Transition to Ultraviolet Fluorescence Test Method

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North Carolina Department of Transportation

Executive Summary

A team was formed to study a new method for the analysis of petroleum contaminated soil and to determine if the Department should transition to using this new method. The new method uses ultraviolet light to fluoresce the soil sample and is therefore referred to as Ultraviolet Fluorescence or UVF. The amount of fluorescence measured in the sample relates to the amount of petroleum. The traditional method is to use a gas chromatograph to separate and analyze the petroleum compounds. This is known as US EPA Method 8015 or Method 8015. UVF promises to reduce the cost per sample, shorten the wait time for the results, and to provide onsite analysis for near immediate results. The study shows that the use of UVF instead of Method 8015 would not have influenced our recommendations on the vast majority of the sites.

The team compared the actual cost spent over an eighteen month period on the current method to the cost if UVF had been utilized. The result would have been an almost fifty percent savings if UVF had been used. A savings of six times the actual cost would have been realized if the traditional method had been rushed to equal the forty-eight hour standard turnaround time of UVF.

UVF is approved by North Carolina's Department of Environment and Natural Resources but the team wanted actual field data comparing the two methods before making the decision to transition to UVF. Ten projects were selected to provide the comparison which resulted in seventy-four samples. Portions of each of the seventy-four samples were analyzed by UVF and Method 8015. The sample portions were not mixed to distribute the contamination equally before being analyzed. This mixing was not performed due to contaminant volatilization that would have occurred before the analysis. This fact undoubtedly introduced some error into the results in that the comparative samples may not have been equally contaminated.

Feedback was solicited from our engineering firms (Firms) to gauge their experience with UVF. The overall result of the feedback was a satisfactory to good overall experience using UVF. The individuals with the most experience using UVF recommended transitioning to UVF.

As a result of this study, it is recommended that the Department transition to UVF for the analysis of petroleum contaminated soil for site assessments and defining excavation limits.

Background

The GeoEnvironmental section (Section) of the North Carolina Department of Transportation (Department) is tasked with providing right of way acquisition recommendations for properties with known or perceived soil and groundwater contamination. The intent of the right of way recommendation is to prevent the Department from becoming responsible for pre-existing contamination on properties acquired for transportation projects.

The Section currently has contracts with professional engineering firms (Firms). These Firms are tasked with collecting the data necessary to make informed recommendations on sites of concern. The Firms typically provide information on the site's past uses and the location of known or suspected sources of contamination.

The most common source of contamination encountered is petroleum from leaking underground fuel tanks. Gas stations serve our transportation customers and need to be adjacent to our transportation infrastructure in order to provide service. As a result of their close proximity to the transportation infrastructure they are often impacted by changes to the infrastructure. When these gas stations are in conflict with a proposed transportation project, there is a concern that the underground fuel tanks may have leaked fuel and contaminated the surrounding soil and groundwater. Contaminated soil and groundwater in conflict with the transportation project result in unwanted environmental liability and added cost to the Department.

Sites of concern that are known or suspected to have soil contaminated with petroleum compounds are sampled by the Firm. The samples are collected by pushing a sampling tube into the ground to the desired sampling depth. The samples are retrieved from the sampling tube and placed into jars provided by the laboratory. The samples are packaged and shipped to the laboratory for analysis.

The soil samples are analyzed in parts per million with a gas chromatograph according to US EPA Method 8015 (Method 8015) for petroleum hydrocarbons. The gas chromatograph separates and analyzes the volatile compounds in the sample. The results are sent to the Firm two weeks after receipt of the sample. Any detection over ten parts per million exceeds the regulatory limit for petroleum in soil.

Improvement Opportunity

The project Team proposes to reduce the standard delivery turnaround time of two weeks to forty-eight hours at the same or a reduced cost by switching the analysis from Method 8015 to Ultraviolet Fluorescence (UVF). Method 8015 currently has a standard laboratory turnaround time of two weeks. Quicker turnaround times are usually available but at a substantial cost for Method 8015. The standard turnaround time for UVF is forty-eight hours.

The intent of the project was to reduce the cost of analyzing soil for petroleum compounds by using UVF instead of Method 8015. This transition will result in a reduced cost per sample. The Department will benefit by either saving money during the sampling event or saving money by having more data to make better decisions on how to manage the contaminated soil. A secondary benefit, improved responsiveness to our customers, will result from the standard turnaround time being reduced from two weeks to forty-eight hours. This will allow us to provide preliminary recommendations sooner without the added cost of paying a rush fee to the laboratory for Method 8015.

The Team proposes to compare the cost, analytical results, and the user experience of the UVF method to the traditional Method 8015 to determine if the Department should transition to UVF.

Team

The core Team consisted of the three GeoEnvironmental Project Managers. They are responsible for assigning work to our Firms and using the Firms' data to make recommendations. The project managers were tasked with soliciting feedback from the Firms, comparing the UVF data to the traditional Method 8015 data and comparing the cost associated with the three UVF testing options.

The second group of team members came from the Department's Materials and Test Unit's Chemical Lab. The Department's chemical lab personnel provided valuable baseline data for the historical cost and quantity of samples. They were able to query their paid invoices to quantify the actual number and costs of historical Method 8015 analysis.

The third group of team members represented the front line of this transition, the Firms. The Firms were tasked with testing the new technology alongside the traditional method and providing feedback on their experiences.

Customers

Right of Way

The primary internal customer is the Department's Right of Way Branch responsible for acquiring these sites of concern based on our recommendations.

Engineering Firm

The Firm collecting the data for the Department is an internal customer. The Firm collects the samples, interacts with the laboratory, and presents the data to the Department.

Through the course of this project, it became apparent that the Firms were impacted the most by this transition. To most of the other customers, this transition will be transparent. They will continue to receive the same product and will likely not notice the change. The Firms, however, will have to adapt their sampling protocols and learn how to interpret a new data stream. The customer survey discussed below made it evident that the Firm's acceptance was essential in making this project a success.

Department Engineers

The design engineers are internal customers responsible for bringing the transportation project to the point of construction. The areas of known contamination are provided to the design engineers and they are responsible for presenting these areas on the design and construction plans. Once the engineers are made aware of the areas of concern they can make accommodations as necessary.

Regulators

The regulators at the North Carolina Department of Environment and Natural Resources are external customers. If contamination is found in the soil above ten parts per million, a copy of the findings is provided to the regulator.

The regulators are the other customers, besides the Firms, that will be most affected by this change. Although the regulators approved this technology, it is still new, and they will have to adjust to the new data stream also.

Construction Contractors

The construction contractor (Contractor) that is awarded the opportunity to construct the transportation project is an internal customer. The Contractor is tasked with building the project within the constraints of time and cost while making accommodations for the contamination in conflict with the project. A better defined area of concern will simplify the Contractor's responsibilities.

Property Owners

The property owner where the contamination was found is a secondary customer. They could become an adversarial customer depending on where the contamination is found and the interactions they have with the regulators.

Baseline Data

Laboratory Cost and Turnaround Times

The Materials and Test Unit provided historical laboratory invoices and number of samples analyzed by Method 8015. The baseline data indicated that we paid our contract laboratories to analyze 2,293 samples over an 18 month period at a cost of $94,543 or $41.16 per sample.

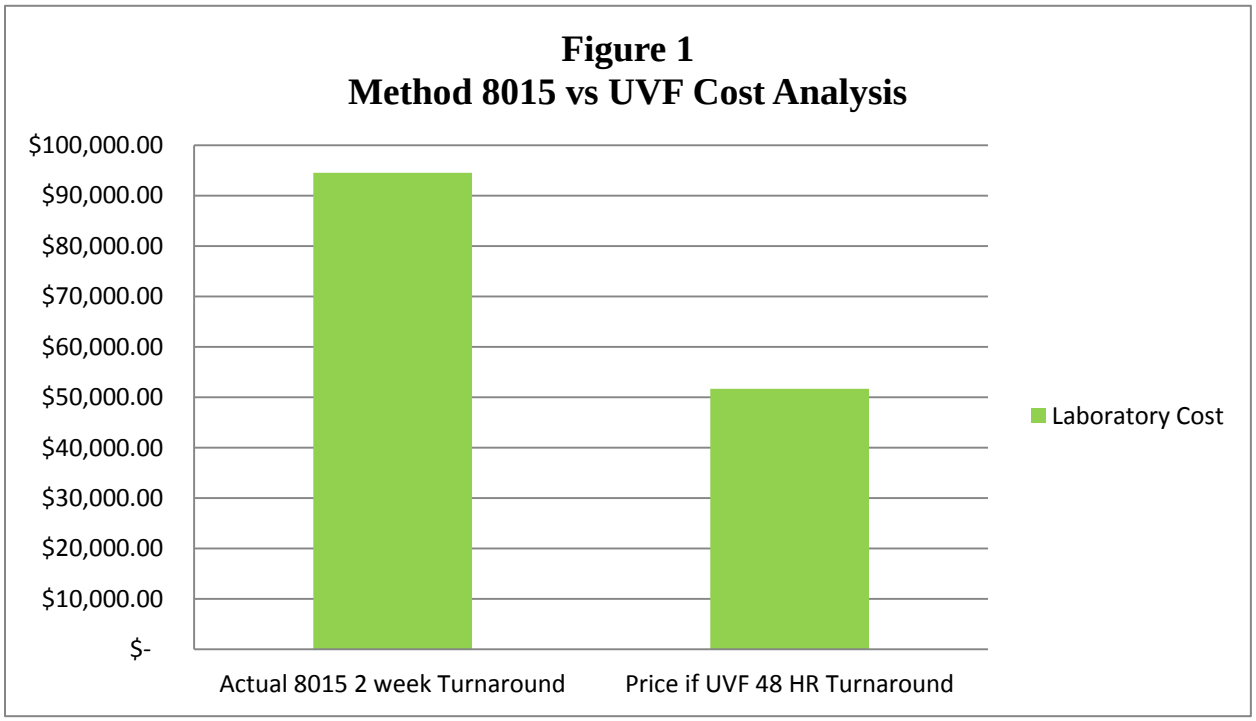
The baseline for delivery is a standard turnaround time of two weeks to receive the results of Method 8015. A faster turnaround time of forty-eight hours is available at an average cost of $137 per sample. This baseline data is for either diesel range organics or gasoline range organics.

The cost for both would be double the above referenced costs: two week turnaround $82.32 per sample or forty-eight hour turnaround at $274 per sample.

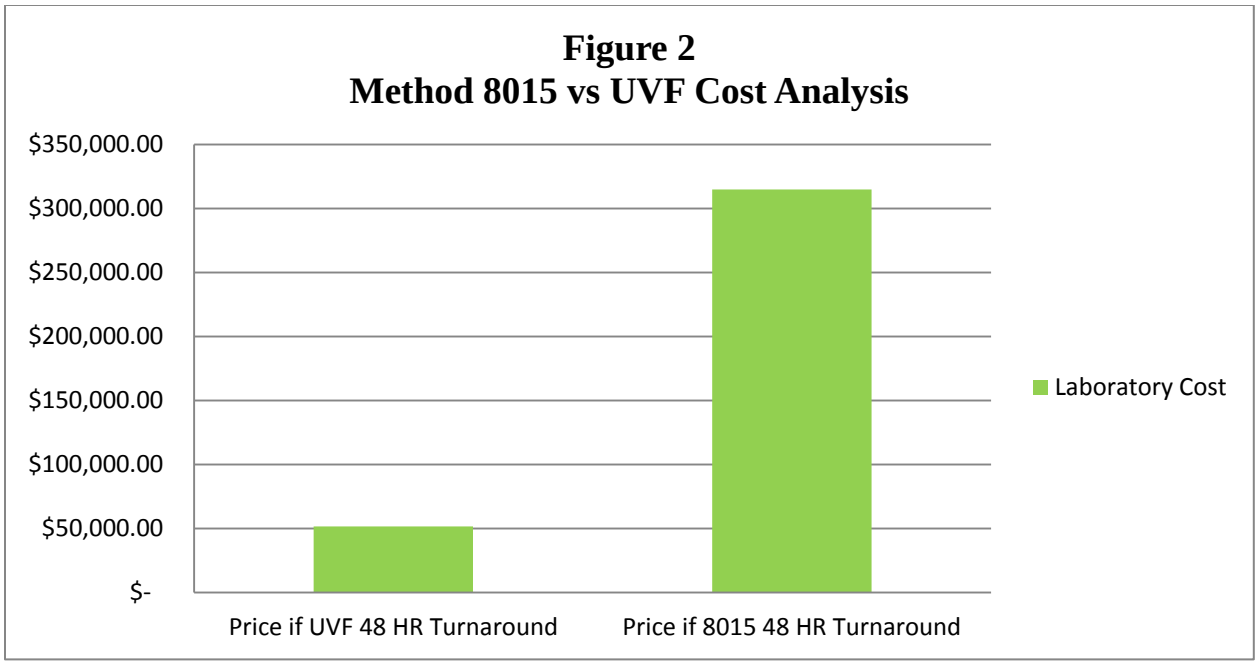
Results

Cost

The data show the potential for significant cost saving by using the UVF test method for detecting petroleum contaminated soil. The baseline data provided by the Department's chemical lab indicated we paid our contract laboratories to analyze 2,293 samples over an eighteen month period at a cost of $94,543 or $41.16 per sample. The chemical lab compared that cost to our standard rate for UVF analysis with a forty-eight hour turnaround time and determined that if we had used UVF analysis instead of Method 8015 we would have had a cost savings of 55% as shown in Figure 1.



