

200 West Pump and Treat Facility - 2nd Quarter CY2020 Briefing

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

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200 West Pump and Treat Facility 2nd Quarter CY2020 Briefing



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Presented to: Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA)
Presented: August 05, 2020



Contents

- 200 West Pump and Treat (P&T) production - liters/gallons treated
- Contaminants of concern (COC) mass removed
- Successes – past and present
- Items on the radar



COVID-19 Impacts

- On March 17th, a stop work was issued and affected activities delayed through 2nd quarter 2020.
- Specific Impacts:
 - Flow reduced to ~1,650 gpm. Wells that were turned off:
 - ETB2 bypass: YE01, 09, 10, 11, 12, 16.
 - RAD: YE02 (to Tc-99IX), YE28, 29, 30, 31, 32 (to UIX). YE27 typically off.
 - Rebound sampling performed on wells in July.
 - Bio system lay up – 16-inch bypass line acceptance testing delayed
 - Sampling & Analysis – missed all quarterly samples
 - New Wells – YJ-35 tie-in delayed
 - TOG Stack sample collection delayed
 - 5 extraction wells planned in FY20 – 3 started drilling and construction with carry over into FY21. FY21 - 2 start drilling and construction as FY20 carryover into FY21. Remaining 5 extraction wells pushed into FY2022.

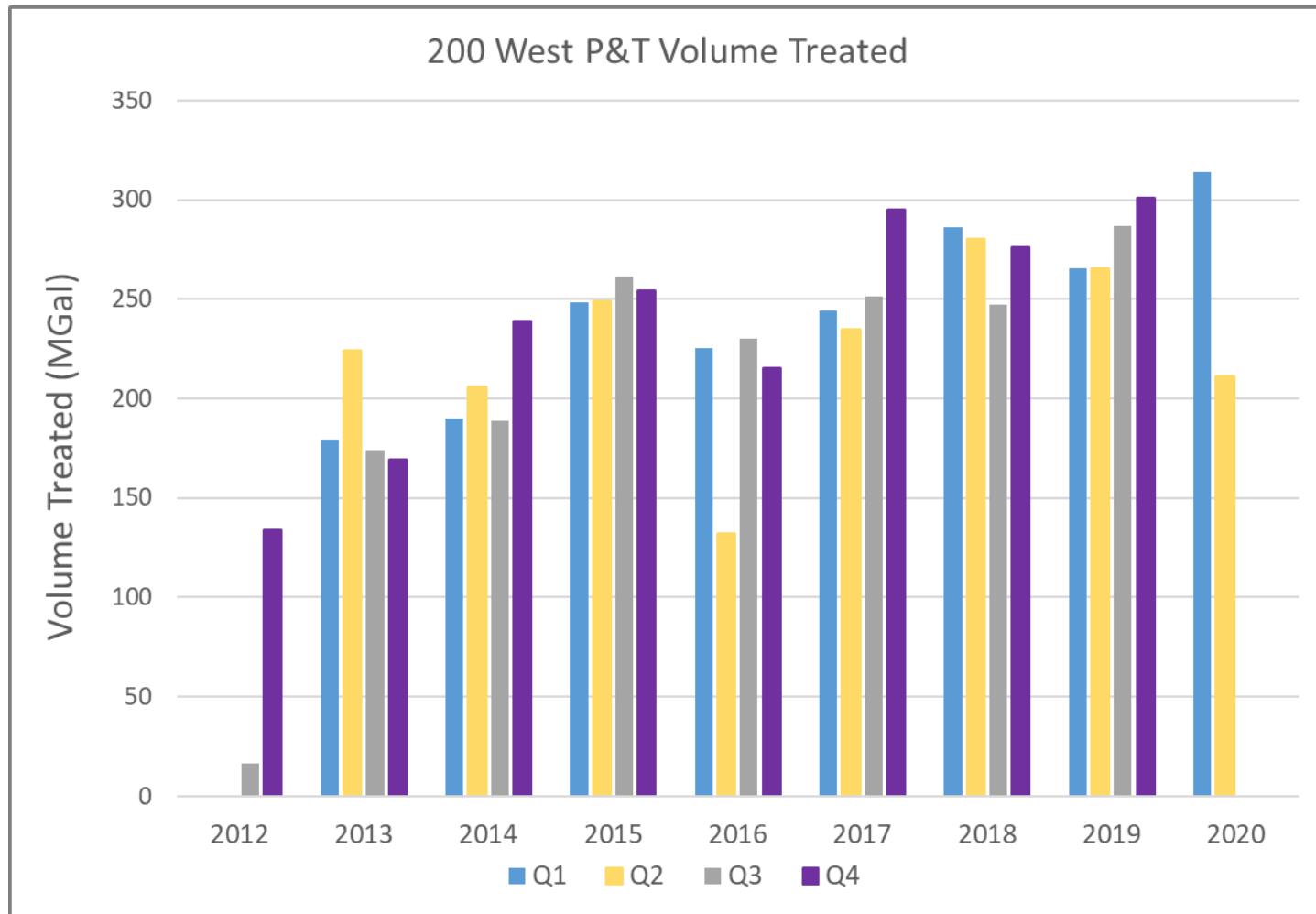


200 West P&T Production

Date	Million Gallons	Million Liters
2012	150.26	568.79
2013	746.55	2,825.98
2014	823.80	3,118.41
2015	1,012.18	3,831.51
2016	802.75	3,038.74
2017	1,025.46	3,881.78
2018	1,089.91	4,125.75
2019	1,118.77	4,235.00
Q1 2020	313.87	1,188.12
April	71.03	268.86
May	71.06	268.99
June	69.37	262.61
Q2 2020	211.46	800.45
Cumulative (Through June 2020)	7,295.02	27,614.55



Volume Water Treated by Quarter



200 West P&T Production

2nd Quarter 2019 Compared with 2020

Date	Million Gallons	Million Liters
April	78.43	296.89
May	96.30	364.53
June	90.63	343.07
2nd Quarter 2019	265.36	1,004.49
April	71.03	268.86
May	71.06	268.99
June	69.37	262.61
2nd Quarter 2020	211.46	800.45

2nd Quarter 2020 production decreased by 20.3% compared to 2nd Quarter 2019. Due to COVID-19 work restrictions, plant flow was reduced during 2nd Quarter of 2020.



