CARB At-Berth Regulation: Innovative Concept Application

Chevron Products Company
Revised
September 28, 2023

Version	Date	Approver
0	12/1/2021	Alan Davis
1	08/19/2022	Tolly Graves
2 (RFI -1)	09/28/2023	Tolly Graves

Certification

I certify that the information contained in the Innovative Concept application being submitted pursuant to Control Measure for Ocean-Going Vessels At Berth (At-Berth Regulation), Title 17, Division 3, Chapter 1, Subchapter 7.5 of the California Code of Regulations (CCR) is true, accurate, and complete to the best of my knowledge, signed under penalty of perjury.

[signature]	Tolly Graves	Sept 28, 2023
Responsible Official Signature	Printed Name	Date

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1. Executive Summary

The Chevron Richmond Refinery is submitting this revised application to the California Air Resources Board (CARB) for approval of the following Innovative Concept (IC) projects in accordance with **Section 93130.17** of the Control Measure for Ocean-Going Vessels At Berth ("At-Berth Regulation"), Title 17, Division 3, Chapter 1, Subchapter 7.5 of the California Code of Regulations (CCR), Sections 93130-93130.22. Chevron has revised the original Innovative Concept application to submit information and materials responsive CARB's Request for Information letter dated Augst 31, 2023.

Each Innovative Concept is listed below and then discussed in greater detail in the following sections of this application.

Table ES-1: Innovative Concept Projects List

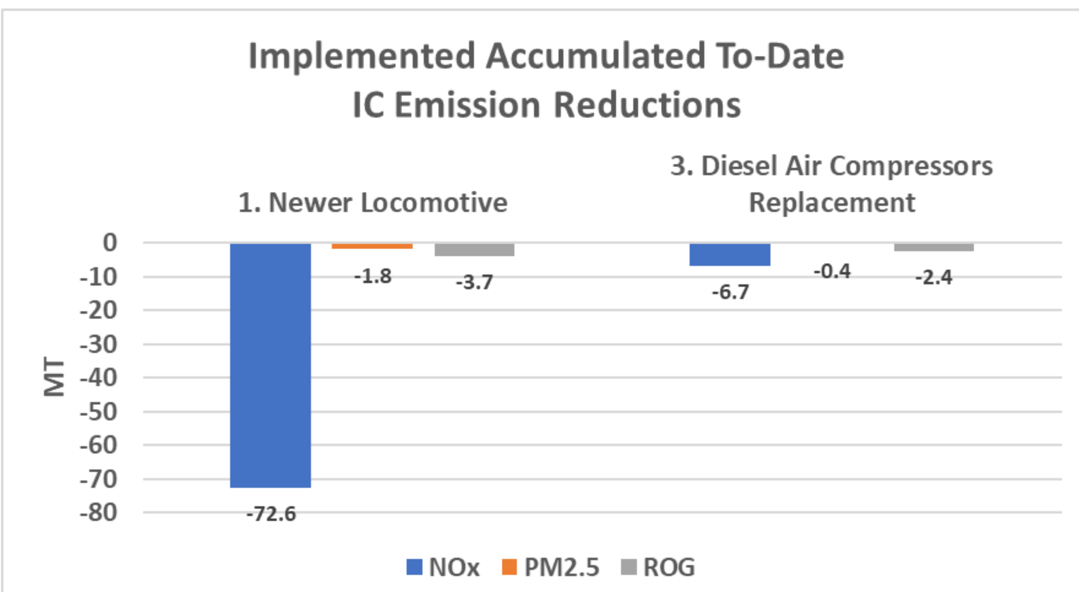
Project #	Project Description	Estimated Project Implementation Date(s)	Environmental Review Needed?
1	Newer Locomotive	Implemented on 4/7/2022 (Ongoing)	No
2	Boiler Replacement Project	2026	Yes
3	Diesel Air Compressors Replacement	Project in progress (Ongoing)	No
4	FCC Ammonia Optimization	2026	Yes
5	Wharf ERD Upgrade	2024	Yes
6	TKN Heater Optimization	2024	No
7	North Ranch Diesel Engine Replacement	2024	No
8	Solar Electricity Project - General	2025	Yes
9	Solar Electricity Project – Shore Power	2027-2032	Yes
10	Tier II or above certification on Auxiliary Engines (AE) for ships	2023-2027	No
11	Tier III or above certification on Auxiliary Engines (AE) for ships	2023-2027	No
12	Upgraded Combustion and Control systems for Auxiliary Boilers (AB) for ships	2023-2027	No
13	Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB)	2024-2027	No
14	Shore Power or Stack Capture for Barges/Tug Boats	2027-2032	To Be Determined

At the outset, it is important to emphasize that all the projects listed in **Table ES-1** are intended specifically to achieve compliance with the CARB At-Berth regulation. This package of IC projects was developed by a special team of Chevron experts specifically in response to the CARB At-Berth Regulation as a means of regulatory compliance. There currently are no regulatory requirements to develop, adopt, or implement any of these projects. Further, given current technological and economic trends, none of the projects would be reasonably expected to occur under a "business as usual" scenario. Rather, these IC projects will require significant capital investments, deliberate and beyond business as usual chartering/leasing strategies, and expedited adoption and implementation that would not otherwise be required or anticipated to occur in the absence of the At-Berth Regulation. As a result, the IC projects are designed to achieve emissions reductions in excess of any reductions otherwise required by law and in excess of any reductions that would be reasonably expected under a conservative business as usual scenario.

Because shore power and capture and control CAECS cannot be feasibly implemented by 1/1/2027, Chevron proposes to comply with the CARB At-Berth regulation by implementing a portfolio of IC projects to achieve the required emissions reductions. Accordingly, Chevron requests that CARB approve all of the non-CEQA IC projects by December 2023 to provide for sufficient emissions reductions to achieve compliance with the At- Berth Regulation and retroactively credit emission reductions to the time of implementation for each IC project.

Chevron also requests that CARB promptly approve the IC projects as a collective package, so that Chevron can begin accruing credits for projects that have been implemented by Chevron in good faith during the intervening two years since our application was submitted, while awaiting CARB review of our application. Chevron has invested thousands of man-hours, millions of dollars in engineering, design and procurement of materials and equipment in good faith towards compliance with the regulation while awaiting CARB to begin reviewing Chevron's IC application. As of September 28, 2023, for refinery-based innovative concepts, IC.1 is complete and IC.3 has ceased full-time diesel compressor use resulting in **avoided emissions of 79.3 tons of NOx, 6.1 tons ROG, 2.2 tons $PM_{2.5}$** since their implementation in April 2022 and September 2023, respectively. Furthermore, IC.6 is slated for completion in May 2024, and IC.7 is also slated for completion this coming year. Early emission reductions are critical to Chevron's ability to comply with the At Berth Regulation, as CAECS infrastructure cannot feasibly be designed, permitted and constructed at Richmond Long Wharf by the 1/1/2027 regulatory deadline.

Figure ES-1: Emission reductions generated by completed Innovative Concept (IC) projects IC.1 and IC.3 as of 4/2022 (IC.1) and 9/2023 generators offline (IC.3) as of 9/28/2023.



Chevron has met with CARB staff on numerous occasions over the past three years to discuss our compliance strategy and terminal-specific construction challenges. More recently, in May and July 2023, Chevron met with CARB staff to present compelling data that demonstrates that Chevron's Innovative Concepts portfolio of non-CEQA and CEQA projects is *far more effective* than CAECS at reducing criteria pollutants (NOx, PM, ROG) and greenhouse gas emissions. This is shown below in

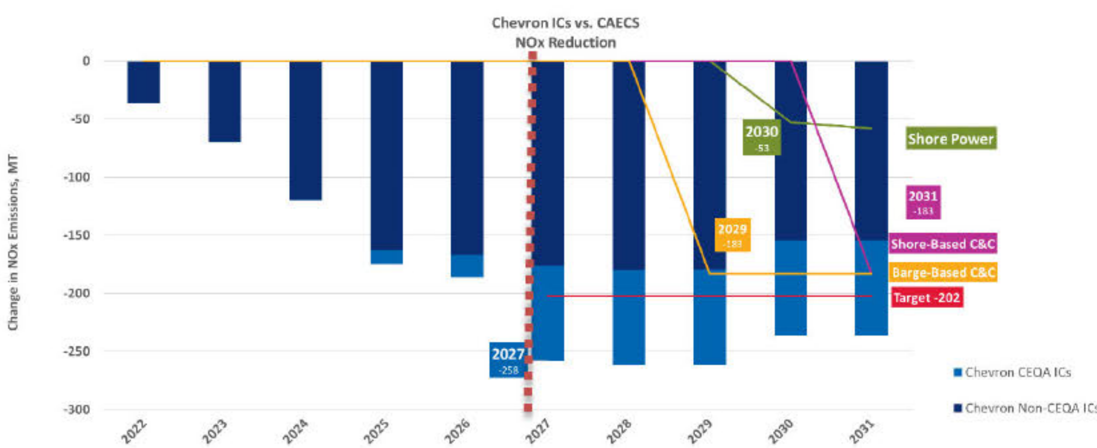
Figure ES-1 and Figures ES-2 through ES-5, and **Appendix B.4**, using a subset of the IC portfolio projects that are expected to generate substantial emission reductions prior to 2027. As a result, the total portfolio significantly outperforms CAECS from 2022-2032, and beyond, particularly for NOx, ROG and GHGs. Chevron believes within the next few years, through our ongoing engagements across the shipping sector, including with ship engine and boiler manufacturers, that we will be able to demonstrate additional PM and ROG reductions from Shipping ICs 10-13, which are not presently included in the forecast.

Table ES-2: Pre-2027 IC Portfolio Emission Reductions Estimates compared with CAECS.

Constituent	Pre-2027 Emission Reduction (MT)	Pre-2027 Emission Reductions CARB-approved CAECs (MT)	Comment
NO_x	-601.6	0	Excludes additional NOx benefits from ICs 4, 9, 13 and 14.
$PM_{2.5}$	-16.3	0	Excludes additional PM benefits from IC.4, IC.9, IC.10-14.
ROG	-50.6	0	Excludes additional ROG benefits from ICs 9, 10, 11, 12, 13 and 14
GHGs	-262,000	0	Excludes additional GHG benefits from ICs 4, 9, 10, 11, 12, 13 and 14.

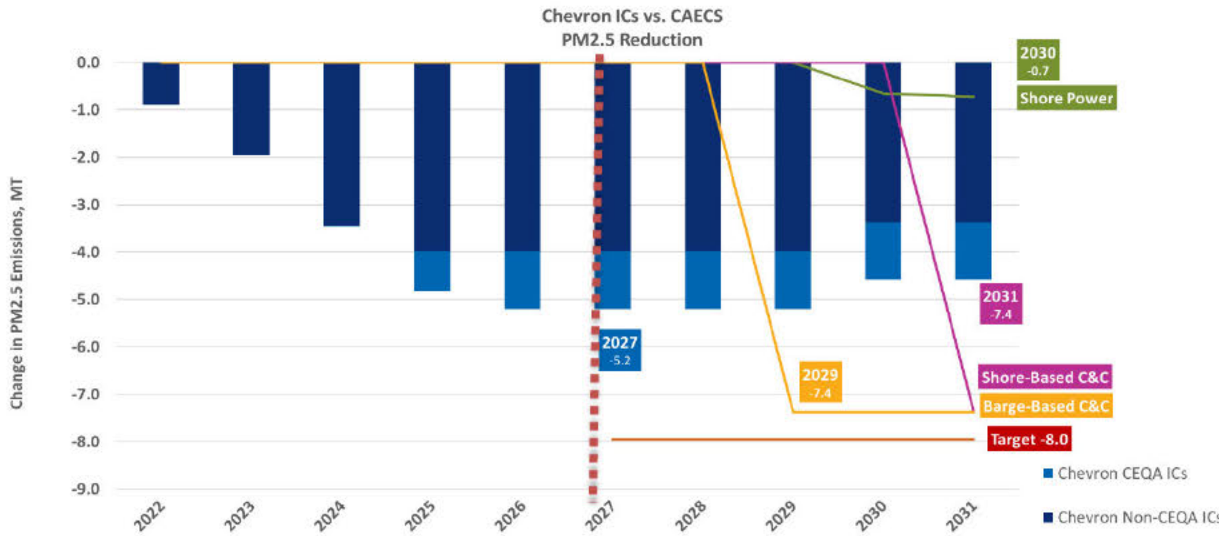
Figures ES-2 to ES-5 show the annualized emission reductions for Chevron's IC portfolio compared with the earliest feasible implementation date for CAECs assuming 1) the CAECS technology is first determined to be safe and feasible on tankers, 2) the technology is available (currently as of 9/2023 shore power equipment is not developed and available) and 3) the supporting infrastructure for the CAECS technology, such as a fender system for barge-based capture & control, or structural foundations and supporting electrical infrastructure for shore power, is fully permitted under CEQA and all permits are obtained within a 24-month period from start of permitting to permits received assuming a CEQA Environmental Impact Report (EIR) is required for the environmental review. Finally, the capture and control CAEC's consumes diesel to operate the equipment, so it is net GHG positive compared with Chevron's strongly GHG-negative IC portfolio. Shore power only controls emissions from vessel diesel auxiliary engines (AEs), so it is far less effective overall than Chevron's IC portfolio as shown in **Appendix B.3 and Appendix B.4,** compared with both CAECs.

Figure ES-2: Chevron IC portfolio annualized NOx emission reductions compared with CAECs based on 2016 baseline (average year):



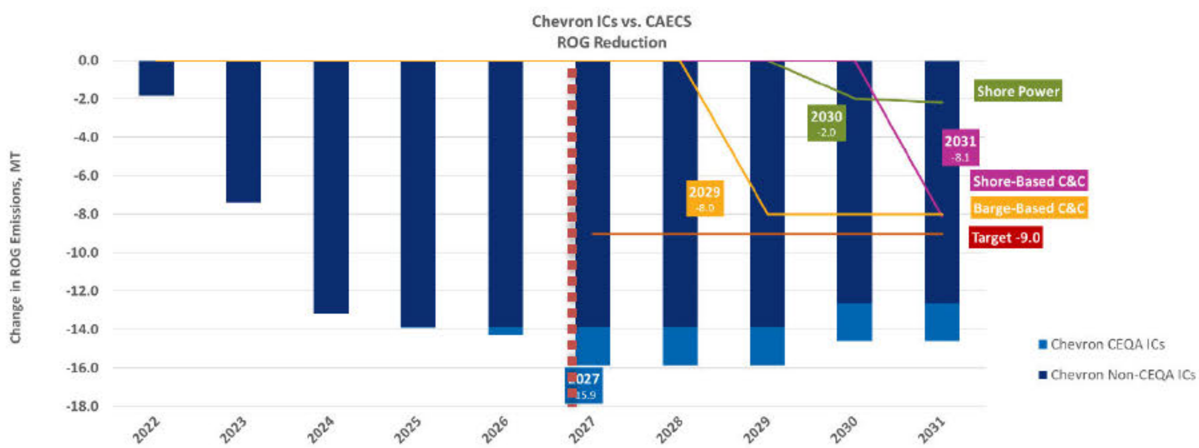
NOTE: Figure ES-2 excludes potential NOx benefits from ICs 4, 9, 13 and 14.

Figure ES-3: Chevron IC portfolio annualized PM2.5 emission reductions compared with CAECs based on 2016 baseline (average year):



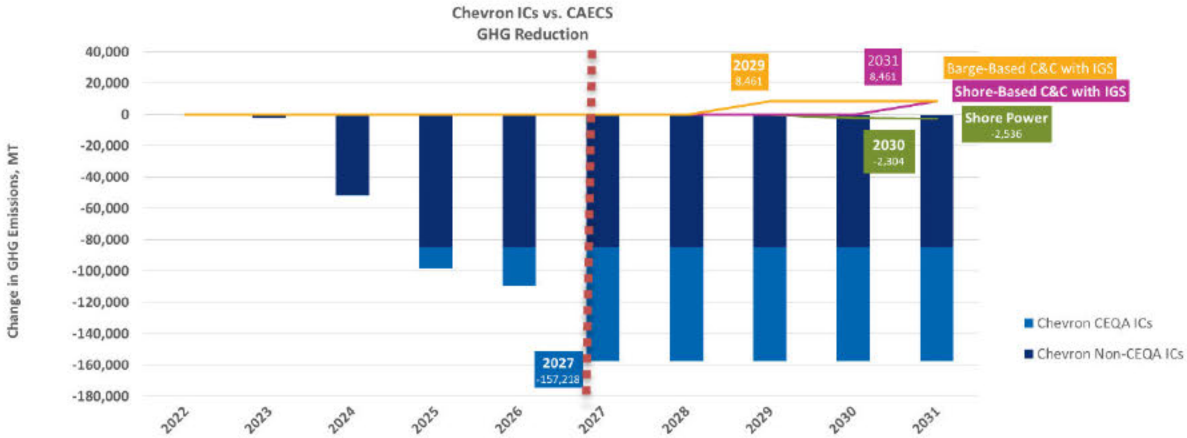
NOTE: Figure ES-3 excludes potential PM benefits from ICs 4, 9, 10, 11, 12, 13 and 14.

Figure ES-4: Chevron IC portfolio annualized ROG emission reductions compared with CAECs based on 2016 baseline (average year):



NOTE: Figure ES-4 excludes potential ROG benefits from ICs 4, 9, 10, 11, 12, 13 and 14.

Figure ES-5: Chevron IC portfolio annualized GHG emission reductions compared with CAECs based on 2016 baseline (average year):



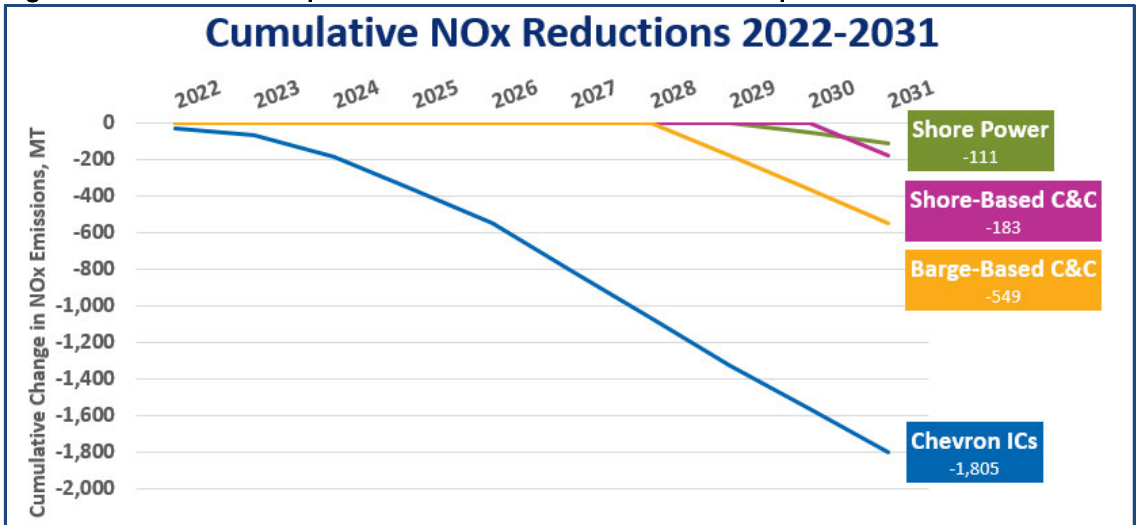
NOTE: Figure ES-5 excludes potential GHG benefits from ICs 4, 9, 10, 11, 12, 13 and 14.

Chevron's IC portfolio outperforms the CAECS baselines for criteria pollutants NOx, ROG and GHGs, on an annual basis (**Figures ES-2 through ES-5**) and cumulatively through 2031 as shown in Figures ES-6 through ES-9, below. For PM, Chevron expects to bank enough credits for the first compliance period. We expect long term that we can meet or exceed PM reductions with our IC portfolio.

In good faith, Chevron has proceeded to progress implementation of our IC portfolio faster, safer, with greater overall environmental benefits and completely avoid impacts to the marine environment compared to either shore power or capture and control.

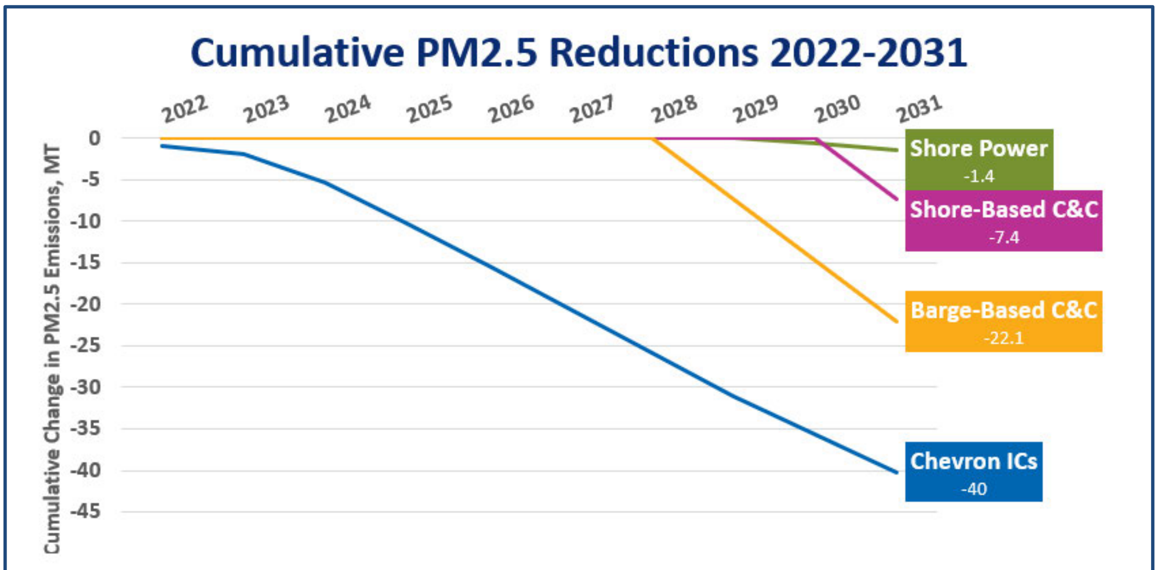
Three years into the regulation which was approved in August 2020, both CAECS (shore power and capture and control) *still* have not been successfully tested on tankers, present unavoidable significant marine environmental and visual impacts, and create novel difficult-to-mitigate safety risks for both terminal and tanker operations. Unlike CAECS, Chevron's IC portfolio 1) results in no increase risks to operational or process safety, 2) completely avoids impacts to the marine environment, and 3) can be implemented much faster than permitting and building the marine infrastructure to support CAECS, 4) results in 31% to 100%+ greater emission reductions than current CAECS technologies (shore power and capture and control), which are as-yet unproven for tanker applications.

Figure ES-6: Chevron IC portfolio NOx emission reductions compared with CAECs



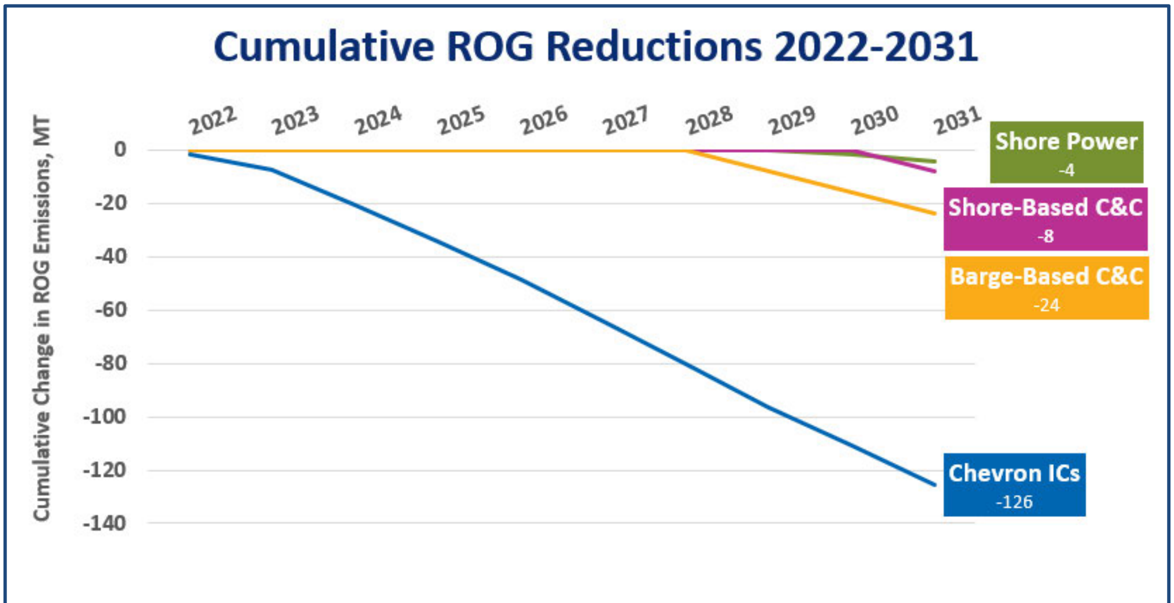
	Cumulative Reduction (MT)	Delta from IC's (MT)	% of IC reduction
IC's	-1,805		
Shore Power	-111	-759	6%
Shore-Based Cap & Cntrl	-183	353	10%
Barge-Based Cap & Cntrl	-549	722	30%

Figure ES-7: Chevron IC portfolio PM2.5 emission reductions compared with CAECS



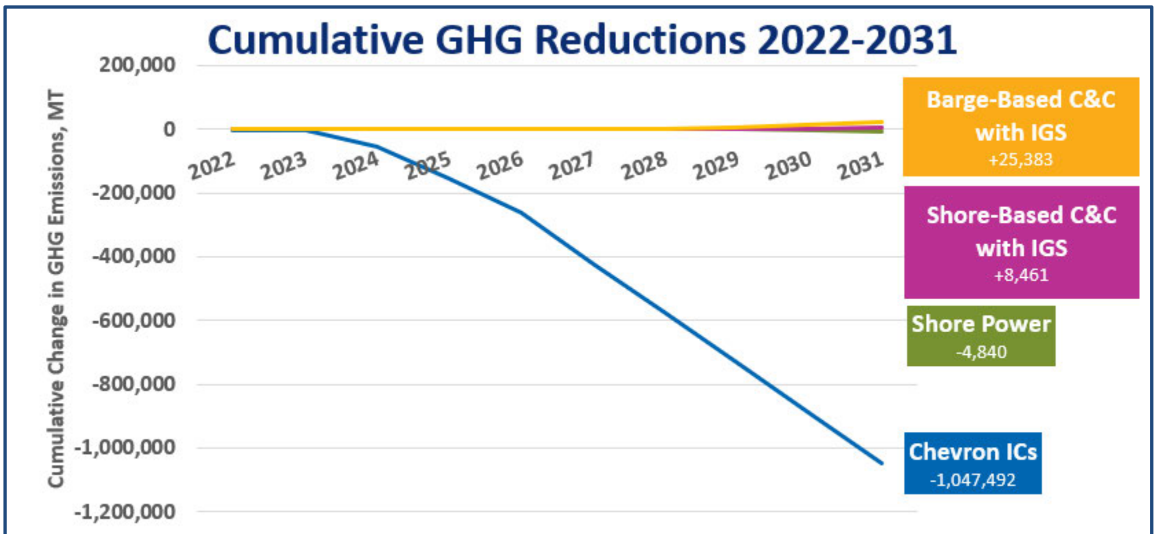
	Cumulative Reduction (MT)	Delta (MT)	% of IC reduction
IC's	-40		
Shore Power	-1	-27	3%
Shore-Based Cap & Cntrl	-7	47	18%
Barge-Based Cap & Cntrl	-22	62	55%

Figure ES-8: Chevron IC portfolio ROG emission reductions compared with CAECS.



	Cumulative Reduction (MT)	Delta (MT)	% of IC reduction
ICs	-126		
Shore Power	-4	-86	3%
Shore-Based Cap & Cntrl	-8	-30	6%
Barge-Based Cap & Cntrl	-24	-15	19%

Figure ES-9: Chevron IC portfolio GHG emission reductions compared with CAECS.



	Cumulative Reduction (MT)	Delta (MT)	% of IC reduction
ICs	-1,047,492		
Shore Power	-4,840	1,042,652	0%
Shore-Based C& C with IGS	8,461	1,055,953	-1%
Barge-Based C&C with IGS	25,383	1,072,875	-2%

Chevron wishes to acknowledge the Board's foresight in including the Innovative Concepts alternative means of compliance within the At Berth regulation. As we demonstrate in our IC application, Chevron's baseline IC performance provides immediate emission reductions (dating to April 4, 2022 for IC.1), and immediate benefits to the community, far sooner than could occur with CAECS implementation.

All but two of the remaining IC projects could be implemented prior to the 2027 regulatory compliance deadline. If Chevron receives an Executive Order for the non-CEQA ICs by December 2023, Chevron expects it will be able to meet the January 1, 2027 compliance deadline with sufficient accumulated emission reduction credits banked to demonstrate compliance through 2031, possibly longer, depending upon refinery and wharf operations, which are variable from year to year. As a result, CARB approval of the non-CEQA ICs will provide for continued pre-2027 emissions reductions, for the benefit of nearby communities.

