



DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, MCAPP
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

June 4, 2020

U-042-20

SUBJECT: Annual Status Report (June 2019 to May 2020) of the AOC-65 Class V Remediation Infiltration Galleries and Injection Wells at Camp Stanley Storage Activity, Boerne, Texas, TCEQ Authorization No. 5X2600645; IHWCA#69026; CN602728206/RN100662840

Mr. Bryan Smith
Texas Commission on Environmental Quality
Underground Injection Control Permits Section
Radioactive Materials Division
MC233
PO Box 13087
Austin, Texas 78711-3087
(512) 239-3150

Dear Mr. Smith:

The Camp Stanley Storage Activity (CSSA), McAlester Army Ammunition Plant, U.S. Army Field Support Command, Army Materiel Command, U.S. Army, is submitting this annual report summarizing the injection activities performed at the on-post Area of Concern (AOC) 65 site. Injection activities performed are part of the AOC-65 In-Situ Chemical Oxidation (ISCO) remedial approach for treatment of chlorinated compounds in groundwater. This annual letter provides a summary of activities for the months of June 2019 through May 2020 and includes a report of injection and associated ISCO activities conducted at AOC-65 during the past year as specified by the Texas Commission on Environmental Quality (TCEQ) Underground Injection Control (UIC) permit.

ISCO injection activities associated with the Class V Injection Well Authorization No. 5X2600645 (amended November 13, 2017) during this reporting period have included the sustained release of chemical oxidants from 30 oxidant infused paraffin wax cylinders that were installed in October and November 2018. These 30 cylinders are installed within ten (10) wells (**Table 1**) at AOC-65. Groundwater monitoring was also performed during the reporting period.

The oxidant cylinders (Remox SR+) deployed at AOC-65 consist of potassium permanganate, sodium persulfate, infused within a paraffin wax matrix in a ratio of 38:38:24. The cylinders are 18 inches long and either 2.5 inches or 1.35 inches in diameter. The 2.5-inch cylinders weigh 5.75 pounds each and the 1.35-inch cylinders weigh 2.875 pounds each. This passive oxidant application approach allows the

continued release of ISCO chemicals into groundwater to occur under varying hydrologic conditions throughout the year.

Groundwater samples were collected from existing monitoring wells, injection wells, and infiltration galleries for analysis of volatile organic compounds (VOCs), metals, and anions (chloride and sulfate) to track the progress of current ISCO applications. Additionally, water quality parameters (pH, DO, ORP, and conductivity) were also collected at monitoring wells. Sampling events were conducted in June, September, and December 2019, and March 2020. Monitoring events will continue quarterly, with the next monitoring event scheduled to take place in June 2020.

Analytical results from the December 2019 and March 2020 sampling events indicate a rebound in VOC concentrations within some of the cylinder-installed wells, indicating that the cylinders are nearing the end of their effective lifespan. As a result, all 30 currently deployed cylinders will be replaced in the next reporting period (June 2020). Additional injections in the next twelve months may include 600 gallons of 6.6% liquid sodium permanganate applied within I/Ws and infiltration cells. No new injection wells or infiltration cells are planned at this time.

If you have any questions regarding the specific ISCO application activities at CSSA, please feel free to contact me at 210-295-7416 or Adrien Lindley, Parsons at 512-719-6052, adrien.lindley@parsons.com.

Sincerely,


Jason D. Shirley
Installation Manager

cc: Margarita Loya, CSSA Environmental Manager
Greg Lyssy, USEPA Region 6
Julie Burdey, Parsons – Austin
Ken Rice, Parsons – Austin
File: 640149.1102013.01005

Table 1
Oxidant Application Summary

Table 1

AOC-65 Permanganate/Persulfate Cylinder Application October 2018 - May 2020

AOC-65	Well ID	Cylinder Installation date	1.35" Cylinder (Qty)	2.5" Cylinder (Qty)
Original Cylinder Wells	SIW-01	October 2018	3	---
	TSW-01	October 2018	1	2
	TSW-05	October 2018	1	2
	VEW-19	October 2018	1	2
	VEW-27	October 2018	1	2
	VEW-32	October 2018	1	2
Additional Cylinder Wells	VEW-15	November 2018	1	2
	VEW-18	November 2018	1	2
	VEW-29	November 2018	1	2
	VEW-31	November 2018	1	2
Total			12	18

