**MEMORANDUM**

Date:          November 12, 2024

Subject:      Seasonality of RIN Generation (2019-2023) and Projected RIN Generation for
              2024 Based on Data Through September 2024

From:        Dallas Burkholder, Office of Transportation and Air Quality, U.S. EPA

To:            Docket No. EPA-HQ-OAR-2024-0411

---

## I.      Introduction

The purpose of this memo is to support EPA's proposed rule to partially waive the cellulosic
biofuel volume requirement for 2024. This memo provides detail on the methodology used by
EPA to project the number of cellulosic RINs available to obligated parties for 2024 based on the
data available. In addition to projecting the number of cellulosic RINs available, we also project
the number of biomass-based diesel (BBD), advanced biofuel, and total renewable fuel RINs
available to determine whether a waiver of these volume requirements is warranted based on the
available data. We note that if EPA finalizes a partial waiver of the 2024 cellulosic biofuel
volume requirement, we intend to use additional data available at the time of the final rule for the
basis of the revised cellulosic biofuel volume requirement and associated percentage standard.

## II.     Projection of RIN Generation for 2024

To project RIN generation for 2024, we used the most recent RIN generation data available from
September 2024.[1] Because RIN generation data for 2024 was only available through September,
we needed to develop a methodology for projecting RIN generation for the remaining months of
2024.

In examining RIN generation in previous years, it is apparent that there are important seasonal
fluctuations in RIN generation that must be considered to accurately project RIN generation for
the rest of 2024. To account for the observed seasonality in RIN generation for each D code, we
began by comparing the cumulative number of RINs generated at the end of each month to the
total number of RINs generated in that calendar year for each year from 2019–2023. Cumulative
RIN generation by month for these years for each D code are shown in Tables 1–5, and the
monthly total as a percentage of the annual totals are shown in Tables 6–10. Tables 6–10 also
show the average percentage of total RINs that had been generated each month from 2019–2023.

---

[1] RIN generation data for this projection was updated on October 10, 2024, and is available at:
https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rins-generated-transactions.

**Table 1: Cumulative D3 RIN Generation by Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| January | 736,722 | 675,928 | 5,266,470 | 851,864 | 2,568,874 |
| February | 32,534,112 | 37,698,110 | 47,238,985 | 50,153,090 | 63,590,989 |
| March | 64,718,893 | 72,404,152 | 84,001,574 | 95,040,729 | 118,918,109 |
| April | 98,189,897 | 113,123,504 | 127,785,455 | 146,085,502 | 182,932,082 |
| May | 129,172,361 | 151,070,530 | 172,622,907 | 203,408,627 | 244,105,285 |
| June | 166,147,377 | 193,246,584 | 222,192,724 | 257,737,192 | 314,890,878 |
| July | 205,066,854 | 234,197,863 | 268,096,722 | 312,895,862 | 379,166,076 |
| August | 242,521,933 | 276,793,177 | 315,737,526 | 374,454,726 | 446,243,556 |
| September | 277,658,307 | 322,651,331 | 365,666,503 | 433,142,970 | 510,320,349 |
| October | 311,161,736 | 367,297,196 | 415,149,963 | 492,837,242 | 573,879,072 |
| November | 344,131,169 | 413,639,306 | 467,573,469 | 552,080,470 | 643,678,304 |
| December | 414,122,810 | 505,872,211 | 568,414,154 | 668,620,752 | 774,735,157 |