This is not a direct comparison because Method 8015 results were received within two weeks while UVF results would have been received within forty-eight hours. In order to show a more equal comparison, we evaluated what the cost would have been if Method 8015 and UVF were both run with a forty-eight hour turnaround time. Figure 2 shows the cost comparison if Method 8015 and UVF were both received within forty-eight hours.



Method 8015 would have cost six times more than UVF in order to receive the sample results within forty-eight hours. This is a substantial cost savings.

Quality

Ten projects were selected to measure the quality in which seventy-four soil samples were analyzed for petroleum by both Method 8015 and UVF. The samples were collected from various regions of the state by seven different Firms. The results of the seventy-four samples are included in the appendix.

All Method 8015 samples were sent to the same laboratory for analysis but each Firm used one of three possible UVF analysis options. The three options were: shipping the sample to a certified UVF laboratory, subcontracting a certified UVF laboratory to analyze the samples onsite, or renting the UVF equipment and having their certified UVF technician analyze the samples onsite.

Figure 3 shows the results of samples collected at a site in Lincoln County. The results match very well. All but one UVF sample, sample number one, are within 30% of the Method 8015 results. The UVF sample results were known within minutes of collecting the samples due to the onsite analysis while the Method 8015 results were received from the laboratory two weeks later.

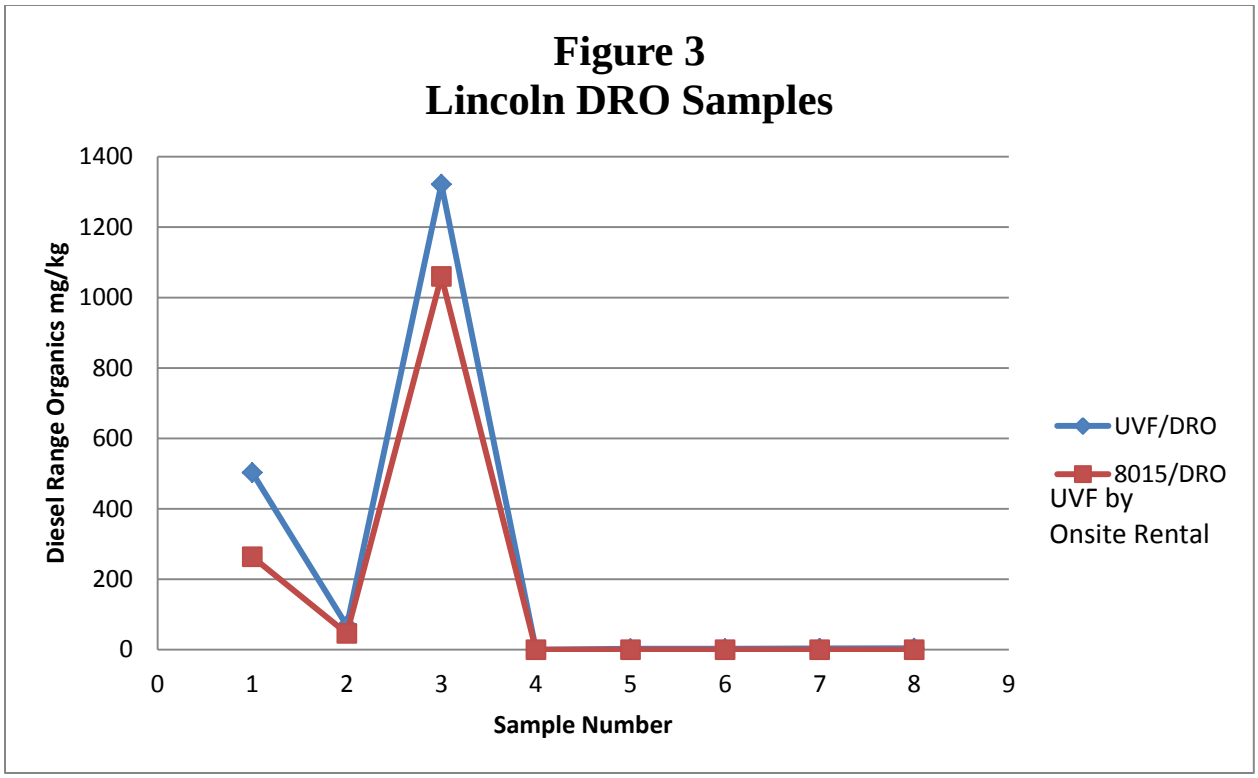
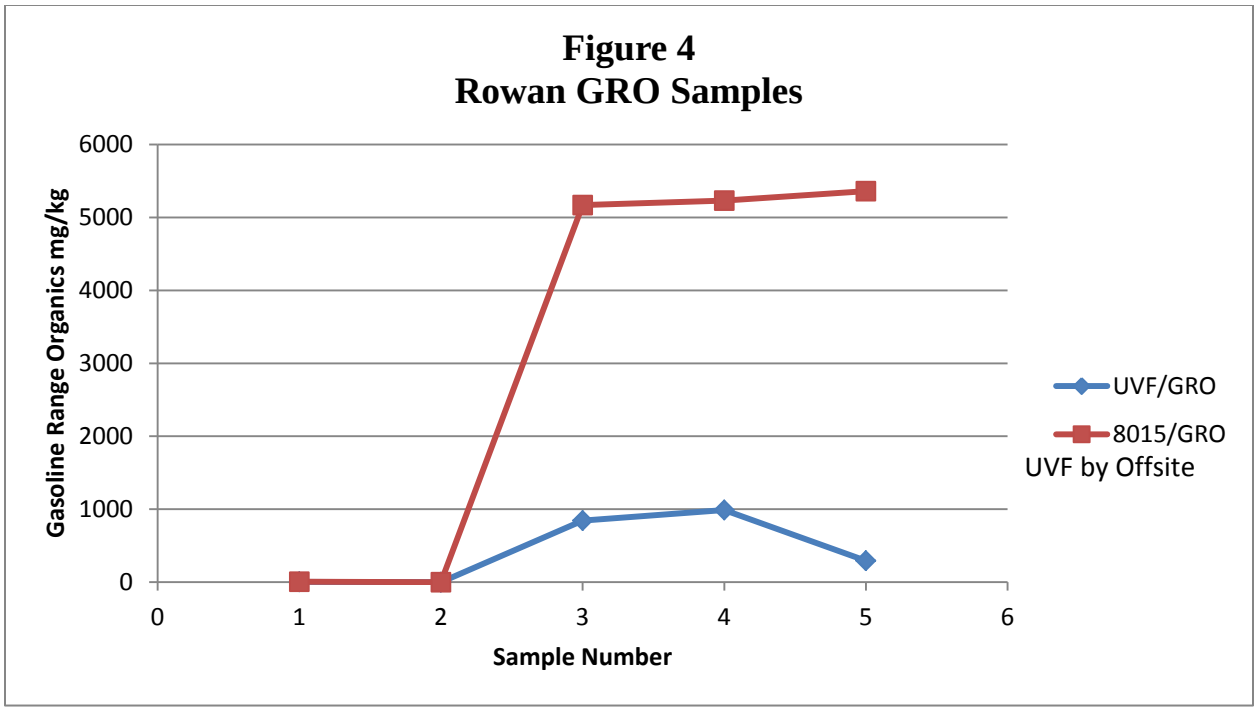
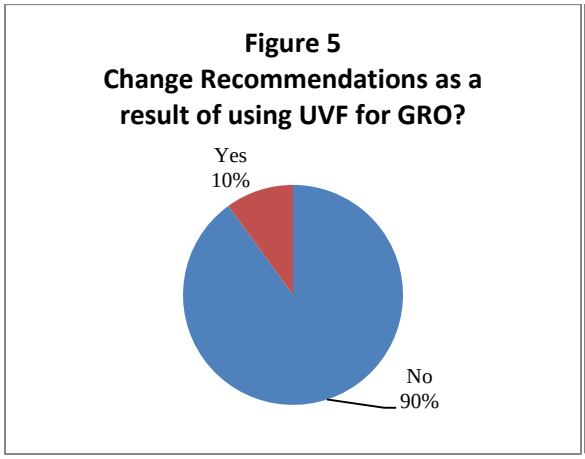


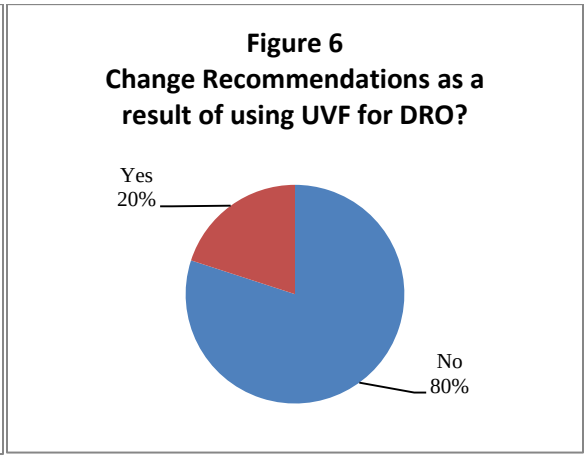
Figure 4 shows the results of samples collected at a site in Rowan County. The first two sets of samples match perfectly. The last three sample sets are five times higher for Method 8015 than UVF. The UVF samples were analyzed offsite by a UVF certified laboratory. The reason for the poor correlation is unknown but there are several possibilities. First, the analytical report for the Method 8015 samples document possible quality control errors in the laboratory that could account for the higher Method 8015 values. Second, the UVF analysis showed high background interference that could have been interpreted as petroleum in the Method 8015 results. Or third, the Method 8015 and UVF samples are both correct and represent the true heterogeneity of the soil samples.



The comparison sample portions were not mixed to distribute the contamination equally before being analyzed so one portion may have had more contamination than another. This mixing was not performed due to contaminant volatilization that would have occurred before the analysis. This fact undoubtedly introduced some error into the results.

Despite the errors revealed in the data analysis, the study shows that the use of UVF would not have influenced our recommendations on the majority of sites. For the gasoline range analysis, approximately ninety percent of the recommendations would have remained unchanged as shown in Figure 5. For the diesel range analysis, approximately eighty percent of the recommendations would have remained unchanged if analyzed by UVF as shown in Figure 6.





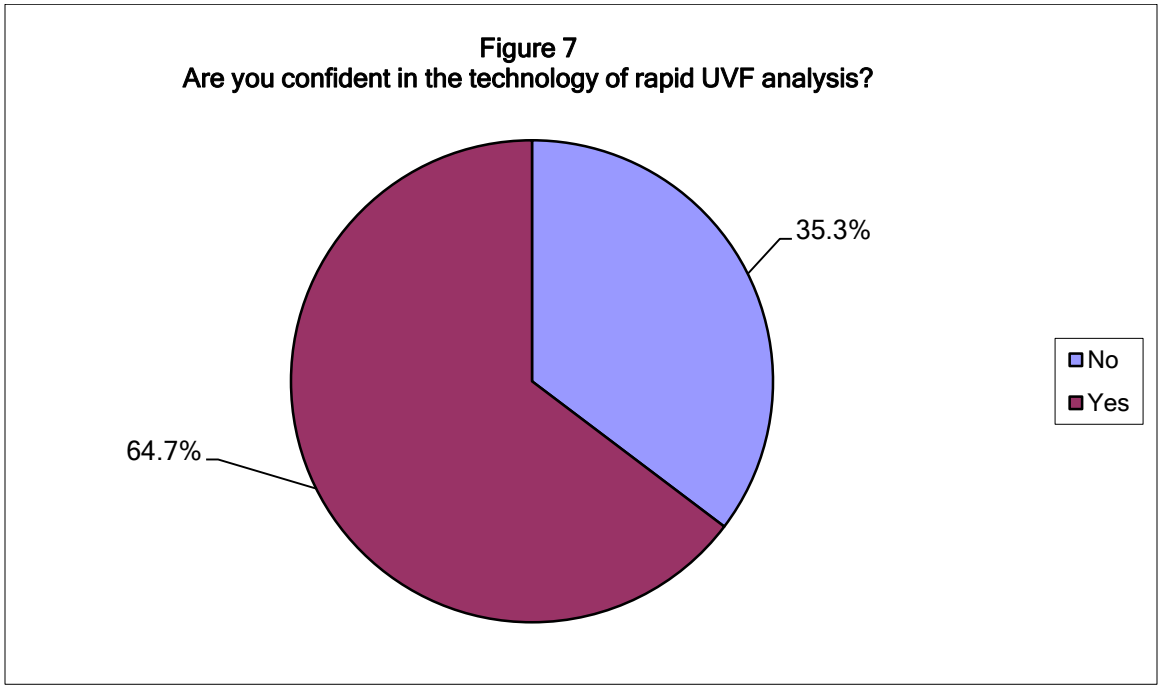
Customer Survey

A customer survey was developed with the intent of soliciting feedback from our Firms. The Team conducted brainstorming sessions to determine the goals of the survey and to determine what questions to ask for each goal. The survey focused on six main areas:

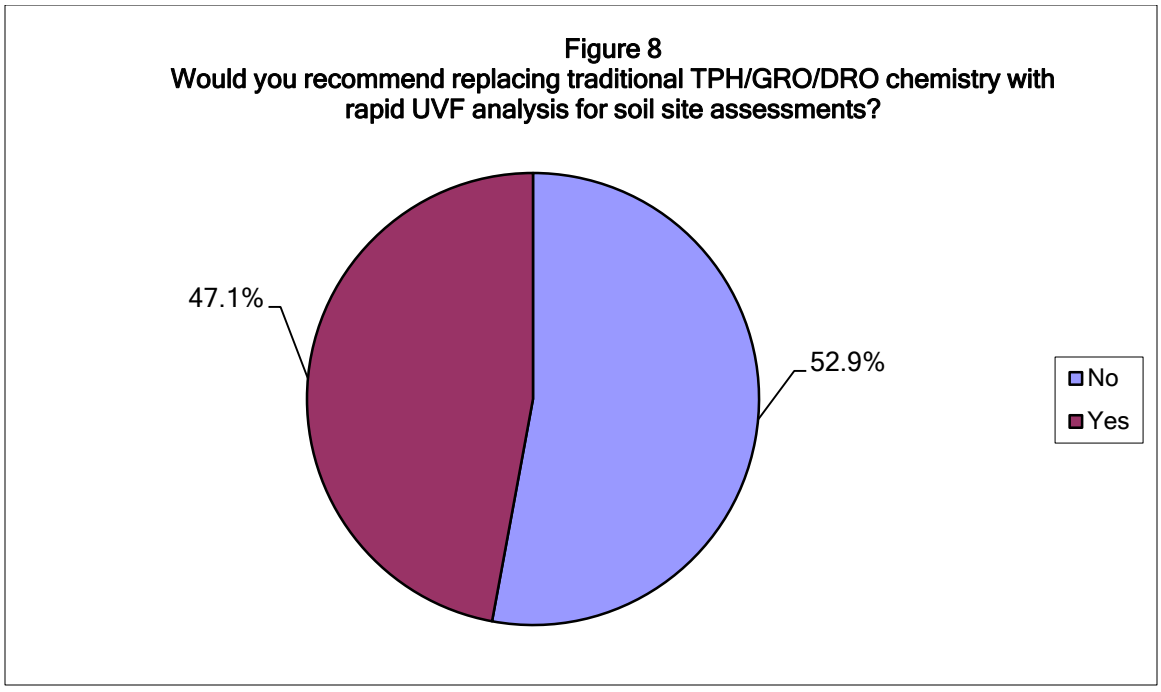
1. How was UVF used
2. The ease of use for the UVF equipment or process
3. Confidence in the results
4. What decisions were made regarding how and when to use UVF
5. What issues were encountered when using UVF
6. Knowledge transfer of how, when and why to use UVF

Each Firm had different levels of experience using the UVF. Twenty-three individuals representing seventeen Firms responded, which we considered to be an outstanding response rate. The following are the highlights of the survey. The detailed survey results are included in the appendix.

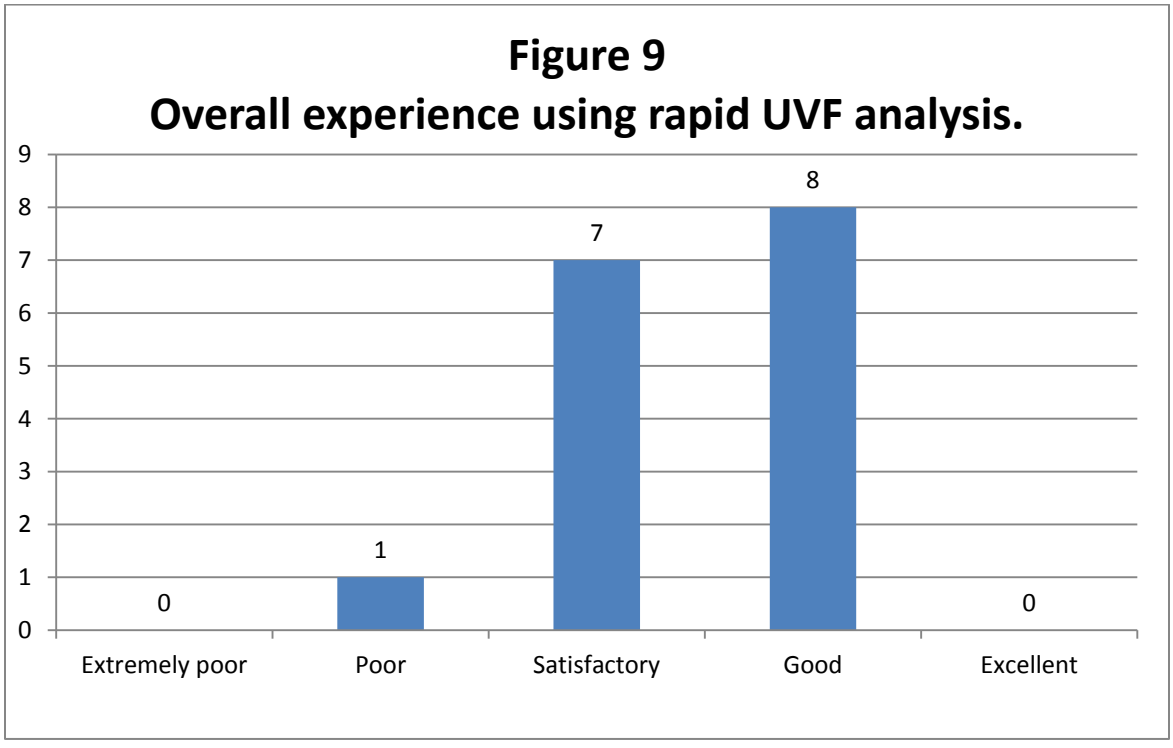
Sixty-five percent of the respondents that had used UVF were confident in the results as shown in Figure 7 below. The trend generally showed that those with more experience with the technology had more confidence with the results.



Fifty-three percent said “no” when we asked the respondents that had used UVF if we should switch from our traditional method to UVF as shown in Figure 8 below. Most of those that said “no” indicated they were not comfortable with the method yet due to their limited experience.



Almost all of the users had a satisfactory to good overall rating with regard to the use of UVF as shown on Figure 9 below. Most of the issues revealed in the survey results can be improved by user experience, manufacture updates, which have recently occurred, and streamlining the billing process.



Implementation

A partial rollout of the UVF method has been implemented with tentative approval of management. The results have been encouraging in that a cost savings is being realized as well as a quicker delivery of the analysis.

The Firms have started to use the new method on select sites. The Firms have had to change their sampling protocols, receive new training before using the equipment, and learn how to interpret the UVF output.

The process improvement will be transparent to most of the remaining customers. The same data will be provided; only the collection method will change. The results of this project were presented to peers at the Virginia Department of Transportation in hopes that they could benefit from this technology. The results will also be presented at a summer workshop of the Transportation Research Board in New York City in mid-June in hopes that national peers will also find this beneficial.

The following implementation chart illustrates the planned steps in order to begin a full implementation.

What	How	Who	When	Notes
Management Review	Send Executive Summary to Group Manager and Unit Head for Review. Summary will include Cost Analysis, Method Comparison Analysis, and Consultant Survey Results	Cyrus	6-23-2014	
Management Approval	Management will review the Executive Summary and Approve the use of UVF	John and Mohammed	7-31-2014	
Develop Guidelines and Standards	Develop reporting guidelines, method selection guidelines, and pricing standards	Craig, Gordon, Terry, and Cyrus	8-15-2014	Standard pricing for offsite UVF analysis only, onsite analysis will be priced based on project specifics.
UVF Implementation Letter	Send letter to consultants, with a copy of the analysis, requesting they use UVF on our projects	Cyrus	8-29-2014	
UVF Implementation	Begin including UVF analysis as a standard in scopes of work for consultants	Craig, Gordon, and Terry	8-29-2014	

Conclusion

The Department should implement the UVF analysis for petroleum contaminated soil based on the results of this project. The Department can expect a cost savings of nearly fifty percent and a quicker delivery for the analysis of petroleum contaminated soil. The results will be measured by reduced invoice amounts and a shorter duration between sample collection and sample results on future projects. One year after implementation, the Team will review the UVF implementation and send a memo to managers to document the results of implementation over the past twelve months.

In order to move forward with the transition, the Team was tasked with verifying that the UVF method would provide comparable results to the Method 8015. Ten projects were selected were selected for this comparison. The results indicated that using either method would have resulted in the same regulatory decision on eighty to ninety percent of the samples. Some samples, however, did have major discrepancies. Some of the discrepancies could be explained but others could not. These discrepancies could have occurred even if duplicate samples were analyzed by the same method.

Our Firms are very dedicated in their mission to assist the Department and they provided detailed feed-back to our survey questions. Their overall approval of the UVF method was encouraging and their comments on the issues will aid us in improving the experience for them in the future.

Appendices

Method 8015 and Ultraviolet Florescence Laboratory Comparison Data

			UVF		8015	
Sample ID	**County**	**UVF Method**	**GRO**	**DRO**	**GRO**	**DRO**
B-4159_004_S-4-2	Jackson	Offsite Lab	0	7	0	0
B-4159_006_S-6-1	Jackson	Offsite Lab	0	5.1	0	10.3
B-4159_006_S-6-2	Jackson	Offsite Lab	0	26.7	0	7.5
B-4159_006_S-6-3	Jackson	Offsite Lab	0	121.7	0	79.5
B-4159_006_S-6-4	Jackson	Offsite Lab	0	60.5	0	8.5
B-4159_006_S-6-8	Jackson	Offsite Lab	0	5.3	0	0
B-4159_011_S-11-3	Jackson	Offsite Lab	0	39.1	0	10.2
B-4159_012_S-12-3	Jackson	Offsite Lab	0	2.2	0	7.5
B-4159_018_S-18-1	Jackson	Offsite Lab	0	179.4	0	49.2
B-4159_018_S-18-2	Jackson	Offsite Lab	0	26.7	0	35.9
B-4159_018_S-18-3	Jackson	Offsite Lab	0	28.7	0	24.2
B-4159_019_S-19-1	Jackson	Offsite Lab	0	0	0	7.6
HA-1	Lincoln	Onsite Rental	0	503	0	264
HA-2	Lincoln	Onsite Rental	0	68.1	0	46.2
HA-3	Lincoln	Onsite Rental	0	1322	0	1060
HA-4	Lincoln	Onsite Rental	0	0	0	0
HA-5	Lincoln	Onsite Rental	0	2.4	0	0
HA-7	Lincoln	Onsite Rental	0	2.5	0	0
HA-8	Lincoln	Onsite Rental	0	3.3	0	0
HA-9	Lincoln	Onsite Rental	0	3.8	0	0
R-2205C_071_2-2	Pitt	Onsite Rental	<0.6	15.3	0	17.1
R-2205C_075_3	Pitt	Onsite Rental	<0.7	12.1	0	0
R-2205C_079-1	Pitt	Onsite Rental	<0.6	4.8	0	0
R-2205C_085_1	Pitt	Onsite Rental	<0.6	1.9	0	0
R-2205C_088_SS-1	Pitt	Onsite Lab	<0.5	<0.5	0	0
R-2250C_101_SS-1	Pitt	Onsite Lab	<0.6	4.8	0	19.6
R-2250C_96_SS-7	Pitt	Onsite Lab	<0.9	37.3	0	391
R-2409D_01_SB-1	Transylvania	Offsite Lab	<0.6	<0.6	0	0
R-2409D_01_SB-2	Transylvania	Offsite Lab	<0.7	<0.7	0	0

			UVF		8015	
Sample ID	**County**	**UVF Method**	**GRO**	**DRO**	**GRO**	**DRO**
R-2409D_01_SB-3	Transylvania	Offsite Lab	7.9	55.5	0	143
R-2409D_01_SB-4	Transylvania	Offsite Lab	<0.7	14.1	0	0
R-2409D_02_SB-1	Transylvania	Offsite Lab	<0.7	<0.7	0	0
R-2409D_02_SB-2	Transylvania	Offsite Lab	<0.7	<0.7	0	0
R-2409D_02_SB-3	Transylvania	Offsite Lab	<0.6	<0.6	0	0
R-2409D_02_SB-4	Transylvania	Offsite Lab	<0.7	<0.7	0	0
R-2501C_011-5	Richmond	Onsite Rental	<0.5	<0.5	0	0
R-2501C_027-3	Richmond	Onsite Rental	<0.5	<0.5	0	0
R-2501C_033-2	Richmond	Onsite Rental	<0.5	<0.5	0	0
R-2501C_042-3	Richmond	Onsite Rental	<0.4	<0.4	0	0
R-2501C_045-2	Richmond	Onsite Rental	<0.4	<0.4	0	0
R-2501C_049-1	Richmond	Onsite Rental	<0.5	0.7	0	0
R-2501C_063_63-8	Richmond	Onsite Rental	200.4	77.8	102	227
R-2501C_063-5	Richmond	Onsite Rental	<0.5	<0.5	0	0
R-2603_045_SS-1	Wilkes	Onsite Rental	1.4	34.3	<7.2	13.6
R-2603_047_SS-3	Wilkes	Onsite Rental	<0.9	42.8	9.5	12.7
R-2603_048_SS-4	Wilkes	Onsite Rental	568.5	214	1830	534
R-2603_051_SS-2	Wilkes	Onsite Rental	<0.9	11.2	11.9	8.1
R-2603_059_SS-4	Wilkes	Onsite Rental	0	24.6	0	24.8
R-2603_073-2	Wilkes	Onsite Rental	<0.7	<0.7	0	0
R-2603_074-1	Wilkes	Onsite Rental	<0.8	<0.8	0	0
R-2603_094-3	Wilkes	Onsite Rental	<0.7	2.6	0	10.5
R-2603_102-2	Wilkes	Onsite Rental	26.2	20.7	105	54.2
R-3601_013_03	Brunswick*	Onsite Rental	<6.2	51.6	35.3	<5.4
R-3601_015_04	Brunswick*	Onsite Rental	<0.7	16.1	9	<5.4
R-3601_023_115-03	Brunswick*	Onsite	<0.7	9.6	33.6	<4.8