Notes:

2.5" cylinders contain 4.37 lbs of oxidant (2.185 lbs of persulfate and permanganate)

1.35" cylinders contain 2.185 lbs of oxidant (1.0925 lbs of persulfate and permanganate)

Field Forms

Personnel: Dietert & Elliott

ISCO Sampling AOC-65

Bold = Performance Monitoring Samples
candles installed

Well ID	TD / pump depth	Water Level ('BTOC)	Sample Date	Sample Time	Temp. (°C)	Cond. (ms/cm ²)	DO	pH	ORP
AOC65-VEW13-LGR	41	33.25	6/12/14	0805	22.44	0.647	0.23	6.84	148.0
AOC65-VEW14-LGR	61	60.38	↓		22.77	0.719	2.89	7.01	301.1
AOC65-VEW15-UGR	13	7.88	6/17/14	1040	22.89	12.92	1.35	6.08	802.3
AOC65-VEW16-LGR	41	29.95	6/12/14	0445	22.99	0.595	0.60	6.88	87.1
AOC65-VEW17-LGR	52.5	50.94	↓		22.85	0.703	3.44	6.92	368.7
AOC65-VEW18-LGR	56	45.53	6/17/14	1150	23.16	3.508	2.92	7.17	622.0
AOC65-VEW19-UGR	26	11.32	↓	1310	22.25	17.32	3.15	7.88	685.7
AOC65-VEW20	25.7	11.20	6/12/14	0750	21.73	0.598	2.03	7.25	568.4
AOC65-VEW21	27	13.23	6/11/14	0845	21.86	0.627	3.14	6.84	214.0
AOC65-VEW22	50.5	49.19			21.69	0.591	3.92	6.87	205.2
AOC65-VEW23	21	17.90		0910	22.66	0.556	4.65	6.81	202.3
AOC65-VEW24	50	50.35							
AOC65-VEW25	21.5	17.70		0945	21.70	5.354	4.35	7.46	344.0
AOC65-VEW26	50	48.26	6/12/14		22.91	5.661	1.20	6.89	216.2
AOC65-VEW27	21	9.36	6/17/14	1345	22.19	25.26	0.88	6.34	727.0
AOC65-VEW28A	120	101.67	6/12/14	1010	22.42	0.658	6.23	6.47	519.0
AOC65-VEW28B	179	101.48	↓	1020	22.49	0.606	8.41	7.03	487.1
AOC65-VEW29	40	30.56	6/17/14	1100	23.08	14.64	1.66	6.10	724.9
AOC65-VEW30	24.5	24.20	6/12/14						
AOC65-VEW31	40	30.95	6/17/14	1115	23.02	14.61	0.91	6.06	724.8
AOC65-VEW32	24	9.25	↓	1130	22.39	6.512	0.50	6.39	709.4
AOC65-VEW33	24.5	24.37	6/12/14						
AOC65-PZ01-LGR	132.35	107.30	6/11/14	0900	21.46	0.676	6.93	6.96	198.3
AOC65-PZ02-LGR	50.26	43.44		1030	22.61	2.076	3.81	7.00	454.4
AOC65-PZ03-LGR	134.2	116.98			21.61	0.555	6.28	6.50	288.3
AOC65-PZ04-LGR	43.1	31.37			23.08	0.723	1.41	6.65	214.6
AOC65-PZ05-LGR	126.87	85.10		1050	21.88	0.708	6.72	6.98	451.7
AOC65-PZ06-LGR	43.64	36.36		0850	22.73	0.606	2.22	6.72	197.0
AOC65-TSW-01	40	32.73	6/17/14	1330	23.04	23.13	1.32	6.02	769.8
AOC65-TSW-02	40	31.50	6/12/14	0825	22.97	3.476	0.51	6.60	183.5
AOC65-TSW-03	40	29.05	↓	0840	22.97	15.07	0.55	6.58	61.0
AOC65-TSW-04	40	28.55	6/11/14	1115	22.60	27.63	0.49	6.44	-238.7
AOC65-TSW-05	40	30.60	6/17/14	1205	22.84	10.86	0.77	6.07	720.4
AOC65-TSW-06	51	35.92	6/12/14	1050	22.95	0.672	0.14	6.91	378.3
AOC65-TSW-07	40	28.15	6/11/14	1055	22.55	6.508	0.57	6.54	-24.2
AOC65-SIW-01	25	13.15	6/17/14	1410	22.50	85.51	2.28	8.79	611.8
AOC65-SIW-02	25.4	23.31	6/12/14	25	22.48	0.866	1.65	6.90	411.0
AOC65-North-IC	4.2	DRY							
AOC65-Middle-IC	9.65	7.55		0955	23.47	9.351	6.25	6.85	611.6
AOC65-South-IC	11.77	10.61	↓	1025	22.74	3.799	2.75	6.92	614.4
IIW-01	116	101.89	6/11/14	0930	21.66	1.389	6.19	7.12	490.0
IIW-02	125	96.22		0955	22.01	7.895	7.10	7.12	584.9
IIW-03	125	37.20		1010	22.30	4.703	4.93	7.52	522.6
IIW-04	125	76.53	↓	1020	21.94	7.909	6.09	7.37	444.7