**Table 2: Cumulative D4 RIN Generation by Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| January | 264,197,374 | 300,431,270 | 300,530,140 | 355,508,039 | 523,261,212 |
| February | 557,245,792 | 615,626,910 | 606,931,648 | 751,049,107 | 1,041,635,297 |
| March | 885,710,576 | 987,504,723 | 1,014,536,627 | 1,240,990,029 | 1,662,105,209 |
| April | 1,261,936,337 | 1,347,221,303 | 1,400,979,400 | 1,739,669,094 | 2,265,644,708 |
| May | 1,644,877,459 | 1,716,779,441 | 1,797,592,361 | 2,253,451,438 | 3,016,679,602 |
| June | 2,002,655,532 | 2,104,657,692 | 2,226,584,570 | 2,744,777,472 | 3,696,278,055 |
| July | 2,403,219,001 | 2,490,819,003 | 2,585,288,269 | 3,166,455,592 | 4,332,227,159 |
| August | 2,735,075,578 | 2,881,168,288 | 3,007,075,341 | 3,640,670,083 | 5,035,513,205 |
| September | 3,076,567,016 | 3,320,059,789 | 3,392,473,074 | 4,142,985,364 | 5,711,213,861 |
| October | 3,452,913,670 | 3,652,776,919 | 3,823,883,759 | 4,620,216,177 | 6,445,708,463 |
| November | 3,763,876,652 | 4,042,784,239 | 4,288,614,024 | 5,202,408,480 | 7,125,909,753 |
| December | 4,146,614,718 | 4,490,241,528 | 4,873,636,560 | 5,787,238,904 | 7,968,264,600 |

**Table 3: Cumulative D5 RIN Generation by Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| January | 10,671,435 | 19,722,474 | 19,686,326 | 16,248,209 | 16,681,168 |
| February | 20,635,162 | 43,054,393 | 32,251,904 | 43,991,705 | 31,282,209 |
| March | 38,585,023 | 79,729,116 | 44,278,315 | 62,521,979 | 58,739,786 |
| April | 62,612,348 | 90,009,373 | 53,773,225 | 81,466,209 | 76,769,329 |
| May | 75,207,546 | 102,716,709 | 62,027,196 | 115,683,799 | 100,477,695 |
| June | 108,660,364 | 113,398,577 | 87,239,344 | 133,291,850 | 126,327,163 |
| July | 142,636,861 | 147,237,458 | 111,574,468 | 154,034,757 | 140,149,639 |
| August | 166,331,611 | 186,546,611 | 144,671,238 | 188,886,835 | 161,834,373 |
| September | 206,019,898 | 225,357,297 | 169,447,222 | 224,098,020 | 202,944,903 |
| October | 268,776,413 | 253,050,235 | 194,883,599 | 263,548,803 | 228,921,732 |
| November | 288,236,511 | 290,340,045 | 204,085,653 | 300,682,627 | 244,802,986 |
| December | 322,343,569 | 335,236,581 | 233,875,137 | 342,765,281 | 263,065,602 |

**Table 4: Cumulative D6 RIN Generation by Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| January | 1,209,885,816 | 1,252,127,757 | 1,079,635,890 | 1,212,911,253 | 1,216,724,281 |
| February | 2,364,117,098 | 2,415,775,632 | 1,982,687,360 | 2,285,973,978 | 2,346,906,981 |
| March | 3,572,449,086 | 3,555,484,995 | 3,173,606,779 | 3,556,832,050 | 3,568,679,370 |
| April | 4,829,578,808 | 4,200,379,582 | 4,310,104,624 | 4,693,353,655 | 4,725,025,342 |
| May | 6,119,511,879 | 5,042,515,057 | 5,573,327,609 | 5,926,956,532 | 6,003,666,356 |
| June | 7,366,077,406 | 6,116,993,835 | 6,843,692,253 | 7,218,827,782 | 7,289,931,787 |
| July | 8,694,292,459 | 7,287,969,165 | 8,118,380,749 | 8,430,733,219 | 8,570,285,430 |
| August | 9,951,188,420 | 8,415,007,468 | 9,335,172,007 | 9,701,037,068 | 9,849,977,061 |
| September | 11,146,598,879 | 9,536,710,686 | 10,497,941,182 | 10,831,506,697 | 11,029,849,582 |
| October | 12,403,960,223 | 10,691,154,327 | 11,702,057,157 | 12,069,430,977 | 12,334,268,424 |
| November | 13,621,501,218 | 11,834,832,545 | 12,959,944,184 | 13,338,122,523 | 13,576,160,186 |
| December | 14,928,211,250 | 12,986,850,360 | 14,259,937,329 | 14,551,064,706 | 14,838,268,048 |

