



**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

December 7, 2025

Ms. Hillary Young, P.E.
Chief Engineer
Land Protection Division
Oklahoma Department of Environmental Quality
P. O. Box 1677
Oklahoma City, Oklahoma 73101-1677

**RE: Response to Notice of Deficiency (NOD) Letter Dated May 19, 2025
Class I Non-Hazardous Injection Well Operating Permit Renewal Application
Well ID: MES #1
Mid-Way Environmental Services, Inc.
Lincoln County, Oklahoma
Operating Permit No. IW-NH-41001-OP**

Dear Ms. Young:

On behalf of Mid-Way Environmental Services, Inc. (MES), A & M Engineering and Environmental Services, Inc. (A & M) respectfully submits this letter and attachments in response to the Notice of Deficiency (NOD) letter dated May 19, 2025, regarding MES's Class I Non-Hazardous Injection Well Operating Permit Renewal Application.

The format utilized in responding to the NODs includes a citation of the individual NOD and the prepared response. For convenience of review and where applicable, revised figures and tables are included with the individual NOD response.

In order to provide a re-assessment of certain calculations and interpretations previously submitted to DEQ, Mid-Way contracted the services of Evren M. Ozbayoglu, PhD, a Professor of Petroleum Engineering and the Director of Drilling Research Project at the University of Tulsa (TU).

Based on a re-assessment of possible reservoir boundary conditions, projected reservoir pressure distributions and projected wastewater migration rates, MES maintains that a surface injection pressure of 1,370 psi for an injectate fluid Specific Gravity of 1.00, a surface injection pressure of 820 psi for an injectate fluid Specific Gravity of 1.20, and a maximum injection flow rate of 450 gpm (as permitted in the Operating Permit No. IW- NH-41001-OP) provides a satisfactory safety factor with respect to formation breakdown and pressure build-up.

The deficiencies cited in the May 19, 2025 letter have been addressed in sufficient detail with respect to the general conditions and operation of the Mid-Way Class I Non-Hazardous Injection Well and believe approval of the renewal of Operating Permit is appropriate.

If you have any questions on this matter, or if you require any additional information, please do not hesitate to call me on (918) 665-6575 or email me at omohammad@aandmengineering.com.

Sincerely,
A & M Engineering and Environmental Services, Inc.

A handwritten signature in blue ink, appearing to read "Orphius Mohammad".

Orphius Mohammad, PhD., P.E.
Senior Environmental Engineer

cc: Tolga Ertugrul, P.E., President, MES
Evren M. Ozbayoglu, PhD, TU

Enclosed: NOD Response

MID-WAY ENVIRONMENTAL SERVICES, INC.
CLASS I NON-HAZARDOUS WASTE INJECTION WELL
MES #1
PERMIT NO. IW-NH-41001-OP

RESPONSE TO NOTICE OF DEFICIENCY LETTER
DATED OCTOBER 31, 2024



PREPARED FOR:
MID-WAY ENVIRONMENTAL SERVICES, INC.
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DECEMBER 7, 2025

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CERTIFICATE OF AUTHORIZATION NUMBER 1326



A & M Engineering and
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Consulting - Design - Construction - Remediation

MID-WAY ENVIRONMENTAL SERVICES, INC.
PERMIT RENEWAL APPLICATION
OPERATING Permit No. IW-NH-41001-OP
FOR MES #1

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DEFICIENCY NO 1

In Section 2.2 of the Application (Plugging and Abandonment Plan), please state that the approved plugging and abandonment plan shall be implemented and completed within six (6) months, unless otherwise specified by the DEQ, in accordance with OAC 252:652-5-1(5)(D).

RESPONSE:

Section 2.2 of the Application with the added line, as requested above, is included in appendix A.



DEFICIENCY NO 2

Mid-Way has opted for a fixed radius of one (1) mile around the well for the Area of Review (AOR). Please include in the renewal Application the relevant evaluations and methods that were used to determine the fixed AOR. Calculations for the zone of endangering influence should be done to substantiate the fixed radius.

RESPONSE:

Injectant Front calculation by volumetric calculations:

The front on injectant fluid may be analyzed using volumetric calculations and considering the actual historical volume of injectant fluid. To perform these calculations, the following equation is used:

$$r^t = \sqrt{\frac{5.615 Q^t B_i}{\pi h \phi (1 - S_{wc} - S_{irw}) S_{eff}}}$$

Where Q^t is the cumulative volume of injectant until time t and r^t is the estimated radius of the front at time t . ϕ is the formation porosity, μ is the viscosity of the system fluid in centipoise (cp), k is the formation permeability in millidarcy (md) taken from the rounded average of the 2023, 2024, and 2025 Pressure Transient Analysis (PTA) reports for MES-1, h is the formation thickness, S_{wc} is the connate (immovable formation water saturation), S_{irw} is the irreducible formation water saturation subject to the injection of injectant, and S_{eff} is the effective sweep efficiency, B_i is the injectant formation volume factor and is used to convert the volume of injectant from the Standard Condition to Reservoir Condition. Note the effective sweep efficiency considers both macroscopic (percentage of reservoir rock volume), and microscopic (percentage of pore volume) sweep efficiencies, $S_{eff} = S_{macroscopic} * S_{microscopic}$. c_t is the total compressibility derived from water compressibility, rock compressibility and porosity.



The system properties considered in estimating the front location are listed in Table 1 and the volume of injectant and the corresponding estimate of the radius of the front on a yearly basis are summarized in Table 2.

Table 1: rock and fluid properties considered in the volumetric front radius calculations

ϕ	h , ft	k , md	B_i	S_{wc}	S_{irw}	S_{eff}	μ , cp	r_w , ft	c_t , psi ⁻¹
0.14	300	250	1.05	0.2	0.1	0.4	1.0	0.329	5.46*10 ⁻⁶

Table 2: The estimated historical plume front location by actual volumetric calculations

Year	bbl Injected	Cumulative Injected (bbl)	Radius of front (ft)
2015	128,983	128,983	143
2016	135,979	264,961	206
2017	143,635	408,597	255
2018	535,095	943,691	388
2019	362,545	1,306,237	457
2020	134,984	1,441,220	480
2021	298,225	1,739,445	527
2022	180,744	1,920,189	554
2023	245,330	2,165,519	588
2024	376,610	2,542,129	637
Jan. 1 – Sept. 30, 2025	642,032	3,184,160	713

Note: 1 bbl (barrel) = 42 gallons



The maximum allowable injection rate in the existing UIC Operations Permit for Class I Injection Well Permit #IW-NH-41001-0P stipulated in Permit Condition A.1 is 450 gpm (10.7 BBL/min). Using the maximum allowable injection rate and assuming 24 hours/day, 7 days/week continuous injection, the estimated radius of the plume are presented in Table 3 for the next 10 years.

Table 3: The estimated future plume front location by volumetric calculations

Year	Volume Injected (bbl)	Cumulative Volume Injected (bbl)	Radius of front (ft)
End of 2025	-	3,284,160 est.	724
Dec-26	5,781,600	9,065,760	1203
Dec-27	5,781,600	14,847,360	1539
Dec-28	5,781,600	20,628,960	1814
Dec-29	5,781,600	26,410,560	2053
Dec-30	5,781,600	32,192,160	2267
Dec-31	5,781,600	37,973,760	2462
Dec-32	5,781,600	43,755,360	2642
Dec-33	5,781,600	49,536,960	2812
Dec-34	5,781,600	55,318,560	2971
Dec-35	5,781,600	61,100,160	3123
Dec-36	5,781,600	66,881,760	3267

Please note that this scenario is not even allowed under the current MES Tier III Solid Waste Permit #3541017 nor is it practical. The Solid Waste Permit does not allow the facility to accept more than 324,000 gallons of Non-Hazardous Industrial Waste (NHIW) per day of operation based on Permit Condition A.7. The facility also cannot receive NHIW on Sundays without DEQ approval, which has historically been an unusual occurrence throughout the 10-year history of the facility. Therefore, the most realistic “worst-case” scenario for annual injection of NHIW



assuming the facility receives NHIW every other Sunday, is 324,000 gal/day X 6.5 days/year X 52 weeks/year, which is equal to a maximum of 109,512,000 gallons of NHIW injected per year or 2,607,429 bbl per year. Therefore, the analysis presented in Table 3 has a Factor of Safety of over 2.2 since the annual injected NHIW is assumed to be 5,781,600 bbl beginning in 2026.

From the above analytical evaluation, it is evident that the projected plume radius in next 10 years with a maximum allowable injection rate (450 gpm or roughly 11 bbl/min) and continuous injection (24 hours/day, 7 days/week) will be less than 1 mile (5280 feet). Therefore, a fixed radius of 1 mile as the area of review (AOR) is extremely conservative and adequate for MES.



DEFICIENCY No 3

Mid-Way identified and provided an evaluation of wells within 1 mile of the MES-1 injection well, including water wells, oil and gas wells and saltwater disposal wells, both plugged and active. Please include in the Application a statement of which wells were reviewed and the dates of when Mid-Way conducted these evaluations. Please provide any available plugging records for wells that penetrate the injection zone. Also, include a determination of the reservoir pressure estimates at any wells penetrating the injection zone within the 1-mile AOR, along with an evaluation of the potential for fluid movement into underground sources of drinking water (USDWs) as a result of improper seals, completions or plugging/abandonment conditions of the wells.

RESPONSE:

Figure 2 of the Response to Notice of Deficiency, dated February 5, 2025, shows water wells, oil and gas wells, and saltwater disposal wells, both plugged, and active within 1 mile of the MES-1 injection well. Additionally, Table 1-1 of the same response document presents a list of oil and gas wells, and saltwater disposal wells within a 1-mile radius of the MES-1 injection well. All wells were evaluated during the initial 2013-2014 permit application process. The well records that were reviewed consisted of geophysical logs, strip logs, completion reports, and plugging records. Table 1-1 was updated during the recent response document during January 2025. Two active gas wells (Underwood #1 and #2) were added to Table 1-1 (Well #16 and #17) as the only wells added to the original table. These wells were drilled to depths of 3,750 feet and 3,752 feet respectively and completed as gas wells in the Prue Sand in 2022. This review was conducted between December of 2024 and January of 2025. To date, over 285 well records have been reviewed over an area of approximately 20 square miles.

The only well within one mile of the MES-1 injection well that penetrated the Arbuckle injection zone is the Equal Energy “Twin Cities” saltwater disposal well which is currently active and located approximately 0.8 miles from the MES-1 injection well. This well was drilled to a total depth of 6,600 feet by Altex Energy in 2001. The well had a perforated interval from 5,100 feet



to 6,600 feet. Altex Energy operated the injection well from 2001 to 2011 at which time Equal Energy took over operation of the injection well. The reservoir pressure increase at the Twin Cities injection well can be estimated from the Reservoir Pressure Analysis provided in the response to Deficiency No. 4 assuming no injection at the Twin Cities injection well. In general, as shown in Figure 1 provided in the aforementioned response on the ensuing pages, the December 2025 reservoir pressure increase due to injection at MES-1 at a radial distance of 4,000 ft from MES-1, which is slightly less than the 0.8 mile distance that the Twin Cities well is located from MES-1, is estimated to be 10.67 psi and can be considered negligible. Without facility data, including injection data, MES cannot reliably estimate the actual reservoir pressure at the Twin Cities injection well.

The surface pressures at MES-1 have been closely monitored since 2013, two years prior to injection, and static reservoir pressures have been measured annually. There have been no indications of interference from the Twin Cities injection well on MES-1 during this period. Given that the Twin Cities injection well is the only well, active or inactive, that penetrates the injection zone within a 1-mile AOR, the potential for fluid movement into underground sources of drinking water (USDWs) because of improper seals, completions or plugging/abandonment conditions of the wells is not applicable.

DEFICIENCY NO 4

Please provide a reservoir analysis and modeling of the cone of influence and plume radius for the ten (10) year permit term, at 24 hours/day, 7 days/week with injection at the requested maximum injection rate in order to show pressure buildup over the permit life. Please also provide an updated evaluation of the maximum allowable injection pressures and maximum injection rates in the Application.

RESPONSE:

The volumetric calculation to estimate the extent of the plume for next ten (10) years for the extreme condition of 450 gpm injection rate and 24 hours/day, 7 days/week continuous injection is included in the response to Deficiency No. 2. The reservoir pressure analysis under similar conditions is included below.

Reservoir Pressure Analysis:

To analyze the pressure-rise due to the injection, the reservoir is assumed to be infinite acting with the rock and fluid properties listed in Table 1 (Deficiency No. 2). For the historical injection period, the cumulative injection volume within each year is assumed to have been injected with a constant average throughout that year. For next 10 years, from 2026 through 2036, an injection rate of 15840 BBL/Day is assumed (equivalent to 11 bbl/min or 462 gpm). The rates are summarized in Table 4.

Table 4: Average Injection Rate at MES-1

Year	Avg. Inj. Rate, bbl/Day
2015	353
2016	373



2017	394
2018	1466
2019	993
2020	370
2021	817
2022	495
2023	672
2024	1032
2025	2033
2026-2036	15,840

Note: 1 bbl = 42 gallons

The pressure profile at various distances from the well from historical injection data and the extreme permit limit estimate for future years is then computed by superposition of all injection years. The following equations are used to calculate the pressure profiles:

$$\Delta P(r, t) = \sum_{j=1}^N \left(\frac{141.2 q \mu}{k h} P_D(r_D, t_D) \right)_j$$

$$P_D(r_D, t_D) = -\frac{1}{2} Ei\left(-\frac{r_D^2}{4t_D}\right)$$

$$r_D = \frac{r}{r_w}$$

$$t_D = \frac{0.000267 k t}{\phi \mu C_t r_w^2}$$

Where q is the flowrate in bbl/day, P_D is the dimensionless pressure in the reservoir, Ei is the exponential integral function, r_D is the dimensionless radius from the center of the injection well, r is radial distance from the center of the injection well in ft, r_w is the wellbore radius in ft, t_D is the dimensionless time component, and t is the time in hours.

Fig. 1 shows the pressure profile changes relative to the static reservoir pressure at the end of each year and as a function of radial distance from the well.

Radius, ft/Year	Dec-15	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28	Dec-29	Dec-30	Dec-31	Dec-32	Dec-33	Dec-34	Dec-35	Dec-36
10	5.54	6.07	6.54	23.47	16.85	7.25	14.02	9.18	11.87	17.60	33.60	250.80	260.35	266.01	270.07	273.23	275.83	278.04	279.95	281.65	283.17	284.54
500	2.93	3.32	3.65	12.67	9.53	4.52	8.00	5.53	6.92	10.00	18.62	134.14	143.68	149.35	153.40	156.57	159.17	161.37	163.29	164.98	166.50	167.88
1000	2.47	2.84	3.13	10.76	8.24	4.04	6.93	4.88	6.04	8.66	15.97	113.48	123.02	128.68	132.73	135.90	138.50	140.70	142.62	144.31	145.83	147.21
1500	2.20	2.55	2.83	9.64	7.48	3.76	6.31	4.51	5.53	7.87	14.42	101.39	110.93	116.59	120.64	123.81	126.41	128.61	130.53	132.22	133.74	135.12
2000	2.01	2.35	2.62	8.85	6.94	3.56	5.87	4.24	5.17	7.31	13.32	92.82	102.35	108.01	112.07	115.23	117.83	120.03	121.95	123.65	125.16	126.54
2500	1.86	2.20	2.45	8.23	6.52	3.40	5.53	4.03	4.88	6.88	12.47	86.18	95.70	101.36	105.41	108.58	111.18	113.38	115.30	116.99	118.51	119.89
3000	1.74	2.07	2.32	7.73	6.18	3.28	5.25	3.86	4.65	6.53	11.77	80.75	90.27	95.93	99.98	103.14	105.74	107.95	109.86	111.56	113.08	114.45
3500	1.64	1.96	2.21	7.30	5.89	3.17	5.01	3.72	4.46	6.23	11.18	76.17	85.68	91.34	95.39	98.55	101.15	103.35	105.27	106.96	108.48	109.86
4000	1.55	1.87	2.11	6.94	5.64	3.07	4.80	3.59	4.29	5.97	10.67	72.20	81.71	87.36	91.41	94.57	97.17	99.37	101.29	102.98	104.50	105.88
4500	1.48	1.78	2.02	6.61	5.42	2.99	4.62	3.48	4.14	5.74	10.22	68.71	78.21	83.85	87.90	91.06	93.66	95.86	97.78	99.47	100.99	102.37
5000	1.41	1.71	1.94	6.32	5.23	2.92	4.46	3.38	4.01	5.54	9.82	65.59	75.07	80.72	84.77	87.93	90.52	92.72	94.64	96.33	97.85	99.23
5500	1.34	1.64	1.87	6.06	5.05	2.85	4.32	3.29	3.89	5.35	9.46	62.77	72.24	77.89	81.93	85.09	87.68	89.88	91.80	93.49	95.01	96.39
6000	1.29	1.58	1.81	5.82	4.89	2.79	4.18	3.21	3.78	5.18	9.13	60.20	69.66	75.30	79.34	82.50	85.09	87.29	89.21	90.90	92.42	93.79
6500	1.23	1.53	1.75	5.61	4.74	2.73	4.06	3.14	3.68	5.03	8.82	57.84	67.29	72.92	76.96	80.12	82.71	84.91	86.82	88.52	90.03	91.41
7000	1.18	1.48	1.69	5.40	4.60	2.68	3.95	3.07	3.58	4.89	8.54	55.66	65.10	70.72	74.76	77.91	80.51	82.71	84.62	86.31	87.83	89.20
7500	1.14	1.43	1.64	5.22	4.47	2.63	3.84	3.00	3.50	4.75	8.28	53.64	63.05	68.68	72.71	75.86	78.45	80.65	82.57	84.26	85.77	87.15
8000	1.10	1.38	1.60	5.04	4.35	2.59	3.74	2.94	3.41	4.63	8.04	51.75	61.15	66.76	70.80	73.95	76.54	78.73	80.64	82.34	83.85	85.23
8500	1.06	1.34	1.55	4.88	4.24	2.54	3.65	2.88	3.34	4.51	7.81	49.98	59.36	64.97	69.00	72.15	74.73	76.93	78.84	80.53	82.05	83.42
9000	1.02	1.30	1.51	4.72	4.13	2.50	3.56	2.83	3.27	4.40	7.59	48.31	57.67	63.28	67.30	70.45	73.04	75.23	77.14	78.83	80.35	81.72
9500	0.99	1.26	1.47	4.58	4.03	2.46	3.48	2.78	3.20	4.30	7.39	46.74	56.08	61.68	65.70	68.85	71.43	73.63	75.54	77.22	78.74	80.11
10000	0.95	1.23	1.43	4.44	3.93	2.43	3.40	2.73	3.13	4.20	7.20	45.25	54.58	60.17	64.18	67.33	69.91	72.10	74.01	75.70	77.21	78.59
10500	0.92	1.20	1.40	4.31	3.84	2.39	3.33	2.69	3.07	4.11	7.01	43.84	53.14	58.73	62.74	65.88	68.46	70.66	72.56	74.25	75.76	77.14
11000	0.89	1.16	1.36	4.18	3.76	2.36	3.26	2.64	3.01	4.02	6.84	42.50	51.78	57.36	61.37	64.50	67.08	69.28	71.18	72.87	74.38	75.75
11500	0.86	1.13	1.33	4.06	3.67	2.32	3.19	2.60	2.96	3.93	6.67	41.23	50.48	56.05	60.05	63.19	65.77	67.96	69.86	71.55	73.06	74.43
12000	0.84	1.10	1.30	3.95	3.59	2.29	3.13	2.56	2.91	3.85	6.52	40.01	49.24	54.80	58.80	61.93	64.51	66.70	68.60	70.29	71.80	73.17
12500	0.81	1.08	1.27	3.84	3.52	2.26	3.06	2.52	2.85	3.77	6.36	38.85	48.05	53.60	57.59	60.72	63.30	65.49	67.39	69.08	70.59	71.96
13000	0.79	1.05	1.24	3.74	3.45	2.23	3.01	2.48	2.81	3.70	6.22	37.73	46.91	52.45	56.44	59.57	62.14	64.33	66.23	67.91	69.42	70.79
13500	0.76	1.02	1.21	3.64	3.38	2.21	2.95	2.45	2.76	3.63	6.08	36.67	45.81	51.34	55.33	58.45	61.02	63.21	65.11	66.79	68.30	69.67
14000	0.74	1.00	1.19	3.54	3.31	2.18	2.89	2.41	2.71	3.56	5.95	35.64	44.76	50.28	54.26	57.38	59.95	62.13	64.03	65.72	67.23	68.60
14500	0.72	0.98	1.16	3.45	3.24	2.15	2.84	2.38	2.67	3.49	5.82	34.66	43.75	49.25	53.23	56.35	58.91	61.10	63.00	64.68	66.19	67.56
15000	0.70	0.95	1.14	3.36	3.18	2.13	2.79	2.35	2.63	3.43	5.69	33.71	42.77	48.27	52.24	55.35	57.92	60.10	61.99	63.67	65.18	66.55

Figure:1 Reservoir Pressure Profiles at the end of each year and as a function of radial distance from the center of the injection well (in psi)

The injection pressure at the sandface (well bottomhole pressure) would depend on the sandface damage or stimulation often known as skin. With the presence of a skin, one may assume an effective wellbore radius with the following equation:

$$r_{w,eff} = r_w * \exp(-s)$$

Where the bottomhole pressure may be estimated at the $r_{w,eff}$. Some past PTA reports, including the original 2025 PTA event conducted by injecting wastewater and the repeat 2025 PTA event conducted by predominantly injecting freshwater, reported a negative skin, and considering a skin value of -3.5, the effective wellbore radius may be approximated as

$$r_{w,eff} = 0.329 * \exp(3.5) \sim 10.9 \text{ ft}$$

Hence, the pressure at 10ft away from the well (first row of the table in Fig. 1) may be used as the bottomhole injection pressure.

It should be noted that the skin value and permeability utilized for this analysis have been approximated from the results of recent PTA reports prepared by Schlumberger and are taken as -3.5 and 250 md, respectively.

Evaluation of the Maximum Allowable Injection Pressures and Maximum Injection Rates:

The existing UIC permit for MES-1 allows for a maximum injection rate of 450 gpm (10.71 bbl/min).

The existing UIC permit for MES-1 allows for maximum injection pressures as described in Table 5 below.

Table 5: Existing MES-1 UIC Permit – Maximum Allowable Injection Pressures for Various Specific Gravities of Injectate

Specific Gravity	Maximum Allowable Injection Pressure
Corrected to 60° Fahrenheit	(psig)
0.95	1370
0.96	1348
0.97	1326
0.98	1304
0.99	1282
1.00	1260
1.01	1238
1.02	1216
1.03	1194
1.04	1172
1.05	1150
1.06	1128
1.07	1106
1.08	1084
1.09	1062
1.10	1040
1.11	1018
1.12	996
1.13	974
1.14	952



1.15	930
1.16	908
1.17	886
1.18	864
1.19	842
1.20	820

The following is an updated analysis of the maximum allowable injection pressure at various flowrates to avoid fracture of the formation. The Formation Fracture Analysis is provided in Appendix B. This analysis shows that the pressure gradient required for fracture is between 0.638 psi/ft and 0.720 psi/ft. The ensuing analysis has been conducted using the most conservative value of this range, which is 0.638 psi/ft.

Two sets of calculations were considered. One for an injectate fluid Specific Gravity (SG) of 1.0 and another for 1.2.

The analysis for an injectate with a SG of 1.0 is presented below.

Table 6A: Maximum Injection Pressure Input for SG of 1.0 Injectate

Formation Pressure Considered	0.472	psi/ft
Fracture Pressure Considered	0.639	psi/ft
Top of inj. Interval	5175	ft
Tubing ID	3.958	in
Tubing length	5203	ft
Relative roughness	0	
Fluid density	8.34 (SG 1.0)	ppg
Formation porosity	0.14	
Effective formation thickness	300	ft
Total compressibility	0.000003	1/psi



Table 6B: Maximum Injection Analysis for SG of 1.0 Injectate

Injection Rate (bbl/min)	Velocity Inside Tubing (ft/s)	Viscosity (cp)	Reynolds Number	Critical Reynolds Number	Fanning Friction Factor	Frictional Pressure Loss Gradient (psi/ft)	Frictional Pressure Loss Inside Tubing (psi)	Hydrostatic Pressure (psi)	Formation Permeability (md)	Injection Time (year)	Bottomhole Injection Pressure Minus Reservoir Pressure (psi)	Expected Bottomhole Injection Pressure (psi)	Estimated Wellhead Injection Pressure (psi)	Fracture Pressure at Casing Shoe (psi)	Maximum Possible Surface Injection Pressure (psi)	Injection Pressure Design Factor (for P _{frac})	Injection Pressure Design Factor (for P _{inj_max} Table-5)	Bottomhole Pressure Design Factor (P _{frac} /P _{bh})
11	12.0	1	369036.1	2100	0.00345	0.041	215.4	2256.4	250	1	251	2707	666	3307	1517	2.28	1.89	1.22
										5	275	2731	690	3307	1541	2.23	1.83	1.21
										10	286	2741	700	3307	1551	2.21	1.80	1.21
11	12.0	1.5	246024	2100	0.00372	0.045	232.3	2256.4	250	1	368	2824	799	3307	1650	2.06	1.58	1.17
										5	404	2860	835	3307	1686	2.02	1.51	1.16
										10	419	2875	851	3307	1702	2.00	1.48	1.15
11	12.0	1	369036.1	2100	0.00345	0.041	215.4	2256.4	200	1	310	2766	725	3307	1575	2.17	1.74	1.20
										5	340	2796	755	3307	1605	2.13	1.67	1.18
										10	353	2809	767	3307	1618	2.11	1.64	1.18
11	12.0	1.5	246024	2100	0.00372	0.045	232.3	2256.4	200	1	453	2909	885	3307	1736	1.96	1.42	1.14
										5	498	2954	930	3307	1781	1.91	1.35	1.12
										10	518	2974	949	3307	1800	1.90	1.33	1.11
18.8	20.6	1	630716.2	2100	0.00314	0.110	571.4	2256.4	250	1	429	2885	1200	3307	2051	1.71	1.05	1.15
										5	470	2926	1241	3307	2092	1.69	1.02	1.13
										10	488	2944	1259	3307	2109	1.68	1.00	1.12
15.87	17.4	1.5	354945.6	2100	0.00348	0.087	451.5	2256.4	250	1	530	2986	1181	3307	2032	1.72	1.07	1.11
										5	582	3038	1233	3307	2084	1.69	1.02	1.09
										10	605	3061	1256	3307	2106	1.68	1.00	1.08
17.48	19.1	1	586431.8	2100	0.00318	0.096	500.3	2256.4	200	1	492	2948	1192	3307	2043	1.71	1.06	1.12
										5	540	2996	1240	3307	2090	1.69	1.02	1.10
										10	561	3016	1260	3307	2111	1.68	1.00	1.10
14.44	15.8	1.5	322962.5	2100	0.00354	0.073	380.4	2256.4	200	1	595	3051	1175	3307	2026	1.72	1.07	1.08
										5	654	3110	1234	3307	2085	1.69	1.02	1.06
										10	680	3135	1259	3307	2110	1.68	1.00	1.05

The analysis for an injectate with a SG of 1.2 is presented below.

