


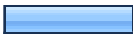




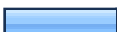



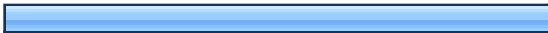




1. I have direct experience with the following number of complex sites

		Response Percent	Response Count
None		5.2%	6
1		9.6%	11
2		11.3%	13
3-5		19.1%	22
6 or more		54.8%	63
answered question			115
skipped question			2


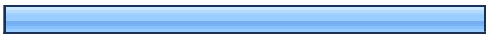

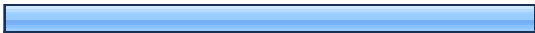

2. The years of experience I have working on complex sites is

		Response Percent	Response Count
Less than 5		15.5%	18
5 to 10		20.7%	24
11-15		18.1%	21
16-20		16.4%	19
21 or more		29.3%	34
answered question			116
skipped question			1

3. The roles I have experience with, for complex sites, include (select all that apply)

		Response Percent	Response Count
Technical contributor		81.7%	94
Project manager		71.3%	82
Liable party representative		24.3%	28
Regulator		30.4%	35
Stakeholder		6.1%	7
answered question			115
skipped question			2

4. The physical site complexities I've dealt with include (select all that apply)

		Response Percent	Response Count
Complex geology		84.3%	97
Geographically large site		72.2%	83
Deep contamination		64.3%	74
Both deep and shallow contamination		80.0%	92
None of the above		7.0%	8







List other features you feel may add to site complexity 57

answered question			115
skipped question			2








5. The type of contaminants I have experience with include (select all that apply)

		Response Percent	Response Count
Petroleum products (e.g., from leaking USTs)		77.4%	89
Volatile organic chemicals		90.4%	104
Non-aqueous phase liquids (in soil, rock or groundwater)		80.9%	93
Poly-cyclic aromatic hydrocarbons		58.3%	67
PCBs		40.9%	47
Metals (heavy metals or otherwise)		74.8%	86
Radionuclides		30.4%	35
Explosives (as contamination of another media)		24.3%	28
Unexploded ordnance		17.4%	20
Multiple classes of contaminants		35.7%	41
	Other (please specify)		11
answered question			115
skipped question			2

6. The non-technical complexities I've dealt with include (select all that apply)

		Response Percent	Response Count
Tight compliance schedules		55.5%	61
Difficult regulatory environment		73.6%	81
Environmental justice concerns		23.6%	26
Natural Resource Damage Assessment		32.7%	36
Aggressive stakeholders		50.9%	56
Cost of cleanup		90.0%	99
answered question			110
skipped question			7








7. The contaminated media I've dealt with include (select all that apply)

		Response Percent	Response Count
Shallow soil		85.2%	98
Indurated rock (aka "bedrock")		53.9%	62
Groundwater		93.9%	108
Surface water		58.3%	67
Sediment		59.1%	68
Bio-accumulation and/or bio-concentration of contaminants		31.3%	36
Vapor intrusion pathways		61.7%	71
answered question			115
skipped question			2





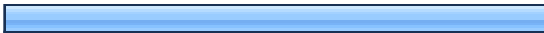
8. List other features that you think contribute to site complexity

	Response Count
	38
answered question	38
skipped question	79






9. The percentage of remediation sites that are complex is

		Response Percent	Response Count
<0-5%		1.8%	2
6-10%		23.2%	26
11-25%		33.0%	37
26-50%		17.0%	19
51-75%		9.8%	11
>75%		1.8%	2
No opinion/don't know		13.4%	15
	answered question		112
	skipped question		5





10. A site can be considered complex if it has more than the following number of Operable Units or Corrective Action Units

		Response Percent	Response Count
2 or more		4.6%	5
3 or more		7.3%	8
5 or more		3.7%	4
10 or more		2.8%	3
The number of OUs/CAUs doesn't make a site complex		81.7%	89
answered question			109
skipped question			8










11. A site can be considered complex if it has at least the following number of solid waste management units (SWMUs) and Areas of Concern (AOCs)

		Response Percent	Response Count
5-10		10.2%	11
11-20		1.9%	2
21-50		2.8%	3
51 or more		1.9%	2
The number of SWMUs/AOCs doesn't determine whether a site is complex		83.3%	90
answered question			108
skipped question			9







12. A site can be considered complex if it has at least the following number of contaminant classes

		Response Percent	Response Count
1, if it's a contaminant class that's usually hard to deal with		37.0%	40
2 or more		9.3%	10
3 or more		7.4%	8
The number of contaminant classes doesn't determine whether a site is complex		46.3%	50
		answered question	108
		skipped question	9

