APPENDIX A

FIELD FORMS

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site

Project Name: OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type: Grab / (Composite)

Sample ID: CS-22

Date: 08-05-20

Sample Time: 16:55

Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-22	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	Yes / (No)

Field Duplicate: Yes / (No) Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-23
Date:	08-05-20
Sample Time:	17:00
Sampler Name:	DJAMS

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-23	0-1'	Brown / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	**Sample ID:** CS-24 Composite
	Date: ~~17:35~~ 08-05-20
	Sample Time: 17:~~40~~
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-24	0-1'	(Brown) / (Gray) / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	**Duplicate No.:**
MS/MSD	(Yes) / No	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / Composite
Sample ID:	CS-25 - Composite
Date:	08-05-20
Sample Time:	~~18:10~~ 18:10
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-25	0-1'	Brown, Gray, Black, Orange, Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, Sand	Yes, No	Dry, Moist, Wet	Organic, Wood, Trash	Yes, No

Field Duplicate	Yes / No	**Duplicate No.:**
MS/MSD	Yes / No	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	Sample ID: CS-26
	Date: 05-05-20
	Sample Time: 17:55
	Sampler Name: DUAL

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-26	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	Dry / (Moist) / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	~~08-06~~ CS-27- composite
Date:	08-06-2020
Sample Time:	1021 0
Sampler Name:	SI

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-27	0-1'	(Brown) / Gray / Black / (Orange) / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	Sample ID: CS-28 Composite
	Date: 08-06-20
	Sample Time: 10:30
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-28	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-29 Composite
Date:	08-06-20
Sample Time:	14:45
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-29	0-1'	(Brown) / (Gray) / Black / (Orange) / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	(Yes) / No	**Duplicate No.:** DUP-01
MS/MSD	Yes / (No)	
Comments:		

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site

Project Name: OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type: Grab / (Composite)

Sample ID: CS-30 Composite

Date: 08-06-20

Sample Time: 14:20

Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-30	0-1'	(Brown) / (Gray) / (Black) / (Orange) / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate: Yes / (No) Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab (Composite)	**Sample ID:** CS-31-Composite
	Date: 08-06-20
	Sample Time: 15:10
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-31	0-1'	(Brown) (Gray) (Black) (Orange) Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, (Sand)	Yes, (No)	(Dry) Moist, Wet	(Organic) (Wood) Trash	(Yes) No

Field Duplicate	Yes (No)	**Duplicate No.:**
MS/MSD	Yes (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site

Project Name: OU1 / OU2 Soil Sampling

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Sample Type: Grab / (Composite)

Sample ID: CS-32-Composite

Date: 08-06-20

Sample Time: 11:00

Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-32	0-1'	(Brown) / Gray / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / (Silty Sand) / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate: Yes / (No) Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-33-Composite
Date:	08-06-20
Sample Time:	09:05
Sampler Name:	SJ

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS 33	0-1'	(Brown) / Gray / (Black) / Orange / (Yellow)	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-34-Composite
Date:	08-06-20
Sample Time:	09:30
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-34	0-1'	(Brown) / (Gray) / (Black) / Orange / (Yellow)	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-35
Date:	08-6-20
Sample Time:	13:05
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-35	0-1'	(Brown) / Gray / (Black) / (Orange) / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate: (Yes) / No — Duplicate No.: Dup-02

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
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Sample Type:	Grab / Composite
Sample ID:	CS-36-Composite
Date:	08-6-20
Sample Time:	13:25
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-36	0-1'	Brown, Gray, Black, Orange, Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, Sand	Yes, No	Dry, Moist, Wet	Organic, Wood, Trash	Yes, No

Field Duplicate: Yes / No — Duplicate No.:

MS/MSD: Yes / No

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-37 Composite
Date:	08-06-20
Sample Time:	13:50
Sampler Name:	CV

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-37	0-1'	(Brown) / Gray / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	**Duplicate No.:**
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type: Grab / (Composite)

Sample ID:	CS-38 Composite
Date:	08-06-20
Sample Time:	11:35
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-38	0-1'	(Brown) / Gray / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate: Yes / (No) — **Duplicate No.:**

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

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Sample Type:	Grab / (Composite)
Sample ID:	CS-@39 Composite
Date:	08-06-20
Sample Time:	11:55
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-39	0-1'	Brown / (Gray) / Black / (Orange) / (Yellow)	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-40 - Composite
Date:	08-7-20
Sample Time:	08:40
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-40	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	**Sample ID:** CS 41 -Composite
	Date: 8-7-20
	Sample Time: 9:11
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-41	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	(Yes) / No	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab (Composite)	Sample ID: CS-42 Composite
	Date: 08-07-20
	Sample Time: 09:45
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-42	0-1'	(Brown) Gray Black Orange Yellow	Clay Sandy Clay Clayey Sand (Silty Sand) Sandy Silt Sand	Yes (No)	(Dry) Moist Wet	(Organic) (Wood) Trash	(Yes) No

Field Duplicate	Yes (No)	Duplicate No.:
MS/MSD	Yes (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	Sample ID: CS-43 Composite
	Date: 08-07-20
	Sample Time: 10:10
	Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-43	0-1'	(Brown) / Gray / (Black) / (Orange) / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	
Comments:		

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	Sample ID: CS-44 - Composite
	Date: 08-07-20
	Sample Time: 10:45
	Sampler Name: ST/CT

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-44	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	
Comments:		

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS
Project Name: OU1 / OU2 Soil Sampling	

Sample Type: ~~Grab~~ Composite

Sample ID: ~~0807-20~~ CS45Composite

Date: 08-07-20

Sample Time: 11:30

Sampler Name: SC

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-45	0-1'	Brown, Gray, Black, Orange, Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, Sand	Yes, No	Dry, Moist, Wet	Organic, Wood, Trash	Yes, No

Field Duplicate: Yes / No (No) Duplicate No.:

MS/MSD: Yes / No (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

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Environmental Challenges
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Sample Type:	Grab / Composite
Sample ID:	CS-46-Composite
Date:	08-07-20
Sample Time:	12:12
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-46	0-1'	Brown, (Gray), (Black), Orange, Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, (Sand)	Yes, (No)	(Dry), Moist, Wet	(Organic), Wood, Trash	(Yes), No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-47-Composite
Date:	08-07-20
Sample Time:	12:42
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-47	0-1'	Brown, (Gray), (Black), Orange, Yellow	Clay, Sandy Clay, Clayey Sand, Slity Sand, Sandy Silt, (Sand)	Yes, (No)	(Dry), Moist, Wet	(Organic), (Wood), Trash	(Yes), No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site

Project Name: OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type: Grab / (Composite)

Sample ID: CS-48-Composite

Date: 08-08-20

Sample Time: 09:00

Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-48	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / (Slity Sand) / Sandy Silt / (Sand)	Yes / (No)	Dry / (Moist) / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate: (Yes) / No Duplicate No.: DUP-3

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-49-Composite
Date:	08-09-23
Sample Time:	08:45
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-49	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / (Clayey Sand) / Silty Sand / Sandy Silt / (Sand)	Yes / (No)	Dry / (Moist) / (Wet)	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments: Very moist to wet sand with some clay

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-50-Composite
Date:	08-07-20
Sample Time:	17:15
Sampler Name:	GT

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-50	0-1'	Brown Gray Black Orange Yellow	Clay Sandy Clay Clayey Sand Slity Sand Sandy Silt Sand	Yes No	Dry Moist Wet	Organic Wood Trash	Yes No

Field Duplicate: Yes / (No) Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-51 (composite)
Date:	8-7-20
Sample Time:	1705
Sampler Name:	DF/BH

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-51	0-1'	Brown / (Gray) / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	Dry / (Moist) / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	**Duplicate No.:**
MS/MSD	Yes / (No)	

Comments: Shoveled down to 1 foot for each increment. Took samples from each side wall.

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-52 (composite)
Date:	8-8-20
Sample Time:	0930
Sampler Name:	DF / BH

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-52	0-1'	(Brown) / Gray / Black / Orange / Yellow / (Light Brown)	Clay / Sandy Clay / Clayey Sand / (Slity Sand) / Sandy Silt / (Sand)	Yes / (No)	Dry / (Moist) / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:
CS-52-A: Lignite / Coal fragments.
CS-52-B: Location on power line easement.
CS-52-C: Location on power line easement. Shell fragments.
CS-52-E: Found adjacent to miscellaneous household trash including plastic bottles and miscellaneous plastic.

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site	EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®
Project Name: OU1 / OU2 Soil Sampling	
Sample Type: Grab / (Composite)	Sample ID: CS-53
	Date: 8.25.20
	Sample Time: 16:30
	Sampler Name: ST, TM

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-53	0-1'	(Brown) Gray (Black) Orange Yellow	Clay Sandy Clay Clayey Sand Silty Sand (Sandy Silt) Sand	Yes (No)	Dry (Moist) Wet	(Organic) (Wood) Trash	(Yes) No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments: CS-53-A: middle of the road. 1' of gravel. No sample collected.

CS-53-C: plastic

CS-53-E: plastic trash

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type:	Grab / (Composite)
Sample ID:	CS-54 - B Composite
Date:	8/7/20
Sample Time:	11:50
Sampler Name:	ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-54	0-1'	(Brown) / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / (Wood) / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name: Kerr-McGee Chemical Corporation Site

Project Name: OU1 / OU2 Soil Sampling

EARTHCON
Environmental Challenges
BUSINESS SOLUTIONS

Sample Type: Grab / (Composite)

Sample ID: CS-55-Composite

Date: 08-07-20

Sample Time: 15:02

Sampler Name: ST

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-55	0-1'	Brown / (Gray) / (Black) / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / (Sand)	Yes / (No)	(Dry) / Moist / Wet	(Organic) / Wood / Trash	(Yes) / No

Field Duplicate: Yes / (No) Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-RISB02
Date:	8-5-20
Sample Time:	1330
Sampler Name:	TM / CA

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-RISB02	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / (Sandy Clay) / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / (No)	(Dry) / Moist / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	**Duplicate No.:**
MS/MSD	Yes / (No)	

Comments:
Old asphalt near RISB02-A.

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CS-SB-125
Date:	8.5.20
Sample Time:	1648
Sampler Name:	~~TH~~, ~~BH~~, DA

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-SB-125	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / (Sandy Clay) / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / (No)	(Dry) / Moist / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	Duplicate No.:
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type: Grab / (Composite)

Sample ID: CSSS-101

Date: .8

Sample Time: 8/5/20 17:27

Sampler Name: TM

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-SS-101	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / (Sandy Clay) / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / (No)	(Dry) / Moist / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate: Yes / (No) — Duplicate No.:

MS/MSD: Yes / (No)

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / (Composite)
Sample ID:	CSSS-104
Date:	8/5/20
Sample Time:	1816
Sampler Name:	JM, [illegible], CA

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-SS-104	0-1'	(Brown) / Gray / Black / Orange / Yellow	Clay / (Sandy Clay) / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / (No)	(Dry) / Moist / Wet	Organic / Wood / Trash	(Yes) / No

Field Duplicate	Yes / (No)	**Duplicate No.:**
MS/MSD	Yes / (No)	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling
Sample Type:	Grab / Composite
Sample ID:	CS-SS-106
Date:	8-6-2020
Sample Time:	11:25
Sampler Name:	JU, BH

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-SS-106	0-1'	Brown / Gray / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / No	Dry / Moist / Wet	Organic / Wood / Trash	Yes / No

Field Duplicate: Yes / No — Duplicate No.:

MS/MSD: Yes / No

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / Composite
Sample ID:	CS-SS-109
Date:	08/06/20
Sample Time:	12:05PM
Sampler Name:	DF/CA

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-SS-109	0-1'	Brown / Gray / Black / Orange / Yellow	Clay / Sandy Clay / Clayey Sand / Slity Sand / Sandy Silt / Sand	Yes / No	Dry / Moist / Wet	Organic / Wood / Trash	Yes / No

Field Duplicate	Yes / No	**Duplicate No.:**
MS/MSD	Yes / No	

Comments:

Field Sample Form

Site Name:	Kerr-McGee Chemical Corporation Site
Project Name:	OU1 / OU2 Soil Sampling

EARTHCON® Environmental Challenges BUSINESS SOLUTIONS®

Sample Type:	Grab / **Composite**
Sample ID:	CS-TB07
Date:	09/06/20
Sample Time:	13:40
Sampler Name:	DF

Grab/Aliquot Location ID:	Depth (ft)	Color	Soil Type	Chemical Odor	Moisture	Misc. Debris	Photograph
CS-TB07	0-1'	Brown, Gray, **Black**, Orange, Yellow	Clay, Sandy Clay, Clayey Sand, **Slity Sand**, Sandy Silt, Sand	Yes, **No**	Dry, **Moist**, Wet	**Organic**, Wood, Trash (gravel)	Yes, **No**

Field Duplicate	Yes / **No**	**Duplicate No.:**
MS/MSD	Yes / **No**	

Comments:

TB-07-A: Slight chemical odor

TB-07-B: Slight chemical odor, 3' from railroad tie

TB-07-C: 3' offset from stake; trace gravel; wood debris present; at 8" bgs - concrete slab

TB-07-D: Adjacent to railroad tie

TB-07-E: at 2" bgs concrete; no sample collected

APPENDIX B

PHOTOGRAPHIC LOG

Sample Location: CS-22	**Date: 08/05/20**

Note: No composite soil photo taken. Aliquot location CS-22-B is a representative sample.

Sample Location: CS-23	**Date: 08/05/20**

Note: No composite soil photo taken. Aliquot location CS-23-A is a representative sample.

Sample Location: CS-24	**Date:08/05/20**

Sample Location: CS-25	**Date:08/05/20**

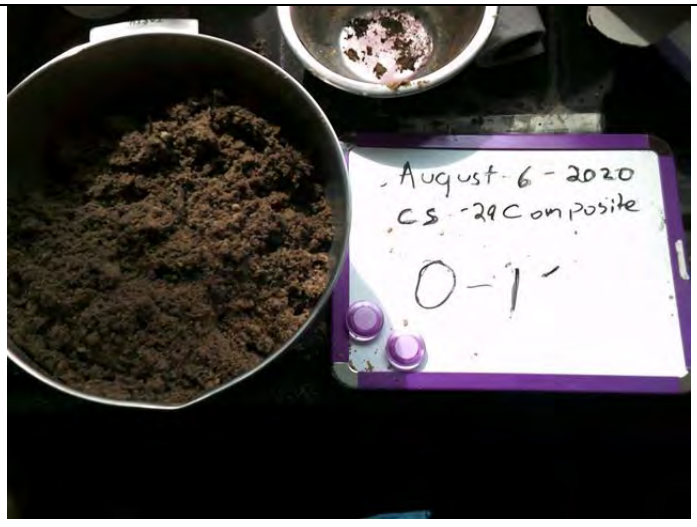
Note: No composite soil photo taken. Aliquot location CS-25-C is a representative sample.

