

Appendix B

START Site Logbooks

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MOTHER NATURE®

SINCE 1916



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ALL-WEATHER
JOURNAL

No 391FX

Fansteel Metals/
FMRI
0001 / 18-173
10/29/18 — 04/12/19



INCH



Name _____
 Address Weston Solutions, Inc.
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Ste. 280
 Phone Frisco, TX 75034
972-977-2644
 Project Forsteel Metals / FMRI



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	 U.S. NRC United States Nuclear Regulatory Commission <i>Protecting people and the environment</i>	
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² 10/25/18

0001/18-173

1110 Arrive in Muskogee, OK
to meet w/ ODEQ, FMRI
& NRC representatives.
START M. Brown & EPA
B. Cook. NRC - Greg, Linda
ODEQ - Libby.

1250 Arrive at Fanshuel/
FMRI property. For
meeting. Training w/
James Burgess on
site access. Currently
leasing one building
on property for storage
has one employee.
Bldg. 3 - one leasing
on monthly basis.

All sumps go into one
basin, prior to treatment.
Meet Jeff Getz,
council w/ FMRI.

1310 EPA discusses
reason for visit &
possible future sampling
that will take place
in Jan-Feb. time frame.
Michael

10/25/18

0001/18-173 ³

- Look @ NPDs permit
& data they have from
sumps. Same info.
in spreadsheets have
reviewed.

Training conducted
discusses rad monitoring
& requirement for an
escort while on site.

1320 Begin tour of facility.
Stack of soils under tarp
According to James, they
are not ~~that~~ contaminated
& not same as socked
materials. All WIP
pulled out of Pond 3
& all but a few of
the sacks have been
removed

Outfall 1 - treated

Outfall 2 - stormwater

↓ 3 - stormwater

↓ 4 - removed in

90s

Liner taken out of
Pond 3 when they ^{leak in the rain.}

4 10/25/18

0001/18-173

dig it out. Currently wetlands w/in. No confirmation sxs. taken after removal. Photo of hose from Sump to treatment, above ground. Inceptor trench cleanouts present. Photo. Trench underground. Observe washouts along fence to Arkansas River. Observe + take photos of liner patches + tears w/in Pond 9.

Sodium Reduction bldg. w/ 1-ton sacks of WIP ~~PK~~ 2K sacks from Ponds 5, 15 + 1N. Been in bldg. since 1995. Ponds 8 + 9 have a leak detection sys. Pond 2 still in progress. Began digging but didn't complete. Blue bags, WIP + ammonia
120 blue bags + 2 WIPs
40 — Mick ~~John~~

10/25/18

0001/18-173 5

1500 Take radiation survey of hands + feet before departing NRC license area.

1510 Sintering Bldg has pit under it to catch cooling tower water 7-12' bgs. Paint booths w/in bldg w/ sand blasting. According to James - dry process. Bldg. vacated ~ 2 months ago. When Fansteel had the bldg. they grided + heated metals. Fansteel would clean Tentulum there w/ solvent.

Access points to pit w/in bldg. + pit concrete lined. 2 m²
Bldg. B - had large equipment that went 3 stories below slab. Filled in w/ sand + concreted over. Electron Beam Furnance. *Rite in the Rain.*

6 10/25/18 0001/18-193

had another pit w/in it
for cooling tower ~ 8' bgs
12' long, 5' wide.

Bldg. 5 currently leased
to company for storage
of tile, ceramic tile,
powder.

1600 START, EPA, NRC,
ODEQ + FMRI attorney
depart site. Several
photographs taken during
the tour. Photos will
be documented within
a separate photo log.

Michelle Row
10/25/18

04/01/19 0001/18-173

1045 STARTs Criner + Brown
arrive onsite at Fansteel.
Meet with James Burgess
of FMRI + go through
site safety training.

ODEQ already onsite
+ performing recon.

1130 Meet with ODEQ
and begin reconning wells
ODEQ, Libby, Hal, Michzel,
Hank + Kelsey. ODEQ
taking water level measure-
ments to see if bladder
pump necessary. One

well was found @ 25.1 ft.
Three MWs, 585, 595 + 605
could not be found. All
other wells found +
accessible. MW-745 is
dry. MW-635 not on
figure but found by
building 5.

1250 ODEQ completed
their recon + done for
day. STARTS START +

Michelle Row

8 04/01/19 0001/18-173

ODEQ scan out for day.
Car doesn't need to be
scanned if stay on
roadways since they
are scanned daily.
(paved or unpaved).

1310 Talk to James
about missing MWs.
They were removed
when inceptor trench
was constructed. (58,59,60).

1315 Depart site and
head to Tulsa, Ok. -
Late entry 1538 - each
well has a dedicated
boiler associated with
it. Will modify sample
schedule based on obser-
vations.

Michelle

04/05/19 0001/18-173

0715 Arrive at Fansteel
site. START M. Brown &
S. Hettinger w/ EPA.
B. Cook, P. O'Fusu, + L.
Turner. Meet w/ ODEQ,
NRC + EPA G. Fife.

Go to White House
& begin organizing
samples for first
sample collection of
SS. Soil Stockpile.
~~Hettinger~~

0800 Hettinger receives
site training from J.
Burgess of FMRI.

Continue organizing
Command Post at
White House.

0845 ODEQ returns from
collecting SS sample.
Scan personnel, samples,
PPE before entering
White House. Keeping
a separate logbook for
scanning.

Michelle hit in the rain

10 04/08/19 0001/18-173

0850 Holding H+S Mtg.
Cell numbers for personnel
Libby McCaskill 405-436-5701
LaDonna Turner 214-212-1732
Sean Hettinger 609-666-9608
Brenda Coet 214-680-9776
Hal Cantwell 405-627-1170
Michael Lea 918-289-3743
Marti Poston (NEC) 713 376 1891
Philip Ufusu 214-704-6327
Greg Fife 214 789 2879

Discussed scanning.
Hydration. Hospital
locations.

0920 Prepare sample
jars for sintering
oldg sump sample
James Burgess shows
ODEQ access point to
sump location within
bldg. Brozowski

1045 George Brozowski sp?
From EPA arrives on
site. Call J. Wright
to confirm sample

— Mike [Signature]

04/08/19 0001/18-173¹¹

bottle counts for ~~any~~
radionuclide analyses.
1-16 oz bottle for solids
for all rad analyses.
Late entry - at 0950
ODEQ collects water
sample SB. No sedi-
ment could be collected
at location SB.