Production Contribution from Each Operable Unit for 2nd Quarter CY 2020

Operable Unit	Million Gallons	Million Liters	Percent of Total	Average Flow (gpm)
200-ZP-1	179.50	679.49	84.63	1,370
200-UP-1	21.71	82.19	10.24	166
S-SX Tank Farm	10.24	38.77	4.83	78
200-BP-5	0.0	0.0	0.0	0.0
Perched Water	0.0	0.0	0.0	0.0
ERDF	0.656	2.48	0.31	5.01
Total	212.11	802.94	100.00	1,619

Production for 2nd Quarter CY 2020 was 211.46 million gallons / 800.45 million liters with average flow of 1,614 gpm.

*Target flows are as follows: 200-ZP-1 at 2,000 gpm, 200-UP-1 at 150 gpm, S-SX Tank Farm at 80 gpm, 200-BP-5 at above 150 gpm (165 gpm average is common)



200 West P&T Radiological System Influent and Effluent Concentrations

Date	Iodine-129 (pCi/L) Cleanup Level is 1 pCi/L			Technetium-99 (pCi/L) Cleanup Level is 900 pCi/L				Uranium (µg/L) Cleanup Level is 30 µg/L			
	U Inf	Tc-99 Inf	Tc-99 Eff	U Inf	U Eff	Tc-99 Inf	Tc-99 Eff	U Inf	U Eff	Tc-99 Inf	Tc-99 Eff
2012	NA	0.48	0.33	NA	NA	1,560	<17	NA	NA	NA	NA
2013	NA	0.32	<0.23	NA	NA	1,584	<17	NA	NA	NA	NA
2014	NA	0.28	0.28	NA	NA	1,281	13	NA	NA	NA	NA
2015	NA	0.52	0.52	3,970	<9	1,357	27	56	<0.05	1.6	1.9
2016	1.22	<0.64	<0.77	3,220	3,082	1,990	78	102	<0.05	1.3	1.1
2017	1.49	0.99	1.01	2,609	2,307	1,794	131	303	<0.07	1.1	1.2
2018	1.58	1.13	1.03	2,548	649	930	73	204	<0.07	0.9	0.8
2019	1.47	1.05*	1.05*	1,668	1,648	1,442	84	169	<0.07	0.9	0.7
Q1 2020	1.56	<0.87	0.67*	1,625	1,715	1,370	105	151	<0.07	1.0	0.8
April	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-
2020	1.56	<0.87	0.67*	1,625	1,715	1,370	105	151	<0.07	1.0	0.8

Note: 2nd quarter samples were not collected due to work restrictions from COVID-19

Uranium system sample result /technetium-99 system sample result

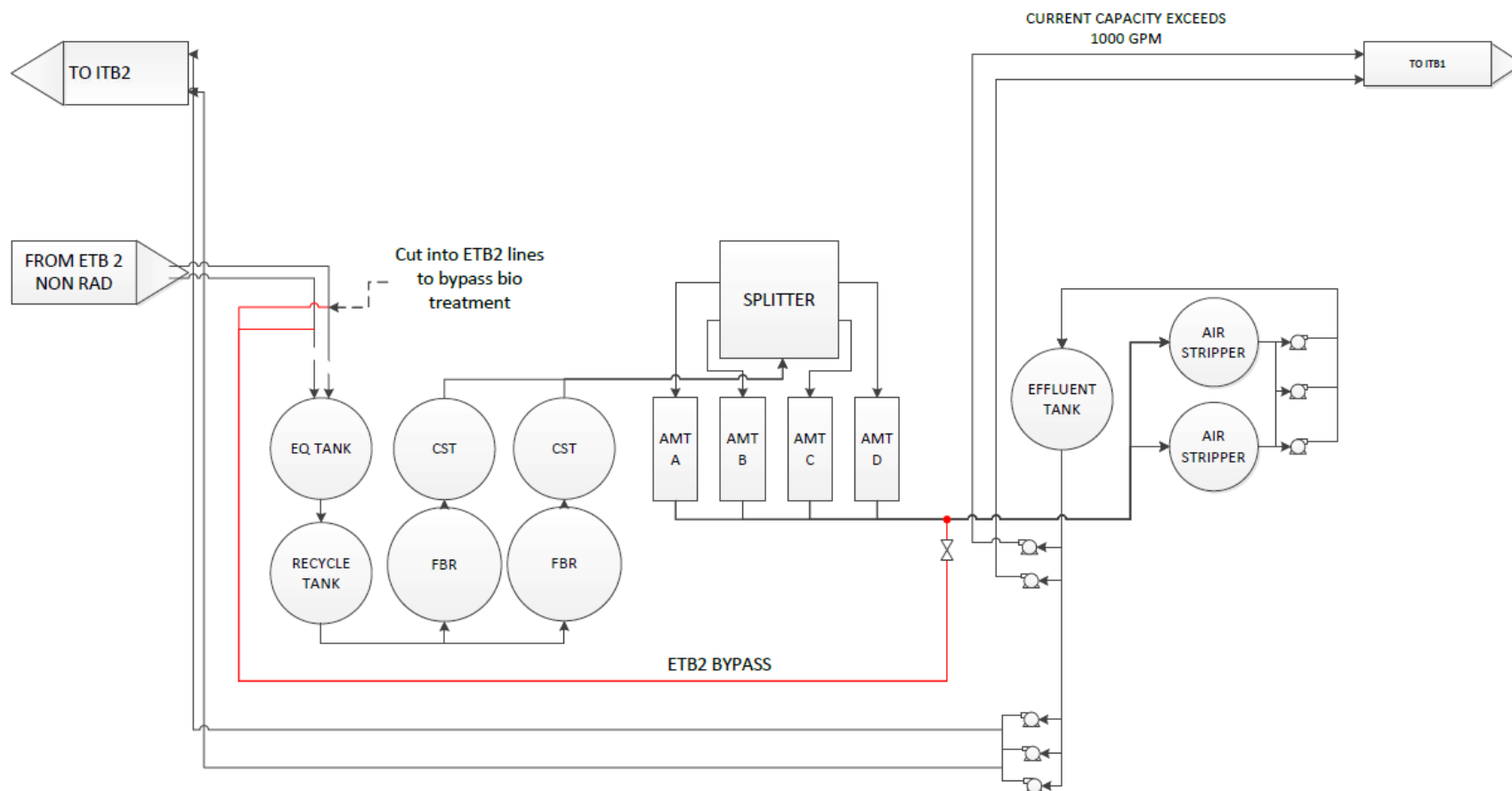
< values = less than the minimum detectable activity

*Average includes values reported as below detection



ETB2 Bypass

- Partial process flow diagram showing changes to increase capacity needs for carbon tetrachloride. Tie in complete August 28, 2019.