13. The following class of contaminants usually make for a complex site (check all that apply)

		Response Percent	Response Count
Petroleum products (e.g., from leaking USTs)		23.2%	23
Volatile organic chemicals		59.6%	59
Non-aqueous phase liquid (in soil, rock or groundwater)		88.9%	88
Poly-cyclic aromatic hydrocarbons		36.4%	36
PCBs		40.4%	40
Metals (heavy metals or otherwise)		54.5%	54
Radionuclides		58.6%	58
Explosives (as contamination of another media)		36.4%	36
Unexploded ordnance		35.4%	35
	Other (please specify)		20
		answered question	99
		skipped question	18


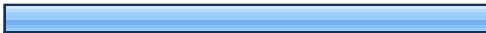

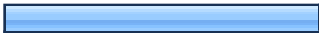







14. The following contaminant-related challenges usually make for a complex site [adapted from ITRC January 2012] (check all that apply)

		Response Percent	Response Count
Form of the contamination in the environment (e.g., dissolved, sorbed, present as a light or dense nonaqueous-phase liquid [NAPL])		92.7%	102
Depth and lateral extent of contamination (e.g., regional contamination from acid mine drainage or from various sources discharging into receiving surface water body)		91.8%	101
Transformation potential or degradability by biotic or abiotic processes		64.5%	71
Partitioning properties, including NAPL dissolution rate, aqueous solubility, volatility, and adsorption affinity for NAPL		80.0%	88
Mobility factors such as interfacial surface tension, viscosity, and specific gravity		74.5%	82
Presence of persistent and ubiquitous anthropogenic contaminants (such as DDT, polycyclic aromatic hydrocarbons)		65.5%	72
		answered question	110
		skipped question	7






15. Contamination of a watershed greater than the following size usually makes a site complex

		Response Percent	Response Count
Contamination <1 square mile can be complex under the right circumstances		45.0%	49
>1 square mile		8.3%	9
>5 square miles		4.6%	5
>10 square miles		2.8%	3
No opinion/I have no experience with watershed contamination		39.4%	43
answered question			109
skipped question			8

16. The presence of any of the following hydrogeologic conditions usually make for a complex site (check all that apply) [adapted from ITRC Jan 2012]

		Response Percent	Response Count
Contamination in multiple geologic units		88.2%	97
Contamination in "deep" units		72.7%	80
Subtle variations in geology within limited vertical and horizontal distances		47.3%	52
Anisotropy		47.3%	52
Preferential geologic formations		48.2%	53
Fractures and fault zones		85.5%	94
Highly heterogenous aquifers		73.6%	81
Deep alluvial basins		30.0%	33
Karst aquifers		63.6%	70
Fractured bedrock aquifers		80.0%	88
No opinion/no experience		4.5%	5
answered question			110
skipped question			7










17. A remediation/restoration time frame greater than the following usually makes for a complex site

		Response Percent	Response Count
10 years or longer		11.2%	12
30 years or longer		28.0%	30
60 years or longer		5.6%	6
100 years or longer		14.0%	15
Restoration time frame does not determine whether a site is a complex site		46.7%	50







Share your understanding of a "reasonable" time frame in years? 34

answered question	107
skipped question	10







18. The non-technical factors that complicate remediation management include (check all that apply)

		Response Percent	Response Count
Inadequate/incomplete site characterization		89.0%	97
Inconsistent funding		71.6%	78
Under-funding/overly optimistic budgeting		65.1%	71
Contract vehicle doesn't match project needs		39.4%	43
Contractor capabilities don't match project needs		51.4%	56
Inexperienced regulatory agency staff/staff turn-over		66.1%	72
Unclear/inconsistent regulatory requirements		74.3%	81
Overly optimistic/overly aggressive project schedule		57.8%	63
None of the above factors make a site complex		8.3%	9
	Other (please specify)		18
answered question			109
skipped question			8








19. A site becomes complex when

		Response Percent	Response Count
Remediation costs are greater than \$10 million		3.7%	4
Remediation costs are greater than \$20 million		2.8%	3
Remediation costs are greater than \$50 million		1.8%	2
Remediation costs are greater than \$100 million		2.8%	3
Remediation costs are disproportionate to benefits (i.e., risk reduction)		17.4%	19
Cost alone does not determine whether a site is a complex site (but may be an indicator of complexity)		71.6%	78
Share your understanding of a "reasonable" cost			26
		answered question	109
		skipped question	8

20. Use of or need for a specific regulatory mechanism usually makes for a complex site (select all that apply)

		Response Percent	Response Count
Technical Impracticability (TI) waiver		51.9%	55
Other ARAR waivers		33.0%	35
State designated groundwater management or containment zones		28.3%	30
Alternative point of compliance		32.1%	34
Alternate concentration limits		36.8%	39
Use of a specific regulatory mechanism may be an indicator of complexity but does not determine whether a site is a complex site		70.8%	75
List other regulatory mechanisms that have been or could be used at complex sites			13
		answered question	106
		skipped question	11