Table 7A: Maximum Injection Pressure Input for SG of 1.2 Injectate

Formation Pressure Considered	0.472	psi/ft
Fracture Pressure Considered	0.639	psi/ft
Top of inj. Interval	5175	ft
Tubing ID	3.958	in
Tubing length	5203	ft
Relative roughness	0	
Fluid density	10 (SG 1.2)	ppg
Formation porosity	0.14	
Effective formation thickness	300	ft
Total compressibility	0.000003	1/psi



Table 7B: Maximum Injection Analysis for SG of 1.2 Injectate

Injection Rate (bbl/min)	Velocity Inside Tubing (ft/s)	Viscosity (cp)	Reynolds Number	Critical Reynolds Number	Fanning Friction Factor	Frictional Pressure Loss Gradient (psi/ft)	Frictional Pressure Loss Inside Tubing (psi)	Hydrostatic Pressure (psi)	Formation Permeability (md)	Injection Time (year)	Bottomhole Injection Pressure Minus Reservoir Pressure (psi)	Expected Bottomhole Injection Pressure (psi)	Estimated Wellhead Injection Pressure (psi)	Fracture Pressure at Casing Shoe (psi)	Maximum Possible Surface Injection Pressure (psi)	Injection Pressure Design Factor (for P _{frac})	Injection Pressure Design Factor (for P _{inj_max} Table-5)	Bottomhole Pressure Design Factor (P _{frac} /P _{bh})
11	12.0	1	442843.3	2100	0.00334	0.048	250.0	2707.7	250	1	251	2707	249	3307	1100	4.41	3.29	1.22
										5	275	2731	273	3307	1124	4.11	3.00	1.21
										10	286	2741	284	3307	1134	4.00	2.89	1.21
11	12.0	1.5	295228.8	2100	0.00360	0.052	269.4	2707.7	250	1	368	2824	385	3307	1236	3.21	2.13	1.17
										5	404	2860	421	3307	1272	3.02	1.95	1.16
										10	419	2875	437	3307	1287	2.95	1.88	1.15
11	12.0	1	442843.3	2100	0.00334	0.048	250.0	2707.7	200	1	310	2766	308	3307	1159	3.76	2.66	1.20
										5	340	2796	338	3307	1189	3.52	2.43	1.18
										10	353	2809	351	3307	1202	3.42	2.34	1.18
11	12.0	1.5	295228.8	2100	0.00360	0.052	269.4	2707.7	200	1	453	2909	471	3307	1322	2.81	1.74	1.14
										5	498	2954	516	3307	1367	2.65	1.59	1.12
										10	518	2974	535	3307	1386	2.59	1.53	1.11
17.86	19.6	1	719016.4	2100	0.00306	0.116	604.9	2707.7	250	1	408	2864	761	3307	1611	2.12	1.08	1.15
										5	447	2903	800	3307	1650	2.06	1.03	1.14
										10	464	2919	817	3307	1667	2.04	1.00	1.13
15.27	16.7	1.5	409831.3	2100	0.00339	0.094	488.6	2707.7	250	1	510	2966	747	3307	1598	2.14	1.10	1.11
										5	560	3016	797	3307	1648	2.07	1.03	1.10
										10	582	3038	819	3307	1669	2.04	1.00	1.09
16.7	18.3	1	672316.6	2100	0.00310	0.103	535.1	2707.7	200	1	470	2926	753	3307	1604	2.13	1.09	1.13
										5	516	2972	799	3307	1650	2.06	1.03	1.11
										10	536	2991	819	3307	1669	2.04	1.00	1.11
13.94	15.3	1.5	374135.5	2100	0.00344	0.080	414.0	2707.7	200	1	575	3030	737	3307	1587	2.15	1.11	1.09
										5	632	3087	794	3307	1644	2.07	1.03	1.07
										10	656	3112	818	3307	1669	2.04	1.00	1.06

The analysis to determine the maximum injection pressures and flowrates presented in Tables 6B and 7B were developed using the tubing length (5,203 ft) as the bottomhole but considered the fracture pressure at a depth of 5,175 ft, which is the casing shoe depth (the weakest point to fracture). The hydrostatic pressure presented in each table is the hydrostatic pressure of the injectant fluid in the tubing. The input data utilized for this analysis, including a skin value of -3.5, matches the other analysis presented in these responses and are derived from the historical PTA analysis. The gradient for the formation pressure has been taken as 0.472 psi/ft, resulting in a 2,456 psi formation pressure at a depth of 5,203 ft (which is not the same as hydrostatic pressure). When a wellhead pressure is observed when injection is not occurring at MES-1, this is due to the formation pressure being greater than the hydrostatic pressure of the fluid inside the well (not artesian conditions).

By combining the formation pressure and well-flow pressure based on diffusivity analysis (flow in reservoir with the desired flow rate, which is similar to the analysis used to derive the reservoir

pressure profiles presented in Figure 1), the bottomhole injection pressure can be estimated. Then, using this bottomhole injection pressure, hydrostatic pressure inside the tubing and frictional losses inside the tubing are considered to acquire the surface injection pressure, which are presented in Tables 6B and 7B for an injectant fluid SG of 1 and SG of 1.2, respectively. The Maximum Possible Surface Injection Pressure has been estimated using fracture pressure, hydrostatic pressure, and frictional losses. As previously mentioned, the Fracture Pressure at the Casing Shoe has been calculated using the conservative fracture gradient of 0.638 psi/ft at a depth of 5,175 ft.

For both the SG of 1.0 and 1.2 cases, the Bottomhole Injection Pressure Minus the Reservoir Pressure column has been calculated with the same methodology used to calculate the reservoir pressure profiles presented in Figure 1. However, in this analysis, the reservoir pressure profiles assuming 24 hours/day, 7 days/week continuous injection have been analyzed for the following scenarios for an injectate SG of 1.0 (as reflected Table 6B) and for an injectate SG of 1.2 (as reflected in Table 7B):

- Continuous injection rates ranging from 11 bbl/min (462 gpm) to 18.8 bbl/min (790 gpm)
- Analysis following 1, 5, and 10 years of continuous injection
- Injectate viscosities ranging from 1.0 to 1.5 cp. (Note, water has a viscosity that can taken as 1.0 cp and higher viscosity considerations yield more conservative results)
- Formation Permeability ranging from 200 to 250 md. (Note, the lower permeability yields more conservative results)

For each of the scenarios outlined above for an injectate SG of 1.0 and 1.2, the Expected Bottomhole Injection Pressure and the Estimated Wellhead Injection Pressure have been calculated.

The Injection Pressure Design Factor, which is the Maximum Possible Surface Injection Pressure divided by Estimated Wellhead Injection Pressure has been calculated for each scenario. An Injection Pressure Design Factor greater than 1.0 means that the Estimated Wellhead Injection Pressure is less than the Maximum (allowable) Possible Surface Injection Pressure.



The Bottomhole Pressure Design Factor is the Fracture Pressure at the Casing Shoe divided by the Expected Bottomhole Injection Pressure. A Bottomhole Pressure Design Factor greater than 1.0 means that the Expected Bottomhole Injection Pressure is less than the allowable bottomhole pressure, which is the Fracture Pressure at the Casing Shoe.

When both the Bottomhole Pressure Design Factor and the Injection Pressure Design Factor are equal to 1.0 or when one of these design factors are equal to 1.0 and the other is greater than 1.0, the maximum injection pressure has been achieved for the SG being evaluated. When both the Bottomhole Pressure Design Factor and the Injection Pressure Design Factor are greater than 1.0, the calculated injection pressure is less than the maximum for the SG being evaluated and is considered “safe” based on the analysis. Therefore, the results presented in Tables 6B and 7B clearly demonstrate that the current permit conditions, shown in Table 5, for maximum injection flowrate and maximum injection pressure will not cause fracture even under the most conservative scenarios considered and MES requests that these permit conditions be maintained in the new permit. More specifically, when comparing the Maximum Allowable Injection Pressures in Table 5 with the corresponding Estimated Wellhead Injection Pressures in Tables 6A and 7B, for each respective SG case, the maximum Expected Bottomhole Injection Pressure that has been calculated (among all of the scenarios evaluated for the two SG cases) is 3,135 psi and thus 172 psi less than the pressure required to cause fracture at the casing shoe of 3,307 psi. This analysis also shows that relatively short-lived, temporary maintenance events, such as for well acidizing, can be safely conducted at much higher flowrates and injection pressures than the existing permit conditions allow and should be considered by DEQ on a case-by-case basis.

DEFICIENCY NO 5

Please provide information in the Application on contingency plans for potential well failures in accordance with 40 C.F.R. § 146.14(a)(12).

RESPONSE:

The Contingency Plan is included in Appendix C-1.

Plans for Well Failure was submitted to DEQ with the original permit application (Section 10, dated April 2012) and is included here in Appendix C-2



DEFICIENCY NO 6

Please provide any updates to the Seismic Contingency Plan (SCP) since the permit modification dated June 26, 2015. This should include an update to the Revised Hall Plot, inclusive of the Hall derivative, dated December 07, 2021, and accepted by DEQ in a letter dated March 8, 2022. The Hall Plot being a component of the SCP is used to assess long term hydraulic behavior resulting from operational conditions and interactions with faults/fractures and other reservoir boundaries which are represented as slope changes on the Hall derivative graph.

RESPONSE:

The Seismic Contingency Plan remains unchanged since the permit modification dated June 26, 2015. The revised Hall Plot inclusive of the Hall derivative, dated December 07, 2021, and accepted by DEQ in a letter dated March 8, 2022, has been updated with recent injection data. The updated Hall plot is included in Appendix D.



DEFICIENCY NO 7

A well construction schematic was included in Appendix A as part of the 2023 Pressure Falloff Test (PFT) Report. The schematic is slightly blurry, making some of the writing illegible. Please include an updated, clearer well construction diagram as a figure in the Application.

RESPONSE:

An updated well construction schematic is included in Appendix E.



DEFICIENCY NO 8

In Section 1.6.2.1 of the Application, the well integrity tests listed include the annual PFT required by 40 C.F.R. 146.13(d) and the five-year mechanical integrity test required by 40 C.F.R. 146.13(b)(3). Please add a summary of the results and conclusions of those tests. Also, please add a section that includes the results of the most recent and previous PFTs (e.g., a table of surface and bottom hole pressures, permeability, skin, and radius of influence) to show any changes in well conditions. OAC 252:652-7-1(4).

RESPONSE:

PRESSURE FALL OFF TEST (PFT)

The results from the PFT are summarized in the following table.

Table 8: Historical PFT Summary

						Double Porosity Reservoir				Radial Composite Reservoir			
Year	Shut -In Period	Avg. Flow Rate	Depth of Bottom Hole Measurement	Bottom Hole Pressure at End of Shut-In	Surface Wellhead Pressure During Injection	Bottom Hole Reservoir Pressure	Permeability	Skin	Radius of Investigation	Bottom Hole Reservoir Pressure	Permeability	Skin	Radius of Investigation
	hours	gpm	ft	psia	psia	psia	md		ft	psia	md		ft
2015	72	175	5300	2537		2558	1140	-4.56	n/a	2558	1800	-2.91	n/a
2016	72	200	5300	2542		2568	620	4.98	7980	2571	877	9.98	9490
2017	72	185.85	5300	2574		2524	129	1.53	n/a				
2018	72	355	5300	2509	656					2505	663	24.3	9640
2019	82	204.8	5300	2500	490					2517	445	9.82	8380
2020	71	218	5650	2672	600.1					2664	126	0.93	3200
2021	72	200	5340	2525	533.03					2532.7	166	5.5	3400
2022	72	202	5340	2577.4	518.97					2536.7	399	23	5760
2023	72	175	5340	2532.92	540.93					2529.27	264.43	16.6	3000
2024	71	191	5340	2522.28	587.5					2518.63	254.03	19.8	4269
2025	71	200	5228	2506.26	750.73					2474.7	217.33	-4.47	3743



5-YEAR MECHANICAL INTEGRITY TEST (MIT)

An Oxygen Activation Log (OAL) was utilized to demonstrate the mechanical integrity of MES -1. The summary of the tests are included in the following table.

Table 9: MIT Result Summary

Year	Logging Station	Water Flow
2017	5045	No Water Flow
	4541	No Water Flow
	4420	No Water Flow
	350	No Water Flow
2022	5045	No Water Flow
	4541	No Water Flow
	4420	No Water Flow
	350	No Water Flow



APPENDIX A

SECTION 2.2 INJECTION WELL PLUGGING AND ABANDONMENT



SECTION 2.2

INJECTION WELL PLUGGING AND ABANDONMENT

The plugging and abandonment of the injection well will start after the closure of surface facilities is completed. An updated Plugging and Abandonment Plan will be prepared and submitted to DEQ for approval at least 180 days prior to cessation of operations or plugging and abandonment of the injection well. The updated plan shall include the requirements of OAC 252:656-5-1(5)(C). DEQ will be notified at least 180 days in advance of the injection well plugging and abandonment. The closure procedures listed below will be followed:

1. Notify DEQ of intended date of closure and plugging.
2. Inject all waste rinsate and contaminated runoff water into the well before ceasing operations.
3. Conduct pressure test of the annulus to assure integrity of casing, tubing and packer. This test shall be conducted for at least 2 hours.
4. Conduct an Oxygen Activation Log or Cement Bond Log to assure that there are no upflow conditions in the well and to verify cement integrity.
5. If there is any problem with the 8-5/8" casing or cement behind it, develop and execute a DEQ approved plan to conduct the necessary remedial actions to restore the casing and/or cement behind it to prevent contamination of underground sources of drinking water at the site.
6. Flush the entire system with fresh water and inject the rinsate into the well.
7. Disconnect pumps and piping.
8. Mobilize a workover rig and brief the crew on the closure and safety procedures.
9. If there is pressure at the wellhead, pump heavy brine or heavy mud to prevent wellhead pressure and fluid flow at the wellhead.
10. Dismantle the wellhead and remove the tubing and packer. Decontaminate and salvage. Decontamination waters should be contained, tested and properly disposed of at a permitted facility.
11. Run tubing and set cement plugs from total depth to the surface in stages.



12. Cut off the casing approximately 5 feet below ground level and weld a steel identifying plate to the top of the casing. The plate will be permanently inscribed with the well permit number and plugging date.
13. Clean-up well location; properly dispose of excess mud, cement and other materials.
14. Re-contour and vegetate the wellhead area to restore the area and prevent erosion.
15. Within 30 days after completion of the well plugging, file plugging records (triplicate) with the DEQ and Oklahoma Corporation Commission.
16. Prepare a report describing all closure activities and submit to the DEQ within 30 days after plugging the well.

The approved plugging and abandonment plan shall be implemented and completed within six (6) months, unless otherwise specified by the DEQ, in accordance with OAC 252:652-5-1(5)(D).



APPENDIX B

FORMATION-FRACTURE PRESSURE ESTIMATION



MES-1 Formation Fracture Pressure Analysis

1. Formation and Fracture Pressure Distribution

In order to determine the formation and fracture pressure distribution in this field, overburden and matrix pressures are required to be estimated.

1.1 Porosity Distribution

Average porosity distribution as a function of depth within Township 14N, Range 5E in Lincoln County, Oklahoma is determined as shown in the Figure-1.

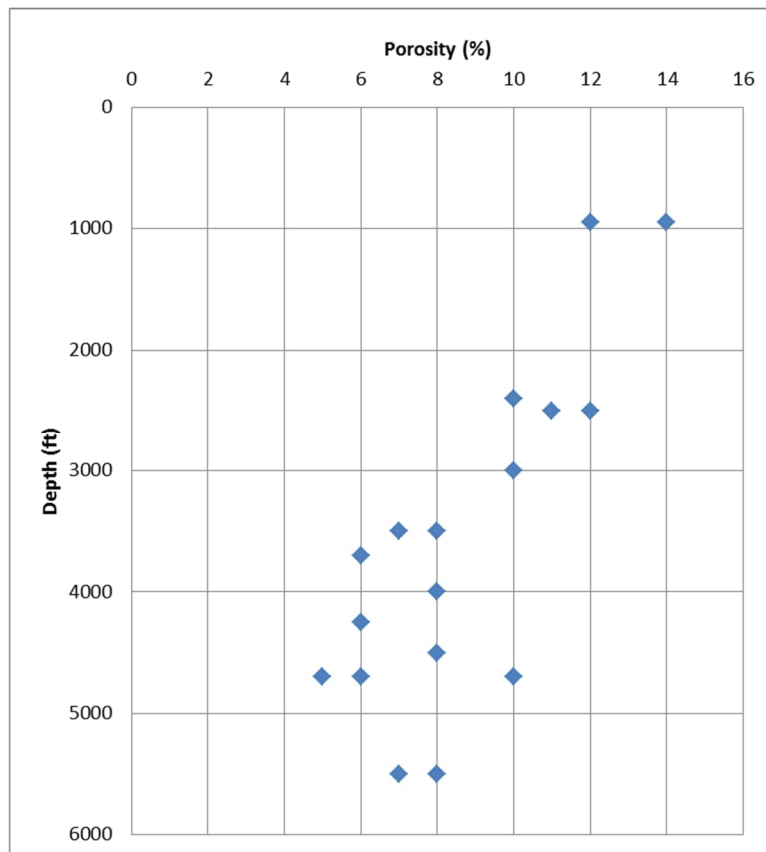


Figure – 1 Porosity distribution of T14N-R5E in Lincoln County, Oklahoma

As seen from the porosity distribution, formation pressures are expected to be “normal”, i.e., overpressurized zones are not expected. Next, porosity distribution as a function of depth is approximated. Porosity distribution as described in Equation A.6 in Appendix A is determined using curve fitting methods (Fig.2).

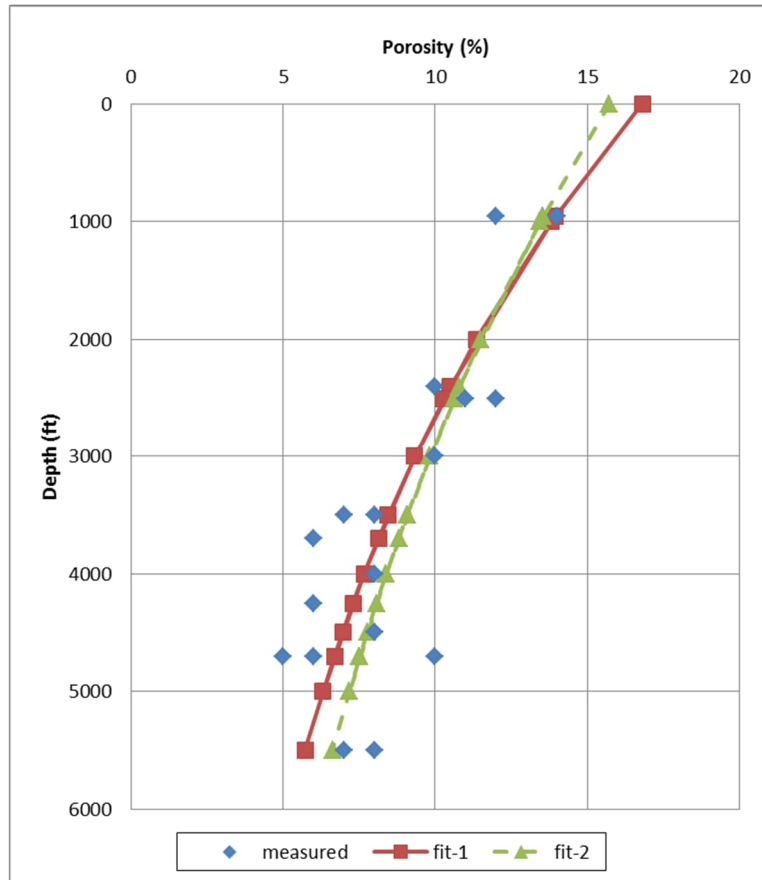


Figure – 2 Estimated porosity distribution for T14N-R5E in Lincoln County, Oklahoma

Equation constants for “Fit-1” and “Fit-2” are determined as:

Table – 1 Equation constants for porosity distribution presented in Fig.2

	Fit-1	Fit-2
Surface Porosity (%), ϕ_0	16.8	15.73
Porosity decline constant, k	0.000196	0.000157

1.2 Overburden Pressure Estimation

As described in Appendix-A, the overburden pressure can be approximated as a function of porosity distribution, average grain density, average formation fluid density, and depth. A series of estimations of overburden pressure is determined for the following variable matrix:

Table – 2 Variable matrix used for overburden pressure estimation calculations

Porosity distribution	Fit-1 and Fit-2
Grain density (sp.gr.), ρ_g	2.55, 2.65 and 2.75
Formation fluid density (sp.gr.), ρ_f	1.05
Depth (ft), Z	0 to 8000

Based on the analysis using the Equation-A.7 in Appendix-A with the variable matrix presented above, the minimum and maximum overburden pressure gradients for T14N-R5E in Lincoln County, Oklahoma are determined as 1.001 psi/ft and 1.129 psi/ft, respectively. The average overburden pressure gradient is calculated as 1.065 psi/ft.

Utilizing data from density logs ran in MES-#1, the bulk density versus depth plot is developed, as shown in Fig.3.

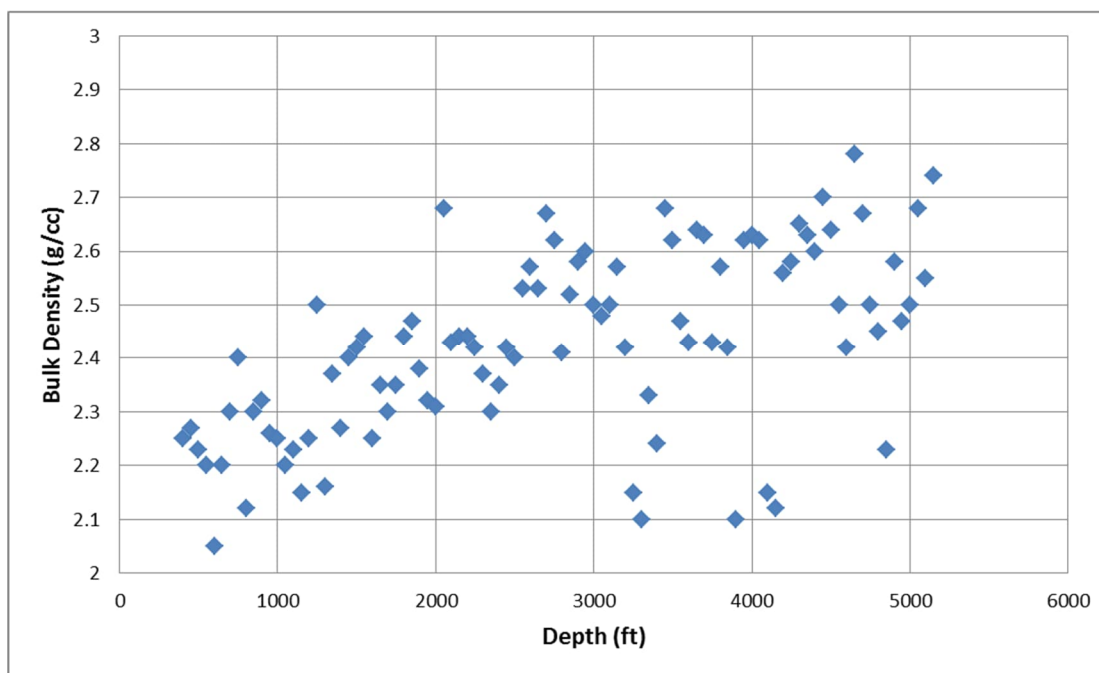


Figure – 3 Bulk density versus depth for Mid-Way MES-#1

Using this information, overburden pressure is calculated by both summing up the sediments and using an average bulk density value, which is determined to be 2.43 g/cc. The overburden pressure gradient at MES-#1 is determined as 1.00 psi/ft.

1.3 Formation Pressure Estimation

Based on the various openhole flow and pressure buildup tests performed on Arbuckle formation at the Mid-Way well, it has been reported that static pressures of 200 psi are recorded at the surface when the tubing is filled with the formation fluid having a density of 8.75 ppg (sp.gr. = 1.05). Considering that the openhole section varies from depths 5173 ft to 7040 ft, minimum and maximum formation pressure gradients for T 14N-R5E in Lincoln County, Oklahoma are estimated as 0.472 psi/ft and 0.501 psi/ft, respectively, using Equation-A.1 in Appendix-A. The average formation pressure gradient is determined as 0.487 psi/ft. For theoretical estimations, formation fluid density is considered to be 1.05 gr/cc, based on actual measurements. The hydraulic calculations in Section 3.2 of this report were performed using this value.

1.4 Fracture Pressure Estimation

Biot's theory states that the overburden is comprised by the fluid and the matrix stress simultaneously. In order to estimate the worst case scenario, Biot's constant, as described in Equation-A.3 in Appendix-A, is assumed to be 1.0. Details about Biot's theory is presented in Appendix-A.

Using the information determined for overburden and formation pressures at a particular depth, the matrix stresses are determined. It is observed that the minimum and maximum matrix stresses for T14N-R5E in Lincoln County, Oklahoma are estimated as 0.472 psi/ft and 0.501 psi/ft, respectively.

Eaton's method, which is a function of Poisson's ratio and matrix stress, is selected to be the technique for estimating fracture pressure. For this purpose, a Poisson's ratio of 0.25 is assumed. When a Poisson's ratio of 0.25 is used, the values estimated for minimum stress, as described in Equation-A.12 in Appendix-A gives the exact same numerical values for the minimum stress values estimated by the Hubbert & Willis method, as given in Equation-11 in Appendix-A.

After the analysis, it is determined that for T14N-R5E in Lincoln County, Oklahoma, minimum and maximum fracture pressure gradients for a Poisson's ratio of 0.25 are estimated as 0.638 psi/ft and 0.720 psi/ft, respectively. The average value of fracture pressure gradient is determined as 0.679 psi/ft. The analysis provided in the response was conducted using the minimum fracture pressure gradient parameter of 0.638 psi/ft.

The theoretical basis for fracture pressure estimation, as described in Appendix-A, can be understood to mean the minimum pressure required to initiate new fractures or propagate existing fractures in the injection zone.

1.5 Summary of Formation & Fracture Pressure Distribution

A summary of overburden, formation and fracture pressures (minimum and maximum values) are presented as a function of depth (Fig.4).

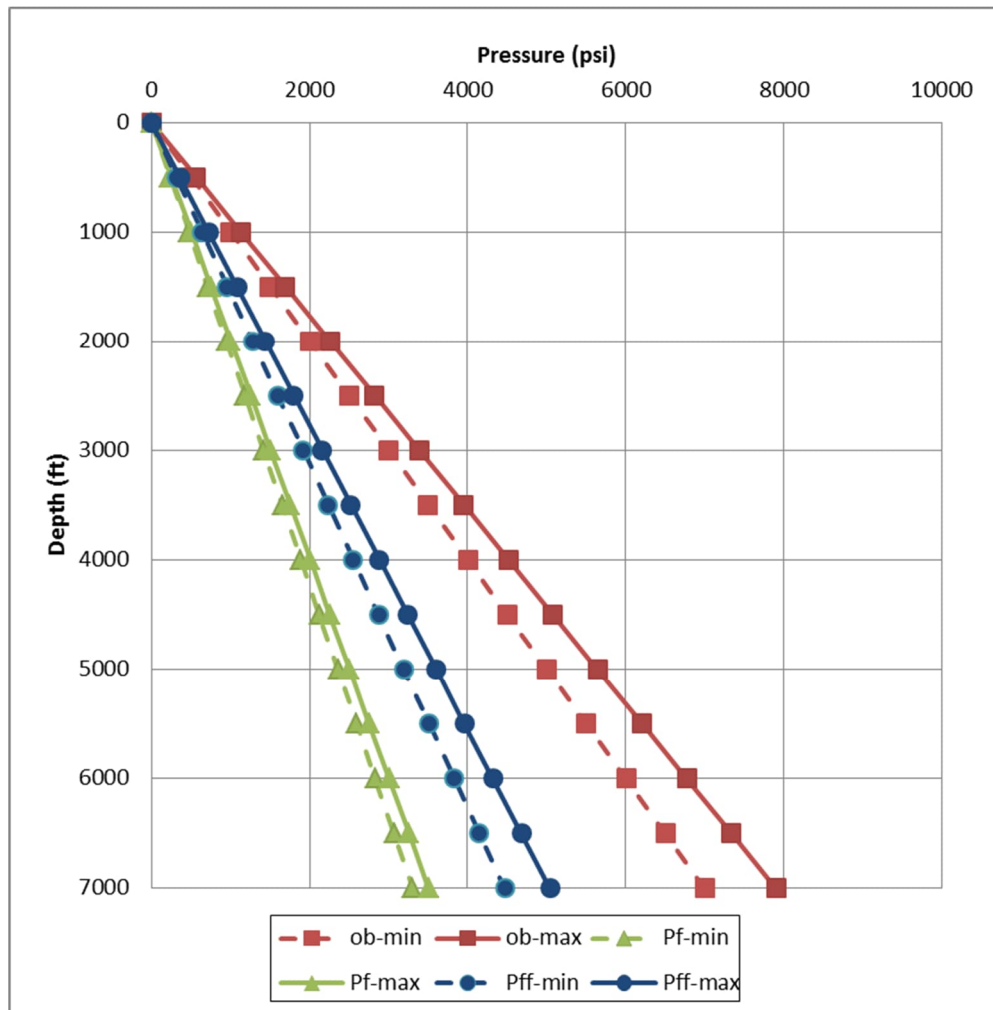


Figure – 4 Estimated formation (P_f), fracture (P_{ff}) and overburden (ob) pressures

APPENDIX – A

Formation, Fracture and Overburden Pressures

The magnitude of the pressure in the pores of a formation, known as the formation pore pressure (or simply formation pressure), is an important consideration in many aspects of well planning and operations. In addition to predicting the pore pressure in a formation it is also very important to be able to predict the pressure at which the rocks will fracture. When the pore pressure and fracture pressure for all of the formations to be penetrated have been predicted the well will be designed, and the operation conducted, such that the pressures in the borehole neither exceed the fracture pressure, nor fall below the pore pressure in the formations

A.1 Formation Pressure

During a period of erosion and sedimentation, grains of sediment are continuously building up on top of each other, generally in a water filled environment. As the thickness of the layer of sediment increases, the grains of the sediment are packed closer together, and some of the water is expelled from the pore spaces. However, if the pore throats through the sediment are interconnecting all the way to surface the pressure of the fluid at any depth in the sediment will be same as that which would be found in a simple column of fluid. The pressure in the fluid in the pores of the sediment will only be dependent on the density of the fluid in the pore space and the depth of the pressure measurement (equal to the height of the column of liquid). It will be independent of the pore size or pore throat geometry (HWU, 2008).