Sample Location: CS-26	**Date: 08/05/20**

Sample Location: CS-27	**Date:08/06/20**

Sample Location: CS-28	**Date: 08/06/20**

Sample Location: CS-29	**Date: 08/06/20**



Sample Location: CS-30	**Date: 08/06/20**

Sample Location: CS-31	**Date: 08/06/20**

Sample Location: CS-32	**Date: 08/06/20**

Sample Location: CS-33	**Date: 08/06/20**

Sample Location: CS-34	**Date: 08/06/20**

Sample Location: CS-35	**Date: 08/06/20**

Note: Whiteboard label is incorrect; should be CS-35-E

Sample Location: CS-36	**Date: 08/06/20**

Sample Location: CS-37	**Date: 08/06/20**

Sample Location: CS-38	**Date: 08/06/20**

Note: Whiteboard label is incorrect; should be CS-38-B

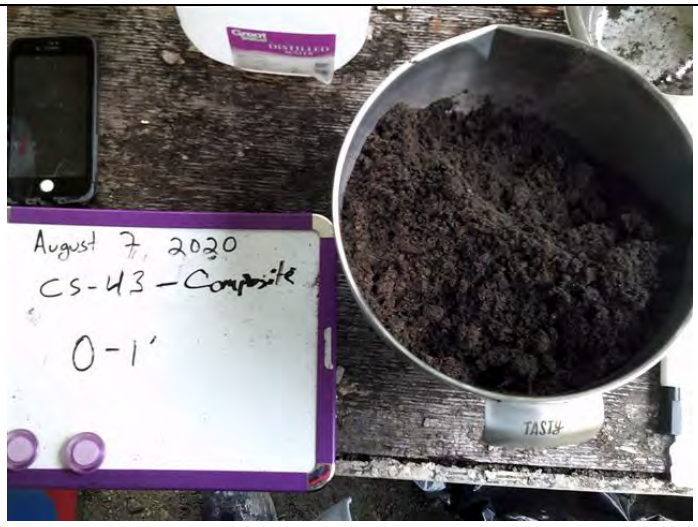
Sample Location: CS-39	**Date: 08/06/20**

Sample Location: CS-40	**Date: 08/07/20**

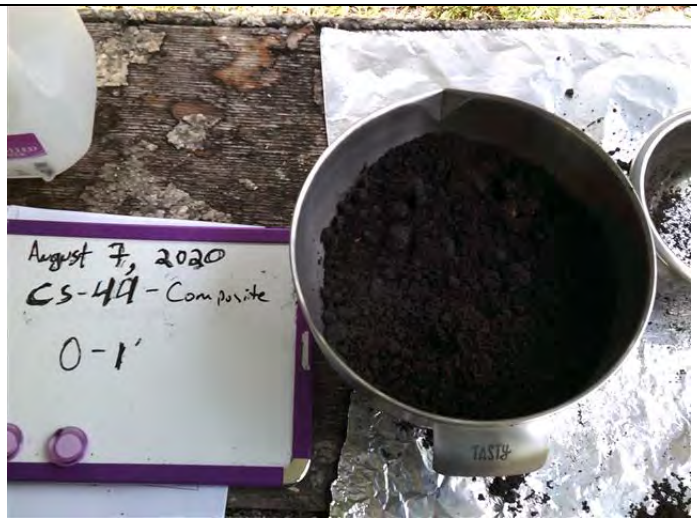
Sample Location: CS-41	**Date: 08/07/20**

Sample Location: CS-42	**Date: 08/07/20**

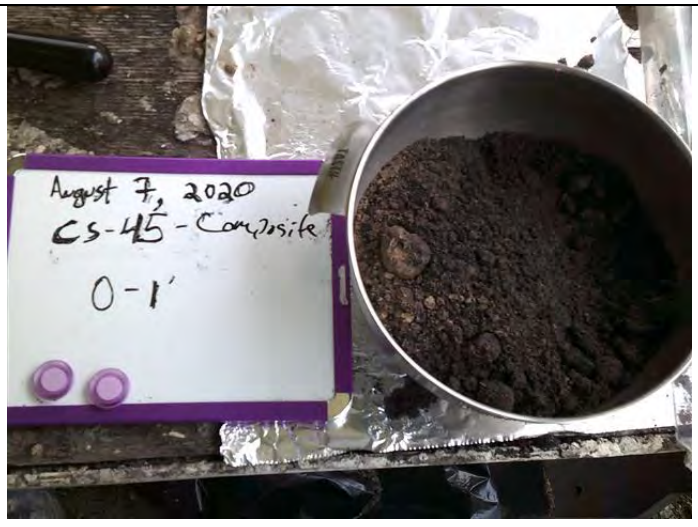
Sample Location: CS-43	**Date: 08/07/20**



Sample Location: CS-44	**Date: 08/07/20**



Sample Location: CS-45	**Date: 08/07/20**



Sample Location: CS-46	**Date: 08/07/20**

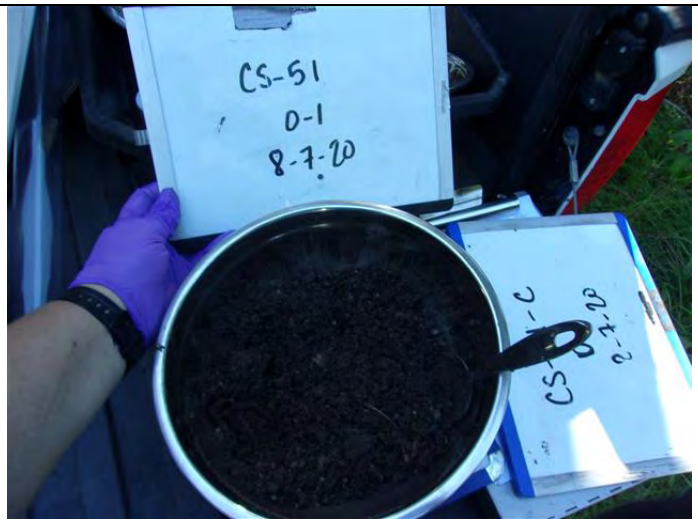
Sample Location: CS-47	**Date: 08/07/20**

Sample Location: CS-48	**Date: 08/08/20**

Sample Location: CS-49	**Date: 08/08/20**

Sample Location: CS-50	**08/07/20**

Sample Location: CS-51	**08/07/20**



Sample Location: CS-52	**08/08/20**

Sample Location: CS-53	**08/25/20**

Sample Location: CS-54	**08/07/20**

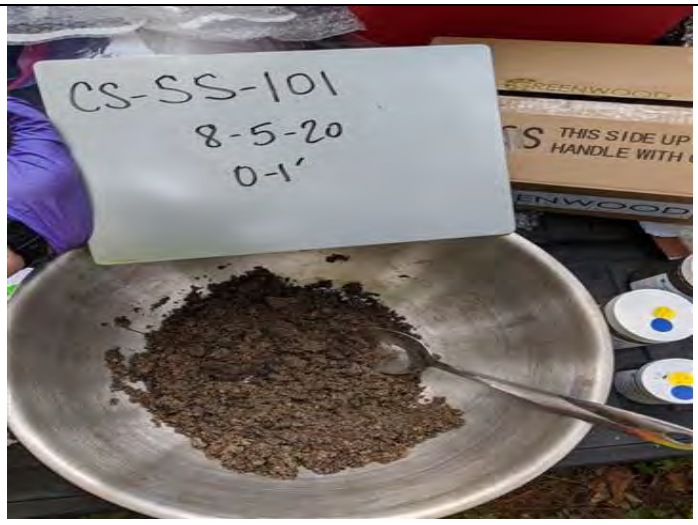
Sample Location: CS-55	**08/07/20**

Sample Location: CS-RISB02	**Date: 08/05/20**

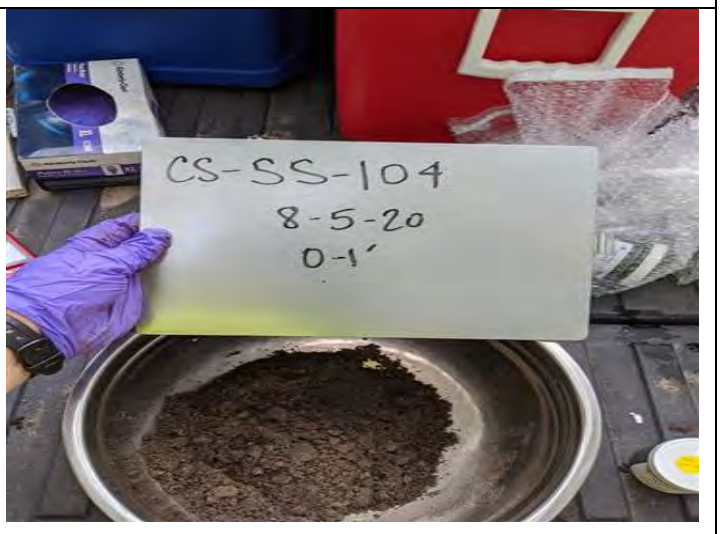
Note: No composite soil photo taken. Aliquot location RISB02-D is a representative sample.

Sample Location: CS-SB-125	Date: 08/05/20

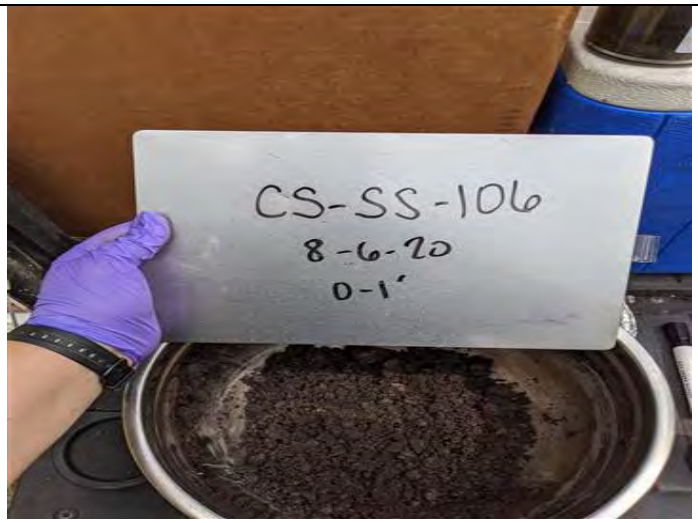
Sample Location: CS-SS-101	Date: 08/05/20



Sample Location: CS-SS-104	Date: 08/05/20



Sample Location: CS-SS-106	**Date: 08/06/20**

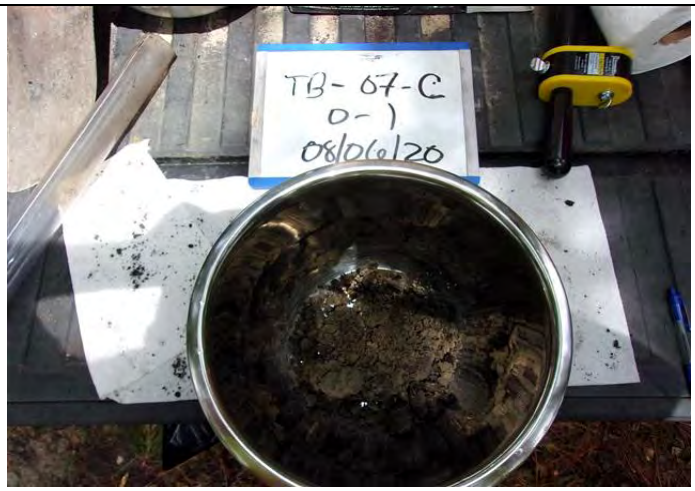


Sample Location: CS-SS-109	**Date: 08/06/20**

Note: No composite soil photo taken. Aliquot location SS-109-A is a representative sample.

Sample Location: CS-TB-07	**Date: 08/06/20**

Note: No aliquot sample collected from this location due to the presence of concrete.



Note: No composite soil photo taken. Aliquot location TB-07-C is a representative sample.

APPENDIX D

DATA VALIDATION NARRATIVE

DATA VALIDATION REPORT

KERR-MCGEE CHEMICAL CORPORATION SITE
NAVASSA, NORTH CAROLINA
OU1 SOIL SAMPLING 2020

Prepared for:

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Prepared by:

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EcoChem Project: C26803-13

August 28, 2020

Approved for Release:

Christine Ransom
Senior Project Chemist
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of compliance (EPA Stage 2A) and full validation (EPA Stage 3/4) performed on soil and associated quality control sample data for the former Kerr-McGee Chemical Corporation Site, Navassa, North Carolina. A complete list of samples is provided in the Sample Index.

Analyses were performed by SGS North America, Orlando, FL, with the exception of Dioxins/Furans which were analyzed at the Wilmington, North Carolina lab. The analytical methods and EcoChem project chemists are listed in the following table:

ANALYSIS	METHOD	PRIMARY REVIEW	SECONDARY REVIEW
Dioxins/Furans	8290A	B. Frans	C. Ransom
Pentachlorophenol (PCP)	SW8270E	E. Clayton	
Polycyclic Aromatic Hydrocarbons (PAH)	SW8270E SIM		
Total Solids	SM2540G		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Quality Assurance Project Plan, Kerr-McGee Chemical Corporation – Navassa Superfund Site, Navassa, North Carolina* (EarthCon, September 2015); National *Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2017); and *National Functional Guidelines for High Resolution Superfund Methods Data Review* (USEPA 2016).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Data that have been rejected are flagged with (R). Rejected data should not be used for any purpose. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Validation criteria are included as Appendix A. The qualified data summary table (QDST) is included as Appendix B. Data Validation Worksheets and project associated communications will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted.

