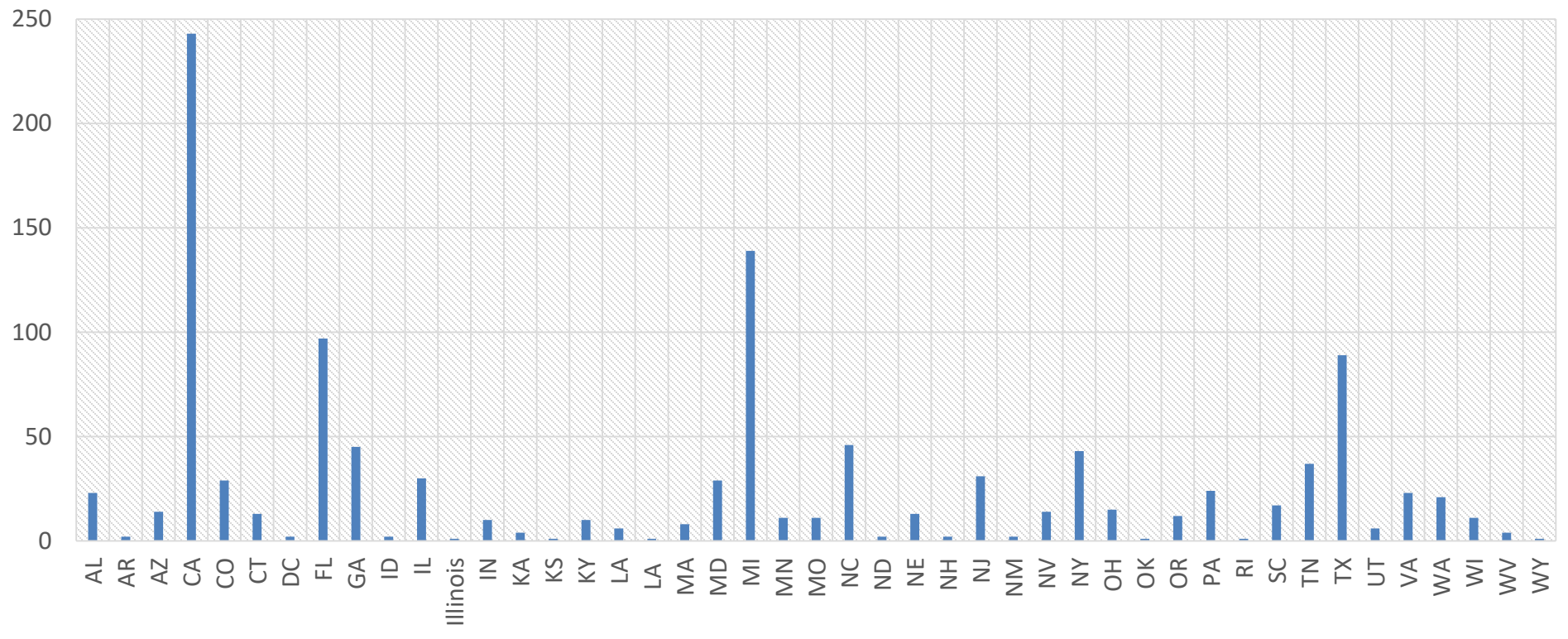
Was contamination detected in the soil gas survey?