21. Who do you represent?

		Response Percent	Response Count
EPA		2.8%	3
State/Local Government		26.6%	29
Public/Tribal Stakeholder		3.7%	4
Private Sector		52.3%	57
DOD		8.3%	9
DOE		4.6%	5
Academia		2.8%	3
		answered question	109
		skipped question	8

22. Your Name? (optional)

		Response Count
		66
		answered question
		66
		skipped question
		51

Page 1, Q4. The physical site complexities I've dealt with include (select all that apply)

1	Presence of fine-grained layers	Mar 9, 2014 9:07 PM
2	Mixed contaminant plumes	Mar 9, 2014 5:05 PM
3	The amount of mass estimated is extremely large. 1.8 to 4 million lbs of DNAPL	Mar 7, 2014 12:47 PM
4	NAPL	Mar 6, 2014 11:15 AM
5	NAPL	Mar 6, 2014 11:15 AM
6	Presence of radionuclides	Mar 6, 2014 6:43 AM
7	multiple sensitive receptors, accessibility	Mar 5, 2014 9:10 AM
8	Highly urban neighborhood (NYC), underground and aboveground active utilities, unknown subsurface structures, third party litigation, local schedule constraints	Mar 4, 2014 6:51 PM
9	Groundwater Surface Water interface contaminant plume characterization, monitoring, and remedy implementation. Large regional sediment sites and public health endocrine disruption due to wide spread contamination	Mar 4, 2014 2:09 PM
10	Groundwater contamination	Mar 4, 2014 10:09 AM
11	fractured bedrock	Mar 4, 2014 10:05 AM
12	multiple AOCs and COCs; active litigation/claims; multiple active stakeholders beyond RP, regulator & consultant	Mar 4, 2014 7:56 AM
13	Buried valley aquifer impact and complexities with property ownership not being RP	Mar 4, 2014 7:42 AM
14	multiple exposure pathways (vi, surface water discharge, storm water)	Mar 4, 2014 7:07 AM
15	Topography, Watershed basin complexity	Mar 4, 2014 6:46 AM
16	presence of dense utility	Mar 4, 2014 6:24 AM
17	DNAPL in bedrock (carbonate, metamorphic, sedimentary); Chlorinated solvent mixtures; low-permeability formations; mixed VOCs/metals/inorganic plumes	Mar 4, 2014 6:13 AM
18	DNAPL	Mar 4, 2014 6:07 AM
19	mixed contaminants	Mar 4, 2014 5:12 AM
20	Groundwater-to-surface water	Mar 3, 2014 1:45 PM
21	Contaminant concentration - large dilute plume	Mar 3, 2014 9:36 AM
22	multi-source, multiple types of contaminant (HW, radiological), unexploded ordnance	Mar 3, 2014 9:32 AM
23	coastal/seawater intrusion	Feb 27, 2014 11:11 AM

Page 1, Q4. The physical site complexities I've dealt with include (select all that apply)

24	DNAPL, matrix diffusion, multiple remediation technologies, nearby receptors	Feb 27, 2014 10:42 AM
25	Karst; Fractured rock	Feb 27, 2014 8:10 AM
26	discontinuous clay with perched water table in clay sands and sinks in clay breaches allowing direct vertical migration to deeper saturated zone of gravelly sand	Feb 27, 2014 7:31 AM
27	Site Setting - Such as Urban Environments and adjacent to Surface Waters	Feb 26, 2014 6:21 PM
28	DNAPL site with significant heterogeneity and high flow paths	Feb 24, 2014 9:29 AM
29	Infrastructure challenges; mission interference	Feb 24, 2014 9:11 AM
30	sensitive issues w.r.t public involvement and risk perception. Unknown chemical transformation rates (e.g. conversion to methylmercury, production of octa-chlorinated PCB)	Feb 24, 2014 8:42 AM
31	site access due to various reasons	Feb 24, 2014 8:06 AM
32	DNAPL high pH	Feb 24, 2014 5:23 AM
33	Accessibility: do existing structures or neighboring uses limit available technologies?	Feb 21, 2014 11:35 AM
34	Highly developed urban areas (NYC)	Feb 21, 2014 5:30 AM
35	Complex Contaminant Mixtures	Feb 20, 2014 3:47 PM
36	comingling of separately regulated substances	Feb 20, 2014 1:30 PM
37	Multiple types of contaminants, physical site constraints such as buildings and utilities limiting access, physical properties of contaminants, and presence of multiple sensitive receptors	Feb 20, 2014 11:19 AM
38	Upland, sediment, groundwater & surface water contamination combined	Feb 20, 2014 8:19 AM
39	Numerous and various contaminants (VOCs, SVOCs, PCBs, metals, rads, etc.); transfer mechanisms between environmental media.	Feb 20, 2014 8:07 AM
40	mixed napl composition, pool dominated source zones	Feb 19, 2014 7:55 PM
41	Multiple releases, commingled plumes, multiparty sites, high risk receptors (e.g., daycare), litigation, enforcement, explosive vapor conditions in buildings	Feb 19, 2014 4:32 PM
42	Estimated time using traditional technologies is over 100 years on some sites	Feb 19, 2014 1:17 PM
43	Many buildings above the plumes	Feb 19, 2014 12:51 PM
44	mixed waste; upland source sites with companion river/estuary impacts	Feb 19, 2014 12:38 PM
45	DNAPLs	Feb 19, 2014 12:08 PM
46	Recalcitrant contaminants, including large groups of recalcitrants	Feb 19, 2014 11:22 AM