			UVF		8015	
Sample ID	**County**	**UVF Method**	**GRO**	**DRO**	**GRO**	**DRO**
		Rental				
R-3601_024_01	Brunswick*	Onsite Rental	<1.5	16.4	17.2	<7.6
R-3601_025_04	Brunswick*	Onsite Rental	<0.7	8	<5.6	<5.0
R-3601_026_01	Brunswick*	Onsite Rental	<3	20.7	<5.6	<4.9
U-2525B_110-3-10	Guilford	Onsite Lab	0	12.9	0	<7.0
U-2525B_116-16-10	Guilford	Onsite Lab	25.4	21.5	63.8	148
U-2525B_116-16-12	Guilford	Onsite Lab	8.8	13.7	120	17
U-2525B_137-7-2	Guilford	Onsite Lab	0	2.1	12.9	22.9
U-2525B_137-8-15	Guilford	Onsite Lab	3.7		<7.2	
U-2525B_155-4-10	Guilford	Onsite Lab	4.2	30.6	0	308
U-2525B_25-12.5	Guilford	Onsite Lab	176.2	4515.8	40.1	4580
U-2525B_26-11	Guilford	Onsite Lab	54	7184	0	0
U-2525B_66-14-8	Guilford	Onsite Lab	7.6	190	7.9	252
U-2525B_66-19-9	Guilford	Onsite Lab	83.1	915.3	<6.7	5460
U-2525B_66-6-10	Guilford	Onsite Lab	2432	31283	696	26600
W-5316 4-1	Rowan	Offsite Lab	4.6	40.5	6.9	123
W-5316 4-3	Rowan	Offsite Lab	0	13.8	0	6.6
W-5316 SB-1	Rowan	Offsite Lab	844.7	3504.6	5170	3440
W-5316 SB-2	Rowan	Offsite Lab	989.9	2356	5230	3220
W-5316 SB-7	Rowan	Offsite Lab	293.4	579.2	5360	579.2

*UVF samples collected from adjacent hole on a different day.

GeoEnvironmental Section Rapid Ultraviolet Fluorescence (UVF) Survey Results

GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?

Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?

No

Q5: If so, who? And, were they satisfied with the results?

Respondent skipped this question

Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?

No

Q7: What are other possible applications of rapid UVF analysis?

Respondent skipped this question

Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?

Yes

Q9: Why not? *Respondent skipped this question*

Q10: Would you consider using it? *Respondent skipped this question*

Q11: If not, why not? *Respondent skipped this question*

COMPLETE

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LastModified: Tuesday, April 29, 2014 2:58:26 PM
Time Spent: 00:26:19

PAGE 1

PAGE 2

PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

#1

GeoEnvironmental UVF Survey

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Q12: What would encourage you to use it? *Respondent skipped this question*

Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.

Respondent skipped this question

Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

Yes

Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?

Yes

Q16: If not, who else is running it? *Respondent skipped this question*

Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)

Yes

Q18: Why or why not?

Not enough data to know

Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
N/A
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
typical sample containers
Q23: What was your experience with billing/invoicing?
OK
Q24: What was your experience with turnaround time of your rapid UVF analysis?
initial results were provided within 24 to 48 hours
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
No
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We did not offset any borings
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Yes
Q34: What was your experience with the availability of sampling supplies?
we received the sample containers on time
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
OK
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
OK
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
No
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We did not offset any borings
Q39: When would you chose onsite/rental when planning a site assessment?
when numerous samples were to be collected
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
when numerous samples were to be collected
Q41: When would you chose offsite analysis when planning a site assessment?
Most of the time since we have a nearby lab.
Q42: What do you like most about rapid UVF analysis?
Only used them once. We still had to send the samples to their lab. Results were quick but it was not necessary for the project schedule.
Q43: What do you like least about rapid UVF analysis?
Unaccustomed to their lab reports
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Unless the project schedule is extremely shortened than I see no real advantage
Q45: Are you confident in the technology of rapid UVF analysis?
No
Q46: Why or why not?
Only used it once, hard to make an assessment on the use with limited data.

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GeoEnvironmental UVF Survey

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Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Don't know enough about the process to adequately assess
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Seemed to be comparable results
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
No
Q50: Why or why not?
not at this time because I only used it once.
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not?
there has to be testing to compare results
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?

Don't have an answer but I believe it should be less than the main labs to make it more attractive to use
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
That is up to the NCDOT
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Satisfactory
Q56: What questions did we not ask but should have? And why?
none at this time
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Never used UVF for petroleum impacted soil
Q7: What are other possible applications of rapid UVF analysis?
Respondent skipped this question
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
No
Q9: Why not?
Cost for instrumentation
Q10: Would you consider using it? Yes
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Tuesday, April 29, 2014 2:40:07 PM
LastModified: Tuesday, April 29, 2014 2:59:42 PM
Time Spent: 00:19:35
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

#2

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
If cost for equipment was compensated.
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Proceed
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

No
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?

Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q33: Was rapid UVF analysis run by offsite lab subcontractor?

No

Q34: What was your experience with the availability of sampling supplies?

Respondent skipped this question

Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?

Respondent skipped this question

Q36: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q37: Were "step-out" borings performed with the offsite lab subcontractor?

Respondent skipped this question

PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.

PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q39: When would you chose onsite/rental when planning a site assessment?

For projects that require a cost effective and timely response.

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?

For projects that require timely response and can absorb the cost of subcontractor.

Q41: When would you chose offsite analysis when planning a site assessment?

For projects where costs are a greater concern than timely results.

Q42: What do you like most about rapid UVF analysis?

Immediate results in the field.

Q43: What do you like least about rapid UVF analysis?

The expense of UVF.

Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)

No preference.

Q45: Are you confident in the technology of rapid UVF analysis?

No

Q46: Why or why not?

The differences in the UVF analysis and standard laboratory methods can produce different results.

Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.

The operator and QA/QC protocols.

Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?

That is beyond my area of expertise.

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GeoEnvironmental UVF Survey

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Q49: **Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?**
No

Q50: **Why or why not?**
I would need more experience with UVF.

Q51: **Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?**
Yes

Q52: **Why or why not?**
It would standardize UVF applications.

Q53: **What is a fair per-sample price of rapid UVF analysis performed by a consultant?**
I would need more information to provide this.

Q54: **Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?**
If NCDOT does they should do so with feedback from the consultants.

Q55: **Overall, please rate your experience using rapid UVF analysis.**
(no label) Good

Q56: **What questions did we not ask but should have? And why?**
You did not ask our chemistry education background. You could be getting feedback from consultants that don't
understand the principles of UVF.

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GeoEnvironmental UVF Survey

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Q3: **Have you heard of rapid UVF for petroleumimpacted soil analysis?**
Yes

Q4: **Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?**
Yes

Q5: **If so, who? And, were they satisfied with the results?**
Department of Defense I think generally yes but the UVF analyses were higher that convential TPH analyses. I did
not work on the project so I don't know the specifics.

Q6: **Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?**
I am proposing to use QED UVF for an assessment now. Can't speak to satisfaction yet.

Q7: **What are other possible applications of rapid UVF analysis?**
I am told that UVF is applicable for ground water analysis also. Contaminated soil removal should be more reliable
with UVF field analysis.

Q8: **Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?**
Yes

Q9: **Why not?** *Respondent skipped this question*

INCOMPLETE

Collector: Web Link 6 (Web Link)

Started: Tuesday, April 29, 2014 2:26:13 PM
LastModified: Tuesday, April 29, 2014 3:16:05 PM
Time Spent: 00:49:52

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#3

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Q10: Would you consider using it? *Respondent skipped this question*

Q11: If not, why not? *Respondent skipped this question*

Q12: What would encourage you to use it? *Respondent skipped this question*

Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.

Respondent skipped this question

Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

Yes

Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?

Yes

Q16: If not, who else is running it? *Respondent skipped this question*

Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)

Yes

Q18: Why or why not?

We haven't used the updated in house methods yet but they appear to be much simpler. We have multiple operators some are confidant others not so much yet.

Q19: Was QED/QROS training adequate for the operator to become competent?

Yes

Q20: If training was not adequate, what would you recommend for the operator to become competent?

Respondent skipped this question

Q21: If training was adequate, after running how many samples was operator competence achieved?

We had a QROS representative onsite when we were renting the equipment. Not sure how many samples were/are necessary.

Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?

Unknown

PAGE 4: Regarding rapid UVF analysis utilized by your internal staff

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PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q23: What was your experience with billing/invoicing?

We didn't have any billing problems. We were charged the amount quoted.

Q24: What was your experience with turnaround time of your rapid UVF analysis?

We had personnel onsite so very good.

Q25: Were "step-out" borings performed with rapid onsite UVF analysis?

Yes

Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Yes in one application. We were able to show the lateral extent of the plume before leaving the site.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Yes
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Not a problem.
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Not a problem.
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Good
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Yes
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Quicker on site plume delineation
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Stright forward plume delineation. Possible UST closure.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
When there are complications of natural background, multiple petroleum types or old degraded plumes that we needed to delineate and I wanted to remove potential operator error from the site condition case I am trying to present to NCDENR
Q41: When would you chose offsite analysis when planning a site assessment?
When the site was close enough that there is not a distinct time advantage in doing UVF onsite.
Q42: What do you like most about rapid UVF analysis?

Results before I leave the site.
Q43: What do you like least about rapid UVF analysis?
Not totally accepted yet by all DENR Incident Managers.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Every tool has it't time for use and is not always applicable.
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
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GeoEnvironmental UVF Survey

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Q46: Why or why not?
Has passed NCDENR testing for use.
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
product degradation
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
UVF provides natural background info, product ID,
onsite analysis at generally reasonable costs. DRO/GRO are currently more widely accepted.
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
Generally yes, more info is provided at quicker turn for currently less money.
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?

Yes
Q5: If so, who? And, were they satisfied with the results?
other clients including a gas station owner
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Yes. but we had inconsistent results on one project
Q7: What are other possible applications of rapid UVF analysis?
not sure
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
No
Q9: Why not?
have not had the right project for it
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Tuesday, April 29, 2014 3:51:34 PM
LastModified: Tuesday, April 29, 2014 4:03:58 PM
Time Spent: 00:12:24
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

#4

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Q10: Would you consider using it? Yes
Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
a project with a lot of TPH soil samples and the need for field results real time
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Exit
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Respondent skipped this question
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability

of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Respondent skipped this question
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Respondent skipped this question
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Respondent skipped this question
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Respondent skipped this question
Q41: When would you chose offsite analysis when planning a site assessment?
Respondent skipped this question
Q42: What do you like most about rapid UVF analysis?
Respondent skipped this question
Q43: What do you like least about rapid UVF analysis?
Respondent skipped this question
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Respondent skipped this question
Q45: Are you confident in the technology of rapid UVF analysis?
Respondent skipped this question
Q46: Why or why not? *Respondent skipped this question*
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Respondent skipped this question
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Respondent skipped this question
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Respondent skipped this question
Q50: Why or why not? *Respondent skipped this question*
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Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question

Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
Yes
Q5: If so, who? And, were they satisfied with the results?
Other private clients - yes, the process of UVF was useful in the assessment.
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Yes - good satisfaction
Q7: What are other possible applications of rapid UVF analysis?
Very useful with determining limits of contamination on excavations.
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
INCOMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 4:53:13 AM
LastModified: Wednesday, April 30, 2014 4:59:36 AM
Time Spent: 00:06:23
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question

Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
The operator attended the required class and has used the instrument on multiple projects outside of NCDOT projects.
Q19: Was QED/QROS training adequate for the operator to become competent?
No
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Respondent skipped this question
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround

time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Respondent skipped this question
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Respondent skipped this question
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Respondent skipped this question
Q41: When would you chose offsite analysis when planning a site assessment?
Respondent skipped this question
Q42: What do you like most about rapid UVF analysis?
Respondent skipped this question
Q43: What do you like least about rapid UVF analysis?
Respondent skipped this question
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Respondent skipped this question

Q45: Are you confident in the technology of rapid UVF analysis?
Respondent skipped this question
Q46: Why or why not? *Respondent skipped this question*
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Respondent skipped this question
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Respondent skipped this question
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Respondent skipped this question
Q50: Why or why not? *Respondent skipped this question*
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GeoEnvironmental UVF Survey

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Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question
Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
Yes
Q5: If so, who? And, were they satisfied with the results?
Marine Corps Base Camp Lejeune. They were not impressed with the results.
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No
Q7: What are other possible applications of rapid UVF analysis?

