# UICI-8-1

# QUARTERLY REPORTS (Q3)

# 2022

August 15, 2022

Mr. Carl Chavez, CHMM
New Mexico Oil Conservation Division (Albuquerque Office)
Energy, Minerals and Natural Resources Department
5200 Oakland Avenue, NE
Albuquerque, NM 87113

RE: 2022 3rd Quarter Injection Report for Wells WDW-1, WDW-2, WDW-3 and WDW-4 HF Sinclair.

Dear Mr. Chavez,

Enclosed, please find the third quarter 2022 sampling results for fluids injected into WDW-1, WDW-2, WDW-3 and WDW-4 and a table showing the various volumes and pressures as required under Permit Condition 2.1.1, Quarterly Reports.

Over the third quarter, the average injection pressure for each well is as reported, 1,065 psig for WDW-1, 1,043 psig for WDW-2, 939 psig for WDW-3 and 210 psig for WDW-4. The average flows for each well is reported as, WDW-1, 259 gpm, WDW-2, 221 gpm, WDW-3, 105 gpm and WDW-4, 247 gpm. There were no significant loses from the glycol expansion tanks Well Annulus Monitoring System (WAMS).The quarterly effluent analyses indicate parameters are within permit limits.

This report covers the period from April 1, 2022 to June 30, 2022. HF Sinclair has disposed a total of 2,566,284 barrels of fluid into the four wells during the fourth quarter 2022. The volume per well is:

- 798,171 barrels into WDW-1: 30-015-27592
- 682,971 barrels into WDW-2: 30-015-20894
- 322,971 barrels into WDW-3: 30-015-26575
- 762,171 barrels into WDW-4: 30-015-44677

This report is signed and certified in accordance with WQCC section 5101.G. If there are any questions or comments, please contact Randy Dade at 575-746-5281

Respectfully,

Kawika Tupou
Environmental Manager
HF Sinclair

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 3 | **2019 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES** | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | Average | Maximum | Minimum | | | | | TOTAL | | | |
| 8 | | Average | Maximum | Minimum | Average | Maximum | Minimum | Annular | Annular | Annular | Average | Maximum | Minimum | | CUMULATIVE | | | |
| 9 | | Pressure | Pressure | Pressure | Flow | Flow | Flow | Pressure | Pressure | Pressure | Volume | Volume | Volume | Volume | Volume | | | |
| 10 | | (psig) | (psig) | (psig) | (gpm) | (gpm) | (gpm) | Av (psig) | Mx (psig) | Mn (psig) | (bpd) | (bpd) | (bpd) | (barrels) | (barrels) | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | **30-015-27592 WDW-1** | | | | | | | | | | | | | **Previous Quar** | 43,261,695 | | | |
| 13 | Jan-19 | 1,272 | 1,400 | 897 | 248 | 301 | 80 | 576 | 734 | 219 | 263,589 | 319,920 | 85,029 | **263,589** | 43,525,284 | | | |
| 14 | Feb-19 | 1,270 | 1,400 | 885 | 196 | 293 | 97 | 364 | 576 | 170 | 188,160 | 281,280 | 103,097 | **188,160** | 43,713,444 | | | |
| 15 | Mar-19 | 1,184 | 1,356 | 1,100 | 125 | 150 | 106 | 456 | 701 | 323 | 132,857 | 159,429 | 112,663 | **132,857** | 43,846,301 | | | |
| 16 | Monthly Avg | 1,242 | | | 190 | | | | | | | | **TOTAL** | 584,606 | | | | |
| 17 | | | | | | | | | | | | | | | | | | |
| 18 | **30-015-20894 WDW-2** | | | | | | | | | | | | | **Previous Quar** | 27,836,942 | | | |
| 19 | Jan-19 | 1,262 | 1,400 | 932 | 71 | 94 | 8 | 390 | 543 | 230 | 75,463 | 99,909 | 8,503 | **75,463** | 27,912,405 | | | |
| 20 | Feb-19 | 1,252 | 1,381 | 1,057 | 64 | 81 | 29 | 410 | 588 | 284 | 61,440 | 77,760 | 27,840 | **61,440** | 27,973,845 | | | |
| 21 | Mar-19 | 1,157 | 1,300 | 1,044 | 50 | 77 | 26 | 432 | 659 | 304 | 53,143 | 81,840 | 27,634 | **53,143** | 28,026,988 | | | |
| 22 | Monthly Avg | 1,224 | | | 62 | | | | | | | | **TOTAL** | 190,046 | | | | |
| 23 | | | | | | | | | | | | | | | | | | |
| 24 | **30-015-26575 WDW-3** | | | | | | | | | | | | | **Previous Quar** | 19,438,780 | | | |
| 25 | Jan-19 | 1,177 | 1,400 | 906 | 87 | 144 | 0 | 741 | 938 | 598 | 92,469 | 153,051 | 0 | **92,469** | 19,531,249 | | | |
| 26 | Feb-19 | 1,116 | 1,258 | 899 | 69 | 109 | 0 | 700 | 930 | 561 | 66,240 | 104,640 | 0 | **66,240** | 19,597,489 | | | |
| 27 | Mar-19 | 1,064 | 1,151 | 999 | 56 | 86 | 25 | 659 | 839 | 592 | 59,520 | 91,406 | 26,571 | **59,520** | 19,657,009 | | | |
| 28 | Monthly Avg | 1,119 | | | 71 | | | | | | | | **TOTAL** | 218,229 | | | | |
| 29 | | | | | | | | | | | | | | | | | | |
| 30 | **30-015-44677 WDW-4** | | | | | | | | | | | | | **Previous Quar** | 0 | | | |
| 31 | Jan-19 | 58 | 89 | 37 | 422 | 683 | 178 | 152 | 227 | 107 | 202,560 | 327,840 | 72,960 | **202,560** | 202,560 | | | |
| 32 | Feb-19 | 50 | 98 | 36 | 238 | 729 | 82 | 159 | 226 | 111 | 228,480 | 699,840 | 78,720 | **228,480** | 431,040 | | | |
| 33 | Mar-19 | 80 | 337 | 51 | 263 | 351 | 192 | 167 | 253 | 96 | 279,531 | 373,063 | 204,069 | **279,531** | 710,571 | | | |
| 34 | Monthly Avg | 63 | | | 308 | | | | | | | | **TOTAL** | 710,571 | | | | |
| 35 | | | | | | | | | | | | | | | | | | |
| 36 | | | | | | | | | | | | | | Total BBLS | Beginning Volume | Ending Volume | | |
| 37 | | | | | | | | | | | | | **WDW1** | 584,606 | 43,261,695 | 43,846,301 | | |
| 38 | | | | | | | | | | | | | **WDW2** | 190,046 | 27,836,942 | 28,026,988 | | |
| 39 | | | | | | | | | | | | | **WDW3** | 218,229 | 19,438,780 | 19,657,009 | | |
| 40 | | | | | | | | | | | | | **WDW4** | 710,571 | 0 | 710,571 | | |
| 41 | | | | | | | | | | | | | | 1,703,452 | 90,537,417 | 92,240,869 | | |

## 2022 THIRD QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | Average Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | Volume (barrels) | TOTAL CUMULATIVE Volume (barrels) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | 49,129,653 |
| Apr-22 | 1,114 | 249 | 313 | 171 | 113 | 911 | 0 | 8,537 | 10,731 | 5,863 | **256,114** | 49,385,767 |
| May-22 | 1,020 | 275 | 340 | 221 | 587 | 1,004 | 296 | 9,428 | 11,657 | 7,587 | **282,857** | 49,668,624 |
| Jun-22 | 1,062 | 252 | 332 | 105 | 598 | 865 | 255 | 8,640 | 11,382 | 3,600 | **259,200** | 49,927,824 |
| Monthly Avg | 1,065 | 259 | | | | | | | | **TOTAL** | 798,171 | |
| **30-015-20894 WDW-2** | | | | | | | | | | | | 30,074,730 |
| Apr-22 | 1,000 | 223 | 302 | 157 | 965 | 1,243 | 709 | 7,646 | 10,354 | 5,383 | **229,371** | 30,304,101 |
| May-22 | 1,102 | 225 | 320 | 163 | 864 | 1,197 | 626 | 7,714 | 10,921 | 5,388 | **231,429** | 30,535,530 |
| Jun-22 | 1,026 | 216 | 303 | 74 | 708 | 880 | 534 | 7,406 | 10,389 | 2,537 | **222,171** | 30,757,701 |
| Monthly Avg | 1,043 | 221 | | | | | | | | **TOTAL** | 682,971 | |
| **30-015-26575 WDW-3** | | | | | | | | | | | | 21,928,710 |
| Apr-22 | 881 | 95 | 118 | 58 | 444 | 746 | 128 | 3,257 | 4,046 | 1,989 | **97,714** | 22,026,424 |
| May-22 | 979 | 112 | 131 | 69 | 258 | 491 | 32 | 3,840 | 4,491 | 2,366 | **115,200** | 22,141,624 |
| Jun-22 | 958 | 107 | 125 | 60 | 449 | 676 | 189 | 3,669 | 4,286 | 2,057 | **110,057** | 22,251,681 |
| Monthly Avg | 939 | 105 | | | | | | | | **TOTAL** | 322,971 | |
| **30-015-44677 WDW-4** | | | | | | | | | | | | 7,892,024 |
| Apr-22 | 170 | 195 | 298 | 100 | 178 | 261 | 97 | 6,686 | 10,217 | 3,429 | **200,571** | 8,092,595 |
| May-22 | 209 | 249 | 285 | 198 | 213 | 265 | 166 | 8,537 | 9,771 | 6,789 | **256,114** | 8,348,709 |
| Jun-22 | 251 | 297 | 352 | 248 | 197 | 249 | 137 | 10,183 | 12,069 | 8,503 | **305,486** | 8,654,195 |
| Monthly Avg | 210 | 247 | | | | | | | | **TOTAL** | 762,171 | |

| | Total BBLS | Beginning Volume | Ending Volume |
|---|---|---|---|
| **WDW1** | 798,171 | 49,129,653 | 49,927,824 |
| **WDW2** | 682,971 | 30,074,730 | 30,757,701 |
| **WDW3** | 322,971 | 21,928,710 | 22,251,681 |
| **WDW4** | 762,171 | 7,892,024 | 8,654,195 |

## 2019 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | | Average Pressure (psig) | Maximum Pressure (psig) | Minimum Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | V (b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,272 | 1,400 | 897 | 248 | 301 | 80 | 576 | 734 | 219 | 263,589 | 319,920 | 85,029 | 2 |
| Feb-19 | 1,270 | 1,400 | 885 | 196 | 293 | 97 | 364 | 576 | 170 | 188,160 | 281,280 | 103,097 | 1 |
| Mar-19 | 1,184 | 1,356 | 1,100 | 125 | 150 | 106 | 456 | 701 | 323 | 132,857 | 159,429 | 112,663 | 1 |
| Monthly Avg | 1,242 | | | 190 | | | | | | | | TOTAL | 5 |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,262 | 1,400 | 932 | 71 | 94 | 8 | 390 | 543 | 230 | 75,463 | 99,909 | 8,503 | 7 |
| Feb-19 | 1,252 | 1,381 | 1,057 | 64 | 81 | 29 | 410 | 588 | 284 | 61,440 | 77,760 | 27,840 | 6 |
| Mar-19 | 1,157 | 1,300 | 1,044 | 50 | 77 | 26 | 432 | 659 | 304 | 53,143 | 81,840 | 27,634 | 5 |
| Monthly Avg | 1,224 | | | 62 | | | | | | | | TOTAL | 1 |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,177 | 1,400 | 906 | 87 | 144 | 0 | 741 | 938 | 598 | 92,469 | 153,051 | 0 | 9 |
| Feb-19 | 1,116 | 1,258 | 899 | 69 | 109 | 0 | 700 | 930 | 561 | 66,240 | 104,640 | 0 | 6 |
| Mar-19 | 1,064 | 1,151 | 999 | 56 | 86 | 25 | 659 | 839 | 592 | 59,520 | 91,406 | 26,571 | 5 |
| Monthly Avg | 1,119 | | | 71 | | | | | | | | TOTAL | 2 |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | | Previo |
| Jan-19 | 58 | 89 | 37 | 422 | 683 | 178 | 152 | 227 | 107 | 202,560 | 327,840 | 72,960 | 2 |
| Feb-19 | 50 | 98 | 36 | 238 | 729 | 82 | 159 | 226 | 111 | 228,480 | 699,840 | 78,720 | 2 |
| Mar-19 | 80 | 337 | 51 | 263 | 351 | 192 | 167 | 253 | 96 | 279,531 | 373,063 | 204,069 | 2 |
| Monthly Avg | 63 | | | 308 | | | | | | | | TOTAL | 7 |

# 2022 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | Average INJ. Pressure (psig) | Maximum INJ. Pressure (psig) | Minimum INJ. Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | Volu (barr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | |
| Oct-21 | 993 | 1,205 | 719 | 228 | 292 | 116 | 81 | 257 | 5 | 7,817 | 10,011 | 3,977 | **242,** |
| Nov-21 | 1,111 | 1,228 | 780 | 208 | 255 | 159 | 37 | 142 | 0 | 7,131 | 8,743 | 5,451 | **299,** |
| Dec-21 | 1,126 | 1,248 | 996 | 217 | 265 | 162 | 51 | 118 | 16 | 7,440 | 9,086 | 5,554 | **312,** |
| Monthly Avg | 1,077 | | | 218 | | | | | | | | **TOTAL** | 854, |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | |
| Oct-21 | 987 | 1,123 | 0 | 77 | 91 | 53 | 295 | 574 | 96 | 2,640 | 3,120 | 1,817 | **81,8** |
| Nov-21 | 1,034 | 1,254 | 790 | 82 | 110 | 41 | 177 | 384 | 96 | 2,811 | 3,771 | 1,406 | **118,** |
| Dec-21 | 993 | 1,145 | 891 | 90 | 106 | 73 | 146 | 323 | 104 | 3,086 | 3,634 | 2,503 | **129,** |
| Monthly Avg | 1,005 | | | 83 | | | | | | | | **TOTAL** | 329, |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | |
| Oct-21 | 894 | 1,000 | 0 | 113 | 141 | 75 | 309 | 490 | 180 | 3,874 | 4,834 | 2,571 | **120,** |
| Nov-21 | 874 | 952 | 772 | 103 | 125 | 82 | 441 | 644 | 225 | 3,531 | 4,286 | 2,811 | **148,** |
| Dec-21 | 868 | 930 | 735 | 94 | 113 | 54 | 460 | 626 | 398 | 3,223 | 3,068 | 1,851 | **135,** |
| Monthly Avg | 879 | | | 103 | | | | | | | | **TOTAL** | 403, |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | |
| Oct-21 | 145 | 187 | 0 | 155 | 253 | 88 | 84 | 189 | 52 | 5,314 | 8,674 | 3,017 | **164,** |
| Nov-21 | 143 | 180 | 119 | 159 | 249 | 77 | 79 | 124 | 53 | 5,451 | 8,537 | 2,640 | **228,** |
| Dec-21 | 171 | 189 | 160 | 240 | 284 | 208 | 94 | 125 | 71 | 8,229 | 9,737 | 7,131 | **345,** |
| Monthly Avg | 153 | | | 185 | | | | | | | | **TOTAL** | 89, |