A.2 Overburden Pressure

It is also important to be able to quantify the vertical stress at any depth since this pressure will have a significant impact on the pressure at which the borehole will fracture when exposed to high pressures. The vertical pressure at any point in the earth is known as the overburden pressure or geostatic pressure. The overburden pressure at any point is a function of the mass of rock and fluid above the point of interest. In order to calculate the overburden pressure at any point, the average density of the material (rock and fluids) above the point of interest must be determined. The average density of the rock and fluid in the pore space is known as the bulk density of the rock. Since the matrix material (rock type), porosity, and fluid content vary with depth, the bulk density will also vary with depth. The overburden pressure at any point is therefore the integral of the bulk density from surface down to the point of interest (HWU, 2007).

The overburden effect is defined as the result of the action of subsidence on the interstitial fluid pressure of a formation. If fluid can only be expelled with difficulty relative to burial conditions, they must support all or part of the weight of overlying sediments. As the depth increases, the porosity is expected to be decreasing.

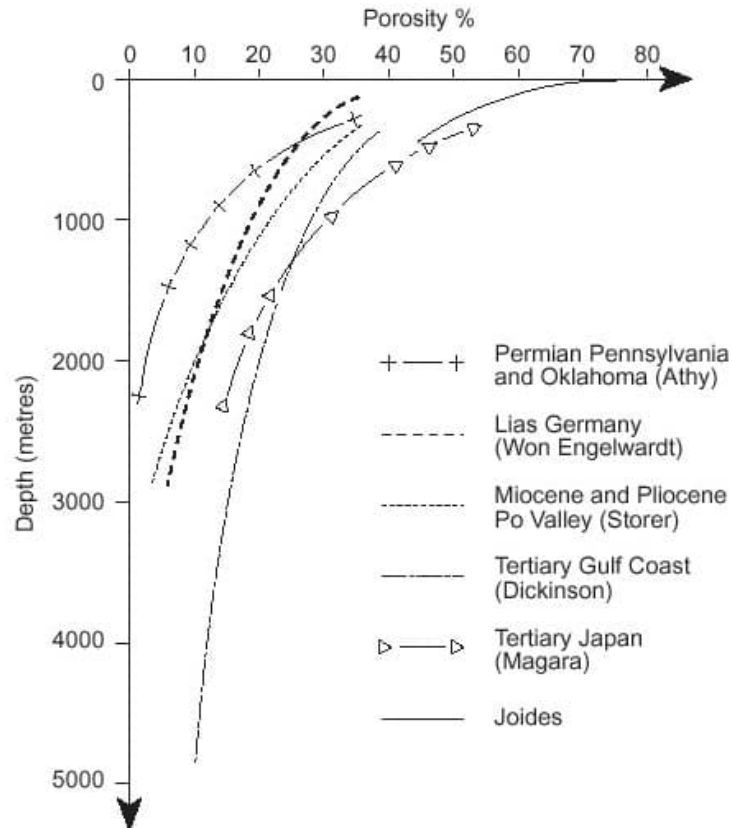


Figure – A.1 Porosity as a function of depth (HWU, 2007)

The principle behind the overburden effect arises from the balance between overburden pressure and the ability of a given formation to expel water. The compaction process can be described by a simplified model consisting of a vessel containing a fluid (representing the pore fluid) and a spring (representing the rock matrix).

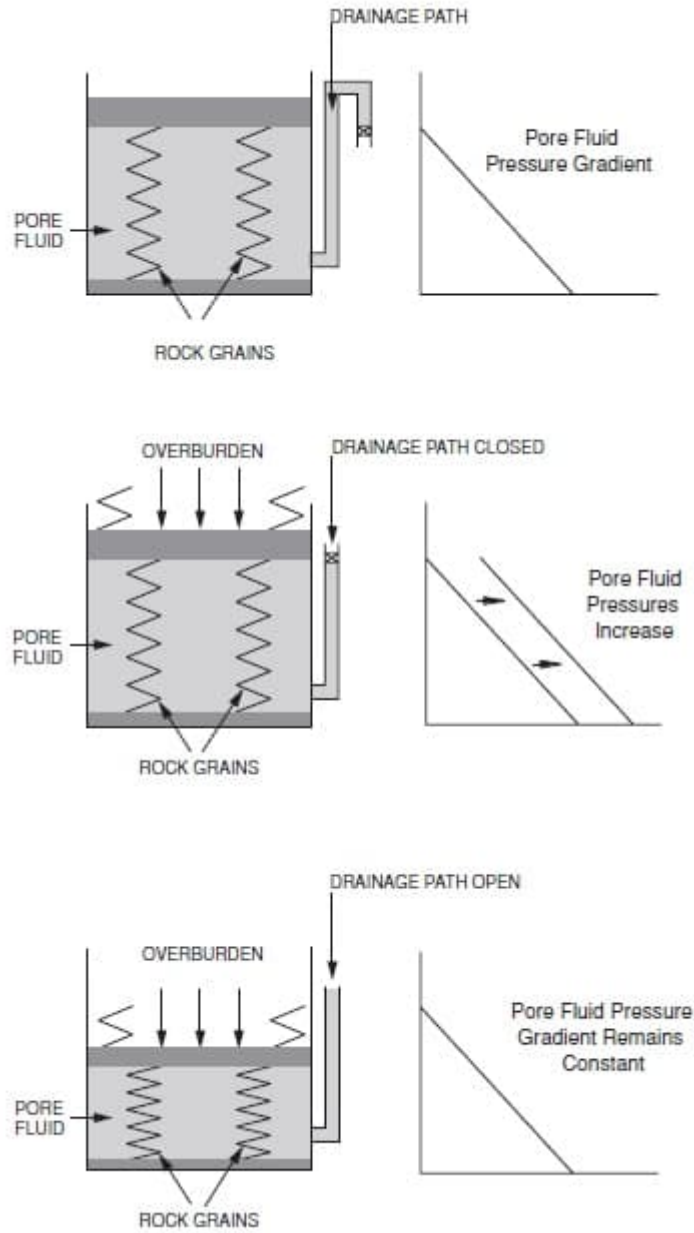


Figure – A.2 Overburden simulation vessel (HWU, 2007)

The overburden stress can be simulated by a piston being forced down on the vessel. The overburden (σ_{ob}) is supported by the stress in the spring (σ_z) and the fluid pressure (P_f).

$$\sigma_{ob} = \sigma_z + P_f \quad (A.1)$$

If the overburden is increased (e.g. due to more sediments being laid down) the extra load must be borne by the matrix and the pore fluid. If the fluid is prevented from leaving the pore space (drainage path closed) the fluid pressure must increase above the hydrostatic value. Such a formation can be described as overpressured (i.e. part of the overburden stress is being supported by the fluid in the pore space and not the matrix). Since the water is effectively incompressible the overburden is almost totally supported by the pore fluid and the grain to grain contact stress is not increased. In a formation where the fluids are free to move (drainage path open), the increased load must be taken by the matrix, while the fluid pressure remains constant. Under such circumstances the pore pressure can be described as “normal”, and is proportional to depth and fluid density (Bourgoyne et al, 1998).

In rock mechanics, there are 3 stresses in a material that are perpendicular to each other; i) σ_v maximum principal stress, ii) σ_H intermediate principal stress, and iii) σ_h minimum principal stress. In practice it is observed that at shallow depths the minimum principal stress is the vertical stress. Here a hydraulic fracture is most likely to occur in a horizontal plane. At greater depths the principal stresses generally follow fault regimes. For example, in a normally pressured sedimentary basin, the minimum stress σ_3 is most probably in the horizontal plane at depths greater than 3300 ft. The maximum principal stress is usually considered to be vertical and equal the overburden stress after these depths.

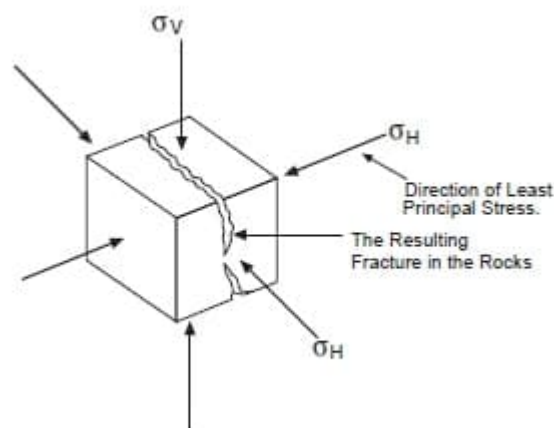


Figure – A.3 Principal stresses acting on a rock sample (HWU, 2007)

Generally the vertical stress is depth dependent and expressed as follows

$$\sigma_v = \int_0^Z \rho_b(h) g dh \quad (\text{A.2})$$

$\rho_b(h)$ is density of rock at given depth Z , and g is gravity. Hence the value of this stress component is obtained from the integration of a density log. σ_v is known as the “overburden gradient” and

varied from 0.8 psi/ft in young, shallow formations to 1.25 psi/ft in high-density formations (Bourgoyne et al, 1998; HWU, 2007).

Pore Pressure supports a portion of the total applied stress in a rock. If a formation is “normally pressured” the pore pressure mechanism can be described as following; sediment burial → full pore fluid escape → porosity decreases → effective rock stress increases → pore pressures are hydrostatic (normal).

Biot proposed an equation to account for the following; any change in pore pressure is accompanied by variation in pore volume – this change in pore volume affects the overall mechanical response of the rock.

$$\sigma_z = \sigma_{ob} - \alpha P_f \quad (A.3)$$

σ_z is effective rock stress (in a given direction), σ_{ob} is total applied stress (in a given direction), P_f is pore pressure, and α is Biot’s constant (varies between 0 and 1). α describes the efficiency of the fluid pressure in counteracting the total applied stress. If $\alpha = 1$ this means that the pore fluid has maximum efficiency in counteracting the total overburden stress (σ_{ob}) and therefore implies that the effective stress of the rock is lower, a pessimistic condition for rock failure. If $\alpha < 1$ this means that the pore fluid is less efficient in counteracting the total overburden stress (σ_{ob}) and the effective stress of the rock is greater for all else equal. α is close to 1 for stiff rocks and close to 0 for rocks with low stiffness (Mitchell, 2006).

Overburden stress is defined as the pressure exerted by the weight of the overlying sediments. Mathematically,

$$\sigma_{ob} = \int_0^Z \rho_b g dZ \quad (A.4)$$

where ρ_b is the bulk density, and g is the gravitational acceleration.

$$\rho_b = \phi \rho_f + (1 - \phi)\rho_g \quad (A.5)$$

Here, where ρ_f is the formation fluid density, and ρ_g is the grain density (Bourgoyne et al, 1998; CDRS, 1990, Prassl, 2000). The specific gravity of the rock bulk density may vary from 2.1 (sandstone) to 2.4 (limestone). Therefore, using an average of 2.3 and converting to units of psi/ft, it can be seen that the overburden pressure gradient exerted by a typical rock, with zero porosity would be 1.0 psi/ft.

Relation between sediment porosity and depth can be explained with

$$\phi = \phi_o e^{-k Z} \quad (A.6)$$

where ϕ_o , k and Z are surface porosity, porosity decline constant and depth below the sediments respectively. ϕ_o and k are field dependent. Overburden stress can be determined by integrating the relation given above and inserting the porosity definition into bulk density relation as

$$\rho_{ob} = \rho_g g Z - \frac{(\rho_g - \rho_f) g \phi_o}{k} (1 - e^{-k Z}) \quad (A.7)$$

A.3 Fracture Pressure:

Assuming that the sediments behave elastically, the horizontal strain, ε_x , can be expressed using Hooke's law:

$$\varepsilon_x = \frac{\sigma_x}{E} - \mu \frac{\sigma_y}{E} - \mu \frac{\sigma_z}{E} \quad (A.8)$$

where E is Young's modulus of elasticity and μ is Poisson's ratio. For compressed rock caused by sedimentation, the horizontal strain is essentially zero, and the horizontal stresses, σ_x and σ_y are approximately equal:

$$\sigma_x = \sigma_y = \sigma_H = \frac{\mu}{1 - \mu} \sigma_z \quad (A.9)$$

where σ_H denotes the average horizontal stress. Therefore, Poisson's ratio is a rock property that describes the behavior of rock stresses in the direction of least principal stress when pressure is applied in the direction of maximum principal stress. Usually, it is assumed that μ varies from 0.18 to 0.5, varies with depth and degree of compaction (Bourgoyne et al, 1998).

As mentioned above, the stress within a rock can be resolved into three principal stresses. A formation will fracture when the pressure in the borehole exceeds the least of the stresses within the rock structure. Normally, these fractures will propagate in a direction perpendicular to the least principal stress.

Once the fracture is initiated, a cavity will form in the direction perpendicular to the minimum principal stress. For fracture fluid to enter the cavity, the pressure of the fracture fluid must exceed the pressure of the formation fluid in the pore spaces of the rock. As the pressure of the fracture fluid is increased above the formation pore pressure, the rock matrix begins to be compressed. The compression is greatest in the direction of the minimum matrix stress. When the fracture fluid pressure exceeds the sum of minimum matrix stress and the pore pressure, parting of the rock matrix occurs and the fracture propagates. The preferred fracture orientation is perpendicular to the least principal stress.

A.4 Prediction of Fracture Pressure:

Most rocks contain pore pressure, hence for rocks with a connected system of pores, failure is controlled by the effective stress.

As given above:

$$\sigma_z = \sigma_{ob} - P_f \quad (A.10)$$

Hubbert and Willis (1957) proposed that in regions of normal faulting, the horizontal matrix stress is the minimum stress. The minimum wellbore pressure required to extend an existing fracture is given as the pressure needed to overcome the minimum principal stress. They also concluded that the minimum principal stress in the shallow sediments is approximately one-third of the vertical matrix stress resulting from weight of the overburden. Thus, fracture pressure is:

$$P_{ff} = \sigma_{min} + P_f = \frac{\sigma_z}{3} + P_f = \frac{\sigma_{ob} + 2 P_f}{3} \quad (A.11)$$

Eaton (1969) assumed that the relationship between horizontal and vertical matrix stress by:

$$\sigma_{min} = \frac{\mu}{1-\mu} \sigma_z \quad (A.12)$$

where

$$P_{ff} = \sigma_{min} + P_f \quad (A.13)$$

Poisson's ratio, μ , is determined from field data.

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APPENDIX C-1

CONTINGENCY PLAN





MID-WAY
ENVIRONMENTAL SERVICES, INC.

SEISMICITY CONTINGENCY PLAN

FOR

MID-WAY ENVIRONMENTAL SERVICES, INC.

CLASS I NON-HAZARDOUS INJECTION WELL

PERMIT NUMBER IW-NH-41001-OP

WITHIN THE N/2 OF THE NE/4 OF THE NW/4 OF THE SW/4

OF

SECTION 9, TOWNSHIP 14 NORTH, RANGE 5 EAST

LINCOLN COUNTY, OKLAHOMA

DATE SUBMITTED: SEPTEMBER 5, 2014

REVISED: JANUARY 2015

MAY 2015

PREPARED FOR:

MID-WAY ENVIRONMENTAL SERVICES, INC.

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SUBMITTED TO:

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

LAND PROTECTION DIVISION

OKLAHOMA CITY, OKLAHOMA

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Table 2 Number of Earthquakes in the United States for 2000 – 2012

1.0 INTRODUCTION

Seismic activity is a common occurrence within the State of Oklahoma and earthquake magnitude and frequency is routinely monitored by both the United States Geological Survey (USGS) and the Oklahoma Geological Survey (OGS) through a series of monitoring stations designed to pinpoint the earthquake location and depth. Earthquakes in Oklahoma are typically low in magnitude and relatively shallow in depth with many of the earthquakes too small to be felt.

The majority of earthquakes which occur in Oklahoma are concentrated within a 25-37 mile wide area in western McClain and Garvin Counties. Southeastern Lincoln County, the county in which the Mid-Way Environmental Services, Inc. (Mid-Way) Class I Non-hazardous Waste Injection Well is located, is also known to be seismically active; especially along a segment of the Wilzetta fault which extends in a southwest/northeast direction and crosses southeastern Lincoln County. The Wilzetta fault is one of a series of small faults formed in the Pennsylvanian Epoch (approx. 300 million year ago) during the intra-plate deformation known as the Ancestral Rocky Mountains mountain-building episode. The Mid-Way Environmental Services, Inc. injection well is located approximately 6-7 miles west of the closest point of the Wilzetta fault line as it passes to the east of Davenport and Stroud, Oklahoma

Another fault, the Meers fault, is located in south-central Oklahoma, about 100 km (~62 miles) southwest of Oklahoma City, is the only fault identified in the state with evidence of surface-rupturing earthquakes in the last 3000 years (prior to historical settlement of the region). Paleoseismology studies have identified a temporal clustering of a least three earthquakes on this fault, two of which are dated (1200-2900 years before present) and the third is believed to be older in age.

This Seismicity Contingency Plan has been prepared to identify the methods and procedures for monitoring seismic activity in the area of the Mid-Way Non-hazardous Waste Injection Well facility and is being submitted to the Oklahoma Department of Environmental Quality (DEQ) in accordance with Part A, Item 10 of the Mid-Way Operations Permit.

1.1 Purpose

The purpose of this plan is to identify the methods to be utilized to identify and report to DEQ all earthquakes whose epicenters are within a ten (10) mile radius of the injection well. Earthquakes whose magnitudes are both felt and unfelt by persons living and/or working in the area near the injection well will be recorded and reported. In addition, this Seismicity

Contingency Plan identifies the procedures to be taken by Mid-Way in the event of a major earthquake within the general vicinity of the injection well and facility.

2.0 Earthquake Monitoring

Monitoring of earthquakes will be conducted primarily through the USGS Earthquake Notification Service and Oklahoma Geological Survey. The Earthquake Notification Service is a customizable system that sends automated notification of earthquake activity to an e-mail address and/or linked cell phone. The service can be customized to provide earthquake information on a local, regional, or world-wide basis. In addition, Mid-Way will monitor the Oklahoma Geological Survey (OGS) seismic event data source, OGS news releases, statewide news media and other local media for information on reported earthquakes.

2.1 Methodology

Key facility management personnel will be assigned the responsibility to monitor the occurrence of earthquakes in the general area and to coordinate the appropriate procedures to be followed in the event of a strong earthquake. To effectively monitor the earthquake activity, an account will be established with the USGS Earthquake Notification System to provide information on all earthquakes whose epicenters are within both a three (3) mile and ten (10) mile radius of the injection well. A facility e-mail account will be utilized for receipt of notifications and a database established for recording the notifications. The e-mail account will be linked to facility management cell phones to allow management to receive real time notification of any earthquake events which occur.

2.2 Magnitude Monitoring Limitation

Information for earthquakes in the U.S. is generally available within 5 minutes of the occurrence. Within the United States, USGS typically locates earthquakes down to about magnitude 2.0 on the Richter scale, and about magnitude 4.0 for the rest of the world.

However, for purposes of notification and recording, Mid-Way will request through the Earthquake Notification Service account that all earthquakes within both a three mile and ten mile radius of the injection well having a magnitude of 1.0 or greater be reported to Mid-Way.

Data gathered by USGS indicates that the vast majority of earthquakes recorded in the United States have a magnitude between 2.0 and 5.0 on the Richter scale. Tables 1 and 2 present historic data on earthquakes recorded in the United States during the period of 1990 through 2012. The data indicates that earthquakes having a magnitude below 1.0 are rare, with none

having been reported during the 1990s, and only three (3) having been reported during the period 2000 through 2012. Therefore, limiting the recording level to magnitude 1.0 and above appears reasonable and appropriate.

Table 1 Number of Earthquakes in the United States for 1990 – 1999*

Magnitude	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
8.0 to 9.9	0	0	0	0	0	0	0	0	0	0
7.0 to 7.9	0	2	2	0	1	0	2	0	0	2
6.0 to 6.9	2	4	15	9	4	6	4	6	3	6
5.0 to 5.9	64	49	72	62	64	45	100	63	62	50
4.0 to 4.9	284	242	404	270	333	350	612	362	411	352
3.0 to 3.9	626	713	1717	1119	1543	1058	1060	1072	1053	1398
2.0 to 2.9	414	559	998	1009	1196	822	654	759	742	814
1.0 to 1.9	1	3	5	7	2	0	0	2	0	0
0.1 to 0.9	0	0	0	0	0	0	0	0	0	0
No Magnitude	877	599	368	457	444	444	375	575	508	381
Total	2268	2171	3581	2933	3587	2725	2807	2839	2779	3003

*Located by the US Geological Survey National Earthquake Information Center

Table 2 Number of Earthquakes in the United States for 2000 - 2012*

Magnitude	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
8.0 to 9.9	0	0	0	0	0	0	0	0	0	0	0	0	0
7.0 to 7.9	0	1	1	2	0	1	0	1	0	0	1	1	0
6.0 to 6.9	6	5	4	7	2	4	7	9	9	4	8	3	5
5.0 to 5.9	63	41	63	54	25	47	51	72	85	58	89	51	27
4.0 to 4.9	281	290	536	541	284	345	346	366	432	288	631	347	271
3.0 to 3.9	917	842	1535	1303	1362	1475	1213	1137	1486	1492	3584	1838	1236
2.0 to 2.9	660	646	1228	704	1336	1738	1145	1173	1573	2379	4132	2941	2251
1.0 to 1.9	0	2	2	2	1	2	7	11	13	26	39	47	43
0.1 to 0.9	0	0	0	0	0	0	1	0	0	1	0	1	0
No Magnitude	415	434	507	333	540	73	13	22	20	14	12	8	3
Total	2342	2261	3876	2946	3550	3685	2783	2791	3618	4262	8496	5237	3836

*Located by the US Geological Survey National Earthquake Information Center - (M2.5+; doesn't include US regional network contributions)

Source (Table 1 and Table 2): USGS web site (<http://earthquake.usgs.gov/earthquakes/eqarchives/year/eqstats.php>) accessed 8/27/2014.

2.3 Recording

Data received from the USGS Earthquake Notification Service and the OGS seismic event data source on all earthquakes occurring within a ten mile radius of the injection well will be saved into a database designed to provide ease of reporting to DEQ. It is anticipated that the database will be in a spreadsheet format. Data to be recorded will include the date and time of the earthquake; the longitude and latitude coordinates of the earthquake epicenter; depth of the earthquake focus; and reported magnitude. USGS notifications of modification to previously reported earthquake data will also be recorded in the database.

2.4 Reporting

Southeastern Lincoln County, the county in which the Mid-Way Class I Non-hazardous Waste Injection Well is located, is known to be seismically active; especially along a segment of the Wilzetta fault which extends in a southwest/northeast direction and crosses southeastern Lincoln County. However, within a three-mile radius of the Mid-Way injection well, this area of Oklahoma is not known to be seismically active and the amount of data to be received from the USGS Earthquake Notification Services and OGS seismic event data source is anticipated to be minimal. As such, reporting of earthquake activity within the three and ten mile radii of the injection well will occur on a quarterly basis. The quarterly reporting frequency is consistent with other permit required reporting activities for the injection well. Reporting will include all data gathered and recorded in the database described above.

3.0 Additional Seismic Monitoring

Based on the magnitude and frequency of earthquakes observed during monitoring, and as determined by the DEQ, Mid-Way will conduct additional monitoring through the USGS Earthquake Notification Service and OGS data sources. Mid-Way acknowledges that in the event of a strong earthquake (≥ 4.0 magnitude) within the general vicinity (10-mile radius) of the injection well, additional consideration must be given to ensuring well integrity. Potential impacts from a seismic event of this magnitude may include separation of casing or tubing, casing collapse, and/or open-hole collapse. As a safety precaution, Mid-Way has included in the design of the well, continuous monitoring and recording with automatic shut-down controls to prevent injection of fluids in the event that well integrity is compromised. A Programmable Logic Controller (PLC) system has been designed and implemented at the injection well to monitor and record the entire injection system and initiate alarms and emergency shut-down of

injection in the event of abnormal increase or decrease in monitored pressures. Monitoring of well conditions and integrity is designed to detect the potential impacts expected from a strong seismic event as described above. Automated detection of such events enables emergency shut-down interlocks to safely shut-down injection so that the situation can be assessed.

It is currently anticipated that a separate Earthquake Notification Service account will be established by Mid-Way to monitor larger earthquakes within the general vicinity (10 mile radius) of the injection well. This separate account will be customized to monitor earthquakes greater than or equal to a 4.0 magnitude. Recording and reporting of earthquakes of this magnitude (≥ 4.0) within the 10 mile radius of the injection well will be similar to the permit required monitoring described in **Section 2.0** above.

During normal business hours and upon notification of a seismic event ≥ 4.0 magnitude within the general vicinity, facility personnel will be required to methodically inspect all piping, tanks, and equipment to ensure that no damage has been sustained; no leaks are evident; and all equipment is fully operational. Mid-Way personnel will conduct a visual inspection of the injection pump house, flow equalization tanks, and filter building as outlined above. In addition, Mid-Way personnel will inspect the Waste Storage tanks, pumps and all other piping for leaks.

In the event of notification of a strong earthquake when the facility is closed, facility personnel will be required to methodically inspect all piping, tanks, and equipment *prior to* initiation of injection activities. Facility personnel will be trained on procedures to be followed in the event of notification of a major earthquake in the general area.

Based upon notification of a strong earthquake (≥ 4.0 magnitude) in the vicinity of the injection well *and* a PLC system shut-down condition MES will:

1. Verbally (or through e-mail) notify DEQ of the shut-down condition;
2. Inspect all surface piping and facilities for leaks, verify well head and annulus pressures, and evaluate all PLC components for potential false signals;
3. Notify DEQ whether or not a loss of mechanical integrity is discovered;
4. If no loss of integrity is discovered, DEQ will be notified of system start-up. If loss of mechanical integrity is discovered, a corrective action plan will be developed for DEQ approval;
5. Implement any necessary corrective action;
6. Restore and demonstrate mechanical integrity to the satisfaction of ODEQ prior to resuming the injection of waste fluids.

4.0 Modification to Operating Parameters

Mid-Way is committed to operating the injection well and facility in an environmentally safe and sound manner and recognizes that modification to operating parameters may be necessary if periods of increased seismicity are observed within a one mile radius of the injection well.

In the event that the frequency of earthquakes in the area appears to be increasing within the immediate area of the injection well, Mid-Way will contact the DEQ within 48 hours of the observed increase to discuss the matter. For purposes of this Seismicity Contingency Plan and for DEQ notification purposes, an “increase in frequency” is defined as one (1) or more or more earthquakes whose epicenter is within a one (1) mile radius of the injection well. Those earthquakes whose magnitude is reported to be ≥ 1.0 on the Richter scale will be considered.

Modeling previously conducted on the Mid-Way injection well and provided to DEQ showed that after 10 years of operation with continuous injection at a rate of 11 barrels per minute (bbl/min), the front of injected fluids is estimated to be only 2,100 ft away from the Mid-Way injection well. After 50 years of continuous injection, the front is estimated to be 5,400 ft (approximately one mile) away from the well. The modeled rate is actually greater than the maximum permitted allowable injection rate. As such, utilizing a one mile radius of evaluation to define an “increase in frequency” appears reasonable and appropriate.

Depending on the level of increased seismicity observed, Mid-Way will unilaterally reduce the daily maximum permitted injection volume by 20%, or by a percentage mutually agreed to with DEQ, until further discussions are held and agreement to resume injection at the maximum permitted volume is obtained or the increased seismic activity is no longer evident.

During the injection volume reduction period, if no seismic activity above a 1.0 magnitude is recorded within a one mile radius of the injection well over a three consecutive month period, Mid-Way, with permission from DEQ, will resume injection up to the maximum permitted rate and volume.

5.0 Additional Geotechnical Information

Mid-Way recognizes that determination of the cause or causes of an increase in observed seismic activity within a one mile radius of the injection well may require gathering additional operational and geotechnical information. Mid-Way is committed to assisting DEQ in gathering

and evaluating all additional information of the area including but not limited to records of recent petroleum exploration activities in the area, on-going oil and gas production and operating activities, identification of private and commercial salt water injection activities, and other geotechnical information deemed necessary.

6.0 Increased Frequency of Well Testing

Mid-Way further understands that an increase in seismic activity may result in a need for an increased frequency in pressure fall off testing and pressure buildup monitoring within the injection zone at the facility. If conditions warrant, Mid-Way will increase the frequency of pressure fall off testing in accordance with permit requirements from an annual to a semi-annual basis. If semi-annual fall off testing is implemented, Mid-Way will coordinate and obtain agreement from DEQ prior to reverting to annual fall off testing. In addition, as sufficient fall-off testing data becomes available, Hall plots utilizing derivatives will be constructed and used to evaluate the injection well's long term hydraulic behavior.

APPENDIX C-2

PLAN FOR WELL FAILURE



PLANS FOR WELL FAILURE

Emergency Procedures

The emergency response procedures for MES #1 are inherently simplified because no hazardous fluids are accepted at the facility or injected through the well. In addition, the injection system are be equipped with the following features to help avoid or reduce the possibility of a significant emergency.