It can be used for any application that needs screening for petroleum.
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 5:06:21 AM
LastModified: Wednesday, April 30, 2014 5:20:10 AM
Time Spent: 00:13:49
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

#6

GeoEnvironmental UVF Survey
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
No
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q25: Were "step-out" borings performed with rapid

onsite UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Yes
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
They seemed to be prepared
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
No problems
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Received results when expected
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Yes
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Delineated area of contamination so that soil could be adequately removed
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Yes
Q34: What was your experience with the availability of sampling supplies?
Requested and received bottle ware, but not Macrocores required to collect the samples.
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
No problems
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Received results when expected
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
No
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Assessment was only within a proscribed areas
Q39: When would you chose onsite/rental when planning a site assessment?
Depends on the size of the assessment and the sensitivity of the analysis
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Depends on the size of the assessment and the sensitivity of the analysis
Q41: When would you chose offsite analysis when planning a site assessment?

Depends on the size of the assessment and the sensitivity of the analysis
Q42: What do you like most about rapid UVF analysis?
The analysis only reports compounds within a specific narrow range of carbon fractions.
Q43: What do you like least about rapid UVF analysis?
The GRO analyses do not appear to be consistent with fixed-lab analyses
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Would use it for tank closures and for screening, but not for confirmation.
Q45: Are you confident in the technology of rapid UVF analysis?
No
Q46: Why or why not?
Needs to be more compatible with time-rested analyses
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GeoEnvironmental UVF Survey

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Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Soil organics can be misinterpreted as GRO
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
DRO seems consistent with 8015, but GRO is sometimes an order of magnitude different from 8015
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
Only for screening
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
No
Q52: Why or why not?
It is still not as reliable as other methods
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Do not have experience with this
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Probably price the equipment rental as opposed to per sample
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Satisfactory
Q56: What questions did we not ask but should have? And why?
None come to mind
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the

results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No I have not. We periodically use PetroFlag by Dexsil for hydrocarbon identification
Q7: What are other possible applications of rapid UVF analysis?
Respondent skipped this question
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
No
Q9: Why not?
We were unable to get an individual to the training class and have not been requested by NCDOT to use.
Q10: Would you consider using it? No
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 4:34:29 AM
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Time Spent: 00:53:49
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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GeoEnvironmental UVF Survey

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
I don't see the value for NCDOT "PSAs". If the field tech is running samples, he can not be watching the crew, logging soils, health and safety concerns. The time spent running samples could be spend on additionally borings
to get the drilling subcontractor offsite sooner. There is a trade off, one could save a few dollars on the TPH samples via UVF analysis, but could ultimately spend more money by having the drill rig and crew onsite for extra
time at $1500 to 1750 per day. I believe the benefit could be realized during an excavation, where one is trying to
get the site "clean". Samples can contiually be run during excavation activities and making field call. However, again, there are limitations with the NCDENR regulations. After collection of the initial samples during excavation/ust closure for TPH via laboratory of UVF, the next set of samples for confirmation sampling will need
to the go to the lab for "risk-based" parameters. There are pros and cons to this method. For the cost savings, the benefits are not considerably higher. However, I do need to understand more about owning/renting a unit and
getting technicians trained to run the unit. Again, it may make sense to use UVF for directing excavations, for PSAs, the cost savings may not be fully realized due to additonal field days.
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Exit
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Respondent skipped this question
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?

Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Respondent skipped this question
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted

area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Respondent skipped this question
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Respondent skipped this question
Q41: When would you chose offsite analysis when planning a site assessment?
Respondent skipped this question
Q42: What do you like most about rapid UVF analysis?
Respondent skipped this question
Q43: What do you like least about rapid UVF analysis?
Respondent skipped this question
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Respondent skipped this question
Q45: Are you confident in the technology of rapid UVF analysis?
Respondent skipped this question
Q46: Why or why not? *Respondent skipped this question*
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Respondent skipped this question

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GeoEnvironmental UVF Survey

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Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Respondent skipped this question
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Respondent skipped this question
Q50: Why or why not? *Respondent skipped this question*
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question
Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: **Have you heard of rapid UVF for petroleumimpacted soil analysis?**
Yes
Q4: **Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?**
Yes
Q5: **If so, who? And, were they satisfied with the results?**
NAVFAC-Marginally satisfied
Q6: **Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?**
No
Q7: **What are other possible applications of rapid UVF analysis?**
Screening Potentially Contaminated Soils
Q8: **Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?**
No
Q9: **Why not?**
Not very familiar with technique
COMPLETE

Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 5:34:50 AM
Last Modified: Wednesday, April 30, 2014 5:37:39 AM
Time Spent: 00:02:49
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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GeoEnvironmental UVF Survey

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Q10: Would you consider using it? Yes
Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
Specification Inclusion
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Exit
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Respondent skipped this question
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid

onsite UVF analysis?
Respondent skipped this question
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Respondent skipped this question
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Respondent skipped this question
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Respondent skipped this question

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Respondent skipped this question
Q41: When would you chose offsite analysis when planning a site assessment?
Respondent skipped this question
Q42: What do you like most about rapid UVF analysis?
Respondent skipped this question
Q43: What do you like least about rapid UVF analysis?
Respondent skipped this question
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Respondent skipped this question
Q45: Are you confident in the technology of rapid UVF analysis?
Respondent skipped this question
Q46: Why or why not? *Respondent skipped this question*
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Respondent skipped this question
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Respondent skipped this question
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Respondent skipped this question
Q50: Why or why not? *Respondent skipped this question*
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GeoEnvironmental UVF Survey

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Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question
Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question

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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?

Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?

Yes

Q5: If so, who? And, were they satisfied with the results?

Various private clients - yes, they were satisfied.

Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?

Yes - they were satisfied.

Q7: What are other possible applications of rapid UVF analysis?

Delineation of impacted soils.

Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?

Yes

Q9: Why not? *Respondent skipped this question*

Q10: Would you consider using it? *Respondent skipped this question*

COMPLETE

Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 5:28:03 AM
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Time Spent: 00:33:43

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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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GeoEnvironmental UVF Survey

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Q11: If not, why not? *Respondent skipped this question*

Q12: What would encourage you to use it? *Respondent skipped this question*

Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.

Respondent skipped this question

Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

Yes

Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?

Yes

Q16: If not, who else is running it? *Respondent skipped this question*

Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)

Yes

Q18: Why or why not?

Number of times using the instrument

Q19: Was QED/QROS training adequate for the operator to become competent?

No
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Real time experience with the instrument and additional training.
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Generally available - methanol sometimes takes up to a week to receive.
Q23: What was your experience with billing/invoicing?
Would prefer to not have to use a credit card for advance payment.
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Generally satisfied.
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GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Delineation of impacted soils for volume estimation.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Yes
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Satisfied
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Satisfied
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Satisfied
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Yes
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Delineation of impacted soils
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q36: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q37: Were "step-out" borings performed with the offsite lab subcontractor?

Respondent skipped this question

Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q39: When would you chose onsite/rental when planning a site assessment?

Where multiple soil samples would be analyzed to make desicions on-site regarding extents of impacted soils.

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?

Only if rental or trained internal staff are unavailable

Q41: When would you chose offsite analysis when planning a site assessment?

Only if rental or trained internal staff are unavailable

Q42: What do you like most about rapid UVF analysis?

Generally quick, reliable results

Q43: What do you like least about rapid UVF analysis?

The instrument is tempremental. Often difficult to obtain calibration. Have to pre-pay with a credit card.

Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)

Having to pre-pay with a credit card.

Q45: Are you confident in the technology of rapid UVF analysis?

Yes

Q46: Why or why not?

Generally good data correlation

Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.

Highly contaminated soils require increased dilution of the sample. No way to determine dry weights of soil samples.

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GeoEnvironmental UVF Survey

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Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?

If there are detections in the field analysis, there are detections in the 8015 analysis, and if there are not detections in the field, there are usually not detections in the 8015 analysis. Correlation of data is average with detections.

Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?

No

Q50: Why or why not?

Still prefer to have fixed-base lab analysis on a small percentage of samples run by UVF for confirmation purposes.

Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?

No

Q52: Why or why not?

May agree if fixed base laboratory analysis is used on a percentage of samples for confirmation purposes.
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
$50 per sample
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Yes
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Satisfactory
Q56: What questions did we not ask but should have? And why?
Should the operator be required to have an at least basic background in chemistry and/or previous laboratory experience? Would be very helpful for the operator to have this.
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No
Q7: What are other possible applications of rapid UVF analysis?
Screening for TPH in groundwater?
Screening for halogenated hydrocarbons in soils/groundwater (in the future)?
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 5:12:58 AM
LastModified: Wednesday, April 30, 2014 6:21:44 AM
Time Spent: 01:08:46
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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GeoEnvironmental UVF Survey

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal

staff (i.e., equipment rental)?
No
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite

lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Yes
Q34: What was your experience with the availability of sampling supplies?
Correct number of sampling containers delivered to office by subcontractor on time. However, terracores needed
to be acquired from separate vendor.
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Invoices reflected cost estimates provided by subcontractor and were submitted soon after analyses were complete.
Q36: What was your experience with turnaround time of your rapid UVF analysis?
All samples were analyzed within the 48-hour turnaround time requested.
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?
No
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Not part of requested scope of work.
Q39: When would you chose onsite/rental when planning a site assessment?
Only when initital screening of soils would be beneficial in approximating areas of potential soil impact by petroleum.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
For petroleum UST closures in NC when immediate decisions must made regarding extent of excavation; also when immediate decisions must be made regarding further assessment of suspected areas of potential soil impact.
Q41: When would you chose offsite analysis when planning a site assessment?
For petroleum UST closures in NC when immediate decisions are not required regarding extent of excavation; NCDOT preliminary site assessments; other assessments that do not require immediate decisions in the field regarding confirmation and/or delineation of soil impact by hydrocarbons based on UVF results.
Q42: What do you like most about rapid UVF analysis?
Cost effectivess; rapid turnaround for results; ease of sampling; customer service.
Q43: What do you like least about rapid UVF analysis?
Results have limited use (as a ascreening tool).
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Preferred for screening soils potentially impacted by petroleum. Prefer not to use for screening soils potentially impacted by other contaminants (e.g., halogenated hydrocarbons). Prefer not to use for ultimate decisions regarding presence or absence of soil impact by petroleum. Confirmation of UVF results using laboratory analysis
is preferred.
Q45: Are you confident in the technology of rapid

UVF analysis?
Yes
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GeoEnvironmental UVF Survey

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Q46: **Why or why not?**
Confidence in results based on fingerprints where there are no other possible factors affecting fingerprints (e.g.,
interference from organics and/or particulates; dilutions).
Q47: **Please list any issues that may impact the quality of rapid UVF analysis test results.**
Interference from organics and/or particulates; dilutions; "very low limits/negatives" trigger DIV# indication instead
of a value.
Q48: **Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?**
Data from both analyses are considered soley as screening data, but can be used in planning additional petroleum
analysis in the laboratory to ultimately determine compaliance with NCDENR standards.
TPH analysis of soil using UVF is quicker and much more cost effective than 8015 analysis.
Results using either analytical approach often lead to "false positives" where followup or concurrent lab analysis of
same sample for VOCs and/or SVOCs show ND for TPH results showing exceedance of NCDENR action levels.
"False negatives" are also possible where followup or consurrent lab analysis of same sample for VOCs and.or SVOCs show detections where TPH results may have shown ND.
Q49: **Would you recommend replacing traditional
TPH/GRO/DRO chemistry with rapid UVF analysis for
soil site assessments?**
Yes
Q50: **Why or why not?**
UVF instead of traditional TPH/GRO/DRO analysis is recommended.....but only for screening purposes for soil
potentially impacted by petroelum.
Q51: **Do you feel that rapid UVF analysis should
become a standard test method (e.g. ASTM, EPA)?**
Yes
Q52: **Why or why not?**
Accreditation of UVF by ASTM or EPA would be expected to be accompanied by universal standards for the method established by the governing agency based on its own criteria.
Q53: **What is a fair per-sample price of rapid UVF analysis performed by a consultant?**
For laboratory UVF analysis: Cost of per/sample analysis quoted by subcontracted lab + cost for disposal of sample following analysis quoted by lab + cost of terracore.
Q54: **Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?**
Opinion: no. Too many project-specific factors in determining a universal per/sample price.
Q55: **Overall, please rate your experience using rapid UVF analysis.**
(no label) Good
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GeoEnvironmental UVF Survey

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Q56: **What questions did we not ask but should have? And why?**
"Should a PG or PE be willing to sign and stamp a document that indicates that soil is impacted by petroleum

and should be remediated based on TPH results alone?"

GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?

Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?

No

Q5: If so, who? And, were they satisfied with the results?