200 West P&T Central System

Influent and Effluent Concentrations

	Carbon Tetrachloride		Hexavalent Chromium		Iodine-129		Nitrate as Nitrogen		Technetium-99		Trichloroethene	
Cleanup Level	3.4 µg/L		48 µg/L		1 pCi/L		10 mg/L		900 pCi/L		1 µg/L	
	Influent ¹	Effluent	Influent ¹	Effluent	Influent ¹	Effluent	Influent ¹	Effluent	Influent ¹	Effluent	Influent ¹	Effluent
2012	663	2.6	15.5	<2.0	0.25	<0.24	19.0	6.3	62	34	4.9	<1.0
2013	821	<2.0	22.9	5.6	0.23	<0.26	23.6	8.0	73	55	4.5	<1.0
2014	611	<0.7	21.7	6.2	<0.26	<0.24	22.9	5.2	67	54	3.7	<0.4
2015	488	<0.1	23.2	3.4	<0.43	<0.54	26.7	6.2	84	63	3.1	<0.3
2016	398	<0.2	19.9	3.3	<0.56	<0.75	30.5	5.8	90	64	2.9	<0.3
2017	373	<0.2	21.0	4.2	<0.80	<0.74	27.4	7.4	121	97	2.9	<0.3
2018	357	<0.2	25.9	3.8	0.98	0.93	30.5	6.9	121	96	2.8	<0.3
2019	377	0.4*	28.0	8.8	0.69*	0.65*	28.2	14.9	121	117	2.8	<0.3
April	-	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-	-
2020	352	<0.3	36.5	27.5	<0.91	0.71	33.3	24.4	129	112	3.2	<0.3

Note: Starting December 2019, effluent values include monthly compliance as well as weekly grab samples in support of composite sampler pilot study. For March 2020, three weeks of samples collected.

< values = less than the detection limit

*Average includes values reported as below detection

1. EQ Tank sample. Does not include ETB2 bypass wells after August 28, 2019.



Contaminants of Concern Mass Removed

Date	CCl ₄ (kg)	NO ₃ -N (kg)	NO ₃ -NO ₃ (kg)	Cr ⁶⁺ (kg) ²	Tc-99 (Ci)	TCE (kg)	U (kg)
2012	531	11,053	48,854	19.32	-	2.42	-
2013	3,049	44,108	195,051	71.92	0.218	13.07	-
2014	2,898	56,762	251,595	75.17	1.311	10.24	-
2015	2,786	78,678	348,431	83.54	1.88	11.00	5.83
2016	1,721	74,710	330,877	69.71	2.511	8.54	33.31
2017	1,906	78,973	349,770	89.37	2.871	10.39	364.53 ¹
2018	2,231	93,821	415,533	103.38	2.516	9.95	123.98
2019	1,917	55,539	245,982	68.52	1.852	10.49	102.98
Q1 2020	547	0	0	0.57	0.412	3.44	19.08
April	155	0	0	0.50	0.059	0.73	0.93
May	155	0	0	0.50	0.059	0.73	0.92
June	150	0	0	0.36	0.056	0.71	0.93
Q2 2020	460	0	0	1.36	0.174	2.17	2.78
Cumulative	18,046	493,644	2,186,275	582.8	13.75	81.7	652.5

Note: for COC mass removed calculations in 2nd Quarter, last sample analysis from 1st Quarter was carried through.

CCl₄ = carbon tetrachloride; kg = kilogram; NO₃-N = nitrate as nitrogen; NO₃-NO₃ = nitrate as nitrate; Cr⁶⁺ = hexavalent chromium; Tc-99 = technetium-99; Ci = curie; TCE = trichloroethene or trichloroethylene; U = uranium

¹ uranium mass removal estimate in 2017 overstated by 200 kg

² Starting December 2019, Cr⁶⁺ removal being tracked through Tc-99 system



Contaminants of Concern – Mass Removed

2nd Quarter 2019 Compared with 2020

Date	CCl ₄ (kg)	NO ₃ -N (kg)	NO ₃ -NO ₃ (kg)	Cr ⁶⁺ (kg)	Tc-99 (Ci)	TCE (kg)	U (kg)
April	138	5,736	25,405	6.64	0.156	0.695	10.17
May	171	7,081	31,362	7.13	0.170	0.933	8.49
June	155	6,190	27,416	6.19	0.161	0.768	7.60
2019	464	19,007	84,183	19.96	0.487	2.40	26.26
March	155	0	0	0.50	0.059	0.73	0.93
April	155	0	0	0.50	0.059	0.73	0.92
May	150	0	0	0.36	0.056	0.71	0.93
2020	460	0	0	1.36	0.174	2.17	2.78
Change	- 4	- 19,107	- 84,183	- 18.6	- 0.313	- 0.23	- 23.48