1. A Programmable Logic Controller (PLC) are incorporated into the system to monitor and control the system as necessary.
2. Pressure switches will be installed in the system so that pressures can be monitored; and
3. Alarm systems are incorporated into the system to alert facility employees of emergency situations.

Pressure switches are connected to actuator valves and to the injection pumps. In the event of an emergency condition (e.g., higher or lower pressure than normal operation pressure), the pressure switches will activate the actuator to close the valve at the pump discharge and turn off the injection pumps to stop fluid injection. As an additional safety measure, pressure relief valves are provided and set to open in the event of a high-pressure situation and circulate pump discharge back to the flow equalization tanks. When the injection pumps shut off, the alarm system turns on and warns the operator about the situation.

In the event of equipment failure (in the suction or injection system), fluid injection operations will cease immediately, and the failure will be corrected. Normal operation will resume once all failures are corrected. Temporary equipment failures will not threaten the Underground Source of Drinking Water (USDW) because all non-hazardous fluids will be contained in the geosynthetic-lined pond and in storage tanks which have sufficient capacity to handle the on-site inventory.

In the event of a significant spill, leak or loss of fluid associated with the suction and filter system, the wellhead or along the piping, the first response priority shall be containment of the lost non-hazardous fluid. All tanks are contained within a secondary containment system and the solid handling building is equipped with geosynthetic lined foundations and sumps to collect fluids. Due to these safeguards, any loss of fluid will be immediately contained. This lost non-hazardous fluid will then be returned to the pond or the tanks by using a small portable transfer pump



equipped with flexible hoses. Repair work shall commence as soon as emergency clean-up procedures are complete.

Emergency System Controls

Injection System

The injection well operation will be monitored and controlled by a PLC programmed with alarms and safety features. A breakdown of the instrumentation and controls that the injection system will be equipped with is provided below.

1. Between the wellhead and the flow meter:
 - a. Pressure Indicator (PI).
 - b. Pressure Indicator Transmitter (PIT) to transmit the pressure readings to the Pressure Indicator Recorder (PIR) and to the PLC.
 - c. Pressure High Alarm and Pressure Low Alarm. The High Pressure Alarm will initiate the Pressure High Shut Down (PSH) and Low Pressure Alarm will initiate Pressure Low Shut Down (PSL) process which is interlocked with the injection well pump operating logic. The Pressure High Alarm (PAH) will be set at 710 psig. The Pressure Low Alarm (PAL) will be set at 350 psig.
 - d. Flow Transmitter (FT) to transmit flow readings to the Flow Indicator Recorder (FIR) and to PLC.
 - e. Temperature Primary Elements (TE) for Temperature Indicator Recording (TIR) and Temperature Transmitting to PLC.
2. Injection Pump (P-16A and P-16B) Controls:
 - a. The pumps will be equipped with a Hand-On-Auto (HOA) switch for manual operation, a Hand Switch (HS) and automated operation capabilities through the PLC.
 - b. Both injection pumps will be interlocked with each other and wellhead Pressure High Shut Down (PSH) and Pressure Low Shut Down (PSL) as described in paragraph 1.c. above.
 - c. Both injection pumps will also be interlocked with Equalization Tank T-118 Low Water Level Shut Down (LSL) and High Water Level Shut Down (LSH).
 - d. Each injection pump discharge will be equipped with a Pressure Indicator (PI) and a piping loop with a Pressure Safety Valve (PSV). These valves will be set to open



to circulate the pump discharge back to the flow equalization tank (T-118), if any system failure occurs.

3. Flow equalization tanks will be equipped with a Water Level Indicator Transmitter (LIT) to transmit the tank water level to PLC for recording, low level alarm, high level alarm, injection pump low level shut down and high level shut down. In addition, the equalization tank high level shut down will also be interlocked with Waste Transfer Pumps P-5A and P-5B and Wastewater Transfer Pumps P-6A and P-6B so that the entire system is shutdown in the event of a high level situation in the equalization tanks.

Annulus Fluid Feed System

The Annulus Fluid Feed System operation will be monitored and controlled by a PLC programmed with alarms and safety features. A breakdown of the instrumentation and controls that the annulus feed system will be equipped with is provided below.

1. Between the wellhead and the Annulus Fluid Storage Tank, the following will be provided:
 - a. Pressure Indicator (PI)
 - b. Pressure Indicator Transmitter (PIT) to transmit the pressure ranges to the PLC for Pressure High Alarm and Pressure Low Alarm. The High Pressure Alarm will initiate the Pressure High Shutdown (PSH) process and Low Pressure Alarm will initiate Pressure Low Shut Down (PSL) process which is interlocked with the Annulus Pressure Regulator operating logic. Based on the operating injection pressures, the Pressure High Alarm (PAH) and the Pressure Low Alarm (PAL) will be set to the proper values to provide adequate protection to the system.
2. The Annulus Fluid Storage Tank will be installed in accordance with OAC 252:652-7-1 to maintain annulus pressure. The tank will be equipped with a Liquid Level Indicator and a Liquid Level Transmitter (LIT) to transmit the tank fluid level to the PLC for Low Level Alarm, High Level Alarm. The tank will be equipped with a pressure relief valve and pressure ratings will be posted on the tank.
3. The Annulus Fluid Pressure Regulator controls:
 - a. The Annulus Fluid Pressure Regulator will be attached to a nitrogen bottle which will be used to pressurize the Annulus Fluid Storage Tank.

The pressure regulator will be equipped with a regulator valve for manual operation, a master valve and automated operation capabilities through the PLC.



APPENDIX D

UPDATED HALL PLOT



UPDATED HALL PLOT

Hall Derivative is calculated using the following Hall Derivative equations (1, 2).

$$D_{hi} = \alpha_1 W_i [\ln(r_e/r_w) - 0.5 + s^*] \dots\dots\dots (1)$$

Where,

α_1 : Reservoir Factors

$$\alpha_1 = 141.2 B \mu / (kh) \dots\dots\dots (2)$$

B : Formation Volume Factor [Generally 1 for Water]

Parameters, μ , kh, r_e , P_e and s^* were used from the 2015 to 2025 Schlumberger PFT Reports [Submitted annually to DEQ with the PFT Reports as an attachment] and are summarized in the following table.

			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Skin	S^*		-4.56	4.98	1.53	24.1	9.82	0.93	5.5	23	16.6	19.8	-4.47
Radial Distance to P_e	r_e	ft	6810	7980	6810	9640	8380	3200	3400	5760	3000	4269	3743
Permeable Thickness	kh	md-ft	540000	263000	38800	199000	133000	37740.0	49965	119700	79330.1	76210.3	65198
Reservoir Factors	α_1		0.000261	0.000537	0.003639	0.000710	0.001062	0.003741	0.002826	0.001180	0.001780	0.001853	0.002166
Reservoir Pressure	P_e	psig	2516.3	2556.3	2509.3	2490.3	1852.3	2649.3	2518	2522	2514.57	2503.93	2460
Depth		ft	5300	5300	5300	5300	5300	5650	5340	5340	5340	5340	5228
Reservoir Pressure @5127 ft	P_e	psig	2434	2473	2427	2409	1792	2404	2418	2421	2414	2404	2412

W_i : Cumulative Injection [from daily injection historical data in barrels]

r_w : Wellbore radius [0.328 ft]

Appendix A-1 (attachment) have been updated with revised data for Hall Derivative.

- (1) Dambani, S.L., "Analysis of Injectivity Decline in some Deepwater Water Injectors," A report submitted in partial fulfillment of the requirements for the MSc and/or the DIC, Imperial College London, September 2013.
- (2) Ratnaningsih, D.R., Danny, I.L., "Waterflooding surveillance: real time injector performance analysis using Hall plot method & derivative," Earth and Environmental Science, IOP Conference Series, January 2018.

In Figure 1-1, both Hall Integral (primary vertical axis) and Hall Derivative (secondary vertical axis) have been plotted as a function of Cumulative Volume of Injected Fluid.



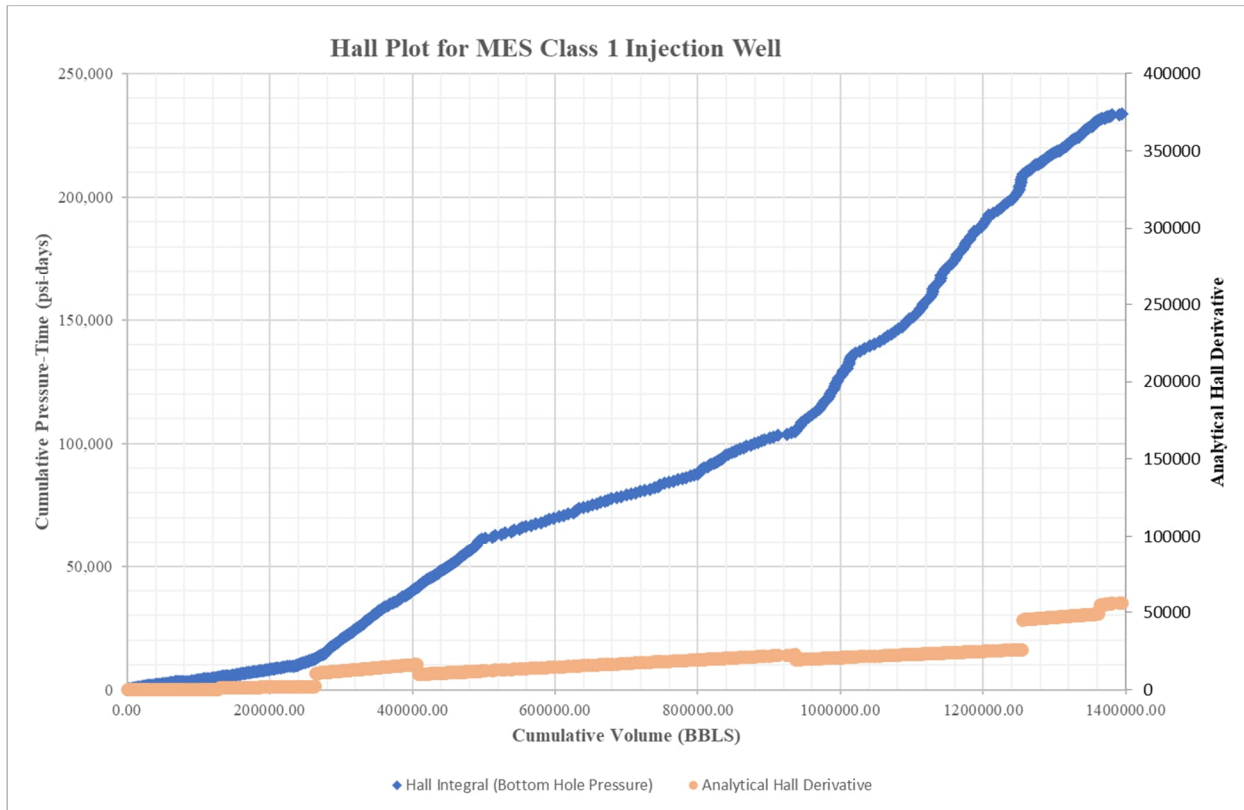


Figure 1-1: Hall Plot for Mid-Way Class I Injection Well [(a) Hall Integral (Primary Vertical Axis) (b) Analytical Hall Derivative (Secondary Vertical Axis)]

Apparently, the Hall Derivative exhibits different segments corresponding to each year data from 2015 to 2025 and the is consistent as previous analysis (approved by DEQ in 2021). The segmentations are due to differences between datasets from each year PFT model (most notably the Radial Distance to P_e and Skin data). Although the Hall Derivative plot is segmented, the slope of all the segments is quite consistent.

DEQ also requested to revise Hall Derivative plot using a graphical calculation for the slope of the Hall Integral. Graphical calculation for the slope of the Hall Integral was done using the following equation:

$$\text{Slope} = \Delta \text{ Hall Integral data (from Figure 1-1)} / \Delta \text{ Cumulative Volume data (from Figure 1-1)}$$

The updated graphical calculation for the slope of the Hall Integral is plotted in Figure 1-2 in tandem with Hall Integral as a function of Cumulative Volume of Injected Fluid.

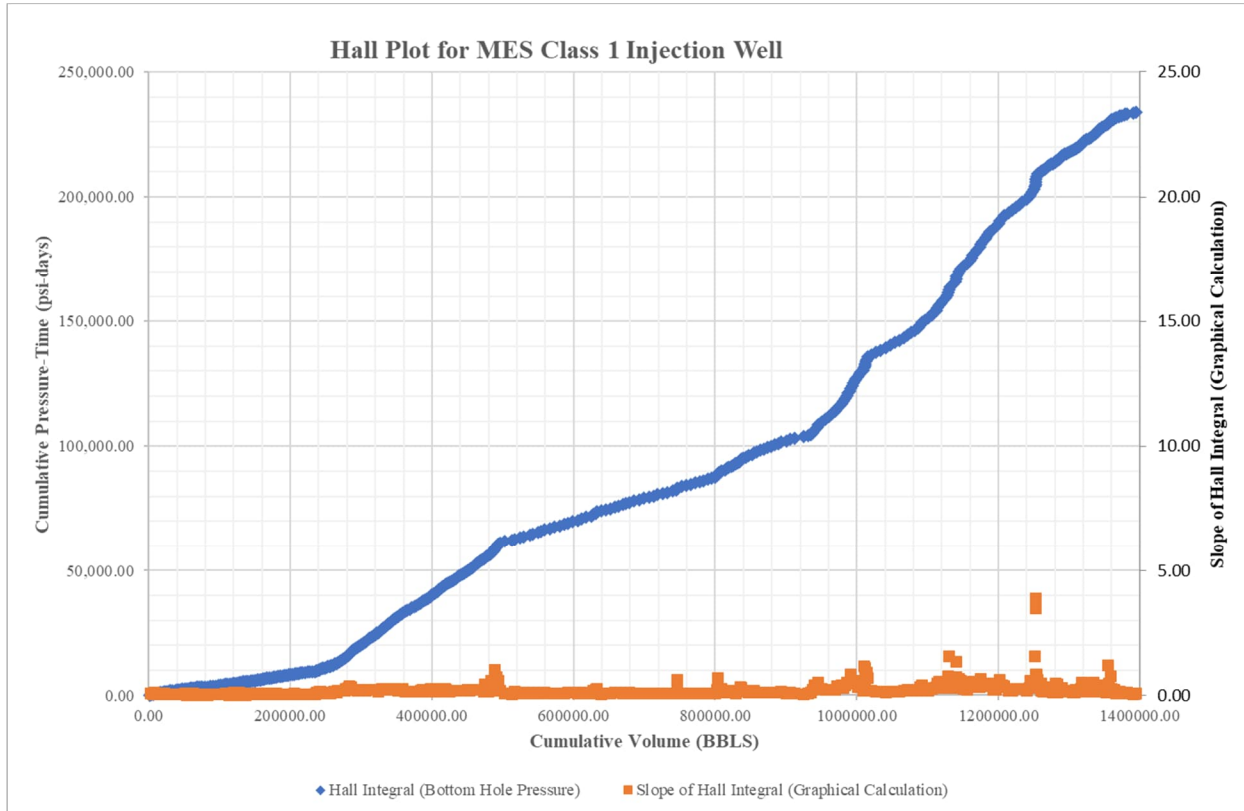
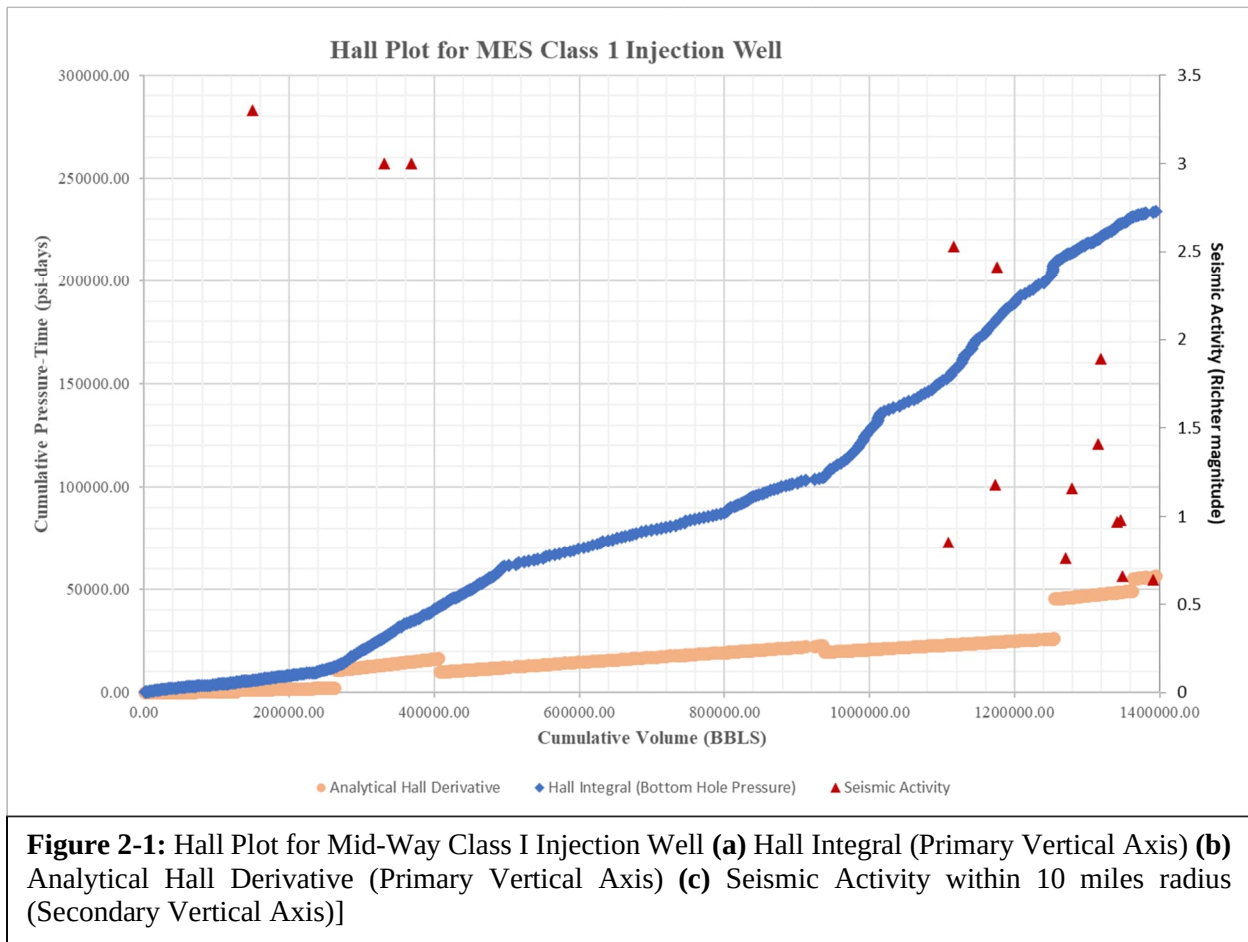


Figure 1-2: Hall Plot for Mid-Way Class I Injection Well [(a) Hall Integral (Primary Vertical Axis) (b) Revised Hall Derivative using the graphical calculation for the slope of the Hall integral (Secondary Vertical Axis)]

As the revised Hall Derivative in Figure 1-2 is calculated graphically from the corresponding Hall Integral data, the changes in slope are agreed with the Hall Integral plot. But again, the change in slope is corresponding to change in operating condition (change in injected volume at same injection pressure). Revised data set for the entire operational period of the injection well (from 3/6/2015 to 6/30/2025) related to Hall Integral and Hall Derivative is included in Appendix A-1 (attachment).

In Figure 2-1, seismic activity within ten (10) miles radius of Mid-Way Class I Injection Well is included as a tandem plot.



The range of magnitude of the earthquake between 10 miles radius was from 0.66 to 3.3 in Richter Scale. The seismic activity data was collected from United States Geological Survey (USGS). The earthquake data is included in Appendix B (attachment).

Appendix A-1

Hall Plot Data



Injection Date	Bottom Hole Pressure			Injectrate Volume			Hall Darivative	Slope of Hall Integral
	Avg. Daily Bottom Hole Pressure P ₂ (psi)	(P ₂ - P _e)*day psi-days	Cummulative psi-days	Daily Injection (When Injecting) (gallons)	Daily Injection (When Injecting) (BBLs)	Cumulative Volume (BBLs)	Analytical Derivative, D _{hi} D _{hi} = $\alpha_1 W_{id} [\ln(re/rw)+s^*]$	(Graphical Calculation) Slope = Δ cummulative psi-days/ Δ cummulative Volume
3/6/2015	2,585	150.96	151	55553.33	1322.70	1322.70	1.69	
3/9/2015	2,537	102.49	253	55553.33	1322.70	2645.40	3.38	0.08
3/18/2015	2,550	115.34	369	55553.33	1322.70	3968.10	5.06	0.09
4/10/2015	2,534	99.43	468	89615.25	2133.70	6101.79	7.79	0.05
4/13/2015	2,634	200.27	668	89615.25	2133.70	8235.49	10.51	0.09
4/23/2015	2,537	102.73	771	89615.25	2133.70	10369.18	13.23	0.05
4/29/2015	2,562	127.34	899	89615.25	2133.70	12502.88	15.96	0.06
5/4/2015	2,531	96.48	995	98377.25	2342.32	14845.20	18.94	0.04
5/6/2015	2,549	115.04	1,110	98377.25	2342.32	17187.51	21.93	0.05
5/7/2015	2,518	84.31	1,194	98377.25	2342.32	19529.83	24.92	0.04
5/12/2015	2,597	163.29	1,358	98377.25	2342.32	21872.14	27.91	0.07
5/18/2015	2,539	105.02	1,463	98377.25	2342.32	24214.46	30.90	0.04
5/22/2015	2,537	102.50	1,565	98377.25	2342.32	26556.77	33.89	0.04
5/26/2015	2,552	118.24	1,683	98377.25	2342.32	28899.09	36.88	0.05
5/29/2015	2,524	90.02	1,773	98377.25	2342.32	31241.40	39.87	0.04
6/5/2015	2,530	96.33	1,870	114675.50	2730.37	33971.77	43.35	0.04
6/15/2015	2,520	86.33	1,956	114675.50	2730.37	36702.14	46.84	0.03
6/18/2015	2,539	104.86	2,061	114675.50	2730.37	39432.51	50.32	0.04
6/25/2015	2,525	91.29	2,152	114675.50	2730.37	42162.88	53.81	0.03
7/2/2015	2,550	116.19	2,268	118648.20	2824.96	44987.84	57.41	0.04
7/9/2015	2,538	103.36	2,372	118648.20	2824.96	47812.80	61.02	0.04
7/16/2015	2,597	163.24	2,535	118648.20	2824.96	50637.75	64.62	0.06
7/21/2015	2,461	27.13	2,562	118648.20	2824.96	53462.71	68.23	0.01
7/29/2015	2,502	68.00	2,630	118648.20	2824.96	56287.67	71.83	0.02
8/3/2015	2,542	107.75	2,738	91910.44	2188.34	58476.01	74.62	0.05
8/4/2015	2,508	73.52	2,811	91910.44	2188.34	60664.35	77.42	0.03
8/5/2015	2,561	127.33	2,939	91910.44	2188.34	62852.70	80.21	0.06
8/7/2015	2,521	87.31	3,026	91910.44	2188.34	65041.04	83.00	0.04
8/14/2015	2,553	118.52	3,145	91910.44	2188.34	67229.39	85.80	0.05
8/19/2015	2,446	11.59	3,156	91910.44	2188.34	69417.73	88.59	0.01
8/21/2015	2,434	-0.17	3,156	91910.44	2188.34	71606.07	91.38	0.00
8/26/2015	2,482	47.75	3,204	91910.44	2188.34	73794.42	94.17	0.02
8/28/2015	2,419	-15.17	3,189	91910.44	2188.34	75982.76	96.97	-0.01
9/2/2015	2,535	100.92	3,290	156781.17	3732.88	79715.65	101.73	0.03
9/9/2015	2,486	52.12	3,342	156781.17	3732.88	83448.53	106.49	0.01
9/14/2015	2,555	121.04	3,463	156781.17	3732.88	87181.42	111.26	0.03
9/15/2015	2,533	99.29	3,562	156781.17	3732.88	90914.30	116.02	0.03
9/18/2015	2,607	172.70	3,735	156781.17	3732.88	94647.19	120.79	0.05
9/24/2015	2,566	131.66	3,866	156781.17	3732.88	98380.07	125.55	0.04
10/7/2015	2,542	107.94	3,974	89536.75	2131.83	100511.90	128.27	0.05
10/15/2015	2,503	69.02	4,043	89536.75	2131.83	102643.73	130.99	0.03
10/23/2015	2,517	82.70	4,126	89536.75	2131.83	104775.55	133.71	0.04
10/30/2015	2,534	99.65	4,226	89536.75	2131.83	106907.38	136.43	0.05
11/11/2015	2,541	107.22	4,333	65181.40	1551.94	108459.32	138.41	0.07
11/16/2015	2,529	95.19	4,428	65181.40	1551.94	110011.26	140.39	0.06
11/20/2015	2,359	-74.81	4,353	65181.40	1551.94	111563.20	142.37	-0.05
11/25/2015	2,460	25.55	4,379	65181.40	1551.94	113115.13	144.35	0.02
11/30/2015	2,332	-102.42	4,276	65181.40	1551.94	114667.07	146.33	-0.07
12/4/2015	2,584	149.35	4,426	75157.75	1789.47	116456.54	148.62	0.08
12/10/2015	2,563	129.00	4,555	75157.75	1789.47	118246.01	150.90	0.07
12/18/2015	2,607	172.71	4,727	75157.75	1789.47	120035.48	153.18	0.10
12/23/2015	2,463	29.00	4,756	75157.75	1789.47	121824.95	155.47	0.02
12/24/2015	2,423	-11.00	4,745	75157.75	1789.47	123614.42	157.75	-0.01
12/28/2015	2,508	74.00	4,819	75157.75	1789.47	125403.89	160.04	0.04
12/30/2015	2,604	169.35	4,989	75157.75	1789.47	127193.36	162.32	0.09
12/31/2015	2,566	131.57	5,120	75157.75	1789.47	128982.83	164.60	0.07
1/6/2016	2,570	97.10	5,217	79565.75	1894.42	130877.26	1024.41	0.05
1/8/2016	2,597	124.57	5,342	79565.75	1894.42	132771.68	1039.23	0.07
1/13/2016	2,525	51.91	5,394	79565.75	1894.42	134666.10	1054.06	0.03
1/15/2016	2,476	3.44	5,397	79565.75	1894.42	136560.52	1068.89	0.00
2/1/2016	2,560	86.98	5,484	63999.75	1523.80	138084.33	1080.82	0.06
2/2/2016	2,471	-1.58	5,483	63999.75	1523.80	139608.13	1092.75	0.00

