"The New Remediation Paradigm":

Reducing Remediation Costs and Environmental Impact by Addressing Hydrocarbon Contamination In-Situ and in Real-Time

The Combination of Real Time and In-Situ (in place) Testing and Treatment of Hydrocarbon Contamination

Definition of Paradigm

- a typical example or pattern of something; a model.
- a model of something, or a very clear and typical example of something

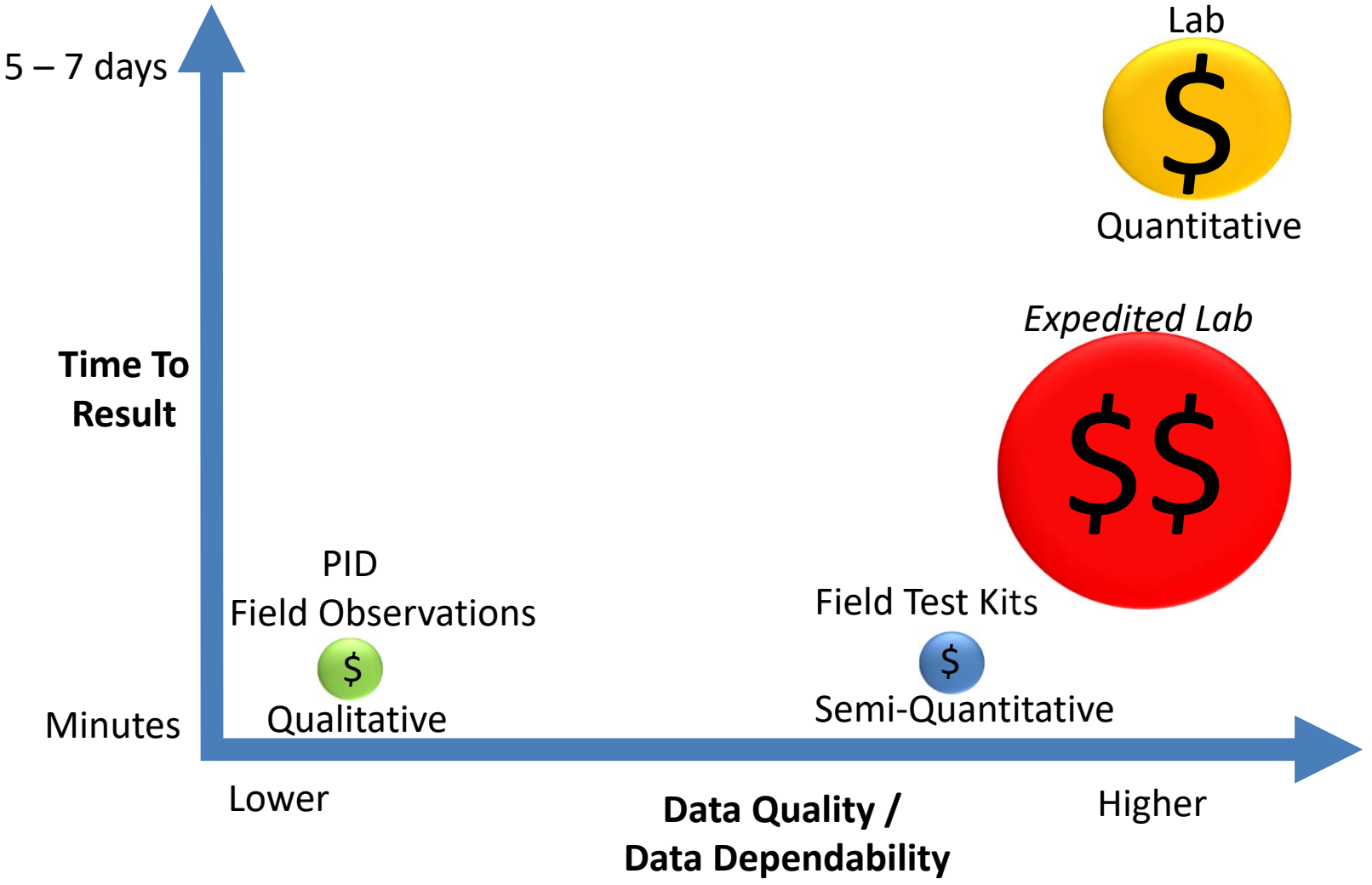
Definition of Paradigm Shift

- a fundamental change in approach or underlying assumptions.
- an important change that happens when the usual way of thinking about or doing something is replaced by a new and different way.

"The New Remediation Paradigm"
Creating A Remediation Paradigm Shift

- The Powerful Combination of Real Time Analysis and Real Time and In-Situ (in place) Remediation
- **Environmental Field Test Kits**
  - Providing Accurate, Fast and Economical Analytical Results
- **Hydrocarbon Eliminator – Chemical Oxidation**
  - Breaking down Hydrocarbon Contamination in Real Time and In-Situ (in place)

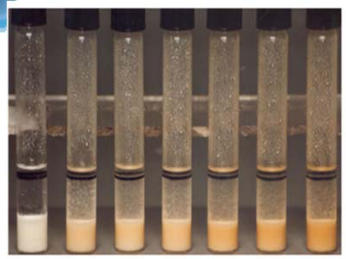
TPH Measurement Tools: Cost-Value Matrix



Summary: Environmental TPH Field Test Kits

Water Kit Soil Kit

The lightweight, rugged and portable TPH Field Test Kits which require little or no training to use.



Technology

This extraction colorimetric test method in these field test kits was discovered in 1986 for identifying the presence of hydrocarbons in soil or water. The method offers a revolutionary solution to obtaining on-site samples that potentially contain petroleum related substances. Field testing is inherently costly, time consuming and, quite often, unreliable. This test kit method is designed to provide a precise color indication of the concentration of petroleum (gasoline, diesel, crude oil, etc) in field samples. **This rapid, accurate method won immediate recognition by the United States Environmental Protection Agency, State Regulatory Agencies throughout the United States and various International Regulatory Agencies around the world.**

*****This field analysis method has been time tested and proven over the last 32 years and is well documented and published by the US EPA.*****

Costs

Very economical:

$1,295 per Test Kit (includes 15 tests)

$375 per Refill Set (includes 15 tests – reduced cost of $25 per test)

Applications and Benefits

- On site Immediate Analysis of Water and Soil Samples for Total Petroleum Hydrocarbons; BTEX, Gasoline, Diesel, PCBs, PAHs, Jet Fuels, Crude Oils, Transformer Oils, Vegetable Oil,
- **4 minutes for Soil and 6 minutes for Water**
- **Found by US EPA and Core of Engineers to be within 10% of a Laboratory Result**
- Crude Oil Spills, Spill Response, Remediation, Monitoring
- US Patent Granted for this method of analysis

Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

TPH Test Kits for Soil & Water

- Self contained kit contains everything to conduct 15 tests including color charts and instructional video.
- Refill sets of replacement reagents of 15 tests can be obtained to restock the test kits easily and quickly.

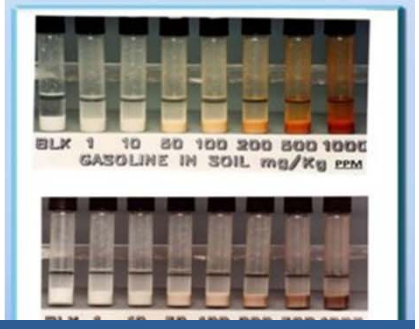
Water Kit

Soil Kit

Kit type		TPH Contamination level
Water		0.1 – 200 PPM
Soil	Low Range	0 – 1000 PPM
	High Range	500 – 50,000 PPM

Advantages of The Method and Kits

- **Accurate Results**
  - results are scaled down in PPM in Soil and PPB in Water; validated by EPA
- **Speed**
  - takes 4-6 min for a result
- **Portability**
  - Lightweight & rugged case can travel in back of truck & not be damaged
- **Easy to use**
  - color is developed in response to the presence of a contaminant and the resulting color is matched to a color chart supplied in the kit
- **Low cost per sample**
  - 15 tests in one kit & 15 tests per refill order
- **Wide range**
  - test for a broad range of petroleum related chemicals



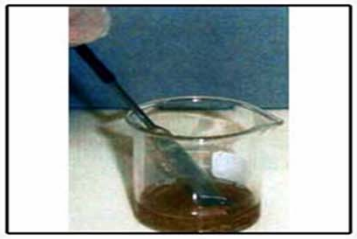
The Robustness of This Method Has Been Tested Over 32 Years

Six easy steps to Screening TPH's in Soil

Rapid, sensitive, positive detection of petroleum in solid samples

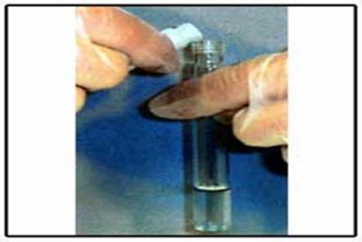
1. Weigh sample into tared beaker

2. Snap ampoule, add solvent

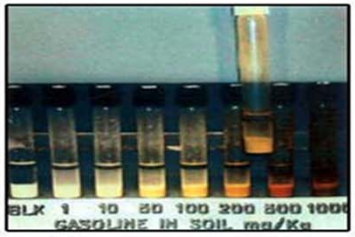


3. Stir. Mix well

4. Pour solvent into test tube.



5. Add catalyst, cap, shake.

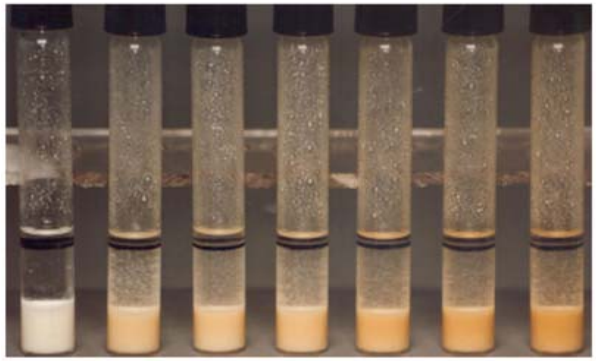


6. Compare with standard photo.

Soil Analysis in 4 Minutes!

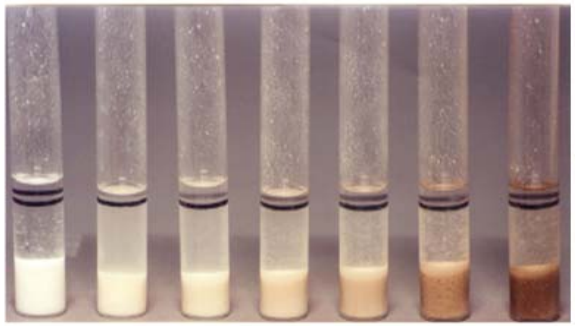
Sample Soil Calibration Photos:

The Kits Contain A Large Number of Calibration Photos (Library)



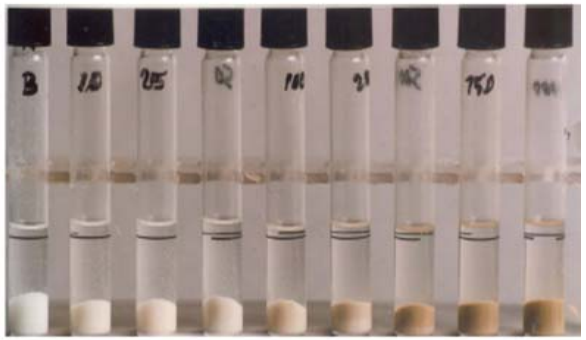
BLK 40 50 60 80 100 120

GASOLINE in Soil mg/Kg



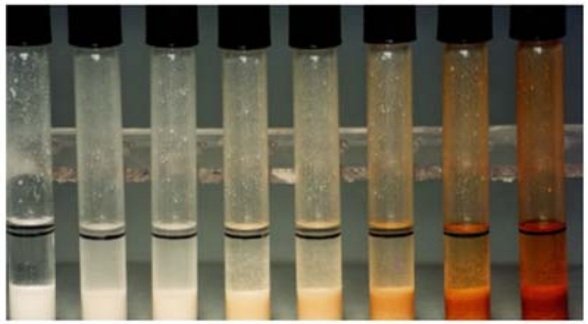
BLK 10 50 100 200 500 1000

WASTE OIL IN SOIL mg/Kg



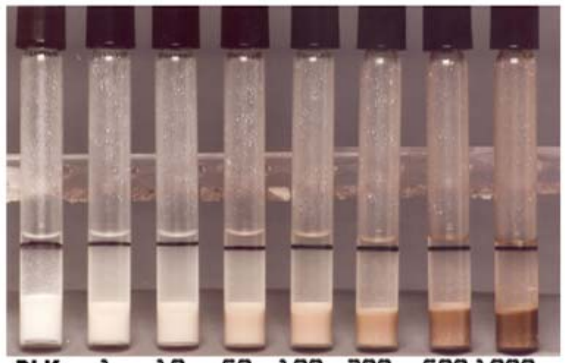
BLK 10 25 50 100 250 500 750 1000

WEST TEXAS CRUDE OIL IN SOIL mg/Kg



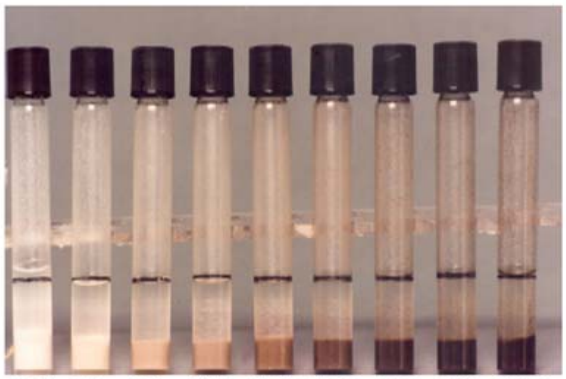
BLK 1 10 50 100 200 500 1000

GASOLINE in Soil mg/Kg



BLK 1 10 50 100 200 500 1000

DIESEL IN SOIL mg/Kg

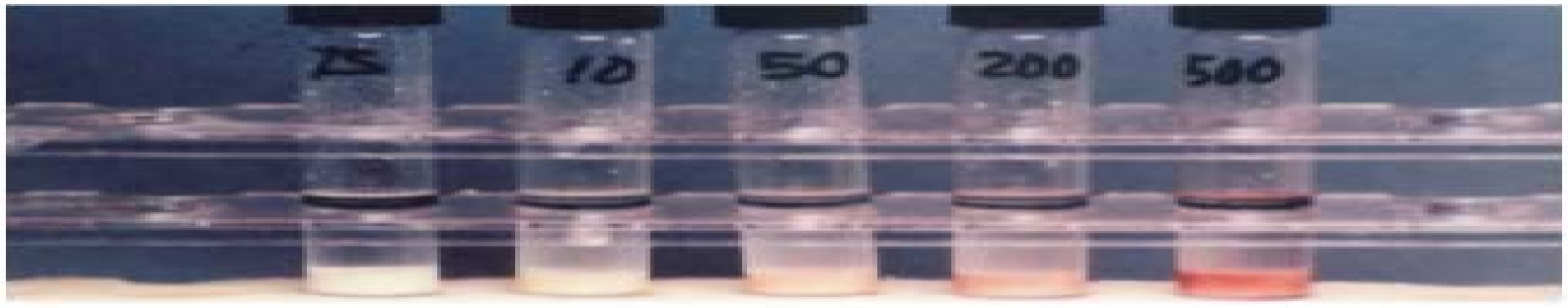


BLK 10 50 100 200 400 600 800 1000

VALDEZ CRUDE OIL IN SOIL mg/Kg

PCBs Are Such A Big Concern
Note Very Distinct Peach Color

Below Are The Calibrations for Two of The Most Commonly Found PCBs. PCBs in general all produce this very district Peach color, so there distinct detection is easily recognized.