**Table 5: Cumulative D7 RIN Generation by Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| January | 148,993 | 0 | 0 | 0 | 0 |
| February | 374,490 | 0 | 0 | 58,930 | 0 |
| March | 797,707 | 0 | 0 | 58,930 | 0 |
| April | 1,036,995 | 0 | 0 | 58,930 | 69,961 |
| May | 1,169,145 | 0 | 0 | 58,930 | 113,426 |
| June | 1,276,618 | 0 | 0 | 160,995 | 137,380 |
| July | 1,276,618 | 0 | 0 | 160,995 | 137,380 |
| August | 1,315,943 | 0 | 0 | 191,369 | 166,084 |
| September | 1,315,943 | 0 | 0 | 202,455 | 166,084 |
| October | 1,315,943 | 0 | 60,338 | 202,455 | 166,084 |
| November | 1,315,943 | 55,892 | 66,773 | 202,455 | 208,643 |
| December | 1,315,943 | 55,892 | 247,518 | 236,352 | 208,643 |

**Table 6: Percentage of Total D3 RINs Generated at the End of Each Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| January | 0.2% | 0.1% | 0.9% | 0.1% | 0.3% | 0.3% |
| February | 7.9% | 7.5% | 8.3% | 7.5% | 8.2% | 7.9% |
| March | 15.6% | 14.3% | 14.8% | 14.2% | 15.3% | 14.9% |
| April | 23.7% | 22.4% | 22.5% | 21.8% | 23.6% | 22.8% |
| May | 31.2% | 29.9% | 30.4% | 30.4% | 31.5% | 30.7% |
| June | 40.1% | 38.2% | 39.1% | 38.5% | 40.6% | 39.3% |
| July | 49.5% | 46.3% | 47.2% | 46.8% | 48.9% | 47.7% |
| August | 58.6% | 54.7% | 55.5% | 56.0% | 57.6% | 56.5% |
| September | 67.0% | 63.8% | 64.3% | 64.8% | 65.9% | 65.2% |
| October | 75.1% | 72.6% | 73.0% | 73.7% | 74.1% | 73.7% |
| November | 83.1% | 81.8% | 82.3% | 82.6% | 83.1% | 82.6% |
| December | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Table 7: Percentage of Total D4 RINs Generated at the End of Each Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| January | 6.4% | 6.7% | 6.2% | 6.1% | 6.6% | 6.4% |
| February | 13.4% | 13.7% | 12.5% | 13.0% | 13.1% | 13.1% |
| March | 21.4% | 22.0% | 20.8% | 21.4% | 20.9% | 21.3% |
| April | 30.4% | 30.0% | 28.7% | 30.1% | 28.4% | 29.5% |
| May | 39.7% | 38.2% | 36.9% | 38.9% | 37.9% | 38.3% |
| June | 48.3% | 46.9% | 45.7% | 47.4% | 46.4% | 46.9% |
| July | 58.0% | 55.5% | 53.0% | 54.7% | 54.4% | 55.1% |
| August | 66.0% | 64.2% | 61.7% | 62.9% | 63.2% | 63.6% |
| September | 74.2% | 73.9% | 69.6% | 71.6% | 71.7% | 72.2% |
| October | 83.3% | 81.3% | 78.5% | 79.8% | 80.9% | 80.8% |
| November | 90.8% | 90.0% | 88.0% | 89.9% | 89.4% | 89.6% |
| December | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Table 8: Percentage of Total D5 RINs Generated at the End of Each Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| January | 3.3% | 5.9% | 8.4% | 4.7% | 6.3% | 5.7% |
| February | 6.4% | 12.8% | 13.8% | 12.8% | 11.9% | 11.6% |
| March | 12.0% | 23.8% | 18.9% | 18.2% | 22.3% | 19.1% |
| April | 19.4% | 26.8% | 23.0% | 23.8% | 29.2% | 24.4% |
| May | 23.3% | 30.6% | 26.5% | 33.8% | 38.2% | 30.5% |
| June | 33.7% | 33.8% | 37.3% | 38.9% | 48.0% | 38.3% |
| July | 44.2% | 43.9% | 47.7% | 44.9% | 53.3% | 46.8% |
| August | 51.6% | 55.6% | 61.9% | 55.1% | 61.5% | 57.1% |
| September | 63.9% | 67.2% | 72.5% | 65.4% | 77.1% | 69.2% |
| October | 83.4% | 75.5% | 83.3% | 76.9% | 87.0% | 81.2% |
| November | 89.4% | 86.6% | 87.3% | 87.7% | 93.1% | 88.8% |
| December | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Table 9: Percentage of Total D6 RINs Generated at the End of Each Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| January | 8.1% | 9.6% | 7.6% | 8.3% | 8.2% | 8.4% |
| February | 15.8% | 18.6% | 13.9% | 15.7% | 15.8% | 16.0% |
| March | 23.9% | 27.4% | 22.3% | 24.4% | 24.1% | 24.4% |
| April | 32.4% | 32.3% | 30.2% | 32.3% | 31.8% | 31.8% |
| May | 41.0% | 38.8% | 39.1% | 40.7% | 40.5% | 40.0% |
| June | 49.3% | 47.1% | 48.0% | 49.6% | 49.1% | 48.6% |
| July | 58.2% | 56.1% | 56.9% | 57.9% | 57.8% | 57.4% |
| August | 66.7% | 64.8% | 65.5% | 66.7% | 66.4% | 66.0% |
| September | 74.7% | 73.4% | 73.6% | 74.4% | 74.3% | 74.1% |
| October | 83.1% | 82.3% | 82.1% | 82.9% | 83.1% | 82.7% |
| November | 91.2% | 91.1% | 90.9% | 91.7% | 91.5% | 91.3% |
| December | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Table 10: Percentage of Total D7 RINs Generated at the End of Each Month (2019–2023)**