Total
**WDW1** 854,
**WDW2** 329,

## 2019 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | | Average Pressure (psig) | Maximum Pressure (psig) | Minimum Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | V (b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | | Previo |
| Jan-19 | | 1,272 | 1,400 | 897 | 248 | 301 | 80 | 576 | 734 | 219 | 263,589 | 319,920 | 85,029 | 2 |
| Feb-19 | | 1,270 | 1,400 | 885 | 196 | 293 | 97 | 364 | 576 | 170 | 188,160 | 281,280 | 103,097 | 1 |
| Mar-19 | | 1,184 | 1,356 | 1,100 | 125 | 150 | 106 | 456 | 701 | 323 | 132,857 | 159,429 | 112,663 | 1 |
| Monthly Avg | | 1,242 | | | 190 | | | | | | | | TOTAL | 5 |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | | Previo |
| Jan-19 | | 1,262 | 1,400 | 932 | 71 | 94 | 8 | 390 | 543 | 230 | 75,463 | 99,909 | 8,503 | 7 |
| Feb-19 | | 1,252 | 1,381 | 1,057 | 64 | 81 | 29 | 410 | 588 | 284 | 61,440 | 77,760 | 27,840 | 6 |
| Mar-19 | | 1,157 | 1,300 | 1,044 | 50 | 77 | 26 | 432 | 659 | 304 | 53,143 | 81,840 | 27,634 | 5 |
| Monthly Avg | | 1,224 | | | 62 | | | | | | | | TOTAL | 1 |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | | Previo |
| Jan-19 | | 1,177 | 1,400 | 906 | 87 | 144 | 0 | 741 | 938 | 598 | 92,469 | 153,051 | 0 | 9 |
| Feb-19 | | 1,116 | 1,258 | 899 | 69 | 109 | 0 | 700 | 930 | 561 | 66,240 | 104,640 | 0 | 6 |
| Mar-19 | | 1,064 | 1,151 | 999 | 56 | 86 | 25 | 659 | 839 | 592 | 59,520 | 91,406 | 26,571 | 5 |
| Monthly Avg | | 1,119 | | | 71 | | | | | | | | TOTAL | 2 |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | | Previo |
| Jan-19 | | 58 | 89 | 37 | 422 | 683 | 178 | 152 | 227 | 107 | 202,560 | 327,840 | 72,960 | 2 |
| Feb-19 | | 50 | 98 | 36 | 238 | 729 | 82 | 159 | 226 | 111 | 228,480 | 699,840 | 78,720 | 2 |
| Mar-19 | | 80 | 337 | 51 | 263 | 351 | 192 | 167 | 253 | 96 | 279,531 | 373,063 | 204,069 | 2 |
| Monthly Avg | | 63 | | | 308 | | | | | | | | TOTAL | 7 |

# 2022 SECOND QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | Average INJ. Pressure (psig) | Maximum INJ. Pressure | Minimum INJ. Pressure | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | Volu (barr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | |
| Jan-22 | 917 | 1,128 | 578 | 193 | 263 | 108 | 18 | 46 | 0 | 6,617 | 9,017 | 3,703 | **205,** |
| Feb-22 | 858 | 1,136 | 422 | 200 | 266 | 80 | 0 | 3 | 0 | 6,857 | 9,120 | 2,743 | **192,** |
| Mar-22 | 1,158 | 1,335 | 804 | 237 | 282 | 125 | 1 | 7 | 0 | 8,126 | 9,669 | 4,286 | **251,** |
| Monthly Avg | 978 | | | 210 | | | | | | | | **TOTAL** | 649, |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | |
| Jan-22 | 907 | 1,077 | 600 | 122 | 172 | 76 | 410 | 1,219 | 91 | 4,183 | 5,897 | 2,606 | **129,** |
| Feb-22 | 814 | 1,028 | 685 | 81 | 137 | 0 | 818 | 987 | 478 | 2,777 | 4,697 | 0 | **77,7** |
| Mar-22 | 1,010 | 1,146 | 827 | 102 | 190 | 50 | 786 | 1,196 | 427 | 3,497 | 6,514 | 6,000 | **108,** |
| Monthly Avg | 910 | | | 102 | | | | | | | | **TOTAL** | 315, |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | |
| Jan-22 | 786 | 976 | 697 | 69 | 122 | 41 | 459 | 1,047 | 62 | 2,366 | 4,183 | 1,406 | **73,3** |
| Feb-22 | 760 | 876 | 685 | 70 | 291 | 7 | 585 | 1,188 | 292 | 2,400 | 9,977 | 240 | **67,2** |
| Mar-22 | 881 | 1,000 | 779 | 97 | 125 | 70 | 595 | 921 | 319 | 3,326 | 4,286 | 2,400 | **103,** |
| Monthly Avg | 809 | | | 79 | | | | | | | | **TOTAL** | 243, |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | |
| Jan-22 | 230 | 682 | 155 | 308 | 541 | 191 | 118 | 223 | 43 | 10,560 | 18,549 | 6,549 | **327,** |
| Feb-22 | 339 | 1500 | 150 | 364 | 542 | 164 | 176 | 239 | 110 | 12,480 | 18,583 | 5,623 | **349,** |
| Mar-22 | 167 | 184 | 146 | 200 | 238 | 123 | 160 | 247 | 63 | 6,857 | 8,160 | 4,217 | **212,** |
| Monthly Avg | 245 | | | 291 | | | | | | | | **TOTAL** | 89, |

Total
**WDW1** 49,
**WDW2** 315,

## 2019 FIRST QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | | Average Pressure (psig) | Maximum Pressure (psig) | Minimum Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | V (b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,272 | 1,400 | 897 | 248 | 301 | 80 | 576 | 734 | 219 | 263,589 | 319,920 | 85,029 | 2 |
| Feb-19 | 1,270 | 1,400 | 885 | 196 | 293 | 97 | 364 | 576 | 170 | 188,160 | 281,280 | 103,097 | 1 |
| Mar-19 | 1,184 | 1,356 | 1,100 | 125 | 150 | 106 | 456 | 701 | 323 | 132,857 | 159,429 | 112,663 | 1 |
| Monthly Avg | 1,242 | | | 190 | | | | | | | | TOTAL | 5 |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,262 | 1,400 | 932 | 71 | 94 | 8 | 390 | 543 | 230 | 75,463 | 99,909 | 8,503 | 7 |
| Feb-19 | 1,252 | 1,381 | 1,057 | 64 | 81 | 29 | 410 | 588 | 284 | 61,440 | 77,760 | 27,840 | 6 |
| Mar-19 | 1,157 | 1,300 | 1,044 | 50 | 77 | 26 | 432 | 659 | 304 | 53,143 | 81,840 | 27,634 | 5 |
| Monthly Avg | 1,224 | | | 62 | | | | | | | | TOTAL | 1 |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | | Previo |
| Jan-19 | 1,177 | 1,400 | 906 | 87 | 144 | 0 | 741 | 938 | 598 | 92,469 | 153,051 | 0 | 9 |
| Feb-19 | 1,116 | 1,258 | 899 | 69 | 109 | 0 | 700 | 930 | 561 | 66,240 | 104,640 | 0 | 6 |
| Mar-19 | 1,064 | 1,151 | 999 | 56 | 86 | 25 | 659 | 839 | 592 | 59,520 | 91,406 | 26,571 | 5 |
| Monthly Avg | 1,119 | | | 71 | | | | | | | | TOTAL | 2 |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | | Previo |
| Jan-19 | 58 | 89 | 37 | 422 | 683 | 178 | 152 | 227 | 107 | 202,560 | 327,840 | 72,960 | 2 |
| Feb-19 | 50 | 98 | 36 | 238 | 729 | 82 | 159 | 226 | 111 | 228,480 | 699,840 | 78,720 | 2 |
| Mar-19 | 80 | 337 | 51 | 263 | 351 | 192 | 167 | 253 | 96 | 279,531 | 373,063 | 204,069 | 2 |
| Monthly Avg | 63 | | | 308 | | | | | | | | TOTAL | 7 |

# 2022 THIRD QUARTER MONTHLY INJECTION PRESSURES, RATES, AND VOLUMES

| | Average INJ Pressure (psig) | Maximum INJ Pressure (psig) | Minimum INJ Pressure (psig) | Average Flow (gpm) | Maximum Flow (gpm) | Minimum Flow (gpm) | Average Annular Pressure Av (psig) | Maximum Annular Pressure Mx (psig) | Minimum Annular Pressure Mn (psig) | Average Volume (bpd) | Maximum Volume (bpd) | Minimum Volume (bpd) | Volu (barr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **30-015-27592 WDW-1** | | | | | | | | | | | | | |
| Apr-22 | 1,114 | 1,333 | 883 | 249 | 313 | 171 | 113 | 911 | 0 | 8,537 | 10,731 | 5,863 | **256,** |
| May-22 | 1,020 | 1,187 | 504 | 275 | 340 | 221 | 587 | 1,004 | 296 | 9,428 | 11,657 | 7,587 | **282,** |
| Jun-22 | 1,062 | 1,163 | 849 | 252 | 332 | 105 | 598 | 865 | 255 | 8,640 | 11,382 | 3,600 | **259,** |
| Monthly Avg | 1,065 | | | 259 | | | | | | | | **TOTAL** | 798, |
| **30-015-20894 WDW-2** | | | | | | | | | | | | | |
| Apr-22 | 1,000 | 1,092 | 837 | 223 | 302 | 157 | 965 | 1,243 | 709 | 7,646 | 10,354 | 5,383 | **229,** |
| May-22 | 1,102 | 1,250 | 921 | 225 | 320 | 163 | 864 | 1,197 | 626 | 7,714 | 10,921 | 5,388 | **231,** |
| Jun-22 | 1,026 | 1,143 | 851 | 216 | 303 | 74 | 708 | 880 | 534 | 7,406 | 10,389 | 2,537 | **222,** |
| Monthly Avg | 1,043 | | | 221 | | | | | | | | **TOTAL** | 682, |
| **30-015-26575 WDW-3** | | | | | | | | | | | | | |
| Apr-22 | 881 | 983 | 735 | 95 | 118 | 58 | 444 | 746 | 128 | 3,257 | 4,046 | 1,989 | **97,7** |
| May-22 | 979 | 1,150 | 764 | 112 | 131 | 69 | 258 | 491 | 32 | 3,840 | 4,491 | 2,366 | **115,** |
| Jun-22 | 958 | 1,066 | 602 | 107 | 125 | 60 | 449 | 676 | 189 | 3,669 | 4,286 | 2,057 | **110,** |
| Monthly Avg | 939 | | | 105 | | | | | | | | **TOTAL** | 322, |
| **30-015-44677 WDW-4** | | | | | | | | | | | | | |
| Apr-22 | 170 | 204 | 136 | 195 | 298 | 100 | 178 | 261 | 97 | 6,686 | 10,217 | 3,429 | **200,** |
| May-22 | 209 | 237 | 178 | 249 | 285 | 198 | 213 | 265 | 166 | 8,537 | 9,771 | 6,789 | **256,** |
| Jun-22 | 251 | 304 | 215 | 297 | 352 | 248 | 197 | 249 | 137 | 10,183 | 12,069 | 8,503 | **305,** |
| Monthly Avg | 210 | | | 247 | | | | | | | | **TOTAL** | 862, |

Total

| | |
|---|---|
| **WDW1** | 798, |
| **WDW2** | 682, |

**From:** Holder, Mike
**To:** Chavez, Carl, EMNRD
**Cc:** Goetze, Phillip, EMNRD; Holder, Mike; Tupou, Kawika
**Subject:** RE: [EXTERNAL] HF Sinclair Navajo Refining, LLC: Status of RDU Sampling Plan Implementation
**Date:** Monday, November 21, 2022 7:30:53 PM
**Attachments:** RDU production 21 Nov 2022.pdf

Carl,

In the January 28, 2022 (revised March 11, 2022) letter entitled "Verification of Non-Hazardous Injection Fluids from RDU Process – Pilot Sampling Plan" (PSP), we described the conditions appropriate for sampling the Refinery/RDU WWTP discharge to the UIC wells (and cooling tower blowdown to the City of Artesia POTW) after the RDU is online. Page 2 of 3 of Appendix A states this condition as when "the RDU is online and corresponding operations are normal and representative". When this condition is met, 4 sample events will occur once per week for a total of 4 weeks.

Normal and representative operating conditions do not necessarily mean "full-scale" or "full-rate" operations. We interpret full-rate to be the RDU design production of 9,000 bpd. However, actual RDU operations may not be able sustain this design level for four consecutive weeks due to such general factors as existing refinery operational limitations and RDU product margin (market) conditions.

The RDU was intended to normally run between a minimum of 4,500 bpd to a maximum of 9,000 bpd. Based on the current business climate, our plans are to run as close to 9,000 bpd through most of the end of the year (i.e., during the PSP 4 week post-RDU sampling period) but the following issues can influence that rate.

The RDU is a significant hydrogen consumer and requires Navajo to make near the maximum hydrogen production to achieve an RDU rate of 9,000 bpd. The existing Refinery has three units that make hydrogen: Unit 63 (small "steam methane reformer" or SMR), Unit 64 (large SMR), and the CCR (naphtha reformer). Any operational "setbacks" in any of those three units result in less hydrogen for consumption across the entire plant. The hydrogen needs of the refinery at the time depend on how it is distributed to all the units that consume hydrogen (not just the RDU). For the most part all the other refinery units will be reduced first depending on inventory and other needs with the RDU being the last to be reduced. However, facility-wide conditions may dictate that a reduction of RDU operations could be necessary.

Availability of feed stock for the RDU is also something that could dictate how much we charge the RDU, thereby effecting production. For example, recent work being done in the PTU (which pretreats the RDU feedstock) limited RDU production to 6,500 bpd. This situation was remedied and, coupled with extra feed in tanks, we were able to increase to a 9,000 bpd rate. Nevertheless, a situation such as this could potentially occur again in the future, thereby limiting the RDU production below full design.

The attached table presents a history of RDU feed rates from Jul 1, 2022 to Nov 15, 2022 and gives more examples of some of the technical issues and obstacles that effect daily rate variability.

Further, the RDU is a relatively new technology and, in Artesia, a "grassroots construction". Consequently, we have experienced challenges early in operation due to rate limitations or unit outages associated with addressing unforeseen issues. The nature of these issues makes forecasting them very difficult but we have every intention in maximizing the unit rates outside of these issues.

Our goal is to commence with the PSP post-RDU sampling as soon as we increase production to 9,000 bpd (or close to it). We will attempt to maintain as high a rate as possible during the four week PSP schedule, but cannot definitively guarantee this due to the refinery operational issues such as those described above. Further, increasing the RDU production rate from lower levels it not straightforward and instantaneous. For instance, if facility conditions dictate that we decrease RDU charge to 7,500 bpd, we can only increase the rate 1,000 barrels per 12 hour shift. Therefore, we cannot simply make a quick adjustment for a PSP weekly sample day as there will be a time element involved.

To give OCD a first indication of any effects from the RDU on the WWTP effluent discharged to the UIC wells, we offer the most recently submitted quarterly monitoring report required by the UICI-8 Discharge permit. This routine monitoring, conducted on September 28, 2022, was not part of the formal PSP post-RDU sampling. On this date, the charge rate for the RDU was 6,230 bpd (see table). Analytical results for permit parameters did not differ from pre-RDU samples and all concentrations were below TCLP limits.

In summary, we will attempt to maintain the RDU production rate as close to the 9,000 bpd design as possible during the PSP 4-week sampling period, but may need to sample at reduced rates if refinery conditions dictate in order to stay on schedule. As we have discovered since the RDU start-up operational rates between 4,500 bpd to 9,000 bpd can be considered normal and representative.

Please let me know if you'd like to discuss and I can set a call with our engineers. With any luck we are hoping to start sampling next week. Hope you have a great Thanksgiving!

Mike

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**From:** Chavez, Carl, EMNRD <Carlj.Chavez@emnrd.nm.gov>
**Sent:** Wednesday, October 26, 2022 4:27 PM
**To:** Holder, Mike <Michael.Holder@HFSinclair.com>
**Cc:** Goetze, Phillip, EMNRD <phillip.goetze@emnrd.nm.gov>
**Subject:** [EXTERNAL] HF Sinclair Navajo Refining, LLC: Status of RDU Sampling Plan Implementation



No, has to be at full scale operation Mike.

Please describe the units and technical issues and any diagrams to display the current setup and obstacles to overcome in order to achieve full-scale operation.

OCD now needs to be involved in the crux of problems that are delaying full-scale operation until we can get through the impasse.

Thank you.

**Carl J. Chavez** ● UIC Group
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EMNRD - Oil Conservation Division
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**From:** Holder, Mike <Michael.Holder@HFSinclair.com>
**Sent:** Wednesday, October 26, 2022 2:43 PM
**To:** Chavez, Carl, EMNRD <Carlj.Chavez@emnrd.nm.gov>
**Cc:** Goetze, Phillip, EMNRD <phillip.goetze@emnrd.nm.gov>; Holder, Mike <Michael.Holder@HFSinclair.com>
**Subject:** [EXTERNAL] HF Sinclair Navajo Refining, LLC: Status of RDU Sampling Plan Implementation

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Hey Carl! You must be reading my mind! We finally got it up and running at full rate for a few days but it is down again now. We hope to be back at full rate by next week. We originally had this set up to collect the samples at full rate but given the variability I was wondering if we could get one at full rate and then the others at whatever variable rate the RDU is at on the following sampling dates? That's probably more reflective of how it's actually operated. Thoughts? Thanks, Mike

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**From:** Chavez, Carl, EMNRD <Carlj.Chavez@emnrd.nm.gov>
**Sent:** Wednesday, October 26, 2022 2:40 PM
**To:** Holder, Mike <Michael.Holder@HFSinclair.com>
**Cc:** Goetze, Phillip, EMNRD <phillip.goetze@emnrd.nm.gov>
**Subject:** HF Sinclair Navajo Refining, LLC: Status of RDU Sampling Plan Implementation

Mike,

Good afternoon!