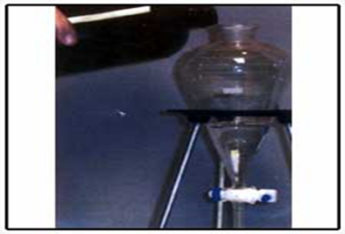
BLK 10 50 200 500
AROCHLOR 1248 IN SOIL mg/Kg

BLK 10 50 200 500
AROCHLOR 1016 IN SOIL mg/Kg

Similarly, Water Analysis in 5 – 6 minutes

5Minute Testing for TPH's in Water

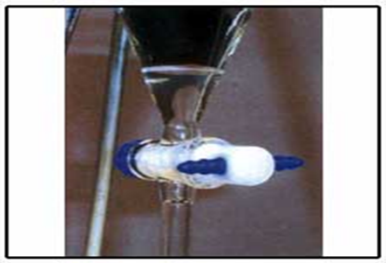
Eficiently and accurately screen dissolved organics, DNAPLS, etc



1. Pour water sample into separatory funnel.

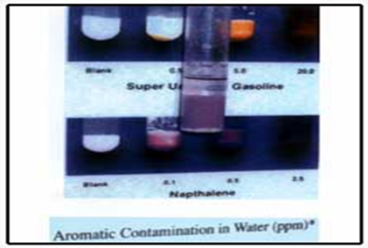
2. Pour solvent in sample.

3. Swirl separatory funnel to extract



4. Let layers separate.

5. Drain solvent into test tube.

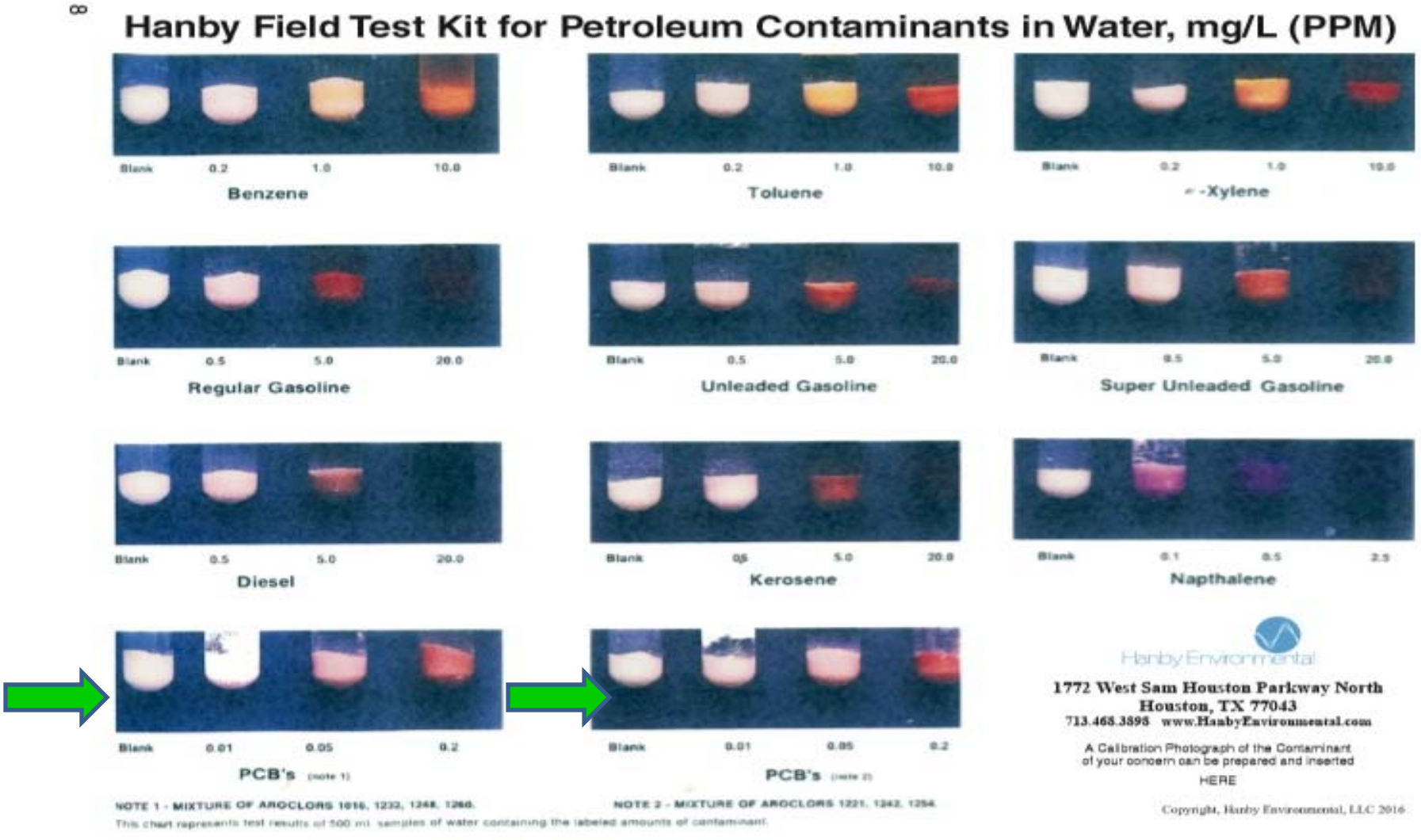


6. Add catalyst, shake, compare.

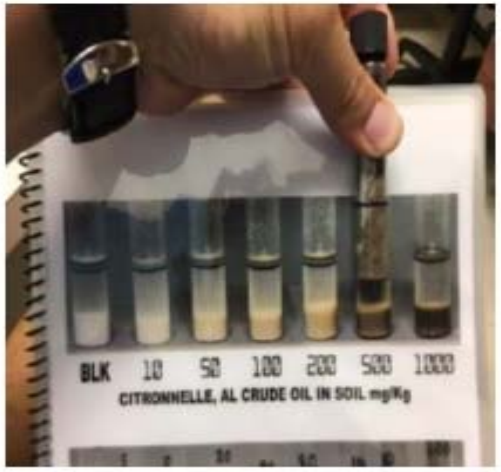
Similar Water Calibration Photos:

A Large Collection of Calibration Photos (Library)