1130 START J. Criner
& S. Nguyen arrive
on site + S. Nguyen
goes through facility
H+S training.

1155 ODEQ team
returns from P3 sample
collection. Scan out
personnel, equipment,
& samples.

1230 Lunch Brezk
G. Brozowski 214-755-1530

1330 Return from lunch.
ODEQ at Ponds collecting
additional samples.
Brought 10 bags of 20lbs.

— Mike [Signature]

12 04/08/19 0001/18-173

ICC. Process 52 samples collected for day 1749. Packaged samples in coolers with ice taken to FedEx for next day shipping. - All vol% files collected during the day shipped out. Have 7 remaining coolers that we are icing + wrapping up for COC + locking up for night.

See Scribe database for samples shipped today.

1530 START, EPA, ODEQ and NRC depart site for day.

Michael

04/09/19 0001/18-173 13

0700 Arrive on site at Fansteel. Begin prepping sample containers at White House for day. 0725 H+S meeting.

Hat today, take breaks + stay hydrated. Keep dust down while driving. Watch for ticks. One found on someone yesterday. Boat sampling taking place today. Will have START GW sampling separately from ODEQ. Two sampling teams today.

0930 STARTS Brown + Hettinger depart site to ship 8 coolers. All samples collected 4/8 have been shipped.

1030 Samples SW/SED-BKG + SW/SED-N-DRNG delivered to White House for processing.

— *Michael*

14 04/09/19 0001/18-173

1130 Sample MW-645 with MS/MSD delivered to White House for processing. Scanned out at 1141.

1400 ODEQ has finished collecting & has delivered OF1 and OF2 locations. Boat operations are done.

~~1530~~ 1415 START has completed the collection of MW-533 and MW-DUPI and delivered it for processing.

1430 Late entry.

ITC tribal representatives have been on site receiving a tour from EPA Turner of the Facility property and an update on site activities.

1530 ODEQ has delivered OF3 and DUPZ (SED &

— Nick

04/09/19 0001/18-173¹⁵

SW) for processing. This sample appears to have a precipitate present in the bottles containing Nitric Acid preservative.

1640 START begins delivery of MW-545 samples for processing.

1730 All samples collected for the day have been processed, placed on ice and sealed in coolers for shipping. 25 mg 17 coolers are sent to Fed Ex for

shipping. Total of 25 coolers for day.

Sample completed include SS, SB, OF1, OF2, OF3, OF5, BKG, N-DRNG, P3, P6, P7, P8, P9, MW-645, MW-533, MW-545 and MW-DUPI

— Nick

04/10/19

0001/18-173

0710 Arrive at Fansteel.

START, EPA, ODEQ.

0725 EPA, George B.
conducts H+S meeting.

Windy day expected.

Ticks found yesterday

Use bug spray + tuck
in pants into boots.

Give update on samples.

Completed scheduled
surface water and
sediment / soil sample
locations. Completed3 MWs. Shipped total
of 32 coolers to date.

0740 START + ODEQ

Sampling teams depart
to begin sampling for
day.0950 START sample team
returns w/ sample from
MW-685 location. Scans
out sample + themselves.ODEQ team reporting
that OW8 is slow toMichelle Green

04/10/19

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recharge. Will allow it
to recharge after purging
and move to another
well.

1010 Process sample

MW-685-20190410

1110 Adding sample from
stormwater collection
basin to collection list.Will call it SCB location
Well 515 only 100 ml/min.
with slow recharge.1330 Samples 515 695,
DUP2 and some OW8
have been collected and
are being processed for
shipping.

1430 START returns

sample 555 for processing.

1500 START Brown +
EPA Cook collect a
sample from thestormwater collection
basin (SCB). There is
a dead frog floatingMichelle Green

18 04/10/19

0001/18-173

in the water, but water appears clear.

1522 Scan out personnel and sample SCB + begin processing sample

1615 Receive sample 75S for processing.

1420 Receive sample 56S for processing.

Late entry 75S scanned out prior to processing.

1730 Leave to deliver 9 coolers. One cooler with just volatiles, + one cooler each for samples OW8, DUPZ, 69S, 75S, 51S, 68S, 56S, + SCB.

1810 ODEQ brings in more of OW8. 3 bottles remaining to be collected. one SVOC container + 2 Radiotracer containers.

1850 START returns

— Mike

04/10/19

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with sample 52S for processing.

1900 Placing 3 coolers one for OW8, one for 72S, ptz, and one for 52S placed on ice under COC for night + delivery tomorrow.

1915 Remaining START + EPA depart site for day.

Mike
Oscar

20 04/11/19 • 0001/18-173

0705 START arrives on site.

0720 Begin H+S meeting
EPA George B conducts.

Winds from yesterday,
not occurring today. Take
breaks, stay hydrated.

0750 START + ODEQ teams
depart to begin sampling
for day.

0920 ODEQ finished the
collection of OW8 and
are working on 715. —

1005 Sample OW3 returned
for scanning + processing.

1220 Sample 715 returned
for scanning + processing.

1340 Receive sample 705
for processing + received
sample OW9 earlier at

-1230. All samples scanned
prior to processing.

1400 START sampling team
working on MW-575 +
DUP3.

1430 ODEQ sampling/
— Michelle

04/11/19

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MW-635. —

1535 START returns with
sample 575 + DUP3
for scanning + processing.

1615 ODEQ returns
with sample 635
for scanning + processing.

1720 START returns with
625 sample for scanning
+ processing. —

1740 START takes 12
coolers to FedEx for
shipping for day. Samples
OW8, 525, 575, 725, 715,
OW3, OW9, 575, DUP3, 705,
635 and 625 shipped
today. —

1830 START sampling
team collecting OW-6.

1840 ODEQ returns
675 for scanning +
processing. Sample is
an amber color and
has an odor to it. The
sample is placed on ice.