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light purple
purple
pink
clear

ISCO Permanganate Candle Placement
AOC-65

Personnel: Elliott + Dietert

Well ID	TD / pump depth	Water Level (BTOC)	Date	Time	Top of Candle 1 (ft. BTOC)	Top of Candle 2 (ft. BTOC)	Top of Candle 3 (ft. BTOC)	
AOC65-VEW15-UGR	13	7.88	6/17/19		7.9	9.9	11.7	
AOC65-VEW18-LGR	56	45.53			45.8	47.4	49.2	
AOC65-VEW19-UGR	26	11.32			11.4	15	18.2	
AOC65-VEW27	21	9.36			9.4	13.7	18.1	
AOC65-VEW29	40	30.56			30.7	34	37.5	
AOC65-VEW31	40	30.95			31.4	34.2	36.7	
AOC65-VEW32	24	9.25			9	12.8	17	
AOC65-TSW-01	40	32.73			33	35.8	37.5	
AOC65-TSW-05	40	30.60			30.6	33.7	36.9	
AOC65-SIW-01	25	13.15		✓		13.1	15.9	17.5

ISCO Sampling AOC-65

Personnel: Elliott + Detert

Bold = Performance Monitoring Samples
candles installed

Well ID	TD / pump depth	Water Level (BTOC)	Sample Date	Sample Time	Temp. (°C)	Cond. (ms/cm ²)	DO	pH	ORP
AOC65-VEW13-LGR	41	34.65	9/18/19	0815	22.79	0.526	2.70	6.51	246.0
AOC65-VEW14-LGR	61	60.44	I		22.88	0.666	3.45	6.80	283.1
AOC65-VEW15-UGR	13	8.18	9/19/19	0905	26.69	10.45	0.74	6.11	855.7
AOC65-VEW16-LGR	41	30.00	9/18/19	0910	22.90	0.539	0.18	6.42	1.9
AOC65-VEW17-LGR	52.5	51.10	I		22.91	0.640	1.99	6.69	292.2
AOC65-VEW18-LGR	56	48.36	9/19/19	1015	23.30	3.378	2.82	7.05	621.4
AOC65-VEW19-UGR	26	13.91	↓	0800	22.94	16.99	5.25	7.30	720.6
AOC65-VEW20	25.7	11.90	9/18/19	0810	22.72	0.571	0.14	6.91	479.3
AOC65-VEW21	27	14.06	9/14/19	0840	22.40	0.611	0.20	6.79	289.7
AOC65-VEW22	50.5	DRY	I						
AOC65-VEW23	21	18.85	I	0900	22.75	0.661	0.10	7.01	-220.0
AOC65-VEW24	50	DRY	I						
AOC65-VEW25	21.5	18.46	I	0950	22.93	16.177	0.55	7.16	366.3
AOC65-VEW26	50	48.6	9/18/19		22.90	4.728	3.74	6.90	280.0
AOC65-VEW27	21	11.40	9/19/19	0830	23.49	25.64	1.46	6.31	742.3
AOC65-VEW28A	120	108.81	9/18/19	0945	23.31	0.621	5.07	6.74	507.5
AOC65-VEW28B	179	110.48	I	0955	22.80	0.564	3.21	6.75	482.1
