

Valero Energy Ltd - Pembroke Refinery

Permit Number : EPR/YP3930EX

Reporting year : 2022

A review of the results of the monitoring and assessment carried out in accordance with the permit [Condition 4.2.2(a)]

Releases to Air

| Substance | CAS No. | Reporting Threshold | Annual Total (kg) | | Comment |
|-------------------------------------|------------|---------------------|-------------------|---------------|--|
| | | | 2021 | 2022 | |
| Ammonia | 7664-41-7 | 1,000 kg | 2219 | 2835 | Emission increased from previous year due to increased refinery throughput. |
| Carbon dioxide | 124-38-9 | 10,000,000 kg | 1,583,182,723 | 2,389,605,036 | Emission increased from previous year due to increased refinery throughput. |
| Carbon monoxide | 630-08-0 | 100,000 kg | 123,026 | 208,779 | Emission increased from previous year due to increased refinery throughput. |
| Nitrous oxide | 10024-97-2 | 10000 kg | 18,955 | 26,468 | Emission increased from previous year due to increased refinery throughput. |
| Benzene | 71-43-2 | 1,000 kg | 6,198 | 11,787 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Butadiene (1,3-Butadiene) | 106-99-0 | 100 kg | 3,281.43 | 2,946.73 | Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Butene - All isomers | 25167-67-3 | 1,000 kg | 33,908 | 46,411 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Ethyl benzene | 100-41-4 | 100 kg | 9,480 | 15,839 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Ethylene (Ethene) | 74-85-1 | 1,000 kg | 2,917 | 4,420 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| 1-Hexene | 592-41-6 | 10 kg | 8,386 | 12,892 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Methane | 74-82-8 | 10,000 kg | 60,477 | 79,984 | Emission increased from previous year due to increased refinery throughput |
| Pentane | 109-66-0 | 100 kg | 467,422 | 360,975 | Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Pentene - all isomers | 25377-72-4 | 1,000 kg | 29,898 | 7,735 | Mass fraction derived from fence line monitoring decreased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Toluene | 108-88-3 | 100 kg | 33,179 | 78,457 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Xylene - All isomers | 1330-20-7 | 1,000 kg | 45,575 | 74,037 | Mass fraction derived from fence line monitoring increased from previous year. Mass fraction used to calculate proportion from Total VOC emission. |
| Antimony | 7440-36-0 | 1 kg | 381 | 214 | Mass fraction derived from FCCU catalyst monitoring decreased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission. |
| Nickel | 7440-02-0 | 10 kg | 1,027 | 683 | Mass fraction derived from FCCU catalyst monitoring decreased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission. |
| Vanadium | 7440-62-2 | 10 kg | 530 | 417 | Mass fraction derived from FCCU catalyst monitoring decreased from previous year. Mass fraction used to calculate proportion from FCCU particulate emission. |
| Nitrogen oxides – NO and NO2 as NO2 | | 100,000 kg | 1,754,026 | 2,407,657 | Emission increased from previous year due to increased refinery throughput. |
| Particulate matter - PM2.5 | | 1,000 kg | 349,976 | 179,307 | See Part B Notification - FCCU Dust (A5A) Oct 2021 - Feb 2022 |
| Particulate matter - PM10 | | 1,000 kg | 420,063 | 211,174 | See Part B Notification - FCCU Dust (A5A) Oct 2021 - Feb 2022 |
| Particulate matter | | 10,000 kg | 432,431 | 216,798 | See Part B Notification - FCCU Dust (A5A) Oct 2021 - Feb 2022 |
| Sulphur oxides | | 100,000 kg | 2,270,986 | 2,114,379 | FCCU sour water stripper overheads flaring decreased from previous year |
| Other individual acid-forming gases | | 1,000 kg | 1,896 | 1,522 | FCCU sour water stripper overheads flaring decreased from previous year |

Releases to Controlled Waters

| Substance | CAS No. | Reporting Threshold | Annual Total (kg) | | Comment |
|-----------|-----------|---------------------|-------------------|------|--|
| | | | 2021 | 2022 | |
| Ammonia | 7664-41-7 | 10 kg | 6216 | 6830 | |
| Arsenic | 7440-38-2 | 5 kg | 33 | 77 | Flow weighted average increased from previous year due to increased refinery output |
| Cadmium | 7440-43-9 | 1 kg | 1.2 | 2.6 | Flow weighted average increased from previous year due to increased refinery output |
| Chromium | 7440-47-3 | 20 kg | 82.3 | 36.5 | Flow weighted average increased from previous year due to increased (periodic monitoring) contribution in January and February |
| Copper | 7440-02-0 | 20 kg | 18 | 114 | Flow weighted average increased from previous year due to increased refinery output |
| Mercury | 7439-97-6 | 0.1 kg | 0.6 | 0.5 | Flow weighted average decreased from previous year |
| Nickel | 7440-02-0 | 20 kg | 114 | 34 | Flow weighted average decreased from previous year to typical emission |
| Zinc | 7440-66-6 | 100 kg | 252 | 326 | Flow weighted average increased from previous year due to increased refinery output |

Waste Releases

| Waste | EWC Code | WFD Code | Annual Total (kg) | | Comment |
|--|-----------|----------|-------------------|-------|--|
| | | | 2021 | 2022 | |
| Hazardous waste transferred for disposal | 16 07 09* | D9 | 3,046 | 1,804 | Hazardous waste for disposal decreased due to a decrease in sulphur (to disposal) |
| Hazardous waste transferred for recovery | 05 01 06* | R13 | 131 | 81 | Hazardous waste for recovery decreased due to a decrease in WWTP Surge pond centrifuge cake make |