— Michelle Michelle

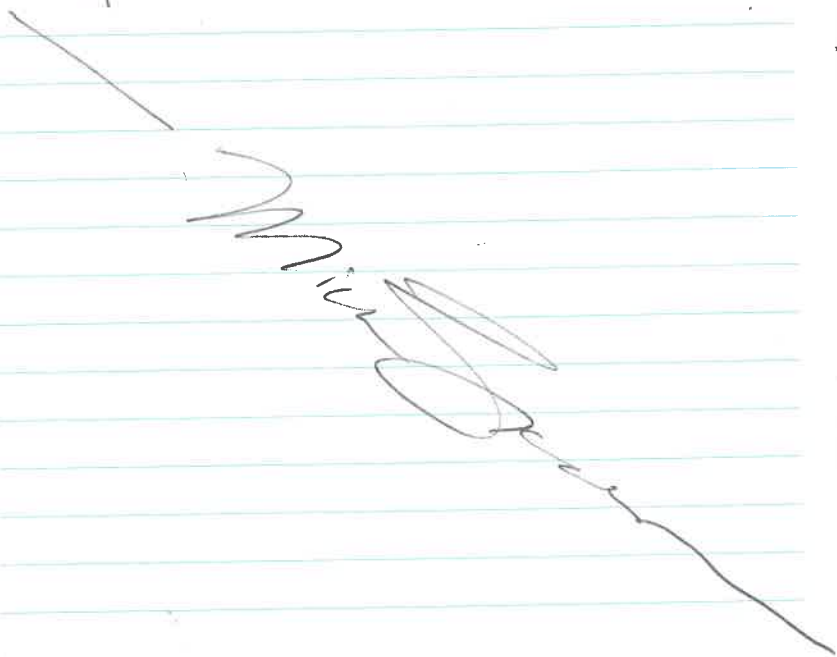
04/11/19

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and sealed for locked storage overnight + shipping tomorrow.

1915 START sample teams returns sample OULC for scanning. Sample placed on ice and sealed for locked storage overnight + shipping tomorrow.

1930 START EPA and ODEQ depart site for day.



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0700 START arrives on site.

ODEQ already on site.

EPA arrives on site.

0730 H+S meeting.

Remember to scan ~~out~~ out. 3 wells left to sample. Will ensure all trash scanned + will dispose of as municipal waste.

Keep a look out for ticks + continue to spray. Weather will be cool but

continue to hydrate.

0800 EPA B. Cook confirmed

with ODEQ Libby McCaskill

& NRC Marhi Poston

that if all PPE trash is layed out + scans

with readings $< 200 \text{ c/m}$

that it can be disposed of as municipal trash.

0815 Background reading between 45-50 c/m.

— 77122 Over *libby*

04/12/19

0001/18-173

0820 Lay out visqueen + scan. Reading between 50-65 c/m. Lay out PPE + scan. Waste includes gloves, tubing wipes, trashed visqueen + a couple of drink containers. Scans read between 50-65 c/m. Bag 1 of waste scanned out.

Note. - in addition to scanning PPE, all personnel + samples have been scanned daily + readings are kept in a separate logbook.

0825 Bag 2 layed out for scanning. In addition to the waste listed in Bag 1, Bag 2 also includes some food trash items. Readings between 40-55 c/m.

M. J.

04/12/19

0001/18-173²⁵

0830 Lay out Bag 3 for scanning. In addition to waste listed in first 2 bags, this bag includes tyvek, additional bags + unused bottles. Reading between 35-60 c/m. The tyvek is being cut-up to make it unwearable.

0835 Scan Bag 4. Waste includes items in previous bags. Readings between 40-55 c/m. Wipe ~~earrings~~ used to clean cooler reading at 100 c/m yesterday at 67 c/m + can be trashed w/ other waste in Bag 4. START Hettinger scans out at 53 c/m. EPA Cook scans out at 53 c/m as well.

0850 All 4 bags are

M. J. Kit in the box

04/12/19 0001/18-173

closed + labeled + ready
for municipal waste. -

0955 Sample OW5

scanned + returned
for processing. -

1040 Sample US9 scanned
& returned for processing.

1130 Start housekeeping
while ODEQ still working
on OW4 sample location

1235 Bag 5 of PPE

trash from today's
activities scanned by
NRC Marti Poston and
deemed at background

and alright to dispose
of as municipal trash.

1300 EPA, START + ODEQ
depart site, End of

sampling event at
Fansteel. START to head

to Tulsa to ship samples,
& empty coolers to lab

& equipment to RES
warehouse. 5 cooler to

Marti Poston

04/12/19

0001/18-173

be shipped today with
samples OW6, 679, OW5,
OW4 + 655. -

FedEx

Address: 2121 NORTH 85TH
EAST AVENUE
TULSA
OK 74115
RVSA
-BTC04

FedEx Express Package(s) - Dropped Off
30978324315 48.7 lbs. (S)

FedEx Express Package(s) - Dropped Off
30978324484 28.7 lbs. (S)

FedEx Express Package(s) - Dropped Off
30978325712 47.6 lbs. (S)

FedEx Express Package(s) - Dropped Off
480978324473 49.5 lbs. (S)

FedEx Express Package(s) - Dropped Off
480978324576 48.5 lbs. (S)

Total P

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End
of
Museum
Logbook

Weston Groundwater Sampling Team



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No 391FX

Fansteel Metals /
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TDD 0001/18-173

04/08/19 - 04/12/19

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1

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5

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2 04/08/19 TDD 0001/18-173

Fansteel Metals / FMRI - Muskogee, OK

Michelle Brown (PL) - Weston

Jeff Criner - Weston

Stephen Nguyen - Weston

Equipment : mini RAE PGM 732C

Ludlum - RFW 23678

1400 Testing mini RAE with Isobutylene

PASS 95.1 ppm

Loosened cap - No readings mini RAE.

20 $\mu\text{R/hr}$ reading in the area. 4-in. PVC well

w/ dedicated bailer w/ protective cap and lock.

Dust is in casing beneath protective cap.

1408 Left well. Left unlabeled and loosely capped

NOTE. EPA ~~Weston~~ Ludlum background is 1-10 $\mu\text{R/hr}$

Action level is 2x amount. ~~Weston~~ Ludlum

is reading ~ 30 $\mu\text{R/hr}$ background. 30-36 $\mu\text{R/hr}$

1417 705 well. Cap lock is broken. general survey. Slip cap. No compression cap.

0.0 ppm isobutylene. Dedicated bailer. 4-in

well. Debris scattered around well.

1416 555 well. By railroad tracks. In good condition

No debris nearby. 15-18 $\mu\text{R/hr}$. 0.0 ppm isobutylene

Compression cap modified to hang bailer. No

compression ability. 4-in well.