Similarly PCBs Are Detected in Water



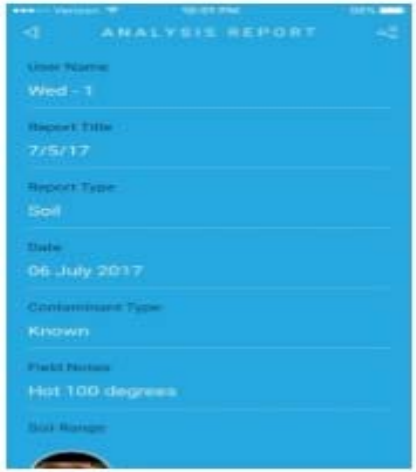
Mobile App Screen Examples



Preliminary Judgement

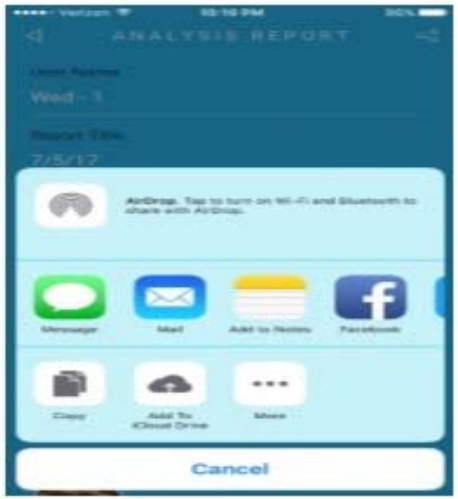
Sample Result

Login Choice

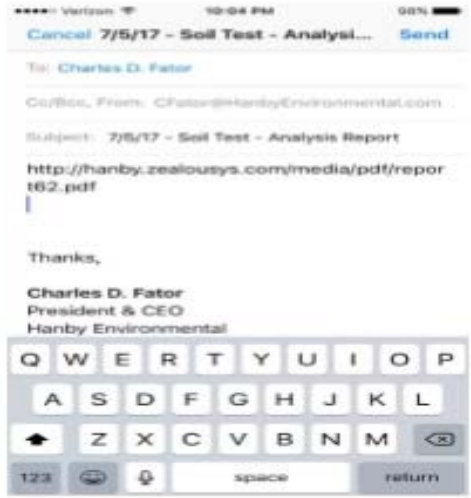


Analysis Details 1

Analysis Details 2



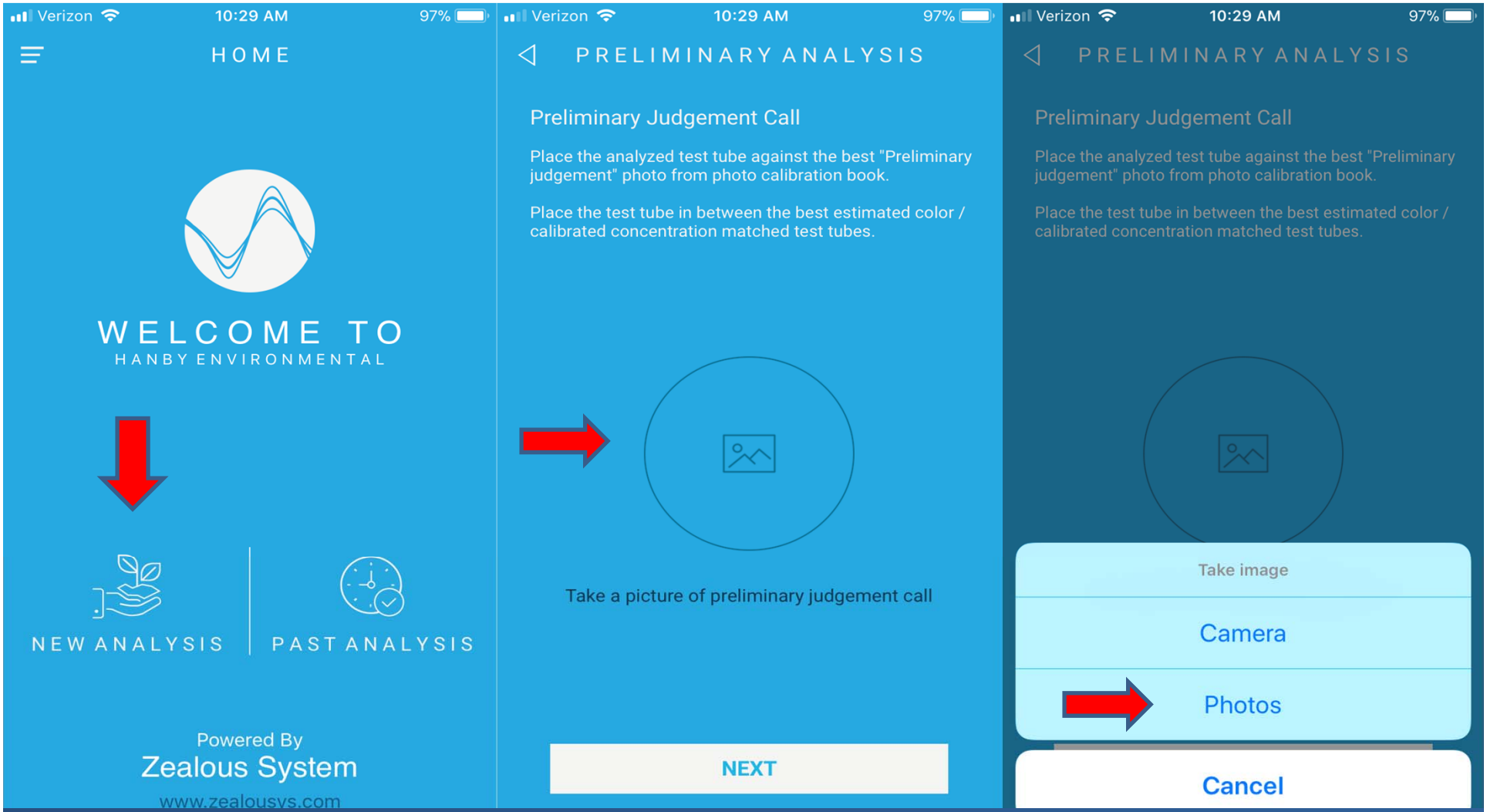
Report Sharing Options



Email Share Report

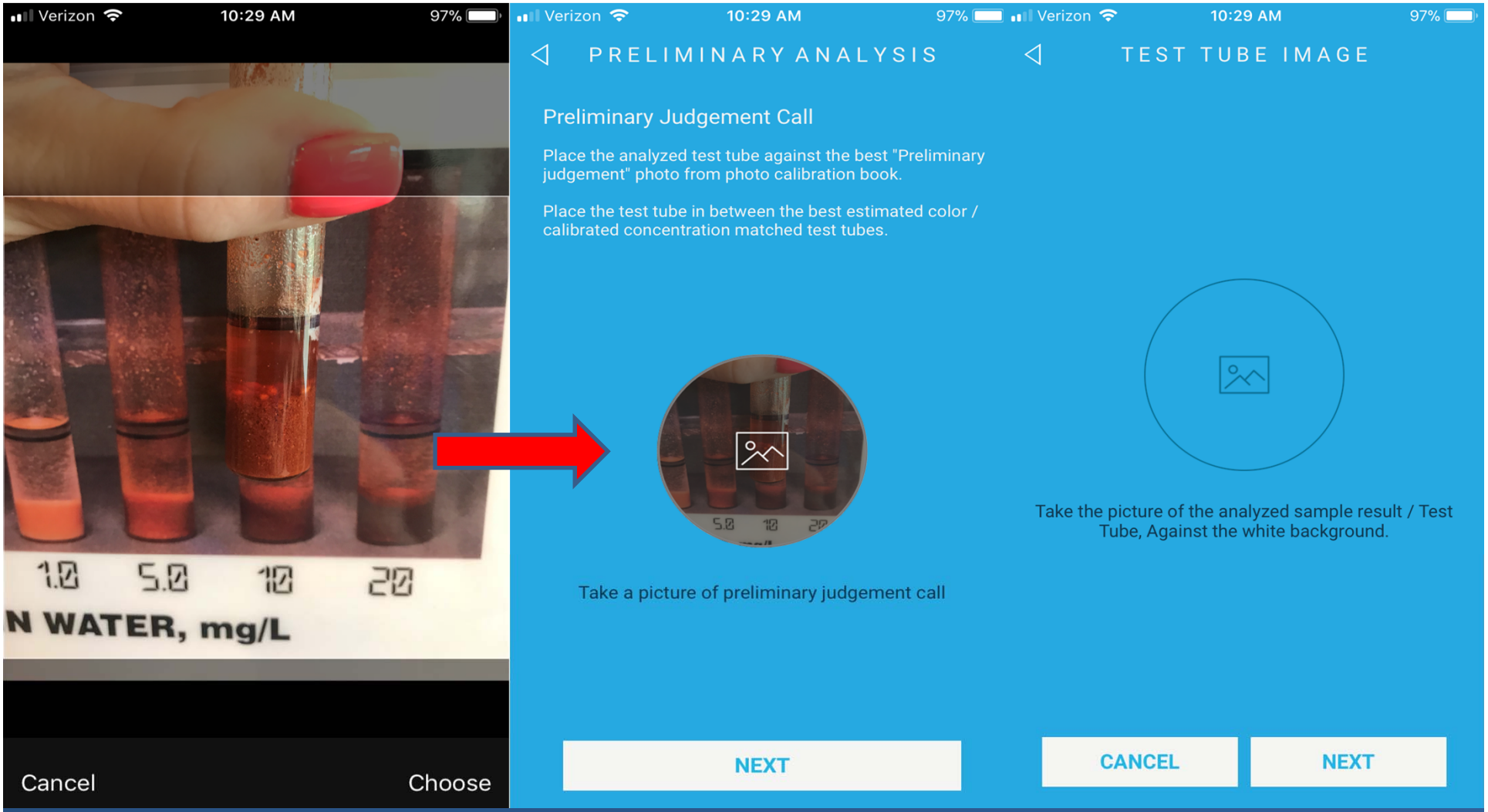
Email Report Received

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



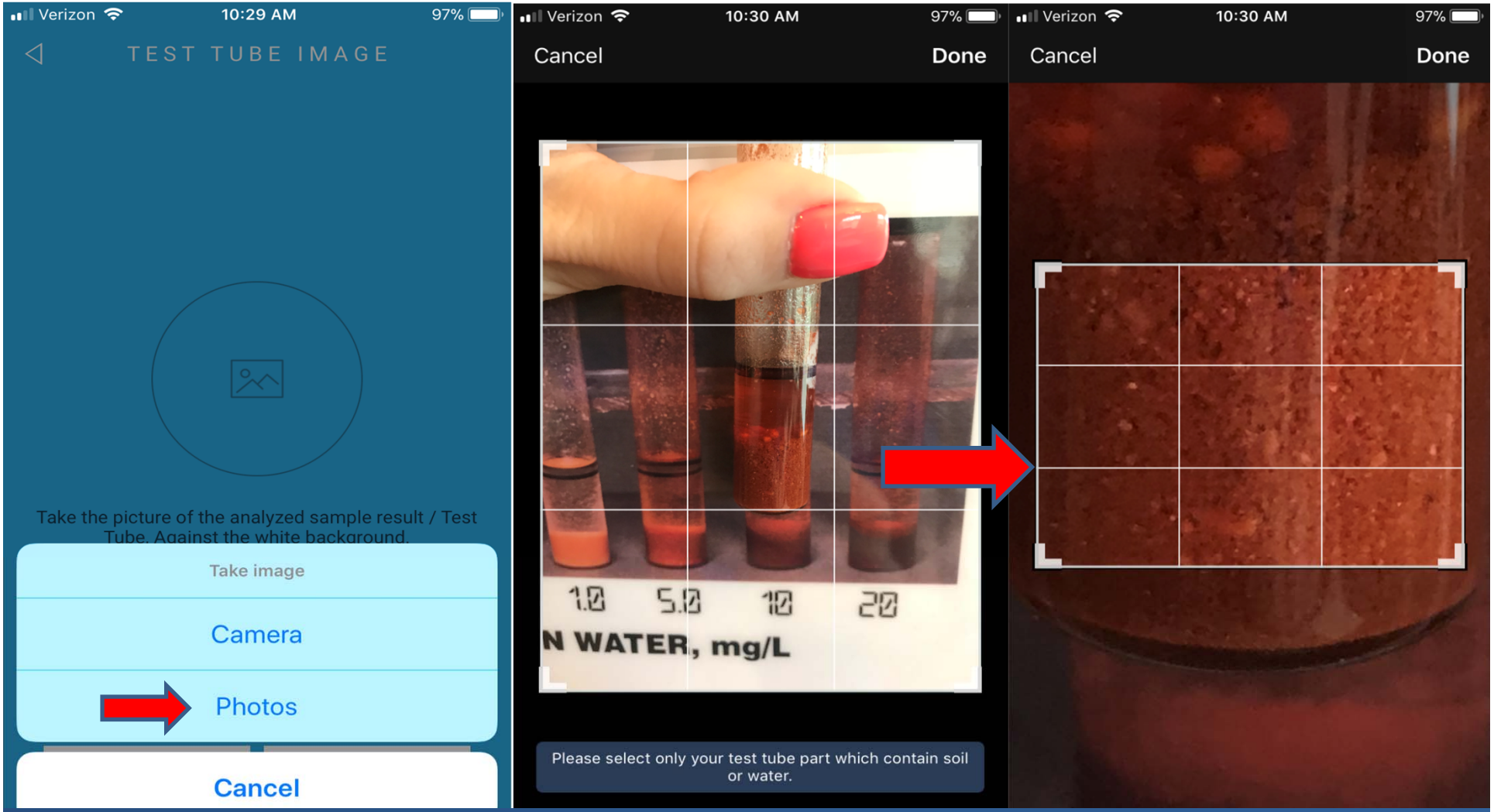
Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



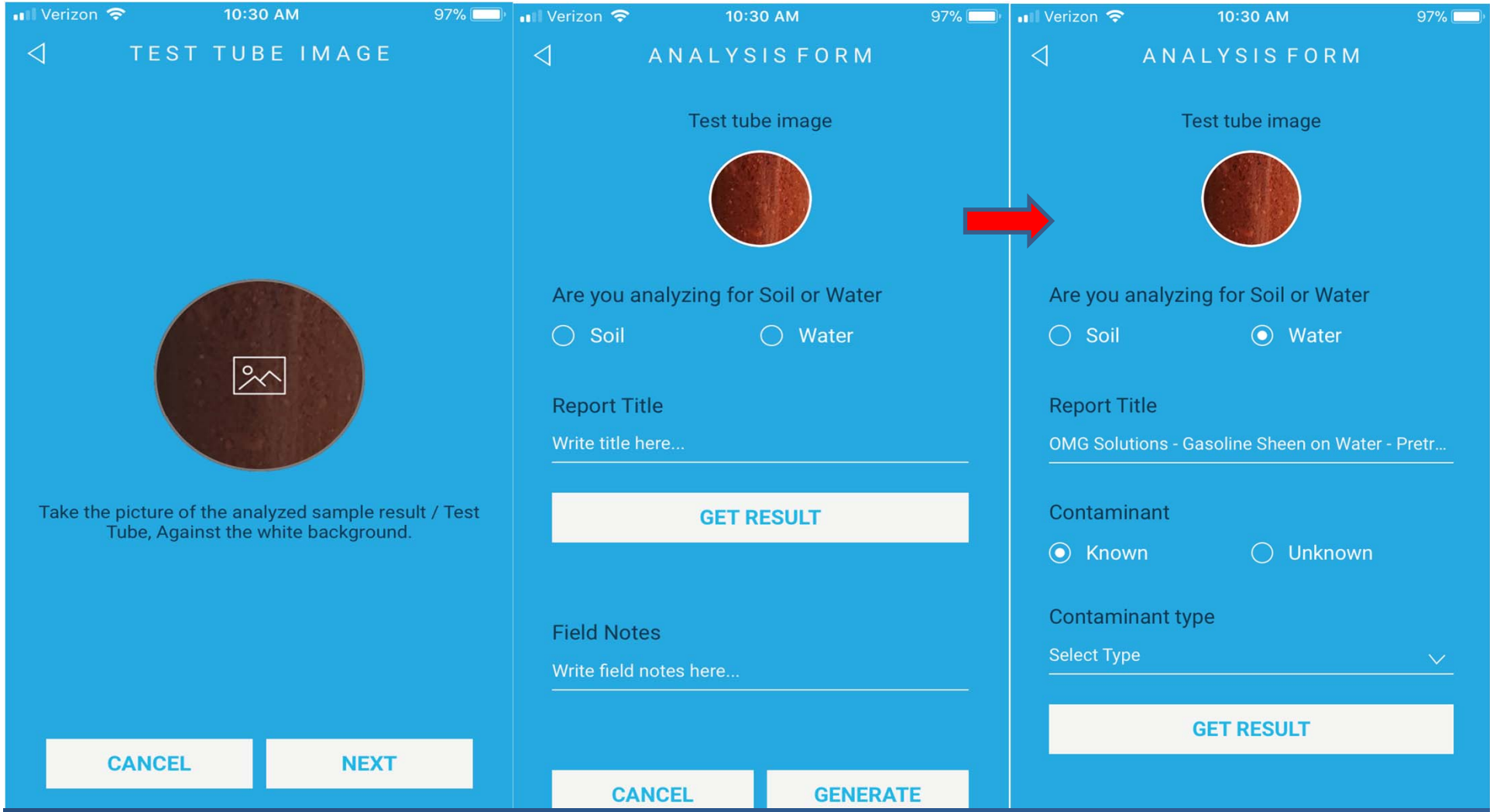
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



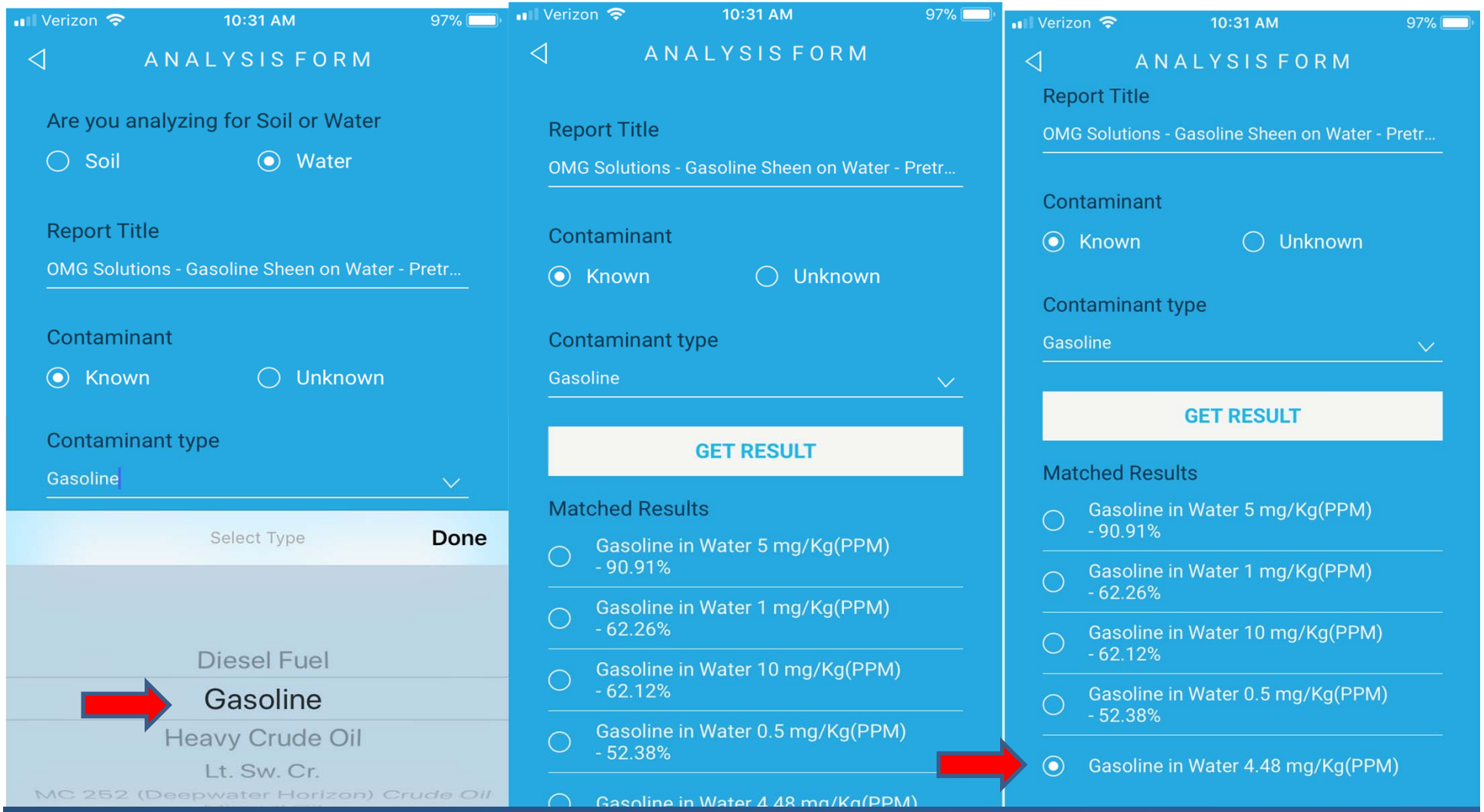
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



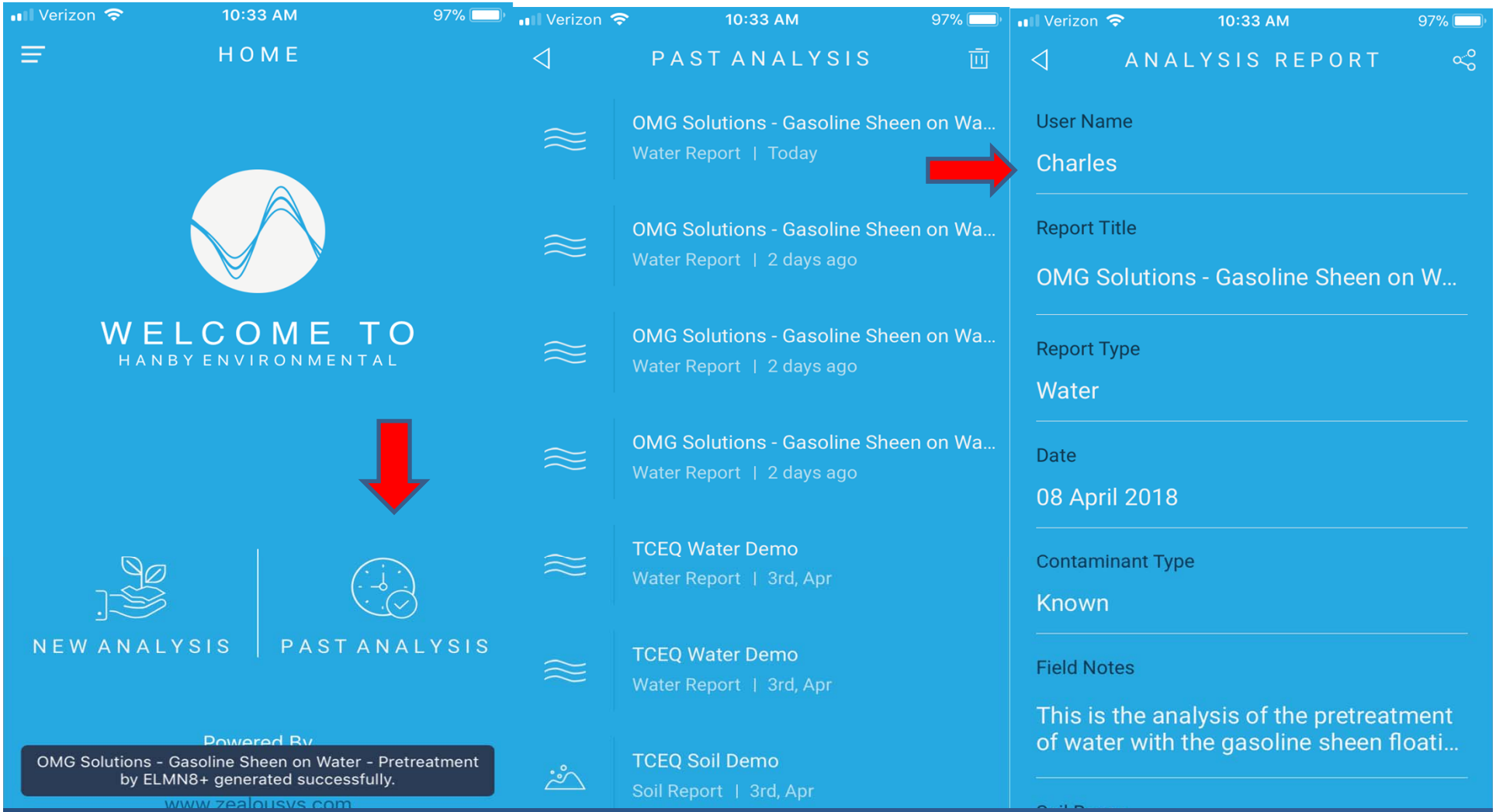
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