In addition to early adoption and implementation upon CARB approval, Chevron intends to operate all but two of the IC projects for the entirety of the duration of the first five-year compliance period (2027-2032). Chevron also intends to continue operating the IC projects for subsequent compliance periods, subject to CARB approval of one or more extensions in accordance with the applicable provisions of the At-Berth Regulation.

As noted in **Table ES-1**, two of the IC projects (projects IC.9 and IC.14) are proposed for commencement during the 2027-2032 compliance period, in the event shore power becomes available during this period as a safe, reliable and feasible way to control tanker emissions. However, as noted in DNV's Technology Assessment (titled "California Air Resources Board's (CARB) Ocean-going Vessels At Berth Regulation Emissions Control Technology Assessment for Tankers, Report # 2021-9470", dated November 2021), shore power is not projected to be available for use at tanker terminals until 2034 at the earliest. The commencement of implementation of IC projects #9 and #14 would thus be tied to the use of shore power as a feasible technology.

Each IC project is discussed individually below according to the following criteria under **Section 93130.17(b)** of the At-Berth Regulation:

- Company name, address, and contact information (**Section 93130.17(b)(1)(A)**)
- Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map (**Section 93130.17(b)(1)(B)**)
- Estimate of vessel emissions planned to be covered by the IC project for each pollutant (NOx, PM 2.5 and ROG) (**Section 93130.17(b)(1)(C)**)
- Proposed recordkeeping, reporting monitoring and testing procedures (**Section 93130.17(b)(1)(D)**)
- A Memorandum of Understanding or similar agreement between the applicant, any funding partners, owners and operators of controlled equipment for the IC that shows agreement regarding IC's scope, and requirements for using the IC project in compliance with the At-Berth Regulation (**Section 93130.17(b)(1)(E)**)
- Proposed length of time for use (**Section 93130.17(b)(1)(F)**).
- A summary of the governmental approvals needed (**Section 93130.17(b)(1)(G)**)
- A discussion of any environmental review requirements that may apply (**Section 93130.17(b)(1)(H)**)
- Any information necessary to demonstrate that the proposed IC project meets all eligibility and applicability requirements (**Section 93130.17(b)(1)(I)**).

With respect to the period of time for implementation (**Section 93130.17(b)(1)(F)**), as explained above, Chevron has proactively progressed and/or completed IC projects and, subject to and upon CARB approval, intends to accelerate implementation of the remaining IC projects. Chevron also intends to implement the IC projects over the long-term, subject to CARB's renewed and continued approval. Examples of projects that were implemented after submission of the application and before CARB IC Executive Order approval are IC.1, New Locomotive, which was delivered and placed in service in April 2022 and is awaiting CARB approval as an Innovative Concept. In addition, IC.3, Diesel Air Compressor Replacement has been partially implemented (diesel air compressors are no longer in service) as of September 1, 2023, and is still awaiting CARB EO approval.

Given the unpredictable amount of time needed for the requisite CEQA or discretionary environmental reviews, Chevron has commenced submitting permit applications to several applicable government agencies to seek to ensure timely review, approval, and implementation of the IC project if it is approved as an IC project by CARB under the At-Berth Regulation. Government agencies typically do not commit to any particular timeframe for completing their reviews or approval processes, so Chevron has strived to expedite the process by submitting for agency approval before Chevron knows if the IC project will ultimately be approved by CARB for use under the At-Berth Regulation. Requesting that agencies commence and complete their environmental reviews is not a guarantee that the project will be executed in the absence of CARB approval, nor is it an indication that Chevron already has commenced project implementation.

Further, as CARB has noted in its FAQ document, an applicant may cancel an IC project for any reason. Accordingly, Chevron reserves the right to remove or cancel an IC project for technological, safety or other reasons that may arise; if this occurs Chevron will promptly notify CARB of the cancellation and the reasons for the cancellation. Chevron understands that if one or more of the IC projects is cancelled or removed, Chevron may need to have an alternative plan for compliance with the At-Berth Regulation, however, the shipping IC emission reductions are based primarily on Chevron-controlled ships and there is future flexibility to include PM and ROG reductions associated with IC.10-14 ship-board technologies based on source testing results. .

With respect to the eligibility criteria under **Section 93130.17(a)**, the applicable criteria specific to each IC project are addressed below. For all of the proposed IC projects, no project will increase emissions at other ports or marine terminals; no public funds will be used to implement these projects; none of the projects are legally mandated by any law, rule or regulation; and none have been identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

With respect to **Section 93130.17(a)(9)**, visits made under an innovative concept would not be counted towards nor used for Vessel Incident Events (VIEs), Terminal Incident (TIEs), or the remediation fund. Emission reductions from innovative concepts would be applied to vessel visits and exhausted prior to the use of VIEs, TIEs, or the remediation fund.

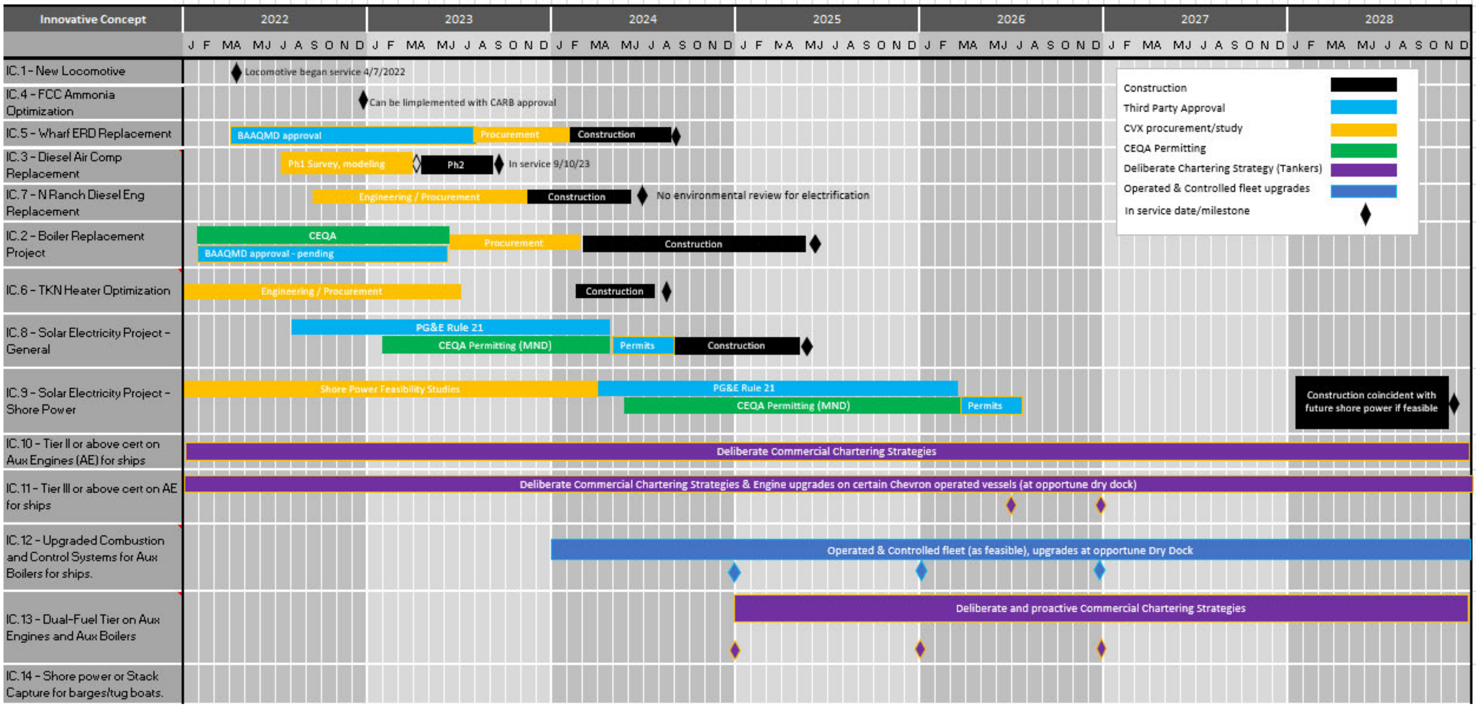
With respect to **Section 93130.17(a)(10)**, Chevron will develop a system of record to account for the use of emissions reduction credits accrued in the compliance period to ensure they are used in the same calendar year that they are achieved or in the following calendar year, as required by this section. Early emission reductions will be accounted for separately and used in any of the five years of the first compliance period, pursuant to Section 93130.17(a)(11).

Chevron will comply with this control measure through the use of innovative concepts. As required by **Section 93130.17(a)(14)**, vessel operators and terminal operators intending to use the innovative concept shall comply with the provisions of this Control Measure, including the emission limits in sections 93130.7 and 93130.9 until such time as Chevron has first been notified in writing by the Executive Officer that the innovative concept application has been approved.

With respect to **Section 93130.17(a)(15)**, A timeline showing how the innovative concepts will be implementable with the timeframe is included in **Table ES-1** and **Figure ES-10.** Environmental review requirements for each IC project are discussed in Section 8 of each IC project description in Section 3 of this application.

With respect to **Section 93130.17(a)(16)**, Chevron acknowledges and understands that no person shall comply with this section by operating under an innovative concept that has been revoked as provided in 93103.17(a)(16) of this Control Measure.

Figure ES-10. Innovative Concept Projects Timeline, updated 9/28/23



Concerning Memoranda of Understanding-MOUs outlined in **Section 93130.17 (b)(1)(E),** it should be noted that such agreements would not apply to Innovative Concepts #1 through #9, as these projects will be funded solely by Chevron. Regarding Innovative Concepts #10 through #14, Chevron is not considering signing MOUs with Third Parties at this time.

Lastly, it is important to emphasize that the IC projects presented in this application are in addition to numerous other environmental improvements being implemented by Chevron that are not eligible as an Innovative Concept. Chevron aims to lower the carbon intensity of our operations, protect the environment, and invest in the communities in which we operate. Projects that accomplish these goals are prioritized, optimized and funded based upon their ability to achieve emission reductions in an economic and timely manner. While we continually work to identify such voluntary projects, the Innovative Concepts proposed above were not planned for completion were it not for the incentives provided by the Innovative Concepts provision of the CARB At-Berth Regulation.

2. Richmond Long Wharf (RLW) Emissions

As noted in the Background section of the "Chevron Richmond Long Wharf Terminal and Port Plan" (Terminal Plan) submitted on December 1, 2021, Chevron estimated annual average emissions to be those listed below in **Table 2-1**. The table below also shows the annual average emissions reductions that must be achieved when using Innovative Concepts in a representative year (2016) reflecting future estimated annual vessel calls. The numbers below were calculated using the emissions factors in **Section 93130.5(d)** and the emissions calculation methodologies described in **Section 93130.17(d)(1)**.

Table 2-1: Annual Emissions and Emissions Reductions Needed from Innovative Concepts (2016 average year)

	NOx [MT]	PM [MT]	ROG [MT]
Aux Engines	163.69	2.02	6.17
Aux Boilers	89.97	7.65	4.95
2016 Total	253.66	9.66	11.12
Reductions Needed from IC Projects	**202.45**	**7.96**	**9.03**

The emissions totals above apply the default emission factors in **93130.5(d)(1) and (d)(2)** that assume that all vessels are Tier 0. It should be noted that Chevron has proactively been implementing the use of Tier I, Tier II and Tier III vessels, and actual vessels emissions are much lower than what is required to be calculated per the assumed default emission rates specified in the CARB At-Berth Regulation. The Terminal and Port Plan describes in detail the true emissions from the RLW.

To ensure the emissions for NOx, PM2.5 and ROG are adequately mitigated, Chevron estimated the emissions reductions possible from the IC projects using best available data. **Table 2-2** below lists the annual emissions reductions that are reasonably expected from each of the IC projects, as calculated in metric tons.

Table 2-2: IC Project Annual Emissions Reductions

Project No	Project Description	NOx [MT]	PM2.5 [MT]	ROG [MT]
Shore-Based Innovative Concept Projects				
1	Newer Locomotive	-49.1	-1.2	-2.5
2	Boiler Replacement Project	-63.2	0	-1.6
3	Diesel Air Compressors Replacement	-27.6	-1.5	-9.7
4	FCC Ammonia Optimization	0	-103.3	0
5	Wharf ERD Upgrade	-11.8	-0.8	0
6	TKN Heater Optimization	-37.1	-1.3	-1.6
7	North Ranch Diesel Engine Replacement	-0.4	-0.02	-0.07
8	Solar Electricity Project - General	-6.9	-0.4	-0.4
9	Solar Electricity Project – Shore Power	-3.9	-0.2	-0.2
	Subtotal	**-200.0**	**-108.7**	**-16.1**
Ship-Based Innovative Concept Projects				
10	Tier II or above certification on Auxiliary Engines (AE) for ships Note 1	-0.7-5.4	0	0
11	Tier III or above certification on Auxiliary Engines (AE) for ships Note 1	-21-34.2	0	0
12	Upgraded Combustion and Control systems for Auxiliary Boilers (AB) for ships Note 1	-29	0	0
13	Dual-Fuel Tier III Auxiliary Engines (AE) and Auxiliary Boilers (AB) Note 1	-56 (likely not until after 2030)	0	0
14	Shore Power or Stack Capture for Barges/Tug Boats	-22	-0.2	-1.4
	Subtotal	**-127.3 – 135.8**	**-0.2**	**-1.4**
	Grand Total	**-327.3 – 335.8**	**-108.9**	**-17.5**

Note 1 These ship-based IC projects are not cumulative. For example, if IC project 11 is implemented, IC project 10 will be redundant.

Table 2-3 below summarizes the emissions reductions possible from implementation of the IC projects ahead of the 2027 compliance deadline, which would not occur without timely CARB approval of these projects, and retroactive credits to the implementation date for ICs that have been completed prior to EO issuance (IC.1, 4/22 and IC.3, 9/23). All non-CEQA ICs would need to be approved by 12/31/2023 to accrue sufficient banked credits to meet the 1/1/2027 compliance deadline requirement and bank sufficient credits to offset operating emissions through 2031. The table also highlights the benefits to the community that would occur due to the early implementation of these projects. The NOx reductions are the equivalent of eliminating approximately 28,000 cars and trucks from the roads in the local community[1], the PM2.5 reductions are similar to eliminating 589,000 cars and trucks and the ROG reductions are similar to eliminating 2,000 cars and trucks in California[2].

Table 2-3: Cumulative Emissions Banking From Early Implementation of Innovative Concepts (4/2022*-1/1/2027)

Project No	Project Description	NOx [MT]	PM2.5 [MT]	ROG [MT]
Shore-Based Innovative Concept Projects				
1	Newer Locomotive*	-232.8	-5.8	-11.8
2	Boiler Replacement Project	-0.2	0	0
3	Diesel Air Compressors Replacement	-96.6	-5.1	-34
4	FCC Ammonia Optimization	0	-206[3]	0
5	Wharf ERD Upgrade	-23.6	-1.7	0
6	TKN Heater Optimization	-95.9	-3.4	-4.1
7	North Ranch Diesel Engine Replacement	-1.2	-0.1	-0.2
8	Solar Electricity Project - General	-6.9	-0.4	-0.4
9	Solar Electricity Project – Shore Power	0	0	0
	Subtotal	**-457.2**	**-16.5 to -222.5[3]**	**-50.5**
Ship-Based Innovative Concept Projects				
10	Tier II or above certification on Auxiliary Engines (AE) for ships Note 1d	-0.7	0	0
11	Tier III or above certification on Auxiliary Engines (AE) for ships Note 1	-95.2	0	0
12	Upgraded Combustion and Control systems for Auxiliary Boilers (AB) for ships Note 1	-48.5	0	0
13	Dual-Fuel Tier III Auxiliary Engines (AE) and Auxiliary Boilers (AB) Note 1	-0 (not implemented until after 2030)	0	0
14	Shore Power or Stack Capture for Barges/Tug Boats	0 (not implemented until after 2030)	0	0
	Subtotal	**-144.4**	**0**	**0**
	Grand Total	**-601.6**	**-16.5 to -222.5[3]**	**-50.5**

Note 1 These ship-based IC projects are not cumulative. For example, if IC project 11 is implemented, IC project 10 will be redundant.
Note 2 Ship based ICs are undergoing PM and ROG stack testing along with manufacturer testing of engines to determine expected PM and ROG reductions. IC application will be updated with data once available to request credit for PM and ROG reductions.
Note 3 IC.4 is a low probability of occurrence IC.

[1] Per 2020 estimate in "Estimated U.S. Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel | Bureau of Transportation Statistics (bts.gov)" and assuming 11,000 miles driven per year as noted in "Greenhouse Gas Emissions from a Typical Passenger Vehicle | US EPA"

[2] Per CARB Emissions Factor (EMFACT) model, https://arb.ca.gov/emfac/

3. Innovative Concept Projects

Project 1: IC.1 - Implementation of Lower Emitting Locomotives

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates locomotives to move railcars throughout the Chevron Richmond Refinery (see location map in **Appendix A1.1**). Chevron would reduce locomotive emissions by replacing 1 or more locomotives with lower emitting locomotives. Instead of operating the current locomotives for the foreseeable future because there is no regulatory requirement to stop operating them, subject to CARB approval as an IC project to reduce emissions for purposes of the At-Berth Regulation, Chevron would invest in lower emitting locomotives as early as 2022. **Update 9/2023:** Chevron replaced one locomotive with a Lower Emissions and Fuel (LEAF) Locomotive on April 7, 2022. As noted above on page 1 of the Executive Summary, the IC projects, including this replacement of the locomotive, would not have been done but for the Innovative Concepts incentives provided by the At-Berth regulation.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Chevron estimates that the emissions reductions from replacing 1 locomotive will be 49.14 metric tons per year (MTPY) for NOx, 1.22 MTPY for PM2.5, and 2.50 MTPY for ROG based on current railcar emissions. Further, the new locomotive will not increase GHGs. See **Appendix A1.3** for the NOx, PM2.5 and ROG emissions calculations for this project. Emissions calculations for IC.1 are based on engine operating hours, fuel log data and EPA/CARB emissions certifications.

The fleet of vessels calling RLW varies annually and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** (above) shows the amount of NOx, PM2.5 and ROG emissions that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** (above) shows how IC.1 contributes to overall emission reductions required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage current monitoring, recordkeeping, calculation, and reporting systems which utilize fuel consumption records and engine operating hour logs collected on a monthly basis in conjunction with EPA/CARB emission certification data to calculate the difference in emissions between the old and new locomotives. Emission reduction recordkeeping will be in the form of spreadsheets which will import fuel usage and engine operation hour data. Emissions reductions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At- Berth Regulation. See **Appendix A1.2** for more details on monitoring, recordkeeping, calculating and reporting emissions for IC.1.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

RailServe is under contract to operate locomotives used at Chevron Richmond, and these locomotives are used exclusively at Chevron Richmond. This contract was amended to account for the operation of the lower emitting locomotives exclusively at Chevron Richmond. A contract for the new Tier 4 Leaf Locomotive was executed between Chevron and RailServe on February 1, 2022, and a copy of that contract was provided to CARB on April 14, 2023. A copy of the contract for public reference is included in **Appendix A1.4.**

6. Proposed length of time during which the IC project would be used

This IC project was implemented on April 7, 2022, as there were no governmental approvals or permits needed to commence placing the Leaf Tier 4 locomotive in service at that time, and in good faith, Chevron sought to begin emission reductions as soon as possible to comply with the CARB at Berth regulation. As explained above, Chevron requests approval for emission reductions retroactive to the April 7, 2022 locomotive in-service date so that Chevron can accrue the associated emission reductions. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through 12/31/2029, and possibly longer, if Chevron converts 100% of its locomotive fleet to Tier 4 engines in advance of the 2023 In-Use Locomotive (13CCR section 2478) regulation requirements. We will continue implementing this IC through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

No government approvals needed, except for a CARB approval as an IC project under the At-Berth Regulation.

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

There are no authorizations required to purchase and operate a different locomotive type within an existing fleet of locomotives. BAAQMD only regulates stationary sources, and a locomotive is not considered stationary.

The City of Richmond regulates new structures and land use via Conditional Use Permits (CUP), and a locomotive does not trigger a CUP as it is neither a new structure nor change in land use. Consequently, CEQA is not triggered for this change in locomotive because neither ministerial nor discretionary permits are required.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The lower emitting locomotives are expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron procured a locomotive and placed it in service on April 4, 2022 that meets this requirement. Chevron will collect all necessary data to verify emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation.

For baseline annual emission reductions for IC.1 compared to CAECs, please see Appendix B.4.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

As of September 2023, there is no existing regulatory requirement, operational need, or economic incentive to cease operating older higher-emitting locomotives and replace them with lower-emitting models. Note; In May 2023, the CARB board adopted the In-Use Locomotive Regulation (13 CCR Section 2478) that requires industrial locomotive fleets to be operating 50% of its fleet as Tier IV locomotives by 2030, and 100% of its fleet Tier IV by 2035. However, the In-Use Locomotive Rule was withdrawn from OAL approval on July 21, 2023, and CARB resubmitted the package to OAL on September 15, 2023. Given the 2030 compliance date, and Chevron's early actions to upgrade in 2022, the emission reductions are clearly early or in excess of the In-Use Locomotive Rule once it is approved.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The new locomotives will be operated throughout the Chevron Richmond Refinery and will be at the most 1-3 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within communities that are adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real"

means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, as of December 1, 2021, there existed no regulatory requirement or industry standard driving the need to cease operating older higher-emitting locomotives and replace them with lower-emitting models. In a conservative business-as-usual scenario, Chevron would continue to operate the pre-Tier 0 locomotive through its contract with RailServe. According to a RailServe management representative, it had "no plans to retire" the conventional pre-Tier 0 locomotives at Chevron and RailServe asserts that the pre-Tier 0 locomotives at Chevron have "many, many years of service" in front of them. In addition, Chevron had no intent or project plan in place to replace the pre-Tier 0 locomotive prior to approval of the CARB at Berth regulation nor was the replacement needed to fulfill an operational need, or to take advantage of any other economic incentive. Accordingly, the reductions associated with this project exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. To that end, the RailServe contract had to be reopened and amended to lease the new Tier 4F locomotive. Chevron proactively initiated the contract for the Tier IV locomotive lease with RailServe. The new Tier IV locomotive was placed in service at Richmond Refinery on April 7, 2022. A copy of the contract (**Appendix A1.4**) and updated emissions reduction calculations were submitted to CARB on April 14, 2023.

All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule. It is important to note that the installation of lower-emitting locomotives would not continue if disapproved as a CARB At-Berth 'Innovative Concept'.

The new locomotive emissions reductions will be real, quantifiable, verifiable, and enforceable as required by the rule:

Demonstrable Actions (Real), Section 93130.17(a)(6)(A)
Chevron will reduce NOx, PM2.5 and ROG emissions by replacing one or more older, higher-emitting locomotives that are currently in operation with lower-emitting locomotives. Metered fuel log data and EPA/CARB emissions certifications will form the basis for certifying that the emissions reductions are 'real'.

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions calculations for IC.1 are based on engine operating hours, fuel log data and EPA/CARB emissions certifications. <u>Results are shown below in Table 1-1.</u>

Table 3-1: IC.1 Pre and Post-IC.1 Annual Emission Reduction Estimate

Current (Pre-Tier 0) Locomotive Emissions			
Pollutant	NOx	$PM_{2.5}$	ROG
MTON/yr	50.00	1.27	2.90

New (Tier 4) Locomotive Emissions			
Pollutant	NOx	$PM_{2.5}$	ROG
MTON/yr	0.86	0.04	0.41

Annual IC Emissions Reductions			
Pollutant	**NOx**	**$PM_{2.5}$**	**ROG**
MTON/yr	**49.14**	**1.22**	**2.50**

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Fuel logs, engine operating hour records and EPA/CARB emissions certifications are available for audit.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 2: IC.2 Boiler Replacement Project

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates 5 steam boilers to meet process steam demands throughout the refinery and would replace them with two new and more fuel-efficient boilers (see location map in **Appendix A2.1**). Instead of operating the current boilers for the foreseeable future because there is no regulatory requirement to stop operating them, subject to CARB approval as an IC project to reduce emissions for purposes of the At-Berth Regulation, Chevron would invest in the lower emitting boilers as early as 2024.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Emissions reductions from this project are expected to be approximately 50 metric tons per year (MTPY) for NOx and 1.5 MTPY of ROG based on current boiler operations. PM2.5 emissions are not expected to change. These new boilers will not increase GHG emissions. See **Appendix A2.3** with the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using vendor provided fuel consumption and emissions data for the new boilers.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**.
Table 2-2 shows how this project fits among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage the emissions reductions calculated as part of the project's New Source Review (NSR) permit evaluation that will be conducted by Bay Area Air Quality Management District (BAAQMD). Emissions calculations are based on 2018-2020 process data (e.g., firing rates, HHVs, F-factors, etc.), emissions factors derived from source testing and engineering calculations for proposed new boilers. See **Appendix A2.3** for details. Emissions reductions will be demonstrated using stack monitoring data required by BAAQMD for this project. This includes CEMS, and/or stack testing data (and data collection frequencies) required by BAAQMD. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of

the At-Berth Regulation.
See **Appendix A2.3** for details on monitoring, recordkeeping, calculating and reporting emissions for IC.3.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron would be the owner and operator of the new boilers.

6. Proposed length of time during which the IC project would be used

This IC project is capable of implementation starting in 2024, assuming all government approvals are obtained in a timely manner. As explained above, Chevron requests a timely CARB approval so that early emissions reductions can be achieved ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Chevron will need CARB approval as an IC project under the At-Berth Regulation, and approval from the following agencies may be required:

1) BAAQMD – Air Permit
2) City of Richmond –Project approval and CEQA Review

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

It is anticipated that the City of Richmond would serve as the CEQA lead agency for this IC project. BAAQMD would also conduct a review in accordance with its new source review rules.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The new boilers are expected to lower NOx and ROG emissions without increasing GHG emissions or PM2.5. Chevron will leverage the emissions calculations from New Source Review conducted by BAAQMD to demonstrate emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

There is no regulatory requirement, operational need, or economic incentive to cease operating older higher-emitting boilers and replace them with new lower-emitting models. Chevron is proactively investing in a project to replace the current older boilers with newer, lower-emitting boilers as an innovative concept to reduce emissions of NOx and ROG. All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The new boilers will be located within the Chevron Richmond Refinery, 1-2 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required and was identified for CARB At-Berth compliance. In the absence of the At-Berth regulation and in light of current technological and economic trends and incentives, a business-as-usual scenario would consist of continued use of the five existing steam boilers at the refinery with maintenance on the internals of the associated furnaces. The inspection data provided in **Table 3-2** support this conclusion as it reveals that furnaces associated with the boilers in scope for this innovative concept have between 4 and 19 years before the next maintenance cycle on their internal components. Furthermore, as there is no regulatory requirement or industry standard driving the need to completely replace the boilers with new boilers, the internal components of the furnaces associated with the boilers would continue to be replaced in-kind with new equipment of the same design when the current internals reach end of life. Furnace internals that are replaced in -kind include equipment such as tubes, refractory, burners, etc.

Table 3-2 IC.2 Boiler Inspection Dates and Intervals

Equipment Type, No.	Inspection Type	Inspection Date	Furnace Internals, next maintenance
Boiler, No.1 Boiler	State permit boiler Insp, Internal visual	10/15/2022	19 years
Boiler, No.3 Boiler	State permit boiler Insp, Internal visual	12/20/2021	9 years
Boiler, No.4 Boiler	State permit boiler Insp, Internal visual	8/25/2023	4 years
Boiler, No.5 Boiler	State permit boiler Insp, Internal visual	3/1/2022	7 years
Boiler, No.7 Boiler	State permit boiler Insp, Internal visual	10/19/2021	18 years

Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. It is important to note that the boiler replacement project would not continue if disapproved as a CARB At-Berth 'Innovative Concept'. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation, and to allow for these emissions reductions to be achieved in the near-term.

The new boiler emissions reductions will be real, quantifiable, verifiable and enforceable as required by the rule:

Table 3-3 IC.2 NOx and ROG Emission Reduction Estimate

Parameter	Value	Units
Current Boilers, Avg. Fuel Consumption	4,411	MMscf/yr
New Boilers, Avg. Fuel Consumption	3,751	MMscf/yr
V701 fuel gas, Avg. Higher Heating Value (HHV)	1097	BTU/scf
Annual Fuel Consumption, Avg. HHV basis	4,114,994	MMBTU/yr
Current Boilers, ROG Emission Factor	4.78E-03	lb/MMBTU
Current Boilers, ROG Emissions	10.49	mTon/yr
New Boilers, ROG Emissions	8.92	MTon/yr
New Boilers, NOx Emission Factor	2.42E-03	lb/MMBTU
Current Boilers, Avg. NOx Emissions	55.35	MTon/yr
New Boilers, NOx Emissions	4.51	MTon/yr
New Boilers, Emission Reduction – NOx	**50.84**	**MTon/yr**
New Boilers, Emission Reduction – ROG	**1.57**	**MTon/yr**

Demonstratable Actions (Real), Section 93130.17(a)(6)(A)
Chevron will reduce NOx and ROG emissions by replacing five (5) older, higher-emitting boilers that are currently in operation with two (2) lower-emitting boilers. Firing rate, Higher-Heating value, F-factor and source test data will form the basis of calculations for certifying that the emissions reductions are 'real'.