04/08/19 TDD 0001/18-173 ——— 6 3

Fansteel Metals / FMRI - Muskogee, OK
[1422] GGS well. Possible prairie dog hole against
slope leading up to well. 4-in well.

Compression cap modified to hung boiler.
Compression is not possible. Clear of debris.
12-14 $\frac{mL}{hr}$ general reading. 0.0 ppm isobutylene.
Fmr. sewage lagoon b/w pond 3 berm and
slope leading up to well ——— 6

[1429] GGS well. Compression cap has a hole
in it, dilled-in. 11-13 $\frac{mL}{hr}$ general reading.
0.0 ppm isobutylene. Site is past NE gate
on ~~at~~ slightly uneven ground ——— 6

[1432] MW-OW8 observation well. Compression
cap was sitting loosely atop. 2-in well encased
in square black casing. 18-20 $\frac{mL}{hr}$. 0.0 ppm isob.

[1436] 75 monitoring well. 20-22 $\frac{mL}{hr}$ general
reading. Slip-cap only. 0.0 ppm isobutylene.
Area is beside a sump station. ——— 6

[1443] MW-~~75~~⁷⁰ 72. Marked by blue drums
and piece of rebar. Area is by a sump ~~pond~~.
18-20 $\frac{mL}{hr}$ general reading. Slip-cap only.
Ants in well heard. Area is in Former Basin 5.

[1450] MW-74S. Marked by blue drum and
piece of rebar. Area slightly overgrown. Compression
cap has a hole in it. 15-16 $\frac{mL}{hr}$ general reading
0.0 ppm isobutylene. Swell coming off Basin 5. *Site in the Rain*

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Faussteel Metals / FMRI - Muskogee - OK
1454 MW-71S. Marked by blue drum &
piece of rebar. By a debris pile. Compromised
compression cap w/ a screw embedded
27-30 ^{µg}hr general reading. 0.0 ppm isobutylene.
Cap is unmarked. Gauges in the ground from
tires. Adjacent to power lines. — 6

1500 Lightly rinsed down fork wheels — 6
1505 MW-65. Located behind Chem A' building
Slip-cap. No debris around well. 0.0 ppm isobutylene

15-17 ^{µg}hr generalized reading. — 6

1512 Frisked - out — 6



04/08/19

04/08/19 TDD 0001/18-173 — 55

Farsteel Metals / FMRI - Muskogee, OK
1528 MW-635. 4-in. well. Screw-compressed
compression cap. 14-16 $\frac{\mu\text{R}}{\text{hr}}$ general reading. \rightarrow
0.0 ppm isobutylene. Built-in bailer — 5

1532 MW-545. Loose & saturated gravel
around well. 4-in well. Slip-cap. Built-in
bailer. 0.0 ppm isobutylene. 15-17 $\frac{\mu\text{R}}{\text{hr}}$. At
by a gravel pad. — 5

1537 MW-515. Cut in grassy area. Well
casing is tilted $\sim 30^\circ$ from vertical. \rightarrow
11-15 $\frac{\mu\text{R}}{\text{hr}}$ generalized reading. Base-locks
ring on well is damaged. 4-in well w/ 2-in
bailer. 0.0 ppm isobutylene — 5

1543 MW-535. Concrete around casing is
fractured. Slip-cap. 4-in well. Built-in bailer.
10-12 $\frac{\mu\text{R}}{\text{hr}}$ general reading. 0.0 ppm isobutylene.
Discarded metal 15 ft. away — 5

1548 MW-0W3. By the berm of Pond 8.
2-in well. Top of well is 2 ft. below — 5
casing. Compression cap is loose. 0.0 ppm isobutylene.
12-14 $\frac{\mu\text{R}}{\text{hr}}$ general reading. No bailer. — 5

1556 MW-565. Cap was found off — 5
4-in well w/ built-in ~~labor~~ bailer. 0.0 ppm
isobutylene. Slip-cap. 10-12 $\frac{\mu\text{R}}{\text{hr}}$ — 5

04/08/19

TDD 0001/18-173

Fairsteel Metals / FMR - Muskogee, OK

~~MW-1602~~ MW-565. Terrain is muddy and could prove challenging to get to with vehicles. Slip-cap. 0.0 ppm isobutylene. 8-10 $\frac{uL}{hr}$ general reading. Saw animal scat with rodent-sized bones. 4-m. well. Right-side of road going in appears to be more conducive to vehicle access.

1613 MW-0W9, locked. 15-16 $\frac{uL}{hr}$ general reading. Vehicle access could be challenging. Found animal burrows

1619 MW-0W7. 2-m well. Compression-cap. Behind sump station. Compression cap was on tight. 0.0 ppm isobutylene. 9-11 $\frac{uL}{hr}$ general reading.

1623 MW-575. No cap on casing. 4-m well. Compression cap is compromised with screw for built-in bailer. Wasp nest inside water around well. 4-m casing surrounded by water inside protective casing. 16-18 $\frac{uL}{hr}$ general reading. 0.0 ppm isobutylene. Protective casing seems more oxidized and deformed than the others encountered.

1629 MW-625. 4-m well. Lock ring is broken off protective casing. Slip-cap. Built-in bailer. 0.0 ppm isobutylene. 14-15 $\frac{uL}{hr}$ general reading.

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Funsteel Metals / FMRI — Muskogee, OK

1632 MW-OW6. Located at the fence-line.

2-in. Compression-cap. 0.0ppm isobutylene.

12-13 $\frac{\mu\text{R}}{\text{hr}}$ general reading. Large plastic sheeting adjacent to well. Arkansas River immediately in view ——— 5

1636 MW-675. Located by blue drum and piece of rebar. Well near by large debris dump and wash-station. 4-in well.

Slip-cap. Protective casing to lock ring is broken. 0.0ppm isobutylene. Built-in boiler. 18-20 $\frac{\mu\text{R}}{\text{hr}}$ general reading. ——— 5

1640 MW-OW5. Concrete around well is fractured. 2-in well. Compression-cap is on tight. Wasp nest. 0.0ppm isobutylene.

Location behind sump station. River is immediately adjacent. 20-21 $\frac{\mu\text{R}}{\text{hr}}$ general reading ——— 6

Down-slope of debris dump & wash station. 5

1645 MW-OW4. Well concrete pad in good condition. 2-in well. Compression cap is loose and covered with ants. 0.0ppm isobutylene.