Sample Index
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	SVOC	SIM PAH	Dioxins
FA77576	CS-TB-07	FA77576-1	✓	✓	
FA77576	CS-SS-106	FA77576-2	✓	✓	
FA77576	CS-27	FA77576-3	✓	✓	
FA77576	CS-35	FA77576-4	✓	✓	
FA77576	CS-37	FA77576-5	✓	✓	
FA77576	CS-SS-109	FA77576-6	✓	✓	
FA77576	DUP-02	FA77576-7	✓	✓	
FA77576	CS-36	FA77576-8	✓	✓	
FA77576	CS-39	FA77576-9	✓	✓	
FA77576	CS-32	FA77576-10	✓	✓	
FA77576	CS-28	FA77576-11	✓	✓	
FA77576	CS-34	FA77576-12	✓	✓	
FA77576	CS-38	FA77576-13	✓	✓	
FA77576	CS-33	FA77576-14	✓	✓	
FA77581	CS-SS-104	FA77581-1	✓	✓	
FA77581	CS-23	FA77581-2	✓	✓	
FA77581	CS-SS-101	FA77581-3	✓	✓	
FA77581	CS-22	FA77581-4	✓	✓	
FA77581	CS-24	FA77581-5	✓	✓	
FA77581	CS-R1SB-02	FA77581-6	✓	✓	
FA77581	SS-108-D	FA77581-7	✓	✓	
FA77581	CS-SB-125	FA77581-8	✓	✓	
FA77581	CS-25	FA77581-9	✓	✓	
FA77581	CS-26	FA77581-10	✓	✓	
FA77615	CS-29	FA77615-1	✓	✓	
FA77615	CS-30	FA77615-2	✓	✓	
FA77615	CS-31	FA77615-3	✓	✓	
FA77615	DUP-01	FA77615-4	✓	✓	
FA77615	CS-40	FA77615-5	✓	✓	
FA77615	CS-41	FA77615-6	✓	✓	
FA77615	CS-42	FA77615-7	✓	✓	
FA77615	CS-43	FA77615-8	✓	✓	
FA77615	CS-44	FA77615-9	✓	✓	
FA77615	CS-45	FA77615-10	✓	✓	
FA77615	CS-54	FA77615-11	✓	✓	
FA77615	CS-46	FA77615-12	✓	✓	
FA77615	CS-47	FA77615-13	✓	✓	
FA77689	CS-55	FA77689-1	✓	✓	
FA77689	CS-50	FA77689-2	✓	✓	
FA77689	CS-51	FA77689-3	✓	✓	

Sample Index
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	SVOC	SIM PAH	Dioxins
FA77689	FB-02	FA77689-4	✓	✓	
FA77689	EB-02	FA77689-5	✓	✓	
FA77689	EB-03	FA77689-6	✓	✓	
FA77689	EB-04	FA77689-7	✓	✓	
FA77689	CS-48	FA77689-8	✓	✓	
FA77689	CS-52	FA77689-9	✓	✓	
FA77689	DUP-03	FA77689-10	✓	✓	
FA77689	CS-49	FA77689-11	✓	✓	
FA77689	EB-07	FA77689-12	✓	✓	
B4511	CS-22	B4511_17654_DF_005			✓
B4511	CS-23	B4511_17654_DF_004			✓
B4511	CS-26	B4511_17654_DF_006			✓
B4511	CS-SS-101	B4511_17654_DF_001			✓
B4511	CS-24	B4511_17654_DF_003			✓
B4511	CS-SB-125	B4511_17654_DF_002			✓
B4511	CS-SS-104	B4511_17654_DF_008			✓
B4511	CS-25	B4511_17654_DF_007			✓
B4511	CS-RISB02	B4511_17654_DF_010			✓
B4511	SS-108-D	B4511_17654_DF_009			✓
B4519	CS-38	B4519_17655_DF_006			✓
B4519	CS-34	B4519_17655_DF_005			✓
B4519	CS-35	B4519_17655_DF_008			✓
B4519	CS-39	B4519_17655_DF_007			✓
B4519	CS-28	B4519_17655_DF_002			✓
B4519	CS-27	B4519_17655_DF_001			✓
B4519	CS-33	B4519_17655_DF_004			✓
B4519	CS-32	B4519_17655_DF_003			✓
B4519	CS-SS-109	B4519_17655_DF_014			✓
B4519	CS-SS-106	B4519_17655_DF_013			✓
B4519	CS-37	B4519_17655_DF_010			✓
B4519	CS-36	B4519_17655_DF_009			✓
B4519	CS-TB-07	B4519_17655_DF_012			✓
B4519	DUP-02	B4519_17655_DF_011			✓
B4526	CS-41	B4526_17662_DF_006			✓
B4526	CS-42	B4526_17662_DF_007			✓
B4526	CS-30	B4526_17662_DF_002			✓
B4526	CS-29	B4526_17662_DF_001			✓
B4526	DUP-01	B4526_17662_DF_004			✓
B4526	CS-40	B4526_17662_DF_005			✓
B4526	CS-31	B4526_17662_DF_003			✓

Sample Index
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	SVOC	SIM PAH	Dioxins
B4526	CS-47	B4526_17662_DF_013			✓
B4526	CS-46	B4526_17662_DF_012			✓
B4526	CS-44	B4526_17662_DF_009			✓
B4526	CS-43	B4526_17662_DF_008			✓
B4526	CS-54	B4526_17662_DF_011			✓
B4526	CS-45	B4526_17662_DF_010			✓
B4527	EB-02	B4527_17665_DF_004			✓
B4527	FB-02	B4527_17665_DF_003			✓
B4527	EB-03	B4527_17665_DF_005			✓
B4527	FB-01	B4527_17665_DF_001			✓
B4527	EB-01	B4527_17665_DF_002			✓
B4527	EB-04	B4527_17665_DF_006			✓
B4527	EB-07	B4527_17665_DF_007			✓
B4528	CS-48	B4528_17661_DF_004			✓
B4528	CS-51	B4528_17661_DF_003			✓
B4528	CS-52	B4528_17661_DF_005			✓
B4528	CS-55	B4528_17661_DF_001			✓
B4528	CS-50	B4528_17661_DF_002			✓
B4528	DUP-03	B4528_17661_DF_006			✓
B4528	CS-49	B4528_17661_DF_007			✓

DATA VALIDATION REPORT
Kerr McGee Navassa Site – OU1 Soil Sampling 2020
Semi-Volatile Organic Compounds by SW8720E, Pentachlorophenol by SW8270E SIM, and Total Solids by SM 2540

This report documents the review of analytical data from the analysis of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS North America, Orlando, Florida. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
FA77576	14 Soil	EPA Stage 2A
FA77581	10 Soil	EPA Stage 2A
FA77615	13 Soil	EPA Stage 2A
FA77689	7 Soil, 4 Equipment Blank, 1 Field Blank	EPA Stage 4 (2A for blanks)

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

The duplicate sample summaries for the total solids analyses were missing from the laboratory report. The laboratory was contacted and submitted the missing documentation.

EDD TO HARDCOPY VERIFICATION

The electronic data deliverable (EDD) was verified against the laboratory portable document format (PDF) data package. No transcription errors were found.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	2	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
✓	GC/MS Instrument Performance (Full DV only)	✓	Internal Standards (Full DV only)
✓	Initial Calibration (ICAL) (Full DV only)	2	Field Duplicates
✓	Continuing Calibration Verification (CCV) (Full DV only)	✓	Target Analyte List
✓	Laboratory Blanks	1	Reporting Limits
1	Field Blanks	✓	Reported Results
✓	Surrogate Compounds	✓	Compound Identification (Full DV only)
✓	Laboratory Control Samples (LCS)	1	Calculation Verification (Full DV only)

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed
1 Quality control outliers are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

SDGs FA77576, FA77581: Some sample coolers were received at temperatures less than the lower control limit between 0.1 to 1.4°C. Results were not adversely affected by the temperature outliers; no action was taken.

SDG FA77576: Sample CS-24 listed on the chain-of-custody (COC) was logged in as Sample CS-34 as per confirmation from the client.

Field Blanks

SDG FA77689: One field blank, FB-02, and four equipment blanks, EB-02, EB-03, EB-04, and EB-07 were submitted. No target analytes were detected in these blanks.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed at the required frequency. Lab limits were used to evaluate the MS/MSD recoveries. No data were qualified if only one of the MS or MSD recoveries was outside of the control limits. Qualifiers for %R value outliers were only issued to the parent sample. The following outliers resulted in qualification of data:

SDG	Parent ID	Analyte	MS %R	MSD %R	RPD	Bias	Qualifier
FA77581	CS-24	Fluoranthene	171	155	--	High	J-8H
		Pyrene	159	153	--	High	J-8H
		Chrysene	135	114	--	High	J-8H
		Benzo(a)anthracene	126	132	--	High	J-8H

Field Duplicates

The relative percent difference (RPD) control limit is 50% for results greater than 5x the reporting limit (RL). For results < 5x the RL, the difference between the sample and duplicate must be less than 2x the RL.

SDG FA77576: Samples CS-55 & DUP-02 were identified as field duplicates. All acceptance criteria were met.

SDG FA77615: Samples CS-29 & DUP-01 were identified as field duplicates. All acceptance criteria were met.

SDG FA77689: Samples CS-48 & DUP-03 were identified as field duplicates. For fluoranthene, the difference between the two results was greater than 2x the RL. The fluoranthene results for these two samples were estimated (J-9).

Reporting Limits

Reporting limits specified in the QAPP were not met for several analytes due to required dilutions and possible matrix interferences.

Calculation Verification

SDG FA77689: Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, laboratory control sample, and MS/MSD percent recovery values and precision was acceptable as demonstrated by the MS/MSD and field duplicate RPD values.

Results were estimated based on MS/MSD percent recovery outliers and a field duplicate precision outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Kerr McGee Navassa Site – OU1 Soil Sampling 2020
Dioxin/Furan Compounds by EPA Method 8290A

This report documents the review of analytical data from the analysis of soil samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by SGS North America, Wilmington, North Carolina. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples and Matrix	Validation Level
B4511	10 Soil	EPA Stage 2A
B4519	14 Soil	EPA Stage 2A
B4527	4 Equipment Blank & 1 Field Blank	EPA Stage 2A
B4528	7 Soil	EPA Stage 4

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables in the initial data packages. The laboratory was contacted and supplied the missing documentation. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (100% verification) by comparing the EDD to the hardcopy laboratory data package. Ten percent (10%) of the laboratory QC results were also verified. The following discrepancies were noted:

The basis field in the EDD was not populated. The basis for QC samples that were not dry weight corrected were updated to "WET"; field samples were updated to "DRY".

The sample matrix for MS/MSD and field duplicate samples were reported in the EDD as SQ (soil QC); the sample matrix code was updated to SO.

SDG B4511. Although it agrees with the CoC, the ID for Sample CS-RISB02 is different than the ID of CS-R1SB-02 used in the SGS Orlando data.

SDGs B4511 and B4519: The sample matrix in the EDD was reported as SE (Sediment). The COC reported the matrix as SO (Soil). The EDD was updated with the correct matrix code.

TECHNICAL DATA VALIDATION

The quality control (QC) requirements that were reviewed are listed in the following table.

✓	Sample Receipt, Preservation, and Holding Times	✓	Ongoing Precision and Recovery (OPR)
✓	System Performance and Resolution Checks (Full DV only)	2	Field Duplicates
✓	Initial Calibration (ICAL) (Full DV only)	✓	Target Analyte List
✓	Calibration Verification (CCAL) (Full DV only)	✓	Reporting Limits
2	Laboratory Blanks	2	Compound Identification
1	Field Blanks	2	Compound Quantitation (Full DV only)
✓	Labeled Compound Recovery	1	Calculation Verification (Full DV only)
✓	Matrix Spike/Matrix Spike Duplicates (MS/MSD)		

✓Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Laboratory Blanks

To assess the impact of any blank contaminant on the reported sample results, an action level is established at five times (5x) the concentration reported in the blank. If a contaminant is reported in an associated field sample and the concentration is less than the action level, the result is qualified as not detected (U-7). No action is taken if the sample result is greater than the action level, or for non-detected results. The laboratory assigned EMPC-flags to values when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications but are "estimated maximum possible concentrations". When these occurred in the method blank the results were considered as false positives. No action levels were established for these analytes. In addition, homolog groups are not evaluated for blanks.

SDG B4519. The compounds 1234678-HPCDD and OCCD were detected in the method blank. Results for these analytes in the associated samples were greater than the action levels; no data were qualified.

SDG B4527. The compounds 1234678-HPCDD and OCCD were detected in the method blank. Results for OCDD in samples FB-01 and EB-01 were less than the action level and were qualified as not-detected (U-7).

Field Blanks

SDG B4527: Two field blanks, FB-01 and FB-02, and five equipment blanks, EB-01, EB-02, EB-03, EB-04, and EB-07 were submitted and analyzed. After qualification based on method blank contamination and EMPCs, there were no positive results or the individual congeners. Total homolog groups are not evaluated. No qualification of data was necessary based on potential field contamination.

Field Duplicates

For sediment samples, the RPD control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the difference between the sample and duplicate must be less than 2x the RL. Field duplicates and any outliers are noted below:

SDG B4519: Samples CS-35 and DUP-02 were submitted as field duplicates. All field precision criteria were met.

SDG B4526: Samples CS-29 and DUP-01 were submitted as field duplicates. All field precision criteria were met.

SDG B4528: Samples CS-48 and DUP-03 were submitted as field duplicates. The RPD or difference values for results that greater than control limit for analytes 1234678-HpCDD, OCDD, Total HpCDD, Total HxCDD, Total TCDD, and Total TCDF greater than the control limits. Results for these analytes in these two samples were estimated (J-9).

Compound Identification

The method requires the confirmation of 2,3,7,8-TCDF detects using an alternate GC column when closely eluting TCDF isomers cannot be adequately separated on the primary column. The laboratory uses an RTX-Dioxin2 column, which has been proven to adequately resolve the TCDF isomers. Confirmation of hits for 2,3,7.8-TCDF was not necessary.

The laboratory reported "estimated maximum possible concentrations" values (EMPC) for one or more of the target analytes. An EMPC value is reported when a peak was detected but did not meet the ion ratio identification criteria specified in the method. These EMPC results are not considered to be positive identifications for the analytes. To indicate that the reported result for an individual analyte is in effect an elevated detection limit, the EMPC values were qualified as not detected (U-25) at the reported values. An EMPC flag was also added to the Total homolog group values if one or more of the individual congeners was reported as an EMPC. The results for totals with EMPC flags were estimated (J-25).

Compound Quantitation

SG B4519: The Total HpCDD result for Sample CS-37 was flagged with an "E" by the laboratory to indicate the result exceeded the calibration range. This result was estimated (J-20).

Calculation Verification

SDG B4528: Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory performed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the labeled compound, OPR (blank spike), and matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision was acceptable as indicated by the MS/MSD and field duplicate RPD values.