Hope all is going well. OCD is writing to request an update on the planned start of the RDU Sampling Plan last scheduled for October 2022.

Could you please update OCD with specifics on the current schedule and any and all problems that have yet to be resolved going forward?

Thank you.

**Carl J. Chavez** ● UIC Group
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| Summary of HFNR RDU Feed and Product Rundown (barrels per day) | | | | | |
|---|---|---|---|---|---|
| Date | Raw Feed to RDU Process | Recycle Feed to RDU Process | Total Combined Feed to RDU Process | Product Rundown | Technical Issues |
| 1-Jul-2022 | 5073 | 0 | 5073 | 4962 | |
| 2-Jul-2022 | 5086 | 0 | 5086 | 5155 | |
| 3-Jul-2022 | 5053 | 0 | 5053 | 5134 | |
| 4-Jul-2022 | 5055 | 0 | 5055 | 5104 | |
| 5-Jul-2022 | 5068 | 0 | 5068 | 5003 | |
| 6-Jul-2022 | 5048 | 0 | 5048 | 5237 | |
| 7-Jul-2022 | 5030 | 0 | 5030 | 4270 | |
| 8-Jul-2022 | 5043 | 0 | 5043 | 5047 | |
| 9-Jul-2022 | 5041 | 0 | 5041 | 4892 | |
| 10-Jul-2022 | 5039 | 0 | 5039 | 5056 | |
| 11-Jul-2022 | 5051 | 0 | 5051 | 4959 | |
| 12-Jul-2022 | 5056 | 0 | 5056 | 4822 | |
| 13-Jul-2022 | 5049 | 765 | 5814 | 5071 | |
| 14-Jul-2022 | 5012 | 612 | 5624 | 5444 | |
| 15-Jul-2022 | 5019 | 938 | 5957 | 5516 | |
| 16-Jul-2022 | 5037 | 999 | 6036 | 5168 | |
| 17-Jul-2022 | 5045 | 968 | 6012 | 5919 | |
| 18-Jul-2022 | 5063 | 960 | 6023 | 6225 | |
| 19-Jul-2022 | 5035 | 953 | 5988 | 5487 | |
| 20-Jul-2022 | 5093 | 931 | 6024 | 5467 | |
| 21-Jul-2022 | 5080 | 0 | 5080 | 4827 | |
| 22-Jul-2022 | 4652 | 0 | 4652 | 4740 | |
| 23-Jul-2022 | 4538 | 0 | 4538 | 4467 | |
| 24-Jul-2022 | 4553 | 0 | 4553 | 4507 | |
| 25-Jul-2022 | 4575 | 0 | 4575 | 4327 | |
| 26-Jul-2022 | 4566 | 0 | 4566 | 4256 | |
| 27-Jul-2022 | 4547 | 0 | 4547 | 4409 | |
| 28-Jul-2022 | 4577 | 0 | 4577 | 5069 | |
| 29-Jul-2022 | 4606 | 0 | 4606 | 4428 | |
| 30-Jul-2022 | 4627 | 0 | 4627 | 4610 | |
| 31-Jul-2022 | 4545 | 0 | 4545 | 3947 | |
| 1-Aug-2022 | 4596 | 0 | 4596 | 5048 | |
| 2-Aug-2022 | 390 | 0 | 390 | 0 | RDU down from Aug 2 to Aug 17 because unit compressor was tripped for an unknown reason. Valves would not hold and had to be set off resulting in a prolonged outage. RDU went back up from Aug 17 to Aug 22. |
| 3-Aug-2022 | 390 | 0 | 390 | 0 | |
| 4-Aug-2022 | 404 | 0 | 404 | 0 | |
| 5-Aug-2022 | 417 | 0 | 417 | 0 | |
| 6-Aug-2022 | 417 | 0 | 417 | 0 | |
| 7-Aug-2022 | 447 | 0 | 447 | 0 | |
| 8-Aug-2022 | 400 | 0 | 400 | 0 | |
| 9-Aug-2022 | 400 | 0 | 400 | 1 | |
| 10-Aug-2022 | 435 | 0 | 435 | 0 | |
| 11-Aug-2022 | 456 | 0 | 456 | 0 | |
| 12-Aug-2022 | 426 | 0 | 426 | 0 | |
| 13-Aug-2022 | 400 | 0 | 400 | 0 | |
| 14-Aug-2022 | 410 | 0 | 410 | 0 | |
| 15-Aug-2022 | 413 | 0 | 413 | 2 | |
| 16-Aug-2022 | 395 | 0 | 395 | 0 | |
| 17-Aug-2022 | 380 | 3192 | 3572 | 0 | |
| 18-Aug-2022 | 4644 | 0 | 4644 | 1 | |
| 19-Aug-2022 | 4646 | 0 | 4646 | 3973 | |
| 20-Aug-2022 | 4540 | 0 | 4540 | 0 | |
| 21-Aug-2022 | 4527 | 0 | 4527 | 0 | |
| 22-Aug-2022 | 4539 | 0 | 4539 | 0 | |
| 23-Aug-2022 | 5135 | 0 | 5135 | 4116 | |

| Summary of HFNR RDU Feed and Product Rundown (barrels per day) | | | | | |
|---|---|---|---|---|---|
| Date | Raw Feed to RDU Process | Recycle Feed to RDU Process | Total Combined Feed to RDU Process | Product Rundown | Technical Issues |
| 24-Aug-2022 | 5120 | 789 | 5909 | 5637 | |
| 25-Aug-2022 | 5730 | 994 | 6724 | 6135 | |
| 26-Aug-2022 | 5762 | 1004 | 6766 | 6442 | |
| 27-Aug-2022 | 5764 | 1013 | 6777 | 6103 | |
| 28-Aug-2022 | 5753 | 1004 | 6757 | 6584 | |
| 29-Aug-2022 | 5724 | 1015 | 6739 | 5777 | |
| 30-Aug-2022 | 5741 | 999 | 6739 | 6110 | |
| 31-Aug-2022 | 6247 | 1001 | 7248 | 6884 | |
| 1-Sep-2022 | 7081 | 996 | 8077 | 7402 | |
| 2-Sep-2022 | 7653 | 996 | 8649 | 8721 | |
| 3-Sep-2022 | 7693 | 1008 | 8701 | 8232 | |
| 4-Sep-2022 | 7732 | 1000 | 8732 | 8154 | |
| 5-Sep-2022 | 7706 | 996 | 8702 | 7933 | |
| 6-Sep-2022 | 7656 | 1004 | 8660 | 7653 | |
| 7-Sep-2022 | 8571 | 0 | 8571 | 7717 | |
| 8-Sep-2022 | 9151 | 0 | 9151 | 8815 | |
| 9-Sep-2022 | 8582 | 0 | 8582 | 8450 | |
| 10-Sep-2022 | 7668 | 0 | 7668 | 6879 | |
| 11-Sep-2022 | 6678 | 0 | 6678 | 6703 | |
| 12-Sep-2022 | 5765 | 0 | 5765 | 5708 | |
| 13-Sep-2022 | 576 | 0 | 576 | 0 | RDU down from Sep 13 to Sep 20 because the unit had an exchanger leak and had to be shutdown. Valve issues again resulted in an extended outage. RDU went back up on Sep 21. |
| 14-Sep-2022 | 536 | 0 | 536 | 0 | |
| 15-Sep-2022 | 510 | 0 | 510 | 1 | |
| 16-Sep-2022 | 513 | 0 | 513 | 0 | |
| 17-Sep-2022 | 522 | 0 | 522 | 0 | |
| 18-Sep-2022 | 505 | 0 | 505 | 0 | |
| 19-Sep-2022 | 497 | 0 | 497 | 0 | |
| 20-Sep-2022 | 512 | 1870 | 2382 | 0 | |
| 21-Sep-2022 | 3223 | 0 | 3223 | 0 | |
| 22-Sep-2022 | 4226 | 0 | 4226 | 3383 | |
| 23-Sep-2022 | 4265 | 0 | 4265 | 2750 | |
| 24-Sep-2022 | 4728 | 0 | 4728 | 4714 | |
| 25-Sep-2022 | 4935 | 0 | 4935 | 4084 | |
| 26-Sep-2022 | 4916 | 1080 | 5996 | 5326 | |
| 27-Sep-2022 | 4940 | 1077 | 6018 | 5835 | |
| 28-Sep-2022 | 5150 | 1080 | 6230 | 6541 | |
| 29-Sep-2022 | 6881 | 1078 | 7959 | 7084 | |
| 30-Sep-2022 | 8484 | 0 | 8484 | 8236 | |
| 1-Oct-2022 | 9207 | 0 | 9207 | 8419 | |
| 2-Oct-2022 | 9175 | 0 | 9175 | 8579 | |
| 3-Oct-2022 | 9255 | 0 | 9255 | 8791 | |
| 4-Oct-2022 | 9168 | 0 | 9168 | 9036 | |
| 5-Oct-2022 | 9177 | 0 | 9177 | 8316 | |
| 6-Oct-2022 | 9184 | 0 | 9184 | 8564 | |
| 7-Oct-2022 | 9153 | 0 | 9153 | 8631 | |
| 8-Oct-2022 | 9273 | 0 | 9273 | 8453 | |
| 9-Oct-2022 | 9127 | 0 | 9127 | 8544 | |
| 10-Oct-2022 | 9197 | 0 | 9197 | 8692 | |
| 11-Oct-2022 | 9168 | 0 | 9168 | 8547 | |
| 12-Oct-2022 | 9172 | 0 | 9172 | 8593 | |
| 13-Oct-2022 | 9137 | 0 | 9137 | 7948 | |
| 14-Oct-2022 | 9171 | 0 | 9171 | 7810 | |
| 15-Oct-2022 | 9178 | 0 | 9178 | 8310 | |
| 16-Oct-2022 | 9191 | 0 | 9191 | 9108 | |

| Summary of HFNR RDU Feed and Product Rundown (barrels per day) | | | | | |
|---|---|---|---|---|---|
| Date | Raw Feed to RDU Process | Recycle Feed to RDU Process | Total Combined Feed to RDU Process | Product Rundown | Technical Issues |
| 17-Oct-2022 | 9162 | 0 | 9162 | 8305 | |
| 18-Oct-2022 | 9326 | 0 | 9326 | 8940 | |
| 19-Oct-2022 | 9308 | 0 | 9308 | 8758 | |
| 20-Oct-2022 | 9167 | 0 | 9167 | 8266 | |
| 21-Oct-2022 | 9334 | 0 | 9334 | 8378 | |
| 22-Oct-2022 | 9092 | 1044 | 10136 | 9035 | |
| 23-Oct-2022 | 8032 | 1024 | 9056 | 8286 | |
| 24-Oct-2022 | 4739 | 1015 | 5754 | 0 | RDU down from Oct 25 to Oct 27 due to loss of naphtha reformer and a steam methane reformer (both producers of hydrogen) and subsequent insufficient hydrogen supply to RDU. RDU swept with nitrogen on Oct 27 (for cooling) and went back up on Oct 28. |
| 25-Oct-2022 | 671 | 968 | 1639 | 1 | |
| 26-Oct-2022 | 671 | 0 | 671 | 0 | |
| 27-Oct-2022 | 665 | 14346 | 15012 | 0 | |
| 28-Oct-2022 | 5001 | 0 | 5001 | 5 | |
| 29-Oct-2022 | 6288 | 596 | 6884 | 7313 | |
| 30-Oct-2022 | 7966 | 584 | 8550 | 6346 | |
| 31-Oct-2022 | 7634 | 604 | 8238 | 8155 | |
| 1-Nov-2022 | 8516 | 1493 | 10008 | 8611 | |
| 2-Nov-2022 | 7644 | 1504 | 9147 | 8458 | |
| 3-Nov-2022 | 7493 | 1504 | 8997 | | |
| 4-Nov-2022 | 7484 | 1504 | 8988 | | |
| 5-Nov-2022 | 7513 | 1504 | 9017 | | |
| 6-Nov-2022 | 7750 | 1504 | 9254 | | |
| 7-Nov-2022 | 7240 | 1504 | 8744 | | RDU down from Nov 7 (8:00 PM) to Nov 12 due to loss of boiler feed water to whole refinery. RDU brought back up on Nov 13 (12:00 PM) |
| 8-Nov-2022 | 816 | 0 | 816 | | |
| 9-Nov-2022 | 816 | 0 | 816 | | |
| 10-Nov-2022 | 816 | 0 | 816 | | |
| 11-Nov-2022 | 816 | 0 | 816 | | |
| 12-Nov-2022 | 816 | 0 | 816 | | |
| 13-Nov-2022 | 4000 | 500 | 4500 | | |
| 14-Nov-2022 | 4500 | 1021 | 5521 | | |
| 15-Nov-2022 | 5000 | 1044 | 6044 | | |

HALL ENVIRONMENTAL ANALYSIS LABORATORY

*Hall Environmental Analysis Laboratory*
*4901 Hawkins NE*
*Albuquerque, NM 87109*
*TEL: 505-345-3975 FAX: 505-345-4107*
*Website: www.hallenvironmental.com*

May 25, 2022

Randy Dade

Navajo Refining Company
P.O. Box 159
Artesia, NM 88211-0159
TEL: (575) 748-3311
FAX

RE: PSP WDW 1 2 3 4 Inj Well OrderNo.: 2204B57

Dear Randy Dade:

Hall Environmental Analysis Laboratory received 2 sample(s) on 4/27/2022 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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*4901 Hawkins NE*
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*TEL: 505-345-3975 FAX: 505-345-4107*
*Website: www.hallenvironmental.com*

# Case Narrative

WO#: **2204B57**
Date: **5/25/2022**

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

Analytical Notes:
Full list TCLP was requested for the two samples in this report. Per the TCLP Method 1311, "If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run". All TCLP compounds are reported as totals in this report, at the TCLP Limits, since the low solids content did not require filtration. The TCLP term is used in the method header; this is used to represent that the compounds listed are the specific TCLP compounds and that these compounds are reported at the TCLP regulatory limits.
The cations were filtered using a 0.45um filter for the C/A balance determination.