| Month | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| January | 11.3% | 0.0% | 0.0% | 0.0% | 0.0% | 2.3% |
| February | 28.5% | 0.0% | 0.0% | 24.9% | 0.0% | 10.7% |
| March | 60.6% | 0.0% | 0.0% | 24.9% | 0.0% | 17.1% |
| April | 78.8% | 0.0% | 0.0% | 24.9% | 33.5% | 27.5% |
| May | 88.8% | 0.0% | 0.0% | 24.9% | 54.4% | 33.6% |
| June | 97.0% | 0.0% | 0.0% | 68.1% | 65.8% | 46.2% |
| July | 97.0% | 0.0% | 0.0% | 68.1% | 65.8% | 46.2% |
| August | 100.0% | 0.0% | 0.0% | 81.0% | 79.6% | 52.1% |
| September | 100.0% | 0.0% | 0.0% | 85.7% | 79.6% | 53.1% |
| October | 100.0% | 0.0% | 24.4% | 85.7% | 79.6% | 57.9% |
| November | 100.0% | 100.0% | 27.0% | 85.7% | 100.0% | 82.5% |
| December | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

In comparing the percentage of total RINs generated at the end of each month, we observed that the seasonality of RIN generation across the five years considered are very consistent for each D code.[2] Therefore, we used the average percentage of the total RINs generated at the end of each month from 2019–2023, together with the number of RINs generated through September 2024, to project total RIN generation for 2024 for each D code. This data, and the resulting RIN generation projections for 2024, are shown in Table 11.

---

[2] Unlike the other D codes, the seasonality of D7 RIN generation has been much more inconsistent that the other categories. However, overall D7 RIN generation remains very limited and therefore the uncertainty in projecting D7 RIN generation for 2024 does not significantly impact this analysis.