Detection limits were elevated based on method blank contamination and ion ratio outliers (EMPC values). Total homolog groups with EMPC values were estimated. Data were also estimated based on field precision outliers. One total HpCDD result was estimated for exceeding the calibration range.

All data, as qualified, are acceptable for use.

ECOCHEM
Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
	5C	Initial Calibration Verification (ICV %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS and/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	4°C±2°C sediment/tissues may require storage at -20°C	NFG (1) Method (3)	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use **PJ** for temp outliers; see **TM20** Current SW846 criterion is ≤ 6° C (3)
Holding Time	**Extraction Aqueous:** 7 days from collection **Extraction Solid:** 14 days from collection **Analysis (all matrices)**: 40 days from extraction Holding time may be extended to 1 year for frozen sediments/tissues	NFG (1) Method (3)	J (pos)/UJ (ND) if HT exceeded J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Gross exceedance = > 2x HT, as per 1999 NFG
Instrument Performance					
Tuning	DFTPP Beginning of each 12 hour period Use method or project acceptance criteria	NFG (1) Method (3)	R (pos/ND) all analytes in all samples associated with the tune	24	
Initial Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG (1) Method (3)	Use **PJ** to qualify J (pos)/UJ (ND)	5A	**TM-06** EcoChem Policy for the Evaluation and Qualification of GCMS Instrument Performance **PJ** - no action if response is stable (ICAL RSD and CCAL %D acceptable)
Initial Calibration **Stability**	Minimum 5 standards %RSD ≤ 20.0% except: %RSD ≤ 40.0% poor responders * **or** co-efficient of determination (r^2) > 0.99	NFG (1) Method (3)	J (pos) if %RSD > limit **or** r^2 value <0.99	5A	
Initial Calibration Verification Check	Prepared from second source; analyze after each ICAL Percent recovery limits = 70-130%	Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) %R < LCL	5A (H,L)[4]	QAPP may have overriding accuracy limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance (continued)					
Continuing Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG [1] Method [3]	Use **PJ** to qualify J (pos)/UJ (ND)	5B	see ICAL RRF guidance
Continuing Calibration **Stability**	Prior to sample analysis and every 12 hours %D ≤ 25% except: %D ≤ 40.0% poor responders *	NFG [1] Method [3]	J (pos) - %D > control limit (high bias) J (pos)/UJ (ND) - %D < -control limit (low bias)	5B (H,L)[4]	
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > MDL	NFG [2] Method [3]	U(pos) if result is < 5X or 10X action level	7	10X action level applies to phthalates only. 5X for all other target analytes **Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review FB , qualify as needed** **Note: Actions as per 1999 NFG**
	No TICs present		R (pos) TICs using 10X rule	7	
Field Blank (FB)	No detected compounds > MDL	NFG [2] Method [3]	U (pos) if result is < 5X or 10X action level	6	
Precision and Accuracy					
LCS/LCSD (recovery)	One per matrix per batch (of ≤ 20 samples) LCSD not required by NFG or method Use method acceptance criteria/laboratory limits	Method [3]	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND)%R < 10%	10 (H,L)[4]	No action if only one spike %R is outside criteria when LCSD is analyzed, unless one recovery is <10%. QAPP may have overriding accuracy limits. Qualify all associated samples.
LCS/LCSD (RPD)	If LCSD analyzed RPD < lab limits	Method [3]	J (pos)	9	Qualify all associated samples. QAPP may have overriding precision limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy (continued)					
Reference Material (RM, SRM, or CRM)	Result ±20% of the 95% confidence interval of the true value for analytes	EcoChem standard policy	J (pos)/UJ (ND) if < LCL J (pos) if > UCL	12 (H,L)[4]	QAPP may have overriding accuracy limits. Some manufacturers have different RM control limits
MS/MSD (recovery)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) if both %R < LCL J (pos)/R (ND) if both %R < 10% J (pos)/UJ (ND) if one > UCL & one < LCL, with no bias	8 (H,L)[4]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only.
MS/MSD (RPD)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (2)	J (pos) in parent sample if RPD > CL	9	Qualify parent sample only
Surrogates	Minimum of 3 acid & 3 base/neutral (B/N) compounds added to all samples Within method control limits	NFG (1) Method (3)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND) if %R < 10%	13 (H,L)[4]	Qualify all compounds in associated fraction. Do not qualify if only 1 acid and/or 1 B/N surrogate is out, unless <10%. If 1 surrogate outlier < 10% then J (pos)/R (ND)
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	NFG (1) Method (3)	J (pos) if > 200% J (pos)/UJ (ND) if < 50% J (pos)/R (ND) if < 25% if RT >30 seconds use **PJ**	19	Qualify compounds quantified using particular internal standard
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	Use project limits if specified

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound Identification and Quantitation and Calculation					
Retention times and relative ion intensities	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	NFG [(1)] Method [(3)]	U (pos) if identification criteria not met	25	
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NFG [(1)] Method [(3)]	NJ the TIC unless: R (pos) common laboratory contaminants	4	
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	EcoChem standard policy	Use "DNR" to flag results that will not be reported.	11	**TM-04** EcoChem Policy for Rejection/Selection Process for Multiple Results

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] National Functional Guidelines for Organic Data Review, October, 1999
[3] Method SW846 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, February 2007.
[4] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

(pos): Positive Result(s)
(ND): Non-detects

* "Poor responder" compounds: acetophenone, atrazine, benzaldehyde, 1,1'-biphenyl, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, caprolactam, carbazole, 4-chloroaniline, diethylphthalate, di-n-butylphthalate, 3-3'-dichlorobenzidine, dimethylphthalate, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, di-n-octylphthalate, hexachlorobutadiene, hexachlorocyclopentadiene, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol, N-nitrosodiphenylamine, 2,2'-oxybis-(1-chloropropane), 1,2,4,5-tetrachlorobenzene use a 0.010 RRF criterion.

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	Waters/Solids ≤ 6°C & in the dark Tissues <-10°C & in the dark **Preservation Aqueous:** If Cl_2 is present Thiosulfate must be added and if pH > 9 it must be adjusted to 7 - 9	NFG [1] Method[2]	J(pos)/R(ND) if thiosulfate not added if Cl_2 present; J(pos)/UJ(ND) if pH not adjusted J(pos)/UJ(ND) if temp > 20°C	1	**EcoChem PJ, see TM-05**
Holding Time	**If properly stored, 1 year or:** **Extraction (all matrices):** 30 days from collection **Analysis (all matrices)**: 45 days from extraction	NFG [1] Method[2]	If not properly stored or HT exceedance: J(pos)/UJ(ND)	1	**EcoChem PJ, see TM-05** Gross exceedance = > 1 year 2011 NFG **Note:** Under CWA, SDWA, and RCRA the HT for H2O is 7 days.
Instrument Performance					
Mass Resolution (Tuning)	PFK (Perfluorokerosene) ≥10,000 resolving power at m/z 304.9824. Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift.	NFG [1] Method [2]	R(pos/ND) all analytes in all samples associated with the tune	24	Notify PM
Windows Defining Mix	Peaks for first and last eluters must be within established retention time windows for each selector group (chlorination level)	NFG [1] Method [2]	If peaks are not completely within windows (clipped): If natives are ok, J(pos)/UJ(ND) homologs (Totals) If natives are affected, R all results for that selector group	24	Notify PM
Column Performance Mix	Both mixes must be analyzed before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) where x = ht. of TCDD (or TCDF) & y = baseline to bottom of valley For all isomers eluting near the 2378-TCDD (TCDF) peak (TCDD only for 8290)	NFG [1] Method [2]	J(pos) if valley > 25%	24	**EcoChem PJ, see TM-05, Rev. 2**; Note: TCDF is evaluated only if second column confirmation is performed
Initial Calibration **Sensitivity**	S/N ratio > 10 for all native and labeled compounds in CS1 std.	NFG [1] Method [2]	If <10, elevate Det. Limit or R(ND)	5A	
Initial Calibration **Selectivity**	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	NFG [1] Method [2]	If 2 or more ion ratios are out for one compound in ICAL, J(pos)	5A	**EcoChem PJ, see TM-05, Rev. 2**

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance (continued)					
Initial Calibration (Minimum 5 stds.) **Stability**	%RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD < 35% for labeled compounds under 1613b)	NFG [1] Method [2]	J(pos) natives if %RSD > 20%	5A	
	Absolute RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 & >15 min on DB-225	NFG [1] Method [2]	Narrate, no action		**EcoChem PJ, see TM-05, Rev. 2**
Continuing Calibration (Prior to each 12 hr. shift) **Sensitivity**	S/N ratio for CS3 standard > 10	NFG [1] Method [2]	If <10, elevate Det. Limit or R(ND)	5B	
Continuing Calibration (Prior to each 12 hr. shift) **Selectivity**	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	NFG [1] Method [2]	For congener with ion ratio outlier, J(pos) natives in all samples associated with CCAL. No action for labeled congener ion ratio outliers.	25	**EcoChem PJ, see TM-05**
Continuing Calibration (Prior to each 12 hr. shift) **Stability**	%D+/-20% for native compounds %D +/-30% for labeled compounds **(Must meet limits in Table 6, Method 1613B)** If %D in the closing CCAL are within 25%/35%, the mean RF from the two CCAL may be used to calculate samples **(Section 8.3.2.4 of 8290)**.	NFG [1] Method [2]	**Labeled compounds:** Narrate, no action. **Native compounds:** 1613: J(pos)/UJ(ND)if %D is outside Table 6 limits J(pos)/R(ND) if %D is +/-75% of Table 6 limits 8290: J(pos)/UJ(ND) if %D = 20% - 75% J(pos)/R(ND) if %D > 75%	5B (H,L)[3]	
	Absolute RT of $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123789-HxCDD should be ± 15 seconds of ICAL RRT for all other compounds must meet criteria listed in Table 2 Method 1316.	NFG [1] Method [2]	Narrate, no action	5B	**EcoChem PJ, see TM-05**
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > RL	NFG [1] Method [2]	U(pos) if result is < 5X action level.	7	**Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review FB , qualify as needed**
Field Blank (FB)	FB: frequency as per QAPP No detected compounds > RL		U(pos) if result is < 5X action level.	6	

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy					
MS/MSD (recovery)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) if both %R > UCL - high bias J(pos)/UJ(ND) if both %R < LCL - low bias J(pos)/R(ND) if both %R < 10% - very low bias J(pos)/UJ(ND) if one > UCL & one < LCL, with no bias **PJ if only one %R outlier**	8 (H,L)[3]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only unless other QC indicates systematic problems.
MS/MSD (RPD)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) in parent sample if RPD > CL	9	Qualify parent sample only.
LCS (or OPR)	One per lab batch (of ≤ 20 samples) Use most current laboratory control limits **or** Limits from Table 6 of 1613B	NFG [1] Method [2]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	10 (H,L)[3]	No action if only one spike %R is outside criteria, when LCSD is analyzed. Qualify all associated samples.
LCS/LCSD (RPD)	**LCSD not typically required for HRMS analyses.** One set per matrix and batch of 20 samples RPD < 35%	Method [2] Ecochem standard policy	J(pos) assoc. compound in all samples if RPD > CL	9	Qualify all associated samples.
Lab Duplicate (RPD)	**Lab Dup not typically required for HRMS analyses.** One per lab batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos)/UJ(ND) if RPD > CL	9	
Labeled Compounds (Internal Standards)	Added to all samples %R = 40% - 135% in all samples 8290 %R must meet limits in Table 7 Method 1613B	NFG [1] Method [2]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	13 (H,L)[3]	
Field Duplicates	Solids: RPD <50% OR difference < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	Narrate and qualify if required by project	9	**Use professional judgment**

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound ID and Calculation					
Quantitation/ Identification	All ions for each isomer must maximize within ± 2 seconds. S/N ratio >2.5 Ion ratios must meet criteria listed in Table 8 Method 8290, or Table 9 of 1613B; RRTs w/in limits in Table 2 of 1613B	NFG [1] Method [2]	Narrate in report; qualify if necessary NJ(pos) for retention time outliers. U(pos) for ion ratio outliers.	25	**EcoChem PJ, see TM-05**
EMPC (estimated maximum possible concentration)	If quantitation identification criteria are not met, laboratory should report an EMPC value.	NFG [1] Method [2]	If laboratory correctly reported an EMPC value, qualify the native compound U(pos) to indicate that the value is a detection limit and qualify total homolog groups J (pos)	25	**Use professional judgment See TM-18**
Interferences	Interferences from chlorodiphenyl ether compounds	NFG [1] Method [2]	J(pos)/UJ(ND) if present	23	**See TM-16**
	Lock masses must not deviate ± 20% from values in Table 8 of 1613B	Method [2]	J(pos)/UJ(ND) if present	24	**See TM-17**
Second Column Confirmation	All 2,3,7,8-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC criteria must also be met for the confirmation analysis.	NFG [1] Method [2]	Report the DB-225 value. If not performed use PJ.	3	DNR-11 DB5 result if both results from both columns are reported. **EcoChem PJ, see TM-05**
Calculation Check	Check 10% of field & QC sample results	EcoChem standard policy	Contact laboratory for resolution and/or corrective action	na	Full data validation only.
Electronic Data Deliverable (EDD)					
Verification of EDD to hardcopy data	EcoChem verify @ 10% unless problems noted; then increase level up to 100% for next several packages.		Depending on scope of problem, correct at EcoChem (minor issues) to resubmittal by laboratory (major issues).	na	EcoChem Project Manager and/or Database Administrator will work with lab to provide long-term corrective action.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	

(pos) - positive (detected) results; (ND) - not detected results

[1] National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) & Chlorinated Dibenzofurans (CDFs) Data Review, September 2011

[2] Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS), USEPA SW-846, Method 8290

[2] EPA Method 1613, Rev.B, Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGS/HRMS, October 1994