Page 1, Q4. The physical site complexities I've dealt with include (select all that apply)

47	Multi phase and mixed contaminants, multiple RPs.	Feb 19, 2014 11:18 AM
48	My background includes remedial activities associated with retail gas station and home heating oil tanks. Generally, both are comprised of shallow contamination.	Feb 19, 2014 11:08 AM
49	Complex stakeholder group, emergency response mode	Feb 19, 2014 10:43 AM
50	Mixed plumes, co-contaminants	Feb 19, 2014 10:31 AM
51	I have analyzed site documentation related to site physical characteristics, including hydrogeology. In addition to the above, presence of	Feb 19, 2014 10:19 AM
52	Facility Decontamination and Decommissioning	Feb 19, 2014 10:15 AM
53	physical characteristics of contaminant i.e. viscosity and density	Feb 19, 2014 10:12 AM
54	Very low and/or very high permeability	Feb 19, 2014 10:08 AM
55	DNAPL and LNAPL	Feb 19, 2014 10:05 AM
56	mix of contaminants with co-solvent effects, DNAPLs, plume traveled onto adjacent properties	Feb 19, 2014 10:04 AM
57	residential receptors, multiple uses,	Feb 19, 2014 9:59 AM

Page 1, Q5. The type of contaminants I have experience with include (select all that apply)

1	pesticides	Mar 6, 2014 11:15 AM
2	pesticides	Mar 6, 2014 11:15 AM
3	nitrate, microbial, arsenic, Fe/Mn	Mar 4, 2014 10:09 AM
4	PFCs	Mar 3, 2014 9:36 AM
5	Dioxin/Furan, methylmercury	Feb 24, 2014 8:42 AM
6	perchlorate, dioxin, sulfonic acids, organic nitrile,	Feb 24, 2014 8:06 AM
7	pH	Feb 24, 2014 5:23 AM
8	TCE	Feb 20, 2014 5:47 AM
9	pesticides	Feb 19, 2014 12:38 PM
10	Mercury	Feb 19, 2014 10:12 AM
11	several COC's from several sources (PRP's)	Feb 19, 2014 9:59 AM

Page 1, Q8. List other features that you think contribute to site complexity

1	Remediation time exceeds budget. Lack of peer reviewed publications or case studies to support unconventional approaches. A site with a history of unsuccessful (incomplete) remediation attempts will most likely be considered "complex".	Mar 9, 2014 5:05 PM
2	realistic cleanup goals	Mar 7, 2014 2:29 PM
3	These are federally owned sites in the process of CERCLA with inadequate remedies in place for the estimated mass of DNAPL. No milestone gauges put into place to verify remedy implementation. Performance based contract.	Mar 7, 2014 12:47 PM
4	RAO definition	Mar 6, 2014 11:15 AM
5	RAO definition	Mar 6, 2014 11:15 AM
6	All of the above aspects do not definitavily make a complex site, it is the combination of these such that the remedial objectives can not be met given contraits (Time, cost, magnitude of required reduction, availability).	Mar 6, 2014 10:45 AM
7	Financial (lack of money) and political (job concerns and high-profile site) issues.	Mar 6, 2014 6:43 AM
8	Groundwater chemisty (affect on equipment)	Mar 5, 2014 10:53 AM
9	Multiple RPs or Data Gaps	Mar 5, 2014 9:10 AM
10	Complex permitting scenarios, local and regional political constraints and expectations, access to contamination (under utilities, railroads, high rises), community impacts	Mar 4, 2014 6:51 PM
11	Proximity to residential areas and critical air and water shed issues related to bio-accumulative and heavy metal contamination	Mar 4, 2014 2:09 PM
12	groundwater contamination, limited groundwater resources, treatment to drinking water standards, acceptance and use by community	Mar 4, 2014 10:09 AM
13	presence of low permeability layers (back diffusion), limited biodegradation (lower MNA potential)	Mar 4, 2014 7:07 AM
14	Background, Non-point source loading, Sediment loading	Mar 4, 2014 6:46 AM
15	Emerging chemicals and changing regulations	Mar 4, 2014 6:29 AM
16	Comingled Plumes	Mar 4, 2014 6:13 AM
17	Biogeochemical processes in soil and groundwater / understanding numerous degradation mechanisms at play	Mar 4, 2014 6:13 AM
18	active site with contaminants below buildings, or sensitive areas	Mar 4, 2014 5:12 AM
19	Multiple contaminants at site, matrix diffusion, GW source of drinking water.	Mar 3, 2014 9:36 AM
20	stratigraphy, urban/other environment	Mar 3, 2014 9:32 AM
21	fractured / weathered bedrock.	Feb 27, 2014 7:31 AM