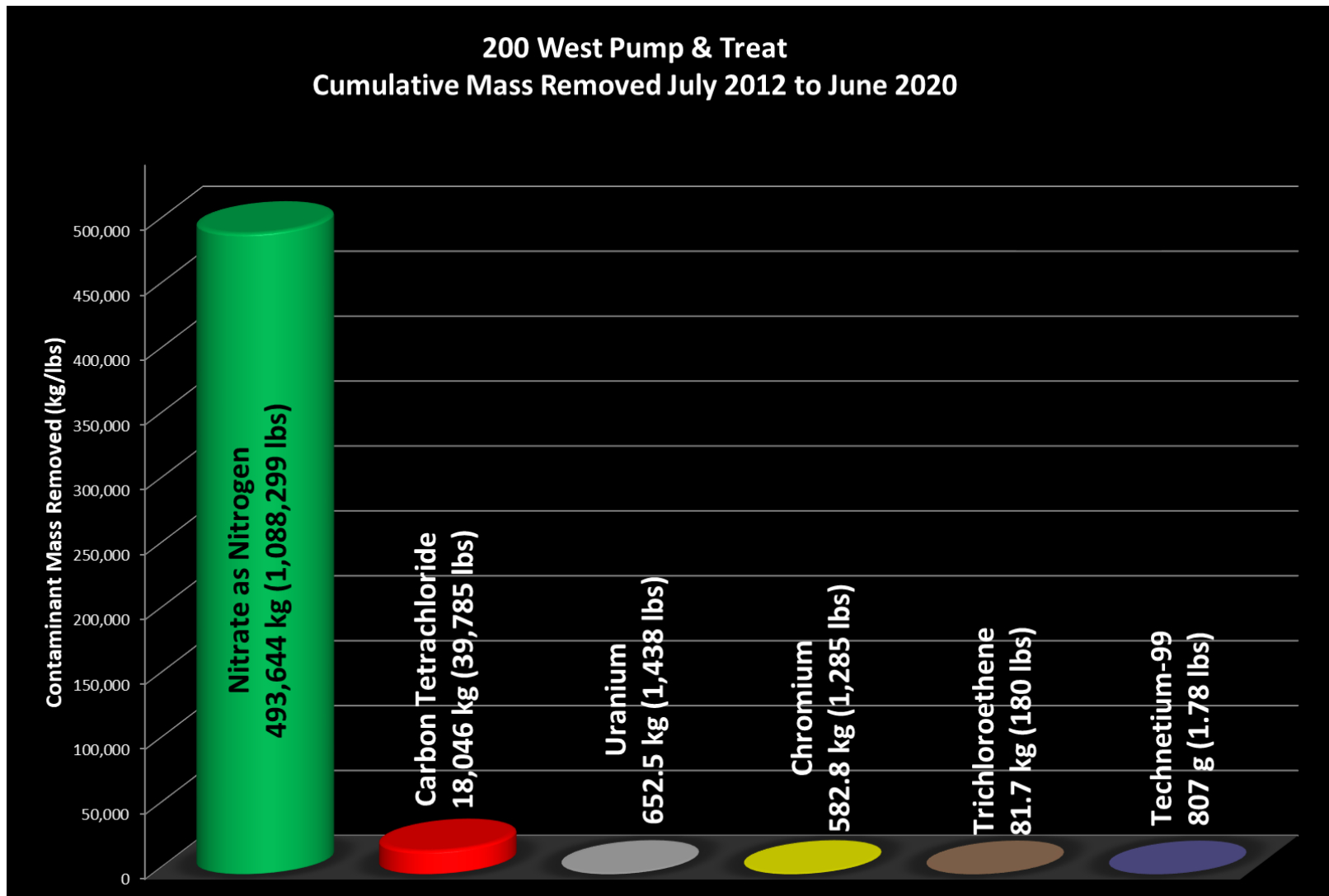
Volume treated:

2nd Quarter 2019: 265.36 million gallons / 1,004.49 million Liters

2nd Quarter 2020: 211.46 million gallons / 800.45 million Liters



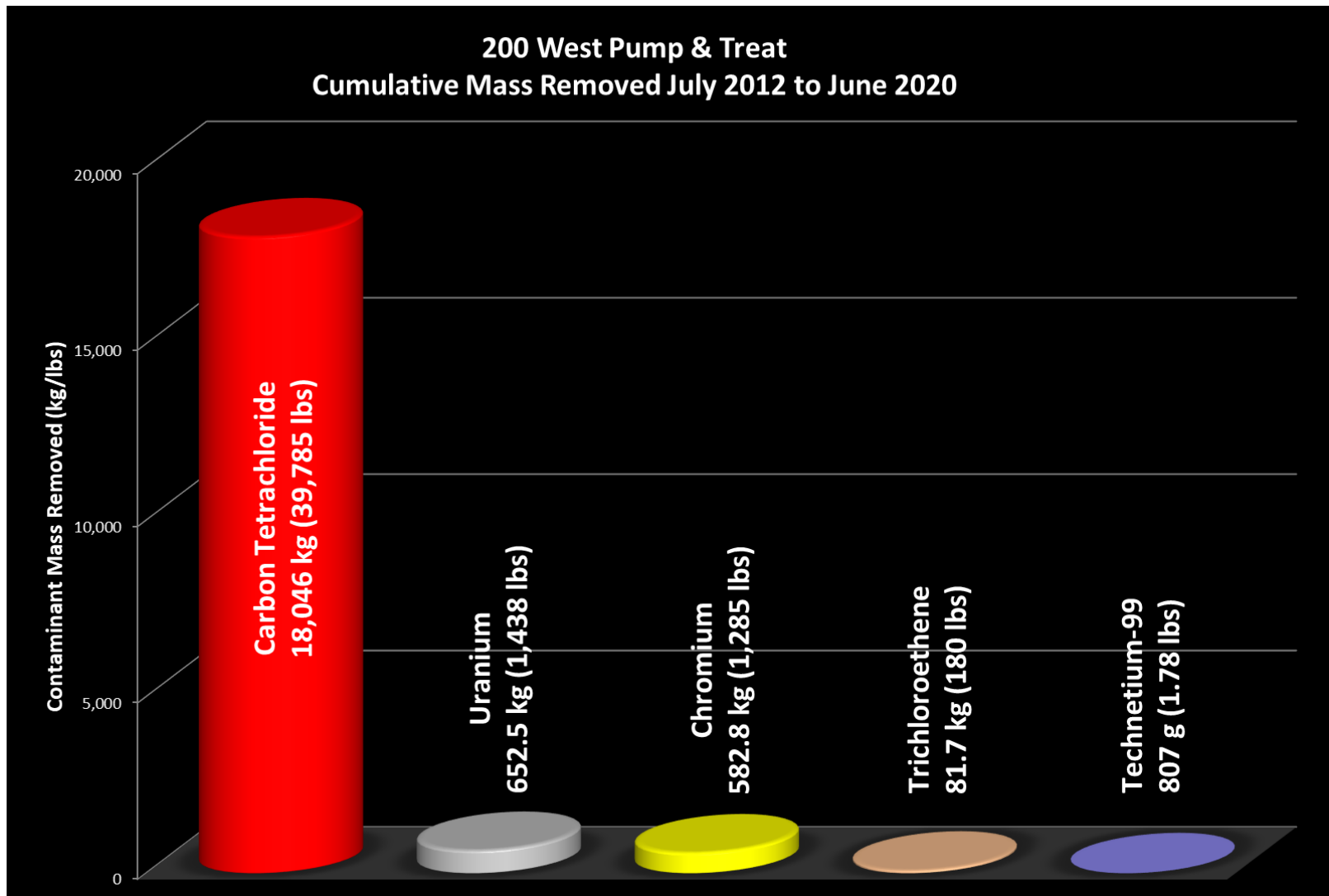
Contaminants of Concern – Mass Removed, 2012 through 2nd quarter 2020