2/15/2016	2,528	55.38	5,538	63999.75	1523.80	141131.93	1104.67	0.04
2/24/2016	2,519	45.73	5,584	63999.75	1523.80	142655.74	1116.60	0.03
3/3/2016	2,549	75.94	5,660	88437.40	2105.65	144761.39	1133.08	0.04
3/10/2016	2,549	76.56	5,736	88437.40	2105.65	146867.04	1149.56	0.04
3/15/2016	2,601	127.72	5,864	88437.40	2105.65	148972.70	1166.04	0.06
3/22/2016	2,568	95.45	5,960	88437.40	2105.65	151078.35	1182.53	0.05
3/30/2016	2,586	112.72	6,072	88437.40	2105.65	153184.00	1199.01	0.05
4/6/2016	2,537	63.97	6,136	75377.88	1794.71	154978.71	1213.05	0.04
4/13/2016	2,548	75.06	6,211	75377.88	1794.71	156773.42	1227.10	0.04
4/14/2016	2,558	85.30	6,297	75377.88	1794.71	158568.13	1241.15	0.05
4/15/2016	2,587	113.97	6,411	75377.88	1794.71	160362.85	1255.20	0.06
4/18/2016	2,607	133.73	6,544	75377.88	1794.71	162157.56	1269.25	0.07
4/20/2016	2,565	92.01	6,636	75377.88	1794.71	163952.27	1283.29	0.05
4/22/2016	2,572	99.06	6,735	75377.88	1794.71	165746.98	1297.34	0.06
4/29/2016	2,550	76.69	6,812	75377.88	1794.71	167541.69	1311.39	0.04
5/3/2016	2,570	97.04	6,909	87997.29	2095.17	169636.86	1327.79	0.05
5/4/2016	2,559	85.94	6,995	87997.29	2095.17	171732.04	1344.19	0.04
5/6/2016	2,525	52.17	7,047	87997.29	2095.17	173827.21	1360.59	0.02
5/12/2016	2,568	94.93	7,142	87997.29	2095.17	175922.38	1376.99	0.05
5/20/2016	2,580	107.04	7,249	87997.29	2095.17	178017.56	1393.39	0.05
5/25/2016	2,601	128.40	7,378	87997.29	2095.17	180112.73	1409.78	0.06
5/26/2016	2,566	93.18	7,471	87997.29	2095.17	182207.90	1426.18	0.04
6/2/2016	2,562	88.99	7,560	98419.50	2343.32	184551.23	1444.53	0.04
6/8/2016	2,576	103.38	7,663	98419.50	2343.32	186894.55	1462.87	0.04
6/14/2016	2,571	98.59	7,762	98419.50	2343.32	189237.87	1481.21	0.04
6/20/2016	2,566	92.66	7,854	98419.50	2343.32	191581.19	1499.55	0.04
6/23/2016	2,578	105.02	7,959	98419.50	2343.32	193924.51	1517.89	0.04
6/30/2016	2,568	95.38	8,055	98419.50	2343.32	196267.83	1536.23	0.04
7/7/2016	2,567	93.68	8,148	92102.17	2192.91	198460.74	1553.40	0.04
7/13/2016	2,564	91.49	8,240	92102.17	2192.91	200653.65	1570.56	0.04
7/15/2016	2,560	86.85	8,327	92102.17	2192.91	202846.56	1587.73	0.04
7/22/2016	2,613	140.16	8,467	92102.17	2192.91	205039.47	1604.89	0.06
7/28/2016	2,588	115.07	8,582	92102.17	2192.91	207232.38	1622.06	0.05
7/29/2016	2,563	90.07	8,672	92102.17	2192.91	209425.29	1639.22	0.04
8/5/2016	2,610	137.22	8,809	115317.33	2745.65	212170.94	1660.71	0.05
8/16/2016	2,577	104.38	8,914	115317.33	2745.65	214916.59	1682.20	0.04
8/31/2016	2,601	128.26	9,042	115317.33	2745.65	217662.24	1703.69	0.05
9/1/2016	2,627	153.68	9,196	142993.60	3404.61	221066.85	1730.34	0.05
9/8/2016	2,627	153.68	9,349	142993.60	3404.61	224471.46	1756.99	0.05
9/15/2016	2,567	93.68	9,443	142993.60	3404.61	227876.07	1783.64	0.03
9/20/2016	2,547	73.68	9,517	142993.60	3404.61	231280.68	1810.29	0.02
9/28/2016	2,547	73.68	9,590	142993.60	3404.61	234685.29	1836.94	0.02
10/5/2016	2,593	119.68	9,710	68541.40	1631.94	236317.22	1849.71	0.07
10/12/2016	2,637	164.52	9,875	68541.40	1631.94	237949.16	1862.48	0.10
10/14/2016	2,629	156.15	10,031	68541.40	1631.94	239581.10	1875.26	0.10
10/19/2016	2,691	218.07	10,249	68541.40	1631.94	241213.04	1888.03	0.13
10/27/2016	2,701	228.15	10,477	68541.40	1631.94	242844.98	1900.80	0.14
11/2/2016	2,678	205.37	10,682	85476.60	2035.16	244880.13	1916.73	0.10
11/3/2016	2,655	181.82	10,864	85476.60	2035.16	246915.29	1932.66	0.09
11/10/2016	2,639	166.54	11,031	85476.60	2035.16	248950.45	1948.59	0.08
11/18/2016	2,660	186.90	11,218	85476.60	2035.16	250985.60	1964.52	0.09
11/25/2016	2,660	187.26	11,405	85476.60	2035.16	253020.76	1980.45	0.09
12/2/2016	2,657	184.41	11,589	71614.86	1705.12	254725.88	1993.80	0.11
12/9/2016	2,617	144.41	11,734	71614.86	1705.12	256430.99	2007.15	0.08
12/15/2016	2,657	184.41	11,918	71614.86	1705.12	258136.11	2020.49	0.11
12/16/2016	2,644	171.00	12,089	71614.86	1705.12	259841.22	2033.84	0.10
12/22/2016	2,699	226.37	12,315	71614.86	1705.12	261546.34	2047.18	0.13
12/23/2016	2,689	216.00	12,531	71614.86	1705.12	263251.46	2060.53	0.13
12/30/2016	2,638	165.64	12,697	71614.86	1705.12	264956.57	2073.88	0.10
1/5/2017	2,757	329.34	13,026	84817.00	2019.45	266976.02	10658.64	0.16
1/12/2017	2,787	359.34	13,386	84817.00	2019.45	268995.48	10739.27	0.18
1/17/2017	2,796	368.96	13,755	84817.00	2019.45	271014.93	10819.89	0.18
1/20/2017	2,756	328.96	14,084	84817.00	2019.45	273034.38	10900.52	0.16
1/27/2017	2,767	339.34	14,423	84817.00	2019.45	275053.83	10981.14	0.17
2/2/2017	2,723	295.52	14,719	70887.60	1687.80	276741.63	11048.52	0.18
2/9/2017	2,829	401.60	15,120	70887.60	1687.80	278429.43	11115.91	0.24
2/10/2017	2,873	445.66	15,566	70887.60	1687.80	280117.23	11183.29	0.26

2/17/2017	2,926	498.91	16,065	70887.60	1687.80	281805.03	11250.67	0.30
2/27/2017	3,010	582.95	16,648	70887.60	1687.80	283492.83	11318.05	0.35
3/3/2017	3,019	591.96	17,240	77326.33	1841.10	285333.94	11391.56	0.32
3/8/2017	2,803	375.86	17,615	77326.33	1841.10	287175.04	11465.06	0.20
3/14/2017	2,828	400.86	18,016	77326.33	1841.10	289016.14	11538.57	0.22
3/21/2017	2,826	398.18	18,415	77326.33	1841.10	290857.25	11612.07	0.22
3/24/2017	2,823	395.48	18,810	77326.33	1841.10	292698.35	11685.57	0.21
3/30/2017	2,780	353.09	19,163	77326.33	1841.10	294539.45	11759.08	0.19
4/6/2017	2,810	382.22	19,545	80584.50	1918.68	296458.13	11835.68	0.20
4/13/2017	2,825	397.98	19,943	80584.50	1918.68	298376.81	11912.28	0.21
4/20/2017	2,823	395.98	20,339	80584.50	1918.68	300295.49	11988.88	0.21
4/21/2017	2,798	370.22	20,709	80584.50	1918.68	302214.17	12065.48	0.19
4/26/2017	2,779	351.22	21,061	80584.50	1918.68	304132.85	12142.08	0.18
4/27/2017	2,761	334.10	21,395	80584.50	1918.68	306051.52	12218.68	0.17
5/1/2017	2,866	439.07	21,834	83261.89	1982.43	308033.95	12297.82	0.22
5/2/2017	2,870	442.85	22,277	83261.89	1982.43	310016.38	12376.97	0.22
5/4/2017	2,861	433.22	22,710	83261.89	1982.43	311998.80	12456.12	0.22
5/11/2017	2,844	417.10	23,127	83261.89	1982.43	313981.23	12535.26	0.21
5/16/2017	2,857	429.11	23,556	83261.89	1982.43	315963.65	12614.41	0.22
5/17/2017	2,827	399.11	23,955	83261.89	1982.43	317946.08	12693.55	0.20
5/19/2017	2,861	434.07	24,389	83261.89	1982.43	319928.51	12772.70	0.22
5/24/2017	2,866	439.07	24,828	83261.89	1982.43	321910.93	12851.84	0.22
5/26/2017	2,724	297.10	25,126	83261.89	1982.43	323893.36	12930.99	0.15
6/2/2017	2,819	391.91	25,517	75286.67	1792.54	325685.90	13002.55	0.22
6/8/2017	2,844	416.85	25,934	75286.67	1792.54	327478.44	13074.12	0.23
6/16/2017	2,850	422.68	26,357	75286.67	1792.54	329270.98	13145.68	0.24
6/19/2017	2,850	422.68	26,780	75286.67	1792.54	331063.52	13217.25	0.24
6/22/2017	2,867	440.06	27,220	75286.67	1792.54	332856.06	13288.81	0.25
6/29/2017	2,847	419.30	27,639	75286.67	1792.54	334648.60	13360.38	0.23
7/5/2017	2,867	439.29	28,078	77228.17	1838.77	336487.36	13433.79	0.24
7/6/2017	2,875	447.42	28,526	77228.17	1838.77	338326.13	13507.20	0.24
7/7/2017	2,857	429.31	28,955	77228.17	1838.77	340164.89	13580.61	0.23
7/13/2017	2,811	383.66	29,339	77228.17	1838.77	342003.66	13654.02	0.21
7/19/2017	2,888	461.03	29,800	77228.17	1838.77	343842.42	13727.43	0.25
7/27/2017	2,923	495.93	30,296	77228.17	1838.77	345681.19	13800.84	0.27
8/3/2017	2,889	461.19	30,757	94171.83	2242.19	347923.38	13890.35	0.21
8/10/2017	2,897	469.29	31,226	94171.83	2242.19	350165.56	13979.87	0.21
8/15/2017	2,871	443.42	31,670	94171.83	2242.19	352407.75	14069.39	0.20
8/17/2017	2,827	399.29	32,069	94171.83	2242.19	354649.94	14158.90	0.18
8/24/2017	2,915	487.42	32,556	94171.83	2242.19	356892.12	14248.42	0.22
8/30/2017	2,958	530.29	33,087	94171.83	2242.19	359134.31	14337.94	0.24
9/1/2017	2,893	465.71	33,552	132318.29	3150.44	362284.74	14463.71	0.15
9/7/2017	2,924	496.71	34,049	132318.29	3150.44	365435.18	14589.49	0.16
9/20/2017	2,902	474.93	34,524	132318.29	3150.44	368585.62	14715.27	0.15
9/21/2017	2,902	474.93	34,999	132318.29	3150.44	371736.05	14841.04	0.15
9/22/2017	2,892	464.93	35,464	132318.29	3150.44	374886.49	14966.82	0.15
9/26/2017	2,920	492.83	35,957	132318.29	3150.44	378036.92	15092.60	0.16
9/29/2017	2,919	491.51	36,448	132318.29	3150.44	381187.36	15218.37	0.16
10/5/2017	2,930	502.23	36,950	110855.50	2639.42	383826.77	15323.75	0.19
10/10/2017	2,961	533.96	37,484	110855.50	2639.42	386466.19	15429.12	0.20
10/19/2017	2,911	483.49	37,968	110855.50	2639.42	389105.61	15534.50	0.18
10/26/2017	2,809	381.98	38,350	110855.50	2639.42	391745.02	15639.87	0.14
11/7/2017	2,727	299.64	38,649	85859.60	2044.28	393789.30	15721.49	0.15
11/9/2017	2,852	424.42	39,074	85859.60	2044.28	395833.58	15803.10	0.21
11/16/2017	2,932	504.60	39,578	85859.60	2044.28	397877.85	15884.72	0.25
11/22/2017	2,936	508.50	40,087	85859.60	2044.28	399922.13	15966.33	0.25
11/30/2017	2,927	499.72	40,587	85859.60	2044.28	401966.40	16047.95	0.24
12/7/2017	2,912	484.52	41,071	92755.67	2208.47	404174.87	16136.12	0.22
12/14/2017	2,781	353.52	41,425	92755.67	2208.47	406383.34	16224.29	0.16
12/21/2017	2,796	368.40	41,793	92755.67	2208.47	408591.81	16312.46	0.17
1/9/2018	2,832	423.39	42,216	69768.14	1661.15	410252.96	9864.61	0.25
1/12/2018	2,812	403.39	42,620	69768.14	1661.15	411914.10	9904.55	0.24
1/18/2018	2,821	411.53	43,031	69768.14	1661.15	413575.25	9944.49	0.25
1/19/2018	2,791	381.53	43,413	69768.14	1661.15	415236.39	9984.43	0.23
1/24/2018	2,811	401.53	43,814	69768.14	1661.15	416897.54	10024.38	0.24
1/26/2018	2,812	403.39	44,218	69768.14	1661.15	418558.69	10064.32	0.24
1/30/2018	2,752	342.64	44,560	69768.14	1661.15	420219.83	10104.26	0.21

2/2/2018	2,771	361.50	44,922	97286.40	2316.34	422536.18	10159.96	0.16
2/9/2018	2,770	361.12	45,283	97286.40	2316.34	424852.52	10215.66	0.16
2/15/2018	2,810	400.75	45,684	97286.40	2316.34	427168.86	10271.35	0.17
2/22/2018	2,811	401.50	46,085	97286.40	2316.34	429485.20	10327.05	0.17
2/23/2018	2,791	381.50	46,467	97286.40	2316.34	431801.55	10382.75	0.16
3/1/2018	2,809	400.08	46,867	90804.13	2162.00	433963.55	10434.73	0.19
3/2/2018	2,809	400.08	47,267	90804.13	2162.00	436125.55	10486.72	0.19
3/8/2018	2,809	400.08	47,667	90804.13	2162.00	438287.56	10538.70	0.19
3/15/2018	2,809	400.08	48,067	90804.13	2162.00	440449.56	10590.69	0.19
3/22/2018	2,812	403.08	48,470	90804.13	2162.00	442611.56	10642.67	0.19
3/23/2018	2,771	362.34	48,833	90804.13	2162.00	444773.57	10694.66	0.17
3/27/2018	2,826	416.96	49,249	90804.13	2162.00	446935.57	10746.65	0.19
3/30/2018	2,779	370.15	49,620	90804.13	2162.00	449097.57	10798.63	0.17
4/5/2018	2,786	377.32	49,997	75714.83	1802.73	450900.31	10841.98	0.21
4/6/2018	2,726	316.95	50,314	75714.83	1802.73	452703.04	10885.33	0.18
4/10/2018	2,801	392.32	50,706	75714.83	1802.73	454505.77	10928.67	0.22
4/11/2018	2,817	407.67	51,114	75714.83	1802.73	456308.51	10972.02	0.23
4/12/2018	2,806	396.95	51,511	75714.83	1802.73	458111.24	11015.37	0.22
4/13/2018	2,813	403.78	51,915	75714.83	1802.73	459913.98	11058.71	0.22
4/16/2018	2,808	399.15	52,314	75714.83	1802.73	461716.71	11102.06	0.22
4/17/2018	2,806	397.15	52,711	75714.83	1802.73	463519.44	11145.41	0.22
4/18/2018	2,806	397.15	53,108	75714.83	1802.73	465322.18	11188.76	0.22
4/20/2018	2,813	404.15	53,512	75714.83	1802.73	467124.91	11232.10	0.22
4/26/2018	2,786	377.32	53,890	75714.83	1802.73	468927.65	11275.45	0.21
4/27/2018	2,786	377.32	54,267	75714.83	1802.73	470730.38	11318.80	0.21
5/2/2018	2,811	401.57	54,668	115889.00	2759.26	473489.64	11385.14	0.15
5/3/2018	2,762	353.39	55,022	34933.00	831.74	474321.38	11405.14	0.42
5/4/2018	2,741	331.57	55,353	52411.00	1247.88	475569.26	11435.15	0.27
5/11/2018	2,763	353.86	55,707	66391.00	1580.74	477150.00	11473.16	0.22
5/17/2018	2,785	376.04	56,083	112296.00	2673.71	479823.71	11537.45	0.14
5/23/2018	2,810	400.89	56,484	102209.00	2433.55	482257.26	11595.96	0.16
5/24/2018	2,785	376.04	56,860	49930.00	1188.81	483446.07	11624.55	0.32
5/25/2018	2,789	379.87	57,240	26785.00	637.74	484083.81	11639.88	0.60
5/31/2018	2,834	425.40	57,666	68928.00	1641.14	485724.95	11679.34	0.26
6/7/2018	2,830	420.57	58,086	79005.00	1881.07	487606.02	11724.57	0.22
6/13/2018	2,826	416.93	58,503	55333.00	1317.45	488923.48	11756.25	0.32
6/14/2018	2,827	417.86	58,921	17454.00	415.57	489339.05	11766.25	1.01
6/21/2018	2,863	454.07	59,375	73680.00	1754.29	491093.33	11808.43	0.26
6/25/2018	2,897	487.86	59,863	28336.00	674.67	491768.00	11824.65	0.72
6/27/2018	2,863	453.86	60,317	50924.00	1212.48	492980.48	11853.80	0.37
6/29/2018	2,858	448.94	60,766	32301.00	769.07	493749.55	11872.30	0.58
7/5/2018	2,896	487.30	61,253	118412.00	2819.33	496568.88	11940.09	0.17
7/12/2018	2,910	500.60	61,754	241304.00	5745.33	502314.21	12078.24	0.09
7/13/2018	2,923	513.55	62,267	429130.00	10217.38	512531.60	12323.91	0.05
7/14/2018	2,936	527.47	62,795	169650.00	4039.29	516570.88	12421.04	0.13
7/16/2018	2,956	546.97	63,341	328246.00	7815.38	524386.26	12608.96	0.07
7/17/2018	2,932	522.71	63,864	238940.00	5689.05	530075.31	12745.76	0.09
7/18/2018	2,930	521.00	64,385	337829.00	8043.55	538118.86	12939.16	0.06
7/19/2018	2,904	494.71	64,880	203436.00	4843.71	542962.57	13055.63	0.10
7/20/2018	2,912	502.82	65,383	282000.00	6714.29	549676.86	13217.08	0.07
7/21/2018	2,955	546.01	65,929	192931.00	4593.60	554270.45	13327.53	0.12
7/23/2018	2,940	531.31	66,460	218359.00	5199.02	559469.48	13452.54	0.10
7/24/2018	2,920	510.52	66,971	275451.00	6558.36	566027.83	13610.24	0.08
7/25/2018	2,977	567.97	67,539	279869.00	6663.55	572691.38	13770.47	0.09
7/26/2018	2,968	558.87	68,097	314652.00	7491.71	580183.10	13950.61	0.07
7/27/2018	2,962	553.39	68,651	289241.00	6886.69	587069.79	14116.20	0.08
7/28/2018	2,981	571.97	69,223	220131.00	5241.21	592311.00	14242.22	0.11
7/30/2018	2,991	582.07	69,805	259665.00	6182.50	598493.50	14390.88	0.09
7/31/2018	3,006	597.24	70,402	298452.00	7106.00	605599.50	14561.75	0.08
8/1/2018	3,011	601.59	71,004	259411.00	6176.45	611775.95	14710.26	0.10
8/2/2018	2,942	532.74	71,536	270987.00	6452.07	618228.02	14865.40	0.08
8/3/2018	2,977	567.89	72,104	297760.00	7089.52	625317.55	15035.87	0.08
8/4/2018	2,937	528.20	72,633	121416.00	2890.86	628208.40	15105.38	0.18
8/7/2018	3,004	595.33	73,228	118048.00	2810.67	631019.07	15172.97	0.21
8/9/2018	2,867	458.40	73,686	75325.00	1793.45	632812.52	15216.09	0.26
8/11/2018	2,791	382.15	74,068	296514.00	7059.86	639872.38	15385.85	0.05
8/13/2018	2,926	516.81	74,585	262183.00	6242.45	646114.83	15535.95	0.08

8/14/2018	2,925	515.81	75,101	257071.00	6120.74	652235.57	15683.12	0.08
8/15/2018	2,940	530.57	75,632	242137.00	5765.17	658000.74	15821.75	0.09
8/16/2018	2,932	522.56	76,154	238146.00	5670.14	663670.88	15958.09	0.09
8/17/2018	2,877	468.14	76,622	239963.00	5713.40	669384.29	16095.47	0.08
8/18/2018	2,922	512.76	77,135	172845.00	4115.36	673499.64	16194.42	0.12
8/20/2018	2,897	487.56	77,623	198469.00	4725.45	678225.10	16308.04	0.10
8/21/2018	2,897	487.56	78,110	317681.00	7563.83	685788.93	16489.92	0.06
8/22/2018	2,921	512.13	78,622	286338.00	6817.57	692606.50	16653.85	0.08
8/23/2018	2,914	504.89	79,127	299807.00	7138.26	699744.76	16825.49	0.07
8/24/2018	2,915	505.62	79,633	284367.00	6770.64	706515.40	16988.29	0.07
8/25/2018	2,897	487.62	80,120	264577.00	6299.45	712814.86	17139.76	0.08
8/27/2018	2,921	511.80	80,632	261237.00	6219.93	719034.79	17289.32	0.08
8/28/2018	2,884	475.29	81,108	298779.00	7113.79	726148.57	17460.37	0.07
8/29/2018	2,890	481.44	81,589	279610.00	6657.38	732805.95	17620.45	0.07
8/30/2018	2,883	473.83	82,063	284478.00	6773.29	739579.24	17783.32	0.07
8/31/2018	2,892	482.82	82,546	227627.00	5419.69	744998.93	17913.63	0.09
9/6/2018	2,863	454.31	83,000	44417.00	1057.55	746056.48	17939.06	0.43
9/7/2018	2,766	357.41	83,357	24289.00	578.31	746634.79	17952.97	0.62
9/10/2018	2,912	503.26	83,861	253649.00	6039.26	752674.05	18098.18	0.08
9/11/2018	2,912	503.37	84,364	280031.00	6667.40	759341.45	18258.50	0.08
9/12/2018	2,896	487.08	84,851	265043.00	6310.55	765652.00	18410.24	0.08
9/13/2018	2,874	465.09	85,316	260392.00	6199.81	771851.81	18559.32	0.08
9/14/2018	2,893	484.21	85,800	275414.00	6557.48	778409.29	18716.99	0.07
9/15/2018	2,888	478.54	86,279	233045.00	5548.69	783957.98	18850.41	0.09
9/17/2018	2,887	477.68	86,757	237362.00	5651.48	789609.45	18986.30	0.08
9/18/2018	2,875	466.11	87,223	225766.00	5375.38	794984.83	19115.55	0.09
9/19/2018	2,888	479.33	87,702	224005.00	5333.45	800318.29	19243.80	0.09
9/20/2018	2,912	503.06	88,205	93674.00	2230.33	802548.62	19297.43	0.23
9/21/2018	2,795	386.21	88,591	37086.00	883.00	803431.62	19318.66	0.44
9/24/2018	2,843	434.44	89,026	25908.00	616.86	804048.48	19333.49	0.70
9/27/2018	2,758	348.63	89,374	55245.00	1315.36	805363.83	19365.12	0.27
10/4/2018	2,785	376.14	89,750	76746.00	1827.29	807191.12	19409.06	0.21
10/10/2018	2,859	450.33	90,201	75450.00	1796.43	808987.55	19452.25	0.25
10/11/2018	2,885	475.49	90,676	197947.00	4713.02	813700.57	19565.58	0.10
10/12/2018	2,881	472.35	91,149	135519.00	3226.64	816927.21	19643.16	0.15
10/13/2018	2,830	421.29	91,570	93665.00	2230.12	819157.33	19696.79	0.19
10/15/2018	2,859	449.68	92,020	136853.00	3258.40	822415.74	19775.13	0.14
10/16/2018	2,859	450.27	92,470	122465.00	2915.83	825331.57	19845.25	0.15
10/17/2018	2,833	423.62	92,893	110755.00	2637.02	827968.60	19908.65	0.16
10/19/2018	2,544	134.75	93,028	65692.00	1564.10	829532.69	19946.26	0.09
10/24/2018	2,920	511.34	93,540	110200.00	2623.81	832156.50	20009.35	0.19
11/7/2018	2,800	391.10	93,931	95001.00	2261.93	834418.43	20063.74	0.17
11/14/2018	2,823	413.57	94,344	51812.00	1233.62	835652.05	20093.40	0.34
11/15/2018	2,810	401.31	94,746	56995.00	1357.02	837009.07	20126.03	0.30
11/16/2018	2,873	463.97	95,210	106262.00	2530.05	839539.12	20186.87	0.18
11/19/2018	2,925	516.16	95,726	160250.00	3815.48	843354.60	20278.61	0.14
11/20/2018	2,938	529.43	96,255	180393.00	4295.07	847649.67	20381.89	0.12
11/21/2018	2,941	531.68	96,787	191180.00	4551.90	852201.57	20491.34	0.12
11/27/2018	2,910	501.25	97,288	107184.00	2552.00	854753.57	20552.70	0.20
12/4/2018	2,921	512.41	97,800	178351.00	4246.45	859000.02	20654.81	0.12
12/5/2018	2,972	562.92	98,363	208592.00	4966.48	863966.50	20774.23	0.11
12/6/2018	2,976	567.17	98,931	203394.00	4842.71	868809.21	20890.67	0.12
12/7/2018	2,959	549.81	99,480	224119.00	5336.17	874145.38	21018.98	0.10
12/12/2018	2,948	539.28	100,020	202226.00	4814.90	878960.29	21134.76	0.11
12/13/2018	2,955	546.16	100,566	223655.00	5325.12	884285.40	21262.80	0.10
12/14/2018	2,962	552.49	101,118	234441.00	5581.93	889867.33	21397.02	0.10
12/15/2018	2,937	527.63	101,646	155286.00	3697.29	893564.62	21485.92	0.14
12/17/2018	2,925	516.38	102,162	305595.00	7276.07	900840.69	21660.88	0.07
12/18/2018	2,936	527.12	102,689	195130.00	4645.95	905486.64	21772.59	0.11
12/19/2018	2,951	542.25	103,232	292792.00	6971.24	912457.88	21940.21	0.08
12/20/2018	2,935	526.46	103,758	518559.00	12346.64	924804.52	22237.09	0.04
12/21/2018	2,934	525.38	104,283	255502.00	6083.38	930887.90	22383.37	0.09
12/26/2018	2,890	480.62	104,764	208883.00	4973.40	935861.31	22502.95	0.10
12/27/2018	2,822	412.91	105,177	85074.00	2025.57	937886.88	22551.66	0.20
1/2/2019	2,908	1,115.89	106,293	116018.00	2762.33	940649.21	19441.57	0.40
1/3/2019	2,894	1,101.80	107,395	125424.00	2986.29	943635.50	19503.29	0.37
1/4/2019	2,854	1,062.36	108,457	87251.00	2077.40	945712.90	19546.23	0.51