18-20 $\frac{\mu\text{R}}{\text{hr}}$ general reading. Immediately adjacent to fence. Downslope from buildings. River is about 40yds. away. ——— 6

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Fansteel Metals / FMRI - Muskegon, OK → 6

1652 Vehicle washed. 2-9 ^{hr}/_{hr} reading. → 6

04/09/19 TDD 0001 / 18-173 — 9

Fansteel Metals / FMRI - Muskogee, OK — 6

0730 Safety meeting & gathering of supplies.

0806 MW-645.

Personnel: Jeff Criner - Weston
Stephen Nguyen - Weston

Equipment: Geopump RFW21142
Heraeus Water Level Meter RFW21139
Trimble
LaMotte Turbidimeter WSH00460
YSI Professional Plus RFW23867

0806 MW-645. Picture 0811.

Casing: 4-in. MS/MSD

Total Depth (TD): 32.19 ft

Static Water (StW): 23.00 ft

Length of Water (LoW): 5.97 ft

Notes: - Further detail, see Field Data Sheet.

- Could only lower down 25.6 ft of tubing + water meter before loss of tension in the lines.

• YSI Calibration: DC% PASSED @ 100% DC
Conductivity at 1514 $\mu\text{m/cm}$ @ 20.9°C
pH 7 PASSED @ pH 7.04

10 04/09/19 TDID 0001/18-173

Fansteel Metals / FMRI - Muskogee, OK.

• YSI Calibration cont'd.

— - pH 4 passed at 3.98-4.02, 4. —

— - pH 10 PASSED @ 10.21 ppm —

— - ORP PASSED @ 296 ORP mV —

• Turbidity: NTU CO (6/11/18) - 0.42 PASS —

— NTU 10.0 (6/11/18) - 10.62 PASS —

0937 YSI measurements have not yet stabilized. pH, temp, turbidity, SPC, and flow rate stable. Canadian Geese and local song birds nearby.

0945 Decreased flow rate to test stabilization of ORP. No success of bottom found. Decision made at 0947 to begin pulling samples. —

0950 WAs taken. ORP held steady at 12 mV for a few minutes, then jumped to 19-20 mV —
a bit, then went down to -15 mV. —

0957 Sampling PCBs in 1 L amber bottles. Sample 19.2°C, 1.56 DO%, 868 SPC, 6.16 pH, -22.2 ORP mV. —

1027 1 mL polys filled. —

1058 19°C, 0.42% DO, SPC 796, 6.15 pH, -37.4 ORP mV. ORP has been ~30 mV for the past 20 minutes. —

1110 Cyanide & metals sampling begins. Last ~45 minutes held -19~-20 ORP mV. —

04/09/19 TDD 0001/18-173 ————— 11

Fan Fee / Metals / FMRI - Mustogee, OK

1202 MW-535, Photo 1238 —————

Casing : 4' + Dip 9' - in. —————

TD : 35.49 ft —————

STW : 26.52 ft. —————

¹ 1202 / 1202 : 5.83 ft. —————

Depth of Sample: 29.66 ft → 31.50 ft @ 1227
↳ because of bubbles in the in-line.

1219 Begin purge. —————

1250 Numbers stabilized. —————

1254 VOA samples taken —————

1258 PCB 1 L amber samples taken. —————

1312 RA 226/228 1 L poly. samples taken. —————

1320 SVOC - 1 L ambers ~~10~~ samples taken to —————

1336 Back to RA 226/228 1 L poly sampling —————

1405 250 mL & 60 mL TAL & Cyanide —————

Sampling —————

1409 End of sampling. Final STW is —————

26.58 ft. —————

Note: ~~Sample~~ Did not encounter unstable readings this time. Sunny outside at 83°F

04/09/19 TDD0001/18-173

Fansteel Metals / FMRI - Muskogee, OK

1535 Arrived a MW-545

1549 Begin purge

Well MW-545. 4-in. Photo 1601

TD: 31.91 ft

STW: 19.35 ft.

well, v. 1: 8.16 Depth of sample intake 27.89 -

1555 Took water flow but realized sensor chamber was installed incorrectly. SPC sensor was not receiving well water.

1558 Flowrate: 42 ml/min Temp: 18.7°C SPC: 299.9

ORP: 229.4 mV ~~Redox~~ DO: 4.46 mg/l 5.48 pH

1633 Begin sampling VOAC

1635 Sampling PCB 1L Ambers

1641 Sampling SVOC 1L Ambers

1648 Sampling RA 226/228 1L poly

1652 Break to fill TAL & Cyanide for expedited sample processing

1655 Resume sampling of RA 226/228 poly

1701 End of sampling. Final STW = 20.13 ft.

Note: Sunny @ 91°F. Temperature while purging was oscillatory.

[Handwritten signature]

04/09/19

04/10⁰⁰/19 TDD 0001 / 18-173 → 13

Fansteel Metals / FMRI - Muskogee, OK

0750 Arrived at MW-685. Photo 0811

Well MW-68 S 4-in. →

TD: 29.17 ft. — YSI Calibration — →

StW: 15.95 ft. — SPC: 1420 $\frac{\mu\text{S}}{\text{cm}}$ — →

^{2nd Well} ~~15.95~~ 8.59 ft. — ORP: 244 mV — →

Depth of sample: 28.00 ft. pH10: 10 $\frac{\mu\text{S}}{\text{cm}}$ — →

Turbidimeter: 10.6 / 10.0 $\frac{\mu\text{S}}{\text{cm}}$ pH7: 7 $\frac{\mu\text{S}}{\text{cm}}$ pH4: 4 $\frac{\mu\text{S}}{\text{cm}}$ } All within 0.01 ppm →

0816 Begin purge.

0818 Initial flow measurements. See field data sheet for details. Temp: 17.8°C SPC: 359.7 $\frac{\mu\text{S}}{\text{cm}}$ ORP: 240.7 mV DO mg/L: 3.02 pH: 6.86 Turb. $\frac{\mu\text{S}}{\text{cm}}$

0852 All readings stabilized except ORP.

0855 Begin sampling VOCs. →

0857 Begin sampling 1 L amber PCBs. →

0903 Begin sampling 2 L amber SVOCs →

0908 Begin sampling TAL & Cyanide →

0910 Begin sampling Ra 226/228 Poly →

0920 ~~From~~ End sampling. Final StW = 1663 $\frac{\mu\text{S}}{\text{cm}}$

Conditions: Sunny, Winds from South @ 15 mph
70°F →

Stephany 04/10/19

Rite in the Rain

14 09/10/09 TDD 0001/18-173 — G

Fansteel Metals / FMRI - Muskogee, OK.