[3] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

ECOCHEM
Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	Total TCDD	1.62	pg/g	EMPC	J	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	Total PeCDD	5.06	pg/g	EMPC	J	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	234678-HxCDF	1.56	pg/g	J EMPC	U	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	Total HxCDF	40.1	pg/g	EMPC	J	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	Total PeCDF	8.99	pg/g	EMPC	J	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	Total TCDF	6.36	pg/g	EMPC	J	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	23478-PeCDF	0.686	pg/g	J EMPC	U	25
B4511	CS-SS-101	B4511_17654_DF_001	SW8290A	12378-PeCDF	0.32	pg/g	J EMPC	U	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total HxCDD	17.1	pg/g	EMPC	J	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	12378-PeCDD	0.187	pg/g	J EMPC	U	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	23478-PeCDF	0.189	pg/g	J EMPC	U	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	123478-HxCDD	0.562	pg/g	J EMPC	U	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total TCDD	0.264	pg/g	EMPC	J	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total HxCDF	18.2	pg/g	EMPC	J	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total PeCDF	2.46	pg/g	EMPC	J	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total TCDF	0.68	pg/g	EMPC	J	25
B4511	CS-SB-125	B4511_17654_DF_002	SW8290A	Total PeCDD	1.46	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total PeCDF	11.3	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total TCDF	5.45	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total HxCDD	31.8	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total PeCDD	3.86	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total TCDD	0.885	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	Total HxCDF	26.4	pg/g	EMPC	J	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	12378-PeCDF	0.225	pg/g	J EMPC	U	25
B4511	CS-24	B4511_17654_DF_003	SW8290A	2378-TCDF	0.204	pg/g	J EMPC	U	25
B4511	CS-23	B4511_17654_DF_004	SW8290A	Total PeCDD	7.19	pg/g	EMPC	J	25
B4511	CS-23	B4511_17654_DF_004	SW8290A	12378-PeCDF	0.416	pg/g	J EMPC	U	25
B4511	CS-23	B4511_17654_DF_004	SW8290A	2378-TCDD	0.116	pg/g	J EMPC	U	25
B4511	CS-23	B4511_17654_DF_004	SW8290A	Total TCDD	3.05	pg/g	EMPC	J	25
B4511	CS-23	B4511_17654_DF_004	SW8290A	Total PeCDF	27.7	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4511	CS-23	B4511_17654_DF_004	SW8290A	Total TCDF	11.2	pg/g	EMPC	J	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	12378-PeCDF	0.621	pg/g	J EMPC	U	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	2378-TCDF	0.523	pg/g	EMPC	U	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	2378-TCDD	0.105	pg/g	J EMPC	U	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	Total HxCDF	79.5	pg/g	EMPC	J	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	Total TCDF	13.4	pg/g	EMPC	J	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	Total PeCDD	10.8	pg/g	EMPC	J	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	Total TCDD	4.11	pg/g	EMPC	J	25
B4511	CS-22	B4511_17654_DF_005	SW8290A	Total PeCDF	29.2	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	123478-HxCDD	0.65	pg/g	J EMPC	U	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	12378-PeCDD	0.175	pg/g	J EMPC	U	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total HxCDF	8.91	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total PeCDF	5.83	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total TCDF	2.47	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total HxCDD	49.9	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total PeCDD	3.15	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	Total TCDD	0.577	pg/g	EMPC	J	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	123478-HxCDF	0.371	pg/g	J EMPC	U	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	23478-PeCDF	0.399	pg/g	J EMPC	U	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	12378-PeCDF	0.128	pg/g	J EMPC	U	25
B4511	CS-26	B4511_17654_DF_006	SW8290A	2378-TCDF	0.0762	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total TCDD	2.16	pg/g	EMPC	J	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	1234789-HpCDF	0.729	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	234678-HxCDF	0.76	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	23478-PeCDF	0.528	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	2378-TCDF	0.19	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	123789-HxCDD	1.25	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	123478-HxCDD	0.802	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	12378-PeCDD	0.345	pg/g	J EMPC	U	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total PeCDD	5.61	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total HxCDD	26.1	pg/g	EMPC	J	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total HpCDF	23.5	pg/g	EMPC	J	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total HxCDF	12.5	pg/g	EMPC	J	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total PeCDF	7.08	pg/g	EMPC	J	25
B4511	CS-25	B4511_17654_DF_007	SW8290A	Total TCDF	6.18	pg/g	EMPC	J	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	2378-TCDF	0.144	pg/g	J EMPC	U	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	Total PeCDF	13	pg/g	EMPC	J	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	Total HxCDF	118	pg/g	EMPC	J	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	Total TCDF	7.29	pg/g	EMPC	J	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	Total PeCDD	4.46	pg/g	EMPC	J	25
B4511	CS-SS-104	B4511_17654_DF_008	SW8290A	Total TCDD	2.52	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	123678-HxCDD	0.488	pg/g	J EMPC	U	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	123478-HxCDD	0.243	pg/g	J EMPC	U	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	12378-PeCDD	0.225	pg/g	J EMPC	U	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total TCDD	6.93	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total HpCDF	6.11	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total HxCDF	4.44	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total PeCDF	4.48	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total TCDF	12.5	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total PeCDD	5.54	pg/g	EMPC	J	25
B4511	SS-108-D	B4511_17654_DF_009	SW8290A	Total HxCDD	9.43	pg/g	EMPC	J	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	123678-HxCDF	0.347	pg/g	J EMPC	U	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	Total TCDD	0.276	pg/g	EMPC	J	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	234678-HxCDF	0.517	pg/g	J EMPC	U	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	Total TCDF	1.25	pg/g	EMPC	J	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	Total PeCDF	3.42	pg/g	EMPC	J	25
B4511	CS-RISB02	B4511_17654_DF_010	SW8290A	Total HxCDF	11.9	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	234678-HxCDF	0.641	pg/g	J EMPC	U	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total HxCDF	14.2	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total PeCDF	5.44	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total TCDF	2.96	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total HxCDD	23.2	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total PeCDD	2.75	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total TCDD	0.759	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	1234789-HpCDF	0.555	pg/g	J EMPC	U	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	123478-HxCDF	0.696	pg/g	J EMPC	U	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	12378-PeCDF	0.165	pg/g	J EMPC	U	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	Total HpCDF	30.9	pg/g	EMPC	J	25
B4519	CS-27	B4519_17655_DF_001	SW8290A	12378-PeCDD	0.17	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	12378-PeCDD	0.272	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total TCDF	5.19	pg/g	EMPC	J	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total HxCDD	64.5	pg/g	EMPC	J	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total PeCDD	5.83	pg/g	EMPC	J	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total TCDD	1.5	pg/g	EMPC	J	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	123678-HxCDF	0.429	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	23478-PeCDF	0.469	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	12378-PeCDF	0.142	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	234678-HxCDF	0.719	pg/g	J EMPC	U	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total PeCDF	5.53	pg/g	EMPC	J	25
B4519	CS-28	B4519_17655_DF_002	SW8290A	Total HxCDF	15.2	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total TCDF	6.76	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total HxCDD	14.6	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total PeCDD	2.73	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total TCDD	0.539	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	23478-PeCDF	0.308	pg/g	J EMPC	U	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	12378-PeCDF	0.187	pg/g	J EMPC	U	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	2378-TCDF	0.109	pg/g	J EMPC	U	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	123678-HxCDD	0.849	pg/g	J EMPC	U	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	123478-HxCDD	0.439	pg/g	J EMPC	U	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	234678-HxCDF	0.43	pg/g	J EMPC	U	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total PeCDF	4.43	pg/g	EMPC	J	25
B4519	CS-32	B4519_17655_DF_003	SW8290A	Total HxCDF	7.61	pg/g	EMPC	J	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	Total TCDF	3.45	pg/g	EMPC	J	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	Total PeCDD	2.67	pg/g	EMPC	J	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	23478-PeCDF	0.495	pg/g	J EMPC	U	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	2378-TCDF	0.125	pg/g	J EMPC	U	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	234678-HxCDF	1.05	pg/g	J EMPC	U	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	Total PeCDF	6.28	pg/g	EMPC	J	25
B4519	CS-33	B4519_17655_DF_004	SW8290A	Total HxCDF	25.4	pg/g	EMPC	J	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	12378-PeCDD	0.3	pg/g	J EMPC	U	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	Total TCDF	3.03	pg/g	EMPC	J	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	Total HxCDD	38.4	pg/g	EMPC	J	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	Total PeCDD	3.27	pg/g	EMPC	J	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	2378-TCDF	0.205	pg/g	J EMPC	U	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	123789-HxCDD	1.58	pg/g	J EMPC	U	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	123478-HxCDD	1.1	pg/g	J EMPC	U	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	234678-HxCDF	0.837	pg/g	J EMPC	U	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	Total PeCDF	5.2	pg/g	EMPC	J	25
B4519	CS-34	B4519_17655_DF_005	SW8290A	Total HxCDF	23	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total TCDF	2.54	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total HpCDD	18.9	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total HxCDD	6.34	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total PeCDD	1.83	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total TCDD	0.909	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	123678-HxCDF	0.181	pg/g	J EMPC	U	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total HpCDF	4	pg/g	EMPC	J	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	1234678-HpCDD	6.8	pg/g	EMPC	U	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	123478-HxCDD	0.257	pg/g	J EMPC	U	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	234678-HxCDF	0.397	pg/g	J EMPC	U	25
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total PeCDF	2.29	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4519	CS-38	B4519_17655_DF_006	SW8290A	Total HxCDF	3.05	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	123478-HxCDF	0.276	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total TCDF	1.75	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total HxCDD	7.88	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total PeCDD	2.14	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	OCDF	3.09	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	1234789-HpCDF	0.303	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	123678-HxCDF	0.358	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total HpCDF	4.66	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	23478-PeCDF	0.285	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	123478-HxCDD	0.329	pg/g	J EMPC	U	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total PeCDF	2.05	pg/g	EMPC	J	25
B4519	CS-39	B4519_17655_DF_007	SW8290A	Total HxCDF	3.51	pg/g	EMPC	J	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	12378-PeCDD	0.407	pg/g	J EMPC	U	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	Total TCDF	8.18	pg/g	EMPC	J	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	Total HxCDD	54.9	pg/g	EMPC	J	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	Total PeCDD	6.42	pg/g	EMPC	J	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	Total TCDD	3.06	pg/g	EMPC	J	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	2378-TCDF	0.254	pg/g	J EMPC	U	25
B4519	CS-35	B4519_17655_DF_008	SW8290A	Total PeCDF	10.4	pg/g	EMPC	J	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	23478-PeCDF	0.635	pg/g	J EMPC	U	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	12378-PeCDF	0.151	pg/g	J EMPC	U	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	2378-TCDF	0.0626	pg/g	J EMPC	U	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	Total PeCDF	10.6	pg/g	EMPC	J	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	Total TCDF	3.48	pg/g	EMPC	J	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	Total PeCDD	4.93	pg/g	EMPC	J	25
B4519	CS-36	B4519_17655_DF_009	SW8290A	Total TCDD	1.03	pg/g	EMPC	J	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	12378-PeCDD	0.502	pg/g	J EMPC	U	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	Total PeCDF	7.3	pg/g	EMPC	J	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	Total TCDF	5.47	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4519	CS-37	B4519_17655_DF_010	SW8290A	Total HpCDD	19500	pg/g	E	J	20
B4519	CS-37	B4519_17655_DF_010	SW8290A	Total PeCDD	55.6	pg/g	EMPC	J	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	Total TCDD	1.85	pg/g	EMPC	J	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	2378-TCDD	0.147	pg/g	J EMPC	U	25
B4519	CS-37	B4519_17655_DF_010	SW8290A	23478-PeCDF	0.549	pg/g	J EMPC	U	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total TCDF	9.8	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total HxCDD	45.4	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total PeCDD	5.88	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total TCDD	2.62	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total HpCDF	89.5	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	12378-PeCDF	0.283	pg/g	J EMPC	U	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	2378-TCDF	0.33	pg/g	J EMPC	U	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	123478-HxCDD	1.26	pg/g	J EMPC	U	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	12378-PeCDD	0.387	pg/g	J EMPC	U	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total PeCDF	11.8	pg/g	EMPC	J	25
B4519	DUP-02	B4519_17655_DF_011	SW8290A	Total HxCDF	33.8	pg/g	EMPC	J	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	Total TCDF	26	pg/g	EMPC	J	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	Total PeCDD	37.2	pg/g	EMPC	J	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	Total TCDD	33	pg/g	EMPC	J	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	23478-PeCDF	1.61	pg/g	J EMPC	U	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	12378-PeCDF	1.13	pg/g	J EMPC	U	25
B4519	CS-TB-07	B4519_17655_DF_012	SW8290A	Total PeCDF	22	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	12378-PeCDD	0.165	pg/g	J EMPC	U	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	123478-HxCDF	0.366	pg/g	J EMPC	U	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total TCDF	12.3	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total HxCDD	43.2	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total PeCDD	5.95	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total TCDD	5.84	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total HpCDF	17.1	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	2378-TCDF	0.174	pg/g	J EMPC	U	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	123789-HxCDD	0.814	pg/g	J EMPC	U	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	123478-HxCDD	0.544	pg/g	J EMPC	U	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	234678-HxCDF	0.37	pg/g	J EMPC	U	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total PeCDF	3.51	pg/g	EMPC	J	25
B4519	CS-SS-106	B4519_17655_DF_013	SW8290A	Total HxCDF	6.21	pg/g	EMPC	J	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	Total TCDF	13.3	pg/g	EMPC	J	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	Total HxCDD	78	pg/g	EMPC	J	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	Total PeCDD	8	pg/g	EMPC	J	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	Total TCDD	4.72	pg/g	EMPC	J	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	12378-PeCDF	0.573	pg/g	J EMPC	U	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	2378-TCDF	0.174	pg/g	J EMPC	U	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	123678-HxCDD	2.37	pg/g	J EMPC	U	25
B4519	CS-SS-109	B4519_17655_DF_014	SW8290A	Total PeCDF	7.23	pg/g	EMPC	J	25
B4526	CS-29	B4526_17662_DF_001	SW8290A	Total TCDF	0.295	pg/g	EMPC	J	25
B4526	CS-29	B4526_17662_DF_001	SW8290A	1234678-HpCDF	0.421	pg/g	J EMPC	U	25
B4526	CS-29	B4526_17662_DF_001	SW8290A	Total HpCDF	0.421	pg/g	EMPC	J	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	123789-HxCDD	0.762	pg/g	J EMPC	U	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	Total HxCDF	4.7	pg/g	EMPC	J	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	Total PeCDF	1.84	pg/g	EMPC	J	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	Total TCDF	0.687	pg/g	EMPC	J	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	Total HxCDD	10.9	pg/g	EMPC	J	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	234678-HxCDF	0.416	pg/g	J EMPC	U	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	123478-HxCDF	0.324	pg/g	J EMPC	U	25
B4526	CS-30	B4526_17662_DF_002	SW8290A	23478-PeCDF	0.208	pg/g	J EMPC	U	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	123478-HxCDD	0.654	pg/g	J EMPC	U	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total TCDF	4.44	pg/g	EMPC	J	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total PeCDF	5.1	pg/g	EMPC	J	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total HxCDD	17.4	pg/g	EMPC	J	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total PeCDD	2.13	pg/g	EMPC	J	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total TCDD	0.651	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4526	CS-31	B4526_17662_DF_003	SW8290A	234678-HxCDF	0.371	pg/g	J EMPC	U	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	123678-HxCDF	0.362	pg/g	J EMPC	U	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	Total HxCDF	6.06	pg/g	EMPC	J	25
B4526	CS-31	B4526_17662_DF_003	SW8290A	23478-PeCDF	0.368	pg/g	J EMPC	U	25
B4526	DUP-01	B4526_17662_DF_004	SW8290A	123789-HxCDD	0.31	pg/g	J EMPC	U	25
B4526	DUP-01	B4526_17662_DF_004	SW8290A	Total TCDF	0.177	pg/g	EMPC	J	25
B4526	DUP-01	B4526_17662_DF_004	SW8290A	Total HxCDD	2.18	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total TCDD	1.64	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	234678-HxCDF	0.273	pg/g	J EMPC	U	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	123678-HxCDF	0.221	pg/g	J EMPC	U	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	23478-PeCDF	0.334	pg/g	J EMPC	U	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total PeCDD	3.03	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total HxCDF	4.61	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total PeCDF	3.04	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total TCDF	2.15	pg/g	EMPC	J	25
B4526	CS-40	B4526_17662_DF_005	SW8290A	Total HxCDD	7.13	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total PeCDF	10.7	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total HpCDF	20.3	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total TCDF	13.7	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total HxCDD	33.4	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total TCDD	3.94	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	1234789-HpCDF	0.729	pg/g	J EMPC	U	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	Total HxCDF	13	pg/g	EMPC	J	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	12378-PeCDF	0.708	pg/g	J EMPC	U	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	123789-HxCDD	1.45	pg/g	J EMPC	U	25
B4526	CS-41	B4526_17662_DF_006	SW8290A	123478-HxCDD	1.12	pg/g	J EMPC	U	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	123678-HxCDF	1.2	pg/g	J EMPC	U	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total HpCDF	28.5	pg/g	EMPC	J	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total HxCDF	17.6	pg/g	EMPC	J	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total PeCDF	14	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total TCDF	16.9	pg/g	EMPC	J	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total PeCDD	14.7	pg/g	EMPC	J	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	Total TCDD	6.91	pg/g	EMPC	J	25
B4526	CS-42	B4526_17662_DF_007	SW8290A	1234789-HpCDF	1.22	pg/g	J EMPC	U	25
B4526	CS-43	B4526_17662_DF_008	SW8290A	Total PeCDF	14	pg/g	EMPC	J	25
B4526	CS-43	B4526_17662_DF_008	SW8290A	Total TCDF	11.7	pg/g	EMPC	J	25
B4526	CS-43	B4526_17662_DF_008	SW8290A	Total HxCDD	16.3	pg/g	EMPC	J	25
B4526	CS-43	B4526_17662_DF_008	SW8290A	123478-HxCDD	0.539	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	Total HxCDD	18.8	pg/g	EMPC	J	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	Total PeCDD	5.98	pg/g	EMPC	J	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	OCDF	5.31	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	123678-HxCDF	0.424	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	Total TCDF	13.9	pg/g	EMPC	J	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	Total PeCDF	10	pg/g	EMPC	J	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	123678-HxCDD	0.897	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	12378-PeCDD	0.326	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	123478-HxCDF	0.412	pg/g	J EMPC	U	25
B4526	CS-44	B4526_17662_DF_009	SW8290A	Total HxCDF	8.62	pg/g	EMPC	J	25
B4526	CS-45	B4526_17662_DF_010	SW8290A	12378-PeCDD	1.8	pg/g	J EMPC	U	25
B4526	CS-45	B4526_17662_DF_010	SW8290A	Total HxCDF	239	pg/g	EMPC	J	25
B4526	CS-45	B4526_17662_DF_010	SW8290A	Total TCDF	16.8	pg/g	EMPC	J	25
B4526	CS-45	B4526_17662_DF_010	SW8290A	Total PeCDD	13	pg/g	EMPC	J	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	2378-TCDF	0.342	pg/g	J EMPC	U	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	Total PeCDD	4.31	pg/g	EMPC	J	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	Total HxCDF	5.24	pg/g	EMPC	J	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	Total PeCDF	4.48	pg/g	EMPC	J	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	Total TCDF	13.1	pg/g	EMPC	J	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	234678-HxCDF	0.274	pg/g	J EMPC	U	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	23478-PeCDF	0.319	pg/g	J EMPC	U	25
B4526	CS-54	B4526_17662_DF_011	SW8290A	12378-PeCDF	0.218	pg/g	J EMPC	U	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4526	CS-46	B4526_17662_DF_012	SW8290A	12378-PeCDF	0.644	pg/g	J EMPC	U	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	2378-TCDF	0.399	pg/g	J EMPC	U	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	23478-PeCDF	1.4	pg/g	J EMPC	U	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	Total PeCDF	25.7	pg/g	EMPC	J	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	Total TCDF	16	pg/g	EMPC	J	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	Total HxCDD	104	pg/g	EMPC	J	25
B4526	CS-46	B4526_17662_DF_012	SW8290A	Total PeCDD	10.3	pg/g	EMPC	J	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	123478-HxCDF	0.568	pg/g	J EMPC	U	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	2378-TCDF	0.34	pg/g	J EMPC	U	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	Total HxCDF	10.2	pg/g	EMPC	J	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	Total PeCDF	9.15	pg/g	EMPC	J	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	Total TCDF	12.5	pg/g	EMPC	J	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	Total HxCDD	21.1	pg/g	EMPC	J	25
B4526	CS-47	B4526_17662_DF_013	SW8290A	Total PeCDD	7.65	pg/g	EMPC	J	25
B4527	FB-01	B4527_17665_DF_001	SW8290A	1234678-HpCDD	4.96	pg/L	J B EMPC	U	25
B4527	FB-01	B4527_17665_DF_001	SW8290A	OCDD	24.7	pg/L	J B	U	7
B4527	FB-01	B4527_17665_DF_001	SW8290A	Total HpCDD	9.24	pg/L	EMPC	J	25
B4527	EB-01	B4527_17665_DF_002	SW8290A	OCDD	27.4	pg/L	J B	U	7
B4527	EB-02	B4527_17665_DF_004	SW8290A	OCDD	12.6	pg/L	J B EMPC	U	25
B4527	EB-03	B4527_17665_DF_005	SW8290A	Total HpCDD	3.33	pg/L	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	123678-HxCDD	0.616	pg/g	J EMPC	U	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	123678-HxCDF	0.351	pg/g	J EMPC	U	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	234678-HxCDF	0.578	pg/g	J EMPC	U	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	OCDF	7.75	pg/g	EMPC	U	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total TCDD	5.57	pg/g	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total PeCDD	6.01	pg/g	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total HxCDD	13.5	pg/g	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total TCDF	9.73	pg/g	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total PeCDF	7.65	pg/g	EMPC	J	25
B4528	CS-55	B4528_17661_DF_001	SW8290A	Total HxCDF	8.55	pg/g	EMPC	J	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4528	CS-50	B4528_17661_DF_002	SW8290A	2378-TCDF	0.439	pg/g	J EMPC	U	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total HxCDD	14.4	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	123478-HxCDD	0.492	pg/g	J EMPC	U	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	123789-HxCDD	0.739	pg/g	J EMPC	U	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total TCDF	5.36	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total TCDD	3.19	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total PeCDD	6.35	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total PeCDF	6.57	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total HxCDF	6.21	pg/g	EMPC	J	25
B4528	CS-50	B4528_17661_DF_002	SW8290A	Total HpCDF	9.52	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	234678-HxCDF	0.502	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total HxCDF	9.69	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	12378-PeCDD	0.487	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	123678-HxCDD	1.47	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	123789-HxCDD	0.783	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	2378-TCDF	0.307	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	23478-PeCDF	0.721	pg/g	J EMPC	U	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total PeCDD	10.4	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total HxCDD	21	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total TCDF	9.42	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total PeCDF	10.6	pg/g	EMPC	J	25
B4528	CS-51	B4528_17661_DF_003	SW8290A	Total HpCDF	15.7	pg/g	EMPC	J	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total HpCDD	208	pg/g		J	9
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total PeCDD	2.36	pg/g	EMPC	J	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	OCDD	280	pg/g		J	9
B4528	CS-48	B4528_17661_DF_004	SW8290A	123478-HxCDD	0.501	pg/g	J EMPC	U	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	123678-HxCDD	0.849	pg/g	J EMPC	U	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	1234678-HpCDD	42.8	pg/g		J	9
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total TCDD	2.6	pg/g	EMPC	J	9,25
B4528	CS-48	B4528_17661_DF_004	SW8290A	123789-HxCDD	0.825	pg/g	J EMPC	U	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total TCDF	3.92	pg/g	EMPC	J	9,25
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total PeCDF	2.04	pg/g	EMPC	J	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total HxCDF	6.4	pg/g	EMPC	J	25
B4528	CS-48	B4528_17661_DF_004	SW8290A	Total HxCDD	28.1	pg/g	EMPC	J	9,25
B4528	CS-52	B4528_17661_DF_005	SW8290A	2378-TCDF	0.296	pg/g	J EMPC	U	25
B4528	CS-52	B4528_17661_DF_005	SW8290A	Total PeCDF	18.2	pg/g	EMPC	J	25
B4528	CS-52	B4528_17661_DF_005	SW8290A	Total TCDD	1.97	pg/g	EMPC	J	25
B4528	CS-52	B4528_17661_DF_005	SW8290A	Total PeCDD	10.9	pg/g	EMPC	J	25
B4528	CS-52	B4528_17661_DF_005	SW8290A	Total TCDF	5.7	pg/g	EMPC	J	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	123789-HxCDD	0.591	pg/g	J EMPC	U	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	1234678-HpCDD	23.9	pg/g		J	9
B4528	DUP-03	B4528_17661_DF_006	SW8290A	OCDD	164	pg/g		J	9
B4528	DUP-03	B4528_17661_DF_006	SW8290A	1234789-HpCDF	0.319	pg/g	J EMPC	U	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total TCDD	0.761	pg/g		J	9
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total PeCDD	0.864	pg/g	EMPC	J	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total HxCDD	13.6	pg/g	EMPC	J	9,25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total HpCDD	100	pg/g		J	9
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total TCDF	1.52	pg/g	EMPC	J	9,25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total HxCDF	2.99	pg/g	EMPC	J	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	Total HpCDF	10.8	pg/g	EMPC	J	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	123678-HxCDD	0.553	pg/g	J EMPC	U	25
B4528	DUP-03	B4528_17661_DF_006	SW8290A	123478-HxCDD	0.255	pg/g	J EMPC	U	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	Total PeCDF	1.67	pg/g	EMPC	J	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	123478-HxCDF	0.364	pg/g	J EMPC	U	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	123678-HxCDF	0.201	pg/g	J EMPC	U	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	Total PeCDD	3.42	pg/g	EMPC	J	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	Total HxCDD	8.84	pg/g	EMPC	J	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	Total TCDF	1.12	pg/g	EMPC	J	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	Total HxCDF	2.63	pg/g	EMPC	J	25
B4528	CS-49	B4528_17661_DF_007	SW8290A	123478-HxCDD	0.259	pg/g	J EMPC	U	25