Presence of soil gas contamination above regulatory standards

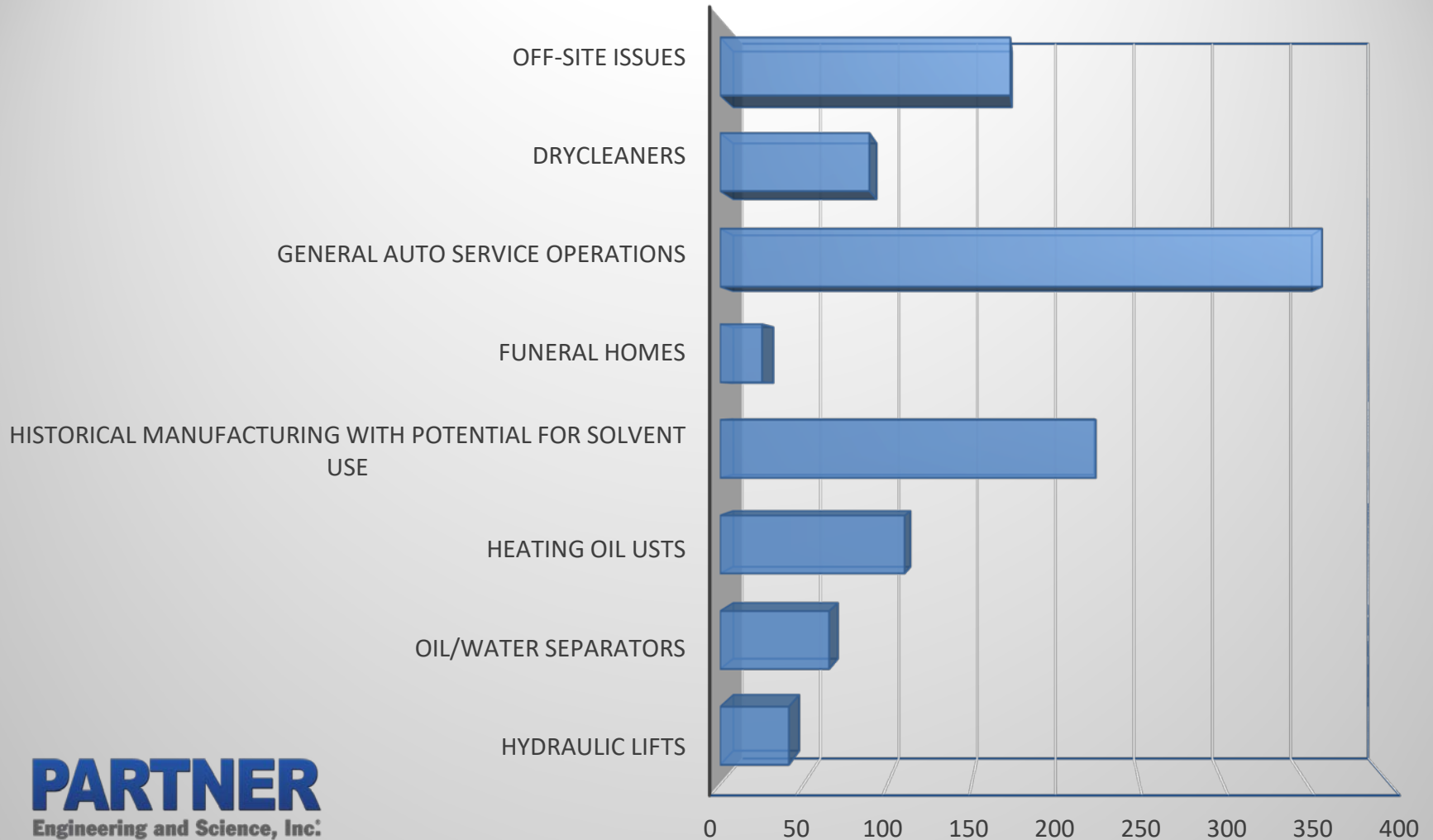
Age of feature investigated

# Number of Sites Surveyed per State

## Distribution of Sites by State

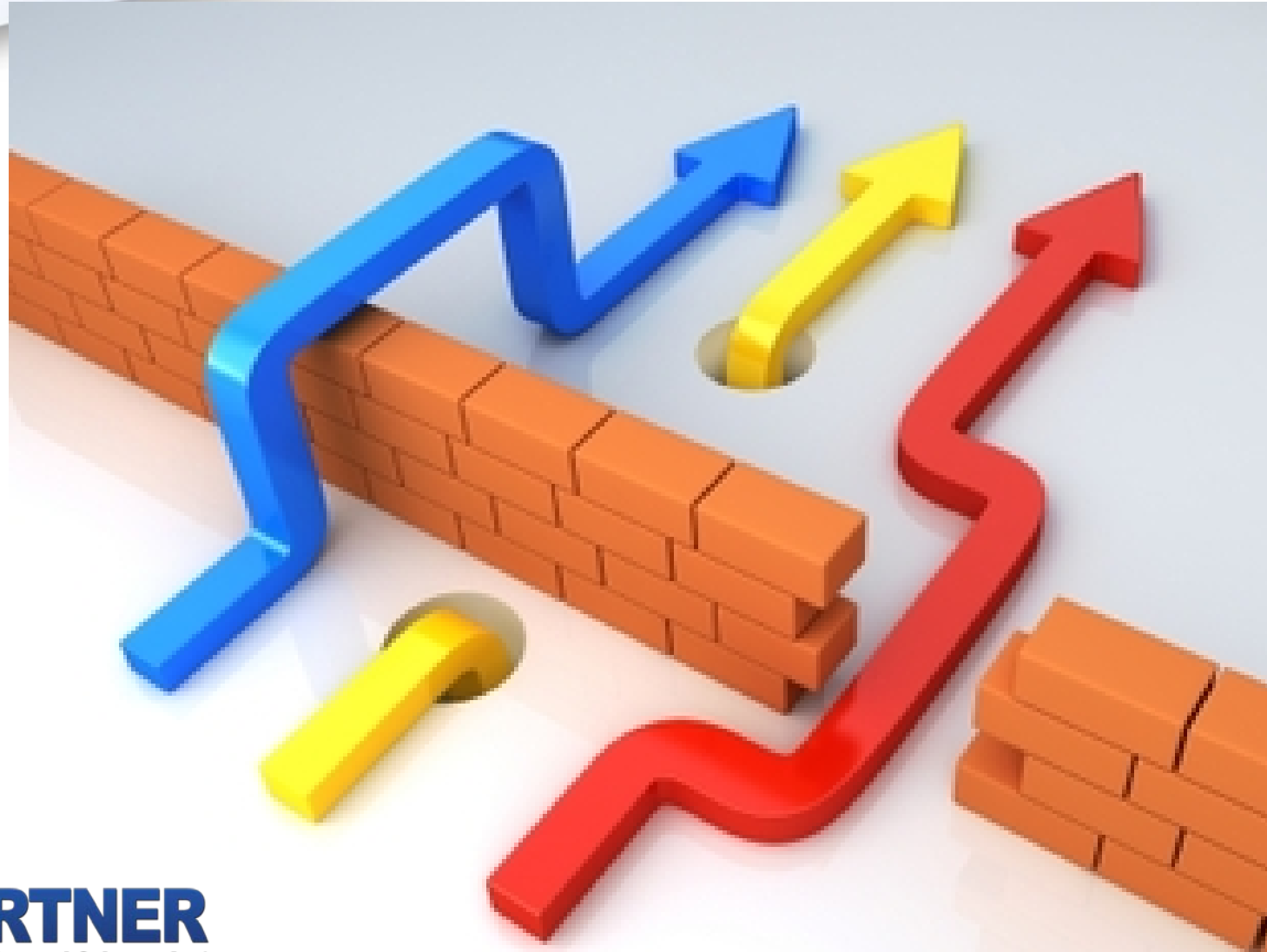