Respondent skipped this question

Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?

yes and they were satisfied

Q7: What are other possible applications of rapid UVF analysis?

?

Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?

Yes

Q9: Why not? *Respondent skipped this question*

Q10: Would you consider using it? *Respondent skipped this question*

COMPLETE

Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 6:32:10 AM
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Time Spent: 00:23:45

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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

#11

GeoEnvironmental UVF Survey

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Q11: If not, why not? *Respondent skipped this question*

Q12: What would encourage you to use it? *Respondent skipped this question*

Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.

Respondent skipped this question

Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

Yes

Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?

Yes

Q16: If not, who else is running it? *Respondent skipped this question*

Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)

Yes

Q18: Why or why not?

in instances where we have run the UVF in the field and also sent comparison samples to the lab, the results were

very similar
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
competence can be achieved in 15 to 20 samples. I would say we have run 50 or so and still have not mastered it.
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
in instances where we only collected the samples and shipped them to KB labs, I would like to see the encore samplers provided. I would also like to see a return shipping label provided using the KB labs account
Q23: What was your experience with billing/invoicing?
no problems so far
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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GeoEnvironmental UVF Survey

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Q24: What was your experience with turnaround time of your rapid UVF analysis?
as expected
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
we were able to delineate horizontal and vertical extents of petroleum impacted soil in real time instead of relying
on the PID
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Yes

Q34: What was your experience with the availability of sampling supplies?
the encore samplers need to be provided. this is an extra cost that is just passed on to the NCDOT. the samplers are only sold in boxes of 100 I believe and are rather expensive.
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
no problems so far
Q36: What was your experience with turnaround time of your rapid UVF analysis?
as expected. there needs to be a more established procedure when hard silts and clays are encountered. these silts and clays will NOT break up in methanol and may lead to incomplete extractions.
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
No
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
NCDOT PSAs do not require delineation
Q39: When would you chose onsite/rental when planning a site assessment?
UST removal and delineations, surface spill delineations
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
it would need to be a rather large job. with multiple drilling/excavations going on at the same time.
Q41: When would you chose offsite analysis when planning a site assessment?
if we were only able to have one person on site during the assessment. one person cannot adequately located borings, collect/classify the soils, perform extractions in a reasonable period of time
Q42: What do you like most about rapid UVF analysis?
immediate results
Q43: What do you like least about rapid UVF analysis?
the need to haul around methanol, the creation of waste, not able to reuse sample jars, software can be "buggy" at times
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
for a simple phase II ESA consisting of 4 borings around a UST I would not use UVF. the rental cost, supply cost
and cost associated with sending a certified person makes it economically unfeasible.
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
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GeoEnvironmental UVF Survey

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Q46: Why or why not?
I have seen the UVF results compare well with traditional lab results.
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
incomplete extractions, careful bookkeeping needs to happen. dilutions sometimes can be confusing
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
from what I have seen, the results compare relatively well
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for

soil site assessments?
Yes
Q50: Why or why not?
it compares well with standard DRO/GRO analysis.
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not?
no answer
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
price per samples is misleading. the price per sample needs to include the cost of the sampler, methanol, sample
jar and waste disposal. just saying it costs $45/sample is nowhere near correct. When using a traditional lab, all these costs are inherent and not seen. I get samplers, I get bottles filled with methanol and I don't have to dispose
of anything. the real cost to the consultant of one UVF sample is much higher than the $45 quoted.
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
yes, but it needs to account for all of the above. if we have to buy $100 worth of non reusable sample jars for every
job, samplers, methanol and eventually pay disposal, how do you quantify all that?
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good
Q56: What questions did we not ask but should have? And why?
I think you covered them all
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
Yes
Q5: If so, who? And, were they satisfied with the results?
We have used UVF on a limited basis for lender clients
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Yes
Yes
Q7: What are other possible applications of rapid UVF analysis?
n/a
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 6:30:35 AM
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it?
n/a
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Technicians were trained by QROS, and QROS staff was available for troubleshooting and Q&A
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
20
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Lab-grade methanol was difficult to obtain due to shipping regulations
Q23: What was your experience with billing/invoicing?
Billing was timely and accurate
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GeoEnvironmental UVF Survey

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Q24: What was your experience with turnaround time of your rapid UVF analysis?
On-site TAT (i.e. renting the QED equipment), TAT was quick, perhaps taking 5 minutes.
QROS' lab service was quick as well, and within advertised TAT (48 hours)
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
No
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We have not used UVF for delineation via borings; however, we have used it during remediation/soil excavation.

UVF provided us greater confidence of "clean" extents, thereby limiting potential of remobilizing for additional work.

Q27: Was rapid UVF analysis run by an onsite subcontractor?

No

Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?

Respondent skipped this question

Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?

Respondent skipped this question

Q30: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q31: Were "step-out" borings performed with onsite lab subcontractor?

Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q33: Was rapid UVF analysis run by offsite lab subcontractor?

Yes

Q34: What was your experience with the availability of sampling supplies?

Terracore samplers were required, but not provided by QROS. other sampling supplies used for this type of work
was standard and provided by us (Ziploc bags, ice, gloves, etc)

PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.

PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.

PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?

the cost of shipping samples to lab were not covered by the lab, this was not implied by the lab up front, and was
therefore unanticipated

Q36: What was your experience with turnaround time of your rapid UVF analysis?

as advertised (within 48 hours)

Q37: Were "step-out" borings performed with the offsite lab subcontractor?

No

Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

the one project where we used lab analysis was a site check, not delineation

Q39: When would you chose onsite/rental when planning a site assessment?

When delineating or performing remedial excavation

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?

Not likely, as we are qualified to perform on-site field analysis ourselves

Q41: When would you chose offsite analysis when planning a site assessment?

Not likely

Q42: What do you like most about rapid UVF analysis?

Quick TAT, fingerprinting, renting and using the equipment for on-site use
Q43: What do you like least about rapid UVF analysis?
pre-prepared vials for UVF laboratory analysis. unsure of results via this method. results are quick and less expensive; however, additional unanticipated costs are incurred (Terra-core samplers, ice, shipping) that make costs similar to that of standard DRO/GRO analysis.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
n/a
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
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GeoEnvironmental UVF Survey

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Q46: Why or why not?
I am confident in results obtained by use of the equipment in the field. unsure of results obtained by sending samples for lab analysis (see #36)
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
for a recent PSA, dense clayey silt was encountered and submitted in prepared vials for UVF lab analysis. the soil
"plugs" did not break down in the methanol, which likely limited the extraction of volatiles from the soil matrix, and
likely impacting the analysis results
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
UVF includes GRO/DRO, with more parameters (BTEX, PAH, BaP, fingerprinting), and faster TAT
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
**Depends on the assessment -
- for site checks, traditional TPH is sufficient
- for delineation/remedial excavation, UVF provides quick TAT for decision making and direction of field work
activities
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not?
UVF technology is prevalent and has been around long enough to warrant standardization
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
difficult to answer, since on-site rental allows an undefined number of samples to be collected and analyzed. in addition, the cost of on-site analysis is impacted by supplies consultants need to supply (methanol, sampling containers)
for lab analysis, the lab costs do not include consumables and shipping. with traditional TPH analysis, the lab will
furnish most things, including a cooler (we had to provide the cooler and it was not returned), Terracore samplers,
shipping costs.
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?

no
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good
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Q56: What questions did we not ask but should have? And why?
n/a
GeoEnvironmental UVF Survey
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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleumimpacted soil for other clients? And were they satisfied with the results?
Respondent skipped this question
Q7: What are other possible applications of rapid UVF analysis?
Respondent skipped this question
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
Q11: If not, why not? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
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Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians

running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Confident because multiple samples were analyzed in a short period of time with little trouble shooting needed. Questions that did arise were quickly resolved after a phone call to QROS rep.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
After 2 samples
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Good experience
Q23: What was your experience with billing/invoicing?
Not great. The invoice is not structured well. It is very confusing what is being charged and what has already been paid.
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Good
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GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We were able to better define the area of impact by comparing the concentrations of the results from the same depths.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 8: Regarding rapid UVF analysis run by an onsite subcontractor.
PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
When petroleum impact is suspected at possible UST sites or reported spill areas.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
It may be worth while having a subcontractor on site if the study area is large with multiple areas of impact suspected, and if the impact materials are not typical and difficult to identify.
Q41: When would you chose offsite analysis when planning a site assessment?
If we only have a few samples to collect and it is not worth renting the equipment, it would be better to send representative samples off site to be analyzed.
Q42: What do you like most about rapid UVF analysis?
I like getting results immediately.
Q43: What do you like least about rapid UVF analysis?
The set-up is a bit high maintenance, especially if the study area is difficult to get to, or inaccessible by vehicle.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
I would use UVF again.
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
Q46: Why or why not?
UVF results match lab results which usually match PID screening results. This increases confidence.
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
If the soil is not analyzed right away, this may impact the test results.
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GeoEnvironmental UVF Survey

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Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Both use standards, blanks, and methanol for preservation.
UVF uses light to determine concentration of contaminants and then provides a fingerprint match, but lab provides
a concentration summary.
UVF provides an excel sheet and fingerprints, but the lab provides an extensive report.
Samples are analyzed the same day with UVF, but are packed on ice and shipped to a lab chemical analysis.
The lab shows "J" values while UVF shows the state of degradation
UVF is cheaper than chemical analyses by a lab.

Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
No

Q50: Why or why not?
More data should be collected and analyzed for accuracy by trained field staff before this type of decision is made.

Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes

Q52: Why or why not?
Yes, however much more data should be collected before it becomes a standard.

Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
The UVF lab charges 45/sample (48 hr TAT). This seems reasonable.

Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
No. The NCDOT should establish an hourly rate for a UVF certified person to be on site since they are taking on
the responsibility of the lab, maintenance of equipment, and attended a class for certification.

Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good

Q56: What questions did we not ask but should have? And why?
Are additional personnel required when UVF analysis is requested? Yes, for efficiency sake, one person needs to
be in the UVF lab performing the analysis while a technician is collecting the sols from the study area. For one person to go back and forth from the rig to the lab is not efficient.

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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
Yes

Q5: If so, who? And, were they satisfied with the results?
NCDENR, UST closure, yes.

Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?

ATC has. Yes.
Q7: What are other possible applications of rapid UVF analysis?
spills, releases, etc.
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Wednesday, April 30, 2014 7:47:58 AM
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Time Spent: 00:12:49
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Took training directly from QROS, was able to troubleshoot equipment in the field.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
I'm not sure.
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Good.
Q23: What was your experience with billing/invoicing?
Good.
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Great.
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff

PAGE 5: Regarding rapid UVF analysis utilized by your internal staff.
PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We were able to delineate the hot spot.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Yes
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Good
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Good
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Great
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Yes
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We were able to delineate the hot spots.
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
When 10-20 samples per day are to be collected.

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
When 20+ samples per day are to be collected.
Q41: When would you chose offsite analysis when planning a site assessment?
If I can avoid it, never.
Q42: What do you like most about rapid UVF analysis?
Real time data to help make fast field decisions.
Q43: What do you like least about rapid UVF analysis?
Background interference led to problems on one site that only QROS was able to identify/fix.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
If there was a way to analyze separeately for potential background interference ahead of time or first thing on-site
then it would helpful to know whether that could create issues further down the field work scope.
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
Q46: Why or why not?
see 32 and 33.
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
see 33.
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GeoEnvironmental UVF Survey

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Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
faster and as long as client is comfortable with technology, preferable.
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
depends on client but fast data (as long as it's accurate) is always better. cost.
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not?
see previous responses.
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
i dont know.
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
yes.
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good
Q56: What questions did we not ask but should have? And why?
further information regarding whether background interference was experienced would probably prove helpful.
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No
Q7: What are other possible applications of rapid UVF analysis?
Respondent skipped this question
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
Q11: If not, why not? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Thursday, May 01, 2014 5:42:54 AM
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Time Spent: 00:16:43
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Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Equipment and tech savy. Strong scientific fundamentals
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question

Q21: If training was adequate, after running how many samples was operator competence achieved?
2
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Good
Q23: What was your experience with billing/invoicing?
Good
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Good
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Quantify contaminated soil
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.
PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q37: Were "step-out" borings performed with the offsite lab subcontractor?

Respondent skipped this question

Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q39: When would you chose onsite/rental when planning a site assessment?

Unsure

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?

Unsure

Q41: When would you chose offsite analysis when planning a site assessment?

Unsure

Q42: What do you like most about rapid UVF analysis?

Data display, data outputs

Q43: What do you like least about rapid UVF analysis?

Constant re-calibration, re-run blank, turbidity issues, intermittent blank contaminatin issues, instrument would say no sample present when a sample was in the insrtument which turned out to be indicative of turbidity issue?

Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)

Photo ionization detection appears to be more overall effective, efficient

Q45: Are you confident in the technology of rapid UVF analysis?

No

Q46: Why or why not?

Experienced many issues with equipment, software issues, programming issues (run time errors)

Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.

Only able to operate in the field under "good" weather, not convienent, weather is always an issue in the field. Too
hot, too cold, rainy, windy, not many field techs have the ability to perform this in a vehicle

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GeoEnvironmental UVF Survey

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Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?

Have not had a chance to compare anaylsis against the same sample

Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?

No

Q50: Why or why not?