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions calculations for IC.2 are based on 2018-2020 process data (e.g., firing rates, HHVs, F-factors, etc.), emissions factors derived from source testing and engineering calculations for proposed new boilers. Results are summarized above in **Table 3-3** and **Appendix A3.3 Emission Calculations Spreadsheet.**

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Process data (e.g. firing rates, HHVs, F-factors, etc.) and source testing data are available for audit.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 3: IC.3 Diesel Air Compressors Replacement

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates diesel air compressors to support the pneumatic air system throughout the Chevron Richmond Refinery (see location map in **Appendix A3.1**). Instead of operating the current diesel air compressors for the foreseeable future to ensure reliable air flows, Chevron would eliminate most of these air compressors and replace them with an electric equivalent. Subject to CARB approval as an IC project to reduce emissions for purposes of the At-Berth Regulation, Chevron could implement this IC project as early as 2023. Chevron plans to conduct a study of the air system in 2022 to confirm the details of how the diesel air compressors would be replaced by 2023, and a permanent electrified backup compressor would be installed by 2027 to eliminate the future need for portable diesel air compressors. Chevron has proceeded in good faith to implement this innovative concept in the absence of CARB's review and EO approval to ensure that emission reductions could be made early to benefit the community, and enable emissions credit banking pursuant to the Innovative Concepts provision of this control measure.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Chevron estimates that reductions from eliminating the diesel air compressor will be 27 metric tons per year (MTPY) for NOx, 1.5 MTPY for PM2.5, and 1.3 MTPY for ROG based on current air compressor emissions. The new air compressor will not increase GHG emissions. See **Appendix A3.3** for the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using fuel consumptions and EPA emissions factors for the existing diesel air compressors.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative baseline year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** shows how this project fits among the Innovative Concepts to ensure emissions are mitigated as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage current monitoring, recordkeeping, calculation and reporting systems which utilize engine fuel consumption records and engine hour operating logs collected on a monthly basis along with EPA/CARB emissions certifications for the existing air compressors to determine emissions reductions. Emissions reduction data will be derived from the 2021 emissions for refinery diesel air compressors. There is no need to track ongoing emissions reductions for this IC in future years as the diesel air compressors will be permanently decommissioned, removed from site and replaced with electrically-driven compressors which functionally have zero emissions. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A3.2** for details on monitoring, recordkeeping, calculating and reporting emissions for IC.3.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron would be the owner and operator of the new equipment.

6. Proposed length of time during which the IC project would be used

This IC project is capable of implementation starting in 2023. As explained above, Chevron requests timely approval so that early emissions reductions can be achieved in the near-term, well ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

No government approvals needed, except for a CARB approval as an IC project under the At-Berth Regulation.

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews required under the California Environmental Quality Act (CEQA). The project only requires ministerial building permits under the jurisdiction of the City of Richmond. Equipment electrification does not require a conditional use permit (CUP). As electrified equipment does not create emissions, there is no nexus to BAAQMD review and permitting. CEQA is only triggered if there is a discretionary approval, and building permits are not discretionary.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

Removal of the diesel air compressors is expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will collect all necessary data to verify emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. As stated above, emissions reductions for IC.3 involve removing diesel air compressors from service and replacing them with electrically powered compressors to supply process air to the Refinery. As there is currently sufficient supply available on the grid to support the use of electrically powered compressors, IC.3 does not increase emissions elsewhere by using fossil fuel combustion to compensate for any reduced power production. See **Appendix A3.3** Emissions Calculation Spreadsheet for detailed calculations.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

There is no regulatory requirement, operational need, or economic incentive to cease operating diesel air compressors and replace them with new electrically driven air compressors. Chevron is proactively investing in a project to replace these diesel air compressors with electric compressors as an innovative concept to reduce emissions of NOx, PM2.5 and ROG. All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The new equipment will be operated throughout the Chevron Richmond Refinery and will be at the most 1-2 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required. It also is not expected to occur under a "business as usual" scenario. Under a business-as-usual scenario in light of current technological and economic trends and incentives, it is likely that the existing diesel air compressors at the refinery would continue to be used as they are currently being used. The diesel air compressors that would be replaced through the implementation of IC.3 are supplied through long-term rental agreements with vendors, as the compressors currently in use reach end of life they would be replaced in-kind by vendors. Based on industry data (See **Appendix A3.4**), the useful life for a diesel compressor is expected to be between 50,000 to 100,000 hours+ based on design. The average annual run time data for the diesel air compressors at the refinery is approximately 2,300 hours equating to a useful life of between 21 and 43 years for this equipment.

Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. Chevron has proceeded with the IC.3 project in good faith in anticipation of approval to ensure early reductions can be achieved. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation by 1/1/2027.

The new air compressor emissions reductions will be real, quantifiable, verifiable and enforceable as required by the rule:

Demonstrable Actions (Real), Section 93130.17(a)(6)(A)
Chevron will reduce NOx, $PM_{2.5}$ and ROG emissions by replacing nine (9) diesel air compressors with new electrically driven air compressors. Engine operating hour records and EPA/CARB emissions certifications of the nine (9) diesel air compressors will form the basis of calculations for certifying that the emissions reductions are 'real'.

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions calculations for IC.3 are based on engine operating hour records and EPA/CARB emissions certifications of the nine (9) diesel air compressors in use. Results are shown below in **Table 3-4** and detailed calculations are provided in **Appendix A3.3 Emissions Calculation Spreadsheet.**

Table 3-4: IC.3 Rental Diesel-Driven Compressor annual emissions profile for NOx, PM2.5 and ROG

Rental Compressors	NOx	$PM_{2.5}$	ROG
	MTon/yr	MTon/yr	MTon/yr
XAS1800 COMP.4F	0.104	0.005	0.049
XAS1800 COMP.4F	0.027	0.001	0.013
XAS1800 COMP.4F	0.027	0.001	0.013
XAS1800 COMP.3	0.938	0.049	0.329
XAS1800 COMP.4I	0.013	0.001	0.006
XAS1800 COMP.3	0.126	0.007	0.044
XAS1800 COMP.4I	0.116	0.006	0.054
XAS1800 COMP.3	13.107	0.690	4.599
XAS1800 COMP.3	13.107	0.690	4.599
Total IC Emissions Reductions (MTon/yr)	**27.56**	**1.45**	**9.71**

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Engine operating hour records and EPA/CARB emissions certifications of the nine (9) diesel air

compressors in use are available for audit. Please see **Appendix A3.2 Data Management System** and **Appendix A3.3 Emissions Calculation Spreadsheet** for more details about inputs, data sources, and calculation validation.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 4: IC.4 FCC Ammonia Optimization

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron operates a Fluidized Catalytic Cracker (FCC) to produce gasoline from long chain hydrocarbons. The process uses a fluidized catalyst, and the process of regenerating the catalyst results in some PM2.5 emissions from the FCC stack. Chevron conducted a series of FCC PM2.5 stack tests to evaluate the optimum ammonia slip conditions for controlling filterable PM2.5 emissions while controlling condensable PM2.5. Too little ammonia increases filterable PM2.5, while too much ammonia increases condensable PM2.5. By operating within the optimal ammonia slip range, significant reductions of total PM2.5 emissions are achievable.

Subject to CARB approval as an IC concept for purposes of compliance with the At-Berth Regulation, Chevron would optimize the ammonia slip to a level which is much lower than the level allowed under existing air permits. This lower ammonia slip results in a significant PM emissions reduction. There is currently no requirement to operate at this optimum ammonia slip through July 2026 when BAAQMD Regulation 6-5 goes into effect. Subject to timely CARB approval, Chevron would optimize ammonia to lower PM2.5 as a CARB At- Berth Innovative Concept (see location map in **Appendix A4.1**) starting in 2022, thereby resulting in earlier emissions reductions than would be achieved under the BAAQMD rule taking effect in 2026. Absent timely CARB approval as an IC concept, these emissions reductions could be delayed until the BAAQMD rule takes effect.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Chevron estimates that reductions from reducing the FCC ammonia slip will be 103 metric tons per year (MTPY) for PM2.5 based on current FCC stack emissions. No change in NOx, ROG or GHGs will occur as part of this project. See **Appendix A4.1** for the best available PM emissions calculations for this project. Emissions were calculated using average emissions rates measured during Chevron's prior ammonia study.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be mitigated with IC projects when using 2016 emissions as an average year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** shows how this project fits among the Innovative Concepts to ensure emissions are mitigated as required by **Section 93130.17(d)(1)**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron will leverage stack ammonia monitoring data and PM stack testing data from Chevron's prior ammonia study to determine emissions reductions. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A4.3** for more details.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron is the applicant, as well as the funder and operator of the FCC plant.

6. Proposed length of time during which the IC project would be used

This IC project is capable of implementation starting in 2022, as there are no governmental approvals or permits needed to commence the project. As explained above, Chevron requests timely approval so that early emissions reductions can be achieved in the near- term, well ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through July 2026 when the referenced BAAQMD regulation goes into effect.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

No government approvals needed, except for a CARB approval per this regulation.

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews required under the California Environmental Quality Act (CEQA); CEQA does not apply.

9. **The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.**

   Reducing the ammonia slip is expected to lower PM2.5 emissions without increasing NOx, ROG and GHG emissions. Chevron will collect all necessary data to verify emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation.

10. **The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.**

    Through July 2026 there is no requirement to optimize ammonia slip. Chevron is proposing to implement these PM reductions in advance of these new FCC PM requirements.

11. **The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.**

    The PM reductions will occur at the FCC plant, which is located 1.5 miles away from the Richmond Long Wharf.

12. **The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.**

As noted above, there is no applicable legal requirement with respect to this IC until the BAAQMD regulation takes effect in July 2026. Similarly, given current technological and economic trends and incentives, it is not anticipated that this IC would be implemented in advance of the upcoming BAAQMD regulation under a "business as usual" scenario.

Accordingly, Chevron is requesting expedited CARB approval for implementation of this project as an IC in order to reduce emissions to fulfill compliance with the At-Berth Regulation, in advance of the BAAQMD regulation taking effect in 2026 and years earlier than when the emissions reductions would otherwise occur.

The FCC PM emissions reductions will be real, quantifiable, verifiable and enforceable: A) Real: Ammonia stack monitoring and FCC PM stack testing data will be the basis for certifying that the emissions reductions are real. B) Quantifiable: Emissions rates will be based on FCC ammonia and PM stack data. C) Verifiable: The ammonia slip data and the FCC stack testing results will be available for audit. D) Enforceable: CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 5: IC.5 Wharf ERD Upgrade

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates the Wharf Emissions Reduction Device (ERD) to control ROG emissions from the loading operations at the RLW. The ERD is essentially a thermal oxidizer that uses natural gas to combust the vapor streams generated at the RLW. Chevron is proposing to replace the ERD with new duplicative vapor recover units (VRU) with activated carbon adsorption technology that will eliminate the need for natural gas combustion while still controlling ROG (see location map in **Appendix A5.1**). Instead of operating the Wharf ERD for the foreseeable future, subject to timely CARB approval as an IC project, Chevron would implement lower emitting VOC controls as early as 2023 for compliance with the At- Berth Regulation.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Emissions reductions from this project are expected to be approximately 7.3 metric tons per year (MTPY) for NOx and 0.8 MTPY of PM2.5 based on current ERD operations. ROG emissions are not expected to change and GHG emissions are not expected to increase. See **Appendix A5.3** with the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using vendor provided emissions data for the new VRU.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**.

Table 2-2 shows how this project fits among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage the emissions reductions calculated as part of the project's New Source Review (NSR) that will be conducted by Bay Area Air Quality Management District (BAAQMD). Emissions reductions for IC.5 will be based on stack monitoring data, including CEMS, and/or source testing data for the future Marine VRU required by BAAQMD for this project. This includes CEMS, and/or stack testing data (and data collection frequencies) required by

BAAQMD. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A5.2 Data Management System** for details on monitoring, recordkeeping, and **Appendix A5.3** for calculating and reporting emissions for IC.5.

5. **A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;**

Not applicable. Chevron is the applicant, as well as the funder and operator of the new VRU.

6. **Proposed length of time during which the IC project would be used**

This IC project is capable of implementation starting in 2024, assuming all government approvals are obtained in a timely manner. As explained above, Chevron requests timely CARB approval so that early emissions reductions can be achieved well ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. **A summary of all governmental approvals necessary to enable development of the innovative concept;**

Chevron will need CARB approval per the CARB At-Berth Regulation and from the following agencies/entities:

1. BAAQMD – Air Permit

For an instrumentation-only upgrade, no permit is required.

8. **A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and**

BAAQMD would conduct a review in accordance with its new source review rules.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The new VRU is expected to lower NOx and PM2.5 emissions without increasing GHG emissions or ROG. Chevron will leverage the emissions calculations from New Source Review conducted by BAAQMD to demonstrate emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. See **Appendix A5.3** for Emission Calculation Spreadsheet which provides more data on calculations and inputs.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

There is no regulatory requirement, operational need, or economic incentive to install a new emissions control device, such as the proposed Marine Vapor Recovery Unit (MVRU) to treat vapor streams from the RLW. Instead of operating the ERD Thermal Oxidizer unit for the foreseeable future, Chevron is proactively investing in this project as an 'Innovative concept' to reduce emissions of NOx and PM2.5. All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule. It is important to note that the Wharf ERD upgrade project would not continue if disapproved as a CARB At-Berth 'Innovative Concept'.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The new VRU will be located within the Chevron Richmond Refinery, 1-2 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required. It also is not expected to occur under a "business as usual" scenario. Under a business as usual scenario in light of current technological and economic trends and incentives, it is likely that the existing ERD would continue to be used as it currently is used. Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. It is important to note that the Wharf ERD upgrade project would not continue if disapproved as a CARB At-Berth 'Innovative Concept'. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation, and also to allow for these emissions reductions to be achieved in the near-term.

The new VRU emissions reductions will be real, quantifiable, verifiable and enforceable as required by the rule:

Demonstrable Actions (Real), Section 93130.17(a)(6)(A)
Chevron will upgrade the ERD currently in operation with a new control system that reduces the need for natural gas co-combustion with vessel vapors. Emissions reductions will be demonstrated using stack monitoring data, including CEMS, and/or stack testing data required by BAAQMD.

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions reductions for IC.5 will be based on stack monitoring data, including CEMS, and/or source testing data for the future Marine VRU.

Table 5-1: IC.5 Wharf ERD Upgrades Estimated Emission Reductions

Project	NOx (MTon/yr)	$PM_{2.5}$ (MTon/yr)
Wharf ERD Upgrade	11.8	0.83

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Stack monitoring data, source testing data Continuous Emissions Monitoring Systems (CEMS) and source test data will be available for audit.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 6: IC.6 TKN Heater Optimization

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates seven process heaters to provide necessary thermal energy at the Taylor Katalytic deNitrification (TKN) plant that is essentially a hydrocracker. Chevron is proposing to install a new heat exchanger technology (such as “finned tubes”) on three of the heaters to reduce overall furnace firing rates (see location map in **Appendix A6.1**). Chevron would implement the proposed heater optimizations as early as May 2024, subject to CARB approval as an IC project. In absence of the CARB at-Berth regulation, Chevron would operate the TKN heat exchangers in their current form, using replacement in-kind internal tube designs for the foreseeable future, as there is no regulatory driver to stop operating the exchangers nor change equipment designs.

Note regarding CARB’s proposal to split IC.6 into sub-Innovative concepts 6a and 6b: From Chevron's perspective, the thermal study is not a stand-alone innovative concept; rather, it serves as a precursor to the development and execution of the emissions reduction opportunity at the TKN plant. Chevron completed the thermal energy study in late 2020 to identify what additional optimizations could be made to the plant to reduce emissions to comply with CARB at-Berth. IC.6 proposes to redesign and replace the exchanger tubes with the new design/technology to reduce furnace firing rates/emissions versus a replacement-in-kind. Therefore, IC.6 should be considered as only one IC, as it is proposed in this application.

Chevron has proceeded in good faith to invest in engineering, design and procurement of the modified fin tubes, and is scheduled to install the new finned tubes in May 2024.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Emissions reductions from this project are expected to be approximately 37.5 metric tons per year (MTPY) for NOx, 4.8 MTPY of PM2.5 and 3.4 MTPY for ROG based on current process heater operations. This optimization will not increase GHG emissions. See **Appendix A6.3** with the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using vendor provided data for the heat exchangers and project optimizations at the heaters.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** shows how this project fits among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage the emissions reductions calculated as part of the project's New Source Review (NSR) that will be conducted by Bay Area Air Quality Management District (BAAQMD) and other baseline emissions data for the heaters.

This includes emissions baselines calculated using GC, stack testing data and process data. Emissions reductions will be demonstrated using stack monitoring data required by BAAQMD for this type of project. This includes CEMS, and/or stack testing data required by BAAQMD (See **Appendix A6.2** for Data Management System summary). The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A6.3** for emissions calculation spreadsheet.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron is the applicant, as well as the funder and operator of the heaters.

6. Proposed length of time during which the IC project would be used

This IC project is capable of implementation within 2024, assuming any necessary government approvals are obtained in a timely manner. As explained above, Chevron requests timely CARB approval so that early emissions reductions can be achieved ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Chevron will need CARB approval as an IC project under the At-Berth Regulation, and approvals may be required from the following agencies:

1) City of Richmond – Ministerial building permits

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews required. The project only requires ministerial building permits under the jurisdiction of the City of Richmond. Only the heat exchanger tubing will be replaced with a more energy-efficient design (finned tubes). CEQA is only triggered if there is a discretionary approval, and building permits are not discretionary approvals.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

This heater optimization is expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will leverage the emissions calculations conducted by BAAQMD to demonstrate emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-3** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. As stated above, emissions reductions for IC.6 involve redesigning and replacing the tubing in the current (multiple) heat exchangers at the TKN unit and replacing the tube bundles with a more efficient finned design that requires less heat input from the associated furnaces to maintain process temperatures. As the heat input from the furnaces decreases due to the aforementioned heat exchanger redesign & replacement, there is a consummate reduction in the amount of fuel gas that needs to be combusted by the furnaces, resulting in lower emissions. IC.6 does not increase emissions elsewhere by increasing the need for fossil fuel combustion from other sources, rather, the opposite occurs as the heat exchanger redesign (IC.6) decreases emissions by lowering the amount of fossil fuel combustion currently needed to operate the TKN unit.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

There is no regulatory requirement, operational need, or economic incentive to replace feed/effluent exchanger bundles at E-510/530/530 with an upgraded finned tube design to improve heat transfer. The project's objectives are to improve fuel efficiency (i.e., reduce fuel gas usage in the associated furnaces) to reduce emissions of NOx, PM2.5 and ROG. Instead of operating the TKN unit in its current form for the foreseeable future, Chevron is proactively investing in this project as an innovative concept to reduce emissions of NOx, PM2.5 and ROG. All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule. There is currently no requirement to conduct these finned tube installations and associated heater optimizations. See **Appendix A6.2** and **Appendix A6.3** IC.6 Emission Calculation Spreadsheet for detailed list of inputs, validation and recordkeeping. .

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The TKN heaters are located within the Chevron Richmond Refinery, 1.5 miles away from the Richmond Long Wharf. Emissions reductions will occur within the 3nm limit from the marine terminal and benefit the communities adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required. Chevron had no intent or project plan in place to redesign and replace these exchangers as such a change is not needed to fulfil an operational need, or to take advantage of economic incentive. It also is not expected to occur under a "business as usual" scenario. Under a business-as-usual scenario in light of current technological and economic trends and incentives, the existing heat exchanger processes and technology would continue to be used as it currently is used. The API 510 inspection data provided in **Table 6-1** (below) supports this conclusion as it reveals the exchangers in scope for this innovative concept have between 31 and 107 years remaining life. API inspection reports may be provided upon CARB's request. Furthermore, as there is no regulatory requirement or industry standard driving the need to change the design of the heat exchangers, this equipment would be replaced in-kind with new exchangers of the same design when the current exchangers reach end of life.

Table 6-1 IC.6 TKN Heat Exchanger Remaining Life data

Equipment Type, No.	Inspection Type	Inspection Date	Remaining Life
Exchanger, E-510	API 510, 5yr External	10/1/2018	37 years
Exchanger, E-520	API 510, 5yr External	10/1/2018	107 years
Exchanger, E-530	API 510, 5yr External	10/1/2018	31 years

Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. It is important to note that the TKN Heater Optimization project would not continue if disapproved as a CARB At-Berth 'Innovative Concept'. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation, and also to allow for these emissions reductions to be achieved in the near-term.

Demonstrable Actions, Section 93130.17(a)(6)(A)

Chevron will reduce NOx, PM2.5 and ROG emissions by installing new heat exchanger technology, such as "finned tubes", on three of the heaters and conduct a thermal energy study on the plant with the goal of reducing furnace firing rates. Firing rates, High-Heating Value (HHV), F-factor, NOx Continuous Emissions Monitoring Systems (CEMS) and source test data will form the basis of calculations for certifying that the emissions reductions are 'real'. See **Appendix A6.2 Data Management System** and **Appendix A6.3 Emissions Calculation Spreadsheet** for further details on data management system, and emission calculations.

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions reductions for IC.6 are based on calculations of current TKN unit operations, utilizing process data for Firing rates, Higher-Heating Value (HHV), F-factor, NOx Continuous Emissions Monitoring Systems (CEMS) and source test data. Vendor-provided data for proposed new heat exchangers and TKN system were also used. **Table 3-6** provides a summary of expected emission reductions associated with this project. Refer to **Appendix A6.3** for further details.

Table 3-6: IC.6 – TKN Heater Optimization Estimated Annual Emissions Reductions

Emissions Sources	NOx (MTon/yr)	PM2.5 (MTon/yr)	ROG (MTon/yr)
Current Emissions TKN Furnaces: F-510, F-520, F-530	59.94	0.94	2.16
TKN Furnaces w/10% fuel reduction from Heat Exchanger replacement: F-510, F-520, F-530	53.97	0.85	1.95
Emissions Reductions, Replacement of E-500 Heat Exchangers	6.00	0.09	0.22
Current Emissions, All TKN Furnaces: F-510, F-520, F-530, F-610, F-620, F-630, F-730, F-731	103.72	3.91	4.66
All TKN Furnaces w/30% fuel reduction from Heat Exchanger replacement: F-510, F-520, F-530, F-610, F-620, F-630, F-730, F-731	72.61	2.74	3.27
Emissions Reductions, Replacement of All Heat Exchangers	31.12	1.17	1.40
Total IC.6 Emissions Reductions	**37.11**	**1.27**	**1.62**

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Process data for Firing rates, Higher-Heating Value (HHV), F-factor, NOx Continuous Emissions Monitoring Systems (CEMS) and source test data are available for audit.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

The process heater emissions reductions will be real, quantifiable, verifiable and enforceable: A) Real: BAAQMD emission inventory calculations will be the basis for the emissions reductions. B) Quantifiable: BAAQMD methodologies and CEMS/source test monitoring data will be used to estimate the reduction. C) Verifiable: The calculations and monitoring data will be available for audit. D) Enforceable: CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 7: IC.7 North Ranch Diesel Engine Replacement

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron currently operates diesel generators to support the electric needs within the North Ranch trailers within the Chevron Refinery (see location map in **Appendix A7.1**). Chevron would eliminate most of these generators by installing electrical energy at the North Ranch. Subject to CARB approval as an IC for purposes of compliance with the At-Berth Regulation, instead of operating the current diesel generators for the foreseeable future to ensure reliable electricity generation, Chevron would install new electrical infrastructure as early as 2023. Chevron plans to conduct a study of the electrical needs in the North Ranch in 2022 to confirm the details of how replacement of the diesel generators would be achieved by 2023.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Chevron estimates that reductions from eliminating the diesel generators will be 0.42 metric tons per year (MTPY) for NOx, 0.02 MTPY for PM2.5, and 0.02 MTPY for ROG based on current generator emissions. The new electrical infrastructure will not increase GHG emissions. See **Appendix A7** for the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using fuel consumptions and EPA emissions factors for the existing diesel generators.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**.

Table 2-2 shows how this project fits among the Innovative Concepts to ensure emissions are mitigated as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron has a robust system for monitoring, recordkeeping, calculating and reporting refinery emissions for the purposes of complying with existing reporting rules and regulations, for example the Bay Area AQMD Rule 12-15 Emissions Inventory and US EPA Toxic Release Inventory (TRI). Chevron will leverage current fuel consumption records collected on a monthly basis and EPA emission data for the existing generators to determine emissions reductions. Emissions data will be in the form of EPA/CARB emissions certifications provided by the diesel engine vendor. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendices A7.2 and A7.3** for more details.

5. **A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;**

Not applicable. Chevron is the applicant, as well as the funder and operator of the new generators.

6. **Proposed length of time during which the IC project would be used**

This IC project is capable of implementation starting in 2023. As explained above, Chevron requests timely approval so that early emissions reductions can be achieved in the near- term, well ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. **A summary of all governmental approvals necessary to enable development of the innovative concept;**

No government approvals needed, except for a CARB approval as an IC project under this regulation.

8. **A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and**

No environmental reviews required under the California Environmental Quality Act (CEQA). The project only requires ministerial building permits under the jurisdiction of the City of Richmond. Equipment electrification does not require a conditional use permit (CUP). As electrified equipment does not create emissions, there is no nexus to BAAQMD review and permitting. CEQA is only triggered if there is a discretionary approval, and building permits are not discretionary.

9. **The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.**

Removal of the diesel generators is expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will collect all necessary data to verify emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. As stated above, emissions reductions for IC.7 involve removing diesel generators from service and replacing them with electrical infrastructure to supply to the structures in the North Yard area of the Refinery. As there is currently sufficient supply available on the grid to support any added load from the North Yard area, IC.7 does not increase emissions elsewhere by using fossil fuel combustion to compensate for any reduced power production.

10. **The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.**

There is no regulatory requirement, operational need, or economic incentive to cease operating diesel generators and connect the area to electrical utility service. Chevron is proactively investing in a project to eliminate these diesel generators by connecting the area to electrical utility service as an innovative concept to reduce emissions of NOx, PM2.5 and ROG. All Chevron Richmond ICs operate as an aggregate to meet the compliance requirements of the At-Berth Rule.

11. **The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.**

The diesel generators currently operate within Chevron Richmond Refinery and are 1.5 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

12. **The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.**

As noted above, the project is not otherwise legally required. It also is not expected to occur under a "business as usual" scenario. Under a business-as-usual scenario in light of current technological and economic trends and incentives, it is likely that the existing diesel generators would continue to be used as it currently is used. The diesel generators that would be replaced through the implementation of IC.7 are supplied through long-term rental agreements with vendors, as the compressors currently in use reach end of life they would be replaced in-kind by vendors. Based on industry data (See **Appendix A7.4**), the useful life for a diesel generator is expected to be between 15,000 to 30,000 hours based on design. The average annual run time data for the diesel generators at the refinery is approximately 6,000 hours equating to a useful life of between 2.5 and 5 years for this equipment.

Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. It is important to note that the Diesel Air replacement project would not continue if disapproved as a CARB At-Berth 'Innovative Concept'. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation, and also to allow for these emissions reductions to be achieved in the near-term.

Demonstrable Actions (Real), Section 93130.17(a)(6)(A)
Chevron will reduce NOx, $PM_{2.5}$ and ROG emissions by eliminating two (2) diesel air generators and connecting the North Yard Ranch area to electrical utility service. Engine operating hour records and EPA/CARB emissions certifications of the two (2) diesel generators will form the basis of calculations for certifying that the emissions reductions are 'real'

Quantifiable Emissions Reductions, Section 93130.17(a)(6)(B)
Emissions calculations for IC.7 are based on engine operating hour records and EPA/CARB emissions certifications of the two (2) diesel generators in use. **Table 3-8** summarizes annual emission reductions. Please see **Appendix A7.2** for the Data Management System and **Appendix A7.3** Emissions Calculation Spreadsheet for detailed emission calculations.

Table 3-8: IC.7 Estimated Annual Emission Reductions

Emissions Sources	NOx (MTon/yr)	PM2.5 (MTon/yr)	ROG (MTon/yr)
Cummins/QSB7-G9	0.30	0.01	0.06
Cummins/QSB5-G11	0.14	0.009	0.01
Total IC Emissions Reductions (MTon/yr)	**0.44**	**0.019**	**0.07**

Verifiable Emission Assertions, Section 93130.17(a)(6)(C)
Engine operating hour records and EPA/CARB emissions certifications of the two (2) diesel generators are available for audit. Project will be installing new SEL relays as part of current scope. The relays include functionality to show both voltage and current. We will run ammeter signal from this to INDX, so that we can trend usage.

CARB Enforcement Authority, Section 93130.17(a)(6)(D)
CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 8: IC.8 Solar Electricity Project - General

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron is currently considering a solar electricity project in the northern end of the Richmond Refinery (see location map in **Appendix A8.1**). This approximately 31,000 MWh project would offset consumption of electricity from the grid, and subject to CARB approval as an IC project for purposes of compliance with the At-Berth Regulation, Chevron could install solar panels as early as 2024.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Emissions reductions from this project are expected to be approximately 5.6 metric tons per year (MTPY) for NOx, 0.3 MTPY of PM2.5, and 0.4 MTPY of ROG based on projected electricity production and current California e-Grid emissions factors. These new solar panels will not increase GHG emissions. See **Appendix A8.3** with the best available NOx, PM2.5 and ROG emissions calculations for this project.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** shows how this project fits among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron will leverage the solar project electricity generation to determine the amount of emissions displaced from not generating electricity. This solar electricity generation along with emissions factors from e-Grid will be used to estimate emissions reductions. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A8.2** for the Data Management System, and **Appendix A8.3** for the Emission Calculation Spreadsheet which will serve as the Annual Report template for more details.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron is the applicant, as well as the funder and operator of the new solar panels. Should a third-party be needed to operate the solar panels, an MOU will be developed and provided.