Page 1, Q8. List other features that you think contribute to site complexity

22	potential or intended future use	Feb 27, 2014 7:22 AM
23	physical site setting	Feb 26, 2014 6:21 PM
24	The remedial technology adds complexity in the overall management of a site to achieve site closeout. Although the selected remedial technology comes as a result of the site characteristics, the technology can also influence site conditions once implemented. Some technologies can be difficult to implement and successfully operate under certain site conditions.	Feb 24, 2014 9:11 AM
25	remediation liability - current site owner and responsible party for remediation are not same. This add complexity for remediation implementation. Site occupation - remediation at busy facility need to consider the impact for facility daily operation and subsurface utility. Comingled contaminants - different contaminants are suitable for different technologies. the co-mingled plumes consisting of the contaminants can make the remediate technology selection to be difficult.	Feb 24, 2014 8:06 AM
26	Contaminated water supply wells, political factors, PRP group dynamics	Feb 23, 2014 4:24 PM
27	Level of experience and skills of the regulators and responsible person and representatives	Feb 21, 2014 11:35 AM
28	addressing source contamination from areas with ongoing and very active industrial activities	Feb 21, 2014 5:53 AM
29	media focus; disconnects among regulatory regulatory statuses; developing regulatory flexibilities; multi-party regulatory agreements.	Feb 20, 2014 8:07 AM
30	field logistics, politics (federal, state, local), legal-related issues (property rights, "takings" issues related to groundwater, environmental justice)	Feb 20, 2014 4:43 AM
31	multi-pathways (ambient air to 7 above); Funding (cost to attempt to cure north of \$1B - still would be TI situation), resistance to permanently relocate people, Mega-Superfund sites with Failed Remedies, High hazard chemicals (Level B), Source Quantity (i.e. 200,000 buried drums); Politics; Highly non-uniform - variable standards	Feb 19, 2014 12:38 PM
32	Property ownership issues	Feb 19, 2014 11:22 AM
33	Failure of the risk assessment process to add clarity/certainty	Feb 19, 2014 10:08 AM
34	Spring and surface water impacts/control/containment	Feb 19, 2014 10:05 AM
35	Inability to reach site cleanup goals in a reasonable timeframe (>30 years)	Feb 19, 2014 10:04 AM
36	stakeholders, demographics, available support utilities, site history, multiple site activities, multiple PRP's, competing agencies,	Feb 19, 2014 9:59 AM
37	Co-mingle plume with impacted sediments and surface water.	Feb 19, 2014 9:58 AM
38	Risk, public perception	Feb 19, 2014 9:49 AM

Page 2, Q13. The following class of contaminants usually make for a complex site (check all that apply)

1	A single contaminant can be complex depending on receptors, pathways, and its toxicity	Mar 5, 2014 9:22 AM
2	There are thousands of toxic chemicals that are both toxic to humans, fish and wildlife. Both fluorinated and brominated compounds need to be recognized and risk to the environment and human health taken into consideration where these chemicals are present. Endocrine disruption in the human health, aquatic/fish and wildlife needs more attention. These compounds are toxic in very small quantities some bioaccumulate as well. .	Mar 4, 2014 3:26 PM
3	it's not necessarily the class of contaminants alone that create complexity, but the cleanup goal	Mar 4, 2014 12:27 PM
4	Mixtures of contaminant types would be most important	Mar 4, 2014 6:20 AM
5	PFCs	Mar 3, 2014 9:41 AM
6	DNAPL	Feb 27, 2014 7:26 AM
7	dioxin/furan	Feb 24, 2014 8:47 AM
8	don't think contaminant class determines if site is complex	Feb 23, 2014 7:24 PM
9	dioxins/furans	Feb 20, 2014 1:20 PM
10	I'm not sure it is the type of contaminant that necessarily makes a site complex, but more the physical setting and age of the release.	Feb 20, 2014 11:31 AM
11	Depending on the site any or all of the above contaminant classes can make the site complex	Feb 20, 2014 8:29 AM
12	Any one class or a combination thereof can be complex contingent upon the site setting (e.g., urban) or the for example the hydrogeologic setting	Feb 20, 2014 4:56 AM
13	Refinery class contaminants of petroleum and others	Feb 19, 2014 4:45 PM
14	especially DNAPLs	Feb 19, 2014 11:34 AM
15	Perchlorate	Feb 19, 2014 11:32 AM
16	COCs are contributors, but not solely responsible	Feb 19, 2014 11:27 AM
17	many complex sites involve VOC's, DNAPL's, PCB's, BTEX, metals from several sources and PRP's	Feb 19, 2014 11:09 AM
18	large agricultural parcels with pesticides (and the underlying groundwater)	Feb 19, 2014 10:19 AM
19	mercury	Feb 19, 2014 10:16 AM
20	any mixture of the above contaminants	Feb 19, 2014 9:59 AM