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-001A

**Client Sample ID:** WDW-1,2,3 & 4 Effluent
**Collection Date:** 4/26/2022 9:25:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **TCLP VOLATILES BY 8260B** | | | | | | | Analyst: **CCM** | |
| Benzene | ND | 0.00023 | 0.50 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| 1,2-Dichloroethane (EDC) | ND | 0.00025 | 0.50 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| 2-Butanone | ND | 0.0020 | 200 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Carbon Tetrachloride | ND | 0.00018 | 0.50 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Chloroform | ND | 0.00013 | 6.0 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| 1,4-Dichlorobenzene | ND | 0.00021 | 7.5 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| 1,1-Dichloroethene | ND | 0.00020 | 0.70 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Tetrachloroethene (PCE) | ND | 0.00036 | 0.70 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Trichloroethene (TCE) | ND | 0.00020 | 0.50 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Vinyl chloride | ND | 0.00032 | 0.20 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Chlorobenzene | ND | 0.00016 | 100 | | mg/L | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Surr: 1,2-Dichloroethane-d4 | 99.6 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Surr: 4-Bromofluorobenzene | 97.7 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Surr: Dibromofluoromethane | 102 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:15:00 PM | T87552 |
| Surr: Toluene-d8 | 90.8 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:15:00 PM | T87552 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-001B

**Client Sample ID:** WDW-1,2,3 & 4 Effluent
**Collection Date:** 4/26/2022 9:25:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 8081: PESTICIDES TCLP** | | | | | | | Analyst: **JME** | |
| Chlordane | ND | 0.0050 | 0.030 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Endrin | ND | 0.00049 | 0.020 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| gamma-BHC (Lindane) | ND | 0.00041 | 0.40 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Heptachlor | ND | 0.00041 | 0.0080 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Heptachlor epoxide | ND | 0.00047 | 0.0080 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Methoxychlor | ND | 0.00046 | 10 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Toxaphene | ND | 0.0050 | 0.50 | D | mg/L | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Surr: Decachlorobiphenyl | 0 | 0 | 73-119 | SD | %Rec | 10 | 5/18/2022 10:41:44 AM | 67182 |
| Surr: Tetrachloro-m-xylene | 0 | 0 | 36.6-84.1 | SD | %Rec | 10 | 5/18/2022 10:41:44 AM | 67182 |
| **EPA METHOD 8270C TCLP** | | | | | | | Analyst: **DAM** | |
| 2-Methylphenol | ND | 0.00051 | 200 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| 3+4-Methylphenol | ND | 0.00045 | 200 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| 2,4-Dinitrotoluene | ND | 0.00062 | 0.13 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Hexachlorobenzene | ND | 0.00066 | 0.13 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Hexachlorobutadiene | ND | 0.00082 | 0.50 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Hexachloroethane | ND | 0.00045 | 3.0 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Nitrobenzene | ND | 0.00051 | 2.0 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Pentachlorophenol | ND | 0.00059 | 100 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Pyridine | 0.0059 | 0.00093 | 5.0 | J | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| 2,4,5-Trichlorophenol | ND | 0.00062 | 400 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| 2,4,6-Trichlorophenol | ND | 0.00043 | 2.0 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Cresols, Total | ND | 0.00051 | 200 | | mg/L | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: 2-Fluorophenol | 42.8 | 0 | 15-118 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: Phenol-d5 | 34.5 | 0 | 15-92.9 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: 2,4,6-Tribromophenol | 46.4 | 0 | 15-150 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: Nitrobenzene-d5 | 68.1 | 0 | 15-136 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: 2-Fluorobiphenyl | 60.5 | 0 | 15-134 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |
| Surr: 4-Terphenyl-d14 | 83.9 | 0 | 15-168 | | %Rec | 1 | 5/3/2022 5:44:26 PM | 67188 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Client Sample ID:** WDW-1,2,3 & 4 Effluent
**Project:** PSP WDW 1 2 3 4 Inj Well
**Collection Date:** 4/26/2022 9:25:00 AM
**Lab ID:** 2204B57-001C
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 300.0: ANIONS** | | | | | | | Analyst: **MRA** | |
| Fluoride | 24 | 0.80 | 2.0 | * | mg/L | 20 | 4/27/2022 9:16:29 PM | R87581 |
| Chloride | 600 | 25 | 50 | * | mg/L | 100 | 5/5/2022 7:33:05 PM | R87788 |
| Nitrogen, Nitrite (As N) | 0.17 | 0.027 | 0.50 | J | mg/L | 5 | 4/27/2022 9:03:38 PM | R87581 |
| Bromide | 0.62 | 0.25 | 0.50 | | mg/L | 5 | 4/27/2022 9:03:38 PM | R87581 |
| Nitrogen, Nitrate (As N) | 0.88 | 0.050 | 0.50 | | mg/L | 5 | 4/27/2022 9:03:38 PM | R87581 |
| Phosphorus, Orthophosphate (As P) | ND | 1.2 | 2.5 | | mg/L | 5 | 4/27/2022 9:03:38 PM | R87581 |
| Sulfate | 2400 | 25 | 50 | * | mg/L | 100 | 5/5/2022 7:33:05 PM | R87788 |
| **SM2510B: SPECIFIC CONDUCTANCE** | | | | | | | Analyst: **LRN** | |
| Conductivity | 6500 | 10 | 10 | | µmhos/c | 1 | 4/28/2022 4:12:20 PM | R87620 |
| **SM4500-H+B / 9040C: PH** | | | | | | | Analyst: **LRN** | |
| pH | 7.33 | | | H | pH units | 1 | 4/28/2022 4:12:20 PM | R87620 |
| **SM2320B: ALKALINITY** | | | | | | | Analyst: **LRN** | |
| Bicarbonate (As CaCO3) | 626.9 | 20.00 | 20.00 | | mg/L Ca | 1 | 4/28/2022 4:12:20 PM | R87620 |
| Carbonate (As CaCO3) | ND | 2.000 | 2.000 | | mg/L Ca | 1 | 4/28/2022 4:12:20 PM | R87620 |
| Total Alkalinity (as CaCO3) | 626.9 | 20.00 | 20.00 | | mg/L Ca | 1 | 4/28/2022 4:12:20 PM | R87620 |
| **SPECIFIC GRAVITY** | | | | | | | Analyst: **CAS** | |
| Specific Gravity | 0.9981 | 0 | 0 | | | 1 | 5/10/2022 4:15:00 PM | R87962 |
| **SM2540C MOD: TOTAL DISSOLVED SOLIDS** | | | | | | | Analyst: **KS** | |
| Total Dissolved Solids | 4640 | 100 | 100 | *D | mg/L | 1 | 5/5/2022 1:25:00 PM | 67191 |
| **SM 2540D: TSS** | | | | | | | Analyst: **KS** | |
| Suspended Solids | 21 | 4.0 | 4.0 | | mg/L | 1 | 5/4/2022 12:57:00 PM | 67224 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-001D

**Client Sample ID:** WDW-1,2,3 & 4 Effluent
**Collection Date:** 4/26/2022 9:25:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 6010B: DISSOLVED METALS** | | | | | | | Analyst: **JRR** | |
| Calcium | 490 | 2.9 | 50 | | mg/L | 50 | 5/16/2022 8:36:22 AM | A88011 |
| Magnesium | 160 | 1.7 | 50 | | mg/L | 50 | 5/16/2022 8:36:22 AM | A88011 |
| Potassium | 100 | 10 | 50 | | mg/L | 50 | 5/16/2022 8:36:22 AM | A88011 |
| Sodium | 580 | 21 | 50 | | mg/L | 50 | 5/16/2022 8:36:22 AM | A88011 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-001E

**Client Sample ID:** WDW-1,2,3 & 4 Effluent
**Collection Date:** 4/26/2022 9:25:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 6020A: TCLP METALS** | | | | | | | Analyst: **DBK** | |
| Arsenic | 0.012 | 0.0025 | 5.0 | J | mg/L | 5 | 5/4/2022 12:10:37 PM | 67111 |
| Lead | ND | 0.0025 | 5.0 | | mg/L | 5 | 5/2/2022 4:17:19 PM | 67111 |
| Selenium | 0.29 | 0.0025 | 1.0 | J | mg/L | 5 | 5/2/2022 4:17:19 PM | 67111 |
| **EPA METHOD 7470A: MERCURY** | | | | | | | Analyst: **VP** | |
| Mercury | ND | 0.000091 | 0.020 | | mg/L | 1 | 5/2/2022 1:09:17 PM | 67181 |
| **EPA 6010B: TCLP METALS** | | | | | | | Analyst: **JLF** | |
| Barium | 0.051 | 0.0011 | 100 | J | mg/L | 1 | 4/28/2022 3:31:14 PM | 67111 |
| Cadmium | ND | 0.0012 | 1.0 | | mg/L | 1 | 4/28/2022 3:31:14 PM | 67111 |
| Chromium | ND | 0.0017 | 5.0 | | mg/L | 1 | 4/28/2022 3:31:14 PM | 67111 |
| Silver | 0.0066 | 0.0013 | 5.0 | J | mg/L | 1 | 4/28/2022 3:31:14 PM | 67111 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
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| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Client Sample ID:** CTB to City of POTW
**Project:** PSP WDW 1 2 3 4 Inj Well
**Collection Date:** 4/26/2022 9:50:00 AM
**Lab ID:** 2204B57-002A
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **TCLP VOLATILES BY 8260B** | | | | | | | Analyst: **CCM** | |
| Benzene | ND | 0.00023 | 0.50 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| 1,2-Dichloroethane (EDC) | ND | 0.00025 | 0.50 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| 2-Butanone | ND | 0.0020 | 200 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Carbon Tetrachloride | ND | 0.00018 | 0.50 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Chloroform | ND | 0.00013 | 6.0 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| 1,4-Dichlorobenzene | ND | 0.00021 | 7.5 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| 1,1-Dichloroethene | ND | 0.00020 | 0.70 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Tetrachloroethene (PCE) | ND | 0.00036 | 0.70 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Trichloroethene (TCE) | ND | 0.00020 | 0.50 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Vinyl chloride | ND | 0.00032 | 0.20 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Chlorobenzene | ND | 0.00016 | 100 | | mg/L | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Surr: 1,2-Dichloroethane-d4 | 96.2 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Surr: 4-Bromofluorobenzene | 96.1 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Surr: Dibromofluoromethane | 103 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:38:00 PM | T87552 |
| Surr: Toluene-d8 | 91.1 | 0 | 70-130 | | %Rec | 200 | 4/27/2022 10:38:00 PM | T87552 |

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**Qualifiers:**

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| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-002B

**Client Sample ID:** CTB to City of POTW
**Collection Date:** 4/26/2022 9:50:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 8081: PESTICIDES TCLP** | | | | | | | Analyst: **JME** | |
| Chlordane | ND | 0.00050 | 0.030 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Endrin | ND | 0.000049 | 0.020 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| gamma-BHC (Lindane) | ND | 0.000041 | 0.40 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Heptachlor | ND | 0.000041 | 0.0080 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Heptachlor epoxide | ND | 0.000047 | 0.0080 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Methoxychlor | ND | 0.000046 | 10 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Toxaphene | ND | 0.00050 | 0.50 | | mg/L | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Surr: Decachlorobiphenyl | 80.7 | 0 | 73-119 | | %Rec | 1 | 5/18/2022 11:08:06 AM | 67182 |
| Surr: Tetrachloro-m-xylene | 59.8 | 0 | 36.6-84.1 | | %Rec | 1 | 5/18/2022 11:08:06 AM | 67182 |
| **EPA METHOD 8270C TCLP** | | | | | | | Analyst: **DAM** | |
| 2-Methylphenol | ND | 0.00051 | 200 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| 3+4-Methylphenol | ND | 0.00045 | 200 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| 2,4-Dinitrotoluene | ND | 0.00062 | 0.13 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Hexachlorobenzene | ND | 0.00066 | 0.13 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Hexachlorobutadiene | ND | 0.00082 | 0.50 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Hexachloroethane | ND | 0.00045 | 3.0 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Nitrobenzene | ND | 0.00051 | 2.0 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Pentachlorophenol | ND | 0.00059 | 100 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Pyridine | ND | 0.00093 | 5.0 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| 2,4,5-Trichlorophenol | ND | 0.00062 | 400 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| 2,4,6-Trichlorophenol | ND | 0.00043 | 2.0 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Cresols, Total | ND | 0.00051 | 200 | | mg/L | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: 2-Fluorophenol | 65.0 | 0 | 15-118 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: Phenol-d5 | 45.0 | 0 | 15-92.9 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: 2,4,6-Tribromophenol | 79.1 | 0 | 15-150 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: Nitrobenzene-d5 | 75.4 | 0 | 15-136 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: 2-Fluorobiphenyl | 71.3 | 0 | 15-134 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |
| Surr: 4-Terphenyl-d14 | 82.1 | 0 | 15-168 | | %Rec | 1 | 5/3/2022 7:54:16 PM | 67188 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Client Sample ID:** CTB to City of POTW
**Project:** PSP WDW 1 2 3 4 Inj Well
**Collection Date:** 4/26/2022 9:50:00 AM
**Lab ID:** 2204B57-002C
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 300.0: ANIONS** | | | | | | | Analyst: **MRA** | |
| Fluoride | 1.3 | 0.040 | 0.10 | | mg/L | 1 | 4/27/2022 9:29:20 PM | R87581 |
| Chloride | 58 | 5.0 | 10 | | mg/L | 20 | 4/27/2022 9:42:12 PM | R87581 |
| Nitrogen, Nitrite (As N) | ND | 0.0053 | 0.10 | | mg/L | 1 | 4/27/2022 9:29:20 PM | R87581 |
| Bromide | ND | 0.050 | 0.10 | | mg/L | 1 | 4/27/2022 9:29:20 PM | R87581 |
| Nitrogen, Nitrate (As N) | 1.5 | 0.010 | 0.10 | | mg/L | 1 | 4/27/2022 9:29:20 PM | R87581 |
| Phosphorus, Orthophosphate (As P) | 1.8 | 0.25 | 0.50 | | mg/L | 1 | 4/27/2022 9:29:20 PM | R87581 |
| Sulfate | 960 | 5.0 | 10 | * | mg/L | 20 | 4/27/2022 9:42:12 PM | R87581 |
| **SM2510B: SPECIFIC CONDUCTANCE** | | | | | | | Analyst: **LRN** | |
| Conductivity | 1700 | 10 | 10 | | µmhos/c | 1 | 4/28/2022 4:36:53 PM | R87620 |
| **SM4500-H+B / 9040C: PH** | | | | | | | Analyst: **LRN** | |
| pH | 7.36 | | | H | pH units | 1 | 4/28/2022 4:36:53 PM | R87620 |
| **SM2320B: ALKALINITY** | | | | | | | Analyst: **LRN** | |
| Bicarbonate (As CaCO3) | 49.16 | 20.00 | 20.00 | | mg/L Ca | 1 | 4/28/2022 4:36:53 PM | R87620 |
| Carbonate (As CaCO3) | ND | 2.000 | 2.000 | | mg/L Ca | 1 | 4/28/2022 4:36:53 PM | R87620 |
| Total Alkalinity (as CaCO3) | 49.16 | 20.00 | 20.00 | | mg/L Ca | 1 | 4/28/2022 4:36:53 PM | R87620 |
| **SPECIFIC GRAVITY** | | | | | | | Analyst: **CAS** | |
| Specific Gravity | 0.9986 | 0 | 0 | | | 1 | 5/10/2022 4:15:00 PM | R87962 |
| **SM2540C MOD: TOTAL DISSOLVED SOLIDS** | | | | | | | Analyst: **KS** | |
| Total Dissolved Solids | 1500 | 20.0 | 20.0 | * | mg/L | 1 | 5/5/2022 1:25:00 PM | 67191 |
| **SM 2540D: TSS** | | | | | | | Analyst: **KS** | |
| Suspended Solids | 9.0 | 4.0 | 4.0 | | mg/L | 1 | 5/4/2022 12:57:00 PM | 67224 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-002D

**Client Sample ID:** CTB to City of POTW
**Collection Date:** 4/26/2022 9:50:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 6010B: DISSOLVED METALS** | | | | | | | Analyst: **JRR** | |
| Calcium | 250 | 0.29 | 5.0 | | mg/L | 5 | 5/16/2022 8:40:17 AM | A88011 |
| Magnesium | 75 | 0.034 | 1.0 | | mg/L | 1 | 5/16/2022 8:38:16 AM | A88011 |
| Potassium | 2.1 | 0.21 | 1.0 | | mg/L | 1 | 5/16/2022 8:38:16 AM | A88011 |
| Sodium | 60 | 0.42 | 1.0 | | mg/L | 1 | 5/16/2022 8:38:16 AM | A88011 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**Analytical Report**
Lab Order: **2204B57**
Date Reported: **5/25/2022**

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well
**Lab ID:** 2204B57-002E

**Client Sample ID:** CTB to City of POTW
**Collection Date:** 4/26/2022 9:50:00 AM
**Matrix:** Aqueous

| Analyses | Result | MDL | RL | Qual | Units | DF | Date Analyzed | Batch ID |
|---|---|---|---|---|---|---|---|---|
| **EPA METHOD 6020A: TCLP METALS** | | | | | | | Analyst: **DBK** | |
| Arsenic | 0.0011 | 0.00050 | 5.0 | J | mg/L | 1 | 5/4/2022 12:12:01 PM | 67111 |
| Lead | 0.00091 | 0.00050 | 5.0 | J | mg/L | 1 | 5/2/2022 4:12:09 PM | 67111 |
| Selenium | 0.0034 | 0.00050 | 1.0 | J | mg/L | 1 | 5/2/2022 4:12:09 PM | 67111 |
| **EPA METHOD 7470A: MERCURY** | | | | | | | Analyst: **VP** | |
| Mercury | ND | 0.000091 | 0.020 | | mg/L | 1 | 5/2/2022 1:11:25 PM | 67181 |
| **EPA 6010B: TCLP METALS** | | | | | | | Analyst: **JLF** | |
| Barium | 0.027 | 0.0011 | 100 | J | mg/L | 1 | 4/28/2022 3:37:46 PM | 67111 |
| Cadmium | ND | 0.0012 | 1.0 | | mg/L | 1 | 4/28/2022 3:37:46 PM | 67111 |
| Chromium | 0.0050 | 0.0017 | 5.0 | J | mg/L | 1 | 4/28/2022 3:37:46 PM | 67111 |
| Silver | 0.0035 | 0.0013 | 5.0 | J | mg/L | 1 | 4/28/2022 3:37:46 PM | 67111 |