6. Proposed length of time during which the IC project would be used

This IC project is capable of implementation starting in 2024, assuming all government approvals are obtained in a timely manner. As explained above, Chevron requests a timely CARB approval so that early emissions reductions can be achieved well ahead of the 2027 compliance deadline. As also explained above, in addition to early implementation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Chevron will need CARB approval as an IC project under the At-Berth Regulation, and approvals may also be required from the following agencies depending on the project details:

1. City of Richmond
2. San Francisco Bay Conservation and Development (BCDC)
3. US Army Corps of Engineers (Section 404/Section 10)
4. California Regional Water Quality Control Board (Section 401/WDRs)

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

The Regional Water Quality Control Board may act as CEQA lead agency. Approvals may be required by the following agencies:

- Regional Water Quality Control Board (RWQCB)
- Bay Area Coastal Development Commission (BCDC)
- US Army Corps of Engineers (USACE)
- Department of Toxic Substances Control (DTSC)
- City of Richmond (Building permits, ministerial approval)
- Other agencies may be consulted.

A Mitigated Negative Declaration (MND) is the expected CEQA review document. Project construction is anticipated to begin in late 2025.Because there will not be operating emissions, BAAQMD has no nexus for discretionary review and approval. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The solar panels are expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will leverage solar electricity data to demonstrate emissions reductions from displacing electricity from the grid on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation.

9. **The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.**

There is currently no requirement to install these solar panels.

10. **The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.**

The new solar panels will be located within the Chevron Richmond Refinery, less than 3 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

11. **The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.**

As noted above, the project is not legally required. It also is not expected to occur under a "business as usual" scenario. Under a business as usual scenario in light of current technological and economic trends and incentives, it is likely that the existing electricity consumption would continue to occur as is currently the case. Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation. Timely CARB approval is requested to afford certainty and reliability in terms of the emissions reductions that can be used to achieve compliance with the At-Berth Regulation, and also to allow for these emissions reductions to be achieved in the near-term.

The new solar panels emissions reductions will be real, quantifiable, verifiable, and enforceable: A) Real: Solar panel electricity generation will be the basis for the emissions reductions and grid emissions factors. B) Quantifiable: Solar electricity meter data will be used to estimate the reduction. C) Verifiable: The calculations and meter data will be available for audit. D) Enforceable: CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Project 9: IC.9 Solar Electricity Project – Shore Power

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

In the event shore power is determined to be available for use as a safe and feasible way to reduce emissions at RLW, Chevron proposes to install a solar electricity project in or near the Richmond Refinery (see location map in **Appendix A9.1**) or procure electricity that is from a source with lower emissions than electricity from the grid. As noted in DNV's Technology Assessment, shore power is not expected to available until 2034 at the earliest, therefore this IC project is intended to be implemented in the event shore power becomes available as a safe and feasible technology to use at RLW within the 2027-2032 compliance period. This approximately 20 MW project would offset consumption of electricity from the grid, and subject to CARB approval as an IC project for purposes of compliance with the At-Berth Regulation and the availability of shore power as referenced above, Chevron could install solar panels as early as 2027.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Emissions reductions from this project are expected to be approximately 3.2 metric tons per year (MTPY) for NOx, 0.2 MTPY of PM2.5 and 0.2 MT for ROG based on projected electricity production/procurement and current California e-Grid emissions factors. This renewable source of electricity will displace electricity from the grid, lowering overall refinery GHG emissions. See **Appendix A9.3** with the best available NOx, PM2.5 and ROG emissions calculations for this project.

The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**.
Table 2-2 shows how this project fits among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Chevron will leverage the solar/renewable project electricity generation to determine the amount of emissions displaced from not generating electricity. This electricity generation along with emissions factors from e-Grid will be used to estimate emissions reductions. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A9.2** for the Data Management System, and **Appendix A9.3** for the Emission Calculation Spreadsheet which will serve as the Annual Report template for more details.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable. Chevron is the applicant, as well as the funder and operator of the new solar panels. Should a third-party be needed to operate the solar panels or provide the renewable electricity, an MOU will be developed and provided.

6. Proposed length of time during which the IC project would be used

This IC project is likely capable of being implemented as early as 2027, depending on the availability of shore power by that time as a safe and feasible technology as referenced above. Subject to this caveat and subject to CARB approval as an IC project under the At- Berth Regulation, Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Chevron will need CARB approval as an IC project under the At-Berth Regulation, and approvals may also be required from the following agencies depending on the project details:

1) City of Richmond
2) San Francisco Bay Conservation and Development (BCDC)
3) US Army Corps of Engineers (Section 404/Section 10)
4) California Regional Water Quality Control Board (Section 401/WDRs)

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

It is anticipated that the City of Richmond would serve as the CEQA lead agency for this IC project. BCDC may also conduct a review in accordance with its shoreline development review authority depending on the exact location of the solar panels. As noted, Corps and Regional Board environmental review also may be required.

9. **The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.**

This project is expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will leverage solar/renewable electricity data to demonstrate emissions reductions from displacing electricity from the grid on a yearly basis as required by **Section 93130.17(d)**. See **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation.

10. **The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.**

There is currently no requirement to install these solar panels or procure renewable electricity.

11. **The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.**

The new electrical equipment will be located within the Chevron Richmond Refinery, 1-3 miles away from the Richmond Long Wharf. Emissions reductions will occur near the marine terminal and within the communities adjacent to the refinery.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required. It also is not expected to occur under a "business as usual" scenario. Under a business as usual scenario in light of current technological and economic trends and incentives, it is likely that shore power electricity demands would be met by electricality from the grid, assuming shore power is shown to be a safe and feasible technology as referenced above. Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation.

The new solar or renewable electricity emissions reductions will be real, quantifiable, verifiable, and enforceable: A) Real: Electricity generation/procurement will be the basis for the emissions reductions and grid emissions factors. B) Quantifiable: Solar electricity meter or electricity purchasing data will be used to estimate the reduction. C) Verifiable: The calculations and meter data will be available for audit. D) Enforceable: CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

Shipping IC Executive Summary: Overview of Innovative Concepts applied to ships (IC.10, 11, 12, 13)

MARPOL (International Convention for Prevention of Pollution from Ships) Annex VI focuses on prevention of air pollution from ships and:

- Sets the emission limits for sulfur oxides (SOx), and nitrogen oxides (NOx) from ship exhaust and emission of volatile organic compounds (VOCs) from specific types of ships.
- Designates Emissions Control Areas with more stringent requirements for emissions of NOx, SOx and particulate matter.
- Establishes different tiers or levels of NOx emission standards, known as "Tier standards", which specify the maximum permissible emission levels for different types of marine diesel engines (Tier I, Tier II, Tier III).

Although the exact phase in dates for Tier I, Tier II, Tier III marine diesel engines varies depending on vessel construction date and specific engine category, the general guidelines are:

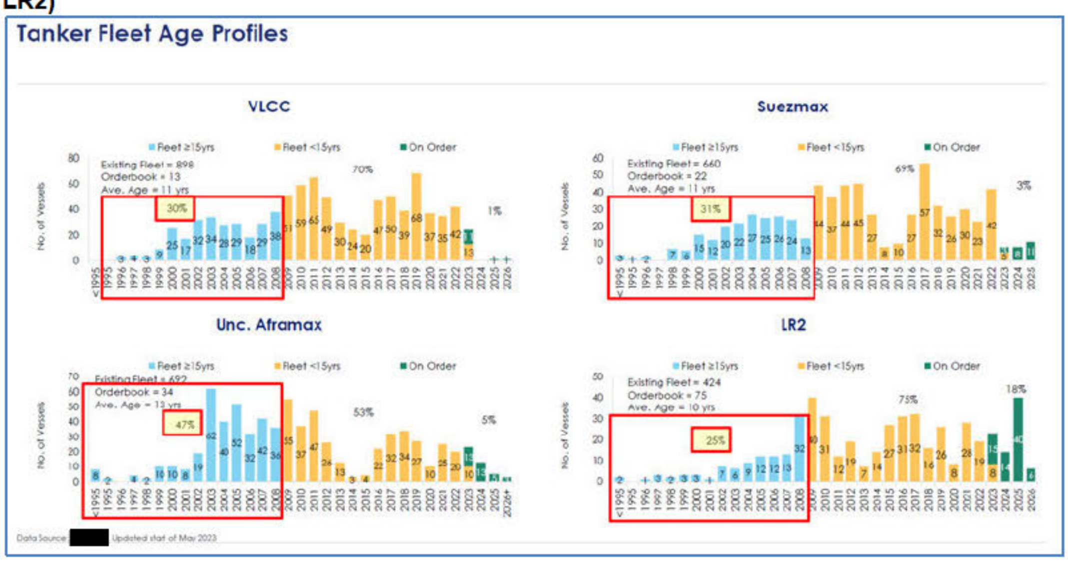
1. Tier I: The phase-in period for Tier 1 marine diesel engines began on January 1, 2000.
2. Tier II: The phase-in period for Tier II marine diesel engines started on January 1, 2011.
3. Tier III: The phase-in period for Tier III marine diesel engines started on January 1, 2016.

Presently, there are **no mandatory phase out dates** for each of the tiered engine categories.

The average operating life of most international oil tankers is assumed to be 20 years. This assumption is based on "normal operability" of vessels and clearance of vessels by various Classification Societies, Flag State and Port State inspections, and by SIRE (Ship Inspection Report) program. US Flag tankers (Jones Act vessels) generally operate for longer periods due to limited availability of new tonnage and the continued demand for Jones Act tankers. The actual design life of most oil tankers is between 25 to 30 years. Ship owners consider a variety of factors when assessing the end of life and decommissioning of tankers.

In May 2019 and during our engagement with CARB on 17th May 2023, Chevron had presented CARB with third party data on global tanker fleet. After that engagement with CARB, Chevron received, from independent third party broker [redacted], the latest global tanker fleet profile as shown in the charts below.

Figure SS-1: [redacted] data (2023) global tanker fleet profile by ship class (VLCC, Suezmax, Unc. Aframax and LR2)



Analyzing the data shared by [redacted], a few key takeaways are:
Significant percentage of tankers, in each tanker segment, are greater than 15 years old.

- All of these old vessels are Tier I tankers (built before 2011).

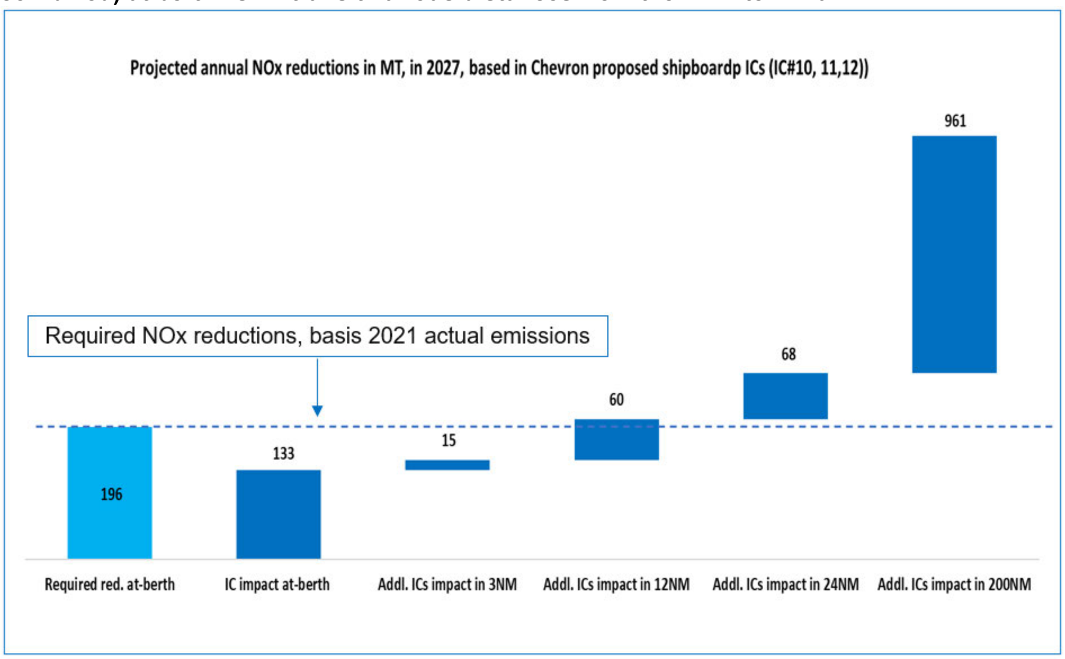
- Except for Long Range 2 vessels (LR2's), which have approximately 18% of newbuild orders, the newbuild orders for tankers is at an all-time low with Very Large Crude Carriers (VLCC's) at 1%, Suezmax at 3% and Aframax at 5%.
- Less newbuild orders and continued strong demand for tankers is resulting in increased percentage of older vessels in the global tanker fleet.

[redacted] provided similar data for existing Jones Act tankers and below are the key takeaways:

- 38% of Jones Act tankers are Tier 0 or Tier I, 60% are Tier II and ~2% are Tier III vessels.
- No new construction of Jones Act tankers is presently happening in US shipyards.

As presented to CARB during our engagement on 17 May 2023, approval of IC.10, IC.11 and IC.12 provides additional environmental benefits due to reduced emissions from vessels during transit to the port. The in-transit benefits, shown in the below chart, ONLY considers potential reductions from IC.10 and IC.11, as applied to international flag vessels visiting Richmond. No assumptions have been made for Jones Act tankers, in the chart below. All Jones Act tanker data is based on actual vessel visits to Richmond Terminal.

Figure SS-2: Emission reduction benefits associated with ship Innovative Concepts (IC.10, IC.11 combined) at berth vs. in transit various distances from the RLW terminal.



Project 10: IC.10 Tier II or above certification for Auxiliary Engines

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron proposes to replace vessels with Tier 0 and Tier I auxiliary engines (AE) with vessels with Tier II AE. We will accomplish this by 1) executing a deliberate 'Tier II AE or above' chartering strategy, or 2) implementing engineering upgrades to AE. CARB's approval of this IC will provide substantial decreases in NOx.

Tier II AE meet International Maritime Organization (IMO) limits for NOx emissions. While the IMO NOx limits are different than those for the CARB At-Berth Regulation, these lower emitting AE can provide substantial decrease in NOx.

As referenced in the 2017 San Pedro Bay Ports' Clean Air Action Plan[3] report, a significant number of calls from Tier II powered ships are not expected in California until late 2020's to early 2030's. Also, According to CARB's 2019 At-Berth inventory[4], almost 25% of time at- berth for tanker vessels visiting Richmond facility are Tier I or older.

Through this Innovative Concept, Chevron will accelerate adoption of vessels with Tier II AE or above, prior to CARB At-Berth implementation date and will significantly reduce NOx emissions not only at berth, but would also substantially reduce emissions during transit, anchorage, and maneuvering when operating within California waters.

This IC will be implemented at an excess cost for RLW. Chevron intends to develop and execute a proactive and deliberate strategy to facilitate early adoption of this IC and is seeking approval for lower emission technology beyond the "business-as-usual" case.

Until data regarding ROG and PM2.5 reductions becomes available from the engine manufacturers, Chevron will conservatively neither estimate nor take credits for reduction in PM2.5 and ROG from this innovative concept. However, any actual reductions in ROG and PM2.5 emissions resulting from the IC project that can be demonstrated after implementation, as determined under Section 93130.17(d) of the At-Berth Regulation, will be included in Chevron's annual reporting to CARB.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Subject to CARB approval, this IC would be implemented using a phased approach across the fleet of vessels that call at the RLW. For example, as early as 2023, Chevron may begin

[3] San Pedro Bay Ports, *Clean Air Action Plan 2017*, November 2017. Available at https://kentico.portoflosangeles.org/getmedia/a2820d01-54f6-4f38-a3c5-81c228288b87/2017-Final-CAAP- Update

[4] CARB, *Appendix H: 2019 Update to Inventory for Ocean-Going Vessels At Berth: Methodology and Results*, October 2019. Available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/ogvatberth2019/apph.pdf

implementing a ‘Tier II AE or above’ chartering strategy, with increasing rates of adoption through 2027. Full implementation of this IC will reduce NOx by 49 MTPY (detailed emission reduction calculations attached in **Appendix A10.3**). The calculations also show the annual and cumulative reductions in emissions resulting from the early, phased implementation of the IC project prior to 2027.

As stated above, Chevron is neither estimating nor requesting emission reduction credits for PM2.5 or ROG, at this time.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Technical files endorsed by the engine maker and classification societies (e.g., American Bureau of Shipping) will be primary basis for ensuring AE Tier II compliance. The RLW Pre-Arrival Information Packet already requires vessel owners to report non- compliance or breakdown of machinery which could impact 'expected normal operations'. This information is recorded in vessel logbook and reported to Terminal and will be used for annual non-compliance reporting to CARB.

Testing of AE stack emissions will not be carried out by RLW as this is a part of the procedure that Classification Society's use to periodically endorse that AE operations are in compliance with “Technical File” requirements.

Chevron routinely collects data from vessels that visit Richmond terminal to comply with various terminal and regulatory requirements, using existing Data Management Systems such as the Marine Enterprise System (MES), in addition to the CARB at Berth "Vessel Questionnaire" (VQ). As shown in **Appendix A10.2 Data Management System**, and **Appendix A10.3 Emissions Calculation Spreadsheet**, Chevron maintains a robust system for monitoring, recordkeeping and reporting vessel and at-berth activity data to different stakeholders (such as BAAQMD, US Coast Guard, CARB, CA State Lands Commission, City of Richmond and others) in a customized manner to meet the specific stakeholder requirements.

To comply with data gathering, validating, and reporting emissions for the CARB At-Berth regulation, Chevron intends to leverage existing data sources and gather additional data to calculate emissions, accurately assess the impact and ensure vessel compliance with the stated Innovative Concept (IC). Chevron may also gather additional vessel information, to verify compliance with IC's, through changes made to the Terminal Information Booklet (TIB).

To accurately complete emissions calculation from vessels, Chevron will utilize:

- Information from existing and new data sources (as stated above)
- Engine loads and boiler pumping factors from Starcrest 2020 PoLB (**Appendix A10.3** Emissions Calculation Spreadsheet) and from Engine technical file (as required).
- SFC (specific Fuel consumption) data from CARB at Berth rulemaking, Appendix H 2019 Update to Inventory for Ocean-going Vessels At Berth: Methodology and Results (**Appendix A10.3** Emissions Calculation Spreadsheet)
- Conversion factors from Final Regulation Section 93130.17 (d)(1)(B)
- Aux. engine emission factors - see **Appendix A10.2 Inputs** and from Engine technical file (as required).
- Auxiliary Boiler Emission factor (for IC.12) from boiler manufacturer and from Engine technical file (as required). Chevron will present the OEM (Original Equipment Manufacturer) data sheet to CARB to demonstrate the source of emission factor.
- Additional required technical information from Engine Technical File. Per IMO requirements, all ships are required to have an Engine Technical File to comply with Marpol Annex VI regulation. Data in this file is verified and validated by an IACS (International Association for Classification Society) member during and after ship construction and at well-defined survey

intervals (annually and at all other required classification surveys), during the operational life of the ship. An overview of the Data Management System detailing data sources, validation and recordkeeping and methodology for calculation of emission reductions for ICs 10, 11, 12 and 13 is also provided in **Appendix A10.2.**

As stated above, Chevron does not intend to perform routine exhaust gas stack testing on ships that visit Richmond terminal. Attempting to do so, will not only delay vessel operations in-port, but the since the testing procedure requires access to the exhaust gas stream, it will require ship staff to remove existing sensors from the exhaust piping to allow the probe to be inserted in-line with the exhaust gases. This is not a 'routine' task and will add an additional safety risks and complicate routine cargo and port operations.

To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable and enforceable, Chevron will ensure that vessels are Tier II (validated by engine Technical file and cleared in Chevron's Marine Assurance system) prior to vessel coming into Richmond. The data within this file is not only verified and validated during construction and commissioning of vessels but is also verified and endorsed annually and at other required statutory surveys, to ensure compliance with prescribed Tier II limit, by an IACS (International Association of Classification Society) member like ABS, DNV, LRS, etc. Prior to annually endorsing the vessel's Technical File, it is required that the vessel presents 3rd party emissions testing data to the Classification Society, which becomes the basis of annual validation. In addition to surveys and inspection by the Classification Society, ships get spot inspected by Port State Control Authorities and USCG (US Coast Guard). Chevron intends to leverage this robust system of verification and validation to ensure that ships comply with IC.10.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable for Chevron owned and operated fleet as Chevron is the applicant, as well as the funder and operator of the vessels. Compliance on other in scope vessels will be addressed through Charter Party agreements with vessel owners at the time of vessel fixture.

6. Proposed length of time during which the IC project would be used

Subject to CARB approval as an IC project under the At-Berth Regulation, Chevron is capable of beginning implementation in a phased manner, starting in 2023 and increasing adoption on vessels through 2027, at which time Chevron expects to be operating with this concept as a new minimum standard for vessels calling at Chevron RLW terminal.

Chevron proposes to implement this IC project through and including the first compliance period (2027-2032) and, continuing through subsequent compliance periods subject to CARB approval of extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Except for CARB approval as an IC project under the At-Berth Regulation, no government approval is needed for vessel modifications associated with the proposed Innovative Concept. Classification society, however, must grant approval and document as part of the vessel's Technical File (see #4 above).

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews needed for vessel modifications associated with the proposed Innovative Concept.

The International Shipping Sector is heavily regulated. Every vessel is subject to the laws that are promulgated by the vessel's Flag State. With extremely rare exception, the Flag State's maritime laws reflect regulatory schemes that have been developed by the IMO. Classification Societies inspect vessels to ensure compliance with Flag State laws when the vessel in question is sailing in distant waters. Vessels are further regulated by the Port States that they call upon. The United States Coast Guard is responsible for conducting Port State Control inspections on vessels that call upon U.S. ports. Consequently, there are no environmental reviews needed for vessel modifications associated with the proposed Innovative Concept.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The proposed Innovative Concept is expected to lower NOx emissions without increasing GHG emissions. See **Section 2, Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. Collectively, as shown in **Figures ES-2 to ES-9**, the portfolio of ICs submitted by Chevron will reduce NOx, PM2.5 and ROG to levels greater than achieved by the control measure.

10. The proposed innovative concept must achieve emissions reductions of NO_x, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

This Innovative Concept is in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a memorandum of understanding with a government entity), that is in effect, has been approved, or has been noticed.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the

innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

This IC will reduce vessel emissions from auxiliary engines (AE) at berth and will benefit communities adjacent to the refinery. It is important to note that the air quality benefits extend well beyond the RLW as the more efficient AE will be in operation during approach, at anchorage, and while transiting San Francisco Bay and California waters. Any actual emissions reductions resulting from the IC project, in addition to reductions while the ships are at berth, that occur overwater within three nautical miles of RLW (per Section 93130.17(a)(4) of the At-Berth Regulation), and that can be shown as determined under Section 93130.17(d) of the Regulation, will be included in Chevron's annual reporting to CARB.

As stated previously, ship Innovative Concepts (IC.10, IC.11, IC.12, IC.13) proposed by Chevron will reduce emissions from vessels, at-berth, within 3NM and beyond. As presented to CARB during our engagement on 17 May 2023, implementation of IC.10, IC.11 and IC.12 provides additional environmental benefits due to reduced emissions from vessels during transit to the port. The in-transit benefits, shown in the previous **Figure SS-2**, ONLY considers potential reductions from IC.10, IC.11, and IC.12 as applied to international flag vessels visiting Richmond. In that figure no assumptions have been made for Jones Act tankers. All Jones Act tanker data is based on actual vessel visits to the Richmond Terminal.

Chevron intends to adopt a phased approach when accounting for emission reductions from the proposed Innovative Concept. Initially, Chevron will only account for emissions reductions at-berth. Hence all data sheets and calculations being proposed at this time, only account for at-berth emissions.

Once Chevron has demonstrated 'steady-state' reporting for at-berth emissions and compliance with CARB at Berth regulation, Chevron intends to assess feasibility of correctly tracking and reporting emissions reductions within 3NM. Chevron will propose all revised data sheets and calculations to CARB and seek alignment before claiming reductions within 3NM. Further, Chevron acknowledges that per the current regulation emissions reduced greater than 3NM from the terminal are not eligible for banking under the Innovative Concept provision, yet they are a significant public benefit that should not be ignored.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

The proposed concept for CARB compliance will achieve emission reductions that are real, quantifiable, verifiable and enforceable. Details are provided in earlier sections of this application.

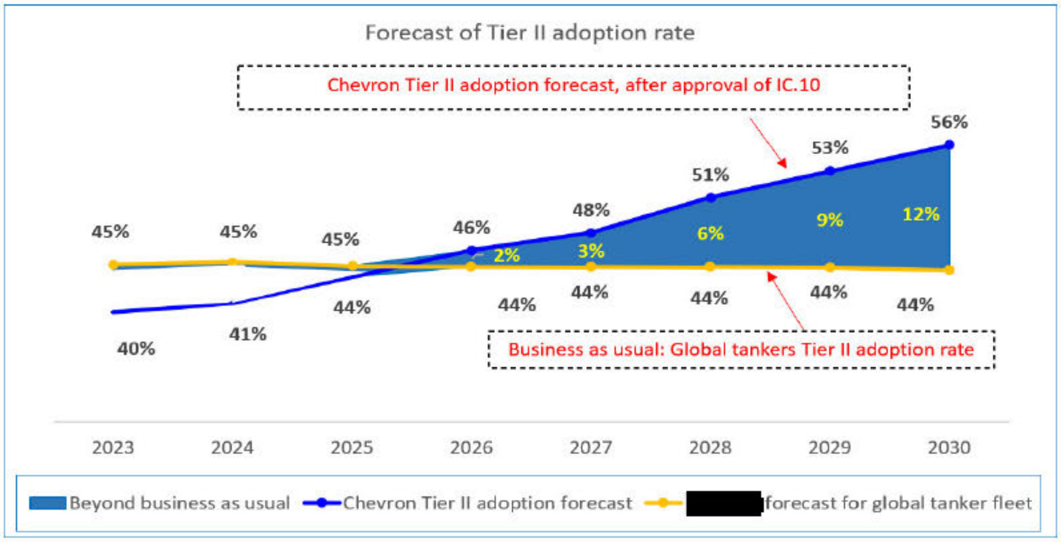
As noted above, there is no legal requirement to implement this project. In addition, the proposed Innovative Concept is in excess of a "business-as-usual" case. No current maritime protocol or policy calls for use of only Tier II vessels and the proposed IC will achieve NOx reductions that are in excess of what otherwise would be expected to occur given current economic and technological trends. Subject to CARB approval as an IC project under the At-Berth Regulation, Chevron intends to develop and execute a proactive and deliberate strategy to facilitate early adoption of this IC and to achieve emissions reductions earlier and in excess of what would take place under a business as usual scenario. Specifically, adoption of a Tier II AE vessel strategy requires a selective (incentivized) chartering strategy whereby Chevron will limit the vessels that it elects to charter, to the extent possible, to only vessels with Tier II AE. Early adoption of this strategy, prior to the compliance date in the At-Berth Regulation, will further reduce overall at berth emissions.

Also, it is important to highlight, as indicated in Section 9 of DNV's 2019 Technology Assessment, business as usual can mean an overall increase in vessel emissions as opposed to simply steady state or decline. In contrast, implementation of this IC project would substantially reduce emissions as compared to baseline.

Chevron's intention to pursue adoption of Tier II vessels is to meet the objective of our proposed Innovative Concept (IC.10) and generate credits to allow Chevron to comply with the CARB At-Berth regulation. As previously mentioned, there are NO International or US regulations that prevent operation of existing Tier 0 or Tier I vessels in California through their end of life.

Per the latest tanker fleet data from 3rd party maritime broker [redacted] (shown below), 42% of the global tanker fleet consist of vessels with less than Tier II rating, and 45% of global fleet consists of vessels with Tier II rating.

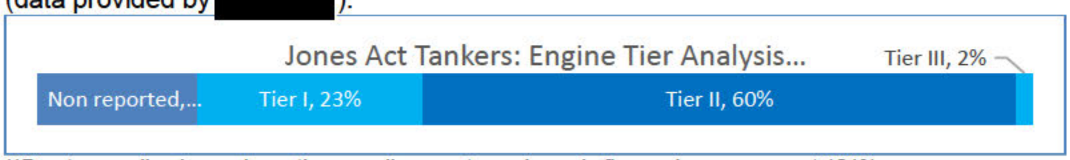
Figure 10-2, IC.10 Tier II forecast – Chevron vs. [redacted] 2023 global international fleet adoption forecast



Chevron's current Tier II adoption rate is lower than [redacted] forecast as Chevron's Tier II adoption has been cannibalized by Chevron's proactive effort to charter many of the tankers visiting Richmond to have Tier III engines (to comply with IC.11).