# Total Number of Each Feature



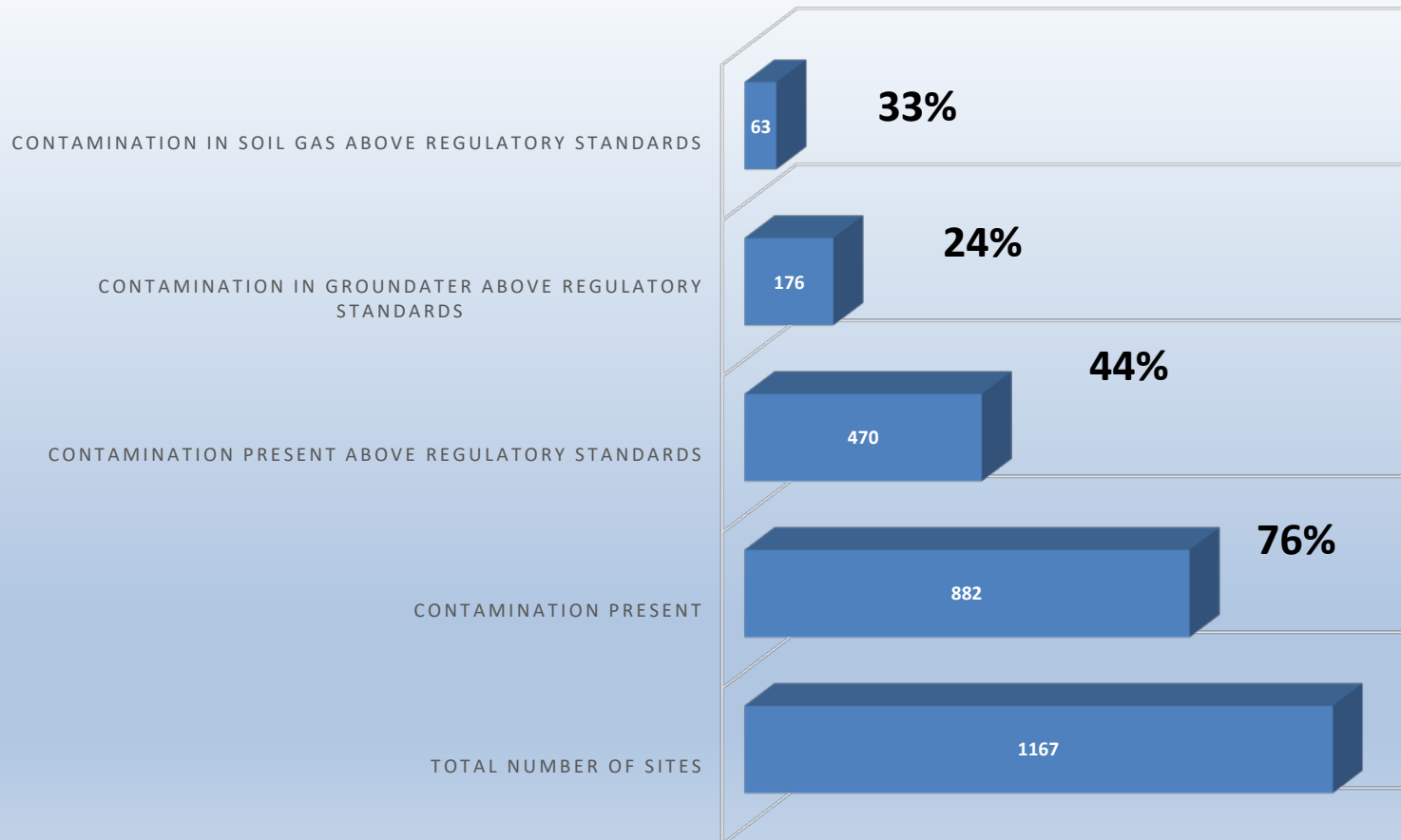


# Limitations



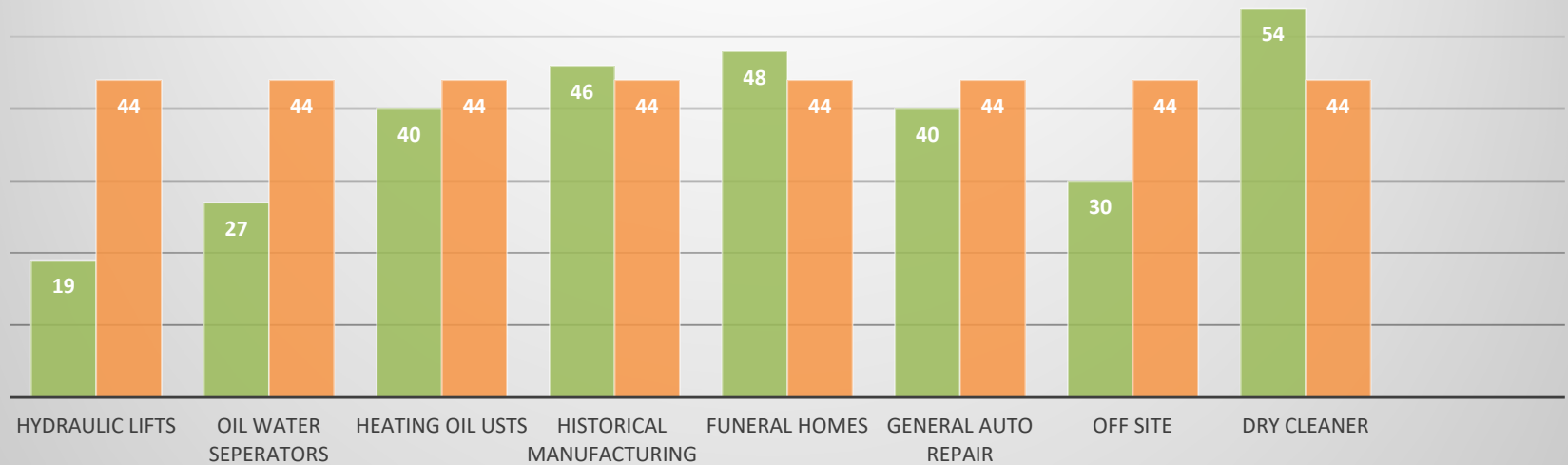
# Findings

## 2015 FINDINGS



# Findings

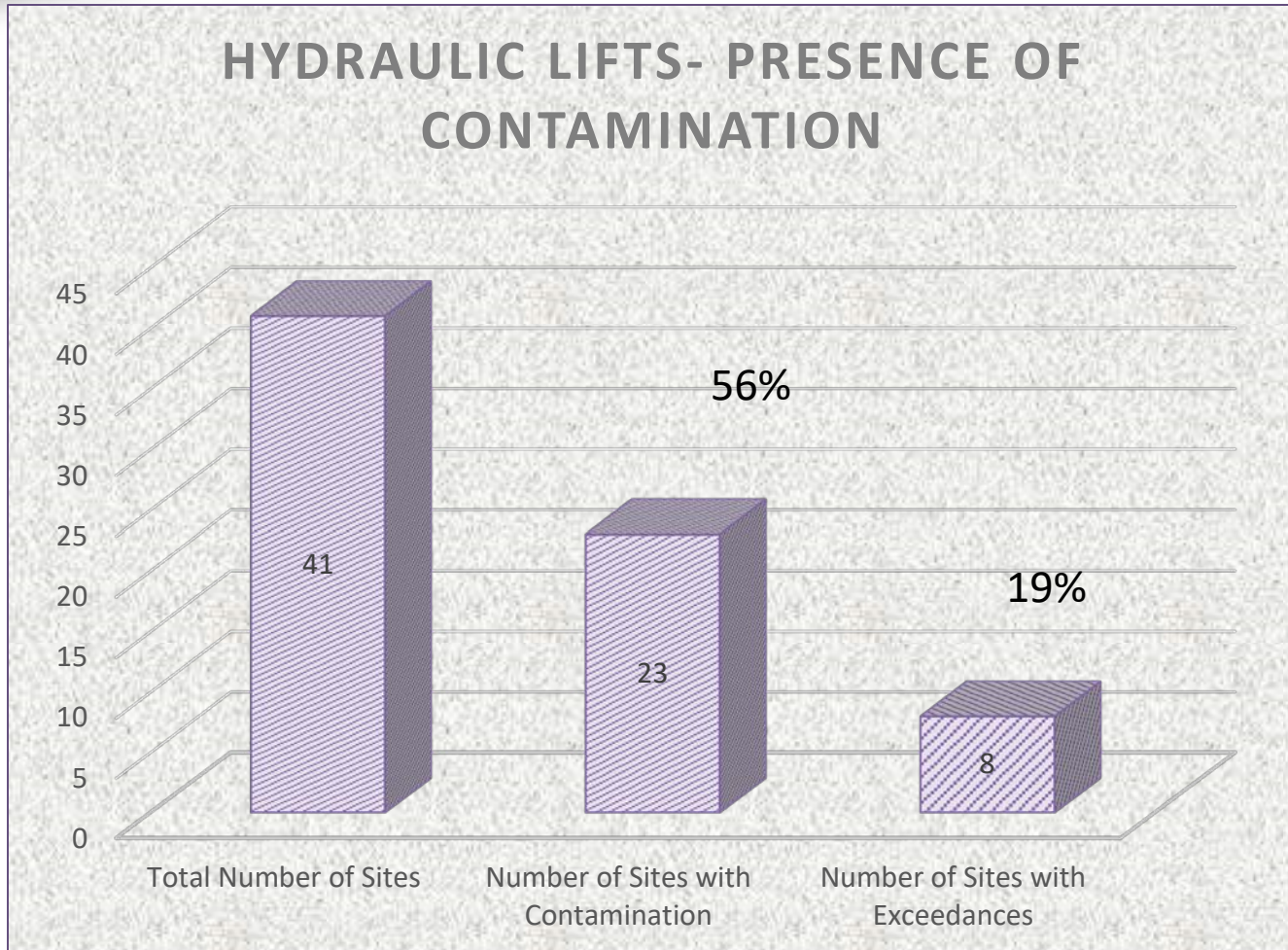
## Comparison of Exceedances by Property type and Overall Exceedances