AOC65-VEW29	40	30.70	9/19/19	0920	23.04	15.06	0.92	6.02	745.5
AOC65-VEW30	24.5	24.20	9/18/19						
AOC65-VEW31	40	31.14	9/19/19	0945	23.03	14.95	0.53	6.01	740.4
AOC65-VEW32	24	10.00	I	1000	23.33	6.785	0.77	6.33	728.8
AOC65-VEW33	24.5	24.30	9/18/19						
AOC65-PZ01-LGR	132.35	113.89	9/16/19	0850	22.60	0.612	5.72	6.82	256.6
AOC65-PZ02-LGR	50.26	47.85	I	1040	22.56	2.252	4.26	6.73	458.0
AOC65-PZ03-LGR	134.2	123.0	I		22.92	0.646	3.87	6.53	423.1
AOC65-PZ04-LGR	43.1	36.45	I		22.48	0.503	6.50	6.72	364.8
AOC65-PZ05-LGR	126.87	109.72	I	1045	23.14	0.681	6.29	6.57	421.3
AOC65-PZ06-LGR	43.64	36.46	I	0845	22.62	0.522	3.54	6.73	269.9
AOC65-TSW-01	40	32.80	9/19/19	0850	22.83	21.62	0.88	6.00	776.2
AOC65-TSW-02	40	31.75	9/18/19	0835	22.82	2.827	0.35	6.52	219.9
AOC65-TSW-03	40	29.05	9/18/19	0850	22.82	7.737	0.64	6.59	71.9
AOC65-TSW-04	40	28.81	9/16/19	1115	22.45	23.70	0.37	6.46	-706.9
AOC65-TSW-05	40	30.58	9/19/19	1050	22.65	10.56	1.07	6.04	724.8
AOC65-TSW-06	51	35.93	9/18/19	1030	22.77	0.627	0.22	6.48	350.0
AOC65-TSW-07	40	28.25	9/16/19	1055	22.33	5.787	0.03	6.44	-15.9
AOC65-SIW-01	25	13.55	9/19/19	1100	22.80	84.15	2.88	8.83	609.1
AOC65-SIW-02	25.4	21.56	9/18/19		22.85	0.786	0.27	6.76	494.8
AOC65-North-IC	4.2	DRY	↓						
AOC65-Middle-IC	9.65	7.70	9/18/19	0920	28.06	8.773	6.71	6.81	661.2
AOC65-South-IC	11.77	8.50	I	1005	26.73	3.323	1.96	7.03	634.8
IIW-01	116	109.20	9/16/19	0940	22.81	1.487	6.04	6.99	487.3
IIW-02	125	7.2	I	1000	23.40	14.67	7.74	7.69	487.2
IIW-03	125	64.51	I	1010	23.12	4.537	4.60	7.13	507.6
IIW-04	125	102.05	I	1025	22.69	7.921	4.56	7.34	525.9

Faint pink

light pink

light pink

light pink

light pink

VEW-19	14'	18'	22'
VEW-27	12'	15	18
TSW-01	32.8'	35.7'	37.3'
VEW-15	8'	10'	12'
VEW-29	30.7	34	37.5
VEW-31	32	34.6	37.2'
VEW-32	9.5'	13'	17'
VEW-18	49'	51'	53'
TSW-05	30.7'	33.8'	36.9'
STW-01	13.2	15.6	17.2