Beyond Business as usual: Chevron recognizes and acknowledges that, associated with new regulations, scrapping of older tonnage etc., tankers will continue to become more modern and efficient. Hence, to develop a baseline for 'business as usual', Chevron sought 3rd party data on global adoption for engine tiers on tankers. As shown in the chart above, Chevron will use [redacted] forecast for Tier II adoption rate as the baseline and will only claim emissions reduction 'beyond business as usual' IF percentage of Tier II vessels visiting Richmond exceed [redacted] forecast adoption rate. Chevron will demonstrate to CARB, percentage of Tier II vessels visiting Richmond, based on data collected from each vessel visiting Richmond (**Appendix A10.2 Data Management System** and **A10.3 Emissions Calculation Spreadsheets.**)

It is important to highlight that Tier ratings of Jones Act tankers are significantly different than International Fleet. **Appendix A10.3,** [redacted] *tab*, contains the Tier rating of Jones Act vessels (data provided by [redacted]).



**Due to rounding in numbers, the overall percentage shown in figure above represent 101%

To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable and enforceable, Chevron will ensure that vessels are Tier II (validated by engine Technical file and cleared in Chevron's Marine Assurance system) prior to vessel coming into Richmond. The data within this file is not only verified and validated during construction and commissioning of vessels but is also verified and endorsed annually and at other required statutory surveys, to ensure compliance with prescribed Tier II limit, by an IACS (International Association of Classification Society) member like ABS, DNV, LRS, etc. Prior to annually endorsing the vessel's Technical File, it is required that the vessel presents 3rd party emissions testing data to the Classification Society, which becomes the basis of annual validation. In addition to surveys and inspection by the Classification Society, ships get spot inspected by Port State Control Authorities and USCG (US Coast Guard). Chevron intends to leverage this robust system of verification and validation to ensure that ships comply with IC.10.

Project 11: IC.11 Tier III or above certification for Auxiliary Engines

1. Company name, address, and contact information

Chevron Shipping Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron proposes to replace vessels with Tier 0, Tier I and Tier II Auxiliary Engines (AE) with vessels installed with Tier III AE. We will accomplish this by 1) retrofitting existing vessels with Tier 0, Tier 1 and Tier II AE with technology such as Selective Catalytic Reactors (SCR) or 2) executing a deliberate 'Tier III AE or above' chartering strategy.

CARB's approval of this IC will provide substantial decreases in NOx. Also, based on preliminary discussions with engine makers and information published by the Pacific Merchant Shipping Association[5], a PM reduction should be expected when operating Tier III engines.

Tier III AE meet both the International Maritime Organization (IMO) and At-Berth Regulation for NOx emissions.

As referenced in the San Pedro Bay Ports' 2017 Clean Air Action Plan report, the "Bay Wide Ocean-Going Vessel International Maritime Organization Tier Forecast 2015- 2050"[6], a significant number of calls from the cleanest Tier III powered ships are not expected in California until mid to late 2030's through mid to late 2040's. Chevron intends to develop and execute a proactive and deliberate strategy to accelerate the use by RLW of Tier III vessels much earlier and well beyond what otherwise would be expected under the "business-as-usual" scenario.

Until data regarding ROG and PM reductions becomes available from the engine manufacturers, Chevron will conservatively neither estimate nor take credits for reduction in PM2.5 and ROG from this innovative concept. However, any actual reductions in ROG and PM2.5 emissions resulting from the IC project that can be demonstrated after implementation, as determined under Section 93130.17(d) of the At-Berth Regulation, will be included in Chevron's annual reporting to CARB.

[5] South Coast Air Quality Management District, Ocean-Going Vessel Working Group (including Pacific Merchant Shipping Association), *Pacific Rim Initiative for Maritime Emission Reductions, Primer, a Multi-Regional Clean Vessel Incentive Framework,* June 2021. Available at http://www.aqmd.gov/docs/default-source/clean-air- plans/air-quality-management-plans/2022-air-quality-management-plan/ogv-presentations-06-02- 21.pdf?sfvrsn=8

[6] San Pedro Bay Ports, *Bay Wide Ocean-Going Vessel International Maritime Organization Tier Forecast 2015 – 2050*, July 2017. Available at https://kentico.portoflosangeles.org/getmedia/a23bdf8e-7df2-42f5-873f-803c36be8a57/CAAP_Vessel_Tier_Forecasts_2015-2050-Final

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Subject to CARB approval, this IC project would be implemented using a phased approach across the fleet of vessels that call at the RLW. For example, as early as 2023, Chevron may begin scheduling shipyard time for Tier III AE upgrades for vessels under Chevron's full operational control. Also, as early as 2023, a 'Tier III AE or above' chartering strategy could commence, with increasing rates of adoption through 2027. Full implementation of this IC will reduce NOx by 133 MTPY (detailed emission reduction calculations attached in **Appendix A11.3**). The calculations also show the annual and cumulative reductions in emissions resulting from the early, phased implementation of the IC project prior to 2027.

As stated above, Chevron is neither estimating nor requesting emission reduction credits for PM2.5 or ROG, at this time.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Technical files endorsed by the engine maker and classification societies (e.g., American Bureau of Shipping) will be primary basis for ensuring Tier III AE compliance.

The RLW Pre-Arrival Information Packet already requires vessel owners to report non-compliance or breakdown of machinery which could impact 'expected normal operations'. This information is 1) recorded in vessel logbook, 2) reported to the Terminal, and 3) will be used for annual non-compliance reporting to CARB.

Testing of AE stack emissions will not be carried out by RLW as this is a part of the procedure that Classification Societies use to periodically endorse that AE operations are in compliance with "Technical File" requirements.

Chevron routinely collects data from vessels that visit Richmond terminal to comply with various terminal and regulatory requirements, using existing Data Management Systems such as the Marine Enterprise System (MES), in addition to the CARB at Berth "Vessel Questionnaire" (VQ). As shown in **Appendix A11.2 Data Management System**, and **Appendix A11.3 Emissions Calculation Spreadsheet**, Chevron maintains a robust system for monitoring, recordkeeping and reporting vessel and at-berth activity data to different stakeholders (such as BAAQMD, US Coast Guard, CARB, CA State Lands Commission, City of Richmond and others) in a customized manner to meet the specific stakeholder requirements.

To comply with data gathering, validating, and reporting emissions for the CARB At-Berth regulation, Chevron intends to leverage existing data sources and gather additional data to calculate emissions, accurately assess the impact and ensure vessel compliance with the stated Innovative Concept (IC). Chevron may also gather additional vessel information, to verify compliance with IC's, through changes made to the Terminal Information Booklet (TIB).

To accurately complete emissions calculation from vessels, Chevron will utilize:

- Information from existing and new data sources (as stated above)
- Engine loads and boiler pumping factors from Starcrest 2020 PoLB (Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)) and from Engine technical

file (as required).

- SFC (specific Fuel consumption) data from, CARB at Berth Appendix H 2019 Update to Inventory for Ocean-going Vessels At Berth: Methodology and Results (see **Appendix A11.3**).
- Conversion factors from Final Regulation Section 93130.17 (d) (1) (B)
- Aux. engine emission factors provided in **Appendix A11.3** and from Engine technical file (as required).
- Auxiliary Boiler Emission factor (for IC.12) from boiler manufacturer and from Engine technical file (as required). Chevron will present the OEM (Original Equipment Manufacturer) data sheet to CARB to demonstrate the source of emission factor.
- Additional required technical information from Engine Technical File. Per IMO requirements, all ships are required to have an Engine Technical File to comply with MARPOL Annex VI regulation. Data in this file is verified and validated by an IACS (International Association for Classification Society) member during and after ship construction and at well-defined survey intervals (annually and at all other required classification surveys), during the operational life of the ship. An overview of the Data Management System detailing data sources, validation and recordkeeping and methodology for calculation of emission reductions for ICs 10, 11, 12 and 13 is also provided in **Appendix A11.2.**

As stated above, Chevron does not intend to perform routine exhaust gas stack testing on ships that visit Richmond terminal. Attempting to do so, will not only delay vessel operations in-port, but the since the testing procedure requires access to the exhaust gas stream, it will require ship staff to remove existing sensors from the exhaust piping to allow the probe to be inserted in-line with the exhaust gases. This is not a 'routine' task and will add an additional safety risks and complicate routine cargo and port operations.

To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable and enforceable, Chevron will ensure that vessels are Tier III (validated by engine Technical File and cleared in Chevron's Marine Assurance system) prior to vessel coming into Richmond.

The data within the Technical File is not only verified and validated during construction and commissioning of vessels but is also verified and endorsed annually and at other required statutory surveys, to ensure compliance with prescribed Tier III limit, by an IACS (International Association of Classification Society) member like ABS, DNV, LRS, etc. Prior to annually endorsing the vessel's Technical File, it is required that the vessel presents 3rd party emissions testing data to the Classification Society, which becomes the basis of annual validation. In addition to surveys and inspection by the Classification Society, ships get spot inspected by Port State Control Authorities and USCG (US Coast Guard). Chevron intends to leverage this robust system of verification and validation to ensure that ships comply with IC.11.

It is important to gain a high-level understanding of Tier III operation for auxiliary engines, to learn how Chevron will validate the use of this Innovative Concept at-berth.
Auxiliary engines use SCR (Selective Catalytic Reduction) NOx abatement technology to meet Tier III standards. Vessels are required to switch 'ON' this abatement technology in ECA (Emission Control Areas). Chevron will require, through updates to the Terminal Information Booklet, that this technology is operated during 'At-Berth' operations and start/ stop times of the use of this technology will be reported to the Terminal. The Technical file provides details on 'methodology' for random/ spot testing of use and compliance of the abatement technology. Guidelines on what information is required to be presented in the NOx Technical file is stipulated as per IMO's MEPC.291(71) regulation. Chevron believes that the verification and validation system, set up by IMO to ensure correct operation and emissions reduction through use of NOx abatement technology is thorough. In addition, start/stop time data (on use of abatement technology) that Chevron gathers, will allow Chevron to assure, with a high degree of confidence the compliance of vessels with IC.11.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable for Chevron owned and operated fleet as Chevron is the applicant, as well as the funder and operator of the vessels. Compliance on other in-scope vessels will be addressed through Charter Party agreements with vessel owners at the time of vessel fixture.

6. Proposed length of time during which the IC project would be used

Subject to CARB approval, Chevron is capable of beginning implementation in a phased manner, beginning in 2023. Adoption would increase on vessels through 2027, at which time Chevron expects to be operating with this concept as a new minimum standard for vessels calling at Chevron RLW.

Chevron proposes to implement this IC project through and including the first compliance period (2027-2032) and, continuing through subsequent compliance periods subject to CARB approval of extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Except for CARB approval as an IC project under the At-Berth Regulation, no government approval is needed for vessel modifications associated with the proposed Innovative Concept. Classification societies (e.g., American Bureau of Shipping), however must grant approval and document as part of the vessel's Technical File (see #4 above).

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews needed for vessel modifications associated with the proposed Innovative Concept.

The International Shipping Sector is heavily regulated. Every vessel is subject to the laws that are promulgated by the vessel's Flag State. With extremely rare exception, the Flag State's maritime laws reflect regulatory schemes that have been developed by the IMO. Classification Societies inspect vessels to ensure compliance with Flag State laws when the vessel in question is sailing in distant waters. Vessels are further regulated by the Port States that they call upon. The United States Coast Guard is responsible for conducting Port State Control inspections on vessels that call upon U.S. ports. Consequently, there are no environmental reviews needed for vessel modifications associated with the proposed Innovative Concept.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year

through annual reporting in section 93130.17(d) of this Control Measure.

The proposed Innovative Concept is expected to lower NOx emissions without increasing GHG emissions. This IC also achieves At-Berth Regulation NOx limits. See Section 2, **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option. Collectively, as shown in **Figures ES-2 to ES-9**, the portfolio of ICs submitted by Chevron will reduce NOx, PM2.5 and ROG to levels greater than achieved by the control measure.

10. The proposed innovative concept must achieve emissions reductions of NO_x , PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

This innovative concept is in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a memorandum of understanding with a government entity), that is in effect, has been approved, or has been noticed.

11. This innovative concept is in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a memorandum of understanding with a government entity), that is in effect, has been approved, or has been noticed. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

This IC will reduce vessel emissions from AE at berth and will benefit communities adjacent to the refinery. It is important to note that the air quality benefits extend well beyond the RLW as the more efficient AE will be in operation during approach, at anchorage, and while transiting San Francisco Bay and California waters. Any actual emissions reductions resulting from the IC project, in addition to reductions while the ships are at berth, that occur overwater within three nautical miles of RLW (per Section 93130.17(a)(4) of the At-Berth Regulation), and that can be shown as determined under Section 93130.17(d) of the Regulation, will be included in Chevron's annual reporting to CARB.

As stated previously, ship Innovative Concepts (IC,10, 11, 12, 13) proposed by Chevron will reduce emissions from vessels, at-berth, within 3NM and beyond. As presented to CARB during our engagement on 17 May 2023, implementation of IC.10, IC.11 and IC.12 provides additional environmental benefits due to reduced emissions from vessels during transit to the port. The in-transit benefits, shown in Section 11 of IC.10, ONLY considers potential reductions from IC.10 and IC.11, as applied to international flag vessels visiting Richmond. No assumptions have been made for Jones Act tankers. All Jones Act tanker data is based on actual vessel visits to the Richmond Terminal.

Chevron intends to adopt a phased approach when accounting for emission reductions from the proposed Innovative Concept. Initially, Chevron will only account for emissions reductions at-berth. Hence all data sheets and calculations being proposed at this time, only account for at-berth emissions.

Once Chevron has demonstrated 'steady-state' reporting for at-berth emissions and compliance with CARB at Berth regulation, Chevron intends to assess feasibility of correctly tracking and reporting emissions reductions within 3NM. Chevron will propose all revised data sheets and calculations to CARB and seek alignment before claiming reductions within 3NM.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

The proposed concept for CARB compliance will achieve emission reductions that are real, quantifiable, verifiable and enforceable. Details are provided in earlier sections of this application.

As noted above, there is no legal requirement to implement this project. In addition, the proposed Innovative Concept is in excess of a "business-as-usual" case. No current maritime protocol or policy calls for use of only Tier III vessels and the proposed IC will achieve Nox reductions that are in excess of what otherwise would be expected to occur given current economic and technological trends. Subject to CARB approval as an IC project under the At-Berth Regulation, Chevron intends to develop and execute a proactive and deliberate strategy to facilitate early adoption of this IC and to achieve emissions reductions earlier and in excess of what would take place under a business as usual scenario.

Specifically, adoption of a Tier III vessels strategy requires early and extensive capital investment in new technology onboard for Chevron controlled tonnage, as well as a selective (incentivized) chartering strategy whereby Chevron will limit the vessels that it elects to charter, to the extent possible, to only vessels with Tier III AE in order to promote execution of the strategy. Early adoption of this strategy, prior to implementation date of the At-Berth Regulation, will further reduce overall at berth emissions.

Also, it is important to highlight, as indicated in Section 9 of DNV's 2019 Technology Assessment, business as usual can mean an overall increase in vessel emissions as opposed to simply steady state or decline. In contrast, this IC would result in substantial emissions reductions compared to baseline.

Chevron's intention to pursue adoption of Tier III vessels is to meet the objective of our proposed Innovative Concept (IC.11) and generate credits to allow Chevron to comply with the CARB At-Berth regulation. Presently, there are NO International or US regulations that prevent operation of Tier 0, Tier I or Tier II vessels in California.

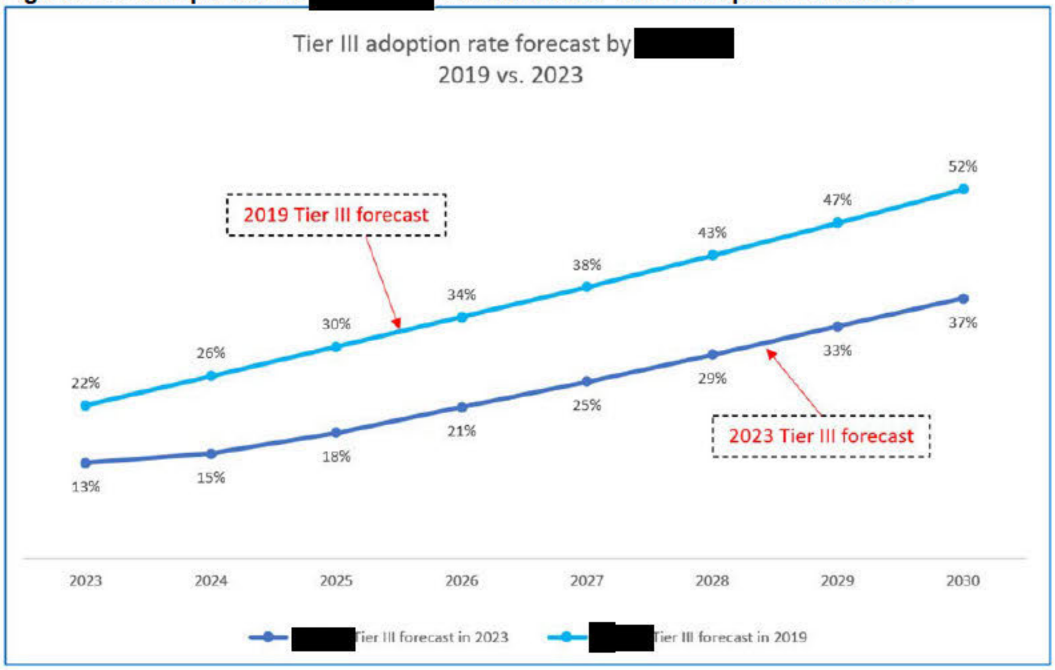
New build tanker orders are at an all-time low. Primary reasons for this are:

- Owners' reluctance to order new tankers due to regulatory uncertainties in a rapidly evolving environmental landscape.
- Technology uncertainties to comply with IMO2023 EEXI (Energy Efficiency for Existing Ship Index) and CII (Carbon Intensity Indicator) requirements during the life of the asset.
- Choice of future fuels from a broad mix of fuels that are currently being evaluated by the

maritime industry.

The points mentioned above are supported in industry data on adoption of Tier III vessels (sourced from 3rd party maritime broker, [redacted]). Chevron had received [redacted] data in 2019 and again requested similar data in 2023. The difference between the two data sets highlights the decreased rate of adoption and forecast of Tier III tankers (**Figure 11-1**).

Figure 11-1 Comparison of [redacted] 2019 and 2023 Tier III adoption forecasts.



Considering the above and challenges and premiums associated with chartering and upgrading tankers to make them more fuel efficient, Chevron, through deliberate execution of this IC to comply with CARB-At-Berth regulation, is committing to accelerate its adoption of Tier III vessels at a rate higher than the global adoption of Tier III vessels.

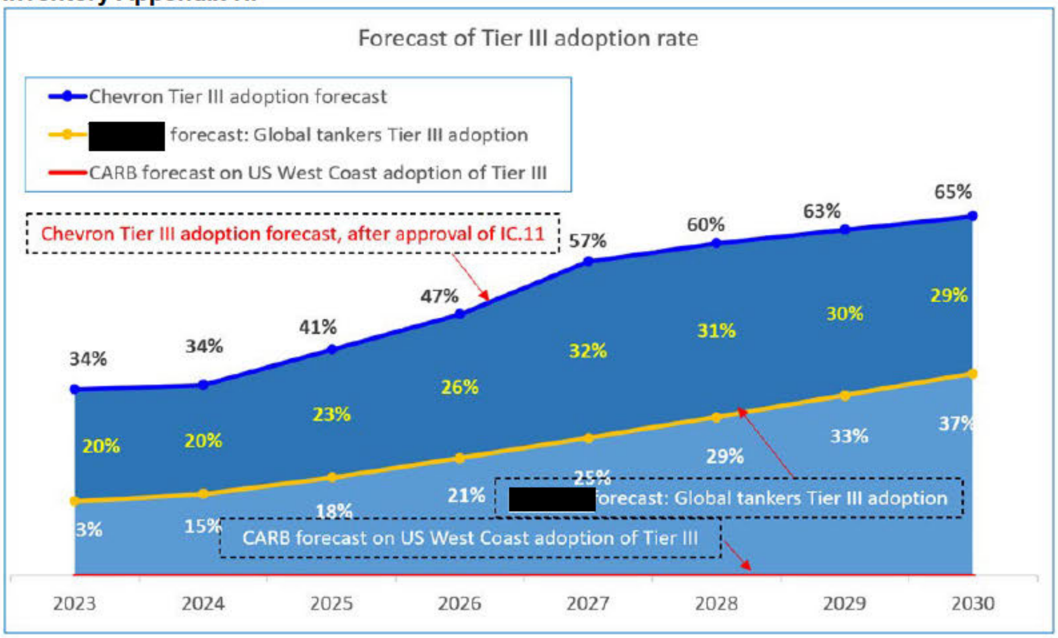
Beyond Business as Usual: Chevron recognizes and acknowledges that, associated with new regulations, scrapping of older tonnage etc. the tankers will continue to become more modern and efficient over time. Hence, to develop a baseline for 'business as usual', Chevron sought 3rd party data on engine tiers on tankers. As stated previously, it must be highlighted that the impact of regulatory uncertainties in a rapidly evolving environmental landscape and technology uncertainties have resulted in less new build orders and made ship replacements at an all-time low. On average, the global adoption rate of Tier III engines is approximately 13% lower now than forecast in 2019 (Chart above). Furthermore, it must be highlighted that the adoption of Tier III vessels in California is expected to be significantly lower than the global average, as referenced in the San Pedro Bay Ports' 2017 Clean Air Action Plan report and the "Bay Wide Ocean-Going Vessel International Maritime Organization Tier Forecast 2015-2050" (CAAP_Vessel_Tier_Forecasts_2015-2050-Final (portoflosangeles.org)). Although CARB's own 2019 Emission Inventory is based on the expectation to not have Tier III vessels in California till late 2030 or 2040, Chevron is choosing to be more stringent and **not adopt** this as this conservative baseline for 'business-as-usual' scenario. Instead, like the proposed methodology for IC.10, Chevron will use [redacted] forecast for Tier III adoption rate as the baseline and will only claim emissions reduction IF percentage of Tier III vessels visiting Richmond exceed [redacted] forecast adoption rate.

It is important to highlight that ONLY to comply with CARB-At-Berth regulation, Chevron has been accelerating its chartering of tier III vessels and hence:

- Chevron's present adoption of Tier III vessels is significantly higher than global Tier III adoption rate.
- Chevron's forecast of Tier III adoption assumes that the remaining international flag Tier 1

vessels are replaced with Tier III vessels, at a rate faster than the expected global tanker forecast (**Figure 11-2**). No assumptions added for Jones Act tankers. Actual data is used for this category of tankers.

Figure 11-2: Comparison of Chevron IC.11 Tier III adoption rate vs. [redacted] vs. CARB 2019 Emission Inventory Appendix H.



Project 12: Upgraded Combustion and Control Systems for Auxiliary Boilers

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron proposes to upgrade combustion and control systems for auxiliary boilers (AB) onboard vessels calling at RLW. We will accomplish this by 1) retrofitting existing vessels with new designed and upgraded combustion and control equipment or 2) executing a deliberate chartering strategy to secure newbuild vessels with upgraded AB systems.
CARB's approval of this IC will provide substantial decreases in Nox. This IC addresses an uncommon vessel technological upgrade that is not mandated by any maritime regulation.

Until data regarding ROG and PM2.5 reductions becomes available from the boiler manufacturers, Chevron will conservatively neither estimate nor take credits for reduction in PM2.5 and ROG from this innovative concept. However, any actual reductions in ROG and PM2.5 emissions resulting from the IC project that can be demonstrated after implementation, as determined under Section 93130.17(d) of the At-Berth Regulation, will be included in Chevron's annual reporting to CARB.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant Nox, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

Subject to CARB approval, this IC would be implemented using a phased approach across select vessels that call at the RLW and are under Chevron operational control and/or vessels with long-term supply contracts with RLW. As early as 2023, Chevron may begin scheduling shipyard time for AB upgrades, increasing rates of adoption through 2027.
Cumulatively, this would account for more than half of the annual RLW vessel calls and would reduce NOx by 48 MTPY at full implementation (detailed emission reduction calculations attached in **Appendix A12.3**). The calculations also show the annual and cumulative reductions in emissions resulting from the early, phased implementation of the IC project prior to 2027.

As stated above, Chevron is neither estimating nor requesting emission reduction credits for PM2.5 or ROG, at this time.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

All AB upgrades onboard vessels will be made after AB manufacturer has demonstrated compliance with CARB At-Berth Regulation emissions limits for NOx. AB Technical File and classification society certification will be used as primary basis to ensure compliance of upgraded equipment, with CARB emission limits and will be available to present to CARB, upon request.

The RLW Pre-Arrival Information Packet already requires vessel owners to report non-compliance or breakdown of machinery which could impact 'expected normal operations'. This information is recorded in vessel logbook and reported to Terminal and will be used for annual non-compliance reporting to CARB.

Additional monitoring and stack testing of AB emissions, in service, will not be required by RLW as this will be a part of the procedure that Classification Society's use to periodically endorse that AB operations are in compliance with “Technical File” requirements.

Chevron routinely collects data from vessels that visit Richmond terminal to comply with various terminal and regulatory requirements, using existing Data Management Systems such as the Marine Enterprise System (MES), in addition to the CARB at Berth "Vessel Questionnaire" (VQ). As shown in **Appendix A11.2 Data Management System**, and **Appendix A11.3 Emissions Calculation Spreadsheet**, Chevron maintains a robust system for monitoring, recordkeeping and reporting vessel and at-berth activity data to different stakeholders (such as BAAQMD, US Coast Guard, CARB, CA State Lands Commission, City of Richmond and others) in a customized manner to meet the specific stakeholder requirements.

To comply with data gathering, validating, and reporting emissions for the CARB At-Berth regulation, Chevron intends to leverage existing data sources and gather additional data to calculate emissions, accurately assess the impact and ensure vessel compliance with the stated Innovative Concept (IC). Chevron may gather this additional vessel information to verify compliance with IC's through changes made to the Terminal Information Booklet (TIB).

To accurately complete emissions calculation from vessels, Chevron will utilize:

- Information from existing and new data sources (as stated above)
- Engine loads and boiler pumping factors from Starcrest 2020 PoLB (Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)) and from Engine technical file (as required).
- SFC (specific Fuel consumption) data from, CARB at Berth Appendix H 2019 Update to Inventory for Ocean-going Vessels At Berth: Methodology and Results (see **Appendix A12.3**).
- Conversion factors from Final Regulation Section 93130.17 (d) (1) (B)
- Aux. engine emission factors provided in **Appendix A12.3** and from Engine technical file (as required).
- Auxiliary Boiler Emission factor (for IC.12) from boiler manufacturer and from Engine technical file (as required). Chevron will present the OEM (Original Equipment Manufacturer) data sheet to CARB to demonstrate the source of emission factor.
- Additional required technical information from Engine Technical File. Per IMO requirements, all ships are required to have an Engine Technical File to comply with MARPOL Annex VI regulation. Data in this file is verified and validated by an IACS (International Association for Classification Society) member during and after ship construction and at well-defined survey intervals (annually and at all other required classification surveys), during the operational life of the ship. An overview of the Data Management System detailing data sources, validation and recordkeeping and methodology for calculation of emission reductions for ICs 10, 11, 12 and 13 is also provided in **Appendix A12.2.**

As stated above, Chevron does not intend to perform routine exhaust gas stack testing on ships that visit Richmond terminal. Attempting to do so, will not only delay vessel operations in-port, but the since the testing procedure requires access to the exhaust gas stream, it will require ship staff to remove existing sensors from the exhaust piping to allow the probe to be inserted in-line with the exhaust gases. This is not a ‘routine’ task and will add an additional safety risks and complicate routine cargo and port operations.

To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable, and enforceable, Chevron will ensure that the below mentioned modification process is followed and the data is summarized in Chevron’s documentation submission to CARB.

For vessels to comply with IC.12, the auxiliary boilers will need to be upgraded with new technology. Per IACS rules, changes to vessel equipment can only be made after that the proposed changes have been reviewed and endorsed by the IACS member. This requires detailed review of engineering drawings and technical details of proposed upgrades. Once the upgrades are completed, Classification Society will review, approve, and witness commissioning of the upgraded system and ensure satisfactory operation, in-line with expected results (boiler test bed data provided by the boiler manufacturer). Vessels are required to carry this record onboard and prior to claiming emissions reduction under IC.12, Chevron will validate through additional data gathered to meet CARB reporting requirements, that vessels have completed these upgrades. Records of boiler modifications can be shared with CARB, if the data is requested from Chevron. Tankers will also be required to always carry these records onboard.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept’s scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable for Chevron owned and operated fleet as Chevron is the applicant, as well as the funder and operator of the vessels. Compliance on other in-scope vessels will be addressed through Charter Party agreements with vessel owners at the time of vessel fixture.

6. Proposed length of time during which the IC project would be used

Subject to CARB approval, Chevron is capable of beginning implementation in a phased manner, starting in 2023 and increasing adoption on vessels through 2027, at which time Chevron expects to be operating with this concept as a new minimum standard for vessels already upgraded and calling at Chevron RLW terminal.

Chevron proposes to implement this IC project through and including the first compliance period (2027-2032) and, continuing through subsequent compliance periods subject to CARB approval of extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Except for CARB approval as an IC project under the At-Berth Regulation, no government approval is needed for vessel modifications associated with the proposed Innovative

Concept. Classification society, however, must grant approval and document as part of the vessel's auxiliary boiler upgrade (see #4 above).