■ % Sites with Exceedances

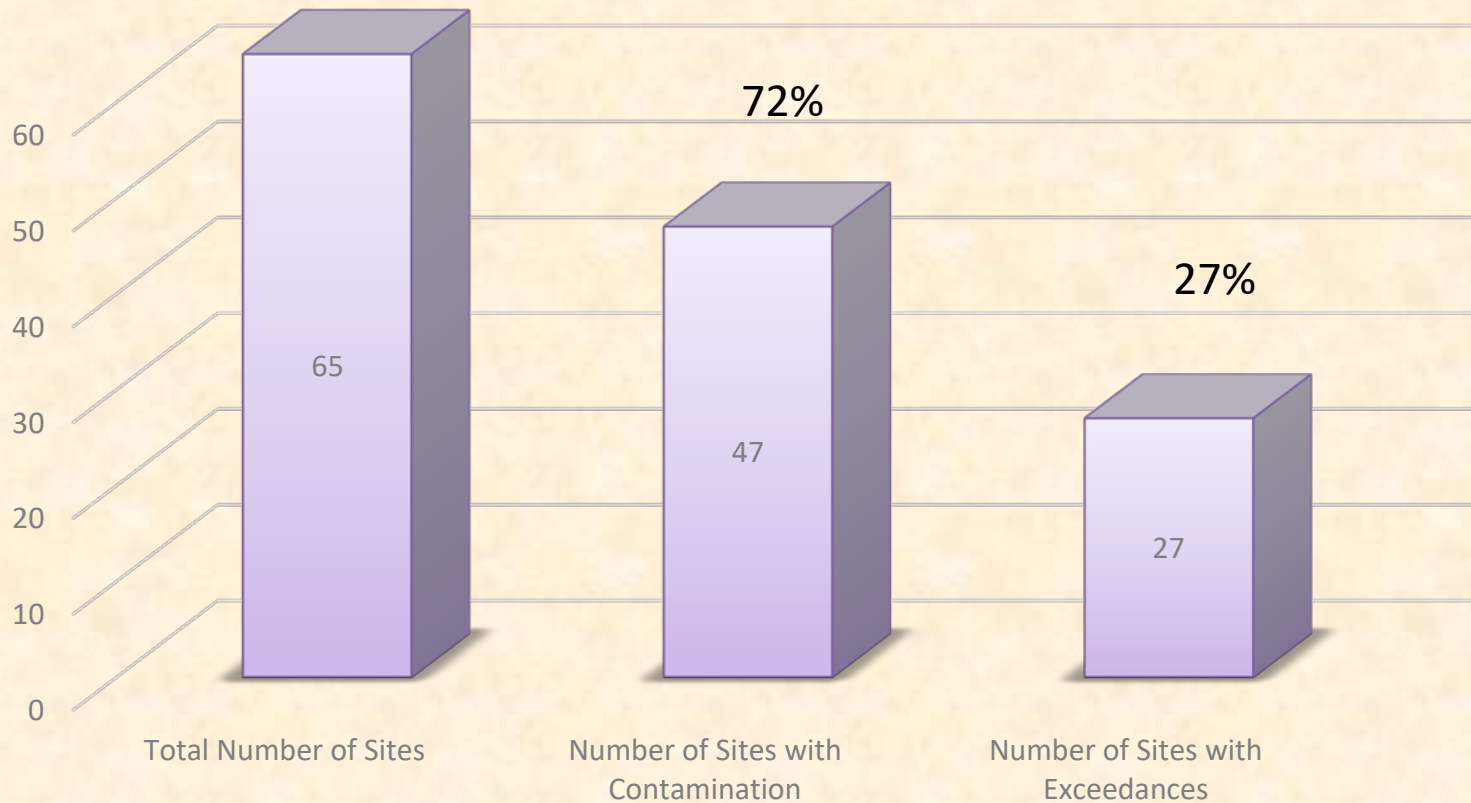
■ Percent Sites with Exceedances - All

# Hydraulic Lifts



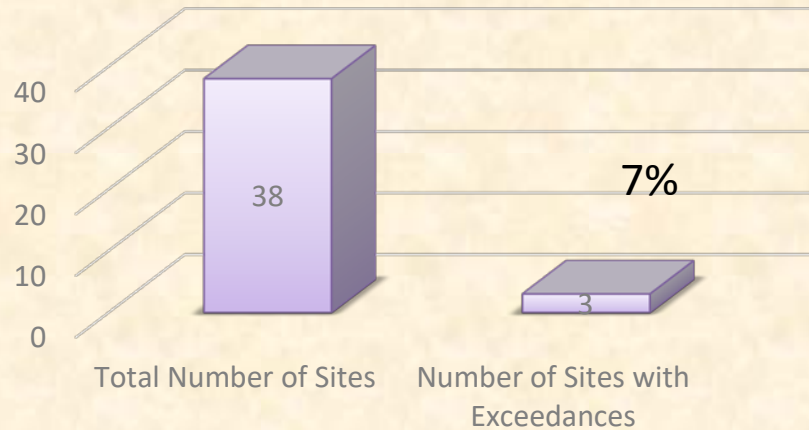
# Oil/Water Separators

## Oil Water Separator - Presence of Contamination

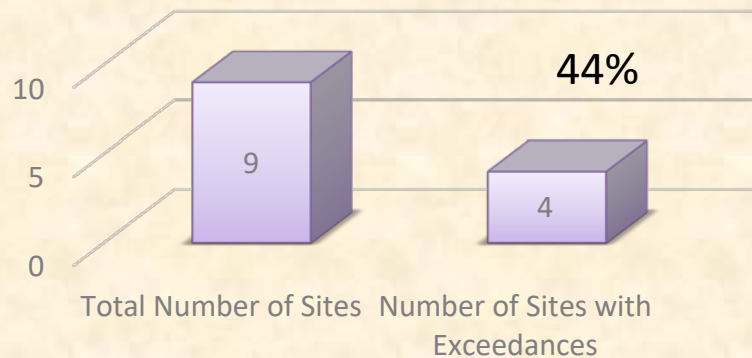


# Oil/Water Separators

## Oil Water Separator- Presence of Contamination in Groundwater



## Oil Water Separator - Presence of Contamination in Soil Gas



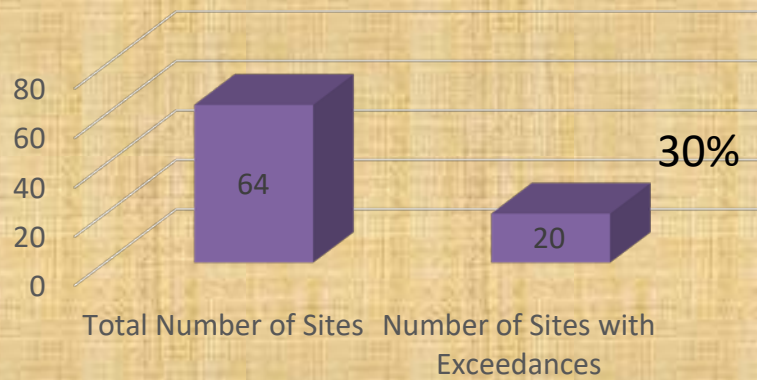
# Heating Oil USTs

## Heating Oil USTs – Presence of Contamination

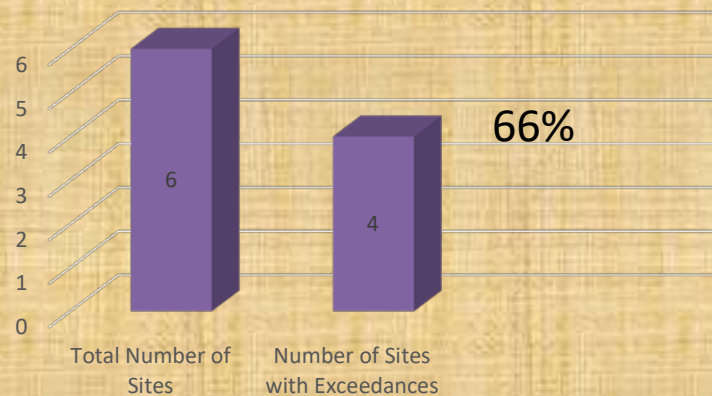


# Heating Oil USTs

## Heating Oil USTs- Presence of Contamination in Groundwater

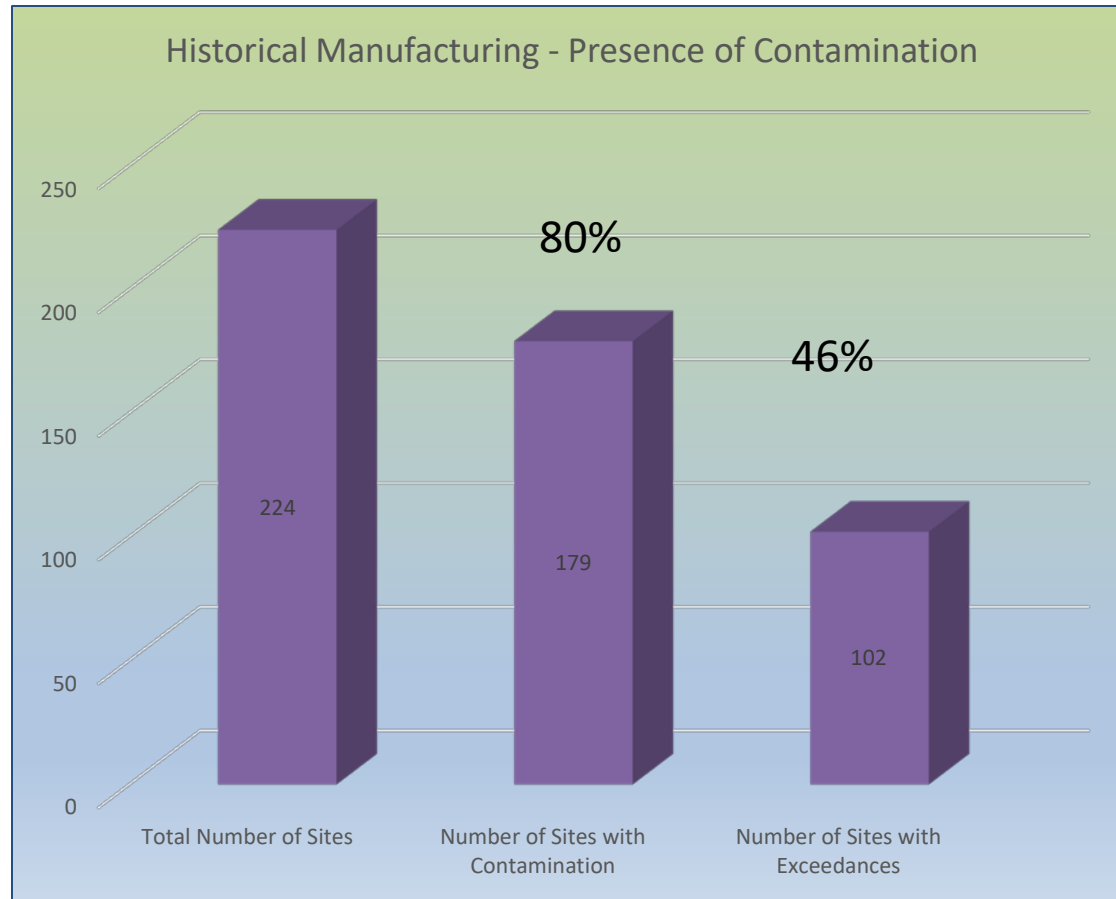


## Heating Oil USTs - Presence of Contamination in Soil Gas



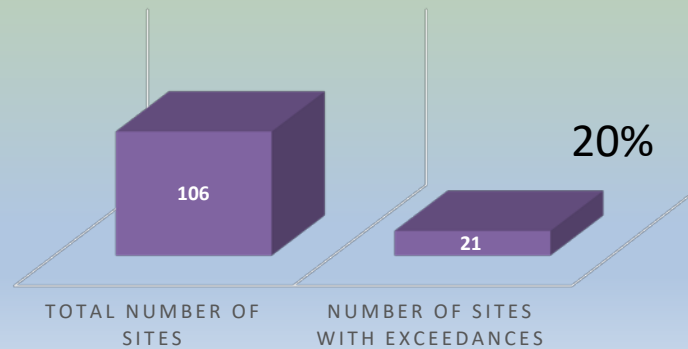