1005 MW-51s. Arrived on site. — G
Photo 1030 — G

Well casing 4-in — G

TD: 34.31 ft. — G

~~STW~~ STW: 28.09 ft. — G

~~STW~~ ~~STW~~ 4.04 ft. — G

Sampling depth: 3206 → Changed to 33.00 ft @ 1025
b/c of airbubbles in in-take tubing. — G

Conditions: Sunny, 21mph winds from South, 75°F — G

1019 Begin purge. — G

1025 Changed depth of sampling to 33.00 ft. — G

1033 Initial readings on max pump rpm are Temp: 20.7°C
SPC: 564 μ S/cm ORP: 165.9 mV DO: 6.64 mg/L pH: 6.76 Turb: 1.1 NTU

1057 Begin sampling VOAs, VERY low flow ~90 μ g/min

1059 Begin sampling 1L amber PCBs

1124 Begin sampling TAC & Cyanide. Spilled

cyanide bottle. Switched to SVOCs 1L amber

sampling and sent for another cyanide sample

container. — G

1126 Began sampling 1L amber SVOCs. — G

1137 Paused SVOC sampling to re-sample cyanide. — G

1141 Resumed sampling SVOC. — G

1151 Began sampling 1L poly R₂ 226/228 — G

Averaging ~10min/L. End STW = 29.39 ft — G

1239 End of sampling. — G

1252 Housekeeping, sample drop off, decontamination — G

04/10/09 TDD 0001/18 - 173 — 15

Functee/ Metals / FMRI - Muskogee, OK

1318 MW-555. Arrived onsite. Sunny, 84°F

24 mph winds from the South. — 6

TD: 24.91 ft. — Well casing: 4-in — 6

STW: 14.42 ft. — Photo: 0144 — 6

Well Vol: 6.89 ft. — 6

Depth of sampling: 21.93 ft. — 6

1333 Begin purge. — 6

1338 Initial readings are Temp: 16.9°C — 6

SPC: 111.5 ORP: 238.4 DO: 7.80 mg/L pH: 5.26

For more details see Field Data Sheet — 6

1408 Begin sampling VOAS. Flow @ 342 ml/min. — 6

1412 Begin sampling 1L amber PCBs. — 6

Note: Before sampling, all readings had stabilized except for turbidity. See Field Data Sheet.

1417 Begin sampling 1L amber SDOCs — 6

1423 Begin sampling 1L poly Ra 226/228 — 6

1435 Begin sampling TAL & Cyanide — 6

~~1435~~ — 6

1436 End sampling. Final STW = 14.60 ft. — 6

1448 Housekeeping, vehicle wash. — 6

1450 Sample wrap off, decontamination — 6

[Signature]
04/10/09

04/10/19 TDD 0001/18-173 - G

Fausstee / Metals / FMRI - Muskogee, OK

1510 Arrived at MW-565. Sunny, 88° F

24 mph wind coming from the South. →

Well casing: 4-in. — Photo 0330 — G

TD: 20.17 ft. ————— G

StW: 13.99 ft. ————— G

~~Well~~ 4.02 ft. ————— G

Depth of Sampling: 19.00 ft. ————— G

~~1325~~ Begin purge. ————— G~~1525~~ Begin purge. ————— G

1532 Initial flow readings Flowrate 284 mL/min

Temp: 16.8°C SSC: 1253 $\frac{AS}{cu}$ ORP: 250.9 mV DO: 3.19 mg/L

DO: → pH: 6.48 Turbidity: clear @ 6.19 NTU — G

1606 Flow rate 272 $\frac{mL}{min}$. Turbidity gradually — G

Sampling. Begin sampling VOAs. — G

1609 Begin sampling 1 L amber PCBs — G

1615 Begin sampling 1 L amber SVOEs — G

1621 Begin sampling 1 L poly Ra 226/228 — G

1635 Begin sampling TAC & Cyanide. — G

1637 End sampling. Final StW = 15.56 ft.

Note: ORP kept drawing down. At time, -10.3 mV

Water was observed b/w well & protective casing

1640 Loaded the samples into Philip Ofosu (EPA)

truck to expedite processing. — G

1646 Cleanup, load truck. — G

1649 Move to MW-525 — G

Site # 04/10/19 TDD 0001/18-173 ¹⁷

Fausstee Metals/FMRI - Muskogee, OK - 8

1650 Arrive at MW-16 525. Sunny w/ - 0
clouds, 90°F, 25 mph winds from South. - 0

Well casing 4-in. — Photo 04:53 — 0

TD: 20.39 ft. ————— 0

StW: 15.99 ft. ————— 0

1 well vol. 4 3.15 ft ————— 0

Depth of Sampling: 19.00 ft. ————— 0

1706 Begin purge. ————— 0

1713 Initial flow readings. Flow rate $\frac{280 \text{ gal}}{\text{min}}$ Temp. 17.6°C

SPC: 420.7 $\frac{\mu\text{S}}{\text{cm}}$ ORP: 252.1 mV DC: 699 $\frac{\mu\text{g}}{\text{L}}$ pH: 6.7

Turbidity: 3.33 NTU ~ clear ————— 0

1758 Begin sampling VOAs. Flow rate $\frac{268 \text{ gal}}{\text{min}}$

Turbidity oscillates b/w 4-5 NTU. — 0

1803 Begin sampling 1L amber PCBs — 0

1809 begin sampling 1L amber SVOCs — 0

1818 Begin sampling 1L poly R₉ 226/228 — 0

1832 End of sampling Final StW = 15.98 ft.

TAL & Cyanide samples taken ~~at~~ at same time as VOAs. ORP stabilized during sampling @ @ at ~ 70 mV — 0