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

**HALL ENVIRONMENTAL ANALYSIS LABORATORY**

## CATION/ANION BALANCE SHEET FOR WATER ANALYSES

| HEAL LAB NUMBER | WDW-1,2,3 & 4 Effluent 2204B57-001 | | CTB to City of POTW 2204B57-002 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CATIONS** | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L |
| Sodium | 580 | 25.23 | 60 | 2.61 | | | | | | | | |
| Potassium | 100 | 2.56 | 2.1 | 0.05 | | | | | | | | |
| Calcium | 490 | 24.45 | 250 | 12.48 | | | | | | | | |
| Magnesium | 160 | 13.17 | 75 | 6.17 | | | | | | | | |
| **Total Cations** | | 65.41 | | 21.31 | | | | | | | | |
| **ANIONS** | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L | mg/L | meq/L |
| Sulfate | 2400 | 49.97 | 960 | 19.99 | | | | | | | | |
| Chloride | 600 | 16.93 | 58 | 1.64 | | | | | | | | |
| Bicarbonate (CaCO3) | 626.9 | 12.53 | 49.16 | 0.98 | | | | | | | | |
| Carbonate (CaCO3) | | | | | | | | | | | | |
| Phosphate (P) | | | 1.8 | 0.17 | | | | | | | | |
| Nitrite (N) | 0.17 | 0.01 | | | | | | | | | | |
| Nitrate (N) | 0.9 | 0.06 | 1.5 | 0.11 | - | | | | | | | |
| Fluoride | 24 | 1.26 | 1.3 | 0.07 | | | | | | | | |
| Bromide | 0.62 | 0.01 | | | | | | | | | | |
| **Total Anions** | | 80.77 | | 22.96 | | | | | | | | |
| Elect. Cond. (µMhos/cm) | 6500 | | 1700 | | | | | | | | | |
| **CATION/ANION RATIO** | | 0.81 | | 0.93 | | | | | | | | |
| % Difference | | 11 | | 4 | | | | | | | | |
| **TOTAL DISSOLVED SOLIDS RATIOS** | | | | | | | | | | | | |
| TDS (measured) | 4640 | | 1500 | | | | | | | | | |
| TDS (calculated) | 4735 | | 1448 | | | | | | | | | |
| Ratio meas TDS:calc TDS | | 1.0 | | 1.0 | | | | | | | | |
| Ratio Meas. TDS:EC | | 0.71 | | 0.88 | | | | | | | | |
| Ratio Calc. TDS:EC | | 0.73 | | 0.85 | | | | | | | | |
| Ratio of anion sum:EC | | 1.2 | | 1.4 | | | | | | | | |
| Ratio of cation sum:EC | | 1.0 | | 1.3 | | | | | | | | |

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

**GENERALLY ACCEPTED RANGES**

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC -- 0.9-1.1

# ANALYTICAL REPORT

May 16, 2022



## Hall Environmental Analysis Laboratory

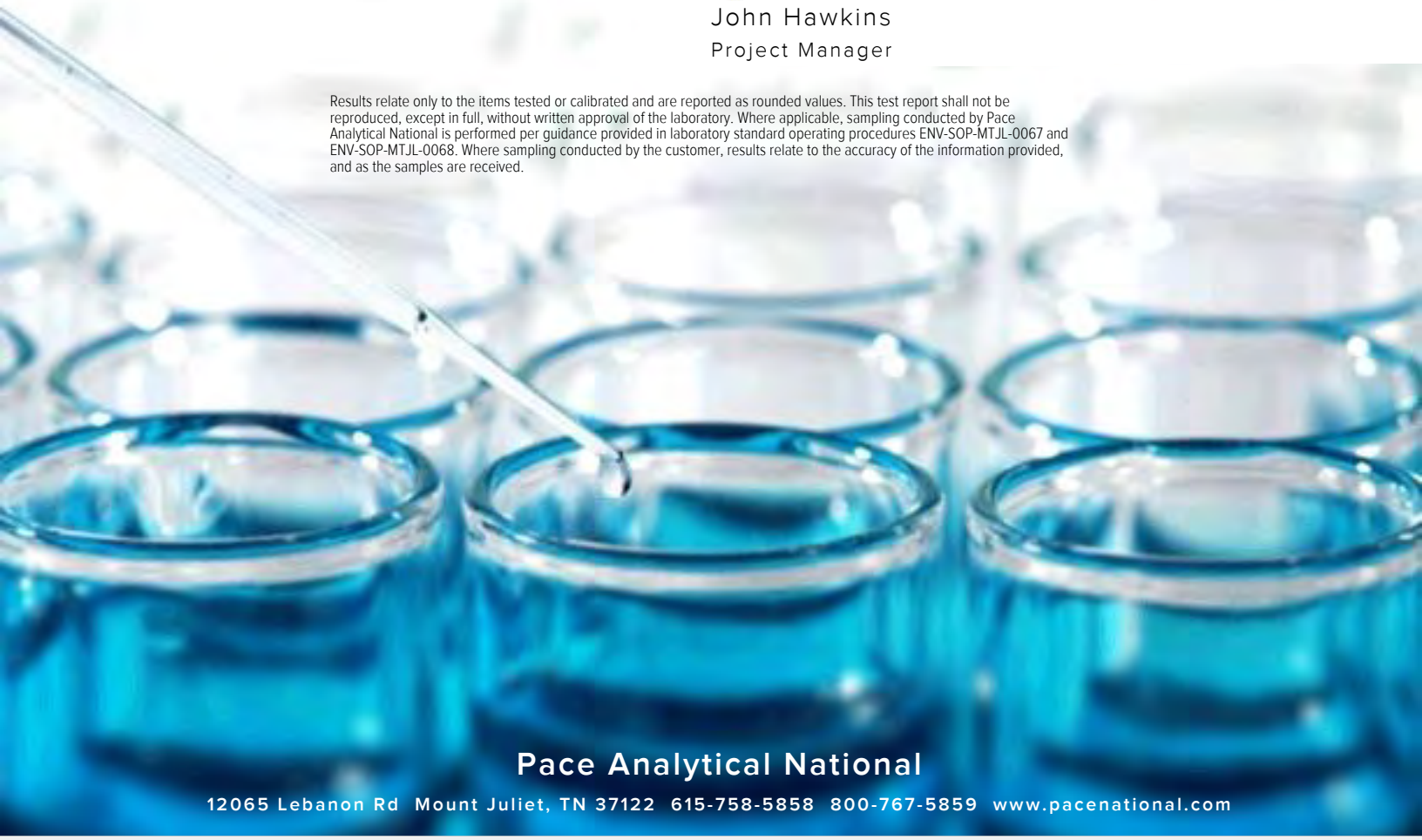
| | |
|---|---|
| Sample Delivery Group: | L1487566 |
| Samples Received: | 04/28/2022 |
| Project Number: | |
| Description: | |

Report To: Andy Freeman
4901 Hawkins NE
Albuquerque, NM 87109

Entire Report Reviewed By:

John Hawkins
Project Manager





Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

# TABLE OF CONTENTS

# SAMPLE SUMMARY



## 2204B57-001F WDW-1,2,3 & 4 EFFLUENT L1487566-01 Waste

Collected by | Collected date/time 04/26/22 09:25 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Preparation by Method 1311 | WG1859202 | 1 | 05/05/22 14:00 | 05/05/22 14:00 | JDG | Mt. Juliet, TN |
| Chlorinated Acid Herbicides (GC) by Method 8151A | WG1860542 | 1 | 05/09/22 02:53 | 05/10/22 02:08 | HMH | Mt. Juliet, TN |

## 2204B57-001G WDW-1,2,3 & 4 EFFLUENT L1487566-02 GW

Collected by | Collected date/time 04/26/22 09:25 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 2580 | WG1859241 | 1 | 05/06/22 11:27 | 05/06/22 11:27 | ARD | Mt. Juliet, TN |

## 2204B57-001H WDW-1,2,3 & 4 EFFLUENT L1487566-03 GW

Collected by | Collected date/time 04/26/22 09:25 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 4500 CN E-2016 | WG1859852 | 1 | 05/07/22 18:20 | 05/09/22 17:49 | CAT | Mt. Juliet, TN |
| Wet Chemistry by Method 4500 S2 D-2011 | WG1862545 | 1 | 05/13/22 17:59 | 05/13/22 17:59 | SMW | Mt. Juliet, TN |
| Wet Chemistry by Method 9040C | WG1859881 | 1 | 05/09/22 13:45 | 05/09/22 13:45 | EPW | Mt. Juliet, TN |
| Wet Chemistry by Method D93/1010A | WG1858842 | 1 | 05/05/22 19:00 | 05/05/22 19:00 | WOS | Mt. Juliet, TN |

## 2204B57-002F CTB TO CITY OF POTW L1487566-04 Waste

Collected by | Collected date/time 04/26/22 09:50 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Preparation by Method 1311 | WG1859202 | 1 | 05/05/22 14:00 | 05/05/22 14:00 | JDG | Mt. Juliet, TN |
| Chlorinated Acid Herbicides (GC) by Method 8151A | WG1860542 | 1 | 05/09/22 02:53 | 05/10/22 02:23 | HMH | Mt. Juliet, TN |

## 2204B57-002G CTB TO CITY OF POTW L1487566-05 GW

Collected by | Collected date/time 04/26/22 09:50 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 2580 | WG1859241 | 1 | 05/06/22 11:27 | 05/06/22 11:27 | ARD | Mt. Juliet, TN |

## 2204B57-002H CTB TO CITY OF POTW L1487566-06 GW

Collected by | Collected date/time 04/26/22 09:50 | Received date/time 04/28/22 09:00

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 4500 CN E-2016 | WG1859852 | 1 | 05/07/22 18:20 | 05/09/22 17:53 | CAT | Mt. Juliet, TN |
| Wet Chemistry by Method 4500 S2 D-2011 | WG1862546 | 1 | 05/12/22 18:30 | 05/12/22 18:30 | AW | Mt. Juliet, TN |
| Wet Chemistry by Method 9040C | WG1859881 | 1 | 05/09/22 13:45 | 05/09/22 13:45 | EPW | Mt. Juliet, TN |
| Wet Chemistry by Method D93/1010A | WG1858842 | 1 | 05/05/22 19:00 | 05/05/22 19:00 | WOS | Mt. Juliet, TN |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Project Manager

## Project Narrative

All Reactive Cyanide results reported in the attached report were determined as totals using method 4500 CN E-2016.
All Reactive Sulfide results reported in the attached report were determined as totals using method 4500 S2 D-2011.

## Sample Delivery Group (SDG) Narrative

**Analysis was performed from an improper container for the following samples.**

| Lab Sample ID | Project Sample ID | Method |
|---|---|---|
| L1487566-06 | 2204B57-002H CTB TO CITY OF POTW | 4500 S2 D-2011 |

## Preparation by Method 1311

| Analyte | Result | Qualifier | Prep date / time | Batch |
|---|---|---|---|---|
| TCLP Extraction | - | | 5/5/2022 2:00:42 PM | WG1859202 |
| Fluid | 1 | | 5/5/2022 2:00:42 PM | WG1859202 |
| Initial pH | N/A | | 5/5/2022 2:00:42 PM | WG1859202 |
| Final pH | N/A | | 5/5/2022 2:00:42 PM | WG1859202 |

## Chlorinated Acid Herbicides (GC) by Method 8151A

| Analyte | Result mg/l | Qualifier | RDL mg/l | Limit mg/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|---|
| 2,4,5-TP (Silvex) | ND | J4 | 0.00200 | 1 | 1 | 05/10/2022 02:08 | WG1860542 |
| 2,4-D | ND | J4 | 0.00200 | 10 | 1 | 05/10/2022 02:08 | WG1860542 |
| *(S) 2,4-Dichlorophenyl Acetic Acid* | *89.6* | | *14.0-158* | | | *05/10/2022 02:08* | WG1860542 |

Collected date/time: 04/26/22 09:25

L1487566

## Wet Chemistry by Method 2580

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | mV | | | date / time | |
| ORP | 157 | T8 | 1 | 05/06/2022 11:27 | WG1859241 |

## Wet Chemistry by Method 4500 CN E-2016

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | | date / time | |
| Reactive Cyanide | 0.0133 | | 0.00500 | 1 | 05/09/2022 17:49 | WG1859852 |

## Wet Chemistry by Method 4500 S2 D-2011

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | | date / time | |
| Reactive Sulfide | 0.108 | Q | 0.0500 | 1 | 05/13/2022 17:59 | WG1862545 |

Sample Narrative:

L1487566-03 WG1862545: Ran out of hold due to supply chain issues.

## Wet Chemistry by Method 9040C

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | su | | | date / time | |
| Corrosivity by pH | 7.25 | T8 | 1 | 05/09/2022 13:45 | WG1859881 |

Sample Narrative:

L1487566-03 WG1859881: 7.25 at 20.5C

## Wet Chemistry by Method D93/1010A

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | deg F | | | date / time | |
| Flashpoint | DNF at 170 | | 1 | 05/05/2022 19:00 | WG1858842 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Preparation by Method 1311

| Analyte | Result | Qualifier | Prep date / time | Batch |
|---|---|---|---|---|
| TCLP Extraction | - | | 5/5/2022 2:00:42 PM | WG1859202 |
| Fluid | 1 | | 5/5/2022 2:00:42 PM | WG1859202 |
| Initial pH | N/A | | 5/5/2022 2:00:42 PM | WG1859202 |
| Final pH | N/A | | 5/5/2022 2:00:42 PM | WG1859202 |

## Chlorinated Acid Herbicides (GC) by Method 8151A

| Analyte | Result mg/l | Qualifier | RDL mg/l | Limit mg/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|---|
| 2,4,5-TP (Silvex) | ND | J4 | 0.00200 | 1 | 1 | 05/10/2022 02:23 | WG1860542 |
| 2,4-D | ND | J4 | 0.00200 | 10 | 1 | 05/10/2022 02:23 | WG1860542 |
| *(S) 2,4-Dichlorophenyl Acetic Acid* | *81.2* | | *14.0-158* | | | *05/10/2022 02:23* | WG1860542 |

## Wet Chemistry by Method 2580

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | mV | | | date / time | |
| ORP | 149 | T8 | 1 | 05/06/2022 11:27 | WG1859241 |

## Wet Chemistry by Method 4500 CN E-2016

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | | date / time | |
| Reactive Cyanide | ND | | 0.00500 | 1 | 05/09/2022 17:53 | WG1859852 |

## Wet Chemistry by Method 4500 S2 D-2011

| Analyte | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| | mg/l | | mg/l | | date / time | |
| Reactive Sulfide | ND | Q | 0.0500 | 1 | 05/12/2022 18:30 | WG1862546 |

Sample Narrative:

L1487566-06 WG1862546: Ran out of hold due to supply chain issues.