# Historical Manufacturing with Potential for Solvent Use

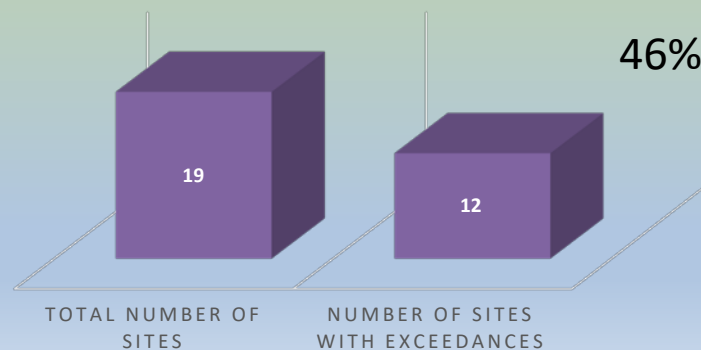


# Historical Manufacturing with Potential for Solvent Use

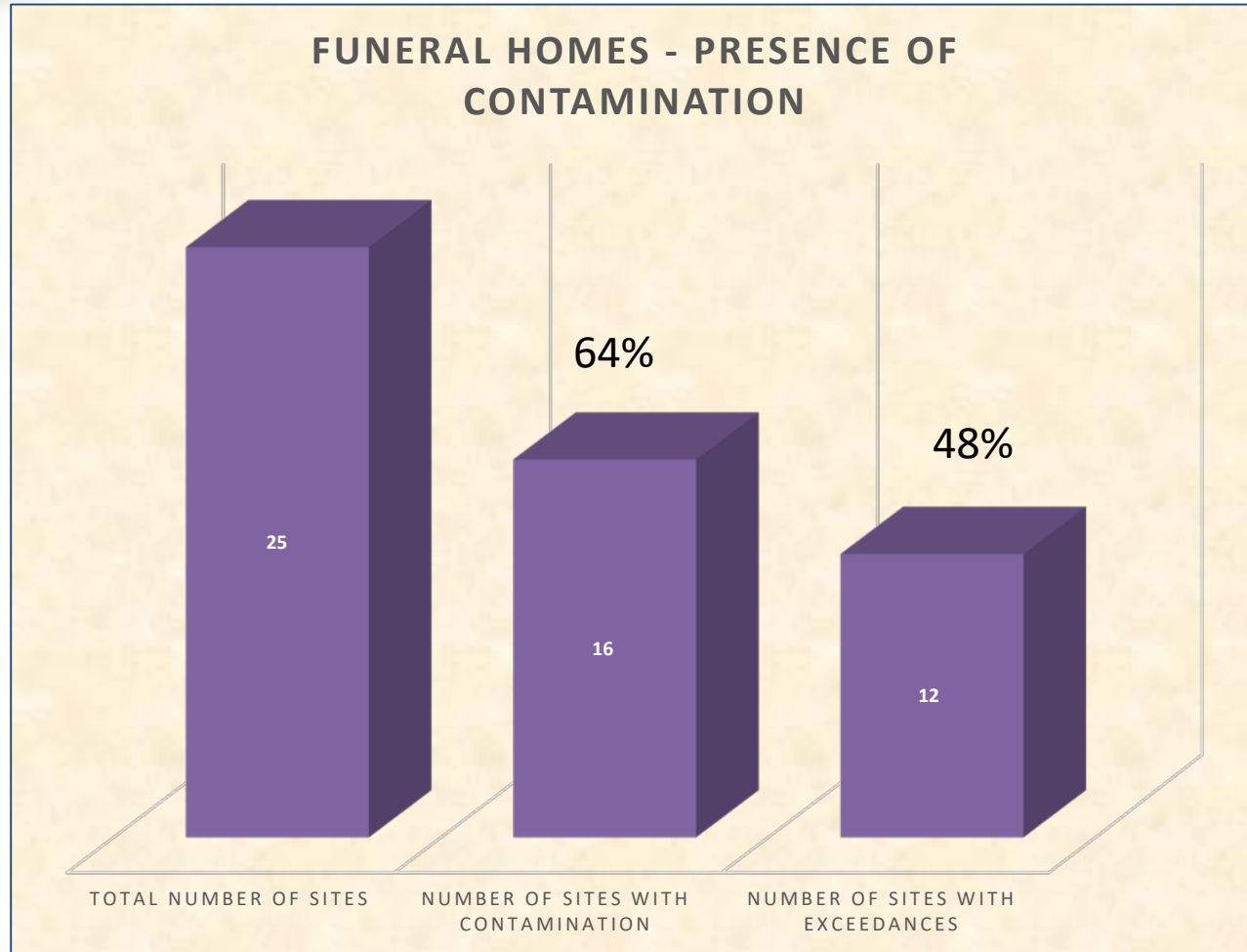
## HISTORICAL MANUFACTURING- PRESENCE OF CONTAMINATION IN GROUNDWATER



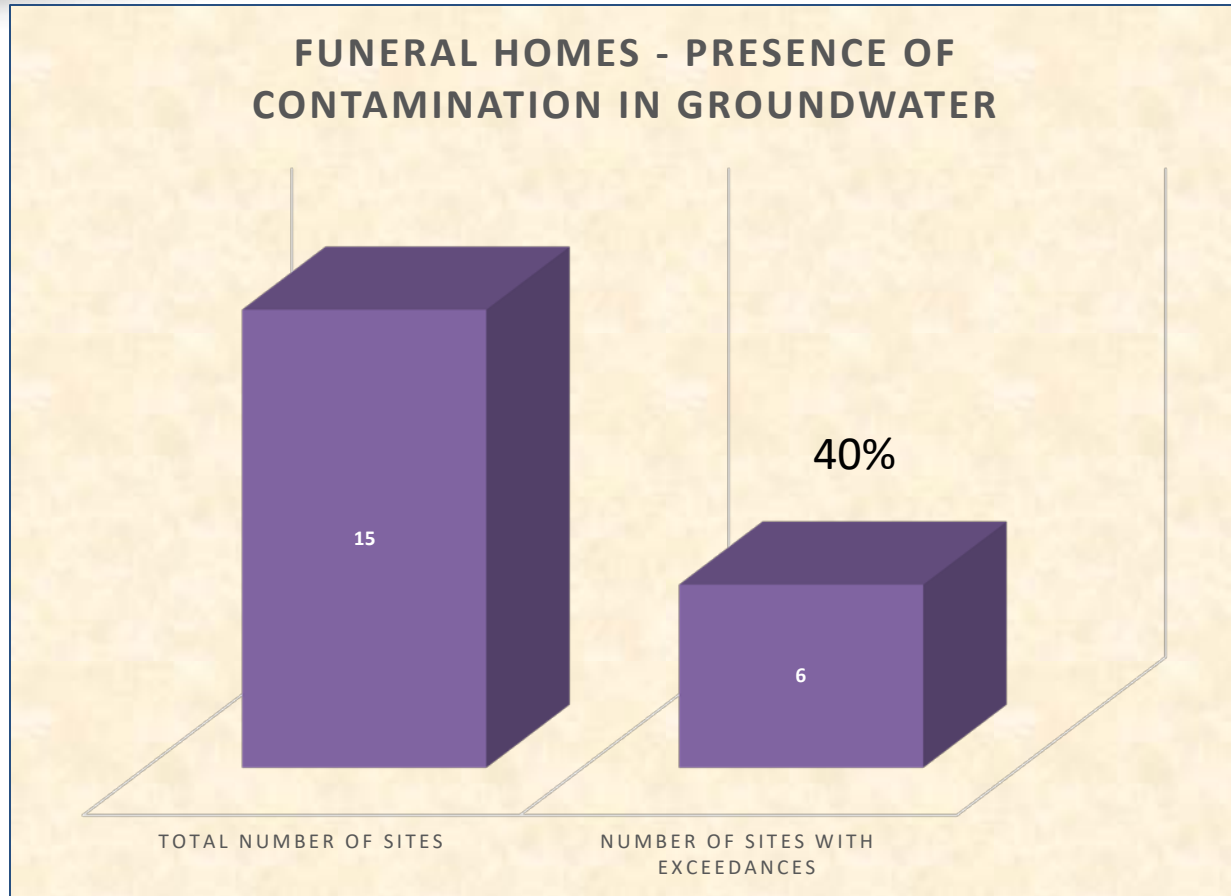
## HISTORICAL MANUFACTURING- PRESENCE OF CONTAMINATION IN SOIL GAS



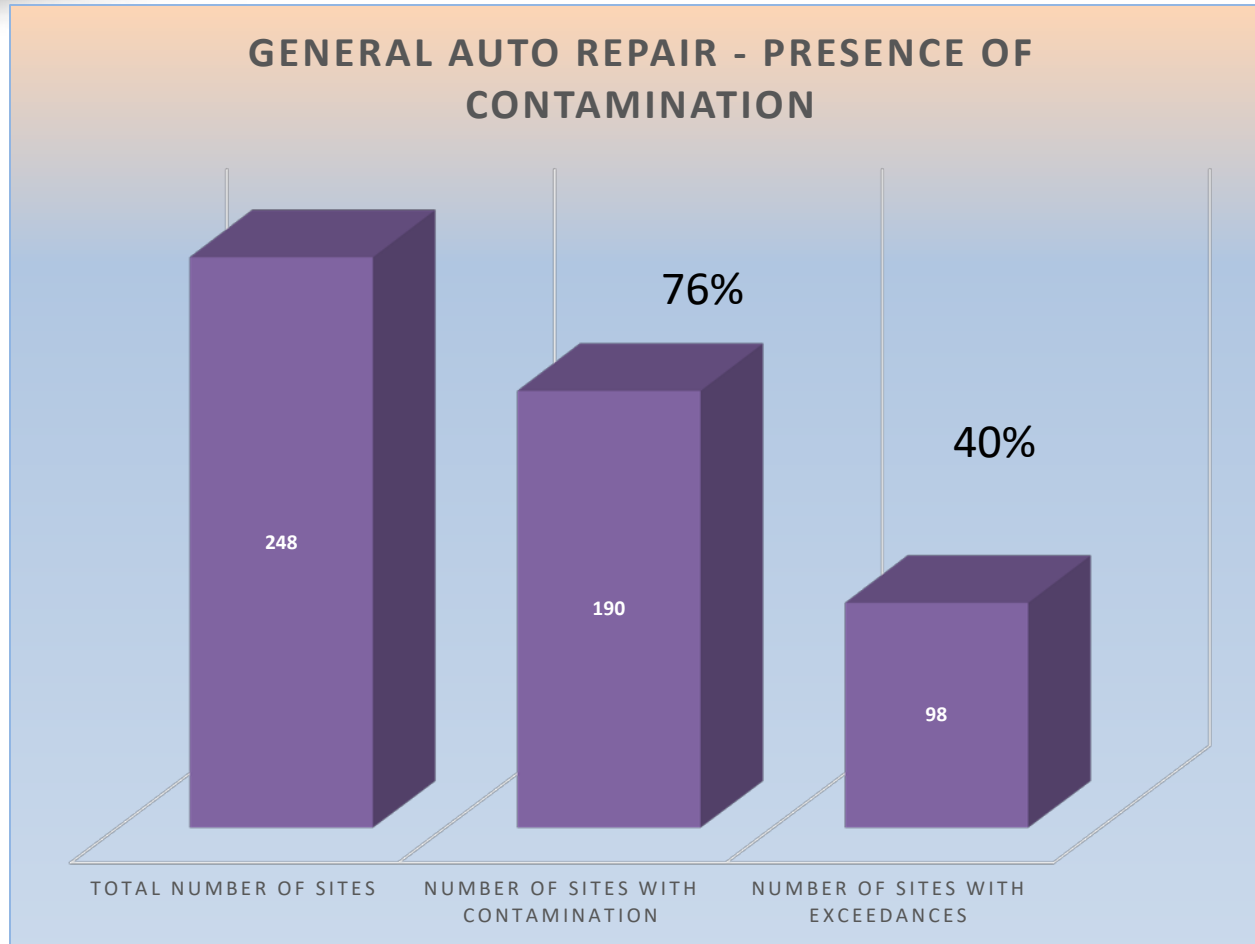
# Funeral Homes



# Funeral Homes

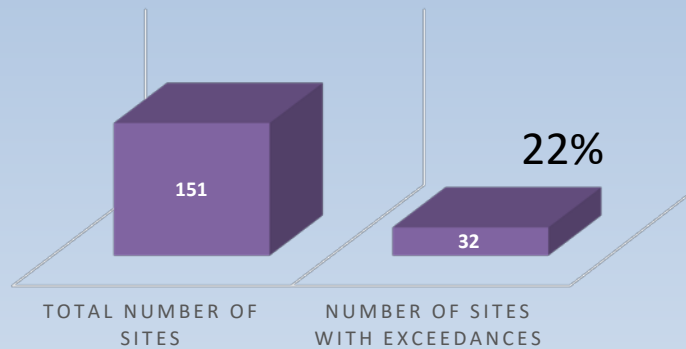


# General Auto Repair

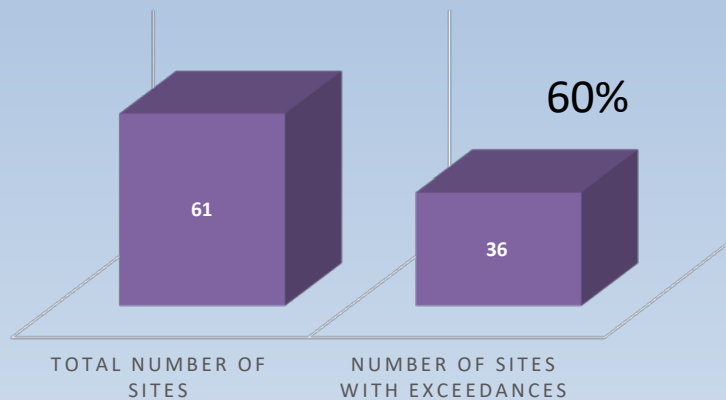


# General Auto Repair

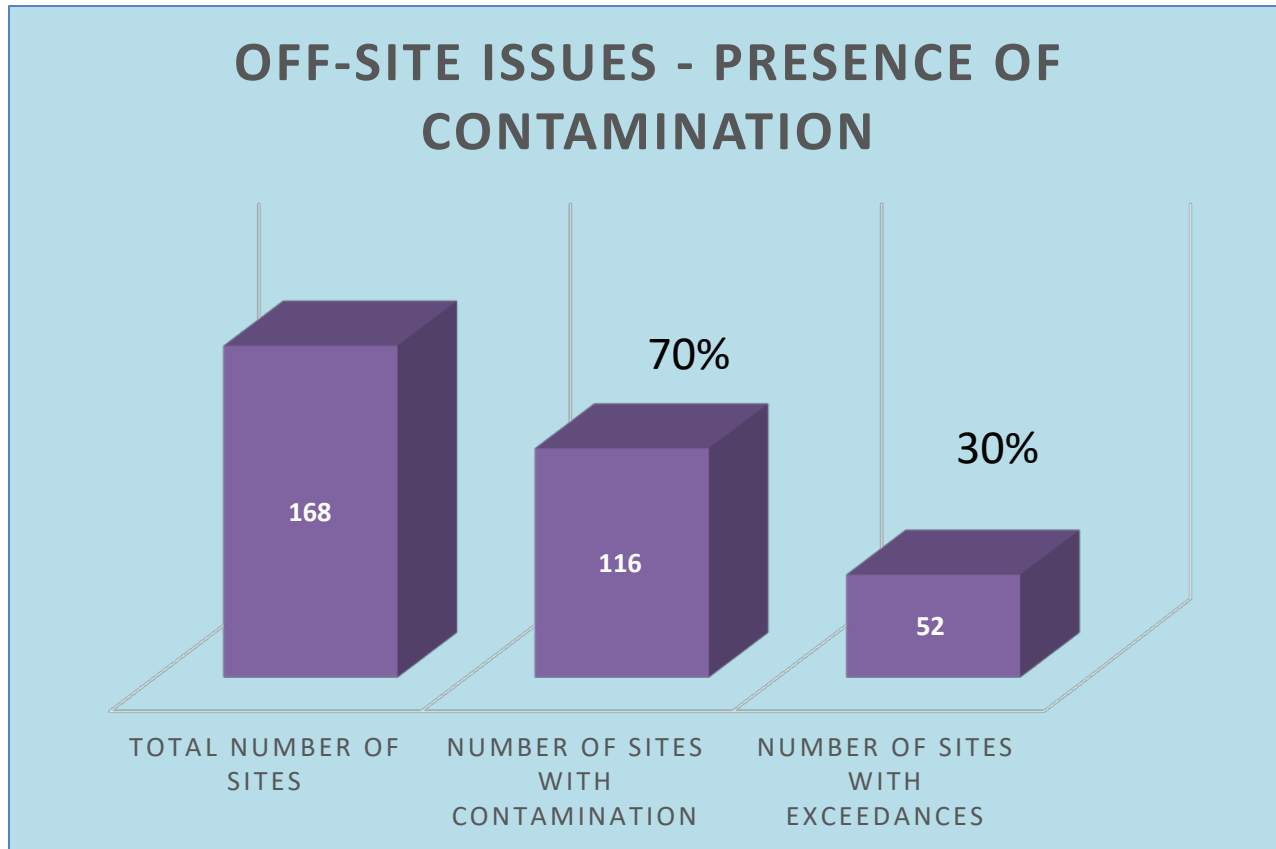
## GENERAL AUTO REPAIR-PRESENCE OF CONTAMINATION IN GROUNDWATER



## GENERAL AUTO REPAIR-PRESENCE OF CONTAMINATION IN SOIL GAS

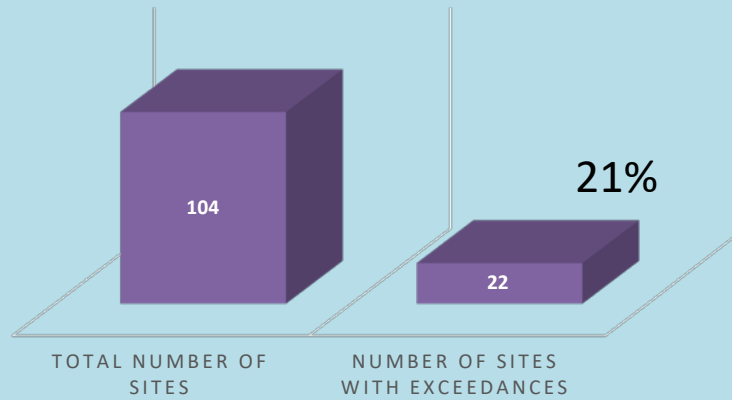