Note: As of October 2019, Nitrate treatment is suspended in accordance with the ZP-1 Optimization Study Plan

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Contaminants of Concern – Mass Removed, 2012 through 2nd quarter 2020



Perched Water Wells– Volume Treated and Estimates* of Mass Removed 2nd Quarter 2020

Well ID	Volume Treated (Gallons)	Volume Treated (Liters)	Nitrate as Nitrogen (kg)	Technetium-99 (Ci)	Uranium (kg)
E33-344 (YE-28)	-	-	-	-	-
E33-350 (YE-29)	-	-	-	-	-
E33-351 (YE-30)	-	-	-	-	-
2nd Quarter 2020	-	-	-	-	-

*Perched well were offline from end of March through June 2020 due to COVID-19 work restrictions. Plan to resume operation in July 2020.



Perched Water Wells– Cumulative Volume Treated and Estimates* of Mass Removed

Year	Volume Treated (Gallons)	Volume Treated (Liters)	Nitrate as Nitrogen (kg)	Technetium-99 (Ci)	Uranium (kg)
2011-2015	301,155	1,139,992	131.8	0.035815	68.5
2016	59,289	224,433	195.0	0.006033	11.2
2017	334,000	1,264,328	444.9	0.044503	76.1
2018	380,000	1,438,455	362.8	0.048718	74.4
2019	328,000	1,241,614	289.2	0.046224	63.3
2020 through Q2	68,000	257,408	62.5	0.011662	10.7
CUMULATIVE	1,470,444	5,566,230	1,335	0.192954	304.2

*Estimates are based on well sampling along with the volume pumped which is tracked through SCADA. Perched wells offline in 2nd Quarter 2020 due to COVID-19 work restrictions.

Note: Table lists volumes treated and mass removed at the effluent treatment facility from 2011 to 2015 from one Well, 299-E33-344, and at the 200 West P&T from three Wells, 299-E33-344 (YE-28), 299-E33-350 (YE-29), and 299-E33-351 (YE-30), in 2017 - 2019

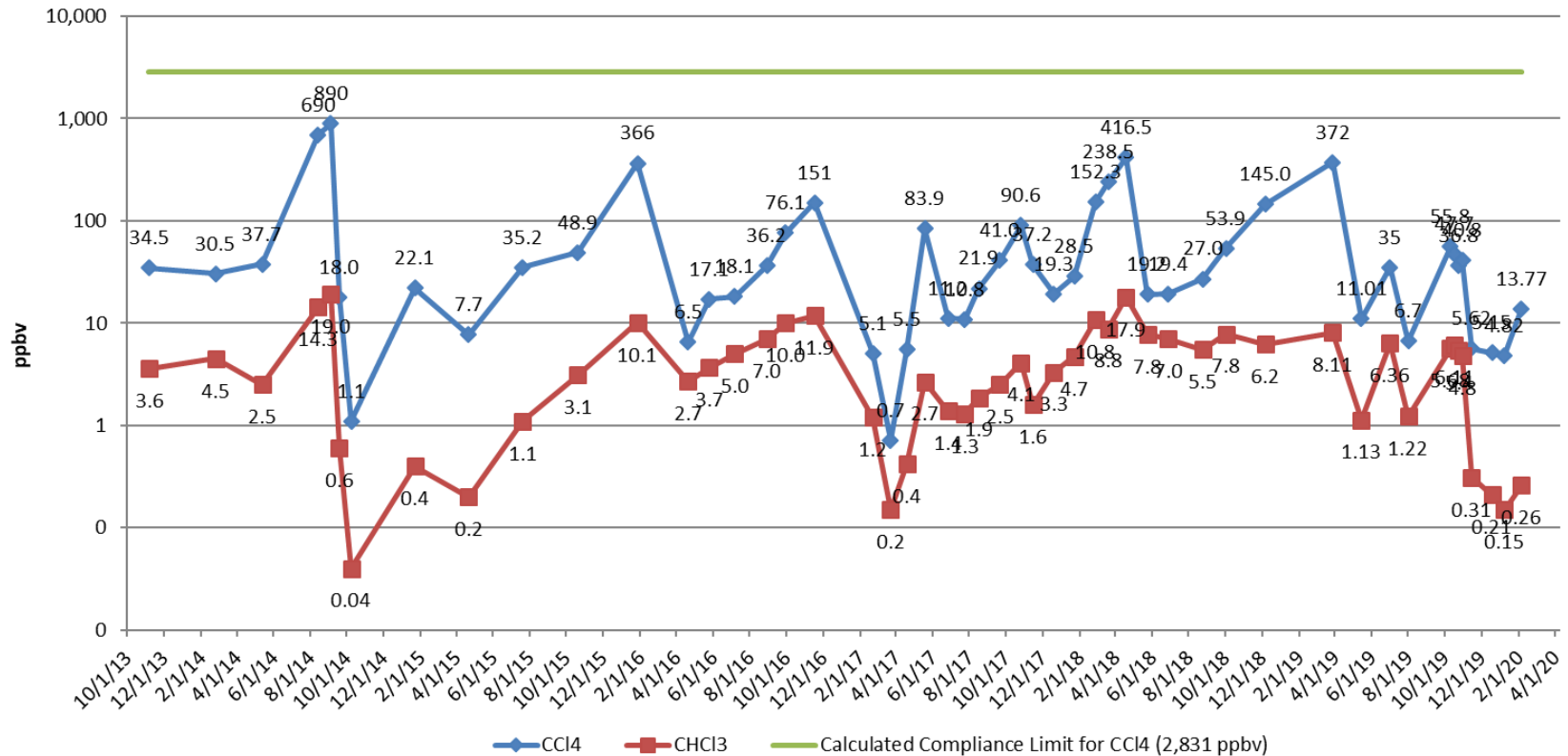


200 West P&T Air Monitoring Activities

- Treated off-gas stack was not sampled in 2nd quarter due to work restrictions from COVID-19.
- Rolling annual average through 1st quarter CY2020 was 15.9 ppbv, which converts to ~144 lbs/yr. This is about 1% of the compliance tracking value for carbon tetrachloride release.