ISCO Sampling AOC-65

Personnel: Elliott, Dietert

Bold = Performance Monitoring Samples
candles installed

Well ID	TD / pump depth	Water Level (BTOC)	Sample Date	Sample Time	Temp. (°C)	Cond. (ms/cm ²)	DO	pH	ORP
AOC65-VEW13-LGR	41	35.45	1/8/20	0820	22.56	0.608	1.63	6.77	230.2
AOC65-VEW14-LGR	61	60.50	↓		21.88	0.727	5.17	7.01	257.1
AOC65-VEW15-UGR	13	8.17	1/9/20	0900	22.65	10.17	0.94	5.83	860.7
AOC65-VEW16-LGR	41	30.03	1/8/20	1000	22.35	0.583	0.50	6.91	-13.4
AOC65-VEW17-LGR	52.5	51.55	↓		22.47	0.476	3.20	6.84	243.3
AOC65-VEW18-LGR	56	49.95	1/9/20	1015	23.01	2.903	2.26	6.97	658.3
AOC65-VEW19-UGR	26	16.10	1/9/20	0900	23.70	13.84	8.05	7.04	674.1
AOC65-VEW20	25.7	12.81	1/8/20	0805	23.53	0.635	0.82	7.31	193.8
AOC65-VEW21	27	15.93	1/6/20	1015	23.17	0.582	0.32	7.02	166.6
AOC65-VEW22	50.5	50.30	Dry	-	-	-	-	-	-
AOC65-VEW23	21	19.13	↓	1045	23.44	0.714	0.33	7.09	-99.1
AOC65-VEW24	50	Dry	-	-	-	-	-	-	-
AOC65-VEW25	21.5	18.77	1/6/20	1105	23.52	7.072	0.37	7.05	450.6
AOC65-VEW26	50	48.75	1/8/20		22.02	5.039	2.94	6.88	251.1
AOC65-VEW27	21	11.92	1/9/20	0840	23.83	22.59	1.51	6.18	767.7
AOC65-VEW28A	120	111.79	1/8/20	1040	19.71	0.667	5.96	7.13	502.5
AOC65-VEW28B	179	115.05	↓	1650	20.19	0.606	7.84	7.34	447.7
AOC65-VEW29	40	30.70	1/9/20	0915	22.93	11.73	1.42	5.90	740.3
AOC65-VEW30	24.5	24.25	1/8/20						
AOC65-VEW31	40	31.10	1/9/20	0935	22.93	12.05	0.75	5.86	740.7
AOC65-VEW32	24	11.15	↓	0950	23.87	5.005	0.53	6.23	711.1
AOC65-VEW33	24.5	24.40	1/8/20						
AOC65-PZ01-LGR	132.35	116.79	1/6/20	1030	21.33	0.564	5.85	7.06	232.4
AOC65-PZ02-LGR	50.26	47.53	1/6/20	1145	22.50	2.168	3.78	6.77	508.0
AOC65-PZ03-LGR	134.2	126.00	↓		20.62	0.465	6.52	6.80	193.8
AOC65-PZ04-LGR	43.1	36.43	↓		22.70	0.625	2.59	6.73	81.8
AOC65-PZ05-LGR	126.87	117.40	1/6/20	1152	21.52	0.626	4.91	6.73	458.3
AOC65-PZ06-LGR	43.64	36.46	1/6/20	1022	22.69	0.548	2.92	6.62	226.9
AOC65-TSW-01	40	33.30	1/9/20	0820	22.71	16.61	2.30	5.84	778.7
AOC65-TSW-02	40	32.05	1/8/20	0835	22.80	3.069	6.87	6.58	262.0
AOC65-TSW-03	40	29.07	↓	0905	22.74	12.60	0.46	6.59	-15.6
AOC65-TSW-04	40	28.68	↓	0920	22.18	19.91	0.85	6.50	-69.6
AOC65-TSW-05	40	30.70	1/9/20	1030	22.57	7.793	0.73	5.95	741.8
AOC65-TSW-06	51	35.93	1/8/20	1125	22.67	0.674	0.28	6.91	308.1
AOC65-TSW-07	40	28.27	↓	0935	21.97	5.361	0.47	6.58	-7.4
AOC65-SIW-01	25	13.22	1/9/20	1050	23.12	69.68	2.58	8.97	607.4
AOC65-SIW-02	25.4	22.45	1/8/20		23.54	0.835	0.46	6.98	459.8
AOC65-North-IC	4.2	Dry	1/8/20						
AOC65-Middle-IC	9.65	to 208.02	↓	1020	21.89	6.833	8.28	6.78	657.5
AOC65-South-IC	11.77	8.66	↓	1100	23.44	3.337	3.45	6.99	628.0
IIW-01	116	112.15	1/6/20	1055	21.69	1.188	4.19	6.84	546.4
IIW-02	125	~101.45	↓	1115	21.84	8.659	6.81	6.82	573.0
IIW-03	125	66.16	↓	1125	22.46	4.239	5.19	7.07	521.8
IIW-04	125	~106.50	↓	1135	22.26	6.671	4.33	7.56	548.8