Previously stated issues

Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?

No

Q52: Why or why not?

Previously stated issues

Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Unsure
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Yes
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Poor
Q56: What questions did we not ask but should have? And why?
Feels like you are asserting that issues with the equipment solely arrise from user error/incompetence.
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
no
Q7: What are other possible applications of rapid UVF analysis?
The main uses would be for instances when a large number of samples are needed with very rapid turn-around
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*

INCOMPLETE
Collector: Web Link 6 (Web Link)
Started: Thursday, May 08, 2014 8:31:28 AM
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GeoEnvironmental UVF Survey

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians

running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
I have not been told of any operator issues. Personnel are very competent.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Respondent skipped this question
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Respondent skipped this question
Q23: What was your experience with billing/invoicing?
Respondent skipped this question
Q24: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Respondent skipped this question
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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GeoEnvironmental UVF Survey

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Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q27: Was rapid UVF analysis run by an onsite subcontractor?
Respondent skipped this question
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
Respondent skipped this question
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
Respondent skipped this question
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Respondent skipped this question
Q41: When would you chose offsite analysis when planning a site assessment?
Respondent skipped this question
Q42: What do you like most about rapid UVF analysis?
Respondent skipped this question
Q43: What do you like least about rapid UVF analysis?
Respondent skipped this question
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
Respondent skipped this question
Q45: Are you confident in the technology of rapid UVF analysis?
Respondent skipped this question
Q46: Why or why not? *Respondent skipped this question*
Q47: Please list any issues that may impact the

quality of rapid UVF analysis test results.
Respondent skipped this question
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Respondent skipped this question
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Respondent skipped this question
Q50: Why or why not? *Respondent skipped this question*
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No
Q7: What are other possible applications of rapid UVF analysis?
Surface Spill Cleanups, Fingerprinting Petroleum Sources to help determine if there my be more than one release
or release from two different petroleum sources at a site.
Q8: Have you used rapid UVF analysis for petroleumimpacted

soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Thursday, May 08, 2014 10:45:06 AM
Last Modified: Thursday, May 08, 2014 12:19:51 PM
Time Spent: 01:34:45
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
The QED/QROS UVF analysis results have been consistent with field observations, split samples with other laboratories, and field screening.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
I would say 5 to 10 samples.
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Initial we had trouble, but now it is good. After we established relationships with suppliers and venders, the availability of supplies needed to operate the UVF equipment is good.
Q23: What was your experience with billing/invoicing?
Initially we had some trouble, but now it is good.
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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GeoEnvironmental UVF Survey
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Q24: What was your experience with turnaround time of your rapid UVF analysis?
Since we do the UVF analysis our self, the turnaround time has been 24 hours or the next day.
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
No
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
We have been collecting and preserving the samples in the field, and doing the UVF analysis in the afternoon/evening; then doing the step-out borings the next day.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question

Q39: **When would you chose onsite/rental when planning a site assessment?**
When you have multiple parcels/sites (more than one or two), so you can have quick or true 24-hour turn-around
time. If you use offsite analysis and/or laboratory, you have to ship the samples to the lab. Then the offsite lab will
start the analysis, and 24-hour turn-around time has turned into 48-hour turn around time.
Q40: **When would you chose onsite analysis by subcontractor when planning a site assessment?**
If you want a third party to do the analysis, or if the certified or trained personal from Pyramid would not be available to do the analysis.
Q41: **When would you chose offsite analysis when planning a site assessment?**
If you have one or two parcels with limited room to do step-out soil borings, or if you want a third party to do the
analysis.
Q42: **What do you like most about rapid UVF analysis?**
The speed of the rapid UVF analysis. You have the results within 12 to 24 hours or sooner.
Q43: **What do you like least about rapid UVF analysis?**
Having the right power source to use the UVF analyzer in the field.
Q44: **If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)**
I have no problem using the rapid UVF analysis.
Q45: **Are you confident in the technology of rapid UVF analysis?**
Yes
Q46: **Why or why not?**
My experience with UVF analyzer. The samples we expected to be contaminated were contaminated, and the samples we expected to be clean were clean.
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Q47: **Please list any issues that may impact the quality of rapid UVF analysis test results.**
Software or hardware issues and operator error. I would recommend having refresher courses or continuing training every year or two years to keep operator up to date any changes problems with the UVF analyzer.
Q48: **Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?**
Our experience with the UVF Analysis, for the majority of the soil samples we split, the UVF analysis was more
sensitive than the traditional TPH GRO/DRO chemical analysis.
Q49: **Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?**
No
Q50: **Why or why not?**
I would use a combination of both the traditional chemistry and rapid UVF analysis. I think of the UVF analysis as
another tool in the tool box.
Q51: **Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?**
Yes
Q52: **Why or why not?**
If the operators receive more training, and a possible state or ASTM certification for the operator.
Q53: **What is a fair per-sample price of rapid UVF analysis performed by a consultant?**
It depends on the number of samples you analyze, but if the consultant's labor is included in the sample then

$130 per sample (12 to 24 hour turn around time) with a minimum number of samples to cover the rental costs. If
the consultant's/operator's labor is not included in the price per sample; then $70/sample for 12 to 24 hour turn around time.
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
No.
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Satisfactory
Q56: What questions did we not ask but should have? And why?
I cannot think of any questions you should of asked.
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GeoEnvironmental UVF Survey
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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
No, just the NCDOT so far.
Q7: What are other possible applications of rapid UVF analysis?
NC DENR tank closures, private client contaminated soil excavation delineation, contaminant plume tracing
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Friday, May 09, 2014 1:40:10 PM
Last Modified: Friday, May 09, 2014 2:00:00 PM
Time Spent: 00:19:50
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?

Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Our technicians are certified and have been trained in field operations by QROS employees who are knowledgeable in the workings of the instrument. Additionally, our staff are highly competent in dealing with petroleum impacted soils, and know what concentrations make sense relative to their experience in the field.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
Multiple samples, at least a full day of analysis followed by additional days soon theerafter while training is fresh.
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Supplies were easily accessible either through QROS or chemical supply companies (i.e. methanol) with sufficient
time to order prior to a project.
Q23: What was your experience with billing/invoicing?
Good experience, no problems.
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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Q24: What was your experience with turnaround time of your rapid UVF analysis?
We ran the analysis either in real time in the field or each evening after sample collection, results are immediate.
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
In some cases, areas of contamination were better defined by the step out borings. In other cases, contamination
was also found in the step out borings and thus the outer boundary was still somewhat arbitrary.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question

Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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GeoEnvironmental UVF Survey

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
When number of samples is enough to justify rental cost relative to 24-hour turnaround lab analysis.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
We would not, we have certified techs.
Q41: When would you chose offsite analysis when planning a site assessment?
If UVF was a requirement, but only a few samples were needed to be analyzed, then we may consider off site analysis rather than a rental if the cost difference was significant enough.
Q42: What do you like most about rapid UVF analysis?
Rapid turnaround time and ability to perform step out borings.
Q43: What do you like least about rapid UVF analysis?
There still seem to be some technical issues with the computer program from QROS shutting down, having to restart, etc.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
For NCDOT projects I think it is a good first order method for preliminary site assessments, where gross contamination is the issue at hand.
Q45: Are you confident in the technology of rapid UVF analysis?

Yes
Q46: Why or why not?
Our lab analysis comparisons have generally shown similar values relative to the UVF results. There are some variances, especially at the lower concentration level, where the QED and the lab can vary by a few mg/kg, and if
the value is close to 10 this can be significant in terms of interpretation.
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GeoEnvironmental UVF Survey

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Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Level of methanol dilution, user error, length of time sample sits in methanol prior to analysis.
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
Previous answers pretty much address this. UVF is faster and can be done in the field, but is new and can have somewhat larger variance in results from user to user. Lab analysis is theoretically a more rigorous protocol resulting in higher precision, but takes more time and does not provide real time results.
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
As stated previously, for NCDOT PSA projects, where gross contamination is the issue, UVF analysis provides a
good tool to characterize a site. I believe further QA/QC needs to be done to meet stricter DENR guidelines for site closure, or general instances where results need to be certain within a few mg/kg.
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
No
Q52: Why or why not?
I think it could be, but more verification of results needs to be done first.
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
This question has too many variables...is the QED being used a rental, or in a lab that owns it? How many total samples are going to be done, and over how many days? Rental costs need to be factored in in order to determine what the cost of a single sample would be.
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
See above answer, I do not believe this would work, each project should be looked at individually.
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good
Q56: What questions did we not ask but should have? And why?
None that come to mind.
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
No
Q5: If so, who? And, were they satisfied with the results?

.
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Have not used it. Used similar technology for metals.
Q7: What are other possible applications of rapid UVF analysis?
Similar to other on-site screening methods in that you can direct assessment activities to get them done quickly and without several mobilizations.
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
No
Q9: Why not?
New to DOT
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Tuesday, May 13, 2014 1:48:03 PM
Last Modified: Tuesday, May 13, 2014 2:20:45 PM
Time Spent: 00:32:42
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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Q10: Would you consider using it? Yes
Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
Where full delineation required in limited time and to minimize mobilizations. I am a huge fan of the EPA Triad
Approach using on-site methods to assess on the fly. I can get much more done for less and end up with a monitoring well network that is bare bones but does the job. No wasted wells.
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Exit
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
No
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Respondent skipped this question
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Respondent skipped this question
Q18: Why or why not? *Respondent skipped this question*
Q19: Was QED/QROS training adequate for the operator to become competent?
Respondent skipped this question
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?

Respondent skipped this question

Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?

Respondent skipped this question

Q23: What was your experience with billing/invoicing?

Respondent skipped this question

PAGE 4: Regarding rapid UVF analysis utilized by your internal staff

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Q24: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q25: Were "step-out" borings performed with rapid onsite UVF analysis?

Respondent skipped this question

Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q27: Was rapid UVF analysis run by an onsite subcontractor?

Yes

Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?

Respondent skipped this question

Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?

Respondent skipped this question

Q30: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q31: Were "step-out" borings performed with onsite lab subcontractor?

Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q33: Was rapid UVF analysis run by offsite lab subcontractor?

Respondent skipped this question

Q34: What was your experience with the availability of sampling supplies?

Respondent skipped this question

Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?

Respondent skipped this question

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PAGE 9: Regarding rapid UVF analysis run by offsite lab subcontractor.

PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

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Q36: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q37: Were "step-out" borings performed with the offsite lab subcontractor?

Respondent skipped this question

Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q39: When would you chose onsite/rental when planning a site assessment?

Respondent skipped this question

Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?

Respondent skipped this question

Q41: When would you chose offsite analysis when planning a site assessment?

Respondent skipped this question

Q42: What do you like most about rapid UVF analysis?

Respondent skipped this question

Q43: What do you like least about rapid UVF analysis?

Respondent skipped this question

Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)

Respondent skipped this question

Q45: Are you confident in the technology of rapid UVF analysis?

Respondent skipped this question

Q46: Why or why not? *Respondent skipped this question*

Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.

Respondent skipped this question

Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?

Respondent skipped this question

Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?

Respondent skipped this question

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Q50: Why or why not? *Respondent skipped this question*

Q51: Do you feel that rapid UVF analysis should

become a standard test method (e.g. ASTM, EPA)?
Respondent skipped this question
Q52: Why or why not? *Respondent skipped this question*
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
Respondent skipped this question
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
Respondent skipped this question
Q55: Overall, please rate your experience using rapid UVF analysis.
Respondent skipped this question
Q56: What questions did we not ask but should have? And why?
Respondent skipped this question
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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?
Yes
Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?
Yes
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
yes - moderately is my guess
Q7: What are other possible applications of rapid UVF analysis?
Guiding excavations
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
No
Q9: Why not?
I've reviewed a few reports where it has been used.
Q10: Would you consider using it? Yes
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Thursday, May 15, 2014 10:48:17 AM
LastModified: Thursday, May 15, 2014 11:20:11 AM
Time Spent: 00:31:54
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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GeoEnvironmental UVF Survey

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Q11: If not, why not?
I would consider using it on my own projects, but my personal preference is to test it against select laboratory

results. I have seen a few field test kits come and go. They are ok at best.
Q12: What would encourage you to use it?
Without my own personal confirmation testing, it helps that NCDOT and DENR like it.
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Proceed
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Yes - because he is QED certified, he has other previous experience with it, and the test is pretty simple (I understand)
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
unknown
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
ok
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PAGE 6: Regarding rapid UVF analysis utilized by your internal staff.

GeoEnvironmental UVF Survey

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Q23: What was your experience with billing/invoicing?
ok
Q24: What was your experience with turnaround time of your rapid UVF analysis?
fine
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
No
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
My experience has included guiding excavation during corrective action, so borings were not involved.
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with

billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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PAGE 10: Regarding rapid UVF analysis run by offsite lab subcontractor.