# Off-Site Issues

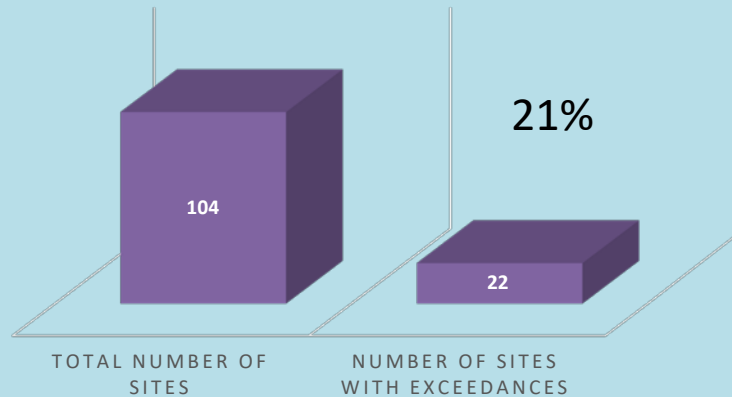


# Off-Site Issues

## OFF-SITE ISSUES - PRESENCE OF CONTAMINATION IN GROUNDWATER

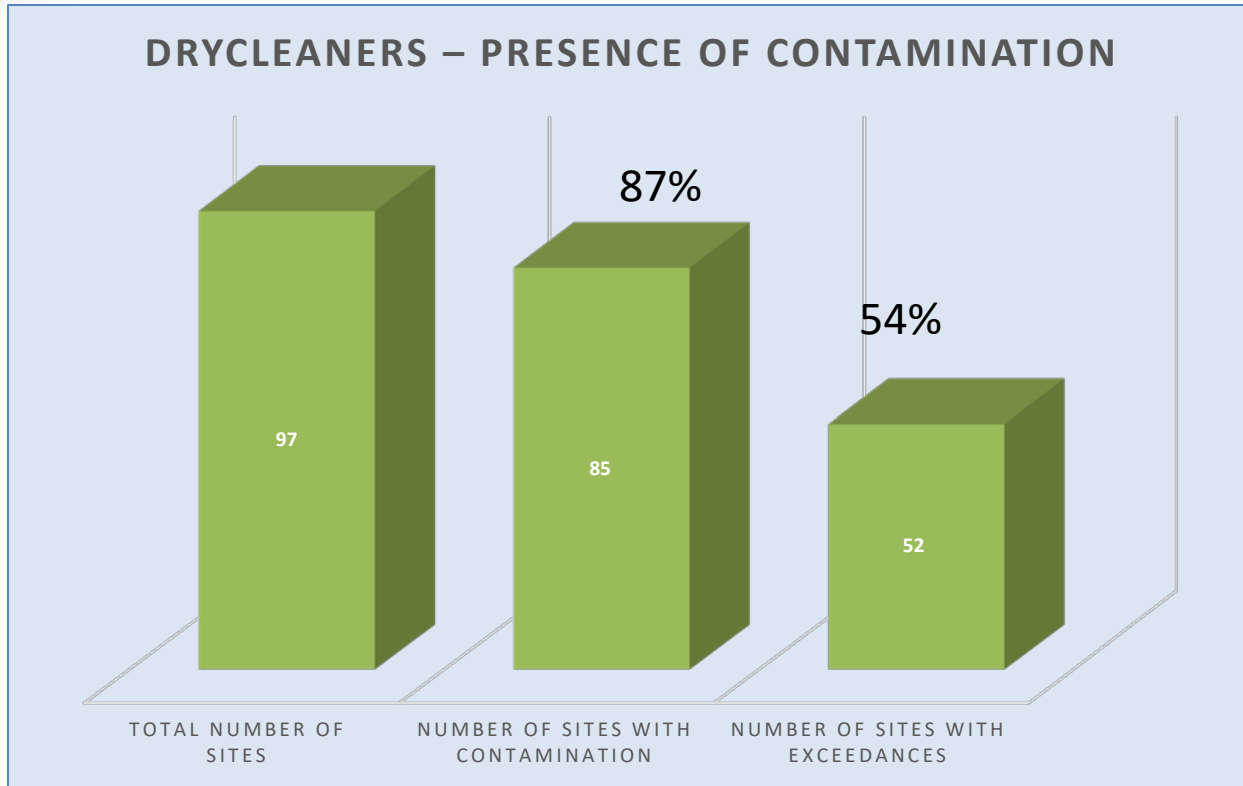


## OFF-SITE ISSUES - PRESENCE OF CONTAMINATION IN GROUNDWATER



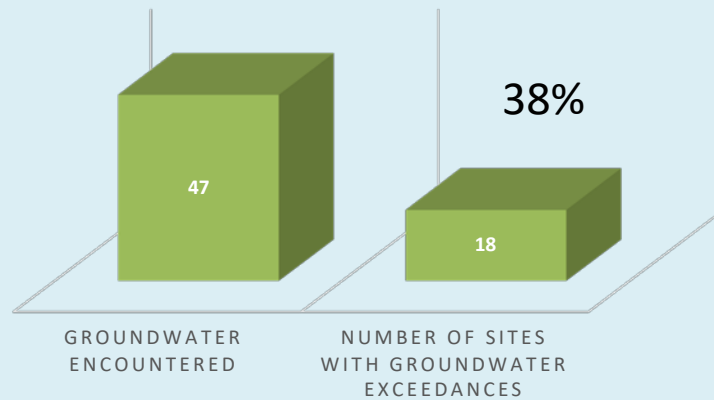


# Dry Cleaners

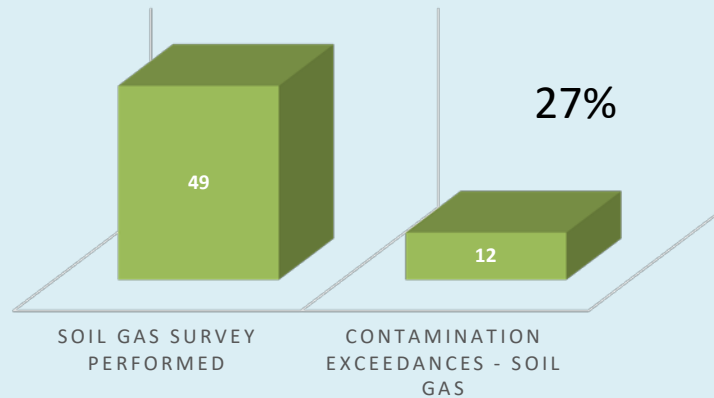


# Dry Cleaners

## DRYCLEANERS – PRESENCE OF CONTAMINATION IN GROUNDWATER



## DRYCLEANERS – PRESENCE OF CONTAMINATION IN SOIL GAS



# Remediation Costs – Gas Stations and USTs

	A	B	C	D
3				
4	Percentile	Minimum	Expected	Maximum
5	40%	\$ 66,880	\$ 153,570	\$ 326,200
6	60%	\$ 225,000	\$ 305,177	\$ 567,096
7	90%	\$ 1,530,877	\$ 1,521,306	\$ 2,427,714
8	Std dev	\$ 593,612	\$ 675,689	\$ 1,104,158