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling 2020

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4528	CS-49	B4528_17661_DF_007	SW8290A	123678-HxCDD	0.344	pg/g	J EMPC	U	25
FA77581	CS-24	FA77581-5	SW8270	Pyrene	3120	ug/kg		J	8H
FA77581	CS-24	FA77581-5	SW8270	Fluoranthene	3000	ug/kg		J	8H
FA77581	CS-24	FA77581-5	SW8270	Chrysene	2380	ug/kg		J	8H
FA77581	CS-24	FA77581-5	SW8270	Benzo(a)anthracene	2060	ug/kg		J	8H
FA77689	DUP-03	FA77689-10	SW8270SIM	Fluoranthene	933	ug/kg		J	9
FA77689	CS-48	FA77689-8	SW8270SIM	Fluoranthene	1950	ug/kg		J	9

DATA VALIDATION REPORT ADDENDUM

KERR-MCGEE CHEMICAL CORPORATION SITE
NAVASSA, NORTH CAROLINA
OU1 SOIL SAMPLING 2020

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September 14, 2020

Approved for Release:

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PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of compliance (EPA Stage 2A) and full validation (EPA Stage 4) performed on soil and associated quality control sample data for the former Kerr-McGee Chemical Corporation Site, Navassa, North Carolina. A complete list of samples is provided in the Sample Index.

Analyses were performed by SGS Accutest, Orlando, FL, with the exception of Dioxins/Furans which were analyzed at the Wilmington, North Carolina lab. The analytical methods and EcoChem project chemists are listed in the following table:

ANALYSIS	METHOD	PRIMARY REVIEW	SECONDARY REVIEW
Dioxins/Furans	8290A	E. Clayton	C. Ransom
Pentachlorophenol (PCP)	SW8270E		
Polycyclic Aromatic Hydrocarbons (PAH)	SW8270E SIM		
Total Solids	SM2540G		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Quality Assurance Project Plan, Kerr-McGee Chemical Corporation – Navassa Superfund Site, Navassa, North Carolina* (EarthCon, September 2015); National *Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2017); and *National Functional Guidelines for High Resolution Superfund Methods Data Review* (USEPA 2016).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Data that have been rejected are flagged with (R). Rejected data should not be used for any purpose. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Validation criteria are included as Appendix A. The qualified data summary table (QDST) is included as Appendix B. Data Validation Worksheets and project associated communications will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted.

Sample Index
Kerr McGee Navassa Site - OU1 Soil Sampling Addendum

SDG	Sample ID	Lab ID	Dioxins	SVOC	SIM PAH	Total Solids
B4585	CS-53	B4585_17706_DF_002	✓			
B4585	CS-TB-16A	B4585_17706_DF_001	✓			
FA8194	CS-TB-16A	FA78194-1		✓	✓	✓
FA8194	CS-53	FA78194-2		✓	✓	✓

DATA VALIDATION REPORT - ADDENDUM
Kerr McGee Navassa Site – OU1 Soil Sampling 2020
Dioxin/Furan Compounds by EPA Method 8290A

This report documents the review of analytical data from the analysis of soil samples and the associated laboratory quality control (QC) samples. Samples were analyzed by SGS North America, Wilmington, North Carolina. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples and Matrix	Validation Level
B4585	2 Soil	EPA Stage 4

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables in the initial data packages. The laboratory was contacted and supplied the missing documentation. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (100% verification) by comparing the EDD to the hardcopy laboratory data package. Ten percent (10%) of the laboratory QC results were also verified.