GeoEnvironmental UVF Survey

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Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
For projects with a short time frame.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Not sure I would, considering we have a certified QED person. Perhaps, if he were unavailable.
Q41: When would you chose offsite analysis when planning a site assessment?
I would not consider offsite analysis of UVF samples at this time.
Q42: What do you like most about rapid UVF analysis?
That you can use it to guide excavation.
Q43: What do you like least about rapid UVF analysis?
I,personally, am not ready to commit. However, if it's accepted by NCDOT and DENR, I will use it.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
I have no problem using it for certain circumstances.
Q45: Are you confident in the technology of rapid UVF analysis?
No

Q46: **Why or why not?**
I need more evidence.
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GeoEnvironmental UVF Survey
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Q47: **Please list any issues that may impact the quality of rapid UVF analysis test results.**
user error
Q48: **Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?**
The lab results has proven to be more realible over a longer period of time.
Q49: **Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?**
No
Q50: **Why or why not?**
I think UVF has its place at a minimum
Q51: **Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?**
No
Q52: **Why or why not?**
not yet
Q53: **What is a fair per-sample price of rapid UVF analysis performed by a consultant?**
unknown
Q54: **Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?**
no - with the provider
Q55: **Overall, please rate your experience using rapid UVF analysis.**
(no label) Satisfactory
Q56: **What questions did we not ask but should have? And why?**
none
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GeoEnvironmental UVF Survey
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Q3: **Have you heard of rapid UVF for petroleumimpacted soil analysis?**
Yes
Q4: **Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?**
No
Q5: **If so, who? And, were they satisfied with the results?**
Respondent skipped this question
Q6: **Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?**
Yes.
Q7: **What are other possible applications of rapid UVF analysis?**
real time field screeneing and separation of imapcted soils
Q8: **Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?**
No
Q9: **Why not?**

Have not yet had an opportunity
Q10: Would you consider using it? Yes
COMPLETE
Collector: Web Link 6 (Web Link)
Started: Saturday, May 17, 2014 7:01:18 AM
Last Modified: Saturday, May 17, 2014 7:13:28 AM
Time Spent: 00:12:10
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PAGE 3: Regarding rapid UVF analysis for petroleum-impacted soil for NCDOT.

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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it?
rapid, real time results
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Proceed
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Yes, the main concern is with the equipment
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
5-6
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
Good, needs adequate lead time to obtain methanol and other supplies.
Q23: What was your experience with billing/invoicing?
N/A
PAGE 4: Regarding rapid UVF analysis utilized by your internal staff
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GeoEnvironmental UVF Survey
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Q24: What was your experience with turnaround time of your rapid UVF analysis?
Good, instantaneous
Q25: Were "step-out" borings performed with rapid

onsite UVF analysis?
No
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
N/A
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
When rapid reuslts are needed and a significant number of samples will be collected
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
Would prefer to do it ourselves to ensure is done correctly by trained personnel.

Q41: **When would you chose offsite analysis when planning a site assessment?**
I would not, if going to use this option may as well use traditional analysis.
Q42: **What do you like most about rapid UVF analysis?**
Instantaneous relaible results
Q43: **What do you like least about rapid UVF analysis?**
Equipment is tempermental in field conditions. Needs stable power source and work are set-up which is not always easy in field. Does not work with hybrid vehicles.
Q44: **If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)**
Equipment is tempermental in field conditions. Needs stable power source and work are set-up which is not always easy in field. Does not work with hybrid vehicles.
Q45: **Are you confident in the technology of rapid UVF analysis?**
Yes
Q46: **Why or why not?**
It supplements, does not replace
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Q47: **Please list any issues that may impact the quality of rapid UVF analysis test results.**
Field conditions, training of personnel.
Q48: **Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?**
quicker results, real time field results, Gets additional detail beyond just TPH (i.e. BTEX)
Q49: **Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?**
No
Q50: **Why or why not?**
Do not have lab results form an independent source.
Q51: **Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?**
Yes
Q52: **Why or why not?**
Is realiable and gives real time results
Q53: **What is a fair per-sample price of rapid UVF analysis performed by a consultant?**
depends upon number of samples. $30-$75
Q54: **Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?**
No. Depends upon number of samples since equipment is rented per day not per sample.
Q55: **Overall, please rate your experience using rapid UVF analysis.**
(no label) Satisfactory
Q56: **What questions did we not ask but should have? And why?**
Equipment relaibaility and documentation of training with results.
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GeoEnvironmental UVF Survey

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Q3: **Have you heard of rapid UVF for petroleumimpacted soil analysis?**
Yes
Q4: **Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted**

soil?
No
Q5: If so, who? And, were they satisfied with the results?
Respondent skipped this question
Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?
Never used for other clients. However, in certain situations it could be beneficial.
Q7: What are other possible applications of rapid UVF analysis?
It could also be used for over-excavations from an AST or surface spill and field delineation.
Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?
Yes
Q9: Why not? *Respondent skipped this question*
Q10: Would you consider using it? *Respondent skipped this question*
COMPLETE
Collector: Web Link 6 (Web Link)
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Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it? *Respondent skipped this question*
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
With the class room training and field training, I thought it was adequate amount of training to operate the equipment.
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?

Respondent skipped this question

Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?

I didn't have problems getting the supplies needed to operate the equipment.

Q23: What was your experience with billing/invoicing?

We were required to pay with a credit card. This made harder to process/track in our accounting system.

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Q24: What was your experience with turnaround time of your rapid UVF analysis?

I never sent any to the lab. We were able to analyze the samples onsite or at night.

Q25: Were "step-out" borings performed with rapid onsite UVF analysis?

Yes

Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Some additional data was collected using the step-out borings, however most of the time we could have performed

step-out borings based on the PID data.

Q27: Was rapid UVF analysis run by an onsite subcontractor?

No

Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?

Respondent skipped this question

Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?

Respondent skipped this question

Q30: What was your experience with turnaround time of your rapid UVF analysis?

Respondent skipped this question

Q31: Were "step-out" borings performed with onsite lab subcontractor?

Respondent skipped this question

Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?

Respondent skipped this question

Q33: Was rapid UVF analysis run by offsite lab subcontractor?

No

Q34: What was your experience with the availability of sampling supplies?

Respondent skipped this question

Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?

Respondent skipped this question

PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.

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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
We would rent the equipment if we had enough soil samples to make it cost affective to rent/use the equipment,
instead of sending all the samples to the lab for analysis.
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
We didn't subcontracted the analysis.
Q41: When would you chose offsite analysis when planning a site assessment?
We didn't sent soil samples for offsite analysis.
Q42: What do you like most about rapid UVF analysis?
Having the data available in the field. In certain situation, it could help you make better decisions in the field.
Q43: What do you like least about rapid UVF analysis?
The major problem we had was the software crashing. We would do multiple samples and go to save them and the computer/software would crash. We would loose all the data and had to start over. Also, sometimes I was unsure when I was matching the petroleum fingerprints. It is kinda trial and error process to match the fingerprints.
If I was unsure, I would send it to QED for review.
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
I am not sure UVF analysis has a great benefit in most cases. I think UVF is a good field screening instrument, however I am still unsure if we should be making final decisions based on the data. Also, most of the time we can conduct step-out borings based on PID readings. However, I did install most of the temporary monitoring wells
based on the UVF data.
Q45: Are you confident in the technology of rapid UVF analysis?
No
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Q46: Why or why not?
The equipment is not within a laboratory environment. The personnel operating the equipment are not laboratory
trained technicians. You are expecting laboratory results from personnel that operate the equipment infrequently.
Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
The equipment was not within a laboratory environment. The possibility of picking the wrong petroleum fingerprint.
Additional sources of error such as measurement, math errors, and no QA/QC method with the equipment.
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?

The traditional GRO/DRO analysis has an EPA approved recongnized methods and standards, is conducted in a
laboratory environment, the lab itself is held to certain standards by the state, and it has a QA/QC processes. The UVF don't have any of the processes above in place to ensure the accuracy of the data.

Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?

No

Q50: Why or why not?

See above.

Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?

No

Q52: Why or why not?

See above.

Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?

The only advantage is the turnaround time. We don't think NCDOT is saving any money over traditional laboratory
methods, if you include the rental cost, supplies, and personnel cost.

Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?

No, because the cost can change substantially based on the project size.

Q55: Overall, please rate your experience using rapid UVF analysis.

(no label) Satisfactory

Q56: What questions did we not ask but should have? And why?

If you were a property owner would you feel confirmable that regulatory decisions were made on the UVF data? I
would want financial decisions be made on UVF data.

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GeoEnvironmental UVF Survey

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Q3: Have you heard of rapid UVF for petroleumimpacted soil analysis?

Yes

Q4: Are you aware of anyone other than NCDOT using rapid UVF analysis for petroleum-impacted soil?

Yes

Q5: If so, who? And, were they satisfied with the results?

North Carolina Army National Guard (NCARNG),
Yes

Q6: Have you used rapid UVF analysis for petroleum-impacted soil for other clients? And were they satisfied with the results?

yes
yes

Q7: What are other possible applications of rapid UVF analysis?

PSAs, Tank Closures, Delineating Soil Contamination.

Q8: Have you used rapid UVF analysis for petroleumimpacted soil for NCDOT?

Yes

Q9: Why not? *Respondent skipped this question*

COMPLETE

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Q10: Would you consider using it? *Respondent skipped this question*
Q11: If not, why not? *Respondent skipped this question*
Q12: What would encourage you to use it? *Respondent skipped this question*
Q13: Please select "Proceed" to continue the survey regarding your experience with UVF. You may select "Exit" if you have no experience with UVF to share.
Respondent skipped this question
Q14: Was rapid UVF analysis utilized by your internal staff (i.e., equipment rental)?
Yes
Q15: Are only QED/QROS-certified technicians running equipment for rapid UVF analysis?
Yes
Q16: If not, who else is running it?
N/A
Q17: Are you confident in the operator(s) competence? (If multiple operators, please explain.)
Yes
Q18: Why or why not?
Cause its me. Well trained by QED training Session and training update
Q19: Was QED/QROS training adequate for the operator to become competent?
Yes
Q20: If training was not adequate, what would you recommend for the operator to become competent?
Respondent skipped this question
Q21: If training was adequate, after running how many samples was operator competence achieved?
just a few
Q22: What was your experience with the availability of supplies needed to operate the UVF equipment?
sufficient
Q23: What was your experience with billing/invoicing?
easy
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Q24: What was your experience with turnaround time of your rapid UVF analysis?
excellent. feedback is immediate
Q25: Were "step-out" borings performed with rapid onsite UVF analysis?
Yes
Q26: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted

area/volume of contaminated soil)?
was able to determine the edge of the contamination plume
Q27: Was rapid UVF analysis run by an onsite subcontractor?
No
Q28: What was your experience with the availability of supplies needed for the onsite lab subcontractor?
Respondent skipped this question
Q29: What was your experience with billing/invoicing from the onsite lab subcontractor?
Respondent skipped this question
Q30: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q31: Were "step-out" borings performed with onsite lab subcontractor?
Respondent skipped this question
Q32: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q33: Was rapid UVF analysis run by offsite lab subcontractor?
No
Q34: What was your experience with the availability of sampling supplies?
Respondent skipped this question
Q35: What was your experience with billing/invoicing with the offsite lab subcontractor?
Respondent skipped this question
PAGE 7: Regarding rapid UVF analysis run by an onsite subcontractor.
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Q36: What was your experience with turnaround time of your rapid UVF analysis?
Respondent skipped this question
Q37: Were "step-out" borings performed with the offsite lab subcontractor?
Respondent skipped this question
Q38: If not, why not? If so, what did you gain by using step-out borings (e.g. minimizing interpreted area/volume of contaminated soil)?
Respondent skipped this question
Q39: When would you chose onsite/rental when planning a site assessment?
When it is cost effective and available. When real time decisions are prudent
Q40: When would you chose onsite analysis by subcontractor when planning a site assessment?
not necessary
Q41: When would you chose offsite analysis when planning a site assessment?
not necessary
Q42: What do you like most about rapid UVF analysis?

more accurate quantifying of impacted soil volume, real time results
Q43: What do you like least about rapid UVF analysis?
Sometimes there are issues with software. however that has been addressed. Hard sell with some project managers that have been around a long time. they know and trusts the wet methods and are a little reluctant to use the UVF. The more we use it and they can see the results and cost effectiveness the more I believe they will
be willing to transition to the UVF
Q44: If you prefer not to use rapid UVF analysis, why not? (Please expound on any issues regarding onsite conditions, or other decision points.)
I prefer the UVF
Q45: Are you confident in the technology of rapid UVF analysis?
Yes
Q46: Why or why not?
I have used and seen the results
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Q47: Please list any issues that may impact the quality of rapid UVF analysis test results.
Sharpie pens
Q48: Compare and contrast UVF analysis vs. traditional TPH GRO/DRO (8015) chemical analysis?
analytical results are instant with the UVF. with the traditional chem analysis we typically have a 10 day turn
Q49: Would you recommend replacing traditional TPH/GRO/DRO chemistry with rapid UVF analysis for soil site assessments?
Yes
Q50: Why or why not?
turn around time and cost effectiveness
Q51: Do you feel that rapid UVF analysis should become a standard test method (e.g. ASTM, EPA)?
Yes
Q52: Why or why not?
cant think of a reason not to.
Q53: What is a fair per-sample price of rapid UVF analysis performed by a consultant?
10
Q54: Should the NCDOT GeoEnvironmental Section establish a standard per-sample price, for their consultants?
yes
Q55: Overall, please rate your experience using rapid UVF analysis.
(no label) Good
Q56: What questions did we not ask but should have? And why?
can not think of any
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