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

No environmental reviews needed for vessel modifications associated with the proposed Innovative Concept.

Speaking more generally, the International Shipping Sector is heavily regulated. Every vessel is subject to the laws that are promulgated by the vessel's Flag State. With extremely rare exception, the Flag State's maritime laws reflect regulatory schemes that have been developed by the IMO. Classification Societies inspect vessels to ensure compliance with Flag State laws when the vessel in question is sailing in distant waters. Vessels are further regulated by the Port States that they call upon. The United States Coast Guard is responsible for conducting Port State Control inspections on vessels that call upon U.S. ports.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The proposed Innovative Concept will lower NOx emissions without increasing GHG emissions. It will also ensure full compliance with CARB At-Berth NOx limits for AB. See Section 2, **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. Collectively, as shown in **Figures ES-2 to ES-9**, the portfolio of ICs submitted by Chevron will reduce NOx, PM2.5 and ROG to levels greater than achieved by the control measure.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

This Innovative Concept is in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a memorandum of understanding with a government entity), that is in effect, has been approved, or has been noticed.

There is NO maritime regulation that requires adoption of technology proposed by Chevron's IC#12. We have reviewed IMO requirements, checked with Classification Society (ABS) and US Coast Guard (USCG). No entity has indicated that upgrading burners on existing ships is required to meet any maritime regulation.

As additional due diligence, Chevron posed the same question to a boiler manufacturer and learned that retrofitting burners in service, to meet the emissions reductions required by CARB, has never been requested by an owner before. Chevron has proposed this IC to ONLY comply with CARB at Berth regulation.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

This IC will reduce vessel emissions from AB at berth and will benefit communities adjacent to the refinery. It is important to note that the air quality benefits extend well beyond the RLW as the more efficient AB will be in operation during approach, at anchorage, and while transiting San Francisco Bay and California waters. Any actual emissions reductions resulting from the IC project, in addition to reductions while the ships are at berth, that occur overwater within three nautical miles of RLW (per Section 93130.17(a)(4) of the At-Berth Regulation), and that can be shown as determined under Section 93130.17(d) of the Regulation, will be included in Chevron's annual reporting to CARB.

As stated previously, ship Innovative Concepts (IC.10, 11, 12, 13) proposed by Chevron will reduce emissions from vessels, at-berth, within 3NM and beyond. As presented to CARB during our engagement on 17 May 2023, implementation of IC.10, IC.11 and IC.12 provides additional environmental benefits due to reduced emissions from vessels during transit to the port. The in-transit benefits, shown in Section 11 of IC.10, ONLY considers potential reductions from IC.10 and IC.11, as applied to international flag vessels visiting Richmond. No assumptions have been made for Jones Act tankers. All Jones Act tanker data is based on actual vessel visits to the Richmond Terminal.

Chevron intends to adopt a phased approach when accounting for emission reductions from the proposed Innovative Concept. Initially, Chevron will only account for emissions reductions at-berth. Hence all data sheets and calculations being proposed at this time, only account for at-berth emissions.

Once Chevron has demonstrated 'steady-state' reporting for at-berth emissions and compliance with the CARB at Berth regulation, Chevron intends to assess feasibility of correctly tracking and reporting emissions reductions within 3NM. Chevron will propose all revised data sheets and calculations to CARB and seek alignment before claiming reductions within 3NM.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

The proposed Innovative Concept for CARB compliance will achieve emission reductions that are real, quantifiable, verifiable and enforceable. Details are provided in earlier sections of this application.

As noted above, there is no legal requirement to implement this project. In addition, the proposed innovative concept is in excess of a “business-as-usual” case. No current maritime protocol or policy calls for use of this innovative and uncommon technology for auxiliary boilers, and the proposed IC will achieve NOx reductions that are in excess of what otherwise would be expected to occur given current economic and technological trends.

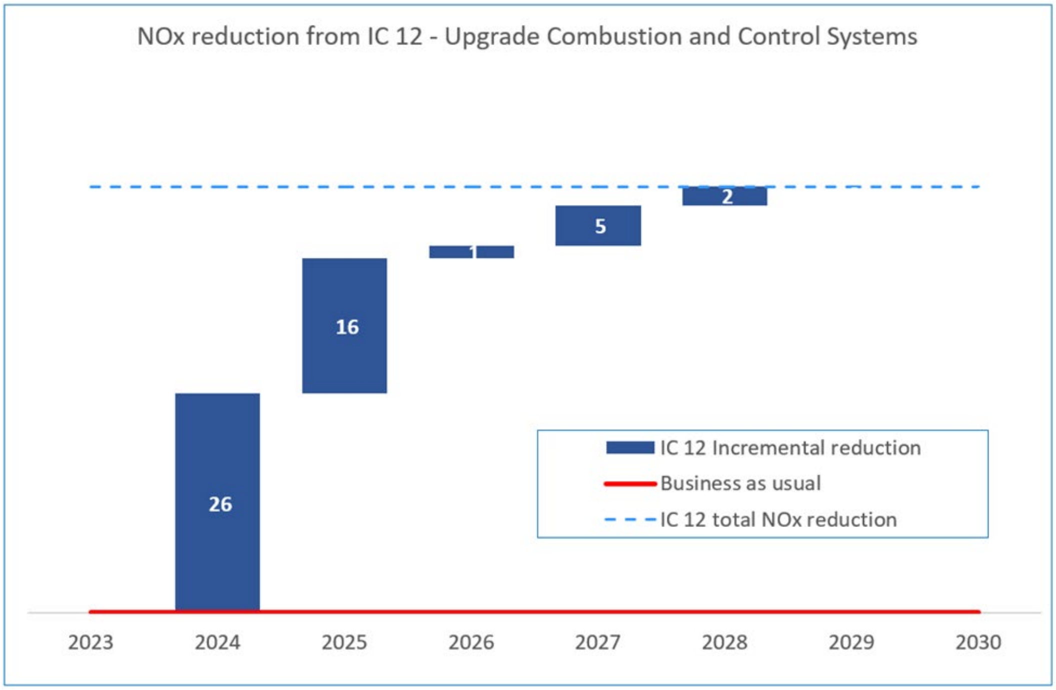
Subject to CARB approval as an IC project under the At-Berth Regulation, Chevron intends to develop and execute a proactive and deliberate strategy to facilitate early adoption of this IC and to achieve emissions reductions earlier and in excess of what would take place under a business as usual scenario. Implementing the technology upgrade under this IC requires early and extensive capital investment in new technology onboard Chevron controlled tonnage, as well as a selective (incentivized) chartering strategy whereby Chevron will limit the vessels that it elects to charter, to the extent possible, to only vessels with upgraded auxiliary boilers in order to promote execution of the strategy. Early adoption of this strategy, prior to implementation date of the At-Berth Regulation, will further reduce overall at berth emissions.

Also, it is important to highlight that as indicated in Section 9 of DNV’s Technology Assessment, business as usual does not necessarily mean steady state or slight decline in emissions but in-fact leads to an overall increase in ship emissions. In contrast, implementing this IC project would substantially lower emissions as compared to baseline conditions.

There is no maritime regulation that requires adoption of technology proposed by Chevron’s IC 12. We have reviewed IMO requirements, checked with Classification Society (ABS) and US Coast Guard. No entity has indicated that upgrading burners on existing ships is required to meet any maritime regulation. As additional due diligence, Chevron posed the same question to a boiler manufacture and learned that retrofitting burners in service, to meet the emissions reductions required by CARB, has never been requested by an owner before. Also, there is NO International or US regulation that prevents vessels equipped with Auxiliary Boilers to enter or operate in California. Chevron has proposed this IC to ONLY comply with the CARB at-Berth regulation.

Beyond Business as Usual: Most crude oil tankers are fitted with steam operated cargo pumps, which are powered by steam from auxiliary boilers. To reduce the environmental impact from operation of auxiliary boilers and to accelerate compliance with the CARB at-Berth regulation, Chevron plans to deliberately upgrade the combustion and control equipment for auxiliary boilers on many of the vessels calling at Richmond terminal in California. As shown in **Figure 12-1**, executing on this IC will offer significant emission reductions, from operation of auxiliary boilers, at berth. Since there is NO International or US regulation that requires vessels to be equipped with the modified Combustion and Control systems on Auxiliary Boilers, Chevron intends to present all emission reductions from this IC as beyond business as usual.

Figure 12-1: Estimated NOx reductions from IC.12 by year compared to business as usual.



To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable, and enforceable, Chevron will ensure that the below mentioned modification process is followed and the data is summarized in Chevron's documentation submission to CARB.

For vessels to comply with IC.12, the auxiliary boilers will need to be upgraded with new technology. Per IACS rules, changes to vessel equipment can only be made after that the proposed changes have been reviewed and endorsed by the IACS member. This requires detailed review of engineering drawings and technical details of proposed upgrades. Once the upgrades are completed, Classification Society will review, approve, and witness commissioning of the upgraded system and ensure satisfactory operation, in-line with expected results (boiler test bed data provided by the boiler manufacturer). Vessels are required to carry this record onboard and prior to claiming emissions reduction under IC.12, Chevron will validate through additional data gathered to meet CARB reporting requirements, that vessels have completed these upgrades. Records of boiler modifications can be shared with CARB, if the data is requested from Chevron. Tankers will also be required to always carry these records onboard.

Project 13: Dual-Fuel Tier III Auxiliary Engines and Auxiliary Boilers

1. Company name, address, and contact information

Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
P.O Box 1272
Richmond, CA 94802 – 0272

2. Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.

Chevron proposes to use vessels equipped with dual-fuel Tier III or above AE and dual fuel compatible AB's. The types of dual fuels used in the AE and AB could be LNG, Methanol, Ammonia, Hydrogen and/or other fuels beyond conventional MGO/MDO. Our proposal to achieve this IC is through 1) executing a deliberate chartering strategy to secure newbuild dual fuel vessels or 2) retrofitting existing vessels with new systems and machinery to allow them to use dual fuel for AE and AB. CARB's approval of this IC will provide substantial decreases in NOx.

Although adoption of dual-fuel AE and AB technology in tanker design is gaining popularity as a concept in the maritime industry, to date, less than 1% of global tanker fleet is dual-fuel capable. Infrastructure and availability of alternative fuels through a mature global supply chain are crucial to adoption of this innovative concept. To implement this IC project, Chevron intends to proactively seek dual-fuel vessels for use at RLW as a deliberate, early- adoption choice that is much earlier and well beyond the "business-as-usual" case, which would seek to continue using existing technology to secure more cost-efficient tonnage.

This IC provides an accelerated path for dual fuel vessels with Tier III or above AE's and dual fuel compatible AB's, which fully meet all NOx emissions criteria for the At-Berth Regulation, to carry crude/ product to and from RLW. Based on the IMO's Fourth Greenhouse Gas Study[7], a reduction in PM2.5 and ROG should also be expected when operating AE and AB's on dual fuel. However, since Maker data for PM2.5 and ROG is not available, Chevron at this time, is neither estimating nor taking credits for any decrease in PM2.5 and ROG, associated with this IC. Any actual reductions in ROG and PM2.5 emissions resulting from the IC project that can be demonstrated after implementation, as determined under Section 93130.17(d) of the At-Berth Regulation, will be included in Chevron's annual reporting to CARB.

3. Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;

[7] International Maritime Organization, *Fourth IMO Greenhouse Gas Study*, 2021. Available at https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Fourth%20IMO%20GHG%20Study%202020%20-%20Full%20report%20and%20annexes.pdf

Subject to CARB approval, this IC would be implemented using a phased approach across the fleet of vessels that call at the RLW. For example, as early as 2024, Chevron may increase use of dual fuel vessels in the fleet, through implementation of a selective and deliberate chartering strategy. Also, in 2026 Chevron will try and incorporate this IC to select vessels under Chevrons operational control by making major modifications and upgrades to engines, boilers, fuel storage and delivery systems during shipyards and also increase adoption of dual fuel vessels through 2027 and beyond. Full implementation of this IC will reduce NOx by 41 MTPY (detailed emission reduction calculations attached in **Appendix A13.3**). The calculations also show the annual and cumulative reductions in emissions resulting from the early, phased implementation of the IC project prior to 2027.

Chevron is neither estimating nor requesting emission reduction credits for PM2.5 and ROG, at this time. However, any actual reductions in ROG and PM2.5 emissions resulting from the IC that can be shown as determined under Section 93130.17(d) of the At-Berth Regulation will be included in Chevron's annual reporting to CARB.

4. The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;

Technical files endorsed by the engine maker and classification societies (e.g., American Bureau of Shipping) will be primary basis for recording and reporting AE Tier III compliance. Record keeping and reporting of change over to alternative fuel (LNG, Methanol, Ammonia, Hydrogen etc.) at berth will be in the ship's logbook and the terminal log.

The RLW Pre-Arrival Information Packet already requires vessel owners to report non-compliance or breakdown of machinery which could impact 'expected normal operations'. This information is recorded in vessel logbook and reported to Terminal and will be used for annual non-compliance reporting to CARB. Expectation on reporting non-compliance, with at berth changeover to alternative fuel, will be added to RLW Terminal Information Booklet and vessels will be made aware of the requirements through the RLW Pre-Arrival Information Packet. Vessels will be fully responsible for reporting compliance to RLW. Additional monitoring of changeover to alternative fuel will be randomly confirmed by Port State Control and RLW personnel.

Testing of AE or AB stack emissions will not be carried out by RLW as this is a part of the procedure that Classification Society's use to periodically endorse AE and AB operations in alignment with "Technical File" requirements.

To comply with various terminal and regulatory requirements, Chevron has been collecting different kinds of data, as detailed in **Appendix A13.2**, from vessels that visit Richmond terminals. Chevron has a robust system for monitoring, recordkeeping and reporting this information to different stakeholders in a customized manner to meet the stakeholder requirements.

To comply with data gathering, validating, and reporting emissions for the CARB At-Berth regulation, Chevron intends to leverage existing data sources and gather additional data to calculate emissions, accurately assess the impact and ensure vessel compliance with the stated Innovative Concept (IC). Chevron will gather this additional vessel information, to verify compliance with IC's, through changes made to the Terminal Information Booklet (TIB).

To accurately complete emissions calculation from vessels, Chevron will utilize:

- Information from existing and new data sources (as stated above)
- Engine loads and boiler pumping factors from Starcrest 2020 PoLB (Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)) and from Engine technical file (as required).

- SFC (specific Fuel consumption) data from CARB at-Berth Appendix H 2019 Update to Inventory for Ocean-going Vessels At Berth: Methodology and Results (see **Appendix A13.3**).
- Conversion factors from Final Regulation Section 93130.17 (d) (1) (B)
- Aux. engine emission factors provided in **Appendix A13.3** and from Engine technical file (as required).
- Auxiliary Boiler Emission factor (for IC.12) from boiler manufacturer and from Engine technical file (as required). Chevron will present the OEM (Original Equipment Manufacturer) data sheet to CARB to demonstrate the source of emission factor.
- Additional required technical information from Engine Technical File. Per IMO requirements, all ships are required to have an Engine Technical File to comply with MARPOL Annex VI regulation. Data in this file is verified and validated by an IACS (International Association for Classification Society) member during and after ship construction and at well-defined survey intervals (annually and at all other required classification surveys), during the operational life of the ship. An overview of the Data Management System detailing data sources, validation and recordkeeping and methodology for calculation of emission reductions for ICs 10, 11, 12 and 13 is also provided in **Appendix A13.2.**

As stated above, Chevron does not intend to perform routine exhaust gas stack testing on ships that visit Richmond terminal. Attempting to do so, will not only delay vessel operations in-port, but the since the testing procedure requires access to the exhaust gas stream, it will require ship staff to remove existing sensors from the exhaust piping to allow the probe to be inserted in-line with the exhaust gases. This is not a ‘routine’ task and will add an additional safety risks and complicate routine cargo and port operations.

To ensure that the emission reductions claimed under this IC are real, quantifiable, verifiable, and enforceable, Chevron will ensure that Dual Fuel vessels will operate their auxiliary engines and auxiliary boilers on the 'dual' fuel, while At-Berth in Richmond. Chevron will validate this through additional data gathered by Chevron for CARB-At-Berth reporting. Emissions reductions through use of dual fuel Tier III auxiliary engines and auxiliary boilers will be based on similar concepts as outlined above for IC.10, IC.11, IC.12.

5. A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of controlled equipment for the innovative concept that shows agreement regarding the innovative concept’s scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Not applicable for Chevron owned and operated fleet as Chevron is the applicant, as well as the funder and operator of the vessels. Compliance on other in-scope vessels will be addressed through Charter Party agreements with vessel owners at the time of vessel fixture.

6. Proposed length of time during which the IC project would be used

Subject to CARB approval, Chevron is capable of beginning implementation in a phased manner, starting in 2024 and increasing adoption on vessels through 2027 and beyond, at which time Chevron expects to be operating with this concept as a new minimum standard for vessels already upgraded and calling at Chevron RLW terminal.

Chevron proposes to implement this IC project through and including the first compliance period (2027-2032) and, continuing through subsequent compliance periods subject to CARB approval of extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

Except for CARB approval as an IC project under the At-Berth Regulation, no government approval is needed for vessel modifications associated with the proposed Innovative Concept. Classification society, however, must grant approval and document as part of the vessel's auxiliary boiler upgrade (see #4 above).

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

There are no regulatory or IMO requirements which mandate the use of dual fuel vessels in port. The maritime industry has commenced transition to dual fuel vessels, with container vessels and ferries/ cruise ships leading the way. Dual fuel tankers make up less than approximately 2% of global tanker fleet and there are no dual fuel Jones act tankers today. No environmental reviews are needed for ship modifications associated with the proposed Innovative Concept.

Speaking more generally, the International Shipping Sector is heavily regulated. Every vessel is subject to the laws that are promulgated by the vessel's Flag State. With extremely rare exception, the Flag State's maritime laws reflect regulatory schemes that have been developed by the IMO. Classification Societies inspect vessels to ensure compliance with Flag State laws when the vessel in question is sailing in distant waters. Vessels are further regulated by the Port States that they call upon. The United States Coast Guard is responsible for conducting Port State Control inspections on vessels that call upon U.S. ports.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

The proposed Innovative Concept will lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. See Section 2, **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. Collectively, as shown in **Figures ES-2 to ES-9**, the portfolio of ICs submitted by Chevron will reduce NOx, PM2.5 and ROG to levels greater than achieved by the control measure.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

This Innovative Concept is in excess of any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a memorandum of understanding with a government entity), that is in effect, has been approved, or has been noticed.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within

adjacent communities, or overwater within three nautical miles of the port or marine terminal.

This IC will reduce vessel emissions from AE and AB at berth and will benefit communities adjacent to the refinery. It is important to note that the air quality benefits extend well beyond the RLW as the more efficient AE and AB will be in operation during approach, at anchorage, and while transiting San Francisco Bay and California waters. Any actual emissions reductions resulting from the IC project, in addition to reductions while the ships are at berth, that occur overwater within three nautical miles of RLW (per Section 93130.17(a)(4) of the At-Berth Regulation), and that can be shown as determined under Section 93130.17(d) of the Regulation, will be included in Chevron's annual reporting to CARB.

As stated previously, ship Innovative Concepts (IC,10, 11, 12, 13) proposed by Chevron will reduce emissions from vessels, at-berth, within 3NM and beyond. As presented to CARB during our engagement on 17 May 2023, implementation of IC.10, IC.11 and IC.12 provides additional environmental benefits due to reduced emissions from vessels during transit to the port. The in-transit benefits, shown in Section 11 of IC.10, ONLY considers potential reductions from IC.10 and IC.11, as applied to international flag vessels visiting Richmond. No assumptions have been made for Jones Act tankers. All Jones Act tanker data is based on actual vessel visits to the Richmond Terminal.

Chevron intends to adopt a phased approach when accounting for emission reductions from the proposed Innovative Concept. Initially, Chevron will only account for emissions reductions at-berth. Hence all data sheets and calculations being proposed at this time, only account for at-berth emissions.

Once Chevron has demonstrated 'steady-state' reporting for at-berth emissions and compliance with CARB at Berth regulation, Chevron intends to assess feasibility of correctly tracking and reporting emissions reductions within 3NM. Chevron will propose all revised data sheets and calculations to CARB and seek alignment before claiming reductions within 3NM.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

The proposed concept for CARB compliance will achieve emission reductions that are real, quantifiable, verifiable and enforceable. Details are provided in earlier sections of this application.

As noted above, there is no legal requirement to implement this IC project. In addition, this IC project is excess of a "business as usual" case. Today, less than 2% of global tanker fleet is dual-fuel capable and there are no dual fuel Jones act tankers today. There is no maritime protocol or policy mandating the use of dual-fueled vessels in California. The maritime industry has commenced transition to dual fuel vessels, with container vessels and ferries/ cruise ships leading the way. Also, as with the other IC projects included in this application, there are not sufficient economic incentives or a technological impetus at this time to implement this IC concept in the absence of the CARB At-Berth Regulation. Rather, execution of this IC project requires early and extensive capital investment in new technology onboard, selective (incentivized) chartering strategies and assurance of mature dual fuel bunkering infrastructure to enable adoption of the IC. Through this IC, Chevron intends to proactively identify opportunities to charter dual-fuel vessels for use at RLW, which would reflect a deliberate, early-adoption choice beyond the “business-as-usual” case, which would seek to rely on existing technology to secure more efficient dual-fuel tonnage. Early adoption of this strategy, prior to implementation date of At-Berth Regulation, will further reduce overall at berth emissions.

Also, it is important to highlight that as indicated in Section 9 of DNV’s Technology Assessment, business as usual does not necessarily mean steady state or slight decline in emissions but in-fact leads to an overall increase in ship emissions. In contrast, this IC would lead to substantially reduced emissions as compared to baseline.

Early adoption of this strategy, prior to implementation date of CARB at-Berth regulation, will further reduce overall at berth emissions.

Beyond business as usual: Based on best industry data, no dual fuel tankers have visited and operated on 'dual fuel' mode in a port in California. There are no mandates from IMO or other regulators on global adoption of dual fuel tankers. Hence, from a business-as-usual perspective, Chevron does not expect any adoption of dual fuel tankers at least within the first compliance period from 2027 - 2032. For this period, Chevron intends to present all emission reductions from this IC as beyond business-as-usual. Chevron will continue to closely track and trend the market adoption of dual fuel vessels with 3rd party sources like [redacted] and will share updates with CARB prior to the 2nd compliance period. Like the approach for IC.10 and IC.11, Chevron will only claim emissions reductions for beyond business as usual based on Industry baseline data.

Project 14: IC.14 - Shore Power or Stack Capture for Barges and Tug Boats

1. **Company name, address, and contact information**
   Chevron Products Company, a subsidiary of Chevron U.S.A. Inc.
   P.O Box 1272
   Richmond, CA 94802 – 0272

2. **Description of proposal including an overview of the source and scope of emission reductions, and a project site plan and location map.**
   Should shore power and/or stack capture and control be shown to be a safe and feasible option at the RLW, subject to CARB approval as an IC project, Chevron intends to also use either or both of these technologies on barges and tugboat that make calls at RLW (see location map in **Appendix A14.1**). As noted in the DNV's Technology Assessment, shore power is not expected to be available until 2034 at the earliest, therefore this IC project is intended to be implemented should shore power be available at RLW within the years 2027- 2032. Chevron would reduce barge and tugboat emissions by controlling engine emissions as would occur on a tanker vessel. Instead of operating the barges and tug boats with no emissions controls for the foreseeable future because there is no requirement to do so, subject to CARB approval as an IC project to reduce emissions for purposes of the At-Berth Regulation, Chevron would control these emissions as early as 2027. This IC project is in excess of the emissions reductions that will be achieved as part of the Commercial Harbor Craft Regulation.

3. **Estimate of the vessel emissions planned to be covered under the innovative concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit;**

   Chevron estimates that the emissions reductions from controlling the barge and tug boat emissions will be 22 metric tons per year (MTPY) for NOx, 0.2 MTPY for PM2.5, and 1.4 MTPY. GHG emissions will not increase. See **Appendix A14.3** for the best available NOx, PM2.5 and ROG emissions calculations for this project. Emissions were calculated using RLW data from the "2021 Update to the Emissions Inventory for Commercial Harbor Craft: Methodology and Results"[8] and anticipated reductions from controlling these emissions.

   The RLW has calls from a variety of vessels that are constantly evolving and Chevron cannot predict exactly which vessels will be in operation when this regulation goes into effect in 2027, nor their exact NOx, PM2.5 and ROG emissions. **Table 2-1** shows the amount of NOx, PM2.5 and ROG emissions that must be reduced with IC projects when using 2016 emissions as a representative year and the emission factors from **Section 93130.5(d)(1) and (d)(2)**. **Table 2-2** shows how this project fits in among the Innovative Concepts as a package to ensure emissions are reduced as required by **Section 93130.17**.

4. **The proposed recordkeeping, reporting, monitoring, and testing procedures that the applicant plans to use to demonstrate reductions;**

   Chevron will leverage annual barge and tug boat emissions calculations, as well the emissions control rates for shore power and stack capture. Stack capture emissions control information will be obtained from the vendor, while shore power emissions controls will assume 100% control in most cases. The emissions will be reported to CARB on an annual basis as required by **Section 93130.17(d)(1)** of the At-Berth Regulation. See **Appendix A14.2 Data Management System (to be provided)** for more details.

5. **A Memorandum of Understanding or similar agreement between the applicant, any funding partners (if more than one entity is providing funding), owners and operators of**

controlled equipment for the innovative concept that shows agreement regarding the innovative concept's scope and requirements for using the innovative concept in compliance with this Control Measure. The Memorandum of Understanding or similar agreement must be approved by the Executive Officer and must be in place prior to the start date of the innovative concept compliance period;

Chevron will address compliance on vessels, included in scope of this Innovative Concept, through Charter Party agreements with vessel owners at the time of vessel fixture.

6. Proposed length of time during which the IC project would be used

Subject to CARB approval, this IC project would be capable of implementation as early as 2027 should shore power become available. Chevron proposes to implement this IC project through and including the first compliance period (2027-2032), and to continue implementation through subsequent compliance periods, subject to CARB approval of one or more extensions. Chevron understands that an IC project may not be extended beyond any compliance period during which the project becomes legally required by law or regulation.

7. A summary of all governmental approvals necessary to enable development of the innovative concept;

We have not developed a detailed project scope at this stage, however, if permanent infrastructure is required at Richmond Long Wharf that includes new pile-supported foundations or fender system, then those piles would need to be permitted through the San Francisco Bay resource agencies.

Chevron will need CARB approval as an IC project under the At-Berth Regulation, and approvals may also be required from the following agencies depending on the project details:

1) California State Lands Commission
2) San Francisco Bay Conservation and Development (BCDC)
3) US Army Corps of Engineers (Section 404/Section 10)
4) California Regional Water Quality Control Board (Section 401/WDRs)
5) California Department of Fish and Wildlife
6) National Marine Fisheries Service
7) City of Richmond (building permits)

8. A discussion regarding any environmental review requirements that may apply to the proposed innovative concept, including identification of which agency would serve as the lead agency for environmental review purposes; and

Depending upon the scope of new infrastructure required, for example, if piles must be driven into San Francisco Bay to support equipment or new fenders, then CEQA is required. If CEQA is required it is likely that the lead agency would be California State Lands Commission, similar to building tanker shore power or a fender system for barge-based capture and control.

9. The proposed innovative concept must reduce NOx, PM 2.5, and ROG emissions equivalent to or greater than the level that would have been achieved by the Control Measure, while not increasing GHG. Emission reductions are verified each year through annual reporting in section 93130.17(d) of this Control Measure.

Controlling the barge and tug boat emissions is expected to lower NOx, PM2.5 and ROG emissions without increasing GHG emissions. Chevron will collect all necessary data to verify emissions reductions on a yearly basis as required by **Section 93130.17(d)**. See Section 2, **Table 2-2** for more details on how this project helps shape the Innovative Concept compliance option within the At-Berth Regulation. Collectively, as shown in **Figures ES-2 to ES-9,** the portfolio of ICs submitted by Chevron will reduce NOx, PM2.5 and ROG to levels greater than achieved by the control measure.

10. The proposed innovative concept must achieve emissions reductions of NOx, PM 2.5, and ROG that, as of the date the compliance period begins, are early or in excess of: (1) any other state, federal or international rule, regulation, statute, or any other legal requirement (including any requirement under a Memorandum of Understanding with a government entity), that is in effect, has been approved, or has been noticed; or (2) of an emission reduction strategy identified in an AB 617 Community Emissions Reduction Program that has been approved by CARB's Governing Board.

There is currently no statute, regulation or other legal requirement to control barge and tug boat emissions as proposed in this IC project. While CARB is updating the emissions regulation that applies to barges and tug boats (Proposed Amendments to Commercial Harbor Craft Regulation), this IC accounts for the emissions reductions that would be achieved as part of the modified CARB regulation. This IC project is in excess of the emissions reductions that will be achieved as part of the Commercial Harbor Craft Regulation.

11. The proposed innovative concept must achieve reductions in and around the California port or marine terminal at which the vessel visits take place for which the innovative concept is used. The reductions must be at the same port or marine terminal, within adjacent communities, or overwater within three nautical miles of the port or marine terminal.

The barge and tug boat emissions will be controlled at the Richmond Long Wharf.