Page 2, Q17. A remediation/restoration time frame greater than the following usually makes for a complex site

1	<10	Mar 9, 2014 5:28 PM
2	100 yrs or less	Mar 7, 2014 12:56 PM
3	Continual progress can be documented where it is not expected to asymptote ahead of the remedial goal	Mar 6, 2014 10:55 AM
4	Restoration time frame is only a philosophy born of the risk management and attenuation and dilution is the solution to pollution remedial strategies that do not institute removal or a proactive treatment remedial option. Having said that, I do believe attenuation, under the right circumstances can be a very good remedial option. It still needs to be compared to the restoration time for an active remediation where money is spent to reduce toxicity and return the resources to the public for their intended uses. Institutional controls may mean a site is never cleaned up and returned to unlimited use, which would be the last category, 100 years or longer. Rationalization that removing a resource from its highest and best use for centuries and stating that it qualifies as a remedy needs some serious justification, The long term economic benefit of having resources available for use and development far outweighs the short term worry about the expenditure of funds to clean up a site. In other words it is all dependent upon the time scale and how the property could be utilized for economic return and environmental stability in the area,	Mar 4, 2014 3:26 PM
5	10 years or less for active remediation, not including operation of engineering controls for protection of receptors	Mar 4, 2014 12:27 PM
6	depends on the particular site and the current and future land use	Mar 4, 2014 7:12 AM
7	It is agreed upon by all stakeholders.	Mar 4, 2014 6:38 AM
8	I think reasonable has no absolute definition and needs to be defined by the comparative analysis of options and the cost/cost-benefit of the action compared to the results / other uses of resources for the protection of human health. In some DNAPL cases, natural dissolution taking 100+ years may be reasonable	Mar 4, 2014 6:20 AM
9	100 yrs	Mar 4, 2014 6:11 AM
10	25	Mar 4, 2014 5:23 AM
11	A timeframe that is commensurate with the risk. High risk, shorter time frame for lower risk - out to indefinite if low to no risk.	Mar 3, 2014 2:00 PM
12	EPA's position, as discussed in EPA OSWER 1999 Directive	Feb 27, 2014 11:23 AM
13	generally 1-10 years but also depends on risk/ACLs, future use, cost/economic factors.	Feb 27, 2014 7:45 AM
14	5-20	Feb 24, 2014 9:36 AM
15	50 years	Feb 24, 2014 5:27 AM
16	<30 years is reasonable to me due to economic considerations and widely cited guidance about F&T modeling uncertainty at long timeframes	Feb 23, 2014 4:32 PM

Page 2, Q17. A remediation/restoration time frame greater than the following usually makes for a complex site

17	Historically a site that can be assessed and cleaned up in less than 5 yrs is probably "not complex" but with the right combination of tools and assessment complex sites could be remediated in less than 10 yrs while some may never be "fully" cleaned up in a 100 years.	Feb 21, 2014 11:35 AM
18	During my 10 years in the oil remediation program, it seems that the sites which aren't resolved by excavation turn into "complex" remediation site and tend to last longer than 10 years.	Feb 20, 2014 11:31 AM
19	Reasonable could be decades (30+ years) depending on numerous factors (see ITRC's APMR-1 (2010), p. 78)	Feb 20, 2014 9:03 AM
20	Less than 20 years before remediation/restoration is reasonable. Reasonable all depends on the receptors - less restoration/remediation time would be appropriate for sites that have direct human/ecological receptors.	Feb 20, 2014 8:29 AM
21	"old" sites that were thought to have been cleaned up (e.g., <10 years) may now be contributing to today's contamination	Feb 20, 2014 4:56 AM
22	Complex sites - 25 to 100+ years	Feb 19, 2014 4:45 PM
23	Closeout within 30 years while not leaving contamination in place	Feb 19, 2014 1:26 PM
24	20 yrs	Feb 19, 2014 12:10 PM
25	historically, RPs have not pushed timetables beyond 30 years - that is now changing and can benefit complex site management	Feb 19, 2014 11:34 AM
26	5 - 30 years	Feb 19, 2014 11:32 AM
27	"Reasonable" can be usually be defined as being within the time limits encountered before.	Feb 19, 2014 11:26 AM
28	A timeframe based on the time it would take for the contaminants of concern to attenuate	Feb 19, 2014 11:12 AM
29	a reasonable time frame is 3-5 years, but permitting, negotiations, planning, approvals, etc. typically double or triple the time frame.	Feb 19, 2014 11:09 AM
30	Lack of concurrence on this definition one of the problems, as well as difficulty in projecting timeframes beyond 10 years or so.	Feb 19, 2014 10:24 AM
31	Oh please - we've been beating around the bush on this question for decades....	Feb 19, 2014 10:19 AM
32	Fewer than 30 years	Feb 19, 2014 10:11 AM
33	Majority of "time" is based on regulatory review, not remediation effort.	Feb 19, 2014 9:56 AM
34	10-15 years	Feb 19, 2014 9:44 AM