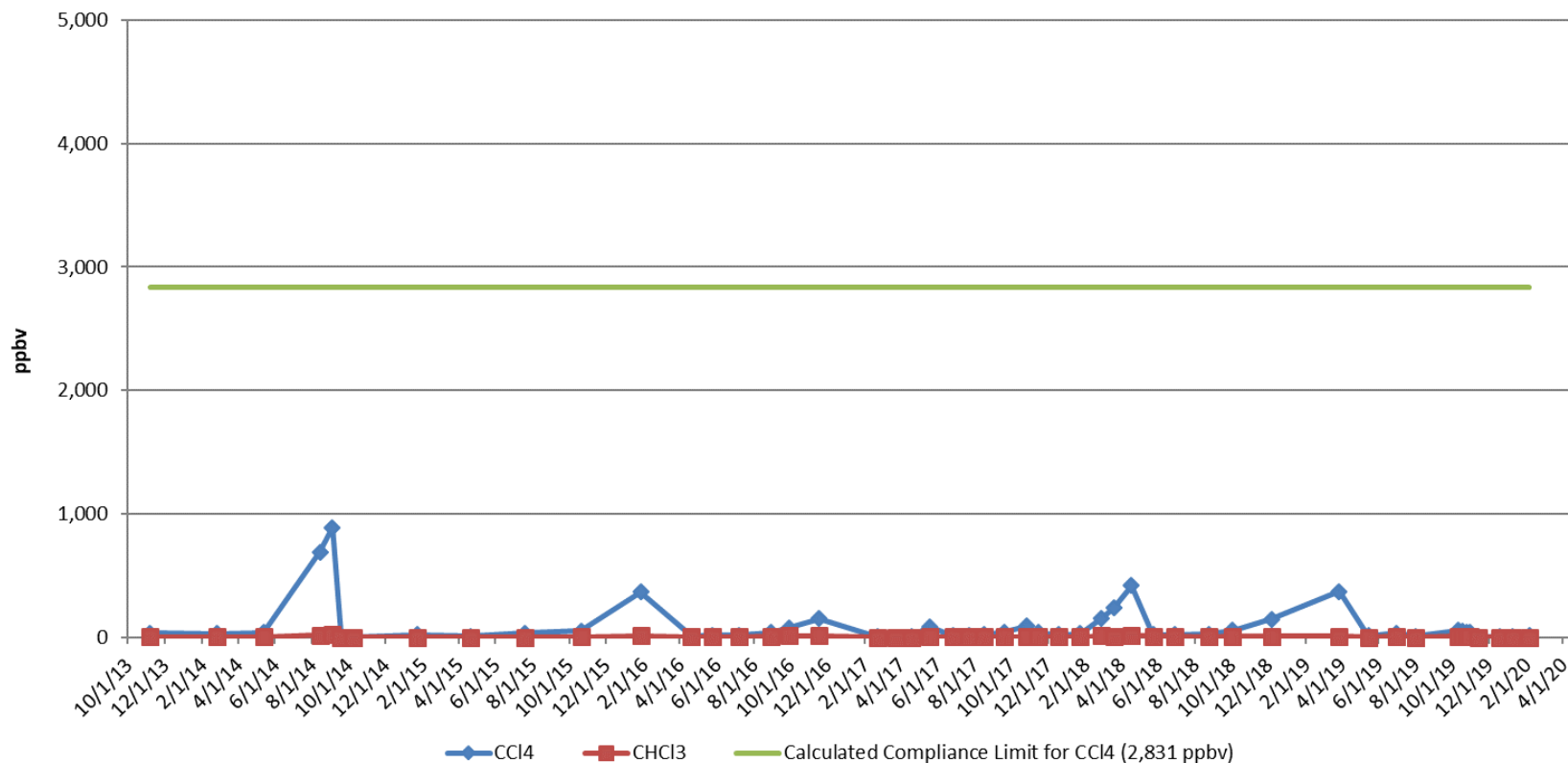
200 West P&T Air Monitoring Activities – Emissions Summary (ppbv) (log scale)



Note: TOG samples not collected in 2nd quarter 2020 due to COVID-19 work restrictions.



200 West P&T Air Monitoring Activities – Emissions Summary (ppbv) (arithmetic scale)



Note: TOG samples not collected in 2nd quarter 2020 due to COVID-19 work restrictions.