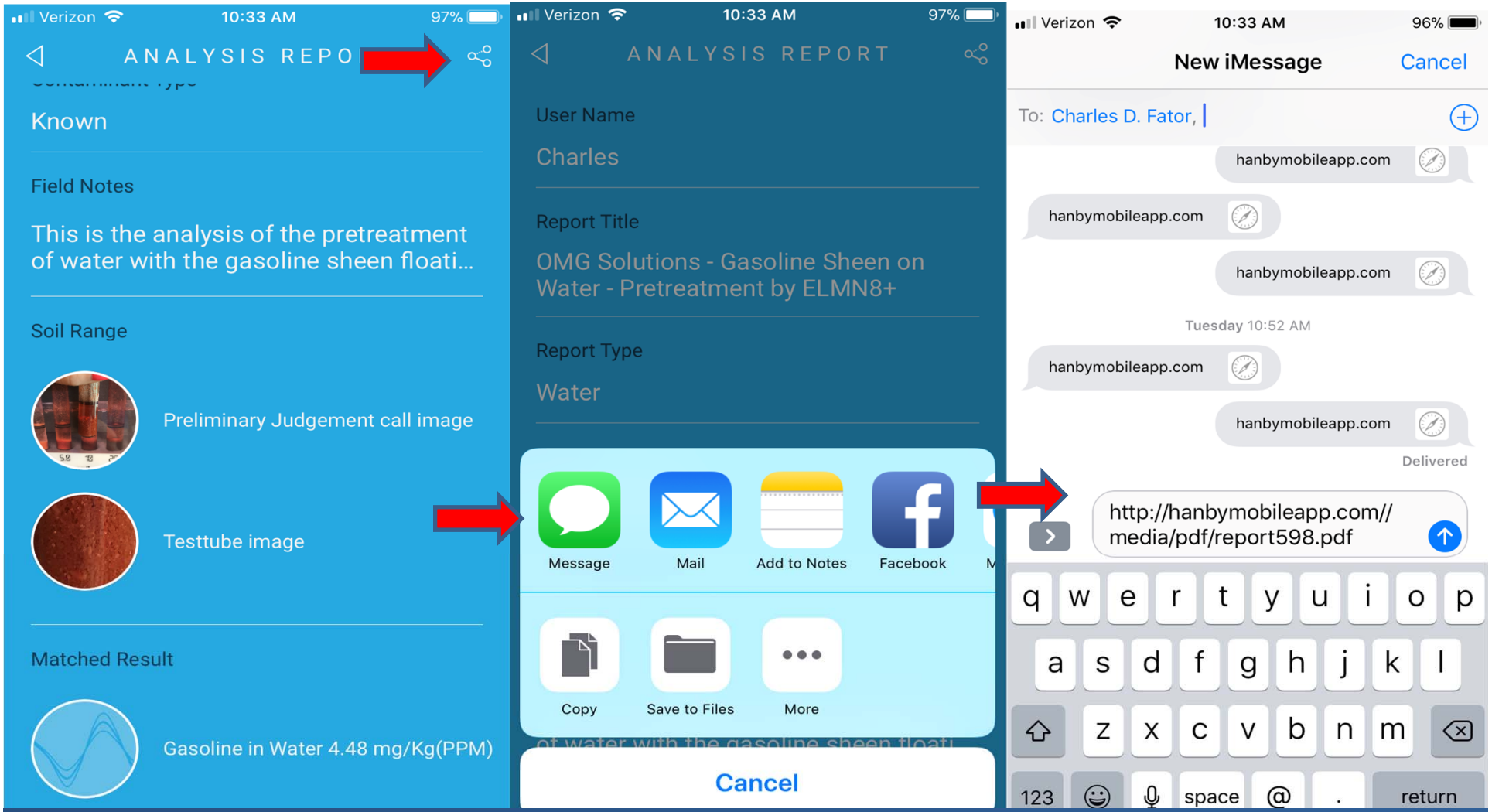
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



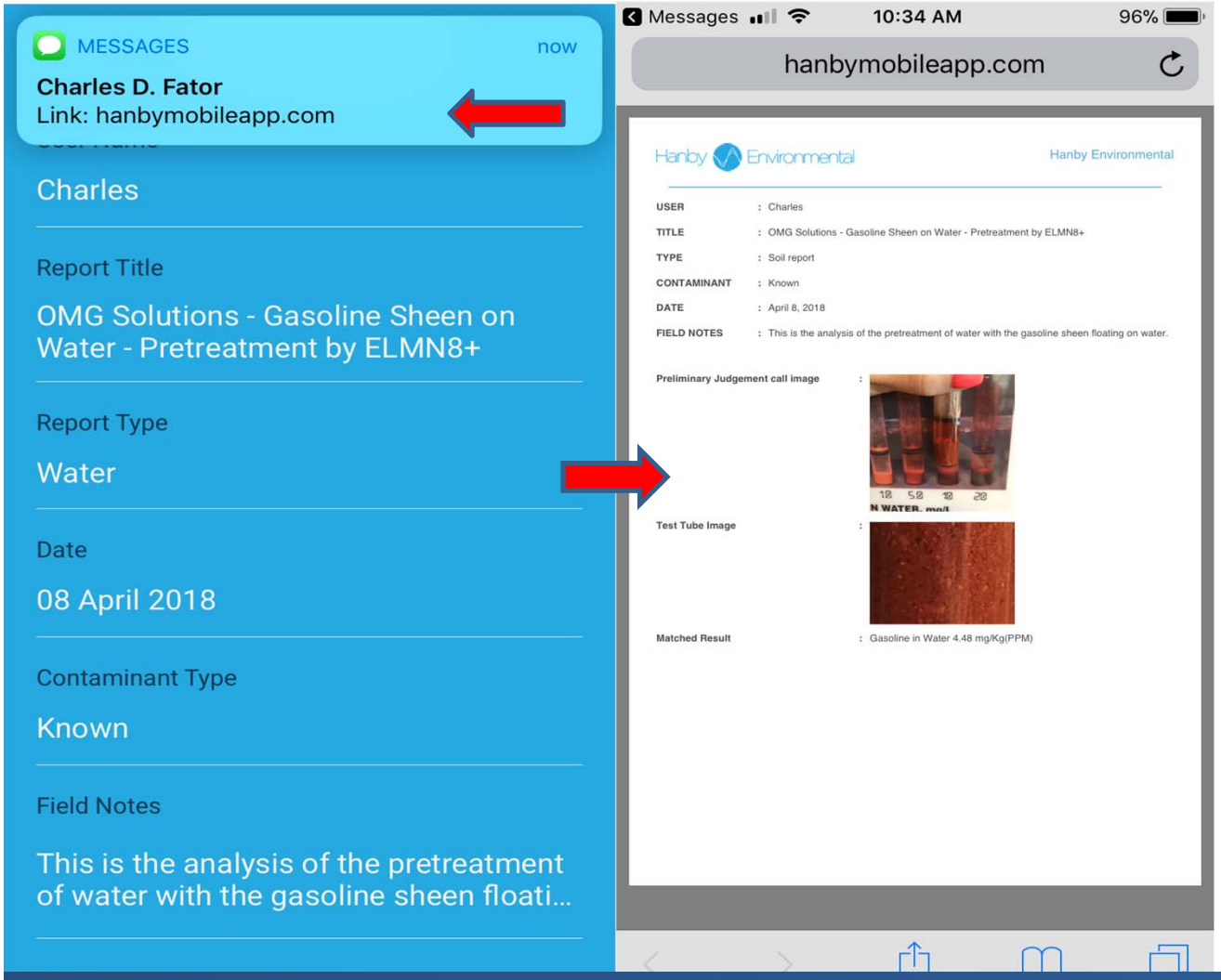
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



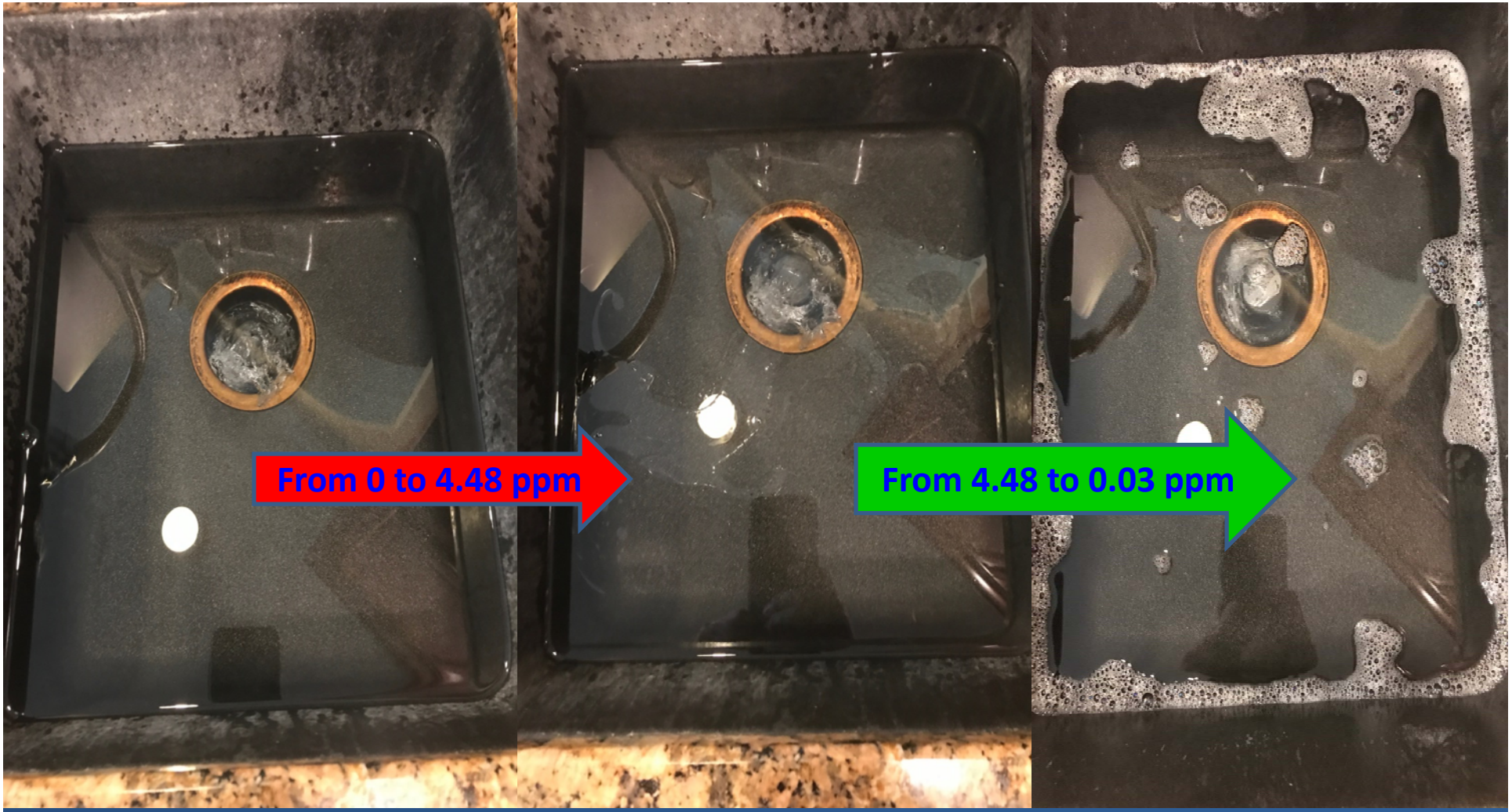
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Walk Thru Mobile App With Real Example Water with Gasoline Sheen



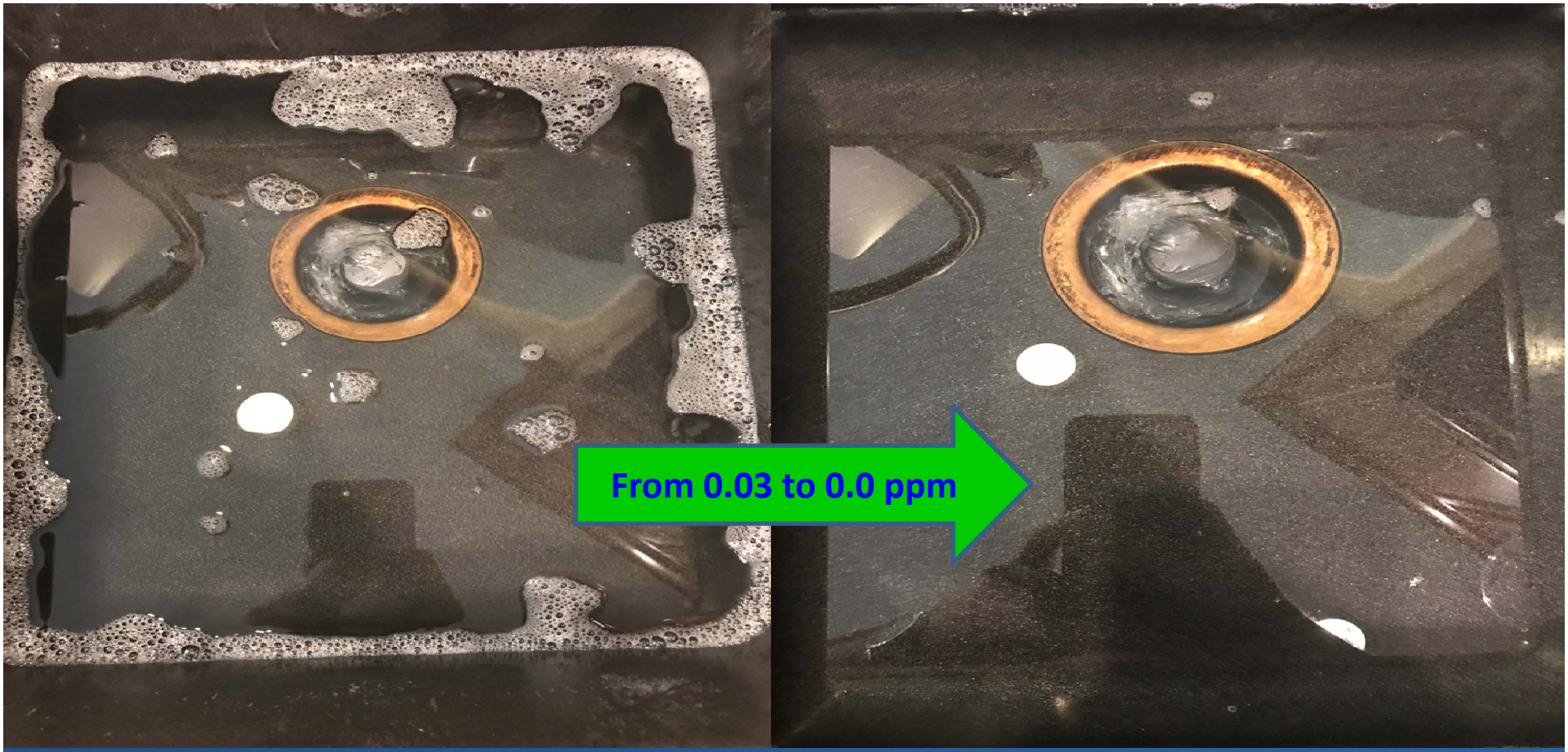
Water With Gasoline Sheen

Pre / Post Treatment by Chemical Oxidation



Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Water With Gasoline Sheen
Pre / Post Treatment by Chemical Oxidation
(90 Minutes Elapsed)



Walk Thru Mobile App With Real Example
Water with Gasoline Sheen Pre / Post Treatment by Chemcial Oxidation Immediate and 90 Minutes Elapsed

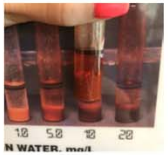
Messages 10:56 AM 96%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Gasoline Sheen on Water - Pretreatment by ELMN8+
TYPE : Soil report
CONTAMINANT : Known
DATE : April 8, 2018
FIELD NOTES : This is the analysis of the pretreatment of water with the gasoline sheen floating on water.