1834 Cleanup. Pack-up truck. — 0

1845 Wash truck & dispose water. — 0

1849 Drop-off samples — 0

04/11/19 TIDD 0001/18-173 →

Fonsteel Metals // FMRI - Muskogee, OK

0721 Safety meeting. Weather conditions are cloudy and windy. Everyone is doing well with safety. ODEQ will continue pumping at MW-OW8. Spray for ticks and wash hands. ————— ↻

0740 Arrived at MW-OW3. Weather is → cloudy, 54°F, 14 mph winds from the West. ↻

Calibration: YSI LaMotte Turbidimeter

————— $SPC = 1413/1480 \frac{MS}{cm}$ NTU 00 (6/11/18) = 0.0/0.49

————— pH 4 = 4.00/3.99 NTU 100 (6/11/18) = 100/10.57

————— pH 7 = 7.00/7.02

————— pH 10 = 10.00/10.18

————— ORP = 240/250 mV

Equipment used: YSI Professional Plus RFW 23867

————— LaMotte Turbidimeter WSH 00460 →

————— geopump - peristaltic RFW 21142 →

————— Heron dipper - T water level meter RFW 21139 →

Well casing: 2 in — Photo 08:07 ————— ↻

TD —————: 29.46 ft — Time of purge: 0821 ————— ↻

STW —————: 20.18 ft. — Personnel: Philip Ofosu (EPA)

Low —————: 9.28 ft. ————— Jeff Cramer (Weston)

1 well volume: 1.48 gal ————— Stephen Nguyen (Weston)

Depth of sampling: 28.00 ft. ————— ↻

04/11/19 TDD 0001/18 - 173

Forsteel Metals / FMRI - Muskogee, OK.

0822 First water up the tube had black sediment.

0826 Flow ~ 230 $\frac{ml}{min}$ Turbidity 12.32 NTU

0828 Flow has stalled. Proceed to remove tubing and water meter. Separated the two which were zipped together. Re-inserted tube & tested water level. Water level is at 20.26 ft.

0836 Restart purge. 22.01 - 22.03 ft. from production casing. 0.03 ft drop in 30 seconds. @ 280 $\frac{ml}{min}$ flow.

0842 Stabilized flow. Likely a kink in the line going through peristaltic pump. Initial readings:
Flow rate = 188 $\frac{ml}{min}$ Temp = 17.1°C SPC = 1840 $\frac{MS}{cm}$ ORP = -102.9 mV
DO = 0.84 $\frac{mg}{L}$ PH = 6.82 Clear-Turbidity = 11.51 NTU and water level = 20.58 ft.

0919 VOAs, TAL, Cyanide. Sampling begins. CRP steadily & gradually moving into the positives. DO gradually moved up to 0.86. All other readings are steady.

0924 Began sampling 1 L amber PCBs. Water level is steady at 20.55 ft.

0933 Began sampling 1 L amber PCBs.

0942 Began sampling 1 L poly bag 226/228.

1002 End of sampling. Final water level 20.62 ft.

04/11/19 TDD 0001/18 - 173

Faustee 1 Metals / FMRI - Muskogee, Ok.

1014 Arrived onsite to check water levels of MW-009 on cam. Jeff & Philya went to dump purge water. Conditions are cloudy. 52°F. 11 mph winds from West.

Well casing: 2 in. Plate: 1056

TD: 30.25 ft. MinirAE (REM) (PEM 7320)

STW: 22.50 ft. Isobutylene: 9.68 ppm.

Low: 7.75 ft.

Well volume: 1.24 gal

Depth of sampling: 29.5 ft.

1041 Begin purge. First water is red, pink w/ sediment. Water is yellow and cloudy. Initial readings:

1056 Flow rate = $\frac{288 \text{ ml}}{\text{min}}$ Temp = 16.0°C SPC = 1495 $\frac{\mu\text{S}}{\text{cm}}$

ORP = 155.1 mV DO = 0.79 % pH = 6.56

Appearance = cloudy yellow Turbidity = 162.0 NTU.

1118 Note. Flow of water and well water level vary. 150 ft. proximity to pump station

1122 Begin sampling. UOAs, TAL & Cyanide.

1127 Begin sampling. 7L amber PCBs

1137 Begin sampling. 7L amber SBOCs

1147 Begin sampling. 7L amber poly Ra 226/228

1206 End of sampling. Final STW: 23.20 ft.

1214 Left site to dispose of purge water.

04/11/19 TDD 0001/18-173 - 21

Fairsteel Metals / FMRI - Muskogee, Okla.
1253 Arrived at site ~~00~~ MW-0W7.

Well: 2-in. ————— STW 19.62 ft —————

TD: 20.33 ft —————

Called Michelle Brown to notify of low water level. Move on to MW-575. May return to attempt.

1307 Arrived at site MW-575: —————

Cloudy with some sun. 61°F. 14 mph wind from the west. Had trouble running tube down to sampling depth.

1325 MW-575 Purging begins. —————

Casing: 4-in. ————— Photo: 01:34:30 —————

TD: 21.01 ft. —————

STW: 17.64 ft. ————— DUPLICATE TAKEN —————

LW: 3.37 ft. —————

Well volume: 0.54 gal. —————

Depth of sampling: 19.00 ft. —————

1327 Preliminary flow rate at 230 $\frac{mL}{min}$. —————

1336 Initial readings. Flow rate: 256 $\frac{mL}{min}$. Temp: 16.8°C

SPC: 2376 $\frac{ug}{L}$ ORP: 173.6 mV DO: 0.73 $\frac{mg}{L}$ pH: 6.00

Appearance: clear ————— Turbidity: 0.64 —————

For more details, see Field Data Sheet. —————

Note: Turbidimeter is ~~at 100%~~ calibration is 100% compared to this morning. —————