12. The proposed innovative concept must achieve emissions reductions that exceed any reductions otherwise required by law, regulation, or legally binding mandate, and that exceed any reductions that would otherwise occur in a conservative business-as-usual scenario. For purposes of this section, "business as usual" means the set of conditions reasonably expected to occur within the relevant area in the absence of the incentive provided by the innovative concept provisions of this Control Measure, taking into account all current laws and regulations, as well as current economic and technological trends. The proposed innovative concept must achieve reductions that are real, quantifiable, verifiable, and enforceable where: (A) "Real" means that reductions result from a demonstrable action or set of actions, and are quantified using appropriate, accurate, and conservative methodologies that account for all emissions within the innovative concept; (B) "Quantifiable" means the ability to accurately measure and calculate reductions relative to a project baseline in a reliable and replicable manner for all emissions within the innovative concept; (C) "Verifiable" means that any emission assertions are well documented and transparent such that it lends itself to an objective review; and (D) "Enforceable" means the authority for CARB to hold a particular party or parties liable and to take appropriate action if any of the provisions of this article are violated.

As noted above, the project is not legally required. It also is not expected to occur under a "business as usual" scenario. Under a business as usual scenario in light of current technological and economic trends and incentives, it is likely that the that barge and tug boat emissions would not be controlled via shore power or stack capture and control. Accordingly, this IC project is being proposed specifically as a means to achieve compliance with the At-Berth Regulation, and in fact reflects one of the specific examples provided by CARB staff of a potential IC project under the Regulation.

The barge and tug boat reductions will be real, quantifiable, verifiable and enforceable: A) Real: Vendor provided emissions control rates, and estimated barge and tug boat emissions will be the basis for certifying that the emissions reductions are real. B) Quantifiable: Emissions rates will be based on vendor emissions certifications for stack capture and 100% control for shore power. C) Verifiable: The EPA/CARB certifications and estimated barge and tug boat emissions will be available for audit. D) Enforceable: CARB will be able to pursue enforcement if the requisite emissions reductions are not achieved to comply with the At-Berth Regulation and/or if there is a violation of other requirements (e.g., reporting/recordkeeping) under the Regulation.

4. Recordkeeping, Reporting, Monitoring, and Testing Procedures

Annual Report

Each IC will be reported to CARB annually in a report identical to the Appendix A#.2 Emissions Calculation Spreadsheets provided in Appendix A of the IC Application. The Emissions Calculation Spreadsheets are the same that Chevron will use to tabulate annual emissions, and annual emission reductions as a result of the Innovative Concept.

Calculations and Annual Report Templates for each IC are shown in the Appendices as listed below.

- For Refinery ICs (non-CEQA) - Please see Appendices A1.2, A3.2, A6.2, A7.2
- For Shipping ICs (non-CEQA) - Please see Appendices A10.2, A11.2, A12.2, A13.2

Chevron proposes the Annual Report will be submitted with the following content, supported by the Appendix A. Emissions Calculation Spreadsheet presented for each IC.

1. Format: One .xls workbook per IC with tabs
    - i. ICs - All individual .xls workbooks.
        1. Baseline Actuals
        2. IC Annual Actual: How the IC performed in the year.
    - ii. Ship Calls/Activity
        1. Annual Shipping Emissions (using CARB EFs)
            - a) Vessel data
            - b) NOx, PM, ROG Emissions
            - c) Applied IC credits and sources.
    - iii. Net IC credit annual accounting
        1. IC Credits generated (NOx, PM, ROG)
        2. IC Credits carry over (banked, + prior year)
        3. IC credits used (annually)
        4. IC credits expired (> 2 years old)
        5. IC Credits remaining
            - 1) Pre-2027
            - 2) Prior year
            - 3) Current year

Chevron acknowledges and understands that records and reports required in 93103.17(a)(13) shall be retained for a period of not less than five years and shall be submitted to the Executive Officer in the manner specified in the approved innovative concept and upon request by the Executive Officer, either within 10 calendar days or by a later date approved the by Executive Officer on a case-by-case base.

Appendix A – Innovative Concepts Supporting Documents

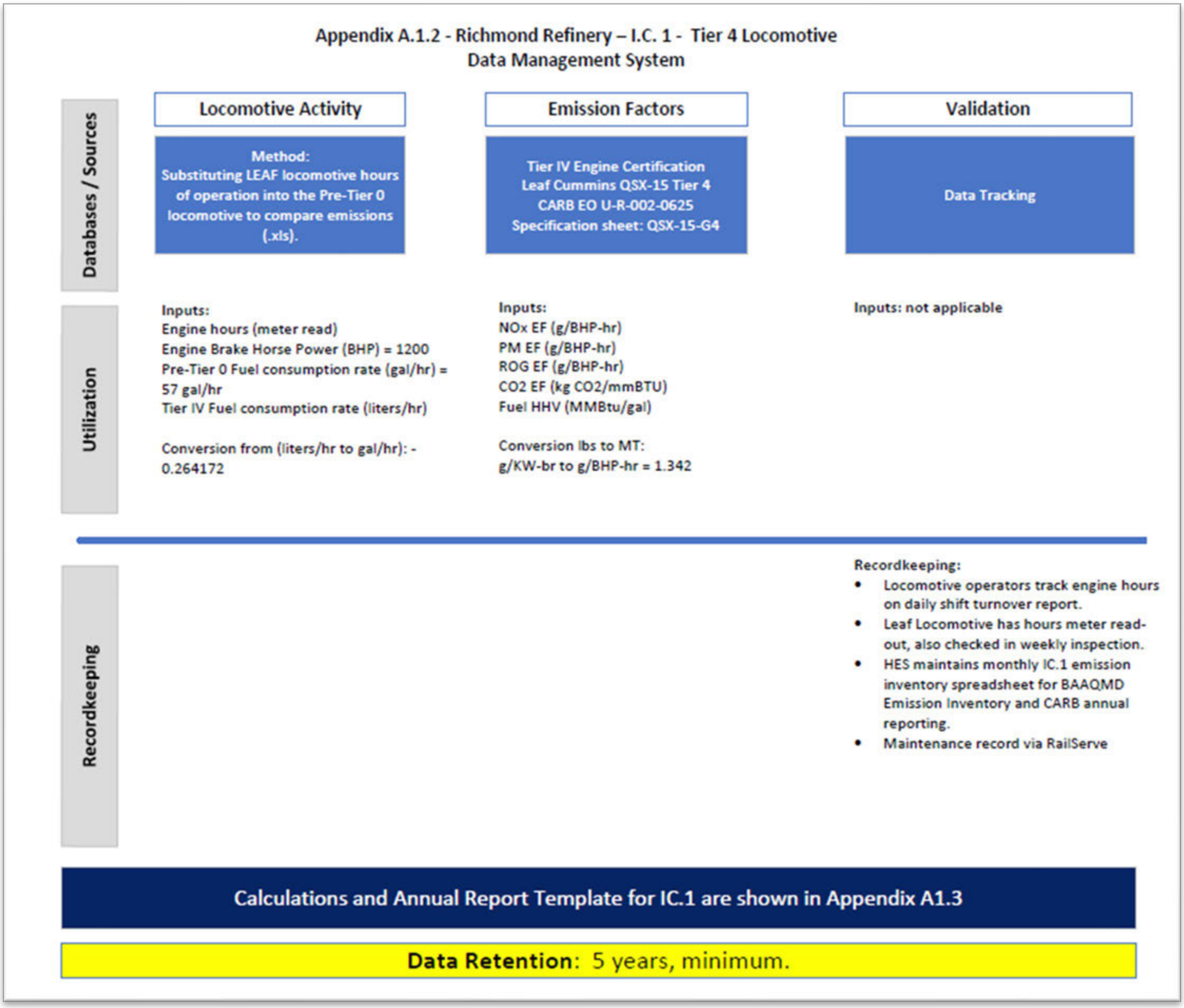
Appendix	IC Project ID	IC Project Name
A1	IC.1	New Locomotive (Tier 4)
A2	IC.2	Boiler Replacement Project
A3	IC.3	Diesel Air Compressors Replacement Project
A4	IC.4	FCC Ammonia Optimization
A5	IC.5	Wharf ERD Upgrade
A6	IC.6	TKN Heater Optimization
A7	IC.7	North Yard Diesel Generators Project
A8	IC.8	Solar Electricity Project – General
A9	IC.9	Solar Electricity Project – Shore Power
A10	IC.10	Tier II or above certification for Auxiliary Engines
A11	IC.11	Tier III or above certification for Auxiliary Engines
A12	IC.12	Upgraded Combustion and Control Systems for Auxiliary Boilers
A13	IC.13	Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)
A14	IC.14	Shore Power or Stack Capture for Barges and Tug Boats

Appendix A1: IC.1 New Lower-Emitting Locomotive

A1.1 – Map
A1.2 – Data Management System
A1.3 – Emission Calculation Spreadsheet
A1.4 – Public Copy of Contract

Appendix A1.1: Map - IC.1 New Lower Emitting Locomotive

Appendix A1.2: IC.1 New Lower-Emitting Locomotive Data Management System



Appendix A1.3: IC.1 New Lower-Emitting Locomotive Emissions Calculation Spreadsheet

Appendix A1.3 Emissions Calculation Spreadsheet

Chevron Richmond, *IC.1 Diesel Locomotive Replacement Calculations*

Boiler Project CO2e Emission Reductions

LEAF Locomotive Usage (hours)	2,397	Note: Hours 4/9/22 to 3/1/2023, +1 month Avg. use

Emissions, EMD 12-645E Locomotive							
NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
50,043,665	1,265,472	2,904,833					grams/yr
110,228	2,790	6,404					lbs/yr
50.00	1.27	2.90	1,404.43	1,399.72	0.06	0.01	mTon/yr

Emissions, LEAF Tier 4 Locomotive							
NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
858,220	42,911	407,655					grams/yr
1,890	95	899					lbs/yr
0.86	0.04	0.41	936.29	933.14	0.04	0.01	mTon/yr

	NOx	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**
Annual IC Emissions Reductions	**49.14**	**1.22**	**2.50**	**468.14**	**466.57**	**0.02**	**0.004**	**mTon/yr**
20-Year Life Total reduction	**982.83**	**24.45**	**49.94**	**9,362.85**	**9,331.44**	**0.38**	**0.08**	**mTon**

Appendix A1.3 Emissions Calculation Spreadsheet (continued)
Chevron Richmond, *IC.1 Diesel Locomotive Replacement Calculations*

Updated w/use data 3-2023, GHG data 4-2023

Engine	NOx (g/BHP-hr)	PM (g/BHP-hr)	ROG (HC) (g/BHP-hr)	Engine Horsepower (BHP)	Fuel Consumption Rate (gal/hr)	Source
	Emissions Factors					
Existing pre-1973 EMD 12-645E Pre-Tier 0	17.40	0.44	1.01	1,200	57	EPA guidance 40 CFR 1033, Emission Factors for Locomotives, Table 2-Switch Engines, pre-Tier 0 locomotives, https //nepis.epa.gov/Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF
LEAF Cummins QSX-15 Tier 4	0.298	0.015	0.142	1,200	38.1	CARB certificate Executive order U-R-002-0625, Cummins QSX-15 T4, converted g/KW-hr to g/BHP-hr by dividing by 1.342

Legend

Colour	Meaning
Yellow	Input
Pink	Output (Nox, PM, ROG)
Orange	Output (GHG)

Emission Reduction Calculations

LEAF Locomotive Usage (hours)	2,397	Note Hours 4/9/22 to 3/1/2023, +1 month Avg. use

	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
Emissions, EMD 12-645E Locomotive								
	50,043,665	1,265,472	2,904,833					grams/yr
	110,228	2,790	6 404					lbs/yr
	50.00	1.27	2.90	1404.43	1399.72	0.06	0.01	mTon/yr
Emissions, LEAF Tier 4 Locomotive								
	858,220	42,911	407,655					grams/yr
	1,890	94.6	898.7					lbs/yr
	0.86	0.04	0.41	936.29	933.14	0.04	0.01	mTon/yr
Annual Reduction	49.14	1.22	2.50	468.14	466.57	0.02	0.004	mTon/yr
20-Year Life Total reduction	982.83	24.45	49.94	9,362.85	9,331.44	0.38	0.08	mTon

April 2022

LEAF Locomotive Usage (hours)	105	Pre-Tier 0 Fuel Usage (Gallons)	6,008	LEAF Fuel Usage (Gallons)	4,005

	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
Emissions, EMD 12-645E Locomotive								
	2,192,400	55,440	127,260					grams/yr
	4,829	122	281					lbs/yr
	2.19	0.06	0.13	61.53	61.32	0.0025	0.0005	mTon/yr
Emissions, LEAF Tier 4 Locomotive								
	37 598	1 880	17 859					grams/yr
	83	4.1	39.4					lbs/yr
	0.04	0.00	0.02	4 .02	40.88	0.0017	0.0003	mTon/yr
Reduction	2.15	0.05	0.11	20.51	20.44	0.0008	0.0002	mTon/yr

May 2022

LEAF Locomotive Usage (hours)	280	Pre-Tier 0 Fuel Usage (Gallons)	16,022	LEAF Fuel Usage (Gallons)	10,681

Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
Emissions, EMD 12-645E Locomotive							
grams/yr	5,846,400	147,840	339,360				
lbs/yr	12,878	326	748				
mTon/yr	5.84	0.15	0.34	164.07	163.52	0.0066	0.0013
Emissions, LEAF Tier 4 Locomotive							
grams/yr	100,262	5,013	47,625				
lbs/yr	221	11.1	105.0				
mTon/yr	0.10	0.01	0.05	109.38	109.02	0.0044	0.0009
Reduction mTon/yr	5.74	0.14	0.29	54.69	54.51	0.0022	0.0004

Notes:
Commercial Transportation Manager - Richmond Refinery responsible for all rail transport and manages the locomotive usage hours - meter read outs

IC.1 Locomotive - Inputs and Calculation Methodology for NOx, PM, and ROG

$$Emissions = EF \times Engine\ Horsepower \times LEAF\ Locomotive\ Usage$$

grams   g/BHP-hr   BHP   hr

Emissions = mass emissions for NOx, PM, or ROG (metric tons)
EF = Emission Factor for NOx, PM, or ROG (g/BHP-hr)
Engine Horsepower = BHP
Leaf Locomotive Usage = hours

IC.1 Locomotive - Inputs and Calculation Methodology for GHG Emissions (CO2, CH4, N2O)

$$GHG = 1 \times 10-3 \times Fuel \times HHV \times EF$$

mTon   mTon/kg   gallons   mmBtu/gallon   kg CO2/mmBtu

GHG = mass emissions for CO2, CH4, or N2O (metric tons)
Fuel = Volume of the fuel combusted (gallons)
HHV = Default high heat value of the fuel from 40 CFR Appendix Table C-1 to Subpart C of Part 98
EF = Fuel-specific default emission factor (for CO2, CH4, of N2O), from 40 CFR Appendix Table C-1/C-2 to Subpart C of Part 98 (kg/mmBtu)

Source 40 CFR Part 98 Subpart Chttps //www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C

$$CO_2 = 1x10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-1)}$$

CO2 = Annual CO2 mass emissions for the specific fuel type (metric tons)
Fuel = Volume in gallons for liquid fuel
HHV = Default high heat value of the fuel, from Table C-1 of this subpart (mmBtu per mass or mmBtu per volume, as applicable)
EF = Fuel-specific default CO2 emission factor, from Table C-1 of this subpart (kg CO2/mmBtu)
1 × 10-3 = Conversion factor from kilograms to metric tons

Default CO2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO2 emission factor
Coal and coke	mmBtu/short ton	kg CO2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO2/mmBtu
(Weighted U.S. Average)	1.026 × 10[illegible]	53.06
Petroleum products-liquid	mmBtu/gallon	kg CO2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96

$$CH_4\ or\ N_2O = 1x10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-8)}$$

CH4 or N2O = Annual CH4 or N2O emissions from the combustion of a particular type of fuel (metric tons)
Fuel = Mass or volume of the fuel combusted, either from company records or directly measured by a fuel flow meter, as applicable (mass or volume per year)
HHV = Default high heat value of the fuel from Table C-1 of this subpart
EF = Fuel-specific default emission factor for CH4 or N2O, from Table C-2 of this subpart (kg CH4 or N2O per mmBtu)
1 x 10-3 = Conversion factor from kilograms to metric tons

Table C-2 to Subpart C of Part 98 Default CH_4 and N_2O Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1 × 10[illegible]	1.6 × 10[illegible]
Natural Gas	1.0 × 10[illegible]	1.0 × 10[illegible]
Petroleum Products (All fuel types in Table C-1)	3.0 × 10[illegible]	6.0 × 10[illegible]
Fuel Gas	3.0 × 10[illegible]	6.0 × 10[illegible]
Other Fuels-Solid	3.2 × 10[illegible]	4.2 × 10[illegible]
Blast Furnace Gas	2.2 × 10[illegible]	1.0 × 10[illegible]
Coke Oven Gas	4.8 × 10[illegible]	1.0 × 10[illegible]
Biomass Fuels-Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2 × 10[illegible]	4.2 × 10[illegible]
Wood and wood residuals	7.2 × 10[illegible]	3.6 × 10[illegible]
Biomass Fuels-Gaseous (All fuel types in Table C-1)	3.2 × 10[illegible]	6.3 × 10[illegible]
Biomass Fuels-Liquid (All fuel types in Table C-1)	1.1 × 10[illegible]	1.1 × 10[illegible]

	June 2022						
	LEAF Locomotive Usage (hours)	205	Pre-Tier 0 Fuel Usage (Gallons)	11,730	LEAF Fuel Usage (Gallons)	7,820	
	Emissions, EMD 12-645E Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	4,280,400	108,240	248,460				
lbs/yr	9,428	239	548				
mTon/yr	4.28	0.11	0.25	120.13	119.72	0.0049	0.0010
	Emissions, LEAF Tier 4 Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	73 406	3 670	34 868				
lbs/yr	162	8.1	76.9				
mTon/yr	0.07	0.00	0.03	80.08	79.81	0.0032	0.0006
Units	**NOx**	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**
mTon/yr	4.20	0.10	0.21	40.04	39.91	0.0016	0.0003

	July 2022						
	LEAF Locomotive Usage (hours)	73	Pre-Tier 0 Fuel Usage (Gallons)	4,177	LEAF Fuel Usage (Gallons)	2,785	
	Emissions, EMD 12-645E Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	1,524,240	38,544	88,476				
lbs/yr	3,357	85	195				
mTon/yr	1.52	0.04	0.09	42.78	42.63	0.0017	0.0003
	Emissions, LEAF Tier 4 Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	26 140	1 307	12 416				
lbs/yr	58	2.9	27.4				
mTon/yr	0.03	0.00	0.01	28.52	28.42	0.0012	0.0002
Units	**NOx**	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**
mTon/yr	1.50	0.04	0.08	14.26	14.21	0.0006	0.0001

	August 2022						
	LEAF Locomotive Usage (hours)	279	Pre-Tier 0 Fuel Usage (Gallons)	15,964	LEAF Fuel Usage (Gallons)	10,643	
	Emissions, EMD 12-645E Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	5,825,520	147,312	338,148				
lbs/yr	12,832	325	745				
mTon/yr	5.82	0.15	0.34	163.49	162.94	0.0066	0.0013
	Emissions, LEAF Tier 4 Locomotive						
Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O
grams/yr	99 904	4 995	47 455				
lbs/yr	220	11.0	104.6				
mTon/yr	0.10	0.00	0.05	108.99	108.63	0.0044	0.0009
Units	**NOx**	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**
mTon/yr	5.72	0.14	0.29	54.50	54.31	0.0022	0.0004

	LEAF Locomotive Usage (hours)	208
Units	NOx	PM
grams/yr	4,343,040	109,824
lbs/yr	9,566	242
mTon/yr	4.34	0.11
Units	NOx	PM
grams/yr	74 481	3 724
lbs/yr	164	8.2
mTon/yr	0.07	0.00
Units	**NOx**	**PM**
mTon/yr	4.26	0.11

Appendix A1.3

September 2022

Pre-Tier 0 Fuel Usage (Gallons)	11,902	LEAF Fuel Usage (Gallons)	7,934

Emissions, EMD 12-645E Locomotive

ROG	CO2e	CO2	CH4	N2O	Units
252,096					grams/yr
556					lbs/yr
0.25	121.88	121.47	0.0049	0.0010	mTon/yr

Emissions, LEAF Tier 4 Locomotive

ROG	CO2e	CO2	CH4	N2O	Units
35 378					grams/yr
78.0					lbs/yr
0.04	81.26	80.98	0.0033	0.0007	mTon/yr

ROG	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**
0.22	40.63	40.49	0.0016	0.0003	mTon/yr

October 2022

LEAF Locomotive Usage (hours)	254	Pre-Tier 0 Fuel Usage (Gallons)	14,534	LEAF Fuel Usage (Gallons)	9,689

Emissions, EMD 12-645E Locomotive

NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
5,303,520	134,112	307,848					grams/yr
11,682	296	679					lbs/yr
5.30	0.13	0.31	148.84	148.34	0.0060	0.0012	mTon/yr

Emissions, LEAF Tier 4 Locomotive

NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
90 952	4 548	43 202					grams/yr
200	10.0	95.2					lbs/yr
0.09	0.00	0.04	99.23	98.89	0.0040	0.0008	mTon/yr

NOx	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**
5.21	0.13	0.26	49.61	49.45	0.0020	0.0004	mTon/yr

November 2022

LEAF Locomotive Usage (hours)	265	Pre-Tier 0 Fuel Usage (Gallons)	15,163	LEAF Fuel Usage (Gallons)	10,109

Emissions, EMD 12-645E Locomotive

NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
5,533,200	139,920	321,180					grams/yr
12,188	308	708					lbs/yr
5.53	0.14	0.32	155.28	154.76	0.0063	0.0013	mTon/yr

Emissions, LEAF Tier 4 Locomotive

NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
94 891	4 745	45 073					grams/yr
209	10.5	99.4					lbs/yr
0.09	0.00	0.05	103.52	103.18	0.0042	0.0008	mTon/yr

NOx	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**
5.43	0.14	0.28	51.76	51.59	0.0021	0.0004	mTon/yr

December 2022

LEAF Locomotive Usage (hours)	199	Pre-Tier 0 Fuel Usage (Gallons)	11,387	LEAF Fuel Usage (Gallons)	7,591

Emissions, EMD 12-645E Locomotive

NOx	PM	ROG	CO2e	CO2	CH4
4,155,120	105,072	241,188			
9,152	232	532			
4.15	0.11	0.24	116.61	116.22	0.0047

Emissions, LEAF Tier 4 Locomotive

NOx	PM	ROG	CO2e	CO2	CH4
71 258	3 563	33 848			
157	7.9	74.6			
0.07	0.00	0.03	77.74	77.48	0.0031

NOx	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**
4.08	0.10	0.21	38.87	38.74	0.0016

		January 2023								**February 2023**							
		LEAF Locomotive Usage (hours)	89	Pre-Tier 0 Fuel Usage (Gallons)	5,093	LEAF Fuel Usage (Gallons)	3,395			LEAF Locomotive Usage (hours)	240	Pre-Tier 0 Fuel Usage (Gallons)	13,733	LEAF Fuel Usage (Gallons)	9,155		
		Emissions, EMD 12-645E Locomotive								Emissions, EMD 12-645E Locomotive							
N2O	Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
	grams/yr	1,858,320	46,992	107,868					grams/yr	5,011,200	126,720	290,880					grams/yr
	lbs/yr	4,093	104	238					lbs/yr	11,038	279	641					lbs/yr
0.0009	mTon/yr	1.86	0.05	0.11	52.15	51.98	0.0021	0.0004	mTon/yr	5.01	0.13	0.29	140.63	140.16	0.0057	0.0011	mTon/yr
		Emissions, LEAF Tier 4 Locomotive								Emissions, LEAF Tier 4 Locomotive							
N2O	Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Units
	grams/yr	31 869	1 593	15 138					grams/yr	85 939	4 297	40 821					grams/yr
	lbs/yr	70	3.5	33.4					lbs/yr	189	9.5	90.0					lbs/yr
0.0006	mTon/yr	0.03	0.00	0.02	34.77	34.65	0.0014	0.0003	mTon/yr	0.09	0.00	0.04	93.76	93.44	0.0038	0.0008	mTon/yr
N2O	**Units**	**NOx**	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**	**NOx**	**PM**	**ROG**	**CO2e**	**CO2**	**CH4**	**N2O**	**Units**
0.0003	mTon/yr	1.82	0.05	0.09	17.38	17.33	0.0007	0.0001	mTon/yr	4.92	0.12	0.25	46.88	46.72	0.0019	0.0004	mTon/yr

Appendix A1.4: IC.1 New Lower-Emitting Locomotive Contract – Public Copy

AMENDMENT NO. 1
TO MASTER PRODUCTS AND SERVICES CONTRACT [redacted]

This **Amendment No. 1** ("**Amendment**") effective as of 01 February 2022 (the "**Amendment Effective Date**") is made by and between **CHEVRON USA, INC.**, a Pensylvannia corporation, ("**Company**" or "Chevron"), and **RAILSERVE, INC.**, a Delaware Corporation ("**Supplier**") (each a "**Party**" and collectively the "**Parties**").

RECITALS

[redacted]

[redacted]

a. Supplier agrees to replace one (1) conventional locomotive with one (1) Single Railserve LEAF™ (love emission and fuel) locomotive RSSX 1003 at Company's facility located in Richmond, California;

b. Extend the Term of the Contract for a new five (5) -year term starting on the Amendment Effective Date.

[redacted]

[redacted]

[redacted]

Parties agree to amend the Contract Term by extending it through 31 January 2027 representing a new 5-year term from the date the new LEAF™ locomotive RSSX 1003 is put in service ("**In-Service Date**") at Richmond facility (tentatively scheduled for 01 February 2022 or before).