1/5/2019	2,896	1,103.90	109,561	190728.00	4541.14	950254.05	19640.08	0.24
1/6/2019	2,915	1,122.85	110,684	223836.00	5329.43	955583.48	19750.23	0.21
1/7/2019	2,861	1,068.96	111,753	195505.00	4654.88	960238.36	19846.44	0.23
1/8/2019	2,914	1,122.52	112,875	204281.00	4863.83	965102.19	19946.97	0.23
1/9/2019	2,875	1,083.03	113,958	206672.00	4920.76	970022.95	20048.67	0.22
1/15/2019	2,829	1,036.82	114,995	115514.00	2750.33	972773.29	20105.52	0.38
1/18/2019	2,820	1,028.46	116,024	115115.00	2740.83	975514.12	20162.16	0.38
1/29/2019	2,821	1,029.62	117,053	110628.00	2634.00	978148.12	20216.60	0.39
2/6/2019	2,821	1,029.53	118,083	143951.00	3427.40	981575.52	20287.44	0.30
2/12/2019	2,825	1,033.20	119,116	109494.00	2607.00	984182.52	20341.32	0.40
2/15/2019	2,815	1,023.03	120,139	83730.00	1993.57	986176.10	20382.53	0.51
2/22/2019	2,766	974.37	121,113	83324.00	1983.90	988160.00	20423.53	0.49
3/1/2019	2,806	1,013.88	122,127	82228.00	1957.81	990117.81	20464.00	0.52
3/8/2019	2,790	998.42	123,126	50971.00	1213.60	991331.40	20489.08	0.82
3/15/2019	2,819	1,027.50	124,153	92060.00	2191.90	993523.31	20534.38	0.47
3/22/2019	2,773	981.38	125,135	75385.00	1794.88	995318.19	20571.48	0.55
3/29/2019	2,868	1,076.28	126,211	80175.00	1908.93	997227.12	20610.93	0.56
4/4/2019	2,609	816.74	127,028	72880.00	1735.24	998962.36	20646.80	0.47
4/12/2019	2,670	878.33	127,906	112535.00	2679.40	1001641.76	20702.18	0.33
4/18/2019	2,639	847.19	128,753	80203.00	1909.60	1003551.36	20741.64	0.44
4/25/2019	2,654	862.32	129,615	62762.00	1494.33	1005045.69	20772.53	0.58
5/2/2019	2,636	844.60	130,460	183724.00	4374.38	1009420.07	20862.94	0.19
5/8/2019	2,674	881.88	131,342	31845.00	758.21	1010178.29	20878.61	1.16
5/9/2019	2,640	848.19	132,190	58946.00	1403.48	1011581.76	20907.62	0.60
5/14/2019	2,573	781.53	132,972	30417.00	724.21	1012305.98	20922.59	1.08
5/15/2019	2,679	886.67	133,858	53395.00	1271.31	1013577.29	20948.86	0.70
5/17/2019	2,679	886.68	134,745	41066.00	977.76	1014555.05	20969.07	0.91
5/20/2019	2,682	889.67	135,635	55801.00	1328.60	1015883.64	20996.53	0.67
5/21/2019	2,686	893.93	136,529	212853.00	5067.93	1020951.57	21101.28	0.18
5/22/2019	2,749	957.54	137,486	253806.00	6043.00	1026994.57	21226.17	0.16
5/23/2019	2,699	907.26	138,393	264684.00	6302.00	1033296.57	21356.43	0.14
5/24/2019	2,753	961.05	139,354	330915.00	7878.93	1041175.50	21519.27	0.12
5/25/2019	2,802	1,009.93	140,364	270809.00	6447.83	1047623.33	21652.54	0.16
5/26/2019	2,823	1,031.21	141,396	289882.00	6901.95	1054525.29	21795.19	0.15
5/28/2019	2,773	980.86	142,376	268107.00	6383.50	1060908.79	21927.12	0.15
5/29/2019	2,782	990.32	143,367	217049.00	5167.83	1066076.62	22033.93	0.19
5/30/2019	2,830	1,038.00	144,405	218897.00	5211.83	1071288.45	22141.65	0.20
5/31/2019	2,795	1,003.53	145,408	238510.00	5678.81	1076967.26	22259.02	0.18
6/1/2019	2,734	941.90	146,350	191221.00	4552.88	1081520.14	22353.12	0.21
6/3/2019	2,734	942.27	147,292	215366.00	5127.76	1086647.90	22459.10	0.18
6/4/2019	2,806	1,014.08	148,306	135137.00	3217.55	1089865.45	22525.61	0.32
6/7/2019	2,815	1,023.24	149,330	106979.00	2547.12	1092412.57	22578.25	0.40
6/11/2019	2,797	1,005.47	150,335	171597.00	4085.64	1096498.21	22662.69	0.25
6/12/2019	2,817	1,025.52	151,361	217037.00	5167.55	1101665.76	22769.50	0.20
6/13/2019	2,846	1,054.43	152,415	180745.00	4303.45	1105969.21	22858.44	0.25
6/18/2019	2,755	963.47	153,379	140791.00	3352.17	1109321.38	22927.73	0.29
6/21/2019	2,743	951.33	154,330	117359.00	2794.26	1112115.64	22985.48	0.34
6/26/2019	2,742	949.91	155,280	82005.00	1952.50	1114068.14	23025.83	0.49
6/28/2019	2,730	938.26	156,218	73381.00	1747.17	1115815.31	23061.94	0.54
7/3/2019	2,808	1,016.61	157,235	128487.00	3059.21	1118874.52	23125.17	0.33
7/10/2019	2,810	1,018.21	158,253	129876.00	3092.29	1121966.81	23189.08	0.33
7/18/2019	2,810	1,018.61	159,272	140409.00	3343.07	1125309.88	23258.18	0.30
8/1/2019	2,850	1,058.45	160,330	101140.00	2408.10	1127717.98	23307.95	0.44
8/5/2019	2,867	1,074.81	161,405	59369.00	1413.55	1129131.52	23337.17	0.76
8/7/2019	2,900	1,108.39	162,513	29909.00	712.12	1129843.64	23351.88	1.56
8/28/2019	2,914	1,122.23	163,635	76751.00	1827.40	1131671.05	23389.65	0.61
8/29/2019	2,868	1,076.18	164,712	151327.00	3603.02	1135274.07	23464.12	0.30
8/30/2019	2,914	1,121.97	165,834	158214.00	3767.00	1139041.07	23541.98	0.30
9/3/2019	2,879	1,087.28	166,921	63045.00	1501.07	1140542.14	23573.00	0.72
9/4/2019	2,774	981.81	167,903	31014.00	738.43	1141280.57	23588.27	1.33
9/10/2019	2,851	1,059.21	168,962	86891.00	2068.83	1143349.40	23631.02	0.51
9/17/2019	2,803	1,010.96	169,973	63649.00	1515.45	1144864.86	23662.35	0.67
9/18/2019	2,891	1,099.03	171,072	82192.00	1956.95	1146821.81	23702.79	0.56
9/19/2019	2,872	1,079.96	172,152	182211.00	4338.36	1151160.17	23792.46	0.25
9/20/2019	2,915	1,123.14	173,275	227462.00	5415.76	1156575.93	23904.39	0.21
9/23/2019	2,915	1,123.29	174,398	129988.00	3094.95	1159670.88	23968.36	0.36
9/24/2019	2,921	1,129.43	175,528	98242.00	2339.10	1162009.98	24016.71	0.48

9/27/2019	2,909	1,117.09	176,645	84270.00	2006.43	1164016.40	24058.18	0.56
9/28/2019	2,913	1,121.35	177,766	127127.00	3026.83	1167043.24	24120.73	0.37
9/29/2019	2,915	1,123.37	178,890	148511.00	3535.98	1170579.21	24193.82	0.32
9/30/2019	2,927	1,135.33	180,025	139594.00	3323.67	1173902.88	24262.51	0.34
10/1/2019	2,860	1,068.31	181,093	68529.00	1631.64	1175534.52	24296.23	0.65
10/4/2019	2,771	979.07	182,072	107511.00	2559.79	1178094.31	24349.14	0.38
10/9/2019	2,801	1,009.01	183,081	119669.00	2849.26	1180943.57	24408.03	0.35
10/18/2019	2,785	992.73	184,074	89233.00	2124.60	1183068.17	24451.94	0.47
10/25/2019	2,790	998.64	185,073	120289.00	2864.02	1185932.19	24511.14	0.35
10/29/2019	2,827	1,034.99	186,108	89098.00	2121.38	1188053.57	24554.98	0.49
10/31/2019	2,831	1,038.94	187,147	188035.00	4477.02	1192530.60	24647.51	0.23
11/1/2019	2,860	1,067.88	188,214	196572.00	4680.29	1197210.88	24744.25	0.23
11/2/2019	2,893	1,100.87	189,315	136048.00	3239.24	1200450.12	24811.20	0.34
11/4/2019	2,855	1,063.14	190,378	73144.00	1741.52	1202191.64	24847.19	0.61
11/5/2019	2,947	1,155.49	191,534	124164.00	2956.29	1205147.93	24908.29	0.39
11/6/2019	2,905	1,112.85	192,647	125735.00	2993.69	1208141.62	24970.17	0.37
11/7/2019	2,803	1,010.77	193,658	250461.00	5963.36	1214104.98	25093.42	0.17
11/8/2019	2,869	1,077.06	194,735	263920.00	6283.81	1220388.79	25223.29	0.17
11/9/2019	2,940	1,148.36	195,883	198917.00	4736.12	1225124.90	25321.18	0.24
11/11/2019	2,802	1,010.36	196,893	179777.00	4280.40	1229405.31	25409.65	0.24
11/12/2019	2,830	1,037.91	197,931	182275.00	4339.88	1233745.19	25499.35	0.24
11/13/2019	2,844	1,052.56	198,984	268186.00	6385.38	1240130.57	25631.32	0.16
11/14/2019	2,833	1,041.56	200,025	149935.00	3569.88	1243700.45	25705.10	0.29
11/15/2019	2,800	1,008.32	201,034	71519.00	1702.83	1245403.29	25740.30	0.59
12/4/2019	2,757	965.00	201,999	126394.00	3009.38	1248412.67	25802.50	0.32
12/11/2019	2,755	962.81	202,961	95068.00	2263.52	1250676.19	25849.28	0.43
12/12/2019	2,849	1,057.26	204,019	28742.00	684.33	1251360.52	25863.43	1.54
12/16/2019	2,802	1,009.97	205,029	51677.00	1230.40	1252590.93	25888.86	0.82
12/17/2019	2,781	989.18	206,018	12016.00	286.10	1252877.02	25894.77	3.46
12/18/2019	2,837	1,045.20	207,063	11358.00	270.43	1253147.45	25900.36	3.86
12/23/2019	2,778	985.88	208,049	50129.00	1193.55	1254341.00	25925.03	0.83
12/30/2019	2,815	1,023.56	209,073	69766.00	1661.10	1256002.10	25959.36	0.62
1/7/2020	2,948	543.59	209,616	80363.00	1913.40	1257915.50	45252.82	0.28
1/15/2020	2,780	375.61	209,992	90291.00	2149.79	1260065.29	45330.15	0.17
1/17/2020	2,829	425.02	210,417	36807.00	876.36	1260941.64	45361.68	0.48
1/23/2020	2,778	374.03	210,791	97912.00	2331.24	1263272.88	45445.54	0.16
1/28/2020	2,817	413.43	211,204	93072.00	2216.00	1265488.88	45525.26	0.19
1/31/2020	2,756	352.24	211,556	46452.00	1106.00	1266594.88	45565.05	0.32
2/4/2020	2,747	343.32	211,900	68921.00	1640.98	1268235.86	45624.08	0.21
2/11/2020	2,759	354.56	212,254	70199.00	1671.40	1269907.26	45684.21	0.21
2/14/2020	2,802	398.29	212,653	57307.00	1364.45	1271271.71	45733.30	0.29
2/20/2020	2,638	233.56	212,886	64348.00	1532.10	1272803.81	45788.41	0.15
2/26/2020	2,648	243.73	213,130	75482.00	1797.19	1274601.00	45853.07	0.14
3/4/2020	2,625	221.27	213,351	85157.00	2027.55	1276628.55	45926.01	0.11
3/10/2020	2,675	270.76	213,622	98326.00	2341.10	1278969.64	46010.23	0.12
3/17/2020	2,785	380.47	214,002	73800.00	1757.14	1280726.79	46073.44	0.22
3/19/2020	2,658	253.93	214,256	22342.00	531.95	1281258.74	46092.58	0.48
3/25/2020	2,659	254.76	214,511	88729.00	2112.60	1283371.33	46168.58	0.12
3/27/2020	2,702	297.92	214,809	29943.00	712.93	1284084.26	46194.22	0.42
4/3/2020	2,772	368.40	215,177	60332.00	1436.48	1285520.74	46245.90	0.26
4/8/2020	2,773	368.73	215,546	72252.00	1720.29	1287241.02	46307.79	0.21
4/10/2020	2,803	398.70	215,945	62674.00	1492.24	1288733.26	46361.47	0.27
4/14/2020	2,779	374.93	216,320	55252.00	1315.52	1290048.79	46408.79	0.29
4/15/2020	2,746	341.69	216,661	95737.00	2279.45	1292328.24	46490.79	0.15
4/16/2020	2,776	372.14	217,034	79108.00	1883.52	1294211.76	46558.55	0.20
4/22/2020	2,738	333.96	217,368	76637.00	1824.69	1296036.45	46624.20	0.18
4/28/2020	2,684	280.20	217,648	81419.00	1938.55	1297975.00	46693.93	0.14
5/7/2020	2,719	315.29	217,963	72380.00	1723.33	1299698.33	46755.93	0.18
5/13/2020	2,762	357.83	218,321	104243.00	2481.98	1302180.31	46845.22	0.14
5/21/2020	2,732	327.91	218,649	137042.00	3262.90	1305443.21	46962.60	0.10
5/27/2020	2,630	225.83	218,875	79507.00	1893.02	1307336.24	47030.70	0.12
6/1/2020	2,721	316.65	219,191	56943.00	1355.79	1308692.02	47079.47	0.23
6/2/2020	2,669	264.99	219,456	57873.00	1377.93	1310069.95	47129.04	0.19
6/5/2020	2,690	285.82	219,742	69751.00	1660.74	1311730.69	47188.79	0.17
6/17/2020	2,739	334.97	220,077	87155.00	2075.12	1313805.81	47263.44	0.16
7/1/2020	2,830	426.25	220,503	87321.00	2079.07	1315884.88	47338.23	0.21
7/9/2020	2,758	353.74	220,857	60668.00	1444.48	1317329.36	47390.20	0.24

7/10/2020	2,805	400.58	221,258	32681.00	778.12	1318107.48	47418.19	0.51
7/14/2020	2,841	436.67	221,694	64765.00	1542.02	1319649.50	47473.66	0.28
7/17/2020	2,806	402.19	222,096	54913.00	1307.45	1320956.95	47520.70	0.31
7/28/2020	2,875	470.50	222,567	93637.00	2229.45	1323186.40	47600.90	0.21
7/31/2020	2,786	382.02	222,949	69488.00	1654.48	1324840.88	47660.42	0.23
8/10/2020	2,880	476.10	223,425	116386.00	2771.10	1327611.98	47760.11	0.17
8/11/2020	2,844	440.43	223,866	133394.00	3176.05	1330788.02	47874.36	0.14
8/12/2020	2,866	461.59	224,327	114718.00	2731.38	1333519.40	47972.62	0.17
8/13/2020	2,814	409.88	224,737	34314.00	817.00	1334336.40	48002.02	0.50
8/25/2020	2,866	461.91	225,199	106728.00	2541.14	1336877.55	48093.43	0.18
9/4/2020	2,849	444.60	225,644	75812.00	1805.05	1338682.60	48158.37	0.25
9/11/2020	2,800	396.43	226,040	46361.00	1103.83	1339786.43	48198.08	0.36
9/18/2020	2,782	377.99	226,418	40363.00	961.02	1340747.45	48232.65	0.39
9/23/2020	2,829	425.30	226,843	46456.00	1106.10	1341853.55	48272.44	0.38
10/1/2020	2,685	280.77	227,124	40244.00	958.19	1342811.74	48306.91	0.29
10/14/2020	2,811	406.72	227,531	111987.00	2666.36	1345478.10	48402.83	0.15
10/16/2020	2,728	323.49	227,854	46688.00	1111.62	1346589.71	48442.82	0.29
10/28/2020	2,751	346.66	228,201	89318.00	2126.62	1348716.33	48519.33	0.16
11/11/2020	2,862	457.78	228,659	160125.00	3812.50	1352528.83	48656.48	0.12
11/12/2020	2,858	453.97	229,113	91181.00	2170.98	1354699.81	48734.58	0.21
11/13/2020	2,858	453.97	229,567	16009.00	381.17	1355080.98	48748.29	1.19
11/19/2020	2,734	329.51	229,896	29841.00	710.50	1355791.48	48773.85	0.46
11/20/2020	2,721	317.08	230,213	102511.00	2440.74	1358232.21	48861.65	0.13
11/25/2020	2,708	303.69	230,517	16898.00	402.33	1358634.55	48876.13	0.75
12/3/2020	2,710	305.94	230,823	49458.00	1177.57	1359812.12	48918.49	0.26
12/10/2020	2,713	309.32	231,132	107235.00	2553.21	1362365.33	49010.34	0.12
12/18/2020	2,719	314.79	231,447	66420.00	1581.43	1363946.76	49067.23	0.20
1/6/2021	2685.527115	267.96	231714.8816	127642.00	3039.10	1366985.86	55032.90702	0.09
1/13/2021	2694.154961	276.59	231991.4737	131822.00	3138.62	1370124.48	55159.26336	0.09
1/15/2021	2649.776884	232.21	232223.6876	62435.00	1486.55	1371611.02	55219.10965	0.16
1/26/2021	2679.646596	262.08	232485.7713	125033.00	2976.98	1374588.00	55338.95848	0.09
1/29/2021	2668.812042	251.25	232737.0204	121195.00	2885.60	1377473.60	55455.12845	0.09
2/5/2021	2676.529292	258.97	232995.9868	93582.00	2228.14	1379701.74	55544.83031	0.12
2/12/2021	2599.824905	182.26	233178.2488	64903.00	1545.31	1381247.05	55607.04227	0.12
2/19/2021	2761.766389	344.20	233522.4523	402271.00	9577.88	1390824.93	55992.63414	0.04
2/22/2021	2669.121835	251.56	233774.0112	156558.00	3727.57	1394552.50	56142.70087	0.07
2/23/2021	2768.216867	350.65	234124.6651	232896.00	5545.14	1400097.64	56365.94044	0.06
2/24/2021	2738.865196	321.30	234445.9674	200155.00	4765.60	1404863.24	56557.79652	0.07
2/25/2021	2766.312543	348.75	234794.717	148773.00	3542.21	1408405.45	56700.40103	0.10
3/5/2021	2693.274219	275.71	235070.4283	168661.00	4015.74	1412421.19	56862.06894	0.07
3/8/2021	2741.855196	324.29	235394.7206	181241.00	4315.26	1416736.45	57035.79525	0.08
3/9/2021	2672.74691	255.18	235649.9046	219965.00	5237.26	1421973.71	57246.63997	0.05
3/10/2021	2685.133491	267.57	235917.4751	207906.00	4950.14	1426923.86	57445.92568	0.05
3/11/2021	2708.339575	290.78	236208.2518	110422.00	2629.10	1429552.95	57551.76932	0.11
3/17/2021	2562.827641	145.26	236353.5165	102064.00	2430.10	1431983.05	57649.6015	0.06
3/18/2021	2681.722574	264.16	236617.6762	68949.00	1641.64	1433624.69	57715.6917	0.16
3/20/2021	2714.306478	296.74	236914.4197	181170.00	4313.57	1437938.26	57889.34996	0.07
3/23/2021	2676.040344	258.48	237172.8972	100226.00	2386.33	1440324.60	57985.42034	0.11
3/24/2021	2745.658267	328.10	237500.9925	244504.00	5821.52	1446146.12	58219.78661	0.06
3/25/2021	2686.667717	269.10	237770.0973	194587.00	4633.02	1450779.14	58406.30557	0.06
3/26/2021	2709.312543	291.75	238061.8469	151942.00	3617.67	1454396.81	58551.94768	0.08
3/30/2021	2710.375509	292.81	238354.6595	86557.00	2060.88	1456457.69	58634.91582	0.14
3/31/2021	2675.040513	257.48	238612.1371	170782.00	4066.24	1460523.93	58798.61678	0.06
4/1/2021	2733.433662	315.87	238928.0078	68589.00	1633.07	1462157.00	58864.36192	0.19
4/2/2021	2731.633387	314.07	239242.0783	72456.00	1725.14	1463882.14	58933.81372	0.18
4/5/2021	2867.33119	449.77	239691.8466	76178.00	1813.76	1465695.90	59006.83319	0.25
4/9/2021	2812.465499	394.90	240086.7491	160243.00	3815.31	1469511.21	59160.43213	0.10
4/14/2021	2800.273818	382.71	240469.46	170210.00	4052.62	1473563.83	59323.58481	0.09
4/16/2021	2699.945278	282.38	240751.8424	91519.00	2179.02	1475742.86	59411.30921	0.13
4/20/2021	2752.434244	334.87	241086.7137	117111.00	2788.36	1478531.21	59523.5645	0.12
4/23/2021	2731.527787	313.96	241400.6786	153240.00	3648.57	1482179.79	59670.4508	0.09
4/28/2021	2715.782466	298.22	241698.8981	164876.00	3925.62	1486105.40	59828.49064	0.08
4/30/2021	2705.733458	288.17	241987.0687	114459.00	2725.21	1488830.62	59938.2039	0.11
5/4/2021	2777.395452	359.83	242346.9012	93630.00	2229.29	1491059.90	60027.95177	0.16
5/6/2021	2760.030136	342.47	242689.3684	159229.00	3791.17	1494851.07	60180.57875	0.09
5/7/2021	2800.952808	383.39	243072.7583	153329.00	3650.69	1498501.76	60327.55036	0.11
5/12/2021	2749.042994	331.48	243404.2384	88295.00	2102.26	1500604.02	60412.18443	0.16

5/14/2021	2788.78987	371.23	243775.4653	182332.00	4341.24	1504945.26	60586.95651	0.09
5/20/2021	2711.484877	293.92	244069.3873	152375.00	3627.98	1508573.24	60733.01367	0.08
5/25/2021	2656.381209	238.82	244308.2056	130114.00	3097.95	1511671.19	60857.73283	0.08
5/27/2021	2664.929371	247.37	244555.572	131794.00	3137.95	1514809.14	60984.06233	0.08
5/28/2021	2630.892493	213.33	244768.9016	116620.00	2776.67	1517585.81	61095.84698	0.08
6/2/2021	2650.281864	232.72	245001.6205	96463.00	2296.74	1519882.55	61188.31039	0.10
6/3/2021	2661.620655	244.06	245245.6783	115465.00	2749.17	1522631.71	61298.98793	0.09
6/4/2021	2682.441238	264.88	245510.5566	160639.00	3824.74	1526456.45	61452.96645	0.07
6/8/2021	2677.074923	259.51	245770.0686	97844.00	2329.62	1528786.07	61546.7536	0.11
6/11/2021	2654.478307	236.92	246006.984	132987.00	3166.36	1531952.43	61674.22664	0.07
6/16/2021	2729.107297	311.54	246318.5283	181542.00	4322.43	1536274.86	61848.24146	0.07
6/17/2021	2717.810133	300.25	246618.7756	60168.00	1432.57	1537707.43	61905.91475	0.21
6/21/2021	2646.959933	229.40	246848.1726	137963.00	3284.83	1540992.26	62038.15747	0.07
6/23/2021	2648.228875	230.67	247078.8385	115665.00	2753.93	1543746.19	62149.02672	0.08
6/25/2021	2706.382638	288.82	247367.6582	113182.00	2694.81	1546441.00	62257.51592	0.11
6/28/2021	2691.60788	274.04	247641.7032	96480.00	2297.14	1548738.14	62349.99563	0.12
6/29/2021	2710.619478	293.06	247934.7598	132999.00	3166.64	1551904.79	62477.48017	0.09
6/30/2021	2639.480412	221.92	248156.6772	98010.00	2333.57	1554238.36	62571.42643	0.10
7/1/2021	2686.885909	269.32	248426.0002	113261.00	2696.69	1556935.05	62679.99136	0.10
7/6/2021	2725.863061	308.30	248734.3004	172685.00	4111.55	1561046.60	62845.51642	0.07
7/9/2021	2664.072792	246.51	248980.8102	115867.00	2758.74	1563805.33	62956.57929	0.09
7/15/2021	2712.887831	295.32	249276.1352	111342.00	2651.00	1566456.33	63063.30478	0.11
7/22/2021	2701.454959	283.89	249560.0272	174924.00	4164.86	1570621.19	63230.97601	0.07
7/23/2021	2638.460138	220.90	249780.9244	70969.00	1689.74	1572310.93	63299.00246	0.13
7/30/2021	2759.685229	342.12	250123.0467	105219.00	2505.21	1574816.14	63399.85883	0.14
8/4/2021	2651.184649	233.62	250356.6684	151439.00	3605.69	1578421.83	63545.0188	0.06
8/6/2021	2613.078366	195.52	250552.1839	110916.00	2640.86	1581062.69	63651.33596	0.07
8/10/2021	2617.64131	200.08	250752.2623	97847.00	2329.69	1583392.38	63745.12598	0.09
8/12/2021	2596.94381	179.38	250931.6432	71837.00	1710.40	1585102.79	63813.98445	0.10
8/16/2021	2685.488031	267.93	251199.5683	93764.00	2232.48	1587335.26	63903.86076	0.12
8/18/2021	2681.330194	263.77	251463.3355	105606.00	2514.43	1589849.69	64005.08808	0.10
8/20/2021	2634.872844	217.31	251680.6455	111300.00	2650.00	1592499.69	64111.77331	0.08
8/24/2021	2700.268182	282.71	251963.3507	36691.00	873.60	1593373.29	64146.94302	0.32
8/25/2021	2617.438404	199.88	252163.2262	96865.00	2306.31	1595679.60	64239.79176	0.09
8/27/2021	2544.425689	126.86	252290.089	72210.00	1719.29	1597398.88	64309.00776	0.07
9/2/2021	2640.664289	223.10	252513.1903	75102.00	1788.14	1599187.02	64380.99585	0.12
9/3/2021	2629.450116	211.89	252725.0775	55959.00	1332.36	1600519.38	64434.63465	0.16
9/7/2021	2641.988588	224.43	252949.5032	60116.00	1431.33	1601950.71	64492.2581	0.16
9/9/2021	2646.531534	228.97	253178.4718	102379.00	2437.60	1604388.31	64590.39221	0.09
9/15/2021	2572.762645	155.20	253333.6715	77140.00	1836.67	1606224.98	64664.3338	0.08
9/17/2021	2667.46845	249.91	253583.5771	58652.00	1396.48	1607621.45	64720.55395	0.18
9/22/2021	2713.668449	296.11	253879.6826	129266.00	3077.76	1610699.21	64844.46027	0.10
9/24/2021	2675.7216	258.16	254137.8413	130296.00	3102.29	1613801.50	64969.35388	0.08
9/30/2021	2664.181793	246.62	254384.4601	144906.00	3450.14	1617251.64	65108.25172	0.07
10/1/2021	2749.715912	332.15	254716.6131	25158.00	599.00	1617850.64	65132.36661	0.55
10/7/2021	2758.587709	341.02	255057.6379	107781.00	2566.21	1620416.86	65235.67875	0.13
10/12/2021	2688.065744	270.50	255328.1408	89486.00	2130.62	1622547.48	65321.45444	0.13
10/15/2021	2648.667398	231.10	255559.2452	60983.00	1451.98	1623999.45	65379.90894	0.16
10/26/2021	2763.267258	345.70	255904.9496	110951.00	2641.69	1626641.14	65486.25964	0.13
10/29/2021	2729.840284	312.28	256217.2269	96627.00	2300.64	1628941.79	65578.88025	0.14
11/10/2021	2766.243726	348.68	256565.9077	128700.00	3064.29	1632006.07	65702.24404	0.11
11/11/2021	2815.643326	398.08	256963.9881	280800.00	6685.71	1638691.79	65971.40139	0.06
11/12/2021	2803.889794	386.33	257350.315	159967.00	3808.74	1642500.52	66124.73577	0.10
11/16/2021	2717.976866	300.41	257650.729	134764.00	3208.67	1645709.19	66253.91213	0.09
11/19/2021	2677.437888	259.87	257910.6039	85593.00	2037.93	1647747.12	66335.95624	0.13
11/24/2021	2644.136178	226.57	258137.1772	73458.00	1749.00	1649496.12	66406.36849	0.13
12/3/2021	2709.988666	292.43	258429.6029	108440.00	2581.90	1652078.02	66510.31231	0.11
12/10/2021	2681.915377	264.35	258693.9554	92347.00	2198.74	1654276.76	66598.83037	0.12
12/11/2021	2700.182196	282.62	258976.5747	38221.00	910.02	1655186.79	66635.46664	0.31
12/15/2021	2614.772546	197.21	259173.7843	89253.00	2125.07	1657311.86	66721.01899	0.09
12/22/2021	2634.716215	217.15	259390.9376	86933.00	2069.83	1659381.69	66804.34754	0.10
12/30/2021	2609.78631	192.22	259583.161	49269.00	1173.07	1660554.76	66851.57373	0.16
1/6/2022	2667.065809	245.66	259828.8234	95880.00	2282.86	1662837.62	63303.8967	0.11
1/7/2022	2571.501536	150.10	259978.9216	11983.00	285.31	1663122.93	63314.75838	0.53
1/14/2022	2619.300495	197.90	260176.8187	116807.00	2781.12	1665904.05	63420.63503	0.07
1/19/2022	2644.196355	222.79	260399.6117	113262.00	2696.71	1668600.76	63523.2984	0.08
1/21/2022	2640.036057	218.63	260618.2444	29086.00	692.52	1669293.29	63549.66264	0.32