light pink

pink

pink

light pink

pink

ISCO Permanganate Candle Placement
AOC-65

Personnel: Elliott + Dietert

Well ID	TD / pump depth	Water Level (BTOC)	Date	Time	Top of Candle 1 (ft. BTOC)	Top of Candle 2 (ft. BTOC)	Top of Candle 3 (ft. BTOC)
AOC65-VEW15-UGR	13	8.17	1/9/20		8	10	12
AOC65-VEW18-LGR	56	49.95			49	51.2	52.9
AOC65-VEW19-UGR	26	16.10		16	18	19.5	
AOC65-VEW27	21	11.92		12.5	14.8	17.8	
AOC65-VEW29	40	30.70		30.7	34	37.3	
AOC65-VEW31	40	31.10		31.8	34.5	37	
AOC65-VEW32	24	11.15		11	14.5	17.5	
AOC65-TSW-01	40	33.3		33	35.8	37.4	
AOC65-TSW-05	40	30.7		30.7	37.8	36.7	
AOC65-SIW-01	25	13.22		✓	13.3	15	16.5

ISCO Sampling AOC-65

Personnel: Elliott & Dietert

Bold = Performance Monitoring Samples
candles installed

Well ID	TD / pump depth	Water Level ('BTOC)	Sample Date	Sample Time	Temp. (°C)	Cond. (ms/cm ²)	DO	pH	ORP
AOC65-VEW13-LGR	41	35.55	3/19/20	1125	22.98	0.706	1.25	6.62	240.2
AOC65-VEW14-LGR	61	60.50	↓		22.53	0.781	3.12	6.90	228.9
AOC65-VEW15-UGR	13	7.73	3/23/20	0925	21.02	12.03	1.17	5.84	707.9
AOC65-VEW16-LGR	41	29.47	3/20/20	0820	22.63	0.594	1.61	6.86	235.2
AOC65-VEW17-LGR	52.5	51.27	3/19/20		22.85	0.448	4.95	6.73	240.0
AOC65-VEW18-LGR	56	46.10	3/23/20	1025	23.05	3.046	2.19	6.98	557.3
AOC65-VEW19-UGR	26	12.12	3/23/20	0845	23.00	17.00	2.94	7.64	608.3
AOC65-VEW20	25.7	13.53	3/19/20	1140	22.50	0.644	2.19	7.13	456.3
AOC65-VEW21	27	13.94		0825	22.52	0.626	2.69	7.12	358.2
AOC65-VEW22	50.5	49.99	+	Dry	-	-	-	-	-
AOC65-VEW23	21	20.20		0835	22.55	0.803	4.21	7.43	322.3
AOC65-VEW24	50	Dry	+	-	-	-	-	-	-
AOC65-VEW25	21.5	18.08	↓	0915	22.47	7.657	2.30	7.32	505.1
AOC65-VEW26	50	48.57	↓		22.77	5.075	2.56	6.76	212.6
AOC65-VEW27	21	9.70	3/23/20	0915	22.79	27.21	2.19	6.06	684.7
AOC65-VEW28A	120	112.67	3/20/20	0845	20.79	0.657	5.83	7.08	430.0
AOC65-VEW28B	179	116.43	3/20/20	0900	20.98	0.689	5.56	7.25	405.4
AOC65-VEW29	40	30.56	3/23/20	0945	23.06	12.52	1.00	5.84	682.9
AOC65-VEW30	24.5	24.30	3/20/20	DRY					
AOC65-VEW31	40	31.00	3/23/20	1000	23.10	13.09	0.79	5.84	688.3