## Wet Chemistry by Method 9040C

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | su | | | date / time | |
| Corrosivity by pH | 7.54 | T8 | 1 | 05/09/2022 13:45 | WG1859881 |

Sample Narrative:

L1487566-06 WG1859881: 7.54 at 19.9C

## Wet Chemistry by Method D93/1010A

| Analyte | Result | Qualifier | Dilution | Analysis | Batch |
|---|---|---|---|---|---|
| | deg F | | | date / time | |
| Flashpoint | DNF at 170 | | 1 | 05/05/2022 19:00 | WG1858842 |

## L1487566-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1487566-02 05/06/22 11:27 • (DUP) R3788898-3 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 157 | 149 | 1 | 7.80 | | 20 |

## L1487566-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1487566-05 05/06/22 11:27 • (DUP) R3788898-4 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 149 | 156 | 1 | 7.20 | | 20 |

## L1487958-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-01 05/06/22 11:27 • (DUP) R3788898-5 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 359 | 359 | 1 | 0.200 | | 20 |

## L1487958-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-02 05/06/22 11:27 • (DUP) R3788898-6 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 87.0 | 87.1 | 1 | 0.100 | | 20 |

## L1487958-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-03 05/06/22 11:27 • (DUP) R3788898-7 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 314 | 313 | 1 | 0.600 | | 20 |

## L1487958-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-04 05/06/22 11:27 • (DUP) R3788898-8 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 302 | 301 | 1 | 0.400 | | 20 |

## L1487958-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-05 05/06/22 11:27 • (DUP) R3788898-9 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 316 | 316 | 1 | 0.100 | | 20 |

## L1487958-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-06 05/06/22 11:27 • (DUP) R3788898-10 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 73.9 | 76.5 | 1 | 2.60 | | 20 |

## L1487958-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-07 05/06/22 11:27 • (DUP) R3788898-11 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 197 | 197 | 1 | 0.800 | | 20 |

## L1487958-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1487958-08 05/06/22 11:27 • (DUP) R3788898-12 05/06/22 11:27

| Analyte | Original Result mV | DUP Result mV | Dilution | DUP Diff mV | DUP Qualifier | DUP Diff Limits mV |
|---|---|---|---|---|---|---|
| ORP | 251 | 255 | 1 | 3.70 | | 20 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3788898-1 05/06/22 11:27 • (LCSD) R3788898-2 05/06/22 11:27

| Analyte | Spike Amount mV | LCS Result mV | LCSD Result mV | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | Diff mV | Diff Limits mV |
|---|---|---|---|---|---|---|---|---|---|---|
| ORP | 108 | 108 | 115 | 99.5 | 106 | 90.0-110 | | | 7.40 | 20 |

## Method Blank (MB)

(MB) R3789863-1 05/09/22 17:29

| Analyte | MB Result mg/l | MB Qualifier | MB MDL mg/l | MB RDL mg/l |
|---|---|---|---|---|
| Reactive Cyanide | U | | 0.00180 | 0.00500 |

## L1487559-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1487559-02 05/09/22 17:37 • (DUP) R3789863-3 05/09/22 17:38

| Analyte | Original Result mg/l | DUP Result mg/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Reactive Cyanide | ND | ND | 1 | 0.000 | | 20 |

## L1487566-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1487566-03 05/09/22 17:49 • (DUP) R3789863-8 05/09/22 17:50

| Analyte | Original Result mg/l | DUP Result mg/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Reactive Cyanide | 0.0133 | 0.0142 | 1 | 6.55 | | 20 |

## Laboratory Control Sample (LCS)

(LCS) R3789863-2 05/09/22 17:30

| Analyte | Spike Amount mg/l | LCS Result mg/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Reactive Cyanide | 0.100 | 0.108 | 108 | 87.1-120 | |

## L1487559-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1487559-03 05/09/22 17:41 • (MS) R3789863-4 05/09/22 17:42 • (MSD) R3789863-5 05/09/22 17:43

| Analyte | Spike Amount mg/l | Original Result mg/l | MS Result mg/l | MSD Result mg/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Cyanide | 0.100 | ND | 0.0996 | 0.105 | 99.6 | 105 | 1 | 90.0-110 | | | 5.28 | 20 |

## L1487562-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1487562-01 05/09/22 17:44 • (MS) R3789863-6 05/09/22 17:45 • (MSD) R3789863-7 05/09/22 17:46

| Analyte | Spike Amount mg/l | Original Result mg/l | MS Result mg/l | MSD Result mg/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Cyanide | 0.100 | ND | 0.0869 | 0.0920 | 86.9 | 92.0 | 1 | 90.0-110 | J6 | | 5.70 | 20 |

## Method Blank (MB)

(MB) R3791750-1 05/13/22 17:58

| Analyte | MB Result mg/l | MB Qualifier | MB MDL mg/l | MB RDL mg/l |
|---|---|---|---|---|
| Reactive Sulfide | U | | 0.0250 | 0.0500 |

## Laboratory Control Sample (LCS)

(LCS) R3791750-2 05/13/22 17:58

| Analyte | Spike Amount mg/l | LCS Result mg/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Reactive Sulfide | 0.500 | 0.555 | 111 | 85.0-115 | |

## Method Blank (MB)

(MB) R3791378-1 05/12/22 18:29

| Analyte | MB Result mg/l | MB Qualifier | MB MDL mg/l | MB RDL mg/l |
|---|---|---|---|---|
| Reactive Sulfide | U | | 0.0250 | 0.0500 |

## Laboratory Control Sample (LCS)

(LCS) R3791378-2 05/12/22 18:29

| Analyte | Spike Amount mg/l | LCS Result mg/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Reactive Sulfide | 0.500 | 0.528 | 106 | 85.0-115 | |

## L1487566-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1487566-06 05/12/22 18:30 • (MS) R3791378-3 05/12/22 18:30 • (MSD) R3791378-4 05/12/22 18:30

| Analyte | Spike Amount mg/l | Original Result mg/l | MS Result mg/l | MSD Result mg/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Sulfide | 0.500 | ND | 0.536 | 0.529 | 107 | 106 | 1 | 80.0-120 | | | 1.31 | 20 |

Sample Narrative:

OS: Ran out of hold due to supply chain issues.

## Laboratory Control Sample (LCS)

(LCS) R3789960-1 05/09/22 13:45

| Analyte | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---|---|---|---|---|---|
| | su | su | % | % | |
| Corrosivity by pH | 10.0 | 9.92 | 99.2 | 99.0-101 | |

Sample Narrative:

LCS: 9.92 at 21.1C

## L1487566-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1487566-06 05/05/22 19:00 • (DUP) R3788643-3 05/05/22 19:00

| Analyte | Original Result deg F | DUP Result deg F | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Flashpoint | DNF at 170 | DNF at 170 | 1 | 0.000 | | 10 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3788643-1 05/05/22 19:00 • (LCSD) R3788643-2 05/05/22 19:00

| Analyte | Spike Amount deg F | LCS Result deg F | LCSD Result deg F | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Flashpoint | 126 | 130 | 130 | 103 | 103 | 96.0-104 | | | 0.000 | 10 |

## Method Blank (MB)

(MB) R3790044-1 05/09/22 21:28

| Analyte | MB Result mg/l | MB Qualifier | MB MDL mg/l | MB RDL mg/l |
|---|---|---|---|---|
| 2,4,5-TP (Silvex) | U | | 0.000667 | 0.00200 |
| 2,4-D | U | | 0.000667 | 0.00200 |
| *(S) 2,4-Dichlorophenyl Acetic Acid* | *76.4* | | | *14.0-158* |

## Laboratory Control Sample (LCS)

(LCS) R3790044-2 05/09/22 21:43

| Analyte | Spike Amount mg/l | LCS Result mg/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| 2,4,5-TP (Silvex) | 0.0500 | 0.0641 | 128 | 50.0-125 | E J4 |
| 2,4-D | 0.0500 | 0.0873 | 175 | 50.0-120 | E J4 |
| *(S) 2,4-Dichlorophenyl Acetic Acid* | | | *144* | *14.0-158* | |

## L1487556-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1487556-01 05/10/22 01:24 • (MS) R3790044-3 05/10/22 01:38 • (MSD) R3790044-4 05/10/22 01:53

| Analyte | Spike Amount mg/l | Original Result mg/l | MS Result mg/l | MSD Result mg/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-TP (Silvex) | 0.0500 | ND | 0.0355 | 0.0374 | 71.0 | 74.8 | 1 | 50.0-125 | | | 5.21 | 20 |
| 2,4-D | 0.0500 | ND | 0.0546 | 0.0497 | 109 | 99.4 | 1 | 50.0-120 | E | | 9.40 | 20 |
| *(S) 2,4-Dichlorophenyl Acetic Acid* | | | | | *75.8* | *68.4* | | *14.0-158* | | | | |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| (S) | Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J4 | The associated batch QC was outside the established quality control range for accuracy. |
| J6 | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |
| Q | Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values. |
| T8 | Sample(s) received past/too close to holding time expiration. |

## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN000032021-1 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | TN00003 |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO000356 |
| Kentucky [1 6] | KY90010 | South Carolina | 84004002 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1 4] | 2006 |
| Louisiana | LA018 | Texas | T104704245-20-18 |
| Maine | TN00003 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN000032021-11 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 110033 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 998093910 |
| Montana | CERT0086 | Wyoming | A2LA |
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

# CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

A199

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975
FAX: 505-345-4107
Website: www.hallenvironmental.com

| | | | |
|---|---|---|---|
| SUB CONTRATOR: Pace TN | COMPANY: PACE TN | PHONE: (800) 767-5859 | FAX: (615) 758-5859 |
| ADDRESS: 12065 Lebanon Rd | | ACCOUNT #: | EMAIL: |
| CITY, STATE, ZIP: Mt. Juliet, TN 37122 | | | |

L148758d6

| ITEM | SAMPLE | CLIENT SAMPLE ID | BOTTLE TYPE | MATRIX | COLLECTION DATE | # CONTAINERS | ANALYTICAL COMMENTS | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2204B57-001F | WDW-1,2,3 & 4 Effluent | 1LAMGU | Aqueous | 4/26/2022 9:25:00 AM | 1 | 8151TCLP *RUSH 7 DAY TAT* | -01 |
| 2 | 2204B57-001G | WDW-1,2,3 & 4 Effluent | 125HDP | Aqueous | 4/26/2022 9:25:00 AM | 1 | ORP *RUSH 7 DAY TAT* | -02 |
| 3 | 2204B57-001H | WDW-1,2,3 & 4 Effluent | 500HDPE | Aqueous | 4/26/2022 9:25:00 AM | 3 | RCI *RUSH 7 DAY TAT* | -03 |
| 4 | 2204B57-002F | CTB to City of POTW | 1LAMGU | Aqueous | 4/26/2022 9:50:00 AM | 1 | 8151TCLP *RUSH 7 DAY TAT* | -04 |
| 5 | 2204B57-002G | CTB to City of POTW | 125HDP | Aqueous | 4/26/2022 9:50:00 AM | 1 | ORP *RUSH 7 DAY TAT* | -05 |
| 6 | 2204B57-002H | CTB to City of POTW | 500HDPE | Aqueous | 4/26/2022 9:50:00 AM | 3 | RCI *RUSH 7 DAY TAT* | -06 |

7767 0976 9790

Sample Receipt Checklist

| | | | |
|---|---|---|---|
| COC Seal Present/Intact: | Y N | If Applicable | |
| COC Signed/Accurate: | Y N | VOA Zero Headspace: | Y N |
| Bottles arrive intact: | Y N | Pres.Correct/Check: | Y N |
| Correct bottles used: | Y N | DRA7 | |
| Sufficient volume sent: | Y N | 3.8 to = 3.8 | |
| RAD Screen <0.5 mR/hr: | Y N | | |

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

| | | | | | |
|---|---|---|---|---|---|
| Relinquished By: | Date: 4/27/2022 | Time: 10:38 AM | Received By: | Date: 4/28/22 | Time: 0900 |
| Relinquished By: | Date: | Time: | Received By: | Date: | Time: |
| Relinquished By: | Date: | Time: | Received By: | Date: | Time: |

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:

☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples _____ °C Attempt to Cool ? _____

Comments: _____

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB** | SampType: **mblk** | TestCode: **EPA Method 300.0: Anions** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **R87581** | RunNo: **87581** | | | | | | | |
| Prep Date: | Analysis Date: **4/27/2022** | SeqNo: **3099704** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Fluoride | ND | 0.10 | | | | | | | | |
| Chloride | ND | 0.50 | | | | | | | | |
| Nitrogen, Nitrite (As N) | ND | 0.10 | | | | | | | | |
| Bromide | ND | 0.10 | | | | | | | | |
| Nitrogen, Nitrate (As N) | ND | 0.10 | | | | | | | | |
| Phosphorus, Orthophosphate (As P | ND | 0.50 | | | | | | | | |
| Sulfate | ND | 0.50 | | | | | | | | |

| Sample ID: **LCS** | SampType: **lcs** | TestCode: **EPA Method 300.0: Anions** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **R87581** | RunNo: **87581** | | | | | | | |
| Prep Date: | Analysis Date: **4/27/2022** | SeqNo: **3099705** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Fluoride | 0.50 | 0.10 | 0.5000 | 0 | 99.5 | 90 | 110 | | | |
| Chloride | 4.6 | 0.50 | 5.000 | 0 | 92.5 | 90 | 110 | | | |
| Nitrogen, Nitrite (As N) | 0.98 | 0.10 | 1.000 | 0 | 98.0 | 90 | 110 | | | |
| Bromide | 2.4 | 0.10 | 2.500 | 0 | 97.5 | 90 | 110 | | | |
| Nitrogen, Nitrate (As N) | 2.5 | 0.10 | 2.500 | 0 | 100 | 90 | 110 | | | |
| Phosphorus, Orthophosphate (As P | 4.6 | 0.50 | 5.000 | 0 | 92.6 | 90 | 110 | | | |
| Sulfate | 10 | 0.50 | 10.00 | 0 | 100 | 90 | 110 | | | |

| Sample ID: **MB** | SampType: **mblk** | TestCode: **EPA Method 300.0: Anions** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **R87788** | RunNo: **87788** | | | | | | | |
| Prep Date: | Analysis Date: **5/5/2022** | SeqNo: **3109682** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Chloride | ND | 0.50 | | | | | | | | |
| Sulfate | ND | 0.50 | | | | | | | | |

| Sample ID: **LCS** | SampType: **lcs** | TestCode: **EPA Method 300.0: Anions** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **R87788** | RunNo: **87788** | | | | | | | |
| Prep Date: | Analysis Date: **5/5/2022** | SeqNo: **3109683** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Chloride | 4.6 | 0.50 | 5.000 | 0 | 92.8 | 90 | 110 | | | |
| Sulfate | 10 | 0.50 | 10.00 | 0 | 101 | 90 | 110 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67111** | SampType: **MBLK** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67111** | RunNo: **87655** |
| Prep Date: **4/27/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103419** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead | ND | 0.0010 | | | | | | | | |
| Selenium | ND | 0.0010 | | | | | | | | |

| Sample ID: **MSLLLCS-67111** | SampType: **LCSLL** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **BatchQC** | Batch ID: **67111** | RunNo: **87655** |
| Prep Date: **4/27/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103420** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.0012 | 0.0010 | 0.001000 | 0 | 124 | 70 | 130 | | | |
| Selenium | 0.00099 | 0.0010 | 0.001000 | 0 | 98.7 | 70 | 130 | | | J |

| Sample ID: **MSLCS-67111** | SampType: **LCS** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67111** | RunNo: **87655** |
| Prep Date: **4/27/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103421** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead | 0.052 | 0.0010 | 0.05000 | 0 | 103 | 80 | 120 | | | |
| Selenium | 0.048 | 0.0010 | 0.05000 | 0 | 96.0 | 80 | 120 | | | |

| Sample ID: **MB-67111** | SampType: **MBLK** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67111** | RunNo: **87716** |
| Prep Date: **4/27/2022** | Analysis Date: **5/4/2022** | SeqNo: **3107038** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ND | 0.0010 | | | | | | | | |

| Sample ID: **MSLLLCS-67111** | SampType: **LCSLL** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **BatchQC** | Batch ID: **67111** | RunNo: **87716** |
| Prep Date: **4/27/2022** | Analysis Date: **5/4/2022** | SeqNo: **3107039** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.00096 | 0.0010 | 0.001000 | 0 | 96.1 | 70 | 130 | | | J |

| Sample ID: **MSLCS-67111** | SampType: **LCS** | TestCode: **EPA Method 6020A: TCLP Metals** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67111** | RunNo: **87716** |
| Prep Date: **4/27/2022** | Analysis Date: **5/4/2022** | SeqNo: **3107040** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.050 | 0.0010 | 0.05000 | 0 | 99.7 | 80 | 120 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67182** | SampType: **MBLK** | TestCode: **EPA Method 8081: Pesticides TCLP** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67182** | RunNo: **88093** |
| Prep Date: **5/2/2022** | Analysis Date: **5/18/2022** | SeqNo: **3123051** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Chlordane | ND | 0.030 | | | | | | | | |
| Endrin | ND | 0.020 | | | | | | | | |
| gamma-BHC (Lindane) | ND | 0.40 | | | | | | | | |
| Heptachlor | ND | 0.0080 | | | | | | | | |
| Heptachlor epoxide | ND | 0.0080 | | | | | | | | |
| Methoxychlor | ND | 10 | | | | | | | | |
| Toxaphene | ND | 0.50 | | | | | | | | |
| Surr: Decachlorobiphenyl | 0.0024 | | 0.002500 | | 94.2 | 73 | 119 | | | |
| Surr: Tetrachloro-m-xylene | 0.0018 | | 0.002500 | | 72.6 | 36.6 | 84.1 | | | |

| Sample ID: **MB-67182** | SampType: **MBLK** | TestCode: **EPA Method 8081: Pesticides TCLP** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67182** | RunNo: **88093** |
| Prep Date: **5/2/2022** | Analysis Date: **5/18/2022** | SeqNo: **3123052** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Chlordane | ND | 0.030 | | | | | | | | |
| Endrin | ND | 0.020 | | | | | | | | |
| gamma-BHC (Lindane) | ND | 0.40 | | | | | | | | |
| Heptachlor | ND | 0.0080 | | | | | | | | |
| Heptachlor epoxide | ND | 0.0080 | | | | | | | | |
| Methoxychlor | ND | 10 | | | | | | | | |
| Toxaphene | ND | 0.50 | | | | | | | | |
| Surr: Decachlorobiphenyl | 0.0023 | | 0.002500 | | 92.2 | 73 | 119 | | | |
| Surr: Tetrachloro-m-xylene | 0.0018 | | 0.002500 | | 72.8 | 36.6 | 84.1 | | | |

| Sample ID: **LCS-67182** | SampType: **LCS** | TestCode: **EPA Method 8081: Pesticides TCLP** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67182** | RunNo: **88093** |
| Prep Date: **5/2/2022** | Analysis Date: **5/18/2022** | SeqNo: **3123054** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Endrin | 0.00047 | 0.00010 | 0.0005000 | 0 | 93.5 | 56.3 | 126 | | | |
| gamma-BHC (Lindane) | 0.00040 | 0.00010 | 0.0005000 | 0 | 81.0 | 45.8 | 103 | | | |
| Heptachlor | 0.00027 | 0.00010 | 0.0005000 | 0 | 53.2 | 33.7 | 104 | | | |
| Heptachlor epoxide | 0.00043 | 0.00010 | 0.0005000 | 0 | 85.9 | 50.1 | 116 | | | |
| Methoxychlor | 0.00055 | 0.00010 | 0.0005000 | 0 | 111 | 15 | 203 | | | |
| Surr: Decachlorobiphenyl | 0.0022 | | 0.002500 | | 87.0 | 73 | 119 | | | |
| Surr: Tetrachloro-m-xylene | 0.0016 | | 0.002500 | | 64.1 | 36.6 | 84.1 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