1/26/2022	2595.10931	173.71	260791.9503	69242.00	1648.62	1670941.90	63612.42524	0.11
2/2/2022	2609.220432	187.82	260979.7674	92802.00	2209.57	1673151.48	63696.54319	0.09
2/11/2022	2645.298489	223.90	261203.6625	83320.00	1983.81	1675135.29	63772.06642	0.11
2/17/2022	2598.005409	176.60	261380.2645	111326.00	2650.62	1677785.90	63872.97496	0.07
3/1/2022	2634.542554	213.14	261593.4037	132504.00	3154.86	1680940.76	63993.07974	0.07
3/4/2022	2701.964795	280.56	261873.9651	66929.00	1593.55	1682534.31	64053.74578	0.18
3/10/2022	2711.776676	290.37	262164.3384	98941.00	2355.74	1684890.05	64143.42826	0.12
3/17/2022	2721.342831	299.94	262464.2779	129444.00	3082.00	1687972.05	64260.75939	0.10
3/23/2022	2718.929104	297.53	262761.8036	97758.00	2327.57	1690299.62	64349.36957	0.13
3/25/2022	2624.578677	203.18	262964.9789	78106.00	1859.67	1692159.29	64420.16671	0.11
3/31/2022	2665.292826	243.89	263208.8684	88526.00	2107.76	1694267.05	64500.40878	0.12
4/6/2022	2719.822027	298.42	263507.287	96938.00	2308.05	1696575.10	64588.27569	0.13
4/13/2022	2649.841249	228.44	263735.7249	90114.00	2145.57	1698720.67	64669.95717	0.11
4/20/2022	2717.359024	295.96	264031.6806	100589.00	2394.98	1701115.64	64761.13344	0.12
4/22/2022	2633.187814	211.78	264243.465	55028.00	1310.19	1702425.83	64811.01213	0.16
4/27/2022	2706.871505	285.47	264528.9331	50706.00	1207.29	1703633.12	64856.97325	0.24
4/29/2022	2656.087248	234.68	264763.617	35393.00	842.69	1704475.81	64889.05431	0.28
5/4/2022	2715.251365	293.85	265057.465	131814.00	3138.43	1707614.24	65008.53366	0.09
5/5/2022	2667.875909	246.47	265303.9376	47661.00	1134.79	1708749.02	65051.73473	0.22
5/6/2022	2695.254911	273.85	265577.7891	75737.00	1803.26	1710552.29	65120.38455	0.15
5/11/2022	2654.903855	233.50	265811.2896	62326.00	1483.95	1712036.24	65176.87832	0.16
5/13/2022	2654.762294	233.36	266044.6485	85966.00	2046.81	1714083.05	65254.79995	0.11
5/18/2022	2696.718731	275.32	266319.9639	93946.00	2236.81	1716319.86	65339.95484	0.12
5/24/2022	2642.126178	220.72	266540.6867	126083.00	3001.98	1719321.83	65454.23948	0.07
5/26/2022	2735.512218	314.11	266854.7955	111653.00	2658.40	1721980.24	65555.44442	0.12
5/27/2022	2693.540385	272.14	267126.9325	26932.00	641.24	1722621.48	65579.85623	0.42
6/3/2022	2687.329998	265.93	267392.8592	120709.00	2874.02	1725495.50	65689.26974	0.09
6/8/2022	2686.484877	265.08	267657.9407	103164.00	2456.29	1727951.79	65782.78005	0.11
6/10/2022	2661.111547	239.71	267897.6488	81139.00	1931.88	1729883.67	65856.32637	0.12
6/14/2022	2712.217772	290.81	268188.4632	107151.00	2551.21	1732434.88	65953.45059	0.11
6/16/2022	2723.679198	302.28	268490.7391	117826.00	2805.38	1735240.26	66060.25088	0.11
6/22/2022	2736.464877	315.06	268805.8006	142759.00	3399.02	1738639.29	66189.65104	0.09
6/24/2022	2739.609745	318.21	269124.0069	114165.00	2718.21	1741357.50	66293.13292	0.12
6/28/2022	2763.686242	342.28	269466.2898	112064.00	2668.19	1744025.69	66394.7104	0.13
6/30/2022	2773.870359	352.47	269818.7568	110585.00	2632.98	1746658.67	66494.94728	0.13
8/3/2022	2671.501947	250.10	270068.8554	68962.00	1641.95	1748300.62	66557.45608	0.15
8/5/2022	2648.243752	226.84	270295.6958	74115.00	1764.64	1750065.26	66624.63568	0.13
8/12/2022	2718.080432	296.68	270592.3728	79343.00	1889.12	1751954.38	66696.55406	0.16
8/19/2022	2673.128918	251.73	270844.0984	96563.00	2299.12	1754253.50	66784.08107	0.11
8/25/2022	2723.495307	302.09	271146.1903	37022.00	881.48	1755134.98	66817.63869	0.34
8/26/2022	2737.396063	315.99	271462.183	120521.00	2869.55	1758004.52	66926.8818	0.11
8/31/2022	2713.641551	292.24	271754.4212	76283.00	1816.26	1759820.79	66996.02652	0.16
9/2/2022	2636.47171	215.07	271969.4895	74593.00	1776.02	1761596.81	67063.6394	0.12
9/9/2022	2704.022012	282.62	272252.1082	72945.00	1736.79	1763333.60	67129.75848	0.16
9/14/2022	2767.973654	346.57	272598.6784	96117.00	2288.50	1765622.10	67216.88122	0.15
9/16/2022	2701.311583	279.91	272878.5867	78401.00	1866.69	1767488.79	67287.94576	0.15
9/21/2022	2689.058111	267.65	273146.2414	76688.00	1825.90	1769314.69	67357.45759	0.15
9/23/2022	2665.977201	244.57	273390.8152	69634.00	1657.95	1770972.64	67420.5755	0.15
9/28/2022	2633.757365	212.35	273603.1692	88340.00	2103.33	1773075.98	67500.64898	0.10
9/30/2022	2646.4695	225.07	273828.2354	31883.00	759.12	1773835.10	67529.54849	0.30
10/5/2022	2747.825255	326.42	274154.6572	59099.00	1407.12	1775242.21	67583.11724	0.23
10/7/2022	2671.038924	249.64	274404.2928	61108.00	1454.95	1776697.17	67638.50698	0.17
10/12/2022	2705.720394	284.32	274688.6098	105325.00	2507.74	1779204.90	67733.97607	0.11
10/14/2022	2728.289687	306.89	274995.4961	52365.00	1246.79	1780451.69	67781.44096	0.25
10/19/2022	2724.261596	302.86	275298.3544	109280.00	2601.90	1783053.60	67880.49495	0.12
10/21/2022	2711.598761	290.20	275588.5497	72915.00	1736.07	1784789.67	67946.58684	0.17
10/27/2022	2735.141981	313.74	275902.2884	27899.00	664.26	1785453.93	67971.87516	0.47
10/28/2022	2743.845183	322.44	276224.7302	117392.00	2795.05	1788248.98	68078.28207	0.12
11/2/2022	2710.96626	289.56	276514.2931	81144.00	1932.00	1790180.98	68151.83292	0.15
11/4/2022	2697.587314	276.18	276790.477	56803.00	1352.45	1791533.43	68203.32052	0.20
11/14/2022	2780.180174	358.78	277149.2538	89510.00	2131.19	1793664.62	68284.45451	0.17
11/16/2022	2746.353822	324.95	277474.2043	116605.00	2776.31	1796440.93	68390.14806	0.12
11/18/2022	2764.147364	342.74	277816.9482	73294.00	1745.10	1798186.02	68456.58349	0.20
11/22/2022	2754.511411	333.11	278150.0563	104459.00	2487.12	1800673.14	68551.26762	0.13
11/23/2022	2725.34533	303.94	278453.9982	71545.00	1703.45	1802376.60	68616.11771	0.18
11/29/2022	2735.857896	314.45	278768.4528	66963.00	1594.36	1803970.95	68676.81457	0.20
12/1/2022	2724.425233	303.02	279071.4746	99303.00	2364.36	1806335.31	68766.82517	0.13

12/6/2022	2751.956062	330.55	279402.0273	93524.00	2226.76	1808562.07	68851.59756	0.15
12/7/2022	2684.069494	262.67	279664.6934	20116.00	478.95	1809041.02	68869.83118	0.55
12/8/2022	2742.535638	321.13	279985.8257	72053.00	1715.55	1810756.57	68935.14173	0.19
12/12/2022	2678.290059	256.89	280242.7124	51715.00	1231.31	1811987.88	68982.01744	0.21
12/14/2022	2705.79582	284.39	280527.1049	108619.00	2586.17	1814574.05	69080.47229	0.11
12/15/2022	2683.966374	262.56	280789.6679	116171.00	2765.98	1817340.02	69185.77245	0.09
12/16/2022	2715.283686	293.88	281083.5482	117691.00	2802.17	1820142.19	69292.45038	0.10
12/19/2022	2804.468449	383.07	281466.6132	82174.00	1956.52	1822098.71	69366.93485	0.20
12/20/2022	2801.228672	379.83	281846.4385	120700.00	2873.81	1824972.52	69476.34021	0.13
12/21/2022	2851.380669	429.98	282276.4158	106992.00	2547.43	1827519.95	69573.3203	0.17
12/28/2023	2898.511624	484.24	282760.6577	45478.00	1082.81	1828602.76	82086.86853	0.45
12/29/2023	2828.029245	413.76	283174.4172	32123.00	764.83	1829367.60	82121.20227	0.54
12/30/2023	2819.377928	405.11	283579.5254	33218.00	790.90	1830158.50	82156.70637	0.51
1/5/2023	2895.618976	481.35	284060.8747	82936.00	1974.67	1832133.17	82245.35012	0.24
1/6/2023	2840.049344	425.78	284486.6543	50134.00	1193.67	1833326.83	82298.9344	0.36
1/10/2023	2862.04674	447.78	284934.4313	80950.00	1927.38	1835254.21	82385.45547	0.23
1/13/2023	2827.422883	413.15	285347.5844	106361.00	2532.40	1837786.62	82499.13635	0.16
1/19/2023	2760.903365	346.63	285694.2181	81446.00	1939.19	1839725.81	82586.18756	0.18
1/20/2023	2759.018179	344.75	286038.9665	23012.00	547.90	1840273.71	82610.78327	0.63
1/25/2023	2847.810267	433.54	286472.507	49926.00	1188.71	1841462.43	82664.14523	0.36
1/28/2023	2833.34814	419.08	286891.5854	43957.00	1046.60	1842509.02	82711.1274	0.40
2/2/2023	2839.281384	425.01	287316.5971	25874.00	616.05	1843125.07	82738.78208	0.69
2/3/2023	2855.806672	441.54	287758.134	84694.00	2016.52	1845141.60	82829.30482	0.22
2/8/2023	2894.804393	480.53	288238.6687	103411.00	2462.17	1847603.76	82939.83268	0.20
2/10/2023	2878.88021	464.61	288703.2792	99937.00	2379.45	1849983.21	83046.64745	0.20
2/11/2023	2867.231509	452.96	289156.2409	92135.00	2193.69	1852176.90	83145.12329	0.21
2/13/2023	3073.185489	658.92	289815.1567	66617.00	1586.12	1853763.02	83216.32494	0.42
2/14/2023	2871.596304	457.33	290272.4832	116573.00	2775.55	1856538.57	83340.92063	0.16
2/15/2023	3094.031027	679.76	290952.2445	103819.00	2471.88	1859010.45	83451.88457	0.27
2/16/2023	2856.024122	441.75	291393.9989	92705.00	2207.26	1861217.71	83550.96963	0.20
2/17/2023	2849.246958	434.98	291828.9761	90795.00	2161.79	1863379.50	83648.01324	0.20
2/18/2023	2798.720247	384.45	292213.4267	68559.00	1632.36	1865011.86	83721.29055	0.24
2/20/2023	2837.678022	423.41	292636.8349	83870.00	1996.90	1867008.76	83810.93258	0.21
2/24/2023	2875.732678	461.46	293098.2979	121928.00	2903.05	1869911.81	83941.2518	0.16
3/1/2023	2861.946437	447.68	293545.9746	70024.00	1667.24	1871579.05	84016.09493	0.27
3/3/2023	2864.674054	450.40	293996.3789	54667.00	1301.60	1872880.64	84074.52417	0.35
3/8/2023	2891.664219	477.39	294473.7734	54852.00	1306.00	1874186.64	84133.15115	0.37
3/9/2023	2891.822571	477.55	294951.3262	123884.00	2949.62	1877136.26	84265.56098	0.16
3/10/2023	2883.865632	469.60	295420.9221	118798.00	2828.52	1879964.79	84392.5348	0.17
3/13/2023	2919.479331	505.21	295926.1317	88851.00	2115.50	1882080.29	84487.50062	0.24
3/14/2023	2894.437344	480.17	296406.2993	40104.00	954.86	1883035.14	84530.36462	0.50
3/15/2023	2874.343913	460.07	296866.3735	109980.00	2618.57	1885653.71	84647.91357	0.18
3/17/2023	2874.677563	460.41	297326.7813	45241.00	1077.17	1886730.88	84696.26811	0.43
3/22/2023	2866.329185	452.06	297778.8408	80338.00	1912.81	1888643.69	84782.13506	0.24
3/24/2023	2804.909195	390.64	298169.4802	39246.00	934.43	1889578.12	84824.08201	0.42
3/28/2023	2797.771174	383.50	298552.9817	45030.00	1072.14	1890650.26	84872.21103	0.36
3/31/2023	2769.518067	355.25	298908.23	61935.00	1474.64	1892124.90	84938.40846	0.24
4/5/2023	2650.617277	236.35	299144.5775	56674.00	1349.38	1893474.29	84998.98283	0.18
4/7/2023	2662.423074	248.15	299392.7309	58944.00	1403.43	1894877.71	85061.98342	0.18
4/12/2023	2652.678773	238.41	299631.1399	54439.00	1296.17	1896173.88	85120.16898	0.18
4/14/2023	2660.748033	246.48	299877.6182	68230.00	1624.52	1897798.40	85193.09464	0.15
4/19/2023	2650.553277	236.28	300113.9018	90326.00	2150.62	1899949.02	85289.63698	0.11
4/21/2023	2594.72173	180.45	300294.3538	63265.00	1506.31	1901455.33	85357.25595	0.12
4/26/2023	2651.345026	237.08	300531.429	80983.00	1928.17	1903383.50	85443.81229	0.12
4/28/2023	2639.269131	225.00	300756.4284	96667.00	2301.60	1905685.10	85547.13202	0.10
5/3/2023	2659.073362	244.80	301001.2321	83609.00	1990.69	1907675.79	85636.49508	0.12
5/5/2023	2638.419577	224.15	301225.3819	63578.00	1513.76	1909189.55	85704.44859	0.15
5/10/2023	2669.317647	255.05	301480.4298	90009.00	2143.07	1911332.62	85800.65211	0.12
5/12/2023	2600.121481	185.85	301666.2816	61606.00	1466.81	1912799.43	85866.4979	0.13
5/16/2023	2676.265003	262.00	301928.2768	97652.00	2325.05	1915124.48	85970.87042	0.11
5/18/2023	2671.684517	257.41	302185.6916	69349.00	1651.17	1916775.64	86044.9921	0.16
5/19/2023	2664.710774	250.44	302436.1326	101147.00	2408.26	1919183.90	86153.10015	0.10
5/23/2023	2671.925029	257.66	302693.7879	92321.00	2198.12	1921382.02	86251.77479	0.12
5/24/2023	2659.246953	244.98	302938.7652	80511.00	1916.93	1923298.95	86337.82664	0.13
5/26/2023	2598.997303	184.73	303123.4927	55513.00	1321.74	1924620.69	86397.16011	0.14
5/31/2023	2737.469009	323.20	303446.692	114944.00	2736.76	1927357.45	86520.01468	0.12
6/1/2023	2749.799857	335.53	303782.2221	109776.00	2613.71	1929971.17	86637.34559	0.13

6/2/2023	2731.528775	317.26	304099.4812	123908.00	2950.19	1932921.36	86769.78108	0.11
6/7/2023	2737.974797	323.71	304423.1862	77413.00	1843.17	1934764.52	86852.52173	0.18
6/9/2023	2726.888449	312.62	304735.8049	88109.00	2097.83	1936862.36	86946.69449	0.15
6/14/2023	2691.604637	277.33	305013.1398	68423.00	1629.12	1938491.48	87019.82643	0.17
6/16/2023	2628.41905	214.15	305227.2891	59781.00	1423.36	1939914.83	87083.72163	0.15
6/21/2023	2698.172504	283.90	305511.1919	46088.00	1097.33	1941012.17	87132.98146	0.26
6/23/2023	2665.33609	251.07	305762.2583	85725.00	2041.07	1943053.24	87224.60615	0.12
6/28/2023	2703.138523	288.87	306051.1271	110390.00	2628.33	1945681.57	87342.59331	0.11
6/30/2023	2654.927166	240.66	306291.7845	48713.00	1159.83	1946841.40	87394.6588	0.21
7/6/2023	2687.402598	273.13	306564.9173	71910.00	1712.14	1948553.55	87471.51772	0.16
7/7/2023	2688.731777	274.46	306839.3794	74658.00	1777.57	1950331.12	87551.31377	0.15
7/11/2023	2681.320281	267.05	307106.4299	62556.00	1489.43	1951820.55	87618.17494	0.18
7/13/2023	2673.385388	259.12	307365.5456	101066.00	2406.33	1954226.88	87726.19642	0.11
7/14/2023	2631.754684	217.48	307583.0305	45850.00	1091.67	1955318.55	87775.20187	0.20
7/19/2023	2679.968126	265.70	307848.7289	84317.00	2007.55	1957326.10	87865.32166	0.13
7/21/2023	2658.157507	243.89	308092.6167	83433.00	1986.50	1959312.60	87954.49661	0.12
7/26/2023	2687.059755	272.79	308365.4067	93081.00	2216.21	1961528.81	88053.98355	0.12
7/27/2023	2662.484324	248.21	308613.6213	93081.00	2216.21	1963745.02	88153.47049	0.11
7/28/2023	2626.183748	211.91	308825.5353	54426.00	1295.86	1965040.88	88211.64214	0.16
8/3/2023	2628.38099	214.11	309039.6466	121140.00	2884.29	1967925.17	88341.11913	0.07
8/4/2023	2628.38099	214.11	309253.7578	109618.00	2609.95	1970535.12	88458.28117	0.08
8/9/2023	2576.901026	162.63	309416.3891	113339.00	2698.55	1973233.67	88579.42029	0.06
8/10/2023	2576.901026	162.63	309579.0204	75785.00	1804.40	1975038.07	88660.42089	0.09
8/11/2023	2576.901026	162.63	309741.6517	50929.00	1212.60	1976250.67	88714.85488	0.13
8/16/2023	2579.091817	164.82	309906.4738	80054.00	1906.05	1978156.71	88800.41829	0.09
8/18/2023	2581.282609	167.01	310073.4866	98647.00	2348.74	1980505.45	88905.85429	0.07
8/24/2023	2581.282609	167.01	310240.4995	49204.00	1171.52	1981676.98	88958.44456	0.14
8/25/2023	2626.272131	212.00	310452.5019	116155.00	2765.60	1984442.57	89082.59348	0.08
8/29/2023	2621.922007	207.65	310660.1542	68877.00	1639.93	1986082.50	89156.21067	0.13
9/1/2023	2662.715002	248.45	310908.5995	87801.00	2090.50	1988173.00	89250.05423	0.12
9/8/2023	2667.347001	253.08	311161.6767	76446.00	1820.14	1989993.14	89331.76133	0.14
9/13/2023	2668.811595	254.54	311416.2186	65573.00	1561.26	1991554.40	89401.84714	0.16
9/15/2023	2663.598563	249.33	311665.5474	71184.00	1694.86	1993249.26	89477.9301	0.15
9/20/2023	2669.372056	255.10	311920.6497	98860.00	2353.81	1995603.07	89583.59376	0.11
9/22/2023	2665.37383	251.10	312171.7538	51074.00	1216.05	1996819.12	89638.18273	0.21
10/3/2023	2641.371043	227.10	312398.8551	54824.00	1305.33	1998124.45	89696.77978	0.17
10/5/2023	2642.254043	227.98	312626.8394	79940.00	1903.33	2000027.79	89782.22134	0.12
10/6/2023	2633.978795	219.71	312846.5485	56264.00	1339.62	2001367.40	89842.35749	0.16
10/10/2023	2648.953407	234.68	313081.2322	86607.00	2062.07	2003429.48	89934.92488	0.11
10/12/2023	2652.823655	238.55	313319.7861	63384.00	1509.14	2004938.62	90002.67104	0.16
10/13/2023	2642.44062	228.17	313547.957	73277.00	1744.69	2006683.31	90080.99104	0.13
10/17/2023	2637.212508	222.94	313770.8997	75985.00	1809.17	2008492.48	90162.20542	0.12
10/19/2023	2648.016406	233.75	314004.6464	84129.00	2003.07	2010495.55	90252.12427	0.12
10/20/2023	2622.858341	208.59	314213.235	25092.00	597.43	2011092.98	90278.94313	0.35
10/24/2023	2641.036504	226.77	314440.0018	81731.00	1945.98	2013038.95	90366.29895	0.12
10/27/2023	2656.578078	242.31	314682.3101	58946.00	1403.48	2014442.43	90429.30168	0.17
11/3/2023	2662.095938	247.83	314930.1363	109396.00	2604.67	2017047.10	90546.22643	0.10
11/8/2023	2735.530955	321.26	315251.3975	120120.00	2860.00	2019907.10	90674.61322	0.11
11/9/2023	2733.34177	319.07	315570.4696	382200.00	9100.00	2029007.10	91083.11666	0.04
11/10/2023	2762.098523	347.83	315918.2984	502320.00	11960.00	2040967.10	91620.00688	0.03
11/13/2023	2682.45921	268.19	316186.4878	36067.00	858.74	2041825.83	91658.55605	0.31
11/14/2023	2680.136223	265.87	316452.3543	88874.00	2116.05	2043941.88	91753.54646	0.13
11/15/2023	2672.714836	258.45	316710.7994	88806.00	2114.43	2046056.31	91848.46419	0.12
11/16/2023	2664.546953	250.28	316961.0766	89454.00	2129.86	2048186.17	91944.07451	0.12
11/17/2023	2673.556702	259.29	317220.3636	81057.00	1929.93	2050116.10	92030.70995	0.13
11/21/2023	2650.719089	236.45	317456.813	56324.00	1341.05	2051457.14	92090.91023	0.18
11/29/2023	2669.187885	254.92	317711.7311	122902.00	2926.24	2054383.38	92222.27048	0.09
11/30/2023	2647.010362	232.74	317944.4717	80625.00	1919.64	2056303.02	92308.44418	0.12
12/1/2023	2643.743164	229.47	318173.9452	36965.00	880.12	2057183.14	92347.95316	0.26
12/6/2023	2714.654379	300.38	318474.3298	124276.00	2958.95	2060142.10	92480.78197	0.10
12/8/2023	2623.517813	209.25	318683.5779	100858.00	2401.38	2062543.48	92588.58113	0.09
12/13/2023	2680.343742	266.07	318949.6519	110330.00	2626.90	2065170.38	92706.50416	0.10
12/15/2023	2692.241662	277.97	319227.6238	64806.00	1543.00	2066713.38	92775.77019	0.18
12/19/2023	2429.845297	15.58	319243.1994	47120.00	1121.90	2067835.29	92826.13304	0.01
12/22/2023	2562.671155	148.40	319391.6008	96451.00	2296.45	2070131.74	92929.2219	0.06
12/27/2023	2597.963047	183.69	319575.2941	67463.00	1606.26	2071738.00	93001.32778	0.11
12/28/2023	2657.105938	242.84	319818.1303	87133.00	2074.60	2073812.60	93094.45737	0.12

12/29/2023	2677.720142	263.45	320081.5807	33825.00	805.36	2074617.95	93130.61025	0.33
12/30/2023	2681.720142	267.45	320349.0311	36552.00	870.29	2075488.24	93169.6778	0.31
1/3/2024	2665.155699	261.10	320610.1327	87203.00	2076.26	2077564.50	110756.2305	0.13
1/4/2024	2681.767169	277.71	320887.8457	112477.00	2678.02	2080242.52	110898.9976	0.10
1/5/2024	2466.370421	62.32	320950.162	47669.00	1134.98	2081377.50	110959.5038	0.05
1/10/2024	702.1926867	-1,701.86	319248.3005	100548.00	2394.00	2083771.50	111087.1294	-0.71
1/11/2024	2480.252484	76.20	319324.4989	90466.00	2153.95	2085925.45	111201.9579	0.04
1/12/2024	2481.004771	76.95	319401.4495	43298.00	1030.90	2086956.36	111256.9161	0.07
1/18/2024	2722.740687	318.69	319720.1361	48067.00	1144.45	2088100.81	111317.9276	0.28
1/19/2024	2761.09146	357.04	320077.1734	88173.00	2099.36	2090200.17	111429.8456	0.17
1/24/2024	2833.640535	429.59	320506.7598	96134.00	2288.90	2092489.07	111551.8685	0.19
1/26/2024	2888.300497	484.25	320991.0061	97217.00	2314.69	2094803.76	111675.266	0.21
1/29/2024	2787.042041	382.99	321373.994	65404.00	1557.24	2096361.00	111758.2834	0.25
1/30/2024	2852.660538	448.61	321822.6004	106296.00	2530.86	2098891.86	111893.2049	0.18
1/31/2024	2835.939506	431.89	322254.4858	105240.00	2505.71	2101397.57	112026.7861	0.17
2/1/2024	2828.308098	424.25	322678.7397	100363.00	2389.60	2103787.17	112154.1768	0.18
2/2/2024	2731.20339	327.15	323005.889	113393.00	2699.83	2106487.00	112298.1066	0.12
2/3/2024	2768.819935	364.77	323370.6548	107753.00	2565.55	2109052.55	112434.8775	0.14
2/5/2024	2776.409014	372.35	323743.0097	89086.00	2121.10	2111173.64	112547.9544	0.18
2/6/2024	2767.738435	363.68	324106.694	108440.00	2581.90	2113755.55	112685.5973	0.14
2/7/2024	2794.556539	390.50	324497.1964	105513.00	2512.21	2116267.76	112819.525	0.16
2/8/2024	2774.920323	370.87	324868.0625	88742.00	2112.90	2118380.67	112932.1652	0.18
2/9/2024	2799.073667	395.02	325263.0821	111936.00	2665.14	2121045.81	113074.2456	0.15
2/10/2024	2777.77892	373.72	325636.8068	75690.00	1802.14	2122847.95	113170.3189	0.21
2/12/2024	2758.227274	354.17	325990.98	93067.00	2215.88	2125063.83	113288.4489	0.16
2/13/2024	2733.112484	329.06	326320.0383	97041.00	2310.50	2127374.33	113411.6231	0.14
2/14/2024	2728.340673	324.29	326644.3249	109685.00	2611.55	2129985.88	113550.8463	0.12
2/15/2024	2743.222553	339.17	326983.4933	99210.00	2362.14	2132348.02	113676.7735	0.14
2/16/2024	2652.518418	248.46	327231.9575	55392.00	1318.86	2133666.88	113747.0826	0.19
2/21/2024	2752.807523	348.75	327580.7109	84860.00	2020.48	2135687.36	113854.7954	0.17
2/23/2024	2804.275046	400.22	327980.9318	62100.00	1478.57	2137165.93	113933.619	0.27
2/28/2024	2712.416214	308.36	328289.2939	100171.00	2385.02	2139550.95	114060.7661	0.13
3/1/2024	2743.080932	339.03	328628.3207	76974.00	1832.71	2141383.67	114158.4692	0.18
3/7/2024	2831.702385	427.65	329055.9689	132657.00	3158.50	2144542.17	114326.8507	0.14
3/8/2024	2802.500292	398.45	329454.4151	45852.00	1091.71	2145633.88	114385.0507	0.36
3/13/2024	2692.925425	288.87	329743.2864	127699.00	3040.45	2148674.33	114547.1391	0.10
3/15/2024	2654.601409	250.55	329993.8337	70115.00	1669.40	2150343.74	114636.136	0.15
3/20/2024	2825.702385	421.65	330415.4819	116499.00	2773.79	2153117.52	114784.0083	0.15
3/21/2024	2832.585305	428.53	330844.0131	66316.00	1578.95	2154696.48	114868.1832	0.27
3/27/2024	2717.18339	313.13	331157.1423	102324.00	2436.29	2157132.76	114998.063	0.13
3/29/2024	2799.721097	395.67	331552.8093	71467.00	1701.60	2158834.36	115088.7761	0.23
4/3/2024	2796.761261	392.71	331945.5164	82840.00	1972.38	2160806.74	115193.925	0.20
4/5/2024	2781.297121	377.24	332322.7594	51886.00	1235.38	2162042.12	115259.7839	0.31
4/10/2024	2797.168498	393.11	332715.8737	98268.00	2339.71	2164381.83	115384.5155	0.17
4/12/2024	2770.648953	366.59	333082.4685	98027.00	2333.98	2166715.81	115508.9412	0.16
4/17/2024	2807.629273	403.58	333486.0437	111973.00	2666.02	2169381.83	115651.0685	0.15
4/19/2024	2773.198392	369.14	333855.1879	94625.00	2252.98	2171634.81	115771.176	0.16
4/24/2024	2815.228425	411.17	334266.3622	110883.00	2640.07	2174274.88	115911.9199	0.16
4/26/2024	2765.094971	361.04	334627.403	100272.00	2387.43	2176662.31	116039.1951	0.15
4/30/2024	2791.347993	387.29	335014.6969	100676.00	2397.05	2179059.36	116166.9832	0.16
5/1/2024	2779.033326	374.98	335389.6761	64256.00	1529.90	2180589.26	116248.5434	0.25
5/2/2024	2786.785015	382.73	335772.4069	72559.00	1727.60	2182316.86	116340.6425	0.22
5/3/2024	2764.063667	360.01	336132.4165	86460.00	2058.57	2184375.43	116450.3862	0.17
5/7/2024	2824.54276	420.49	336552.9051	111268.00	2649.24	2187024.67	116591.6187	0.16
5/8/2024	2820.402268	416.35	336969.2532	105367.00	2508.74	2189533.40	116725.3611	0.17
5/9/2024	2828.011405	423.96	337393.2105	105393.00	2509.36	2192042.76	116859.1364	0.17
5/10/2024	2815.726387	411.67	337804.8827	80153.00	1908.40	2193951.17	116960.8747	0.22
5/14/2024	2833.869809	429.82	338234.6984	72863.00	1734.83	2195686.00	117053.3597	0.25
5/16/2024	2824.181419	420.13	338654.8257	63910.00	1521.67	2197207.67	117134.4807	0.28
5/17/2024	2809.223063	405.17	339059.9946	50787.00	1209.21	2198416.88	117198.9446	0.34
5/21/2024	2835.858435	431.80	339491.7989	85909.00	2045.45	2200462.33	117307.9889	0.21
5/23/2024	2831.317328	427.26	339919.0621	109084.00	2597.24	2203059.57	117446.4493	0.16
5/24/2024	2814.211049	410.16	340329.219	44621.00	1062.40	2204121.98	117503.0867	0.39
5/29/2024	2873.745666	469.69	340798.9105	117600.00	2800.00	2206921.98	117652.3564	0.17
5/30/2024	2873.886197	469.83	341268.7426	170908.00	4069.24	2210991.21	117869.29	0.12
5/31/2024	2885.046984	480.99	341749.7354	81005.00	1928.69	2212919.90	117972.1097	0.25
6/1/2024	2856.485166	452.43	342202.1664	81005.00	1928.69	2214848.60	118074.9293	0.23