Page 2, Q18. The non-technical factors that complicate remediation management include (check all that apply)

1	See previous inputs	Mar 4, 2014 6:57 PM
2	There is a huge void in the bullets listed in this category. Experience and an attitude that will bring a site to closure are needed in both the regulatory as well as the regulated communities. Teamwork and cooperation between parties is the only means of achieving an equitable solution for all sides, regulatory, responsible party and stakeholder. The poor characterization and remedial options that have been instituted all over the nation on complex sites is more so due to the remedial options and site characterization presented by the responsible party to the public and the regulatory agencies. The general rule off thumb is that the remedy that is implemented is only what the responsible party is willing to do, not what is necessary to restore resources and protect human health and the environment. The regulatory agencies and the public are at an extreme disadvantage with respect to getting protective remedies and restoration due to this nationwide dynamic. There is no funding available to properly regulate sites in most of the nations states as well as the federal government.	Mar 4, 2014 3:26 PM
3	Overzealous regulatory agency staff	Mar 4, 2014 8:41 AM
4	Stakeholder, Trustee & NGO drivers	Mar 4, 2014 6:54 AM
5	Lack of dynamics/communication between stakeholders.	Mar 4, 2014 6:38 AM
6	Many companies do not look at the entire life-cycle costs of remediation in making management decisions, including those that only look at the potential for short-term "pay back" on remedial optimization	Mar 4, 2014 6:20 AM
7	complicating remediation management is different from making a site complex	Feb 27, 2014 8:22 AM
8	Uneducated Stakeholders - Example: Not understanding the value of an effective CSM and wanting to dive right into remediation	Feb 26, 2014 6:22 PM
9	Public perception and risk communication	Feb 24, 2014 8:47 AM
10	Inability to learn and adapt the remediation as it progresses: committment to a single remediation technology	Feb 21, 2014 11:35 AM
11	Outside stakeholders not directly involved with remediation, but concerned with site outcomes....NRDA-like stakeholders.	Feb 20, 2014 8:29 AM
12	as stated in Part 1, there are also political, demographic, legal factors that may complicate remediation management	Feb 20, 2014 4:56 AM
13	inadequate public education/participation/notification	Feb 19, 2014 1:26 PM
14	Note--site characterization IS a tech. factor.	Feb 19, 2014 12:10 PM
15	interpretation and realistic application of ARAR's	Feb 19, 2014 11:09 AM
16	Lack of consensus on alternative gwater cleanup objectives to MCLs throughout entire plume, and understanding/acknowledgement of "tail-end" barriers like matrix diffusion, impacts of heterogeneity, etc.	Feb 19, 2014 10:24 AM
17	We typically don't have clear cleanup objectives - and those objectives offered	Feb 19, 2014 10:19 AM

Page 2, Q18. The non-technical factors that complicate remediation management include (check all that apply)

are generally unattainable

18	stakeholder interests (such as narby neighbors) that want the site cleaned up "immediately."	Feb 19, 2014 10:11 AM
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Page 2, Q19. A site becomes complex when