Preliminary Judgement call image :



Test Tube Image :

Matched Result : Gasoline in Water 4.48 mg/Kg(PPM)

4.48 ppm

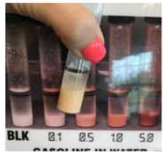
Messages 10:56 AM 96%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Gasoline Sheen on Water - Post Treatment by ELMN8+
TYPE : Soil report
CONTAMINANT : Known
DATE : April 8, 2018
FIELD NOTES : This is the analysis of the immediate post treatment of water with gasoline floating sheen.

Preliminary Judgement call image :



Test Tube Image :

Matched Result : Gasoline in Water 0.03 mg/Kg(PPM)

0.03 ppm

Messages 10:56 AM 96%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Gasoline Sheen on Water - Post Treatment by ELMN8+ - 90 Minute Elapsed
TYPE : Soil report
CONTAMINANT : Known
DATE : April 8, 2018
FIELD NOTES : This is the analysis of the post treated water wth the sheen after 90 minutes.

Preliminary Judgement call image :

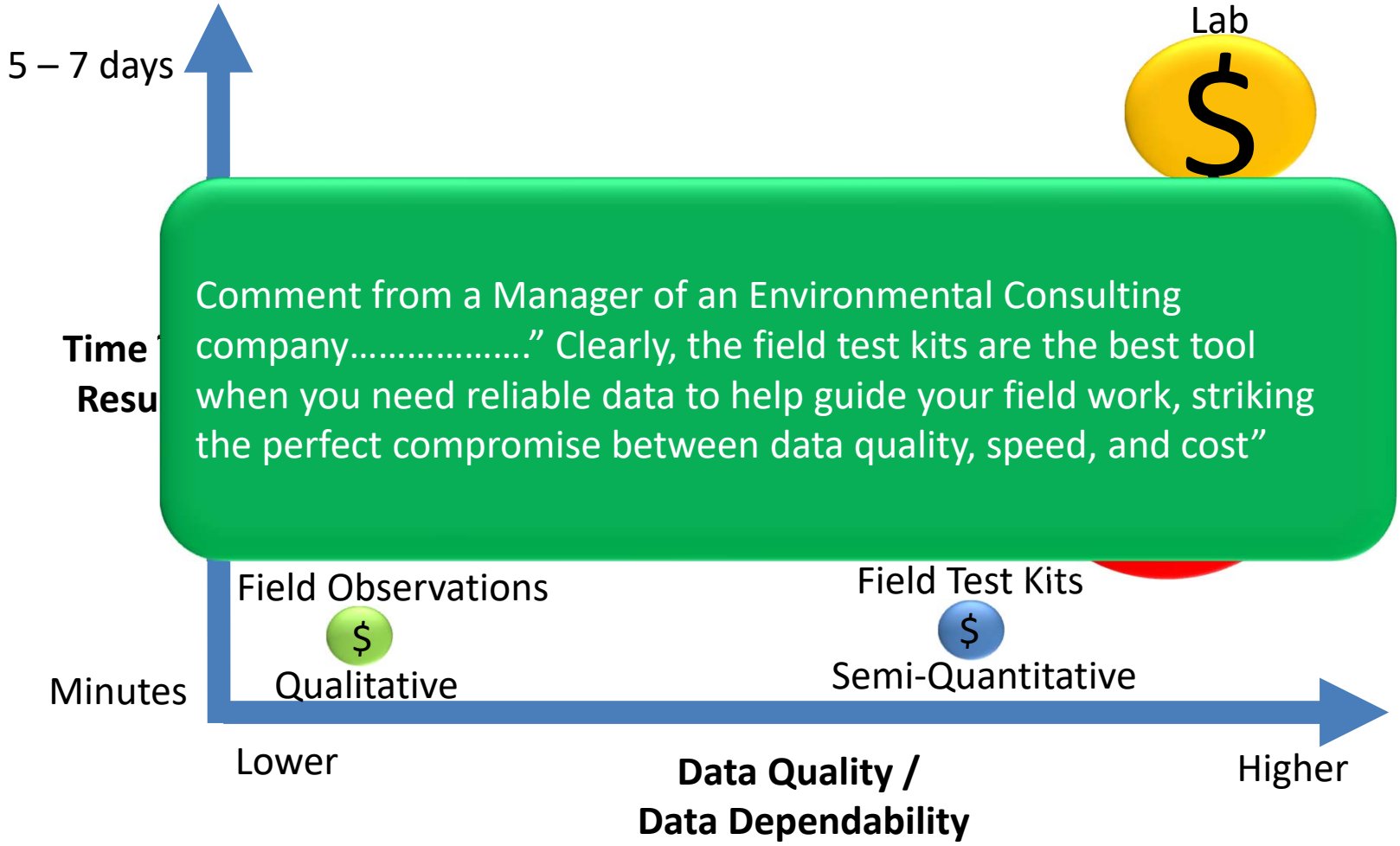
Test Tube Image :

Matched Result : Gasoline in Water 0.0 mg/Kg(PPM)

0.0 ppm

http://hanbymobileapp.com//media/pdf/report598.pdf
http://hanbymobileapp.com//media/pdf/report599.pdf
http://hanbymobileapp.com//media/pdf/report600.pdf

Cost-Value Matrix……..Final Words



Similar to Measurement Options, There Are Remediation Options

- Each Option Has Challenges Associated With Its Selection

- Dig and Haul – Time Consuming and Expensive
  - Still Have Waste, Relocating The Problem

- Enzymes and/or Microbos – Take A Long Time to Work and Can Be Weather Sensitive

A New In-Situ (in place) Remediation Option

- A New Chemical Oxidation Option
- Non-Hazardous and Non-Toxic
- Can Be Applied to Surface with Immediate Results and Tilled to Assure Contact With Contaminations
- Injection or Migration Methods Effective
- Saves On Average 60% Over Dig and Haul
- No Enzymes or Microbes, Thus No Shelf Life
- Not Weather Sensitive
- By-Products: Water, Carbon Dioxide and Dust

Similar to The Test Kits Detection, This Chemical Oxidation Solution Treats A Wide Range Petroleum Contaminants

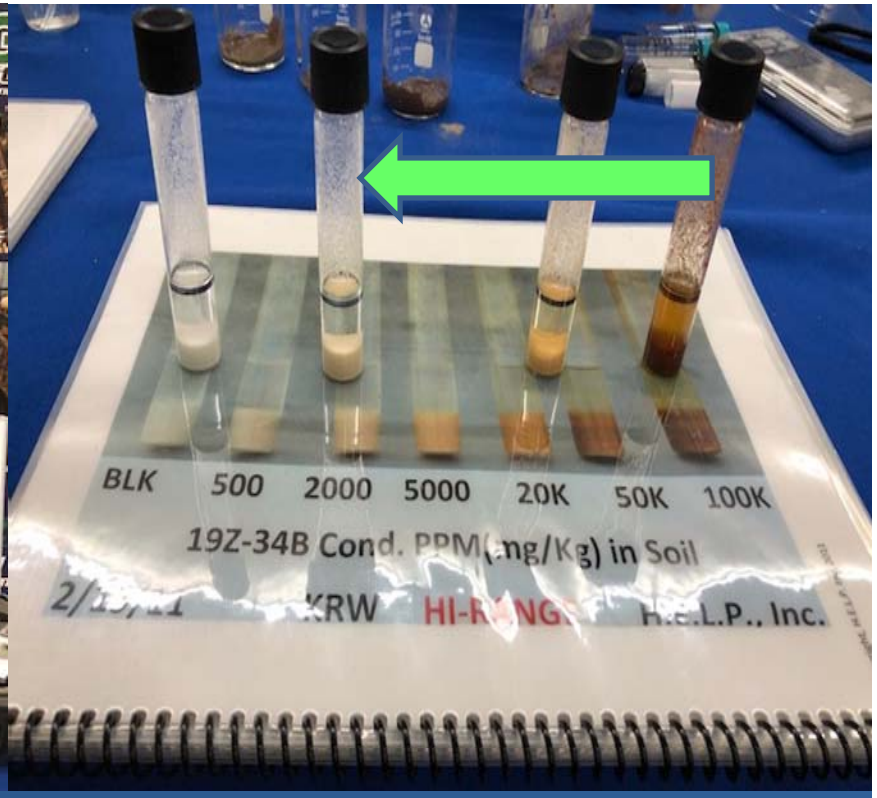
- TPH, Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- Diesel Fuel, Gasoline, Jet Fuel
- Pesticides
- Mineral and Vegetable Oils
- Transmission and Dielectric Fuels and more.

The New Remediation Paradigm

- The Combined Use of The TPH Field Test Kits and The Chemical Oxidation Solution
- Test Kits Provide The Immediate Feedback of Beginning Concentration and Monitors The Remediation Progress
- The Solution Immediately Eliminates The Hydrocarbon Contamination

Typical Soil Test Results:

Clean Soil, Contaminated Soil to 125.5k ppm,
Reduced to 24.4k ppm,
Reduced to 1.1k ppm by Two Treatments



Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Soil Treatment Validation Results Per Mobile App:

125.5k, 24.4k and 1.1k ppm

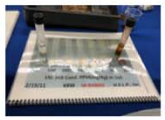
Messages 2:07 PM 100%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER	: Charles
TITLE	: EUEC Soil Demo Pretreatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: March 5, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 125510.2 mg/Kg(PPM)

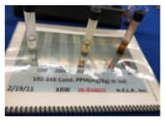
Messages 2:09 PM 100%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER	: Charles
TITLE	: EUEC Soil Demo Post First Treatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: March 5, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 24375.0 mg/Kg(PPM)

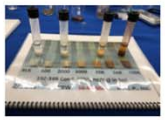
Messages 2:09 PM 100%

hanbymobileapp.com

Hanby Environmental — Hanby Environmental

USER	: Charles
TITLE	: EUEC Soil Demo Post Second Treatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: March 5, 2018
FIELD NOTES	:

Preliminary Judgement call image :

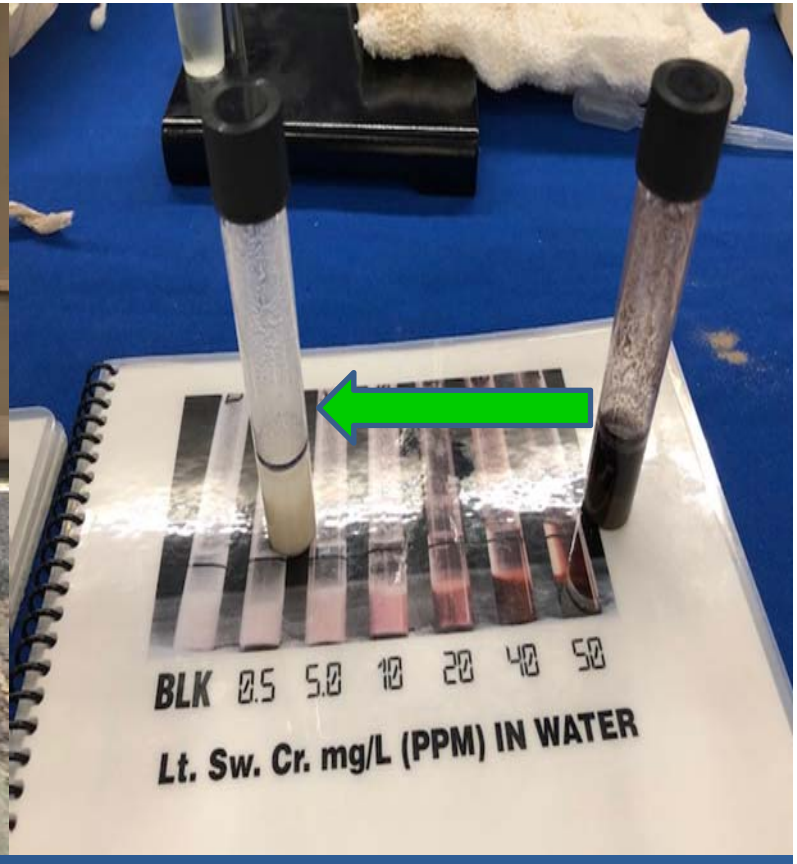


Test Tube Image :

Matched Result : 19Z_34B cond in Soil 1100.0 mg/Kg(PPM)

Typical Water Test Results:

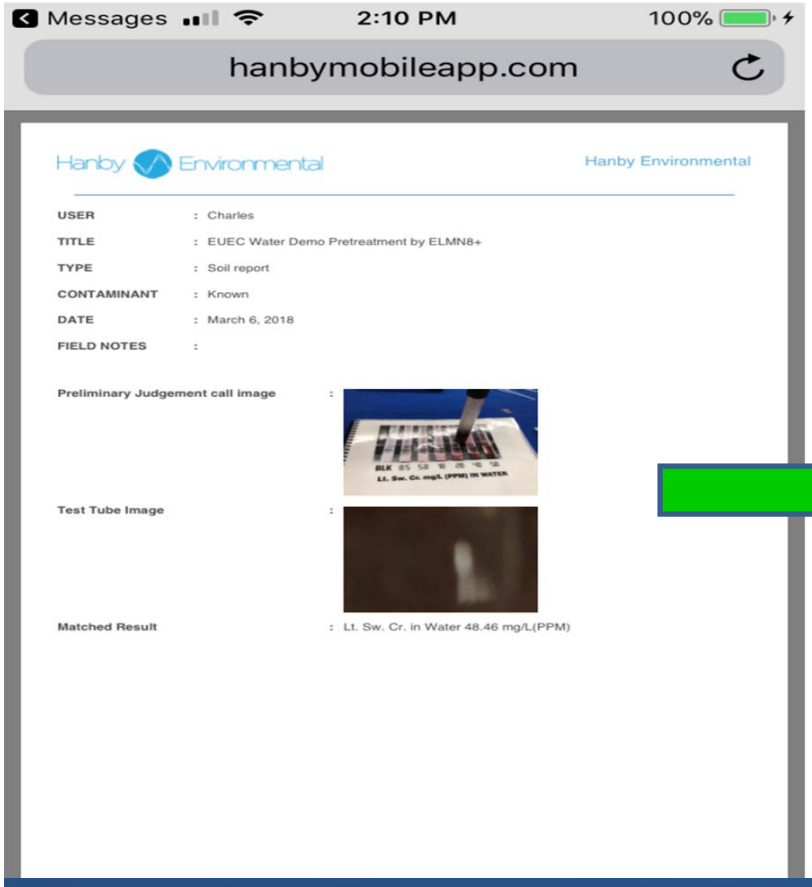
Clean Water, Contaminated Water to 48.5 ppm, Reduced to 7.7 ppm by One Treatment

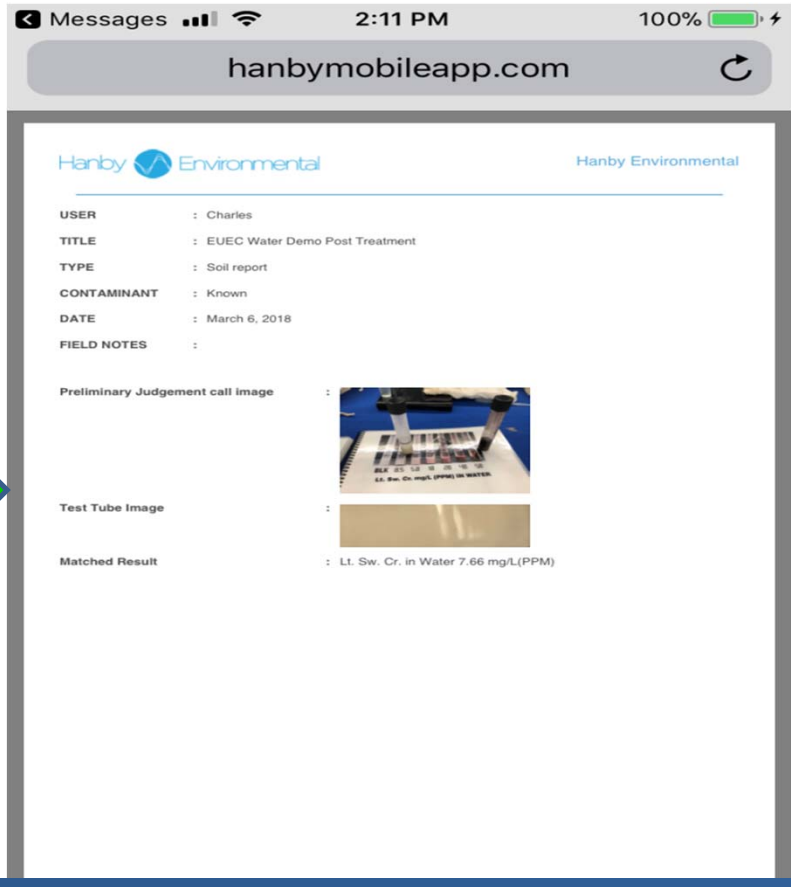


Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Water Treatment Validation Results Per Mobile App:

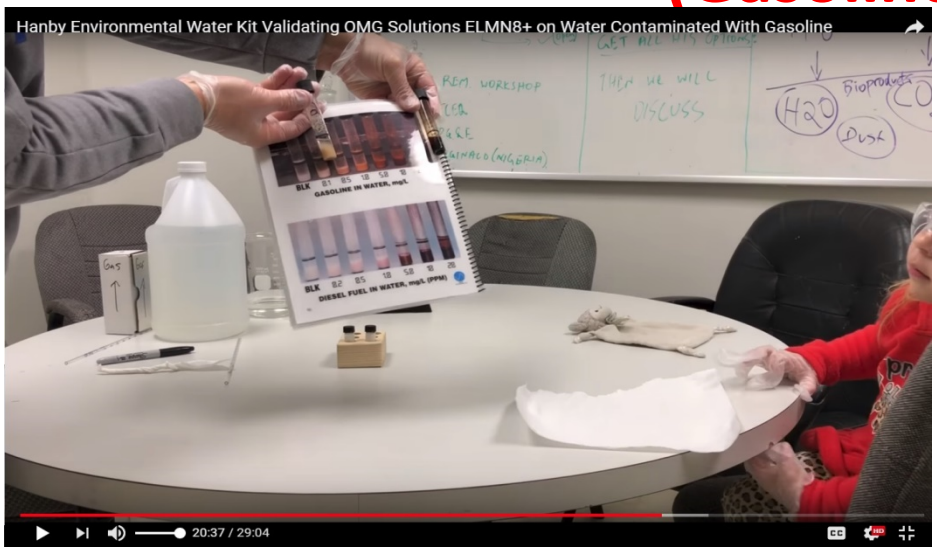
48.5 and 7.7 ppm

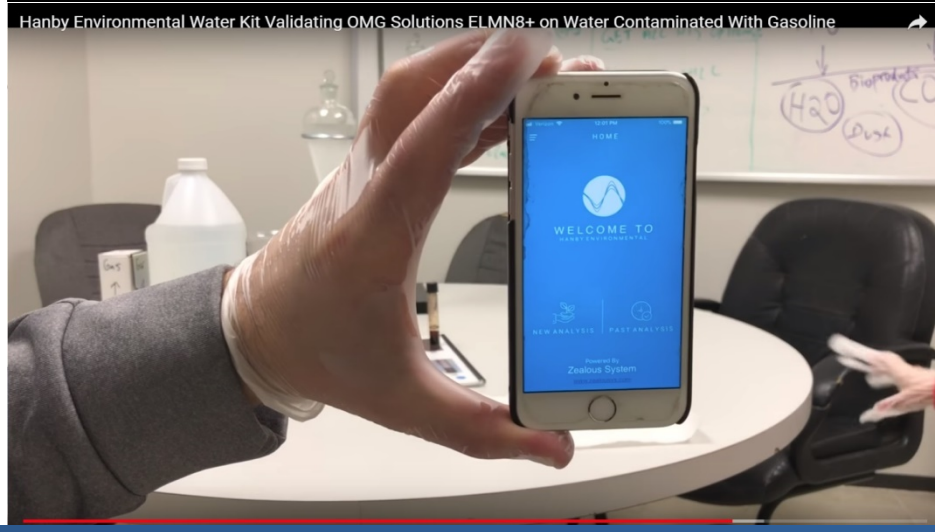




Validation Test of The Solution

(Gasoline in Water)

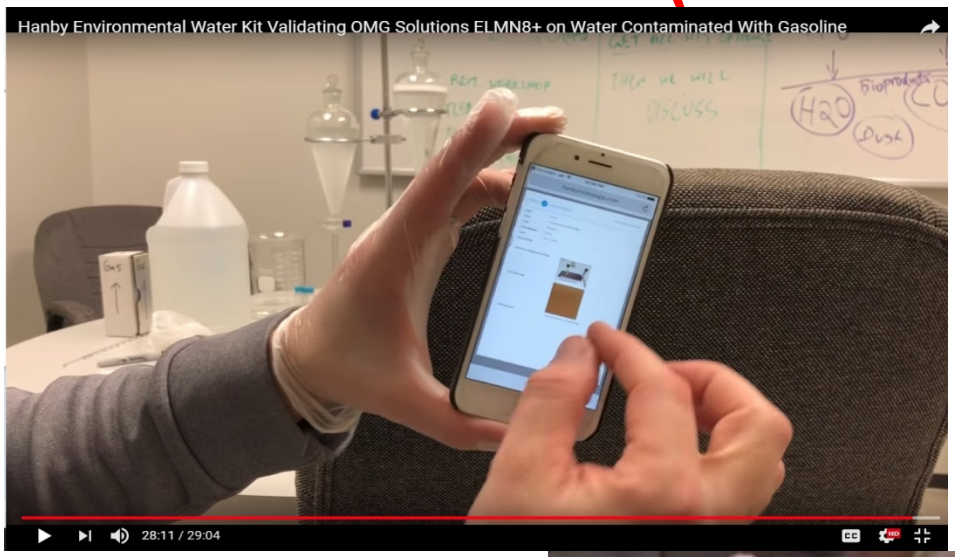


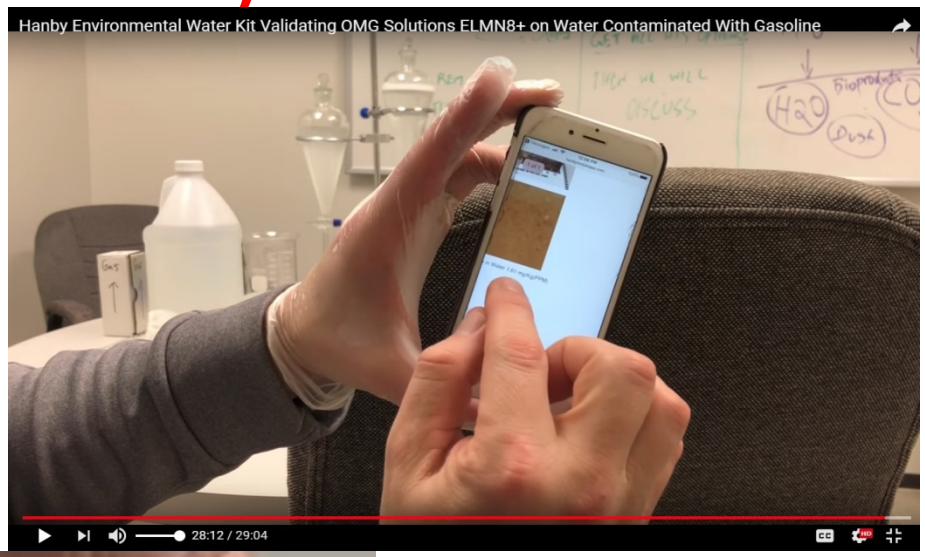


Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Validation Test of The Solution

(Gasoline in Water)





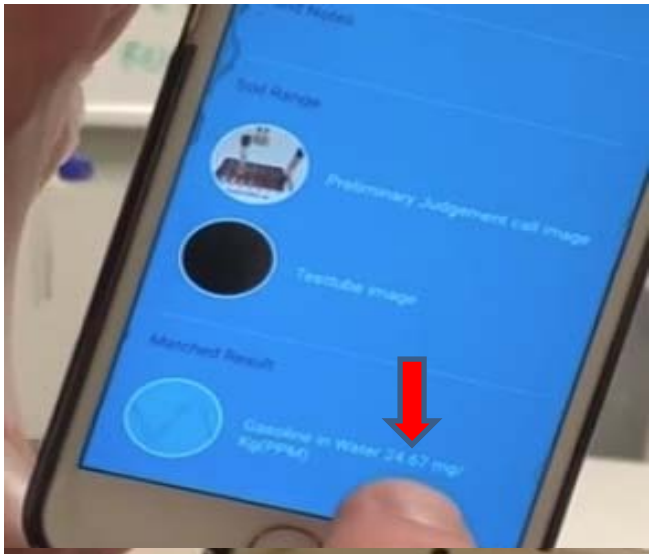
Reduced to 1.61 ppm

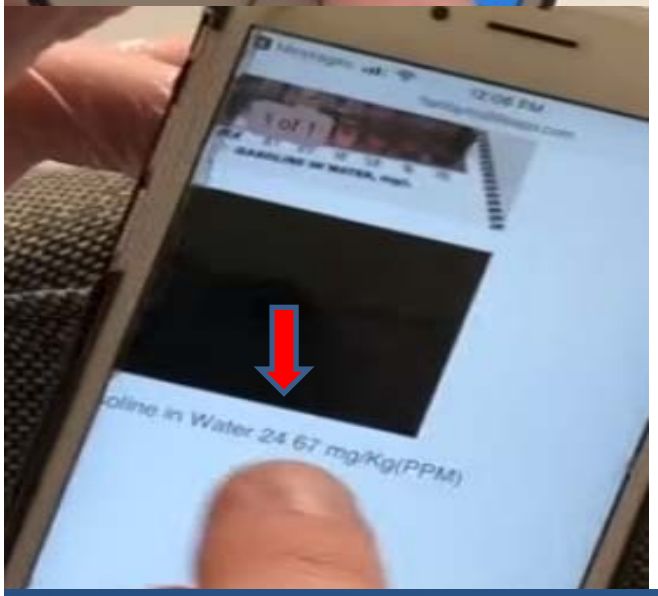
24.67 ppm

Introduction to The New Remediation Paradigm
NEMC 2018 – August 8, 2018 - New Orleans, LA
By Charles D. Fator of Hanby Environmental and Randy Cook and Jessica Innocenti of OMG Solutions

Validation Test of The Solution

(Gasoline in Water)



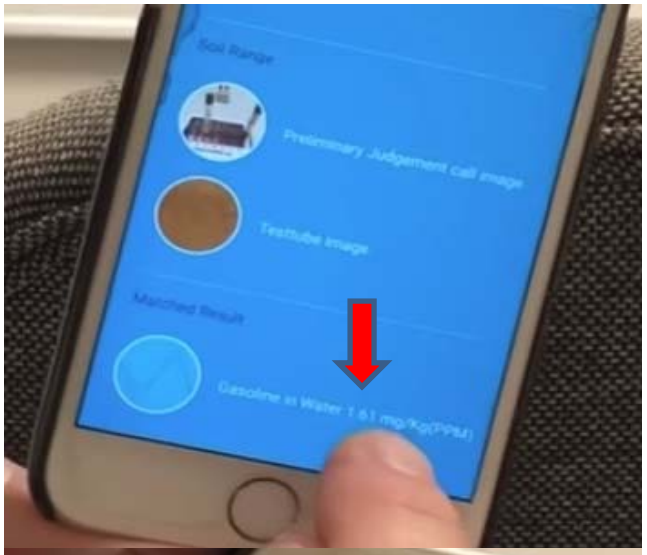


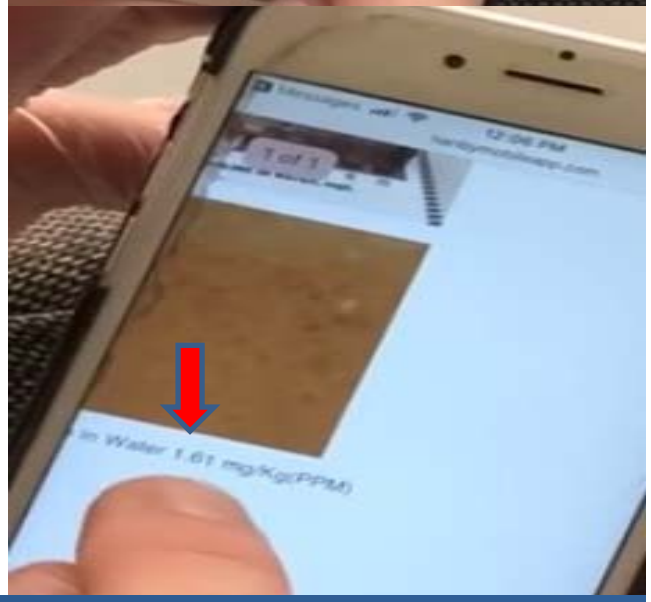
Results Reflected:

From 24.67 ppm

Reduced to 1.61 ppm

By One Treatment of ELMN8+





ConEdison Blind Samples Demo

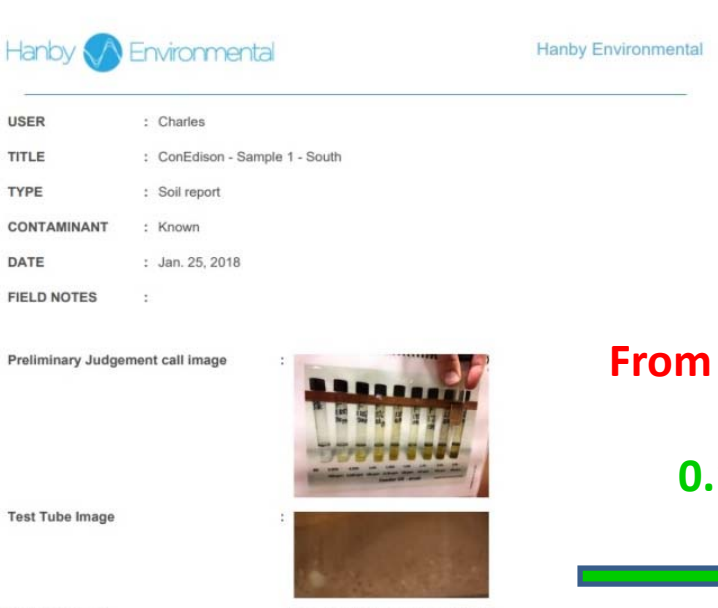
Performed by Hanby Environmental and OMG Solutions on ConEdison provided blind samples.

ConEdison is the largest Power Provider in New Jersey and New York.

To summarize the results reflected in the pictures below are supported by the links to the reports generated by the recently released Hanby Mobile Application is as follows:

Soil Sample 1 - South had a beginning contamination level of 2.3% or 23k ppm reduced to 0.15% or 1.5k ppm after a single application of OMG's product ELMN8.