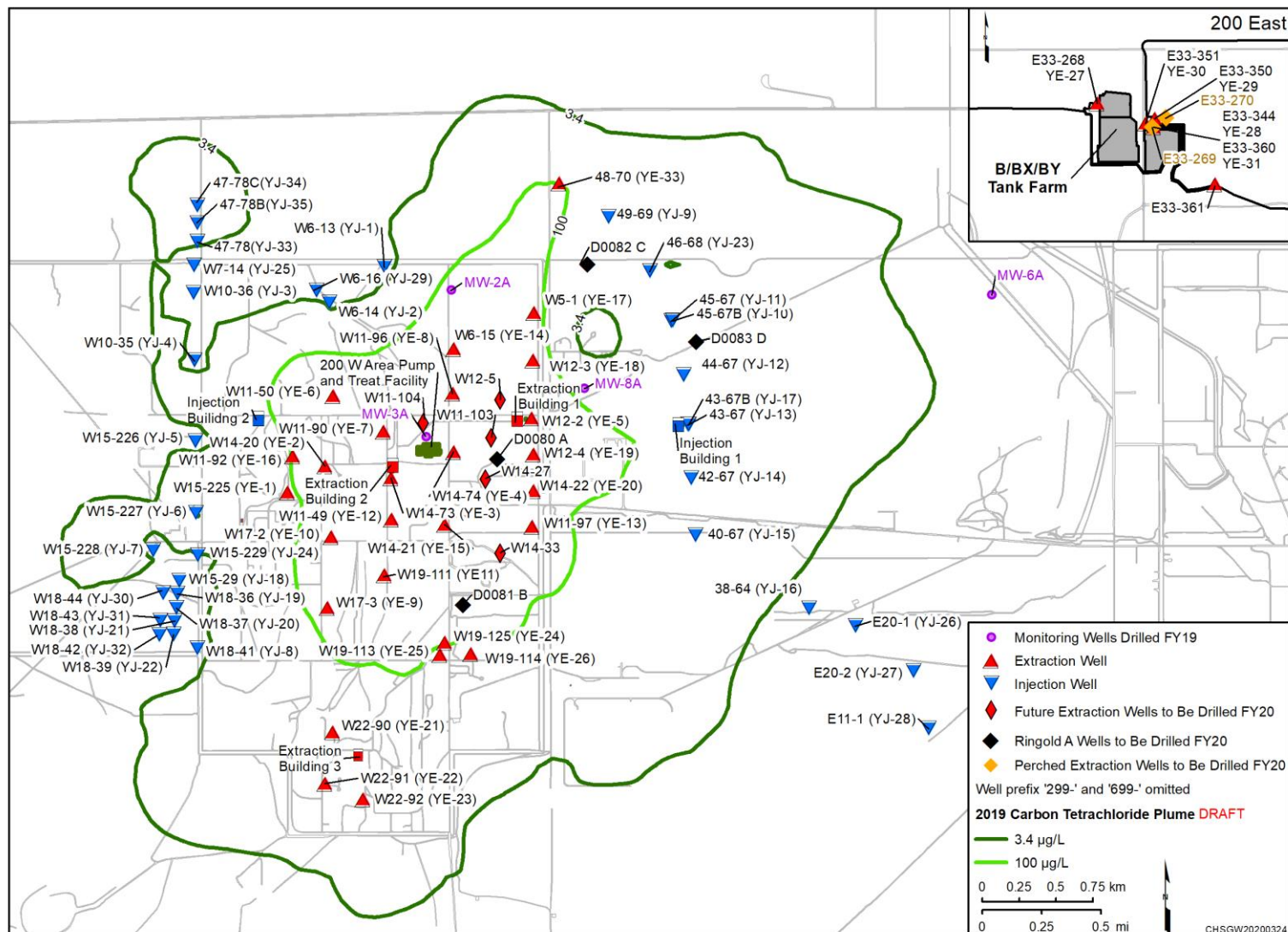
200 West P&T Waste Management Activities

- Granular Activated Carbon (GAC) summary:
 - 2nd Quarter CY2020
 - Changed out 0 GAC containers
 - Shipped 0 GAC canisters
 - CY2012 through June 2020
 - Changed out 32 GAC containers
 - Shipped 32 containers to Siemens/Evoqua for regeneration

Note: No change in waste management activity in 2nd quarter 2020 due to COVID-19 work restrictions.



200 West P&T Well Network



200 West P&T Well Network, continued

- 33 Extraction wells:

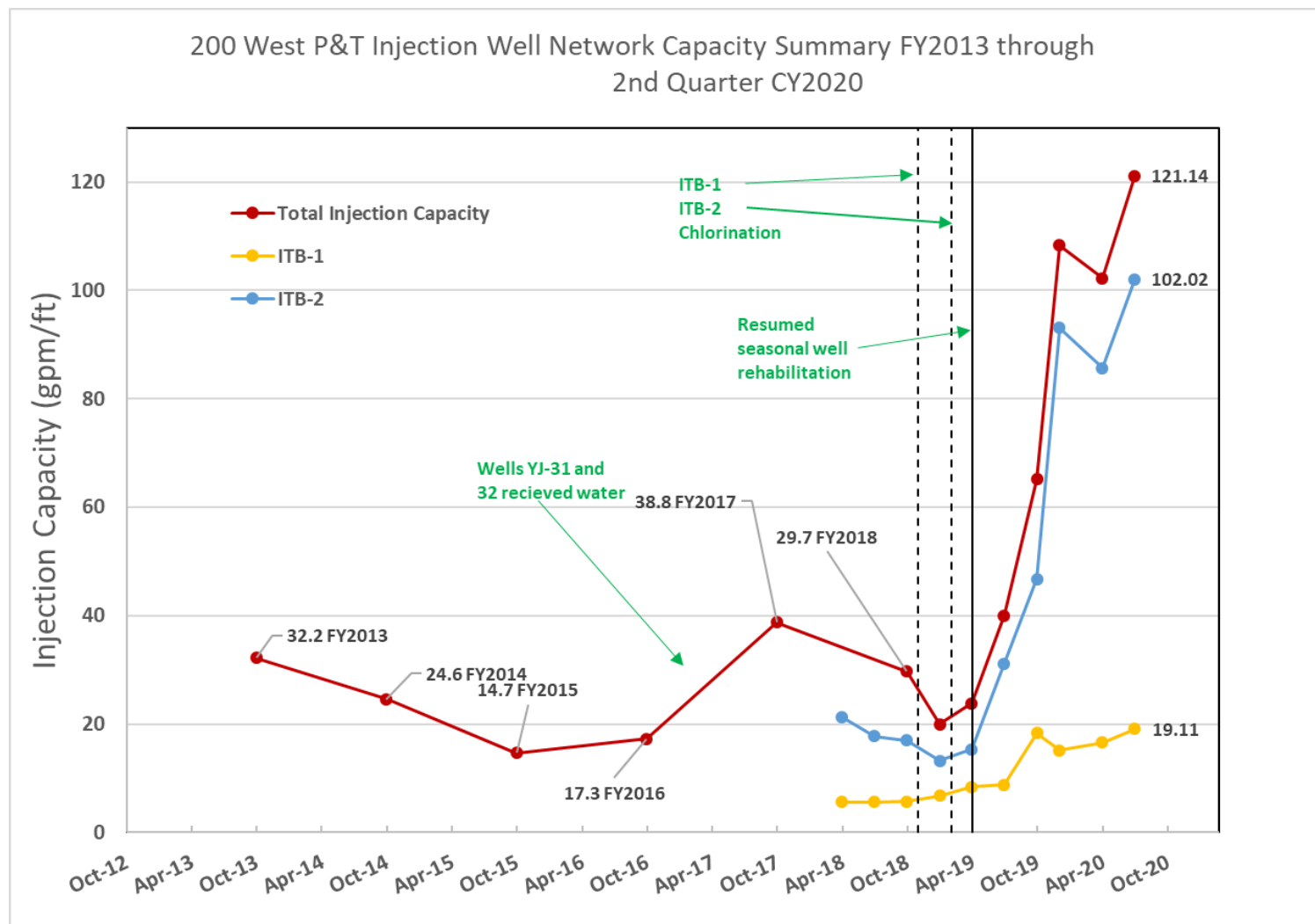
- ✓ 21 in 200-ZP-1 all operational (6 offline due to work restrictions)
- ✓ 3 in 200-UP-1 all operational
- ✓ 3 in S-SX all operational
- ✓ 3 in BP-5 with 2 operational (all offline due to work restrictions)
- ✓ 3 in DV-1 perched water all operational (all offline due to work restrictions)