Sample ID: **LCS-67182** SampType: **LCS** TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSW** Batch ID: **67182** RunNo: **88093**
Prep Date: **5/2/2022** Analysis Date: **5/18/2022** SeqNo: **3123055** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Endrin | 0.00047 | 0.00010 | 0.0005000 | 0 | 94.4 | 56.3 | 126 | | | |
| gamma-BHC (Lindane) | 0.00041 | 0.00010 | 0.0005000 | 0 | 82.4 | 45.8 | 103 | | | |
| Heptachlor | 0.00027 | 0.00010 | 0.0005000 | 0 | 53.4 | 33.7 | 104 | | | |
| Heptachlor epoxide | 0.00043 | 0.00010 | 0.0005000 | 0 | 86.3 | 50.1 | 116 | | | |
| Methoxychlor | 0.00052 | 0.00010 | 0.0005000 | 0 | 103 | 15 | 203 | | | |
| Surr: Decachlorobiphenyl | 0.0021 | | 0.002500 | | 85.3 | 73 | 119 | | | |
| Surr: Tetrachloro-m-xylene | 0.0016 | | 0.002500 | | 64.2 | 36.6 | 84.1 | | | |

Sample ID: **LCSD-67182** SampType: **LCSD** TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02** Batch ID: **67182** RunNo: **88093**
Prep Date: **5/2/2022** Analysis Date: **5/18/2022** SeqNo: **3123056** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Endrin | 0.00048 | 0.00010 | 0.0005000 | 0 | 95.9 | 56.3 | 126 | 2.57 | 20 | |
| gamma-BHC (Lindane) | 0.00042 | 0.00010 | 0.0005000 | 0 | 83.6 | 45.8 | 103 | 3.16 | 20 | |
| Heptachlor | 0.00034 | 0.00010 | 0.0005000 | 0 | 67.7 | 33.7 | 104 | 24.0 | 20 | R |
| Heptachlor epoxide | 0.00045 | 0.00010 | 0.0005000 | 0 | 89.7 | 50.1 | 116 | 4.30 | 20 | |
| Methoxychlor | 0.00054 | 0.00010 | 0.0005000 | 0 | 108 | 15 | 203 | 2.80 | 20 | |
| Surr: Decachlorobiphenyl | 0.0022 | | 0.002500 | | 88.7 | 73 | 119 | 0 | 0 | |
| Surr: Tetrachloro-m-xylene | 0.0015 | | 0.002500 | | 61.0 | 36.6 | 84.1 | 0 | 0 | |

Sample ID: **LCSD-67182** SampType: **LCSD** TestCode: **EPA Method 8081: Pesticides TCLP**
Client ID: **LCSS02** Batch ID: **67182** RunNo: **88093**
Prep Date: **5/2/2022** Analysis Date: **5/18/2022** SeqNo: **3123057** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Endrin | 0.00048 | 0.00010 | 0.0005000 | 0 | 96.0 | 56.3 | 126 | 1.73 | 20 | |
| gamma-BHC (Lindane) | 0.00043 | 0.00010 | 0.0005000 | 0 | 85.1 | 45.8 | 103 | 3.12 | 20 | |
| Heptachlor | 0.00034 | 0.00010 | 0.0005000 | 0 | 67.6 | 33.7 | 104 | 23.5 | 20 | R |
| Heptachlor epoxide | 0.00045 | 0.00010 | 0.0005000 | 0 | 89.5 | 50.1 | 116 | 3.56 | 20 | |
| Methoxychlor | 0.00052 | 0.00010 | 0.0005000 | 0 | 103 | 15 | 203 | 0.199 | 20 | |
| Surr: Decachlorobiphenyl | 0.0022 | | 0.002500 | | 87.5 | 73 | 119 | 0 | 0 | |
| Surr: Tetrachloro-m-xylene | 0.0017 | | 0.002500 | | 68.7 | 36.6 | 84.1 | 0 | 0 | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

Sample ID: **100ng lcs** SampType: **LCS** TestCode: **TCLP Volatiles by 8260B**
Client ID: **LCSW** Batch ID: **T87552** RunNo: **87552**
Prep Date: Analysis Date: **4/27/2022** SeqNo: **3099812** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 0.022 | 0.50 | 0.02000 | 0 | 108 | 70 | 130 | | | J |
| 1,1-Dichloroethene | 0.020 | 0.70 | 0.02000 | 0 | 102 | 70 | 130 | | | J |
| Trichloroethene (TCE) | 0.021 | 0.50 | 0.02000 | 0 | 104 | 70 | 130 | | | J |
| Chlorobenzene | 0.020 | 100 | 0.02000 | 0 | 99.4 | 70 | 130 | | | J |
| Surr: 1,2-Dichloroethane-d4 | 0.0097 | | 0.01000 | | 96.6 | 70 | 130 | | | |
| Surr: 4-Bromofluorobenzene | 0.010 | | 0.01000 | | 99.8 | 70 | 130 | | | |
| Surr: Dibromofluoromethane | 0.010 | | 0.01000 | | 101 | 70 | 130 | | | |
| Surr: Toluene-d8 | 0.0091 | | 0.01000 | | 91.2 | 70 | 130 | | | |

Sample ID: **mb** SampType: **MBLK** TestCode: **TCLP Volatiles by 8260B**
Client ID: **PBW** Batch ID: **T87552** RunNo: **87552**
Prep Date: Analysis Date: **4/27/2022** SeqNo: **3099813** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 0.50 | | | | | | | | |
| 1,2-Dichloroethane (EDC) | ND | 0.50 | | | | | | | | |
| 2-Butanone | ND | 200 | | | | | | | | |
| Carbon Tetrachloride | ND | 0.50 | | | | | | | | |
| Chloroform | ND | 6.0 | | | | | | | | |
| 1,4-Dichlorobenzene | ND | 7.5 | | | | | | | | |
| 1,1-Dichloroethene | ND | 0.70 | | | | | | | | |
| Tetrachloroethene (PCE) | ND | 0.70 | | | | | | | | |
| Trichloroethene (TCE) | ND | 0.50 | | | | | | | | |
| Vinyl chloride | ND | 0.20 | | | | | | | | |
| Chlorobenzene | ND | 100 | | | | | | | | |
| Surr: 1,2-Dichloroethane-d4 | 0.0099 | | 0.01000 | | 99.0 | 70 | 130 | | | |
| Surr: 4-Bromofluorobenzene | 0.0099 | | 0.01000 | | 99.4 | 70 | 130 | | | |
| Surr: Dibromofluoromethane | 0.010 | | 0.01000 | | 101 | 70 | 130 | | | |
| Surr: Toluene-d8 | 0.0092 | | 0.01000 | | 92.5 | 70 | 130 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **mb-67188** | SampType: **MBLK** | TestCode: **EPA Method 8270C TCLP** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67188** | RunNo: **87709** |
| Prep Date: **5/2/2022** | Analysis Date: **5/3/2022** | SeqNo: **3105691** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylphenol | ND | 200 | | | | | | | | |
| 3+4-Methylphenol | ND | 200 | | | | | | | | |
| 2,4-Dinitrotoluene | ND | 0.13 | | | | | | | | |
| Hexachlorobenzene | ND | 0.13 | | | | | | | | |
| Hexachlorobutadiene | ND | 0.50 | | | | | | | | |
| Hexachloroethane | ND | 3.0 | | | | | | | | |
| Nitrobenzene | ND | 2.0 | | | | | | | | |
| Pentachlorophenol | ND | 100 | | | | | | | | |
| Pyridine | ND | 5.0 | | | | | | | | |
| 2,4,5-Trichlorophenol | ND | 400 | | | | | | | | |
| 2,4,6-Trichlorophenol | ND | 2.0 | | | | | | | | |
| Cresols, Total | ND | 200 | | | | | | | | |
| Surr: 2-Fluorophenol | 0.14 | | 0.2000 | | 69.3 | 15 | 118 | | | |
| Surr: Phenol-d5 | 0.094 | | 0.2000 | | 46.9 | 15 | 92.9 | | | |
| Surr: 2,4,6-Tribromophenol | 0.14 | | 0.2000 | | 69.0 | 15 | 150 | | | |
| Surr: Nitrobenzene-d5 | 0.082 | | 0.1000 | | 82.0 | 15 | 136 | | | |
| Surr: 2-Fluorobiphenyl | 0.072 | | 0.1000 | | 71.5 | 15 | 134 | | | |
| Surr: 4-Terphenyl-d14 | 0.076 | | 0.1000 | | 75.8 | 15 | 168 | | | |

| Sample ID: **lcs-67188** | SampType: **LCS** | TestCode: **EPA Method 8270C TCLP** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67188** | RunNo: **87709** |
| Prep Date: **5/2/2022** | Analysis Date: **5/3/2022** | SeqNo: **3105692** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylphenol | 0.077 | 0.00010 | 0.1000 | 0 | 77.0 | 19 | 106 | | | |
| 3+4-Methylphenol | 0.16 | 0.00010 | 0.2000 | 0 | 82.4 | 16.3 | 112 | | | |
| 2,4-Dinitrotoluene | 0.056 | 0.00010 | 0.1000 | 0 | 55.7 | 15 | 99.6 | | | |
| Hexachlorobenzene | 0.070 | 0.00010 | 0.1000 | 0 | 70.2 | 41.8 | 111 | | | |
| Hexachlorobutadiene | 0.057 | 0.00010 | 0.1000 | 0 | 56.6 | 15 | 91.5 | | | |
| Hexachloroethane | 0.064 | 0.00010 | 0.1000 | 0 | 64.5 | 15 | 87.5 | | | |
| Nitrobenzene | 0.072 | 0.00010 | 0.1000 | 0 | 71.6 | 19.3 | 114 | | | |
| Pentachlorophenol | 0.063 | 0.00010 | 0.1000 | 0 | 63.0 | 29 | 103 | | | |
| Pyridine | 0.018 | 0.00010 | 0.1000 | 0 | 18.3 | 15 | 92.6 | | | |
| 2,4,5-Trichlorophenol | 0.078 | 0.00010 | 0.1000 | 0 | 77.7 | 25.2 | 114 | | | |
| 2,4,6-Trichlorophenol | 0.076 | 0.00010 | 0.1000 | 0 | 75.7 | 25.7 | 112 | | | |
| Cresols, Total | 0.24 | 0.00010 | 0.3000 | 0 | 80.6 | 15 | 145 | | | |
| Surr: 2-Fluorophenol | 0.13 | | 0.2000 | | 62.8 | 15 | 118 | | | |
| Surr: Phenol-d5 | 0.086 | | 0.2000 | | 43.0 | 15 | 92.9 | | | |
| Surr: 2,4,6-Tribromophenol | 0.15 | | 0.2000 | | 73.6 | 15 | 150 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

Sample ID: **lcs-67188** SampType: **LCS** TestCode: **EPA Method 8270C TCLP**
Client ID: **LCSW** Batch ID: **67188** RunNo: **87709**
Prep Date: **5/2/2022** Analysis Date: **5/3/2022** SeqNo: **3105692** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Surr: Nitrobenzene-d5 | 0.078 | | 0.1000 | | 77.9 | 15 | 136 | | | |
| Surr: 2-Fluorobiphenyl | 0.069 | | 0.1000 | | 69.4 | 15 | 134 | | | |
| Surr: 4-Terphenyl-d14 | 0.085 | | 0.1000 | | 84.9 | 15 | 168 | | | |

Sample ID: **2204b57-001bms** SampType: **MS** TestCode: **EPA Method 8270C TCLP**
Client ID: **WDW-1,2,3 & 4 Efflu** Batch ID: **67188** RunNo: **87709**
Prep Date: **5/2/2022** Analysis Date: **5/3/2022** SeqNo: **3105694** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylphenol | 0.075 | 0.00010 | 0.1000 | 0 | 74.9 | 15.8 | 101 | | | |
| 3+4-Methylphenol | 0.16 | 0.00010 | 0.2000 | 0 | 79.1 | 16.9 | 97.9 | | | |
| 2,4-Dinitrotoluene | 0.058 | 0.00010 | 0.1000 | 0 | 57.5 | 20.1 | 90.5 | | | |
| Hexachlorobenzene | 0.072 | 0.00010 | 0.1000 | 0 | 71.6 | 34 | 108 | | | |
| Hexachlorobutadiene | 0.063 | 0.00010 | 0.1000 | 0 | 63.0 | 15 | 99.7 | | | |
| Hexachloroethane | 0.068 | 0.00010 | 0.1000 | 0 | 67.9 | 15 | 86.4 | | | |
| Nitrobenzene | 0.073 | 0.00010 | 0.1000 | 0 | 72.6 | 15 | 109 | | | |
| Pentachlorophenol | 0.024 | 0.00010 | 0.1000 | 0 | 24.1 | 15 | 130 | | | |
| Pyridine | 0.049 | 0.00010 | 0.1000 | 0.005858 | 42.9 | 15 | 82 | | | |
| 2,4,5-Trichlorophenol | 0.073 | 0.00010 | 0.1000 | 0 | 73.0 | 28.1 | 105 | | | |
| 2,4,6-Trichlorophenol | 0.064 | 0.00010 | 0.1000 | 0 | 64.3 | 21.5 | 110 | | | |
| Cresols, Total | 0.23 | 0.00010 | 0.3000 | 0 | 77.7 | 15 | 127 | | | |
| Surr: 2-Fluorophenol | 0.12 | | 0.2000 | | 60.6 | 15 | 118 | | | |
| Surr: Phenol-d5 | 0.086 | | 0.2000 | | 43.2 | 15 | 92.9 | | | |
| Surr: 2,4,6-Tribromophenol | 0.15 | | 0.2000 | | 73.1 | 15 | 150 | | | |
| Surr: Nitrobenzene-d5 | 0.079 | | 0.1000 | | 78.9 | 15 | 136 | | | |
| Surr: 2-Fluorobiphenyl | 0.070 | | 0.1000 | | 70.4 | 15 | 134 | | | |
| Surr: 4-Terphenyl-d14 | 0.082 | | 0.1000 | | 81.6 | 15 | 168 | | | |

Sample ID: **2204b57-001bmsd** SampType: **MSD** TestCode: **EPA Method 8270C TCLP**
Client ID: **WDW-1,2,3 & 4 Efflu** Batch ID: **67188** RunNo: **87709**
Prep Date: **5/2/2022** Analysis Date: **5/3/2022** SeqNo: **3105695** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylphenol | 0.080 | 0.00010 | 0.1000 | 0 | 80.2 | 15.8 | 101 | 6.81 | 20 | |
| 3+4-Methylphenol | 0.17 | 0.00010 | 0.2000 | 0 | 84.2 | 16.9 | 97.9 | 6.20 | 20 | |
| 2,4-Dinitrotoluene | 0.059 | 0.00010 | 0.1000 | 0 | 59.2 | 20.1 | 90.5 | 2.89 | 20 | |
| Hexachlorobenzene | 0.077 | 0.00010 | 0.1000 | 0 | 76.6 | 34 | 108 | 6.76 | 20 | |
| Hexachlorobutadiene | 0.066 | 0.00010 | 0.1000 | 0 | 66.0 | 15 | 99.7 | 4.73 | 20 | |
| Hexachloroethane | 0.069 | 0.00010 | 0.1000 | 0 | 68.9 | 15 | 86.4 | 1.50 | 20 | |
| Nitrobenzene | 0.076 | 0.00010 | 0.1000 | 0 | 75.9 | 15 | 109 | 4.40 | 20 | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