9	Min	\$ 14,500	\$ 23,500	\$ 170,575
10	Average	\$ 398,095	\$ 485,512	\$ 910,772
11	Max	\$ 1,651,677	\$ 2,606,801	\$ 4,128,181

# Remediation Costs – Auto Repair

	A	B	C	D
3				
4	Percentile	Minimum	Expected	Maximum
5	40%	\$ 20,000	\$ 128,590	\$ 290,941
6	60%	\$ 35,063	\$ 166,500	\$ 342,513
7	90%	\$ 100,000	\$ 259,060	\$ 620,316
8	Std dev	\$ 41,209	\$ 126,555	\$ 216,130
9	Min	\$ 500	\$ 1,000	\$ 1,500
10	Average	\$ 40,479	\$ 166,346	\$ 359,444
11	Max	\$ 139,500	\$ 582,540	\$ 809,380

# Remediation Costs – Dry Cleaners

	A	B	C	D
3				
4	Percentile	Minimum	Expected	Maximum
5	40%	\$ 133,096	\$ 249,038	\$ 409,178
6	60%	\$ 183,733	\$ 430,720	\$ 644,160
7	90%	\$ 549,233	\$ 668,194	\$ 871,659
8	Std dev	\$ 280,173	\$ 297,006	\$ 360,446
9	Min	\$ 18,287	\$ 20,000	\$ 100,000
10	Average	\$ 255,749	\$ 380,509	\$ 561,348
11	Max	\$ 1,186,000	\$ 1,482,500	\$ 1,630,750

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- Kathryn Peacock serves as Principal and National Client Manager for Partner Engineering and Science, Inc. With 20 years of experience under her belt, Kathryn has worked on thousands of transactions, subsurface investigations, and site remediation projects for some of the nation's largest lenders and investors.
- Ms. Peacock holds a bachelor degree in Soil Science from Prescott College and a Masters in Education from the Arizona Teachers Institute.
- Kathryn speaks and writes frequently on a wide range of environmental due diligence topics, and is dedicated to advancing standards and best practices through her active involvement with industry associations such as ASTM.