Pretreatment: http://hanbymobileapp.com//media/pdf/report211.pdf
Post treatment: http://hanbymobileapp.com//media/pdf/report212.pdf


Hanby Environmental

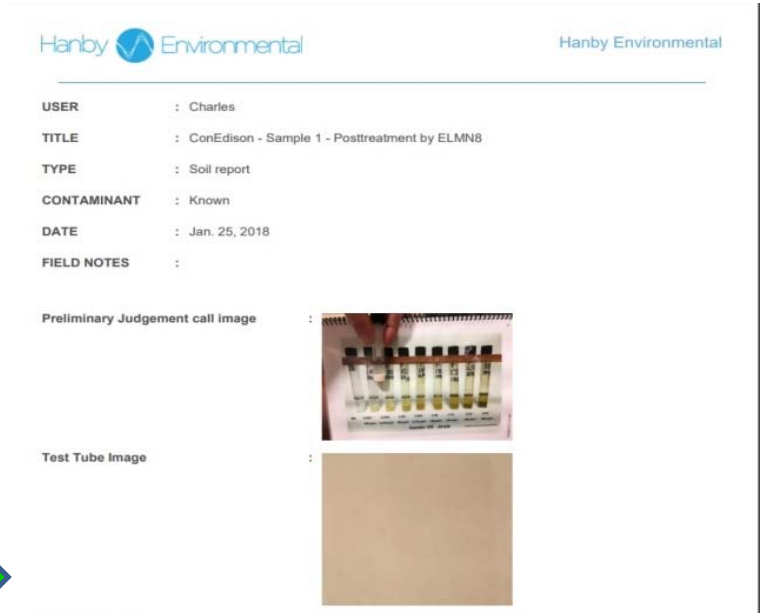
Hanby Environmental

USER : Charles
TITLE : ConEdison - Sample 1 - South
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 25, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

From 2.31% or 23.1k ppm
To
0.15% or 1.5k ppm


Hanby Environmental

Hanby Environmental

USER : Charles
TITLE : ConEdison - Sample 1 - Posttreatment by ELMN8
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 25, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

ConEdison Blind Samples Demo

Performed by Hanby Environmental and OMG Solutions on ConEdison provided blind samples.

ConEdison is the largest Power Provider in New Jersey and New York.

To summarize the results reflected in the pictures below are supported by the links to the reports generated by the recently released Hanby Mobile Application is as follows:

Soil Sample 2 - North had a beginning contamination level of 1.86% or 18.6k ppm reduced to 0.1% or 1k ppm after a single application of OMG's product ELMN8.

Pretreatment: http://hanbymobileapp.com//media/pdf/report213.pdf
Post treatment: http://hanbymobileapp.com//media/pdf/report214.pdf


Hanby Environmental

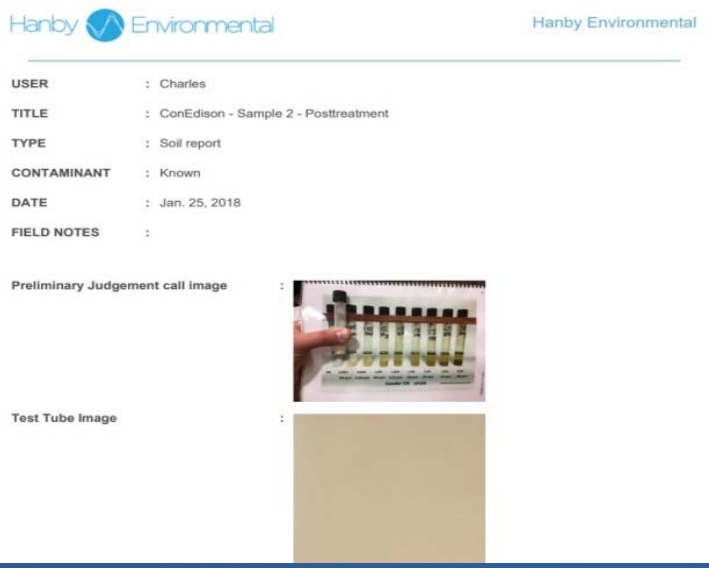
Hanby Environmental

USER : Charles
TITLE : ConEdison - Sample 2 - North
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 25, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

From 1.86% or 18.6k ppm
To
0.1% or 1k ppm


Hanby Environmental

Hanby Environmental

USER : Charles
TITLE : ConEdison - Sample 2 - Posttreatment
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 25, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

ConEdison Blind Samples Demo

Performed by Hanby Environmental and OMG Solutions on ConEdison provided blind samples.

ConEdison is the largest Power Provider in New Jersey and New York.

To summarize the results reflected in the pictures below are supported by the links to the reports generated by the recently released Hanby Mobile Application is as follows:

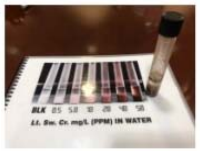
Water Sample - had a beginning contamination level of 52 ppm reduced to 6.7 ppm after a single application of OMG's product ELMN8+

Pretreatment: http://hanbymobileapp.com//media/pdf/report215.pdf
Post treatment: http://hanbymobileapp.com//media/pdf/report216.pdf

Hanby Environmental — Hanby Environmental

USER	: Charles
TITLE	: ConEdiosn - Water Demo - Pretreatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 25, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

From 52 ppm
To
6.7 ppm

Hanby Environmental — Hanby Environmental

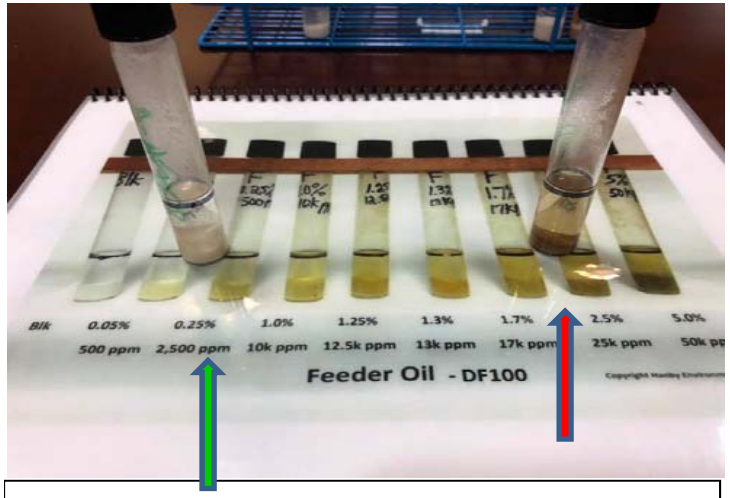
USER	: Charles
TITLE	: ConEdison - Sample 1 - Posttreatment by ELMN8
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 25, 2018
FIELD NOTES	:

Preliminary Judgement call image :

Test Tube Image :

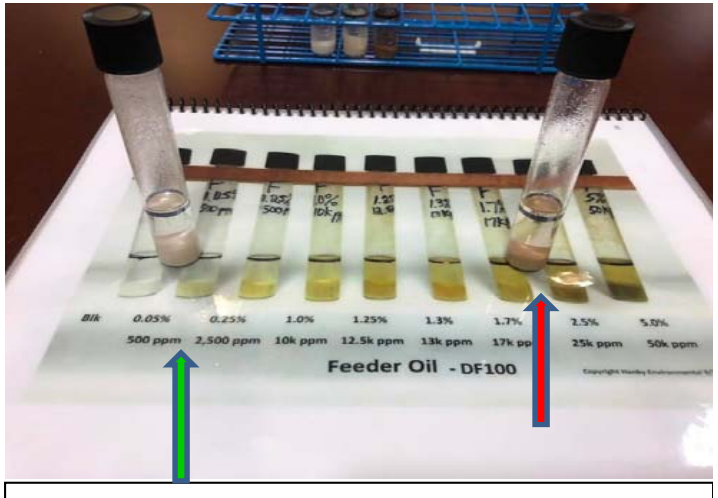
ConEdison Blind Samples Demo

*** Feeder Oil aka DF100 aka Dielectric Fluid ***



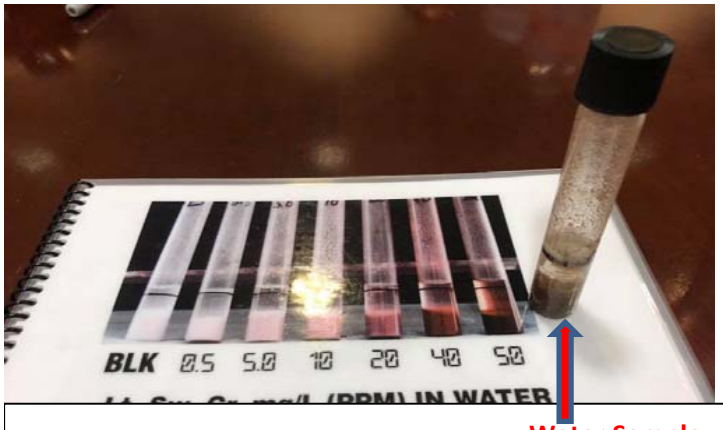
Soil Sample 1 – South

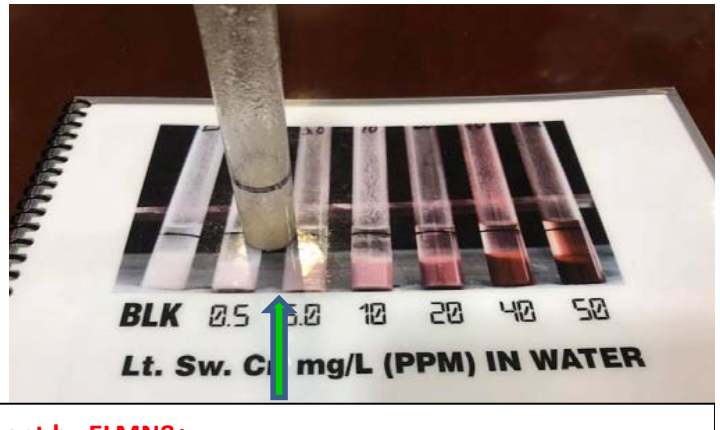
Pre (23k ppm) and Post (1.5k ppm) Treatment by ELMN8



Soil Sample 2 –North

Pre (18.6k ppm) and Post (1k ppm) Treatment by ELMN8

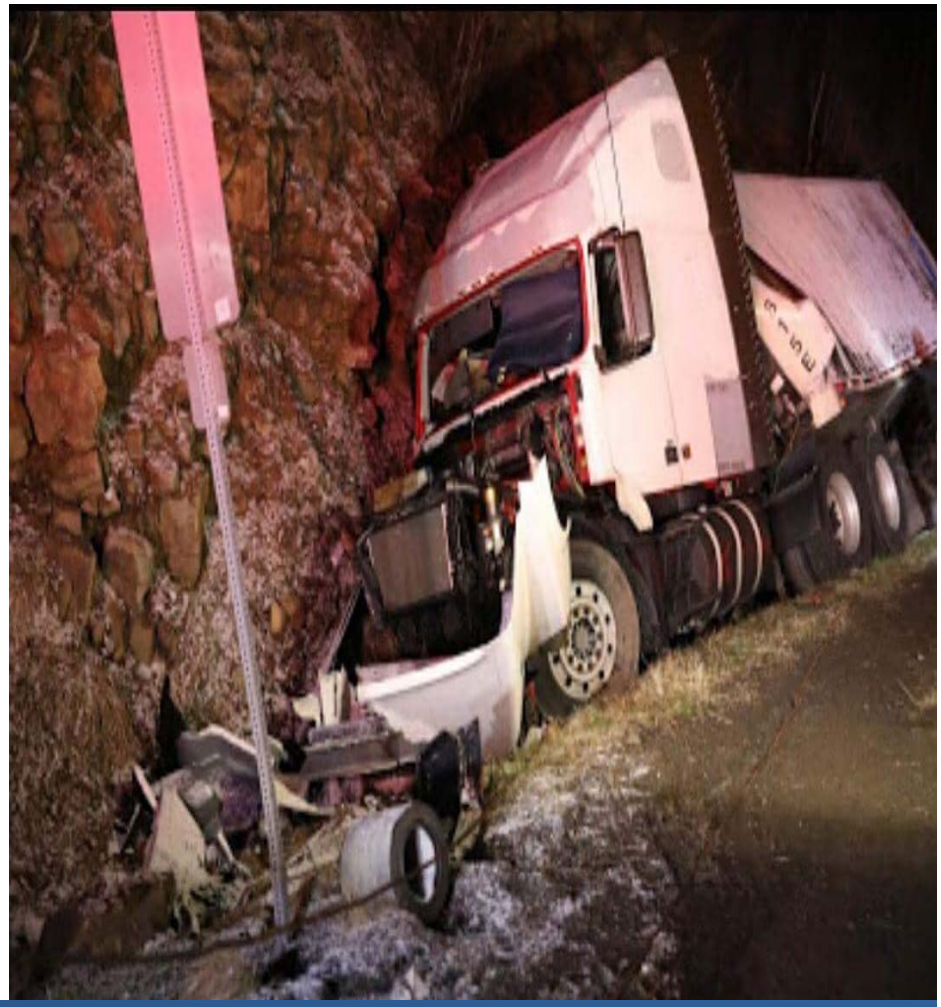




Water Sample - Pre (52 ppm) and Post (6.7 ppm) Treatment by ELMN8+

Emergency Response Use of The New Remediation Paradigm in Pennsylvania in Tough Conditions

- JRL Emergency's Michael Litwak of Pennsylvania Responded to A Diesel Spill in Tough Conditions.
- The 18 Wheeler was in the Ditch Between The Road and a Mountainside.
- The PA DEQ told Him to Find A Solution Without Digging Which Would Probably Cause A Landslide.
- He Implemented The New Remediation Paradigm Utilizing A Combination of Surface Spraying Without Tilling and Injection and Migration.



Emergency Response Use of The New Remediation Paradigm in Pennsylvania in Tough Conditions

- Using Both His Field Test Kit and Mobile App, He Was Able To Document The Beginning Contamination Level of 68k ppm.
- After Two Treatments He Was Able To Document That The Diesel Contamination Had Been Reduced to 332 ppm.
- They Used A High Pressure Jet To Agitate and Break Up Soil and Sprayed for Migration Afterwards.
- At 332 ppm, He Sent Samples Off for Lab Analysis, All The While The Samples Were Still Oxidizing.

Emergency Response Use of The New Remediation Paradigm in Pennsylvania in Tough Conditions

- PreTreatment of 68k ppm:
- http://hanbymobileapp.com//media/pdf/report830.pdf
- Post treatment of 332 ppm:
- http://hanbymobileapp.com/media/pdf/report829.pdf

Hanby Environmental — Hanby Environmental

USER	: Charles
TITLE	: JRL Emergency - Diesel Spill
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: June 3, 2018
FIELD NOTES	:

Preliminary Judgement call image :

Test Tube Image :

Matched Result : Diesel Fuel in Soil 6.78 mg/Kg(%) aka 67800.0 ppm

Hanby Environmental — National Certified Spill Response

USER	: Michael
TITLE	: Morelli Brothers Aftertreatment 2
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: June 3, 2018
FIELD NOTES	: After treatment #2 At MM 136 South I 81

Preliminary Judgement call image :

Test Tube Image :

Matched Result : Diesel in Soil 331.71 mg/Kg aka 331.71 ppm

Emergency Response Use of The New Remediation Paradigm in Pennsylvania in Tough Conditions

- The Lab Results Came Back **Non-Detect for TPH and BTEX.**
- **Michael said, ""We were able to test, apply, and get out of harms way faster with Hanby's quick results and OMG's quick application."**

Pottsville Environmental Testing Laboratory, Inc.
164 East Bacon Street
Palo Alto, Pennsylvania 17901
Telephone 570-622-7315
Fax 570-622-7365

JRL EMERGENCY SERVICES
51 ATLANTIC ST.
POTTSVILLE, PA 17901

06/21/18

Sample Location: SOIL SAMPLE @ MILE MARKER 136 SOUTH ROUTE 81
MORELLI BROTHERS - DIESEL FUEL SPILL
Sample Date @ Time: 06/18/18 @ 1100 Sampled By: MIKE
Rec'd Date @ Time: 06/18/18 @ 1130 Rec'd By: MCF

GENERAL

	PARAMETER	RESULT	MDL	UNITS	TEST DATE	METHOD
1.	Total Solids	98.5	1.0	%	06/19/18	SM2540G[1]

SEMI-VOLATILES

	PARAMETER	RESULT	MDL	UNITS	TEST DATE	METHOD
1.	Fluorene	ND	12.5	ug/kg-dry	06/20/18	E8270C[1]
2.	Phenanthrene	ND	12.5	ug/kg-dry	06/20/18	E8270C[1]

VOLATILES

	PARAMETER	RESULT	MDL	UNITS	TEST DATE	METHOD
1.	Benzene	ND	25.0	ug/kg-dry	06/20/18	E8260B[1]
2.	Toluene	ND	25.0	ug/kg-dry	06/20/18	E8260B[1]
3.	Ethyl benzene	ND	25.0	ug/kg-dry	06/20/18	E8260B[1]
4.	Isopropylbenzene	ND	25.0	ug/kg-dry	06/20/18	E8260B[1]
5.	Naphthalene	ND	25.0	ug/kg-dry	06/20/18	E8260B[1]

If there are any questions regarding this data, feel free to contact me.