1411 Begin sampling VOA's. 1418 for duplicate —————

TAL & Cyanide ————— purposes. —————

Return the Rain

04/11/19 TDD 0001/18-173 — 6

Function Metals / FMRI - Muskegon, O/K

1418 Begin sampling 1 L amber PCBs — 6

1429 Begin sampling SVOCs. 1 L amber — 6

1451 Begin sampling 1 L poly Ra 226/228 — 6

1521 ~~Begin~~ End of sampling. Final water lvl = 17.8 ft. — 6

1528 Disposal of purge & wash water. — 6

Note: Philip Ofosu will not join for next sampling — 6

1548 Arrive at MW-625. Sunny, 70°F, — 6

14mph winds from the West. — 6

Well casing: 4-in — Photo 09:05 — 6

TD — : 22.75 ft. — 6

STW — : 17.63 ft. — 6

LW — : 5.12 ft. — 6

1 Well Vol: 3.33 gal — 6

Depth of sampling: 21.00 ft. — 6

1602 Purge begins. Initial flow rate 304 $\frac{mL}{min}$. — 61611 First flow readings. Flow rate = ~~30~~ 304 $\frac{mL}{min}$. — 6Temp: 17.9°C SPC: 1396 $\frac{mS}{cm}$ ORP: 91.9 mV DO: 0.29 $\frac{mg}{L}$ — 6

pH: 7.55 Appearance: clear Turbidity: 0.81 NTU. — 6

1641 Begin sampling VOAs, TAL, & Cyanide. — 6

Flow rate of 281 $\frac{mL}{min}$. See Field Data Sheet for details. — 6

1644 Begin sampling 1 L Amber PCBs — 6

1650 Begin sampling 1 L amber SVOCs — 6

~~1650~~ 1659 Begin sampling 1 L poly Ra 226/228 — 6~~1650~~ 1715 End sampling. Final STW = 17.74 ft. — 6

04/11/19 TDP 0001/18-173 - 6 23

Farsteel Metals / FMRI - Muskogee, Ok.
MW CWB. Conditions @ 1732 are — 6
sunny, 61°F, 14 mph winds from the West. — 6

1732 Arrived at site well MW CWB
Well casing: 2-in. — Photo: 05:53 — 6

TD — : 19.57 ft. — 6

STW — : 15.98 ft. — 6

Low — : 3.59 ft. — 6

Well Vol. — : 0.57 gal. — 6

Depth of sampling: 18.50 ft. — 6

1747 Begin purging. ~~Flow~~ Preliminary flow rate 340 $\frac{\text{gal}}{\text{min}}$

1755 Initial readings. Flow rate = $\frac{268 \text{ gal}}{\text{min}}$. Temp = 15.6°C

SPC = 1305 $\frac{\mu\text{S}}{\text{cm}}$ ORP = 68.7 mV DO = 3.60 mg/L pH = 6.56

Appearance = clear Turbidity = 7.40 NTU Water bl = 16.55 ft

Note: Water level is falling. ORP & DO falling. — 6

1833 Begin sampling VOCs, TAL, Cyanide

Note: ORP gradually increasing. DO is gradually — 6
oscillating. Water drawdown is $-0.02 / 5\text{-min}$ — 6

1837 Begin sampling 1 L amber SVOCs — 6

1844 Begin sampling 1 L amber PCBs — 6

1852 Begin sampling 1 L poly Re 226/228 — 6

1859 Water level at 16.97 ft. — 6

1904 End of ~~work~~ sampling. 16.99 ft final water bl. — 6

09/12/19 TDD 0001/18 - 173

Fansteel Metals/FMRT - Mustogee, OK.

0730 Safety meeting. Discussed trash removal/disposal concerning radiation. Discussed hydration & ticks. Arrive to be done by 12p.

0740 Arrived MW-655. Begin calibration. Conditions are sunny with some clouds, 39°F, 4 mph winds coming from the northwest.

YSI Calibration LaMotte Turbidimeter Calib.

DO Charge Value: ^{100.1} 1000 / ~~110~~ ^{9.6} NTU 0.0 6/11/18 : 0.0 / 0.5

DO mg/L : 8.82 / ~~14.12~~ ^{11.55} ^{25.00} NTU 10.0 6/11/18 : 10.0 / 11.0

SPC : 1413 / 1511

mV @ pH 4.0 : 4.00 / 9.00 — Note! Temp might be a

MV @ pH 7.0 : 7.00 / 7.10 — factor in calibration numbers.

mV @ pH 10.0 : 10.00 / 10.20 — Changed monthly to level 761.9.

ORP mV : 240 / 255.0 — after readings. pH 7 — buffer about to expire.

0855 Begin purge.

Stephen Nguyen (Weston)

Jeff Cinner (Weston)

Philip Ofosu (EPA)

0908 Flow decreased. Dropped sampling depth to 21.00 ft.

Initial readings @ 0903 are! Flow rate = $\frac{286 \text{ ml}}{\text{min}}$

Temp = 17.5°C SPC = 931 $\frac{\mu\text{s}}{\text{cm}}$ ORP = 267.6 mV DO = 0.72 $\frac{\text{mg}}{\text{L}}$

pH = 5.89 Appearance is clear, Turbidity = 1.82 NTU

For more details see Field Data Sheet.

Well casing: 4-in ——— Photo: 09:16 ———

TD ——— : 33.68 ft. ———

StW ——— : 25.02 ft ———

Low ——— : 8.66 ft. ———

I well vol. — : 5.63 gal ———

Depth of sampling: 27:00 ft → 28:00 ft @ 0908. ———

0936 One of the FMRT site managers mentioned that one of the newer guys encountered a black snake earlier this week. We encountered a baby garter snake on Wednesday 04/10/19 near the wash station. ———

Flow rate is variable. Probably at well head pressure. Gage is at max capacity w/ sampling depth at 28.00 ft. Readings stabilized. Temp creeping up.

0942 Begin sampling VOCs, TAL, Cyanide. ———

0947 Begin sampling 1 L amber SVOCs. ———

0957 Begin sampling 1 L amber PCBs ———

1006 Begin sampling 1 L poly L 226/228 ———

1023 End of sampling. Final well water vol. = 25.4L

1030 Rechecked SPC & ORP calibration ft. again. SPC = 146.8 $\frac{mg}{L}$ ORP = 253 mV. PASSED.

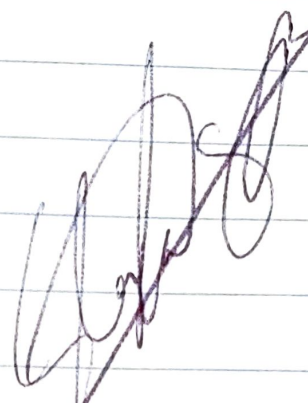
04/12/19 TDD 0001/18 - 173 -

Final Metals / FMRT - Muskogee, OK

Rite in the Rain

04/12/19

Sampling Complete.

A handwritten signature in dark ink, consisting of several loops and flourishes, positioned above the main text.