6/3/2024	2808.326189	404.27	342606.4385	76877.00	1830.40	2216679.00	118172.5093	0.22
6/4/2024	2813.357993	409.30	343015.7423	139932.00	3331.71	2220010.71	118350.125	0.12
6/5/2024	2810.146627	406.09	343421.8348	118373.00	2818.40	2222829.12	118500.3759	0.14
6/6/2024	2770.569861	366.52	343788.3506	107868.00	2568.29	2225397.40	118637.2928	0.14
6/7/2024	2772.58029	368.53	344156.8767	137173.00	3266.02	2228663.43	118811.4065	0.11
6/11/2024	2740.244133	336.19	344493.0667	105651.00	2515.50	2231178.93	118945.5093	0.13
6/13/2024	2801.505055	397.45	344890.5176	104507.00	2488.26	2233667.19	119078.1601	0.16
6/14/2024	2820.466852	416.41	345306.9303	42114.00	1002.71	2234669.90	119131.6154	0.42
6/20/2024	2815.877944	411.82	345718.7541	95132.00	2265.05	2236934.95	119252.3665	0.18
6/21/2024	2829.328693	425.27	346144.0287	50455.00	1201.31	2238136.26	119316.409	0.35
6/25/2024	2762.442737	358.39	346502.4173	69382.00	1651.95	2239788.21	119404.4756	0.22
6/27/2024	2765.348988	361.29	346863.7121	30500.00	726.19	2240514.40	119443.1893	0.50
7/2/2024	2701.795322	297.74	347161.4533	86001.00	2047.64	2242562.05	119552.3504	0.15
7/3/2024	2795.501763	391.45	347552.9009	79420.00	1890.95	2244453.00	119653.1582	0.21
7/9/2024	2784.791659	380.74	347933.6384	81314.00	1936.05	2246389.05	119756.3701	0.20
7/10/2024	2784.584064	380.53	348314.1684	87909.00	2093.07	2248482.12	119867.953	0.18
7/11/2024	2789.927244	385.87	348700.0415	91097.00	2168.98	2250651.10	119983.5824	0.18
7/12/2024	2783.545989	379.49	349079.5333	76364.00	1818.19	2252469.29	120080.5113	0.21
7/22/2024	2791.724426	387.67	349467.2036	47945.00	1141.55	2253610.83	120141.3679	0.34
7/23/2024	2812.627996	408.57	349875.7775	97985.00	2332.98	2255943.81	120265.7403	0.18
7/24/2024	2813.664309	409.61	350285.3876	92137.00	2193.74	2258137.55	120382.6898	0.19
7/25/2024	2818.947961	414.89	350700.2815	94577.00	2251.83	2260389.38	120502.7364	0.18
7/26/2024	2833.738057	429.68	351129.9654	85381.00	2032.88	2262422.26	120611.1105	0.21
7/31/2024	2845.602753	441.55	351571.514	105791.00	2518.83	2264941.10	120745.391	0.18
8/1/2024	2846.345063	442.29	352013.8049	101468.00	2415.90	2267357.00	120874.1844	0.18
8/2/2024	2821.278098	417.22	352431.0289	86750.00	2065.48	2269422.48	120984.2962	0.20
8/7/2024	2870.012812	465.96	352896.9875	93906.00	2235.86	2271658.33	121103.4911	0.21
8/8/2024	2877.227771	473.17	353370.1612	103752.00	2470.29	2274128.62	121235.1835	0.19
8/12/2024	2867.685677	463.63	353833.7927	81854.00	1948.90	2276077.52	121339.0808	0.24
8/14/2024	2866.647042	462.59	354296.3856	84291.00	2006.93	2278084.45	121446.0714	0.23
8/15/2024	2880.534752	476.48	354772.8662	27297.00	649.93	2278734.38	121480.7195	0.73
8/16/2024	2892.178798	488.12	355260.9909	74066.00	1763.48	2280497.86	121574.7315	0.28
8/20/2024	2901.230882	497.18	355758.1676	43760.00	1041.90	2281539.76	121630.2761	0.48
8/22/2024	2910.556841	506.50	356264.6703	85471.00	2035.02	2283574.79	121738.7644	0.25
8/23/2024	2972.061429	568.01	356832.6776	60263.00	1434.83	2285009.62	121815.2563	0.40
8/27/2024	2836.808508	432.75	357265.432	107055.00	2548.93	2287558.55	121951.1412	0.17
8/29/2024	2858.377442	454.32	357719.7553	54669.00	1301.64	2288860.19	122020.5326	0.35
9/5/2024	2750.477601	346.42	358066.1787	108308.00	2578.76	2291438.95	122158.008	0.13
9/6/2024	2689.46259	285.41	358351.5872	113529.00	2703.07	2294142.02	122302.1104	0.11
9/11/2024	2731.25191	327.20	358678.7849	93670.00	2230.24	2296372.26	122421.0057	0.15
9/13/2024	2726.575579	322.52	359001.3064	65814.00	1567.00	2297939.26	122504.5434	0.21
9/18/2024	2733.030882	328.98	359330.2831	52401.00	1247.64	2299186.90	122571.056	0.26
9/19/2024	2737.942606	333.89	359664.1716	124250.00	2958.33	2302145.24	122728.7666	0.11
9/20/2024	2734.090908	330.04	359994.2084	53373.00	1270.79	2303416.02	122796.5129	0.26
9/24/2024	2715.9732	311.92	360306.1274	104064.00	2477.71	2305893.74	122928.6014	0.13
9/26/2024	2735.223114	331.17	360637.2964	109835.00	2615.12	2308508.86	123068.015	0.13
10/1/2024	2909.292009	505.24	361142.5343	110113.00	2621.74	2311130.60	123207.7815	0.19
10/3/2024	2904.73259	500.68	361643.2127	113317.00	2698.02	2313828.62	123351.6147	0.19
10/8/2024	2905.998204	501.94	362145.1568	98789.00	2352.12	2316180.74	123477.0077	0.21
10/10/2024	2898.781392	494.73	362639.884	55699.00	1326.17	2317506.90	123547.7064	0.37
10/11/2024	2900.704143	496.65	363136.534	52544.00	1251.05	2318757.95	123614.4005	0.40
10/15/2024	2911.177855	507.12	363643.6577	94162.00	2241.95	2320999.90	123733.9204	0.23
10/16/2024	2915.090722	511.04	364154.6943	127725.00	3041.07	2324040.98	123896.0417	0.17
10/18/2024	2921.944342	517.89	364672.5845	222139.00	5289.02	2329330.00	124178.0028	0.10
10/22/2024	2952.147178	548.09	365220.6776	74285.00	1768.69	2331098.69	124272.2928	0.31
10/24/2024	2917.677563	513.62	365734.301	73734.00	1755.57	2332854.26	124365.8834	0.29
10/27/2024	2922.219793	518.17	366252.4666	40516.00	964.67	2333818.93	124417.3103	0.54
10/31/2024	2890.677563	486.62	366739.0901	67396.00	1604.67	2335423.60	124502.8561	0.30
11/1/2024	2905.729975	501.68	367240.7659	103958.00	2475.19	2337898.79	124634.81	0.20
11/4/2024	2897.358055	493.30	367734.0698	80998.00	1928.52	2339827.31	124737.6208	0.26
11/6/2024	2891.358055	487.30	368221.3737	79123.00	1883.88	2341711.19	124838.0516	0.26
11/8/2024	2879.002268	474.95	368696.3219	91908.00	2188.29	2343899.48	124954.7105	0.22
11/11/2024	2937.445805	533.39	369229.7135	104360.00	2484.76	2346384.24	125087.1747	0.21
11/12/2024	2915.193696	511.14	369740.8531	103323.00	2460.07	2348844.31	125218.3226	0.21
11/13/2024	2926.034755	521.98	370262.8337	135010.00	3214.52	2352058.83	125389.6908	0.16
11/14/2024	2935.034755	530.98	370793.8143	394345.00	9389.17	2361448.00	125890.233	0.06
11/15/2024	2932.668995	528.61	371322.4292	519256.00	12363.24	2373811.24	126549.3248	0.04

11/18/2024	2941.609496	537.56	371859.9845	127136.00	3027.05	2376838.29	126710.6985	0.18
11/19/2024	2963.853891	559.80	372419.7843	194528.00	4631.62	2381469.90	126957.6129	0.12
11/20/2024	2940.844928	536.79	372956.5751	125445.00	2986.79	2384456.69	127116.8403	0.18
11/21/2024	2948.125025	544.07	373500.6459	114864.00	2734.86	2387191.55	127262.6372	0.20
11/22/2024	2931.936498	527.88	374028.5283	163326.00	3888.71	2391080.26	127469.9469	0.14
11/23/2024	2920.936498	516.88	374545.4107	135058.00	3215.67	2394295.93	127641.3761	0.16
11/25/2024	2895.51574	491.46	375036.8723	101162.00	2408.62	2396704.55	127769.781	0.20
11/26/2024	2905.501242	501.45	375538.3194	150076.00	3573.24	2400277.79	127960.2725	0.14
11/27/2024	2893.115659	489.06	376027.3809	120117.00	2859.93	2403137.71	128112.7371	0.17
12/2/2024	2895.031674	490.98	376518.3584	200587.00	4775.88	2407913.60	128367.3422	0.10
12/3/2024	2896.950075	492.90	377011.2543	158851.00	3782.17	2411695.76	128568.9718	0.13
12/4/2024	2883.917683	479.86	377491.1179	143030.00	3405.48	2415101.24	128750.5198	0.14
12/5/2024	2893.026098	488.97	377980.0898	168994.00	4023.67	2419124.90	128965.024	0.12
12/6/2024	2857.628332	453.57	378433.664	168756.00	4018.00	2423142.90	129179.226	0.11
12/9/2024	2894.358124	490.30	378923.968	118119.00	2812.36	2425955.26	129329.1545	0.17
12/11/2024	2898.510751	494.46	379418.4246	139264.00	3315.81	2429271.07	129505.9223	0.15
12/12/2024	2885.548686	481.49	379899.9192	134698.00	3207.10	2432478.17	129676.8945	0.15
12/13/2024	2859.058297	455.00	380354.9233	122284.00	2911.52	2435389.69	129832.1096	0.16
12/16/2024	2914.028132	509.97	380864.8973	125355.00	2984.64	2438374.33	129991.2227	0.17
12/17/2024	2931.443504	527.39	381392.2867	98701.00	2350.02	2440724.36	130116.5039	0.22
12/18/2024	2912.924342	508.87	381901.1569	98777.00	2351.83	2443076.19	130241.8816	0.22
12/19/2024	2880.770766	476.72	382377.8735	90660.00	2158.57	2445234.76	130356.9564	0.22
12/20/2024	2904.058913	500.00	382877.8783	103997.00	2476.12	2447710.88	130488.9598	0.20
12/26/2024	2892.532232	488.48	383366.3564	83812.00	1995.52	2449706.40	130595.3424	0.24
12/30/2024	2919.572931	515.52	383881.8752	100055.00	2382.26	2452088.67	130722.3422	0.22
1/3/2025	2903.068913	490.59	384372.4689	85437.00	2034.21	2454122.88	132326.84784	0.24
1/7/2025	2917.934342	505.46	384877.9281	67487.00	1606.83	2455729.71	13252.06213	0.31
1/8/2025	2915.557578	503.08	385381.0106	98902.00	2354.81	2458084.52	13274.35863	0.21
1/9/2025	2904.480837	492.01	385873.0163	97347.00	2317.79	2460402.31	13296.30457	0.21
1/10/2025	2903.34744	490.87	386363.8886	4848.00	115.43	2460517.74	13297.3975	4.25
1/14/2025	2916.89517	504.42	386868.3086	67258.00	1601.38	2462119.12	13312.56017	0.31
1/16/2025	2883.629031	471.15	387339.4625	50402.00	1200.05	2463319.17	13323.92281	0.39
1/17/2025	2892.629031	480.15	387819.6164	47036.00	1119.90	2464439.07	13334.52663	0.43
1/22/2025	2898.784781	486.31	388305.9261	53281.00	1268.60	2465707.67	13346.53831	0.38
1/23/2025	2903.193696	490.72	388796.6446	106126.00	2526.81	2468234.48	13370.46339	0.19
1/27/2025	2889.968391	477.49	389274.1379	68557.00	1632.31	2469866.79	13385.91891	0.29
1/29/2025	2878.318401	465.84	389739.9812	56057.00	1334.69	2471201.48	13398.55641	0.35
1/30/2025	2887.573179	475.10	390215.0792	86695.00	2064.17	2473265.64	13418.10096	0.23
1/31/2025	2891.886957	479.41	390694.491	86497.00	2059.45	2475325.10	13437.60088	0.23
2/4/2025	2922.435805	509.96	391204.4517	88055.00	2096.55	2477421.64	13457.45203	0.24
2/6/2025	2903.735915	491.26	391695.7125	125550.00	2989.29	2480410.93	13485.75606	0.16
2/7/2025	2885.839987	473.36	392169.0773	100060.00	2382.38	2482793.31	13508.31362	0.20
2/10/2025	2859.735915	447.26	392616.3381	72419.00	1724.26	2484517.57	13524.63978	0.26
2/12/2025	2885.700043	473.22	393089.563	81211.00	1933.60	2486451.17	13542.94802	0.24
2/13/2025	2868.899506	456.42	393545.9874	69615.00	1657.50	2488108.67	13558.64205	0.28
2/14/2025	2868.426019	455.95	394001.9383	52689.00	1254.50	2489363.17	13570.52027	0.36
2/17/2025	2908.337788	495.86	394497.8009	69252.00	1648.86	2491012.02	13586.13247	0.30
2/18/2025	2902.007162	489.53	394987.333	18251.00	434.55	2491446.57	13590.24698	1.13
2/24/2025	2946.086501	533.61	395520.9443	73112.00	1740.76	2493187.33	13606.72937	0.31
2/25/2025	2998.358207	585.88	396106.8274	166224.00	3957.71	2497145.05	13644.20297	0.15
2/26/2025	2999.308435	586.83	396693.6607	145748.00	3470.19	2500615.24	13677.06044	0.17
2/27/2025	2955.700043	543.22	397236.8856	133207.00	3171.60	2503786.83	13707.09067	0.17
2/28/2025	2938.310594	525.84	397762.7211	117031.00	2786.45	2506573.29	13733.47418	0.19
3/3/2025	2968.253874	555.78	398318.4998	102177.00	2432.79	2509006.07	13756.509	0.23
3/4/2025	3013.378124	600.90	398919.4028	179938.00	4284.24	2513290.31	13797.07428	0.14
3/5/2025	2988.841949	576.37	399495.7696	221376.00	5270.86	2518561.17	13846.98136	0.11
3/6/2025	2977.159011	564.68	400060.4535	238476.00	5678.00	2524239.17	13900.74347	0.10
3/7/2025	2966.393513	553.92	400614.3719	318219.00	7576.64	2531815.81	13972.48287	0.07
3/8/2025	2986.662153	574.19	401188.5589	101610.00	2419.29	2534235.10	13995.38986	0.24
3/10/2025	2989.714143	577.24	401765.7979	125828.00	2995.90	2537231.00	14023.75657	0.19
3/11/2025	3001.586106	589.11	402354.9089	226256.00	5387.05	2542618.05	14074.76379	0.11
3/12/2025	2939.272267	526.80	402881.706	130512.00	3107.43	2545725.48	14104.18646	0.17
3/13/2025	2936.966842	524.49	403406.1977	171756.00	4089.43	2549814.90	14142.90719	0.13
3/14/2025	2909.203696	496.73	403902.9263	120915.00	2878.93	2552693.83	14170.16631	0.17
3/15/2025	2947.641696	535.17	404438.0928	141537.00	3369.93	2556063.76	14202.07446	0.16
3/17/2025	2960.495534	548.02	404986.1132	198412.00	4724.10	2560787.86	14246.80453	0.12
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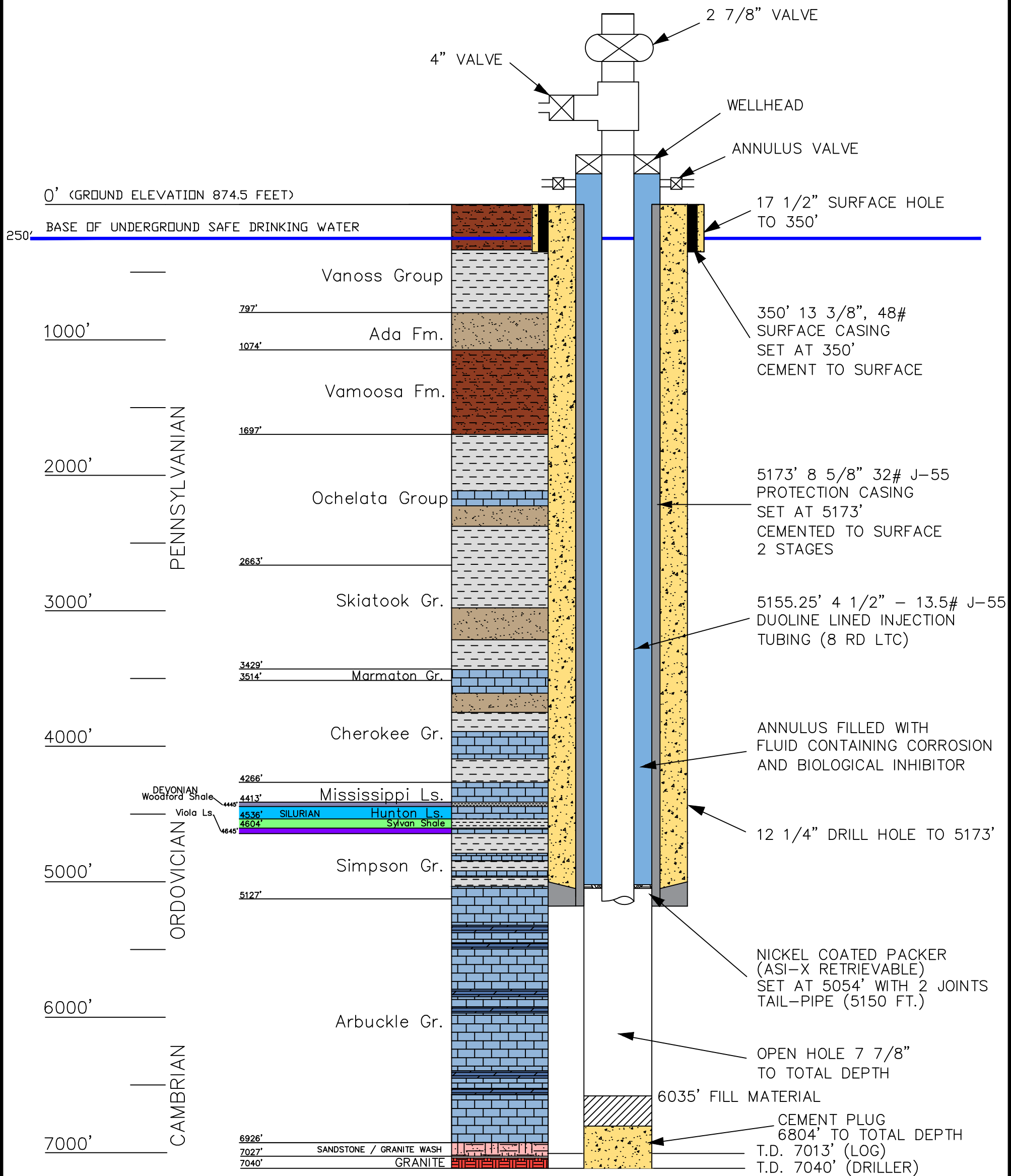
3/19/2025	3002.271963	589.80	406145.1309	67444.00	1605.81	2568975.57	24324.32985	0.37
3/20/2025	2970.233111	557.76	406702.8889	71676.00	1706.57	2570682.14	24340.48851	0.33
3/21/2025	2999.413513	586.94	407289.8273	43708.00	1040.67	2571722.81	24350.34206	0.56
3/24/2025	2977.849362	565.37	407855.2015	41351.00	984.55	2572707.36	24359.66424	0.57
3/25/2025	2968.338435	555.86	408411.0648	38432.00	915.05	2573622.40	24368.32837	0.61
3/27/2025	2849.972051	437.50	408848.5617	44460.00	1058.57	2574680.98	24378.35144	0.41
3/28/2025	2913.888251	501.41	409349.9749	23674.00	563.67	2575244.64	24383.68852	0.89
4/3/2025	2860.147433	447.67	409797.6472	122610.00	2919.29	2578163.93	24411.32976	0.15
4/4/2025	2892.992086	480.52	410278.1641	128640.00	3062.86	2581226.79	24440.3304	0.16
4/7/2025	2904.2761	491.80	410769.9651	126358.00	3008.52	2584235.31	24468.81659	0.16
4/8/2025	2913.495588	501.02	411270.9855	124442.00	2962.90	2587198.21	24496.87084	0.17
4/9/2025	2886.841406	474.37	411745.3518	139341.00	3317.64	2590515.86	24528.28392	0.14
4/10/2025	2846.638096	434.16	412179.5148	66977.00	1594.69	2592110.55	24543.38324	0.27
4/12/2025	2843.824124	431.35	412610.8638	91948.00	2189.24	2594299.79	24564.11202	0.20
4/14/2025	2836.938596	424.46	413035.3272	105687.00	2516.36	2596816.14	24587.93814	0.17
4/16/2025	2854.569537	442.09	413477.4216	123018.00	2929.00	2599745.14	24615.67135	0.15
4/17/2025	2892.661339	480.19	413957.6078	129184.00	3075.81	2602820.95	24644.79464	0.16
4/18/2025	2896.914957	484.44	414442.0476	125095.00	2978.45	2605799.40	24672.9961	0.16
4/21/2025	2888.503984	476.03	414918.0765	102555.00	2441.79	2608241.19	24696.11613	0.19
4/22/2025	2895.103049	482.63	415400.7044	167383.00	3985.31	2612226.50	24733.85101	0.12
4/23/2025	2890.005932	477.53	415878.2352	212643.00	5062.93	2617289.43	24781.78932	0.09
4/24/2025	2897.410929	484.94	416363.171	283860.00	6758.57	2624048.00	24845.78281	0.07
4/25/2025	2892.478451	480.00	416843.1743	273341.00	6508.12	2630556.12	24907.4049	0.07
4/26/2025	2910.494774	498.02	417341.194	251417.00	5986.12	2636542.24	24964.08443	0.08
4/28/2025	2901.980305	489.51	417830.6991	200463.00	4772.93	2641315.17	25009.27688	0.10
4/29/2025	2911.352027	498.88	418329.576	237126.00	5645.86	2646961.02	25062.73464	0.09
4/30/2025	2915.286478	502.81	418832.3874	285788.00	6804.48	2653765.50	25127.16278	0.07
5/1/2025	2921.722574	509.25	419341.6348	324401.00	7723.83	2661489.33	25200.29585	0.07
5/2/2025	2888.198001	475.72	419817.3577	207453.00	4939.36	2666428.69	25247.06413	0.10
5/3/2025	2914.707295	502.23	420319.5898	191670.00	4563.57	2670992.26	25290.27428	0.11
5/5/2025	2902.806054	490.33	420809.9208	201892.00	4806.95	2675799.21	25335.78888	0.10
5/6/2025	2927.434459	514.96	421324.8801	221892.00	5283.14	2681082.36	25385.81228	0.10
5/7/2025	2919.601881	507.13	421832.0068	229806.00	5471.57	2686553.93	25437.61982	0.09
5/8/2025	2908.898157	496.42	422328.4299	176686.00	4206.81	2690760.74	25477.45197	0.12
5/9/2025	2905.188549	492.71	422821.1433	195451.00	4653.60	2695414.33	25521.51451	0.11
5/10/2025	2849.11776	436.64	423257.7859	68204.00	1623.90	2697038.24	25536.89045	0.27
5/12/2025	2871.432765	458.96	423716.7435	144432.00	3438.86	2700477.10	25569.45124	0.13
5/13/2025	2960.334311	547.86	424264.6027	181996.00	4333.24	2704810.33	25610.48048	0.13
5/14/2025	2935.745491	523.27	424787.8731	140819.00	3352.83	2708163.17	25642.22677	0.16
5/15/2025	2815.434372	402.96	425190.8323	65129.00	1550.69	2709713.86	25656.90947	0.26
5/16/2025	2855.768835	443.29	425634.126	166084.00	3954.38	2713668.24	25694.3515	0.11
5/19/2025	2844.174649	431.70	426065.8255	96795.00	2304.64	2715972.88	25716.173	0.19
5/20/2025	2822.824963	410.35	426476.1753	118814.00	2828.90	2718801.79	25742.95847	0.15
5/21/2025	2854.589273	442.11	426918.2895	94436.00	2248.48	2721050.26	25764.24815	0.20
5/22/2025	2876.757258	464.28	427382.5716	106718.00	2540.90	2723591.17	25788.30669	0.18
5/23/2025	2873.618353	461.14	427843.7148	200100.00	4764.29	2728355.45	25833.4173	0.10
5/24/2025	2899.489891	487.01	428330.7296	123804.00	2947.71	2731303.17	25861.32772	0.17
5/27/2025	2893.372027	480.90	428811.6265	154050.00	3667.86	2734971.02	25896.0568	0.13
5/28/2025	2881.864349	469.39	429281.0157	178323.00	4245.79	2739216.81	25936.258	0.11
5/29/2025	2841.76193	429.29	429710.3025	146016.00	3476.57	2742693.38	25969.17589	0.12
5/30/2025	2840.184649	427.71	430138.012	161687.00	3849.69	2746543.07	26005.62666	0.11
5/31/2025	2790.824811	378.35	430516.3617	27876.00	663.71	2747206.79	26011.91104	0.57
6/2/2025	2878.48	466.01	430982.37	139556.00	3322.76	2750529.55	26043.37259	0.14
6/3/2025	2880.72	468.25	431450.61	181396.00	4318.95	2754848.50	26084.26657	0.11
6/4/2025	2869.69	457.21	431907.82	269336.00	6412.76	2761261.26	26144.98576	0.07
6/5/2025	2901.68	489.21	432397.03	235158.00	5599.00	2766860.26	26197.99986	0.09
6/6/2025	2929.98	517.51	432914.54	364451.00	8677.40	2775537.67	26280.16182	0.06
6/7/2025	2974.26	561.79	433476.33	300856.00	7163.24	2782700.90	26347.98689	0.08
6/9/2025	2972.83	560.35	434036.68	293609.00	6990.69	2789691.60	26414.1782	0.08
6/10/2025	2971.13	558.66	434595.34	307829.00	7329.26	2797020.86	26483.57528	0.08
6/11/2025	2943.67	531.20	435126.54	395800.00	9423.81	2806444.67	26572.80456	0.06
6/12/2025	2905.34	492.87	435619.40	413334.00	9841.29	2816285.95	26665.98672	0.05
6/13/2025	2918.97	506.50	436125.90	167468.00	3987.33	2820273.29	26703.74076	0.13
6/14/2025	2915.61	503.14	436629.04	106857.00	2544.21	2822817.50	26727.83064	0.20
6/16/2025	2961.83	549.36	437178.39	250306.00	5959.67	2828777.17	26784.2597	0.09
6/17/2025	2998.08	585.60	437764.00	256423.00	6105.31	2834882.48	26842.06779	0.10
6/18/2025	2990.01	577.53	438341.53	369962.00	8808.62	2843691.10	26925.47215	0.07

6/19/2025	2972.97	560.50	438902.03	369559.00	8799.02	2852490.12	27008.78565	0.06
6/20/2025	2966.29	553.81	439455.84	388207.00	9243.02	2861733.14	27096.30317	0.06
6/21/2025	2963.61	551.14	440006.98	301282.00	7173.38	2868906.52	27164.22428	0.08
6/23/2025	2976.43	563.95	440570.93	100358.00	2389.48	2871296.00	27186.84902	0.24
6/25/2025	2881.85	469.38	441040.30	107577.00	2561.36	2873857.36	27211.10122	0.18
6/26/2025	2947.99	535.52	441575.82	378931.00	9022.17	2882879.52	27296.52755	0.06
6/27/2025	2954.49	542.02	442117.84	269289.00	6411.64	2889291.17	27357.23615	0.08

APPENDIX E

WELL CONSTRUCTION SCHEMATIC





**A & M Engineering and
Environmental Services, Inc.**
Consulting - Design - Construction - Remediation

WELL CONSTRUCTION SCHEMATIC OF
MID-WAY ENVIRONMENTAL SERVICES, INC.
INJECTION WELL MES #1

SCALE: AS SHOWN	DATE: 10/29/2021	FIGURE NO. 1
APPROVED BY: TAT	DRAWN BY: TMF	PROJECT NO. 1706-006