Michael C. Fabian
Laboratory Director

([1]PA DEP Lab Name: M.J. Reider, Inc.; ID Number: 06-003)

1. A result of "ND" indicates the concentration of the analyte tested was either not detected or below the MDL.
2. MDL = minimum detectable level.

Page 1 of 1

Lab Results Correlation Comparison

Performed by Arcadis for Murphy Oil & Gas

Post Treatment by OMG's ELMN8

Table 1. Soil Sample Anaytical Results (mg/kg), Scared Dog Central Lateral Pipeline, Atascosa County, Texas

Sample ID	Sample Date	Sample Depth (feet bgs)	Latitude	Longitude	Organic Vapor Concentration (ppm)	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Chlorides
Stockpile West	1/8/18	0-1'	28.82285°	-98.23717°	---	254	0.429	3.25	2.08	8.41	2,180
Stockpile East	1/8/18	0-1'	28.82321°	-98.23684°	---	380	0.28	4.3	3.45	13.35	2,640
Stockpile 3 Test	1/11/18	0-1'	28.82277°	-98.23718°	---	212	0.0929	1.45	1.12	5.12	4,100
Stockpile 3	1/11/18	0-1'	28.82277°	-98.23718°	---	194	1.52	9.02	4.69	19.24	2,340
Stockpile 4	1/11/18	0-1'	28.82295°	-98.23740°	---	1,630	0.589	4.73	2.64	11.59	3,230
Stockpile 4R	1/15/18	0-1'	28.82295°	-98.23740°	---	---	<0.02	0.0469	0.127	0.492	2,440
Stockpile 5	1/15/18	0-1'	28°49' 23.39"	-98° 14' 13.50"	---	1,410	0.739	7.79	5.7	24.42	1,880
Stockpile 6	1/15/18	0-1'	28°49' 22.13"	-98° 14' 14.37"	---	862	0.114	2.27	2.5	11.14	981
Stockpile 7	1/15/18	0-1'	28°49' 22.91"	-98° 14' 13.32"	---	1,820	0.0469	1.09	1.22	5.84	650
Soil Pile #8	1/22/18	0-1'	28.82328°	-98.23617°	---	153	<0.02	0.0274	0.0493	0.232	3,720
Soil Pile #8R	1/23/18	0-1'	28.82328°	-98.23617°	---	---	---	---	---	---	1,380
Soil Pile #9	1/22/18	0-1'	28.8231322°	-98.2359698°	---	938	0.142	3.8	2.67	11.69	1,280
Soil Pile #10	1/22/18	0-1'	28.82299°	-98.236123°	---	<63.1	<0.03	0.0896	0.0909	0.351	2,100
Soil Pile #11	1/23/18	0-1'	28.823125°	-98.23637°	---	288	<0.02	0.114	0.15	0.533	1,920
Soil Pile #12	1/23/18	0-1'	28.82257°	-98.23716°	---	1,530	0.668	12	7.55	32.7	1,330
Soil Pile #13	1/24/18	0-1'	28.82279°	-98.23724°	---	266	0.0631	1.13	0.71	3.31	319
Soil Pile #14	1/24/18	0-1'	28.82296°	-98.237348°	---	558	0.337	4.41	2.63	10.89	583
Soil Pile #15	1/24/18	0-1'	28.82313°	-98.23704°	---	492	0.0625	1.48	1.25	5.34	615
Soil Pile #16	1/26/18	0-1'	28.822901°	-98.236115°	---	688	<0.02	0.305	0.364	1.666	<243
Soil Pile #17	1/26/18	0-1'	28.8229°	-98.236002°	---	416	0.0309	0.658	0.683	2.94	278
Soil Pile #18	1/29/18	0-1'	28.823040°	-98.236302°	---	739	0.0433	0.791	0.817	2.89	265
Soil Pile #19	1/29/18	0-1'	28.823107°	-98.236406°	---	949	<0.02	0.198	0.359	1.145	309
Soil Pile #20	1/29/18	0-1'	28.823196°	-98.236134°	---	755	<0.02	0.0609	0.264	0.5836	318

ARCADIS

Page 1 of 3

Lab Results Correlation Comparison

Performed by Arcadis for Murphy Oil & Gas

Post Treatment by OMG's ELMN8

Table 1. Soil Sample Anaytical Results (mg/kg), Scared Dog Central Lateral Pipeline, Atascosa County, Texas

Sample ID	Sample Date	Sample Depth (feet bgs)	Latitude	Longitude	Organic Vapor Concentration (ppm)	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Chlorides
Soil Pile #21	1/29/18	0-1'	28.823250°	-98.236256°	---	2,330	0.106	2.17	1.69	6.13	451
Soil Pile #22	1/30/18	0-1'	28.822791°	-98.237407°	---	915	0.087	1.76	1.45	5.84	291
Soil Pile #23	1/30/18	0-1'	28.822877°	-98.237242°	---	487	0.132	2.24	1.79	8.06	237
Soil Pile #24	1/30/18	0-1'	28.822956°	-98.237084°	---	397	0.181	4.11	2.63	10.95	320
Soil Pile #25	1/30/18	0-1'	28.823041°	-98.236952°	---	2,060	0.226	3.25	2	9.05	316
Soil Pile #26	1/31/18	0-1'	28.822302°	-98.236941°		2,390	0.0399	1.55	1.22	5.79	186
Soil Pile #27	1/31/18	0-1'	28.822395°	-98.236998°		2,460	0.0407	2.39	1.73	8.31	176
Soil Pile #28	1/31/18	0-1'	28.822492°	-98.237048°		566	0.0799	1.82	1.36	6.39	252
Soil Pile #29	1/31/18	0-1'	28.822616°	-98.237088°		2,040	0.151	2.93	2.15	10.16	204
Soil Pile #30	2/1/18	0-1'	28.823260°	-98.236596°	---	166	<0.02	0.493	0.405	1.87	268
Soil Pile #31	2/1/18	0-1'	28.823403°	-98.236752°	---	199	<0.02	0.291	0.377	1.72	213
Soil Pile #32	2/5/18	0-1'	28.822901°	-98.236115°	---	93.7	<0.02	<0.02	<0.02	0.0505	121
Soil Pile #33	2/5/18	0-1'	28.823112°	-98.235771°	---	916	<0.02	<0.02	0.0501	0.2079	<116
Test 1	1/29/18	0-1'	---	---	---	---	<0.02	0.36	0.67	3.85	---
Test 2	1/29/18	0-1'	---	---	VOA Vials:	---	<0.119	2.39	1.43	6.48	---
					Bulk Jar:	2,530	0.0428	1.47	1.34	5.93	---
Test 3	1/29/18	0-1'	---	---	---	---	0.0926	1.18	0.579	2.109	---
Test 4 (4')	2/1/18	4'	---	---	---	<57.5	0.0441	0.11	<0.02	<0.07	179
Test 5 (2')	2/1/18	2'	---	---	---	1,280	2.29	21.1	3.88	13.53	<119
Test 6 (18")	2/1/18	1.5'	---	---	---	1,950	0.275	3.4	1.68	7.65	<113
Field QA/QC Samples											
Trip Blank	1/8/18	---	---	---	---	---	<0.001	<0.001	<0.001	<0.003	---
RRC Tier 1 Cleanup Level:						10,000[a]	0.026[a]	8.2[a]	7.6[a]	120[a]	3,000[c]
RRC Tier 1 Cleanup Level for Class 3 Groundwater:[f]						10,000[a]	2.6[a]	820[a]	760[a]	12,000[a]	3,000[c]

ARCADIS

Hanby Mobile App Report Results

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG Solutions - Murphy Oil - 791 - Pretreatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 5, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 30625.0 mg/Kg(PPM)

From 30.6k ppm To 8.6k ppm

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG Solutions - Murphy Oil - 791 - Post 1Treatment

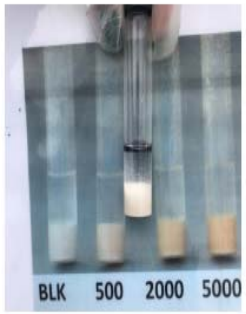
TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 5, 2018

FIELD NOTES :

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 8586.96 mg/Kg(PPM)

Hanby Mobile App Report Results

From 14.1k, 13.8k and 23.8k to 0 ppm

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Murphy Oil - 791 - Pretreatment
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 5, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 14130.43 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Murphy Oil - 791 - Pretreatment 2 Foot
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 5, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 13804.35 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG Solutions - Murphy Oil - 791 - Pretreatment - 1 Foot
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 5, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 23750.0 mg/Kg(PPM)

Environmental — Hanby Environmental

: Charles
: OMG Solutions - Murphy Oil - 791 - Post 1 Treatment
: Soil report
IANT : Known
: Jan. 5, 2018
ES :

/ Judgement call image :

Image :

esult : 19Z_34B cond in Soil 0.0 mg/Kg(PPM)

Hanby Mobile App Report Results

From 15.1k to 3.6k and 4.7k ppm

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Murphy Turnbow Unit Pretreatment
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 8, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 15108.7 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Murphy Turnbow Unit Treatment 1
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 8, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 3956.52 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Murphy Turnbow Unit Treatment 1
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 8, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 3956.52 mg/Kg(PPM)

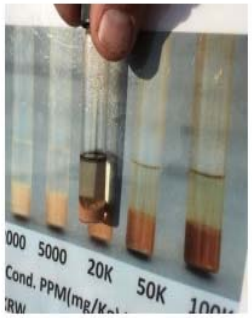
Hanby Mobile App Report Results

Hanby Environmental

Hanby Environmental

USER	: Charles
TITLE	: OMG - Murphy - Scaredog - Pretreatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 11, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 33750.0 mg/Kg(PPM)

From 33.8k ppm To 6.6k ppm

Hanby Environmental

Hanby Environmental

USER	: Charles
TITLE	: OMG - Murphy - Scaredog - Post Treatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 11, 2018
FIELD NOTES	:

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 6630.43 mg/Kg(PPM)

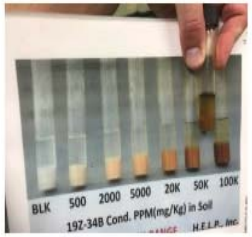
Hanby Mobile App Report Results

Hanby Environmental

Hanby Environmental

USER	: Charles
TITLE	: OMG - Murphy - Scaredog - Pretteatment - Site 2
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 12, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 71428.57 mg/Kg(PPM)

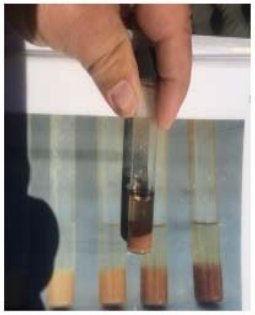
From 71.4k ppm To 24.4k ppm

Hanby Environmental

Hanby Environmental

USER	: Charles
TITLE	: OMG - Murphy - Scaredog - Plot 3 - Posttreatment
TYPE	: Soil report
CONTAMINANT	: Known
DATE	: Jan. 12, 2018
FIELD NOTES	:

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 24375.0 mg/Kg(PPM)

Hanby Mobile App Report Results

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Murphy - Scaredog - Plot 2 - Post Treatment

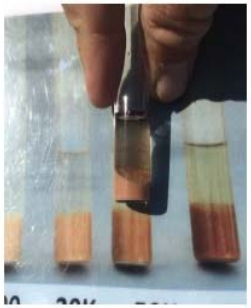
TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 12, 2018

FIELD NOTES :

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 14782.61 mg/Kg(PPM)

From 14.8k ppm To 1.2k ppm

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Murphy - Scaredog - Plot 2 - Posttreatment

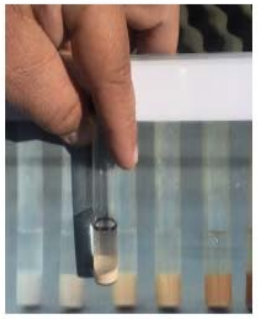
TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 12, 2018

FIELD NOTES :

Preliminary Judgement call image :



Test Tube Image :

Matched Result : 19Z_34B cond in Soil 1175.0 mg/Kg(PPM)

Hanby Mobile App Report Results

From 47.5k, 46.9k and 36.3k to 4.2

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Plot 1 - 1-23-18 - Pretreatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 23, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 47500.0 mg/Kg(PPM)

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Post 4 - 1-25-18 - Pretreatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 25, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 46875.0 mg/Kg(PPM)

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Scared Dog - Plot 14 - Pretreatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 30, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 36250.0 mg/Kg(PPM)

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Scared Dog - Plot 14 - Post Treatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 30, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 4217.39 mg/Kg(PPM)

Hanby Mobile App Report Results

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Scared Dog - Plot 14 - Post Treatment

TYPE : Soil report

CONTAMINANT : Known

DATE : Jan. 30, 2018

FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 32500.0 mg/Kg(PPM)

From 32.5k ppm To 3.2k ppm

Hanby Environmental

Hanby Environmental

USER : Charles

TITLE : OMG - Scared Dog - Plot 14 - Post treatment

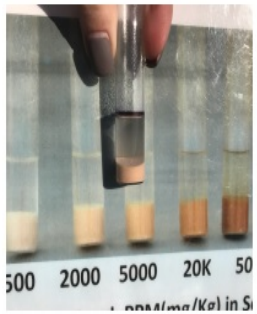
TYPE : Soil report

CONTAMINANT : Known

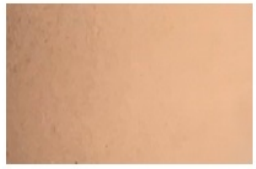
DATE : Jan. 30, 2018

FIELD NOTES :

Preliminary Judgement call image :



Test Tube Image :



Matched Result : 19Z_34B cond in Soil 3173.91 mg/Kg(PPM)

Hanby Mobile App Report Results

Some Final Test Result 1.6k, 4.6k, 4.0k and 6.6k ppm

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Scared Dog - Plot 15 - Post treatment
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 30, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 1550.0 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Scarey Dog - Plot 15
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 30, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 4608.7 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Scarey Dog - Plot 15 -1
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 30, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 3956.52 mg/Kg(PPM)

Hanby Environmental — Hanby Environmental

USER : Charles
TITLE : OMG - Scared Dog - Plot 17 - Post treatment
TYPE : Soil report
CONTAMINANT : Known
DATE : Jan. 31, 2018
FIELD NOTES :

Preliminary Judgement call image :

Test Tube Image :

Matched Result : 19Z_34B cond in Soil 6630.43 mg/Kg(PPM)

Conclusion of The Introduction

- **This New Combined Solution Has Been Tested All Over The US And Has Proven To Save Time and Money While Lowering The Environmental Impact By Immediately Addressing Hydrocarbon Contamination by Real-Time Analysis and Monitoring of The Treatment Process**

- For More Details Visit Our Websites at:
- www.HanbyEnvironmental.com
- www.OMGSol.com

"Thank You"

for Your Interest and Attentiveness As We Introduce This Paradigm Shift!