**Table 11: Projection of RIN Generation by D Code for 2024**

| D Code | RINs Generated Through Sept. 2024 | Average Percentage of Total RINs Generated Through Sept. (2019-2023) | Projected 2024 RIN Generation |
|---|---|---|---|
| D3 | 639,336,129 | 65.2% | 981,144,546 |
| D4 | 6,648,128,010 | 72.2% | 9,207,791,575 |
| D5 | 158,342,212 | 69.2% | 228,742,817 |
| D6 | 11,137,645,545 | 74.1% | 15,030,896,069 |
| D7 | 227,964 | 53.1% | 429,699 |

We next projected the number of RINs retired for reasons other than compliance with RFS obligations and the number of RINs retired by renewable fuel exporters for each D code. To make this projection, we considered the number of RINs retired for these reasons as a percentage of total RIN generation for each D code each year from 2019–2023. We then multiplied the average over this five-year period for each D code by the number of RINs projected to be generated in Table 11. Finally, we subtracted the number of RINs projected to be retired for these reasons from the total number of RINs projected to be generated to project the total number of RINs available to obligated parties to demonstrate compliance with their RFS obligations. These calculations are shown in Tables 12 and 13.

**Table 12: Percentage of RINs Retired for Reasons Other Than Compliance with RFS Obligations and RINs Retired by Renewable Fuel Exporters (2019–2023)**

| D Code | 2019 | 2020 | 2021 | 2022 | 2023 | Average |
|---|---|---|---|---|---|---|
| D3 | 2.02% | 0.19% | 0.95% | 0.85% | 0.25% | 0.85% |
| D4 | 11.33% | 15.59% | 12.47% | 14.81% | 13.23% | 13.49% |
| D5 | 0.92% | 0.07% | 0.64% | 10.03% | 26.96% | 7.72% |
| D6 | 4.46% | 3.59% | 3.31% | 3.59% | 3.89% | 3.77% |
| D7 | 0.46% | 0.00% | 0.00% | 0.00% | 0.00% | 0.09% |

**Table 13: Projected 2024 RINs Available**

| D Code / Category | Projected 2024 RIN Generation | Projected 2024 RINs Not Available for Compliance | Projected 2024 RINs Available |
|---|---|---|---|
| D3 | 981,144,546 | 8,365,945 | 972,778,601 |
| D4 | 9,207,791,575 | 1,241,673,073 | 7,966,118,502 |
| D5 | 228,742,817 | 17,667,049 | 211,075,768 |
| D6 | 15,030,896,069 | 566,423,194 | 14,464,472,876 |
| D7 | 429,699 | 398 | 429,300 |
| Cellulosic Biofuel (D3 + D7) | 981,574,245 | 8,366,343 | 973,207,901 |
| Advanced Biofuel (D3 + D4 + D5 +D6) | 10,418,108,637 | 1,267,706,465 | 9,150,402,171 |
| Total Renewable Fuel (All D Codes) | 25,449,004,706 | 1,834,129,659 | 23,614,875,047 |

As shown in Table 14, the projected number of 2024 RINs available to obligated parties to demonstrate compliance with their RFS obligations is higher than the 2024 volume requirements

for total renewable fuel, advanced biofuel, and BBD. For cellulosic biofuel, however, the projected number of 2024 RINs available is lower than the 2024 volume requirement.

**Table 14: Projected 2024 RINs Available vs. 2024 Volume Requirements (billion RINs)**

| RFS Standard | Projected 2024 RINs Available | 2024 Volume Requirement | Difference |
|---|---|---|---|
| Cellulosic Biofuel | 0.97 | 1.09 | -0.12 |
| BBD | 7.97 | 4.86 | 3.11 |
| Advanced Biofuel | 9.15 | 6.54 | 2.61 |
| Total Renewable Fuel | 23.61 | 21.54 | 2.07 |