- 35 Injection wells:

- ✓ 29 operational, 1 permanently offline (YJ-20), 4 tested and temporarily off-line
- ✓ 1 additional injection well has been constructed and will be hooked up in when field work resumes (YJ-35)



200 West P&T Injection Well Capacity



Operations' Successes

- Throughput averaged 1,614 gpm for 2nd quarter 2020
- Completing SOW for Installation of Air Stripper Tower C, and expect to receive delivery in August
- Continuing SOW for BP-5 PO-1 IX system
- Average injection capacity was 121.14 gpm/ft for the 2nd quarter of 2020

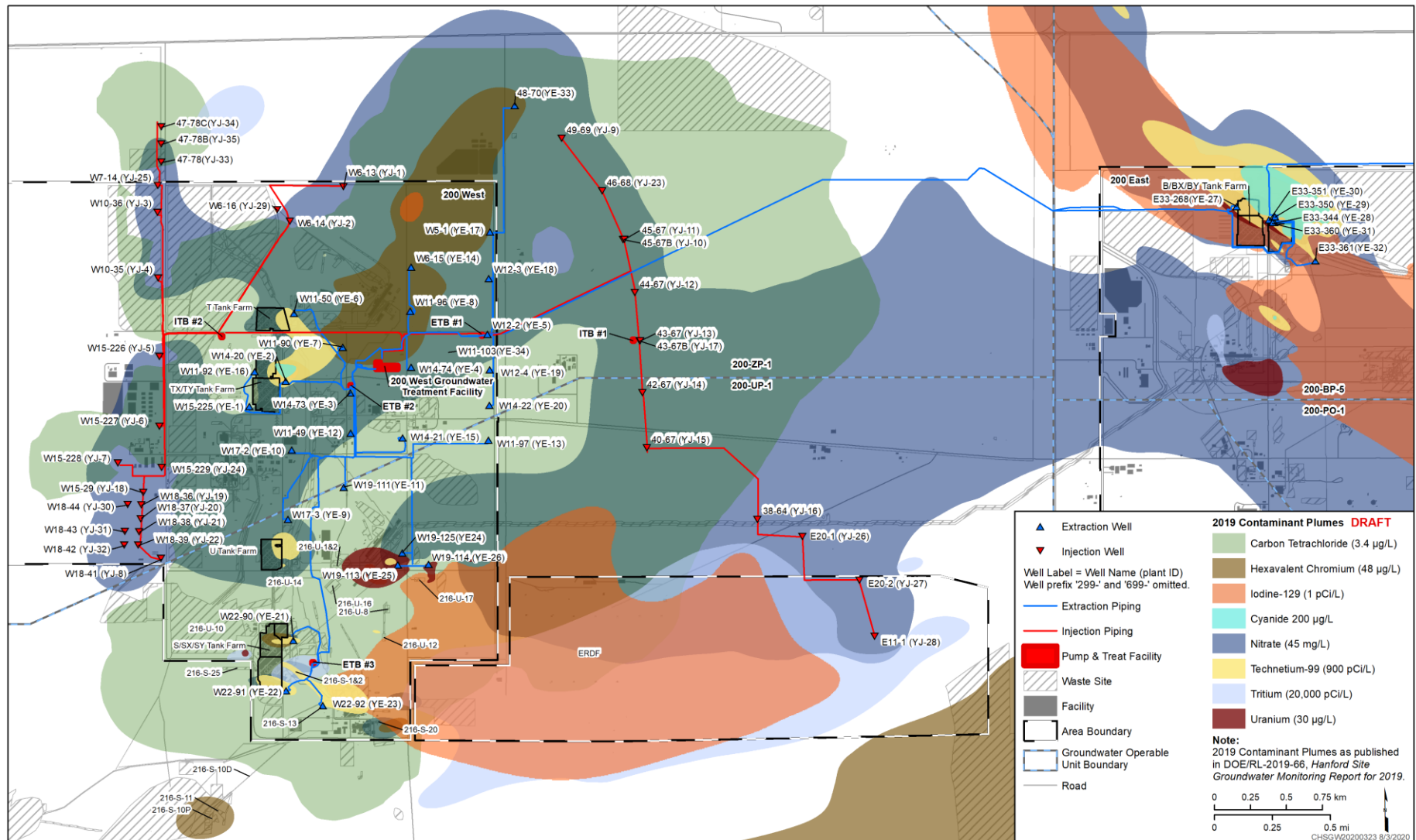


Items on the Radar

- CHPRC, DOE, and EPA briefings
 - Optimization Study Implementation
 - Drafted the Optimization Study (long term monitoring) DOE/RL-2019-76
 - Internal review completed April 27, 2020
 - 93 wells identified to monitor changes in groundwater conditions resulting from the suspension of biological treatment for nitrate
- Suspension of biological systems began October 1, 2019
 - Nitrate in the plant effluent has averaged 24.4 mg/L (<3 times MCL)
 - Continue to evaluate injection performance – benefits of disinfection and cleaning after nitrate suspension
- Continue to track cyanide in monitoring wells and within the 200 West P&T
- Continue to track carbon tetrachloride decomposition products in the treated off gas



200 West P&T Well Network and Contaminant Plumes



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