AOC65-VEW32	24	9.40	↓	1015	23.06	4.699	0.36	6.25	641.5
AOC65-VEW33	24.5	24.26	3/20/20	DRY					
AOC65-PZ01-LGR	132.35	117.76	3/19/20	0840	21.74	0.637	5.95	6.94	368.9
AOC65-PZ02-LGR	50.26	45.79		1005	22.51	2.314	3.04	6.85	569.2
AOC65-PZ03-LGR	134.2	126.91			21.59	0.538	5.83	6.71	382.1
AOC65-PZ04-LGR	43.1	36.42			22.91	0.713	1.64	6.75	376.5
AOC65-PZ05-LGR	126.87	112.53		1010	21.88	0.844	5.14	6.81	606.5
AOC65-PZ06-LGR	43.64	36.38	↓	0830	22.77	0.625	2.85	6.62	403.1
AOC65-TSW-01	40	32.72	3/23/20	0900	22.82	18.87	5.69	5.87	707.2
AOC65-TSW-02	40	31.85	3/19/20	1105	22.86	2.607	0.54	6.49	244.0
AOC65-TSW-03	40	28.62		1055	22.87	13.24	0.40	6.57	-24.4
AOC65-TSW-04	40	28.62	↓	1040	22.54	23.03	1.22	6.54	-59.9
AOC65-TSW-05	40	30.41	3/23/20	1045	22.68	7.981	0.95	5.98	675.6
AOC65-TSW-06	51	35.92	3/20/20	0930	22.64	0.705	0.62	6.87	344.4
AOC65-TSW-07	40	28.20	3/19/20	1020	22.48	5.838	0.93	6.56	-47.4
AOC65-SIW-01	25	13.33	3/23/20	1100	22.84	80.95	2.52	9.08	532.3
AOC65-SIW-02	25.4	20.26	3/19/20		23.13	0.891	0.83	6.91	440.0
AOC65-North-IC	4.2	DRY	3/20/20						
AOC65-Middle-IC	9.65	7.95		0830	20.65	11.34	9.07	6.56	607.9
AOC65-South-IC	11.77	8.05	↓	0915	21.10	3.381	5.11	7.24	548.6
IIW-01	116	113.02	3/19/20	0900	21.88	1.293	4.67	6.82	600.5
IIW-02	125	111.21		0925	21.82	8.442	3.98	6.77	638.1
IIW-03	125	57.95		0940	22.36	4.746	4.10	7.16	578.5
IIW-04	125	105.97	↓	0950	22.01	7.133	4.85	7.57	664.8

pink

faint pink
muddy pink
light pink
purple

ISCO Permanganate Candle Placement
AOC-65

Personnel: Elliott + Dietert

Well ID	TD / pump depth	Water Level (BTOC)	Date	Time	Top of Candle 1 (ft. BTOC)	Top of Candle 2 (ft. BTOC)	Top of Candle 3 (ft. BTOC)
AOC65-VEW15-UGR	13	7.73	3/29/20		7.8	9.9	12
AOC65-VEW18-LGR	56	46.10			46.2		
AOC65-VEW19-UGR	26	12.12		12.4	15.5	20	
AOC65-VEW27	21	9.70		12.5	14.9	17.7	
AOC65-VEW29	40	30.56		30.6	33.8	37.4	
AOC65-VEW31	40	31.00		31.8	34.6	37.1	
AOC65-VEW32	24	9.40		9.5	14.5	18.7	
AOC65-TSW-01	40	32.72		32.7	35.7	37.3	
AOC65-TSW-05	40	30.41		30.6	33.7	36.7	
AOC65-SIW-01	25	13.33		✓	13.3	9.3	13.3
					13.3	17.3	21