TECHNICAL DATA VALIDATION

The quality control (QC) requirements that were reviewed are listed in the following table.

1	Sample Receipt, Preservation, and Holding Times	✓	Ongoing Precision and Recovery (OPR)
✓	System Performance and Resolution Checks (Full DV only)	1	Field Duplicates
✓	Initial Calibration (ICAL) (Full DV only)	✓	Target Analyte List
✓	Calibration Verification (CCAL) (Full DV only)	✓	Reporting Limits
✓	Laboratory Blanks	2	Compound Identification
1	Field Blanks	✓	Compound Quantitation (Full DV only)
✓	Labeled Compound Recovery	1	Calculation Verification (Full DV only)
✓	Matrix Spike/Matrix Spike Duplicates (MS/MSD)		

✓Method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The sample coolers were received at temperatures less than the lower control limit at 0.7°C. Results were not adversely affected by the temperature outliers; no action was taken.

Compound Identification

The method requires the confirmation of 2,3,7,8-TCDF detects using an alternate GC column when closely eluting TCDF isomers cannot be adequately separated on the primary column. The laboratory uses an ZB-5MS column, which has been proven to adequately resolve the TCDF isomers. Confirmation of hits for 2,3,7.8-TCDF was not necessary.

The laboratory reported "estimated maximum possible concentrations" values (EMPC) for one or more of the target analytes. An EMPC value is reported when a peak was detected but did not meet the ion ratio identification criteria specified in the method. These EMPC results are not considered to be positive identifications for the analytes. To indicate that the reported result for an individual analyte is in effect an elevated detection limit, the EMPC values were qualified as not detected (U-25) at the reported values. An EMPC flag was also added to the Total homolog group values if one or more of the individual congeners was reported as an EMPC. The results for totals with EMPC flags were estimated (J-25).

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory performed the specified analytical method. Accuracy was acceptable as demonstrated by the labeled compound, and OPR (blank spike), and matrix spike/matrix spike duplicate (MS/MSD) recoveries. Precision was acceptable as demonstrated by the MS/MSD RPD values.

Detection limits were elevated based on ion ratio outliers (EMPC values). Total homolog groups with EMPC values were estimated.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT - ADDENDUM
Kerr McGee Navassa Site – OU1 Soil Sampling 2020
Semi-Volatile Organic Compounds by SW8720E, Pentachlorophenol by SW8270E SIM, and Total Solids by SM 2540

This report documents the review of analytical data from the analysis of soil samples and the associated laboratory quality control (QC) samples. Samples were analyzed by SGS Accutest Southeast, Orlando, Florida. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
FA78194	2 Soil	EPA Stage 4

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

The electronic data deliverable (EDD) was verified against the laboratory portable document format (PDF) data package. No transcription errors were found.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times	✓	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
✓	GC/MS Instrument Performance (Tune)	✓	Internal Standards
✓	Initial Calibration (ICAL)	2	Field Duplicates
✓	Continuing Calibration (CCAL)	✓	Target Analyte List
✓	Laboratory Blanks	✓	Reporting Limits
1	Field Blanks	✓	Reported Results
✓	Surrogate Compounds	✓	Compound Identification
✓	Laboratory Control Samples (LCS)	1	Calculation Verification

✓Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed
1 Quality control outliers are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The sample coolers were received at temperatures less than the lower control limit at 1.2°C. Results were not adversely affected by the temperature outliers; no action was taken.

Field Blanks

No field blanks were associated with this data set.

Field Duplicates

There were no field duplicates in this data set.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, laboratory control sample, and matrix spike/matrix spike duplicate (MS/MSD) percent recovery values and precision was acceptable as demonstrated by the MS/MSD RPD values.

No data were qualified for any reason. All data, as reported, are acceptable for use.

ECOCHEM
Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
	5C	Initial Calibration Verification (ICV %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS and/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	4°C±2°C sediment/tissues may require storage at -20°C	NFG (1) Method (3)	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use **PJ** for temp outliers; see **TM20** Current SW846 criterion is ≤ 6° C (3)
Holding Time	**Extraction Aqueous:** 7 days from collection **Extraction Solid:** 14 days from collection **Analysis (all matrices)**: 40 days from extraction Holding time may be extended to 1 year for frozen sediments/tissues	NFG (1) Method (3)	J (pos)/UJ (ND) if HT exceeded J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Gross exceedance = > 2x HT, as per 1999 NFG
Instrument Performance					
Tuning	DFTPP Beginning of each 12 hour period Use method or project acceptance criteria	NFG (1) Method (3)	R (pos/ND) all analytes in all samples associated with the tune	24	
Initial Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG (1) Method (3)	Use **PJ** to qualify J (pos)/UJ (ND)	5A	**TM-06** EcoChem Policy for the Evaluation and Qualification of GCMS Instrument Performance **PJ** - no action if response is stable (ICAL RSD and CCAL %D acceptable)
Initial Calibration **Stability**	Minimum 5 standards %RSD ≤ 20.0% except: %RSD ≤ 40.0% poor responders * **or** co-efficient of determination (r^2) > 0.99	NFG (1) Method (3)	J (pos) if %RSD > limit **or** r^2 value <0.99	5A	
Initial Calibration Verification Check	Prepared from second source; analyze after each ICAL Percent recovery limits = 70-130%	Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) %R < LCL	5A (H,L)[4]	QAPP may have overriding accuracy limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance (continued)					
Continuing Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG [1] Method [3]	Use **PJ** to qualify J (pos)/UJ (ND)	5B	see ICAL RRF guidance
Continuing Calibration **Stability**	Prior to sample analysis and every 12 hours %D ≤ 25% except: %D ≤ 40.0% poor responders *	NFG [1] Method [3]	J (pos) - %D > control limit (high bias) J (pos)/UJ (ND) - %D < -control limit (low bias)	5B (H,L)[4]	
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > MDL	NFG [2] Method [3]	U(pos) if result is < 5X or 10X action level	7	10X action level applies to phthalates only. 5X for all other target analytes **Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review FB , qualify as needed** **Note: Actions as per 1999 NFG**
	No TICs present		R (pos) TICs using 10X rule	7	
Field Blank (FB)	No detected compounds > MDL	NFG [2] Method [3]	U (pos) if result is < 5X or 10X action level	6	
Precision and Accuracy					
LCS/LCSD (recovery)	One per matrix per batch (of ≤ 20 samples) LCSD not required by NFG or method Use method acceptance criteria/laboratory limits	Method [3]	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND)%R < 10%	10 (H,L)[4]	No action if only one spike %R is outside criteria when LCSD is analyzed, unless one recovery is <10%. QAPP may have overriding accuracy limits. Qualify all associated samples.
LCS/LCSD (RPD)	If LCSD analyzed RPD < lab limits	Method [3]	J (pos)	9	Qualify all associated samples. QAPP may have overriding precision limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy (continued)					
Reference Material (RM, SRM, or CRM)	Result ±20% of the 95% confidence interval of the true value for analytes	EcoChem standard policy	J (pos)/UJ (ND) if < LCL J (pos) if > UCL	12 (H,L)[4]	QAPP may have overriding accuracy limits. Some manufacturers have different RM control limits
MS/MSD (recovery)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) if both %R < LCL J (pos)/R (ND) if both %R < 10% J (pos)/UJ (ND) if one > UCL & one < LCL, with no bias	8 (H,L)[4]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only.
MS/MSD (RPD)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (2)	J (pos) in parent sample if RPD > CL	9	Qualify parent sample only
Surrogates	Minimum of 3 acid & 3 base/neutral (B/N) compounds added to all samples Within method control limits	NFG (1) Method (3)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND) if %R < 10%	13 (H,L)[4]	Qualify all compounds in associated fraction. Do not qualify if only 1 acid and/or 1 B/N surrogate is out, unless <10%. If 1 surrogate outlier < 10% then J (pos)/R (ND)
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	NFG (1) Method (3)	J (pos) if > 200% J (pos)/UJ (ND) if < 50% J (pos)/R (ND) if < 25% if RT >30 seconds use **PJ**	19	Qualify compounds quantified using particular internal standard
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	Use project limits if specified

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound Identification and Quantitation and Calculation					
Retention times and relative ion intensities	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	NFG [(1)] Method [(3)]	U (pos) if identification criteria not met	25	
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NFG [(1)] Method [(3)]	NJ the TIC unless: R (pos) common laboratory contaminants	4	
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	EcoChem standard policy	Use "DNR" to flag results that will not be reported.	11	**TM-04** EcoChem Policy for Rejection/Selection Process for Multiple Results

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] National Functional Guidelines for Organic Data Review, October, 1999
[3] Method SW846 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, February 2007.
[4] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

(pos): Positive Result(s)
(ND): Non-detects

* "Poor responder" compounds: acetophenone, atrazine, benzaldehyde, 1,1'-biphenyl, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, caprolactam, carbazole, 4-chloroaniline, diethylphthalate, di-n-butylphthalate, 3-3'-dichlorobenzidine, dimethylphthalate, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, di-n-octylphthalate, hexachlorobutadiene, hexachlorocyclopentadiene, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol, N-nitrosodiphenylamine, 2,2'-oxybis-(1-chloropropane), 1,2,4,5-tetrachlorobenzene use a 0.010 RRF criterion.

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	Waters/Solids ≤ 6°C & in the dark Tissues <-10°C & in the dark **Preservation Aqueous:** If Cl_2 is present Thiosulfate must be added and if pH > 9 it must be adjusted to 7 - 9	NFG [1] Method[2]	J(pos)/R(ND) if thiosulfate not added if Cl_2 present; J(pos)/UJ(ND) if pH not adjusted J(pos)/UJ(ND) if temp > 20°C	1	**EcoChem PJ, see TM-05**
Holding Time	**If properly stored, 1 year or:** **Extraction (all matrices):** 30 days from collection **Analysis (all matrices)**: 45 days from extraction	NFG [1] Method[2]	If not properly stored or HT exceedance: J(pos)/UJ(ND)	1	**EcoChem PJ, see TM-05** Gross exceedance = > 1 year 2011 NFG **Note:** Under CWA, SDWA, and RCRA the HT for H2O is 7 days.
Instrument Performance					
Mass Resolution (Tuning)	PFK (Perfluorokerosene) ≥10,000 resolving power at m/z 304.9824. Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift.	NFG [1] Method [2]	R(pos/ND) all analytes in all samples associated with the tune	24	Notify PM
Windows Defining Mix	Peaks for first and last eluters must be within established retention time windows for each selector group (chlorination level)	NFG [1] Method [2]	If peaks are not completely within windows (clipped): If natives are ok, J(pos)/UJ(ND) homologs (Totals) If natives are affected, R all results for that selector group	24	Notify PM
Column Performance Mix	Both mixes must be analyzed before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) where x = ht. of TCDD (or TCDF) & y = baseline to bottom of valley For all isomers eluting near the 2378-TCDD (TCDF) peak (TCDD only for 8290)	NFG [1] Method [2]	J(pos) if valley > 25%	24	**EcoChem PJ, see TM-05, Rev. 2**; Note: TCDF is evaluated only if second column confirmation is performed
Initial Calibration **Sensitivity**	S/N ratio > 10 for all native and labeled compounds in CS1 std.	NFG [1] Method [2]	If <10, elevate Det. Limit or R(ND)	5A	
Initial Calibration **Selectivity**	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	NFG [1] Method [2]	If 2 or more ion ratios are out for one compound in ICAL, J(pos)	5A	**EcoChem PJ, see TM-05, Rev. 2**

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance (continued)					
Initial Calibration (Minimum 5 stds.) **Stability**	%RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD < 35% for labeled compounds under 1613b)	NFG [1] Method [2]	J(pos) natives if %RSD > 20%	5A	
	Absolute RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 & >15 min on DB-225	NFG [1] Method [2]	Narrate, no action		**EcoChem PJ, see TM-05, Rev. 2**
Continuing Calibration (Prior to each 12 hr. shift) **Sensitivity**	S/N ratio for CS3 standard > 10	NFG [1] Method [2]	If <10, elevate Det. Limit or R(ND)	5B	
Continuing Calibration (Prior to each 12 hr. shift) **Selectivity**	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	NFG [1] Method [2]	For congener with ion ratio outlier, J(pos) natives in all samples associated with CCAL. No action for labeled congener ion ratio outliers.	25	**EcoChem PJ, see TM-05**
Continuing Calibration (Prior to each 12 hr. shift) **Stability**	%D+/-20% for native compounds %D +/-30% for labeled compounds **(Must meet limits in Table 6, Method 1613B)** If %D in the closing CCAL are within 25%/35%, the mean RF from the two CCAL may be used to calculate samples **(Section 8.3.2.4 of 8290)**.	NFG [1] Method [2]	**Labeled compounds:** Narrate, no action. **Native compounds:** 1613: J(pos)/UJ(ND)if %D is outside Table 6 limits J(pos)/R(ND) if %D is +/-75% of Table 6 limits 8290: J(pos)/UJ(ND) if %D = 20% - 75% J(pos)/R(ND) if %D > 75%	5B (H,L)[3]	
	Absolute RT of $^{13}C_{12}$-1234-TCDD and $^{13}C_{12}$-123789-HxCDD should be ± 15 seconds of ICAL RRT for all other compounds must meet criteria listed in Table 2 Method 1316.	NFG [1] Method [2]	Narrate, no action	5B	**EcoChem PJ, see TM-05**
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > RL	NFG [1] Method [2]	U(pos) if result is < 5X action level.	7	**Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review FB , qualify as needed**
Field Blank (FB)	FB: frequency as per QAPP No detected compounds > RL		U(pos) if result is < 5X action level.	6	