1	Cost can determine the timeframe to meet remediation goals and affect how complexity of the clean up. For example if a less expensive remedy is chosen it usually indicates a less aggressive remedy and may not address the source area remediation which in turn affects the timeframe.	Mar 7, 2014 12:56 PM
2	The use of dollars as a means to measure cost is wholly inappropriate. Once again, there is a need to look at long-term economic loss in recreation, fishing, agriculture, potential development loss in communities that could spur quality of life, jobs, and long-term employment opportunities. Removing the public will to develop a resource to the highest and best use is intimidating and stifles the ability of a community to thrive where these "complex" sites occur. Institutional controls that remove fishing, hunting, access to agricultural development, or wildlife habitat improvements and have the effect of inhibiting development close to these facilities is a burden on the public. These issues are a cost to the public that are never reflected in the dollar cost of a remedy.	Mar 4, 2014 3:26 PM
3	depends on the site, sustainable source of funding and should be commensurate with risk of not remediating	Mar 4, 2014 12:27 PM
4	This depends on the size of the site, site use, etc.	Mar 4, 2014 8:41 AM
5	I also believe that cost alone is not an indicator of complexity. Similar to restoration timeframe question, cost is relative and what is a reasonable cost is based on the comparative analysis of alternatives and the cost-benefit analysis	Mar 4, 2014 6:20 AM
6	<\$10M	Mar 4, 2014 5:23 AM
7	of sound reason, to be logical, justifiable; not extreme	Mar 3, 2014 10:20 AM
8	Greater than a few million	Feb 27, 2014 10:45 AM
9	this varies by site	Feb 24, 2014 5:27 AM
10	The checked marked is accompanied by the add that the costs are large	Feb 23, 2014 7:24 PM
11	Reasonable cost depends on the circumstances and the value of the resource being damaged. If actual water supply wells are contaminated, a "reasonable" cost should be higher. If all risk is hypothetical future exposure then "reasonable" costs should be lower.	Feb 23, 2014 4:32 PM
12	Are the costs only monetary? Should neighborhood disruption and other environmental impacts also be considered?	Feb 21, 2014 11:35 AM
13	In the world of petroleum remediation sites in NH, if a remedation project is over about \$500,000 it would be classified as more complex.	Feb 20, 2014 11:31 AM
14	In general, I'd say that remediation costs > \$50 million would be an indicator of site complexity.	Feb 20, 2014 9:03 AM
15	Depends on risk reduction for the cost	Feb 20, 2014 8:29 AM
16	Referring to Question #17 above, some of today's complex sites are actually the "old dog" sites that were thought to have been previously remediated	Feb 20, 2014 4:56 AM

Page 2, Q19. A site becomes complex when

17	Varies widely	Feb 19, 2014 4:45 PM
18	There is no such thing as "reasonable" cost	Feb 19, 2014 1:26 PM
19	I'd say \$5MM vs \$10MM = complex site	Feb 19, 2014 12:10 PM
20	cost is very dependent upon a large number of factors including COCs,scale of impact, setting, local property use and reuse plans.	Feb 19, 2014 11:34 AM
21	so variable...	Feb 19, 2014 11:32 AM
22	"Reasonable" cost can be usually be defined as being within the costs encountered before.	Feb 19, 2014 11:26 AM
23	Based on the industry standard for the task in question	Feb 19, 2014 11:12 AM
24	each site is unique;there is no such thing as typical reasonable cost.	Feb 19, 2014 11:09 AM
25	Reasonable cost is a component of the size and complexity of the site and financial status of the RP. Bigger issue is difficulty in projecting timeframes and corresponding costs for stakeholders to provide financial certainty when feasibility of even attaining cleanup objectives usually not known until several years into process.	Feb 19, 2014 10:24 AM
26	Come on - we don't know what a reasonable time is either - look at that report of several years ago comparing the cost per cancer prevented through Superfund with real costs for treatment - Superfund looked completely out of control cost-wise but nothing changed	Feb 19, 2014 10:19 AM

Page 2, Q20. Use of or need for a specific regulatory mechanism usually makes for a complex site (select all that apply)

1	Institutional controls in place of an effective and aggressive remedy.	Mar 7, 2014 12:56 PM
2	There are a multitude of laws that must be complied with in order to craft a remedy. Wildlife restoration, wetlands restoration, zoning, well head protection, regional water quality, NPEDES treatment limits on remedial treatment, Air quality permits....., Zoning and other environmental justice issues etc.. There are many such ancillary and yet relevant and appropriate laws that clean up legislation requires in most states of the union. These are not applied often enough to the regulatory framework. Most clean up law does not allow violation of other statutes in order to meet remedial options	Mar 4, 2014 3:26 PM
3	the listed mechanisms don't make for a complex site, they are alternatives available to develop solutions to complex sites and are therefore a possible indicator of a complex site, not a cause.	Mar 4, 2014 12:27 PM
4	Adjudication of groundwater basin, non adjudication of groundwater basin, water rights, use of site treated water or lack thereof, drought	Mar 4, 2014 10:16 AM
5	exemptions	Mar 3, 2014 10:20 AM
6	Risk-based clean-up levels, mass flux/discharge	Feb 23, 2014 4:32 PM
7	Surely these typically reduce complexity?	Feb 21, 2014 11:35 AM
8	Stream segment use classifications; ground water classifications; practical quantitation limits; institutional controls; interim ground water or surface water standards	Feb 20, 2014 9:03 AM
9	All these mechanisms may be appropriate (singularly or combined) as long as they are implemented appropriately (i.e., not as a "quick fix" to get the site off the books or refer to the state under O&M (100% state cost)!!	Feb 20, 2014 4:56 AM
10	Use of institutional controls to achieve acceptable risk	Feb 19, 2014 12:10 PM
11	Consent Orders	Feb 19, 2014 11:34 AM
12	All sites are 'complex' if we can't close them - and if the standard is restoring paradise we can never achieve that no matter what the amount spent	Feb 19, 2014 10:19 AM
13	Institutional controls (i.e., deed restrictions) that have to be monitored over time	Feb 19, 2014 10:11 AM