Sample ID: **2204b57-001bmsd** SampType: **MSD** TestCode: **EPA Method 8270C TCLP**
Client ID: **WDW-1,2,3 & 4 Efflu** Batch ID: **67188** RunNo: **87709**
Prep Date: **5/2/2022** Analysis Date: **5/3/2022** SeqNo: **3105695** Units: **mg/L**

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Pentachlorophenol | 0.040 | 0.00010 | 0.1000 | 0 | 39.5 | 15 | 130 | 48.7 | 20 | R |
| Pyridine | 0.056 | 0.00010 | 0.1000 | 0.005858 | 49.7 | 15 | 82 | 13.1 | 20 | |
| 2,4,5-Trichlorophenol | 0.077 | 0.00010 | 0.1000 | 0 | 77.3 | 28.1 | 105 | 5.68 | 20 | |
| 2,4,6-Trichlorophenol | 0.076 | 0.00010 | 0.1000 | 0 | 75.8 | 21.5 | 110 | 16.4 | 20 | |
| Cresols, Total | 0.25 | 0.00010 | 0.3000 | 0 | 82.9 | 15 | 127 | 6.40 | 20 | |
| Surr: 2-Fluorophenol | 0.13 | | 0.2000 | | 66.1 | 15 | 118 | 0 | 0 | |
| Surr: Phenol-d5 | 0.096 | | 0.2000 | | 47.8 | 15 | 92.9 | 0 | 0 | |
| Surr: 2,4,6-Tribromophenol | 0.16 | | 0.2000 | | 81.0 | 15 | 150 | 0 | 0 | |
| Surr: Nitrobenzene-d5 | 0.081 | | 0.1000 | | 81.2 | 15 | 136 | 0 | 0 | |
| Surr: 2-Fluorobiphenyl | 0.073 | | 0.1000 | | 73.3 | 15 | 134 | 0 | 0 | |
| Surr: 4-Terphenyl-d14 | 0.078 | | 0.1000 | | 78.3 | 15 | 168 | 0 | 0 | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| | | | | | |
|---|---|---|---|---|---|
| Sample ID: **lcs-1 98.6uS eC** | SampType: **lcs** | | TestCode: **SM2510B: Specific Conductance** | | |
| Client ID: **LCSW** | Batch ID: **R87620** | | RunNo: **87620** | | |
| Prep Date: | Analysis Date: **4/28/2022** | | SeqNo: **3101479** | Units: **µmhos/cm** | |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Conductivity | 100 | 10 | 98.60 | 0 | 102 | 85 | 115 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**

***25-May-22***

**Client:** Navajo Refining Company

**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67181** | SampType: **MBLK** | TestCode: **EPA Method 7470A: Mercury** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67181** | RunNo: **87656** |
| Prep Date: **5/2/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103457** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | ND | 0.00020 | | | | | | | | |

| Sample ID: **LCSLL-67181** | SampType: **LCSLL** | TestCode: **EPA Method 7470A: Mercury** |
|---|---|---|
| Client ID: **BatchQC** | Batch ID: **67181** | RunNo: **87656** |
| Prep Date: **5/2/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103458** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.00014 | 0.00020 | 0.0001500 | 0 | 95.6 | 50 | 150 | | | J |

| Sample ID: **LCS-67181** | SampType: **LCS** | TestCode: **EPA Method 7470A: Mercury** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67181** | RunNo: **87656** |
| Prep Date: **5/2/2022** | Analysis Date: **5/2/2022** | SeqNo: **3103459** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | 0.0051 | 0.00020 | 0.005000 | 0 | 102 | 85 | 115 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB** | SampType: **MBLK** | TestCode: **EPA Method 6010B: Dissolved Metals** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **A88011** | RunNo: **88011** |
| Prep Date: | Analysis Date: **5/16/2022** | SeqNo: **3119568** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | ND | 1.0 | | | | | | | | |
| Magnesium | ND | 1.0 | | | | | | | | |
| Potassium | ND | 1.0 | | | | | | | | |
| Sodium | ND | 1.0 | | | | | | | | |

| Sample ID: **LCS** | SampType: **LCS** | TestCode: **EPA Method 6010B: Dissolved Metals** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **A88011** | RunNo: **88011** |
| Prep Date: | Analysis Date: **5/16/2022** | SeqNo: **3119570** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | 51 | 1.0 | 50.00 | 0 | 102 | 80 | 120 | | | |
| Magnesium | 51 | 1.0 | 50.00 | 0 | 103 | 80 | 120 | | | |
| Potassium | 51 | 1.0 | 50.00 | 0 | 102 | 80 | 120 | | | |
| Sodium | 50 | 1.0 | 50.00 | 0 | 100 | 80 | 120 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**

***25-May-22***

**Client:** Navajo Refining Company

**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67111** | SampType: **MBLK** | TestCode: **EPA 6010B: TCLP Metals** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67111** | RunNo: **87611** |
| Prep Date: **4/27/2022** | Analysis Date: **4/28/2022** | SeqNo: **3100575** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Barium | ND | 0.0020 | | | | | | | | |
| Cadmium | 0.0028 | 0.0020 | | | | | | | | |
| Chromium | ND | 0.0060 | | | | | | | | |
| Silver | ND | 0.0050 | | | | | | | | |

| Sample ID: **LCS-67111** | SampType: **LCS** | TestCode: **EPA 6010B: TCLP Metals** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67111** | RunNo: **87611** |
| Prep Date: **4/27/2022** | Analysis Date: **4/28/2022** | SeqNo: **3100577** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Barium | 0.47 | 0.0020 | 0.5000 | 0 | 93.9 | 80 | 120 | | | |
| Cadmium | 0.48 | 0.0020 | 0.5000 | 0 | 95.5 | 80 | 120 | | | B |
| Chromium | 0.47 | 0.0060 | 0.5000 | 0 | 93.9 | 80 | 120 | | | |
| Silver | 0.096 | 0.0050 | 0.1000 | 0 | 96.0 | 80 | 120 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **mb-1 alk** | SampType: **mblk** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101381** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | ND | 20.00 | | | | | | | | |

| Sample ID: **lcs-1 alk** | SampType: **lcs** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101382** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | 76.12 | 20.00 | 80.00 | 0 | 95.2 | 90 | 110 | | | |

| Sample ID: **mb-2 alk** | SampType: **mblk** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101404** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | ND | 20.00 | | | | | | | | |

| Sample ID: **lcs-2 alk** | SampType: **lcs** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101405** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | 75.60 | 20.00 | 80.00 | 0 | 94.5 | 90 | 110 | | | |

| Sample ID: **mb-3 alk** | SampType: **mblk** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101427** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | ND | 20.00 | | | | | | | | |

| Sample ID: **lcs-3 alk** | SampType: **lcs** | TestCode: **SM2320B: Alkalinity** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **R87620** | RunNo: **87620** | | | | | | | |
| Prep Date: | Analysis Date: **4/28/2022** | SeqNo: **3101428** | Units: **mg/L CaCO3** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Total Alkalinity (as CaCO3) | 76.32 | 20.00 | 80.00 | 0 | 95.4 | 90 | 110 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67191** | SampType: **MBLK** | TestCode: **SM2540C MOD: Total Dissolved Solids** |
|---|---|---|
| Client ID: **PBW** | Batch ID: **67191** | RunNo: **87767** |
| Prep Date: **5/3/2022** | Analysis Date: **5/5/2022** | SeqNo: **3108756** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | ND | 20.0 | | | | | | | | |

| Sample ID: **LCS-67191** | SampType: **LCS** | TestCode: **SM2540C MOD: Total Dissolved Solids** |
|---|---|---|
| Client ID: **LCSW** | Batch ID: **67191** | RunNo: **87767** |
| Prep Date: **5/3/2022** | Analysis Date: **5/5/2022** | SeqNo: **3108757** Units: **mg/L** |

| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | 1010 | 20.0 | 1000 | 0 | 101 | 80 | 120 | | | |

**Qualifiers:**

| | | | |
|---|---|---|---|
| * | Value exceeds Maximum Contaminant Level. | B | Analyte detected in the associated Method Blank |
| D | Sample Diluted Due to Matrix | E | Estimated value |
| H | Holding times for preparation or analysis exceeded | J | Analyte detected below quantitation limits |
| ND | Not Detected at the Reporting Limit | P | Sample pH Not In Range |
| PQL | Practical Quanitative Limit | RL | Reporting Limit |
| S | % Recovery outside of range due to dilution or matrix interference | | |

# QC SUMMARY REPORT
## Hall Environmental Analysis Laboratory, Inc.

WO#: **2204B57**
***25-May-22***

**Client:** Navajo Refining Company
**Project:** PSP WDW 1 2 3 4 Inj Well

| Sample ID: **MB-67224** | SampType: **MBLK** | TestCode: **SM 2540D: TSS** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **PBW** | Batch ID: **67224** | RunNo: **87726** | | | | | | | |
| Prep Date: **5/3/2022** | Analysis Date: **5/4/2022** | SeqNo: **3106971** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Suspended Solids | ND | 4.0 | | | | | | | | |

| Sample ID: **LCS-67224** | SampType: **LCS** | TestCode: **SM 2540D: TSS** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Client ID: **LCSW** | Batch ID: **67224** | RunNo: **87726** | | | | | | | |
| Prep Date: **5/3/2022** | Analysis Date: **5/4/2022** | SeqNo: **3106972** | Units: **mg/L** | | | | | | |
| Analyte | Result | PQL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | %RPD | RPDLimit | Qual |
| Suspended Solids | 90 | 4.0 | 92.40 | 0 | 97.4 | 83.44 | 119.05 | | | |

**Qualifiers:**

| | |
|---|---|
| * | Value exceeds Maximum Contaminant Level. |
| D | Sample Diluted Due to Matrix |
| H | Holding times for preparation or analysis exceeded |
| ND | Not Detected at the Reporting Limit |
| PQL | Practical Quanitative Limit |
| S | % Recovery outside of range due to dilution or matrix interference |
| B | Analyte detected in the associated Method Blank |
| E | Estimated value |
| J | Analyte detected below quantitation limits |
| P | Sample pH Not In Range |
| RL | Reporting Limit |

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

# Sample Log-In Check List

Client Name: Navajo Refining | Work Order Number: 2204B57 | RcptNo: 1

Received By: Juan Rojas 4/27/2022 7:10:00 AM

Completed By: Sean Livingston 4/27/2022 10:32:16 AM

Reviewed By: KPG 4-27-22

## Chain of Custody

| | | | |
|---|---|---|---|
| 1. Is Chain of Custody complete? | Yes ☑ | No ☐ | Not Present ☐ |
| 2. How was the sample delivered? | Courier | | |

## Log In

| | | | |
|---|---|---|---|
| 3. Was an attempt made to cool the samples? | Yes ☑ | No ☐ | NA ☐ |
| 4. Were all samples received at a temperature of >0° C to 6.0°C | Yes ☑ | No ☐ | NA ☐ |
| 5. Sample(s) in proper container(s)? | Yes ☑ | No ☐ | |
| 6. Sufficient sample volume for indicated test(s)? | Yes ☑ | No ☐ | |
| 7. Are samples (except VOA and ONG) properly preserved? | Yes ☑ | No ☐ | |
| 8. Was preservative added to bottles? | Yes ☐ | No ☑ | NA ☐ |
| 9. Received at least 1 vial with headspace <1/4" for AQ VOA? | Yes ☑ | No ☐ | NA ☐ |
| 10. Were any sample containers received broken? | Yes ☐ | No ☑ | |
| 11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) | Yes ☑ | No ☐ | |
| 12. Are matrices correctly identified on Chain of Custody? | Yes ☑ | No ☐ | |
| 13. Is it clear what analyses were requested? | Yes ☑ | No ☐ | |
| 14. Were all holding times able to be met? (If no, notify customer for authorization.) | Yes ☑ | No ☐ | |

# of preserved bottles checked for pH: 6 4
(<2 or >12 unless noted)
Adjusted? NO
Checked by: JN 4/27/22

## Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date: ____
By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: ____
Client Instructions: ____

16. Additional remarks: Poured off 125ml from samples 001B 2 of 2, 002B 2 of 2. For orp analysis. JN 4/27/22.

17. **Cooler Information**

| Cooler No | Temp °C | Condition | Seal Intact | Seal No | Seal Date | Signed By |
|---|---|---|---|---|---|---|
| 1 | 0.6 | Good | | | | |

# Chain-of-Custody Record

| | |
|---|---|
| Client: Navajo Refining Co. | Turn-Around Time: Standard X Rush X |
| | Project Name: PSP WDW-1, 2, 3 &4 Inj Well |
| Mailing Address: P.O. Box 159 | Project #: P.O. # 251841 |
| Artesia, NM 88211-0159 | |
| Phone #: 575-748-3311 | |
| email or Fax#: 575-746-5451 | Project Manager: Randy Dade |
| QA/QC Package: ☐ Standard ☐ Level 4 (Full Validation) ☐ Other ☐ EDD (Type) | Sampler: Brady Hubbard<br>On Ice: ☒ Yes ☐ No<br>Sample Temperature: 0.3+0.3=0.6 |


**HALL ENVIRONMENTAL ANALYSIS LABORATORY**

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107


| Date | Time | Matrix | Sample Request ID | Container Type and # | Preservative Type | HEAL No. 2204857 | Specific Gravity, C/A Balance, ORP, pH, TSS | 8260 TCLP Compounds | 8270 TCLP Compounds | RCI | RCRA 8 Metals | 8081 TCLP Compounds | 8151 TCLP Compounds |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | ** | ** | 001 | X | | | | | | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | 3-40ml VOA | HCL | | | X | | | | | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | 1-1L Amber | none | | | | X | | | | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | *** | *** | | | | | X | | | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | 1-250ml P | HNO3 | | | | | | X | | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | 1-1L Amber | none | | | | | | | X | |
| 4/26/22 | 9:25 | Liquid | WDW-1, 2, 3 & 4 Effluent | 1-1L Amber | none | | | | | | | | X |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | ** | ** | 002 | X | | | | | | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | 3-40ml VOA | HCL | | | X | | | | | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | 1-1L Amber | none | | | | X | | | | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | *** | *** | | | | | X | | | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | 1-250ml P | HNO4 | | | | | | X | | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | 1-1L Amber | none | | | | | | | X | |
| 4/26/22 | 9:50 | Liquid | CTB to City POTW | 1-1L Amber | none | | | | | | | | X |

| | | | | | |
|---|---|---|---|---|---|
| Date: 4-26-22 | Time: 11:15 | Relinquished by: Brady Hubbard | Received by: | Date | Time |
| Date: 4/26/22 | Time: 1900 | Relinquished by: | Received by: Courier | Date 4/27/22 | Time 7:10 |

Remarks: Dissolved Cations by EPA Method 200.7. **1-500ml unpreserved plastic, 1-125ml H2SO4 plastic, 1-125ml HNO3 plastic. *** 1-500ml unpreserved plastic, 1-500ml NaOH plastic, 1-500ml NaOH/ZnAcetate plastic.

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

**District I**
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
**District II**
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
**District III**
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
**District IV**
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

# State of New Mexico
# Energy, Minerals and Natural Resources
# Oil Conservation Division
# 1220 S. St Francis Dr.
# Santa Fe, NM 87505

COMMENTS

Action 168888

## COMMENTS

| | |
|---|---|
| Operator:<br>NAVAJO REFINING COMPANY, L.L.C.<br>P.O. Box 159<br>Artesia, NM 88211 | OGRID:<br>15694 |
| | Action Number:<br>168888 |
| | Action Type:<br>[UF-DP] Discharge Permit (DISCHARGE PERMIT) |

**COMMENTS**

| Created By | Comment | Comment Date |
|---|---|---|
| cchavez | Quarterly Report FY22 Q3 Submittal | 12/20/2022 |

**District I**
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
**District II**
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
**District III**
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
**District IV**
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

# State of New Mexico
# Energy, Minerals and Natural Resources
# Oil Conservation Division
# 1220 S. St Francis Dr.
# Santa Fe, NM 87505

CONDITIONS

Action 168888

## CONDITIONS

| | |
|---|---|
| Operator:<br>NAVAJO REFINING COMPANY, L.L.C.<br>P.O. Box 159<br>Artesia, NM 88211 | OGRID:<br>15694 |
| | Action Number:<br>168888 |
| | Action Type:<br>[UF-DP] Discharge Permit (DISCHARGE PERMIT) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| cchavez | Conditions of approval are: 1. Please QA/QC all uploaded reports in advance of submittal to the OCD; 2. Include all surface injection pressure figures in summary of reports. 3. Include the continuous monitoring device surface pressure data readings as an appendix in each quarterly report. | 12/20/2022 |