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy					
MS/MSD (recovery)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) if both %R > UCL - high bias J(pos)/UJ(ND) if both %R < LCL - low bias J(pos)/R(ND) if both %R < 10% - very low bias J(pos)/UJ(ND) if one > UCL & one < LCL, with no bias **PJ if only one %R outlier**	8 (H,L)[3]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only unless other QC indicates systematic problems.
MS/MSD (RPD)	**MS/MSD not typically required for HRMS analyses.** If lab analyzes MS/MSD then one set per matrix per batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos) in parent sample if RPD > CL	9	Qualify parent sample only.
LCS (or OPR)	One per lab batch (of ≤ 20 samples) Use most current laboratory control limits **or** Limits from Table 6 of 1613B	NFG [1] Method [2]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	10 (H,L)[3]	No action if only one spike %R is outside criteria, when LCSD is analyzed. Qualify all associated samples.
LCS/LCSD (RPD)	**LCSD not typically required for HRMS analyses.** One set per matrix and batch of 20 samples RPD < 35%	Method [2] Ecochem standard policy	J(pos) assoc. compound in all samples if RPD > CL	9	Qualify all associated samples.
Lab Duplicate (RPD)	**Lab Dup not typically required for HRMS analyses.** One per lab batch (of ≤ 20 samples) Use most current laboratory control limits	EcoChem standard policy	J(pos)/UJ(ND) if RPD > CL	9	
Labeled Compounds (Internal Standards)	Added to all samples %R = 40% - 135% in all samples 8290 %R must meet limits in Table 7 Method 1613B	NFG [1] Method [2]	J(pos) if %R > UCL - high bias J(pos)/UJ(ND) if %R < LCL - low bias J(pos)/R(ND) if %R < 10% - very low bias	13 (H,L)[3]	
Field Duplicates	Solids: RPD <50% OR difference < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	Narrate and qualify if required by project	9	**Use professional judgment**

Dioxin/Furan Analysis by HRMS
(Based on Dioxin NFG 2011 and Methods EPA 1613B and SW-846 8290)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound ID and Calculation					
Quantitation/ Identification	All ions for each isomer must maximize within ± 2 seconds. S/N ratio >2.5 Ion ratios must meet criteria listed in Table 8 Method 8290, or Table 9 of 1613B; RRTs w/in limits in Table 2 of 1613B	NFG [1] Method [2]	Narrate in report; qualify if necessary NJ(pos) for retention time outliers. U(pos) for ion ratio outliers.	25	**EcoChem PJ, see TM-05**
EMPC (estimated maximum possible concentration)	If quantitation identification criteria are not met, laboratory should report an EMPC value.	NFG [1] Method [2]	If laboratory correctly reported an EMPC value, qualify the native compound U(pos) to indicate that the value is a detection limit and qualify total homolog groups J (pos)	25	**Use professional judgment See TM-18**
Interferences	Interferences from chlorodiphenyl ether compounds	NFG [1] Method [2]	J(pos)/UJ(ND) if present	23	**See TM-16**
	Lock masses must not deviate ± 20% from values in Table 8 of 1613B	Method [2]	J(pos)/UJ(ND) if present	24	**See TM-17**
Second Column Confirmation	All 2,3,7,8-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC criteria must also be met for the confirmation analysis.	NFG [1] Method [2]	Report the DB-225 value. If not performed use PJ.	3	DNR-11 DB5 result if both results from both columns are reported. **EcoChem PJ, see TM-05**
Calculation Check	Check 10% of field & QC sample results	EcoChem standard policy	Contact laboratory for resolution and/or corrective action	na	Full data validation only.
Electronic Data Deliverable (EDD)					
Verification of EDD to hardcopy data	EcoChem verify @ 10% unless problems noted; then increase level up to 100% for next several packages.		Depending on scope of problem, correct at EcoChem (minor issues) to resubmittal by laboratory (major issues).	na	EcoChem Project Manager and/or Database Administrator will work with lab to provide long-term corrective action.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	Standard reporting policy	Use "DNR" to flag results that will not be reported.	11	

(pos) - positive (detected) results; (ND) - not detected results

[1] National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) & Chlorinated Dibenzofurans (CDFs) Data Review, September 2011

[2] Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS), USEPA SW-846, Method 8290

[2] EPA Method 1613, Rev.B, Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGS/HRMS, October 1994

[3] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

ECOCHEM
Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Kerr McGee Navassa Site - OU1 Soil Sampling Addendum

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Flag	DV Qual	DV Code
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total HpCDF	10.7	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total HxCDF	4.71	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total PeCDF	3.08	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total TCDF	3.48	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total HxCDD	13.7	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	Total PeCDD	3.61	pg/g	EMPC	J	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	1234789-HpCDF	0.249	pg/g	J EMPC	U	25
B4585	CS-TB-16A	B4585_17706_DF_001	SW8290A	OCDF	6.67	pg/g	EMPC	U	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	2378-TCDF	0.669	pg/g	EMPC	U	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	234678-HxCDF	0.461	pg/g	J EMPC	U	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total HpCDF	10.7	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total HxCDF	6.83	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total PeCDF	8.34	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total TCDF	11	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total HxCDD	25.9	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total PeCDD	7.54	pg/g	EMPC	J	25
B4585	CS-53	B4585_17706_DF_002	SW8290A	Total TCDD	3.94	pg/g	EMPC	J	25

APPENDIX E

SUMMARY OF FIELD QA/QC RESULTS

Table E-1: Duplicated Results and RPD

Analyte	8/6/2020 CS-29			8/6/2020 CS-35			8/8/2020 CS-48		
	CS-29	Dup	RPD	CS-35	Dup	RPD	CS-48	Dup	RPD
Conventionals									
Solids, Percent	92.2	77.7	17.07	90.7	82.7	9.23	65.4	64.6	1.23
Semi-volatile Organic Compounds (ug/kg)									
1-Methylnaphthalene	18 U	21 U	na	18.1 J	27 J	39.47	25 U	26 U	na
2-Methylnaphthalene	18 U	21 U	na	26.2 J	37.3 J	34.96	25 U	26 U	na
Acenaphthene	19 U	22 U	na	94.9 J	139 J	37.71	27.1 J	27 U	na
Acenaphthylene	41.7 J	70.9 J	51.87	1170	1800	42.42	217 J	232 J	6.68
Anthracene	62.2 J	73.1 J	16.11	2940	2740	7.04	346	403	15.22
Benzo(a)anthracene	51.8 J	39.9 J	25.95	2730	3940	36.28	644	491	26.96
Benzo(a)pyrene	43 J	36.1 J	17.45	2580	3430	28.29	470	473	0.64
Benzo(b)fluoranthene	137 J	119 J	14.06	8120	8920	9.39	1280	1310	2.32
Benzo(g,h,i)perylene	30.6 J	26.4 J	14.74	1700	2150	23.38	265	305	14.04
Benzo(k)fluoranthene	51.2 J	38.1 J	29.34	2060	2460	17.7	397	399	0.5
Chrysene	88.6 J	72.8 J	19.58	4160	4750	13.24	1060	828	24.58
Dibenzo(a,h)anthracene	22 U	27 U	na	689	939	30.71	81.1 J	87.7 J	7.82
Fluoranthene	91.5 J	86.3 J	5.85	6240	7130	13.31	1950 J	933 J	70.55
Fluorene	19 U	23 U	na	185	269	37	56.3 J	56.8 J	0.88
Indeno(1,2,3-cd)pyrene	48.5 J	41.8 J	14.84	2790	3450	21.15	363	414	13.13
Naphthalene	18 U	21 U	na	31.6 J	49 J	43.18	25 U	26 U	na
Phenanthrene	18 U	21 U	na	808	1040	25.11	157 J	123 J	24.29
Pyrene	152 J	143 J	6.1	6480	7620	16.17	2190	1320	49.57
Pentachlorophenol (SIM)	18 U	21 U	na	18 U	20 U	na	13 U	13 U	na
Dioxins and Furans (pg/g)									
2,3,7,8-Tetrachlorodibenzodioxin	0.191 U	0.181 U	na	0.115 J	0.145 U	na	0.222 U	0.142 U	na
1,2,3,7,8-Pentachlorodibenzodioxin	0.167 U	0.211 U	na	0.407 U	0.387 U	na	0.276 U	0.204 U	na
1,2,3,4,7,8-Hexachlorodibenzodioxin	0.401 U	0.177 U	na	1.8 J	1.26 U	na	0.501 U	0.255 U	na
1,2,3,6,7,8-Hexachlorodibenzodioxin	0.419 U	0.167 U	na	4.21	3.34	23.05	0.849 U	0.553 U	na
1,2,3,7,8,9-Hexachlorodibenzodioxin	0.437 U	0.31 U	na	3.11	2.19	34.72	0.825U	0.591 U	na
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	5.78	4.51	24.68	158	123	0	42.8 J	23.9 J	56.67
Octachlorodibenzodioxin	292	193	40.82	1360	1040	26.67	280 J	164 J	52.25
2,3,7,8-Tetrachlorodibenzofuran	0.105 U	0.111 U	na	0.254 U	0.33 U	na	0.252 U	0.126 U	na
1,2,3,7,8-Pentachlorodibenzofuran	0.121 U	0.112 U	na	0.407 J	0.283 U	na	0.293 U	0.128 U	na
2,3,4,7,8-Pentachlorodibenzofuran	0.122 U	0.115 U	na	0.987 J	1.06	7.13	0.285 U	0.124 U	na
1,2,3,4,7,8-Hexachlorodibenzofuran	0.14 U	0.104 U	na	2.73	2.14	24.23	0.292 J	0.126 U	na
1,2,3,6,7,8-Hexachlorodibenzofuran	0.145 U	0.102 U	na	1.25 J	1.16	7.47	0.246 J	0.126 U	na
2,3,4,6,7,8-Hexachlorodibenzofuran	0.162 U	0.111 U	na	2.03 J	1.63	21.86	0.501 J	0.129 U	na
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.171 U	0.145 U	na	0.3 U	0.243 U	na	0.247 U	0.155 U	na
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.421 U	0.847 J	na	34.7	28.6	19.27	5.58	3.65	41.82
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.154 U	0.12 U	na	3.46	1.91	57.73	0.543 J	0.319 U	na
Octachlorodibenzofuran	0.661 U	0.589 U	na	109	72.8	39.82	18	11.8	41.61

RPD - relative percent difference
DUP - duplicated
na - Not applicable to non-detect results
U - not detected above the method detection limit
J- estimated concentration
ug/kg - microgram per kilogram
pg/g - picogram per gram

Table E-2: Field and Equipment Blank Results

		Field ID	EB-02	EB-03	EB-04	EB-07	FB-02
		Sample date	08/08/20	08/08/20	08/08/20	08/08/20	08/08/20
Chem Group	Analyte name	Units					
Dioxin/furan	2,3,7,8-Tetrachlorodibenzodioxin	pg/L	<1.16	<1.43	<3.43	<1.35	<0.991
Dioxin/furan	1,2,3,7,8-Pentachlorodibenzodioxin	pg/L	<1.32	<1.42	<4.81	<1.29	<1.45
Dioxin/furan	1,2,3,4,7,8-Hexachlorodibenzodioxin	pg/L	<1.07	<1.27	<2.05	<0.772	<1.12
Dioxin/furan	1,2,3,6,7,8-Hexachlorodibenzodioxin	pg/L	<1.02	<1.25	<1.95	<0.77	<1.14
Dioxin/furan	1,2,3,7,8,9-Hexachlorodibenzodioxin	pg/L	<1.07	<1.3	<2.14	<0.797	<1.18
Dioxin/furan	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	pg/L	<1.85	<3.16	<2.65	<3.77	<1.74
Dioxin/furan	Octachlorodibenzodioxin	pg/L	<12.6	<7.78	<7.73	<6.07	<7.33
Dioxin/furan	2,3,7,8-Tetrachlorodibenzofuran	pg/L	<0.535	<0.647	<1.24	<0.77	<0.609
Dioxin/furan	1,2,3,7,8-Pentachlorodibenzofuran	pg/L	<0.729	<0.999	<0.883	<0.758	<0.69
Dioxin/furan	2,3,4,7,8-Pentachlorodibenzofuran	pg/L	<0.71	<0.892	<0.905	<0.719	<0.671
Dioxin/furan	1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	<0.788	<0.855	<0.893	<0.712	<0.698
Dioxin/furan	1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	<0.765	<0.793	<0.882	<0.68	<0.712
Dioxin/furan	1,2,3,7,8,9-Hexachlorodibenzofuran	pg/L	<0.978	<1.07	<1.11	<1	<0.923
Dioxin/furan	2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	<0.809	<0.871	<0.918	<0.764	<0.788
Dioxin/furan	1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	<0.781	<0.92	<1.01	<0.747	<0.922
Dioxin/furan	1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/L	<1.26	<1.38	<1.63	<1.21	<1.53
Dioxin/furan	Octachlorodibenzofuran	pg/L	<4.39	<3.89	<3.66	<4.52	<4.21
SVOCs	1-Methylnaphthalene	ug/L	<2.1	<2.1	<2.1	<2.1	<2.1
SVOCs	2-Methylnaphthalene	ug/L	<2.4	<2.4	<2.4	<2.4	<2.4
SVOCs	Acenaphthene	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5
SVOCs	Acenaphthylene	ug/L	<2.6	<2.6	<2.6	<2.6	<2.6
SVOCs	Anthracene	ug/L	<3.2	<3.2	<3.2	<3.2	<3.2
SVOCs	Benzo(a)anthracene	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0
SVOCs	Benzo(a)pyrene	ug/L	<3.1	<3.1	<3.1	<3.1	<3.1
SVOCs	Benzo(b)fluoranthene	ug/L	<3.1	<3.1	<3.1	<3.1	<3.1
SVOCs	Benzo(g,h,i)perylene	ug/L	<3.3	<3.3	<3.3	<3.3	<3.3
SVOCs	Benzo(k)fluoranthene	ug/L	<3.4	<3.4	<3.4	<3.4	<3.4
SVOCs	Chrysene	ug/L	<3.4	<3.4	<3.4	<3.4	<3.4
SVOCs	Dibenzo(a,h)anthracene	ug/L	<3.2	<3.2	<3.2	<3.2	<3.2
SVOCs	Fluoranthene	ug/L	<2.2	<2.2	<2.2	<2.2	<2.2
SVOCs	Fluorene	ug/L	<2.8	<2.8	<2.8	<2.8	<2.8
SVOCs	Indeno (1,2,3-cd) pyrene	ug/L	<2.9	<2.9	<2.9	<2.9	<2.9
SVOCs	Naphthalene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0
SVOCs	Phenanthrene	ug/L	<3.5	<3.5	<3.5	<3.5	<3.5
SVOCs	Pyrene	ug/L	<2.7	<2.7	<2.7	<2.7	<2.7
SVOCs	Pentachlorophenol (SIM)	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20

FB-01 and EB-01 are associated with samples collected from OU2; therefore; their results are not provided in this table
< - non-detect at method detection limit shown
SVOC - semivolatile organic compound
EB - equipment blank
FB - field blank
pg/L - picogram per liter
ug/L - micrograms per liter
SIM - selective ion monitoring