[redacted]

1

[redacted]

2

[redacted]

[redacted]

[redacted]

- [redacted]

  [redacted]

- [redacted]

  [redacted]

[redacted]

[redacted]

3

Appendix A2: IC.2 - Boiler Replacement Project

A2.1 – Map
A2.2 - Data Management System (TBD)
A2.3 – Emissions Calculation Spreadsheet

Appendix A2.1: Map - IC.2 Boiler Replacement Project

Appendix A2.2: IC.2 Boiler Replacement Project Data Management System (To Be Provided Later)

Appendix A2.3: IC.2 Boiler Replacement Project Emissions Calculation Spreadsheet

Appendix A2.3 Emissions Calculation Spreadsheet

Chevron Richmond, IC.2 *Boiler Replacement Calculations*

Parameter	NOx	PM	ROG	CO2e	Units	Data Source
Existing Boilers Emissions	67.69	0.00	.80	319 1 1	mTon/yr	CO2e BAAQMD 12-15 Emiss ons In entory RY2022 V701 Fuel gas drum workbook 'Criteria GHG Summary' tal
New Boilers P jected Emissions	.5	0.00	3.23	271 365	mTon/yr	CVX Permitting team Bo ler project calcula ions.
Total IC Emission Reductions	**63.15**	**0.00**	**1.57**	**47 776**	**mTon/yr**	

Basic emissions calculation formula Emiss ons factor*Fuel characteristic (HHV)*Acti ity data (flow bbls loaded) see 12-15 PREEG

RY2022 12-15 EI Data

Source Number	Description	NOx (lb/yr)	ROG (lb/yr)	CO2e (MT/yr)
S- 129	1 Boiler	26360.39	1880. 1	57 59
S- 131	3 Boiler	30067. 8	213 .01	6 277
S- 132	Boiler	30255.30	21 9.72	6 616
S- 133	5 Boiler	2 509.61	17 8.26	52 702
S- 135	7 Boiler	38031.29	267 .28	80 086

NOx (MT/yr)	ROG (MT/yr)	CO2e (MT/yr)
67.69	80	319 1 1

Parameter	Value	Un ts	Source
2018-2020 A g. V701 Bo ler Fuel Consumption	11.1	MMscf/yr	A erage of 2018-2020 from 5/21/21 application submittal spreadsheet
Projected A g. Fuel Consumption	3750.8	MMscf/yr	Calculated based on efficiency changes in 2/1/21 e-mail from Robert Tsai
% Reduction Fuel Consumption	-1 .97%		

Notes
Emissions Calculation methodology from BAAQMD Reg 12-15 Petroleum Refinery Emissions In entory Guidel nes
Fuel Gas Flowrate calcula ion methodology EEPPR Equation -3 (Emissions Estimation Protocol for Petroleum Refineries)

IC.2 Boiler Replacement - Inputs and Calculation Methodology for NOx

$$NOx\ \text{Emissions} = Exhaust\ Volumetric\ Flow\ Rate \times \text{NOx Concentration} \times \frac{MW_{NO2}}{379.48\frac{ft3}{lb-mol}\ \frac{lb/lb-mol}{\frac{scf}{lb-mol}}}$$

lb/hr dscf/hr ppm

$$Exhaust\ Volumetric\ Flow\ Rate = Fd \times HHV \times \text{Fuel Gas Flowrate} \times \frac{20.95}{20.95-\%O2}$$

dscf/hr dscf/MMBtu Btu/scf MMdscf/hr

NOx Emissions mass emissions for NOx (pounds)
NOx Concentration ppm of NOx from CEMS
MW_{NO2} 46.01 lb/lb-mol constant
$379.48\frac{scf}{lb-mol}$ conversion factor for ideal gases (scf/lb-mol) at 60 F and 1 atm

Exhaust Volumetric Flow Rate dscf/hr
Fd Emission factor (dscf/MMbtu) from EPA Method 19
HHV Btu/scf from fuel characteristics
Fuel Gas Flowrate MMdscf/hr from CEMS
%O2 percent O2 from CEMS

IC.2 Boiler Replacement - Inputs and Calculation Methodology for ROG

$$ROG\ Emissions = Fuel\ Gas\ Flowrate \times \text{HHV} \times Annual\ Exhaust\ Volumetric\ Flow\ Rate$$

lb/hr MMdscf/hr Btu/scf lb/MMBtu

Fuel Gas Flowrate MMdscf/hr from CEMS
HHV Btu/scf from fuel characteristics
Annual Exhaust Volumetric Flow Rate rate in lb/MMBTU from source test

C.2 Boiler Replacement - Inputs and Calculation Methodology for GHG

$$\text{GHG Emissions} = \frac{Annual\ Fuel\ Flow}{Boiler\ Fuel\ Sum} \times GHG\ EmissionsRFG_{V\_701}$$

GHG Emissions MT/year/fuel gas drum for CO2, CH4, N20
Annual Fuel Flow rate in lb/MMBTU from source test
Boiler Fuel Sum rate in lb/MMBTU for all Boilers
GHG $EmissionsRFG_{V\_701}$ in MT/yr per AB32 certification report; RFG V-701 minus Cogen per RY 2022 GHG Emissions

CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

			Fuel Flow Rate	NOX	VOC	CO2	CH4	N2O	CO2e	
Source Name:	1 Boiler			CEMS	Source Test	MRR	MRR	MRR	MRR	Notes/Source:
Source Descr./Location:	Steam Boiler #1 #1PP	Annual Exhaust Volumetric Flow (Source)	13,320	CEMS	0.0018	67,207.02	3.04	0.60739	17459.1	Rate (lb/MMBTU or GHG MT/yr/Drum)
BAAQMD Source #:	S-4129	Annual Fuel Flow (Source)	927.74	26,360	1,880					Annual (lb/yr)
Source Type:	Boiler	Annual Fuel Flow (Sum Indiv Sources)	0.00	13.18	0.9					Annual (ton/yr)
Abatement:	None	Annual Fuel Flow (GHG Drum Meter)	0.00			0	0	0	0	Annual (MT/yr)

Time Period	Category: Time Period	Fuel Data: Fd	HHV	O2 w/ sub	NOX w/ sub	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	Calculated: NOX	VOC
	Notes/Source	Calculated	Calorimeter	CEMS	CEMS	EEPPR Equation (20.95-O2%)	Flow Rate	EEPPR Equation dry basis, convert to lb	Source Test
Date	Hourly	(dscf/MMBtu)	(Btu/scf)	(%)	(ppm)	(dscf/hr)	(MMdscf/hr)	(lb/hr)	(lb/hr)
1/1/2022	1/1/2022 0:00	8,481	1,144	1.71	15.10	2,036,960	0.15	3.79	0.31
1/1/2022	1/1/2022 1:00	8,481	1,146	1.69	15.39	2,036,460	0.15	3.80	0.31
1/1/2022	1/1/2022 2:00	8,481	1,146	1.71	15.40	2,038,528	0.15	3.81	0.31

Legend	
(yellow)	Input
(pink)	Output (Nox, PM, ROG)
(orange)	Output (GHG)

List of PI tags

1 Boiler	O2	90AI1 7	PCT
1 Boiler	NOX	90AI1 8	PPM
3 Boiler	O2	90AI3 7	PCT
3 Boiler	NOX	90AI3 8	PPM
Boiler	O2	90AI 7	PCT
Boiler	NOX	90AI 8	PPM
5 Boiler	O2	90AI5 7	PCT
5 Boiler	NOX	90AI5 8	PPM
7 Boiler	O2	90AI7 7	PCT
7 Boiler	NOX	90AI7 8	PPM

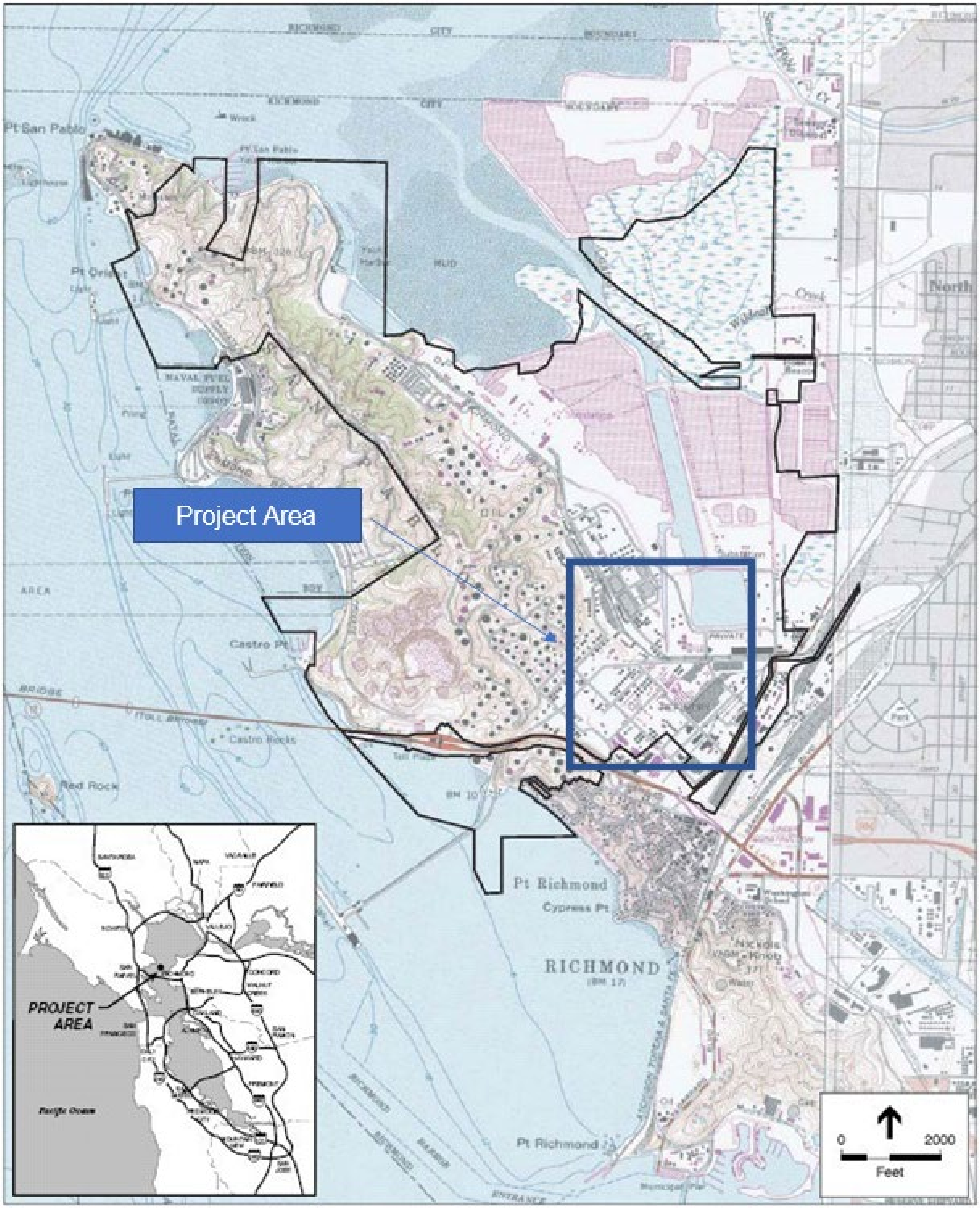
Fuel Gas Flowrate

1 Boiler	90FI120	MMSCFD
3 Boiler	90FI320	MMSCFD
Boiler	90FI 20	MMSCFD
5 Boiler	90FI520	MMSCFD
7 Boiler	90FI720	MMSCFD

Appendix A3: IC.3 - Diesel Air Compressors Replacement

A3.1 – Map
A3.2 - Data Management System
A3.3 – Emission Calculation Spreadsheet
A3.4 – Useful Life

Appendix A3.1: Map - IC.3 Diesel Air Compressor Replacement

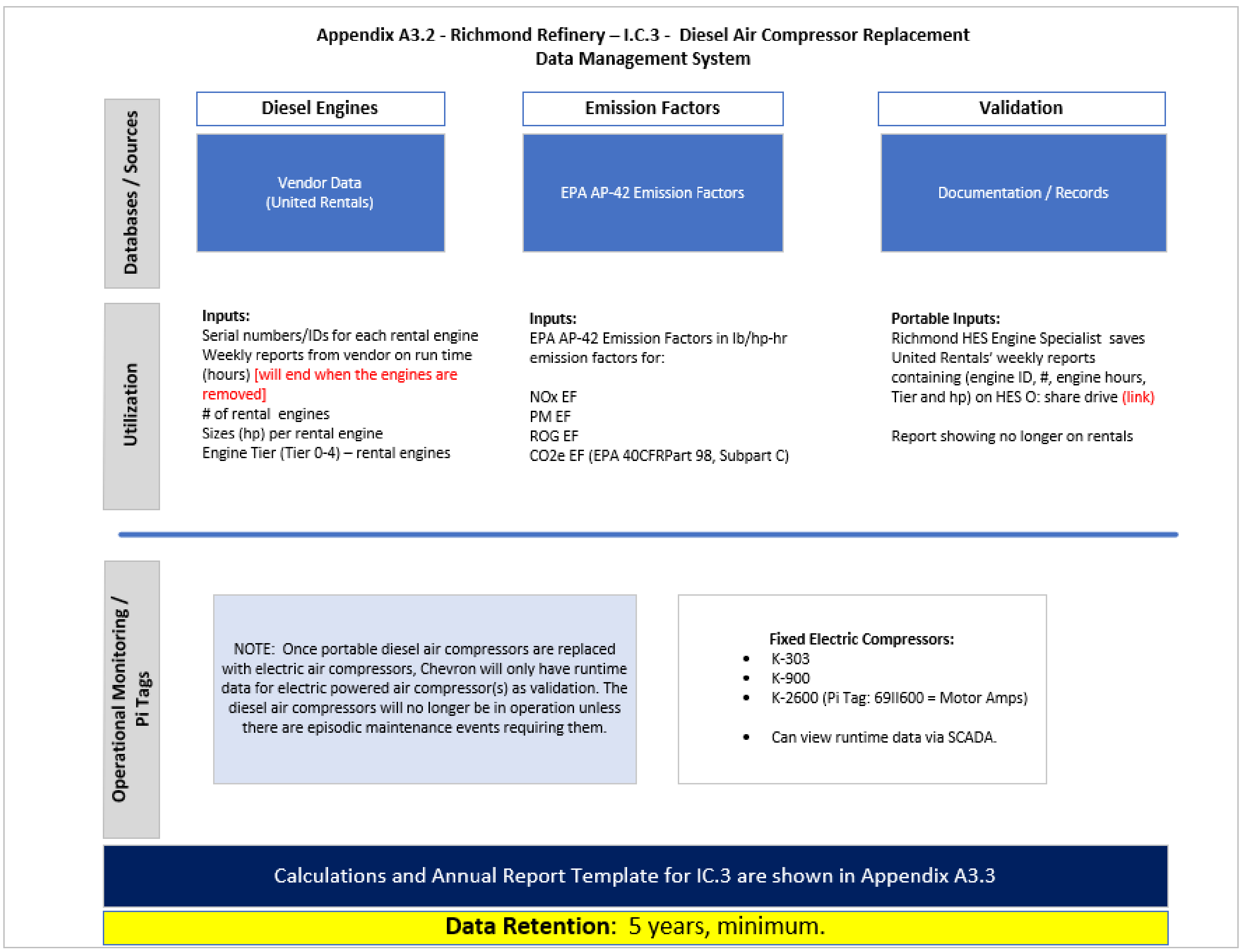


Refinery Boundary

Appendix A3.2: - IC.3 Diesel Air Compressor Replacement Data Management System

To establish the baseline emissions from the diesel air compressors prior to electrification, Chevron used weekly runtime reports from United Rentals (portable generator owner) which report weekly engine run-time hours. EPA AP-42 NOX, PM, ROG emission factors are used for the diesel compressor engines and EPA 40CFR Part 98 Subpart C emission factors for CO_2e. Source test data provides the PM emission factor as inputs for the baseline calculations.

Following removal of the diesel air compressors due to installation of electrical compressors throughout the Refinery, there will no longer be diesel air compressors on site, and United Rentals will not show the compressors on its rental log to Chevron. Consequently, Chevron proposes to provide a post-project report documenting the electrical supply has been commissioned and generators are removed as data validation for the project.



Appendix A3.3: IC.3 - Diesel Air Compressors Replacement Emissions Calculation Workbook

Appendix A3.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.3 *Diesel Air Compressor Calculations*

Rental Compressors	EngineTier	EngineHorsepower	Hours/yr	NOx	PM	ROG	CO2e	CO2	CH4	N2O	Fuel Usage	Fuel Consumption Rate
				mTon/yr	mTon/yr	mTon/yr	mTon/yr	mTon/yr	mTon/yr	mTon/yr	gal/yr	gal/hr
XAS1800 COMP 4F	4F	525	666	0 104	0 005	0 049	87 756	87 461	0 004	0 001	8569.2	12.87
XAS1800 COMP 4F	4F	525	171	0 027	0 001	0 013	22 532	22 456	0 001	0 000	2200.2	12.87
XAS1800 COMP 4F	4F	525	171	0 027	0 001	0 013	22 532	22 456	0 001	0 000	2200.2	12.87
XAS1800 COMP 3	3	525	627	0 938	0 049	0 329	102 094	101 751	0 004	0 001	9969.3	15.9
XAS1800 COMP 4I	4I	525	84	0 013	0 001	0 006	11 068	11 031	0 000	0 000	1080.8	12.87
XAS1800 COMP 3	3	525	84	0 126	0 007	0 044	13 678	13 632	0 001	0 000	1335.6	15.9
XAS1800 COMP 4I	4I	525	738	0 116	0 006	0 054	97 243	96 917	0 004	0 001	9495.6	12.87
XAS1800 COMP 3	3	525	8760	13 107	0 690	4 599	1,426 385	1,421 599	0 058	0 012	139284	15.9
XAS1800 COMP 3	3	525	8760	13 107	0 690	4 599	1,426 385	1,421 599	0 058	0 012	139284	15.9
Total IC Emissions Reductions (mTon/yr)				27.56	1.45	9.71	3,209.67	3,198.90	0.13	0.03		

Legend	
(yellow)	Input
(pink)	Output (NOx, PM, ROG)
(orange)	Output (GHG)

Note: Once Diesel compressors are removed from site and replaced with electric motors, there are no longer emissions and thus no tracking

Notes

Inputs of Engine Horsepower and Hours/Year are reported by United Rentals

IC.3 Diesel Air Compressors - Inputs and Calculation Methodology for NOx, PM, and ROG

$$Mass\ Emissions\ = Emissions\ Standard\ \times\ Engine\ Horsepower \times Engine\ Run\ Time/106$$

mTon *g/(HP*hr)* *HP* *hr* *g/mTon*

Mass Emissions = mass emissions for NOx, PM, and ROG (mTon)
Emissions Standard = in g/(HP*hr) for NOx, PM, and ROG from EPA nonroad diesel engine emission standards
Engine Horsepower = in horsepower (HP)
Engine Run Time = in hours (assuming 3 hours/day)
10^6 = conversion factor from grams to pounds

IC.3 Diesel Air Compressors - Inputs and Calculation Methodology for GHG Emissions (CO2, CH4, N2O)

$$GHG\ =\ 1 \times 10-3\ \times\ \text{Fuel}\ \times\ HHV\ \times\ EF$$

mTon mTon/kg gallons mmBtu/gallon kg CO2/mmBtu

GHG = mass emissions for CO2, CH4, or N2O (metric tons)
Fuel = Volume of the fuel combusted (gallons)
HHV = Default high heat value of the fuel from 40 CFR Part 98 Subpart C Appendix Table C-1
EF = Fuel-specific default emission factor (for CO2, CH4, of N2O), from 40 CFR Part 98 Subpart C Appendix Table C-1/C-2 (kg/mmBtu)

EPA Emissions Standard
EF in g/KW-hr, results converted g/KW-hr to g/BHP-hr by dividing by 1.341

https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf
https://www.dieselnet.com/standards/us/nonroad.php#tier4

EPA United States Environmental Protection Agency

Office of Transportation and Air Quality
EPA-420-B-16-022
March 2016

Nonroad Compression-Ignition Engines: Exhaust Emission Standards

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr)	NOx (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Smoke [a] (Percentage)	Useful Life (hours /years) [b]	Warranty Period (hours /years) [b]
Federal		-	2014+ [i]	0.19	-	0.40	0.02	3.5			
	225 ≤ kW < 450	1	1996-2000	1.3 [j]	-	9.2	0.54	11.4			
		2	2001-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	450 ≤ kW < 560	1	1996-2001	1.3 [j]	-	9.2	0.54	11.4			
		2	2002-2005	-	6.4	-	0.20	3.5	20/15/50	8,000/10	3,000/5
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 [h]	-	4.0	-	0.02	3.5			
			2014+ [i]	0.19	-	0.40	0.02	3.5			
	560 ≤ kW < 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			
	kW > 900	1	2000-2005	1.3 [j]	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5 [k]	0.10	3.5			
			2015+ [i]	0.19	-	3.5 [k]	0.04 [l]	3.5			

Source: 40 CFR Part 98 Subpart Chttps://www ecfr gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C

$$CO_2 = 1 x 10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-1)}$$

CO2 = Annual CO2 mass emissions for the specific fuel type (metric tons)
Fuel = Volume in gallons for liquid fuel
HHV = Default high heat value of the fuel, from Table C-1 of this subpart (mmBtu per mass or mmBtu per volume, as applicable)
EF = fuel-specific default CO2 emission factor, from Table C-1 of this subpart (kg CO2/mmBtu)
1 × 10-3 = Conversion factor from kilograms to metric tons

Table C-1 to Subpart C of Part 98. Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026 × 10^{-3}	53.06
Petroleum products-liquid	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96

$$CH_4 \ or \ N_2O = 1 x 10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-8)}$$

CH4 or N2O = Annual CH4 or N2O emissions from the combustion of a particular type of fuel (metric tons)
Fuel = Mass or volume of the fuel combusted, either from company records or directly measured by a fuel flow meter, as applicable (mass or volume per year)
HHV = Default high heat value of the fuel from Table C-1 of this subpart
EF = Fuel-specific default emission factor for CH4 or N2O, from Table C-2 of this subpart (kg CH4 or N2O per mmBtu)
1 × 10-3 = Conversion factor from kilograms to metric tons

Table C-2 to Subpart C of Part 98 Default Ch_4 and N_2o Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1 × 10[illegible]	1.6 × 10[illegible]
Natural Gas	1.0 × 10[illegible]	1.0 × 10[illegible]
Petroleum Products (All fuel types in Table C-1)	3.0 × 10[illegible]	6.0 × 10[illegible]
Fuel Gas	3.0 × 10[illegible]	6.0 × 10[illegible]
Other Fuels-Solid	3.2 × 10[illegible]	4.2 × 10[illegible]
Blast Furnace Gas	2.2 × 10[illegible]	1.0 × 10[illegible]
Coke Oven Gas	4.8 × 10[illegible]	1.0 × 10[illegible]
Biomass Fuels-Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2 × 10[illegible]	4.2 × 10[illegible]
Wood and wood residuals	7.2 × 10[illegible]	3.6 × 10[illegible]
Biomass Fuels-Gaseous (All fuel types in Table C-1)	3.2 × 10[illegible]	6.3 × 10[illegible]
Biomass Fuels-Liquid (All fuel types in Table C-1)	1.1 × 10[illegible]	1.1 × 10[illegible]

Appendix A3.4: Useful Life

How Long Do Air Compressors Last?

When it comes to industrial air compressors, the lifespan can vary greatl depending on the type and use of the compressor. Generally speaking, the average air compressor can last anywhere from five to twenty years with proper maintenance. Factors such as compressed air temperature, humidity, and usage affect how long an industrial air compressor lasts. With good care and regular maintenance, an air compressor system can provide reliable service for many years to come.

Average Lifespan of Different Types of Air Compressors

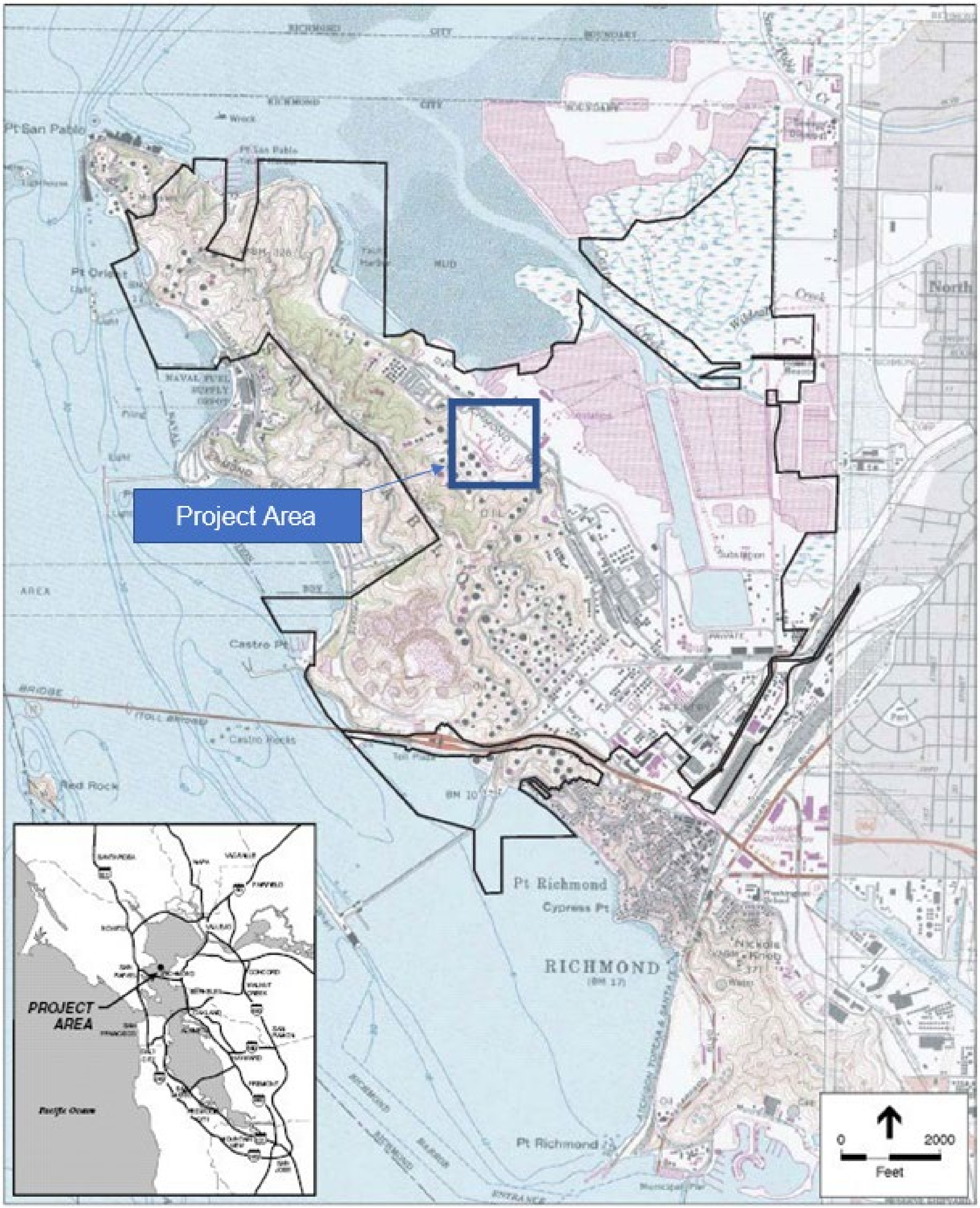
- **Centrifugal Air Compressors:** 250,000+ hours (28+ years)
- **Rotary Screw Air Compressors:** 100,000+ hours (10+ years)
- **Oil-Free Rotary Screw Compressors:** 70,000 hours (8 years)
- **Reciprocating Air Compressors:** 50,000 hours (6 years)

Source: https://nigen.com/how-long-does-an-air-compressor-last/#:~:text=Generally%20speaking%2C%20the%20average%20air,an%20industrial%20air%20compressor%20lasts.

Appendix A4: IC.4 - FCC Ammonia Optimization

A4.1 – Map
A4.2 - Data Management System (TBD)
A4.3 – Emission Calculation Spreadsheet

Appendix A4.1: Map - IC.4 – FCC Ammonia Optimization

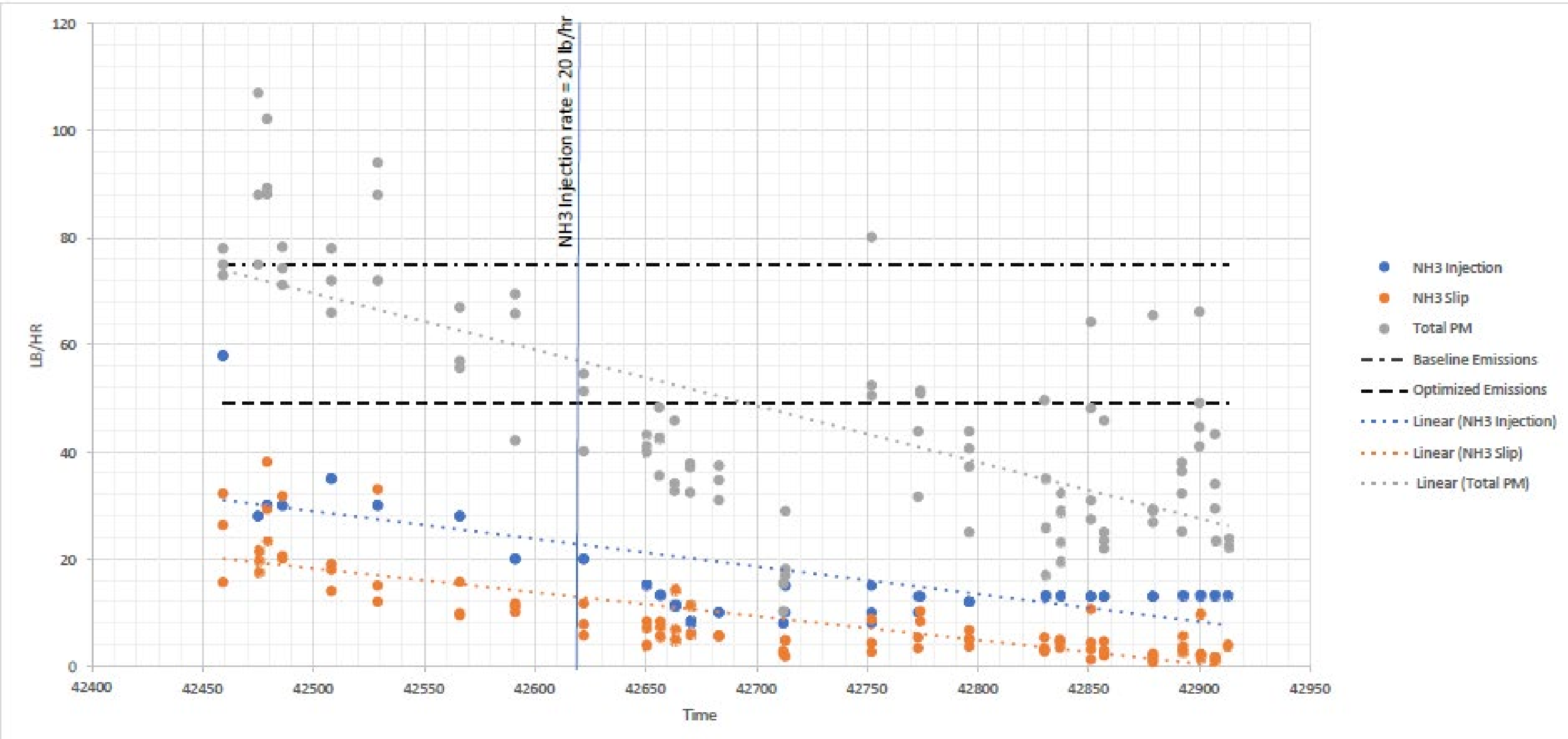


Refinery Boundary

Appendix A4.2: IC.4 – FCC Ammonia Optimization Data Management System (To be Provided Later)

Appendix A4.3: IC.4 - FCC Ammonia Optimization Emissions Calculation Spreadsheet

- Chevron operates a Fluidized Catalytic Cracker (FCC) to produce gasoline from long chain hydrocarbons. The process uses a fluidized catalyst, and the process of regenerating the catalyst results in some PM2.5 emissions from the FCC stack. Chevron conducted a series of FCC PM2.5 stack tests to evaluate the optimum ammonia slip conditions for controlling filterable PM2.5 emissions while controlling condensable PM2.5. Too little ammonia increases filterable PM2.5, while too much ammonia increases condensable PM2.5. By operating within the optimal ammonia slip range, significant reductions of total PM2.5 emissions are achievable.



	PM2.5 Emissions Reduction		
	lbs/hr	Metric Tons per Year	Note on Ammonia Slip
Current Emissions	75	298	at varying ammonia slips
Innovative Concepts Emissions Proposal	49	195	with ammonia optimization
Net Reduction	**26**	**103**	

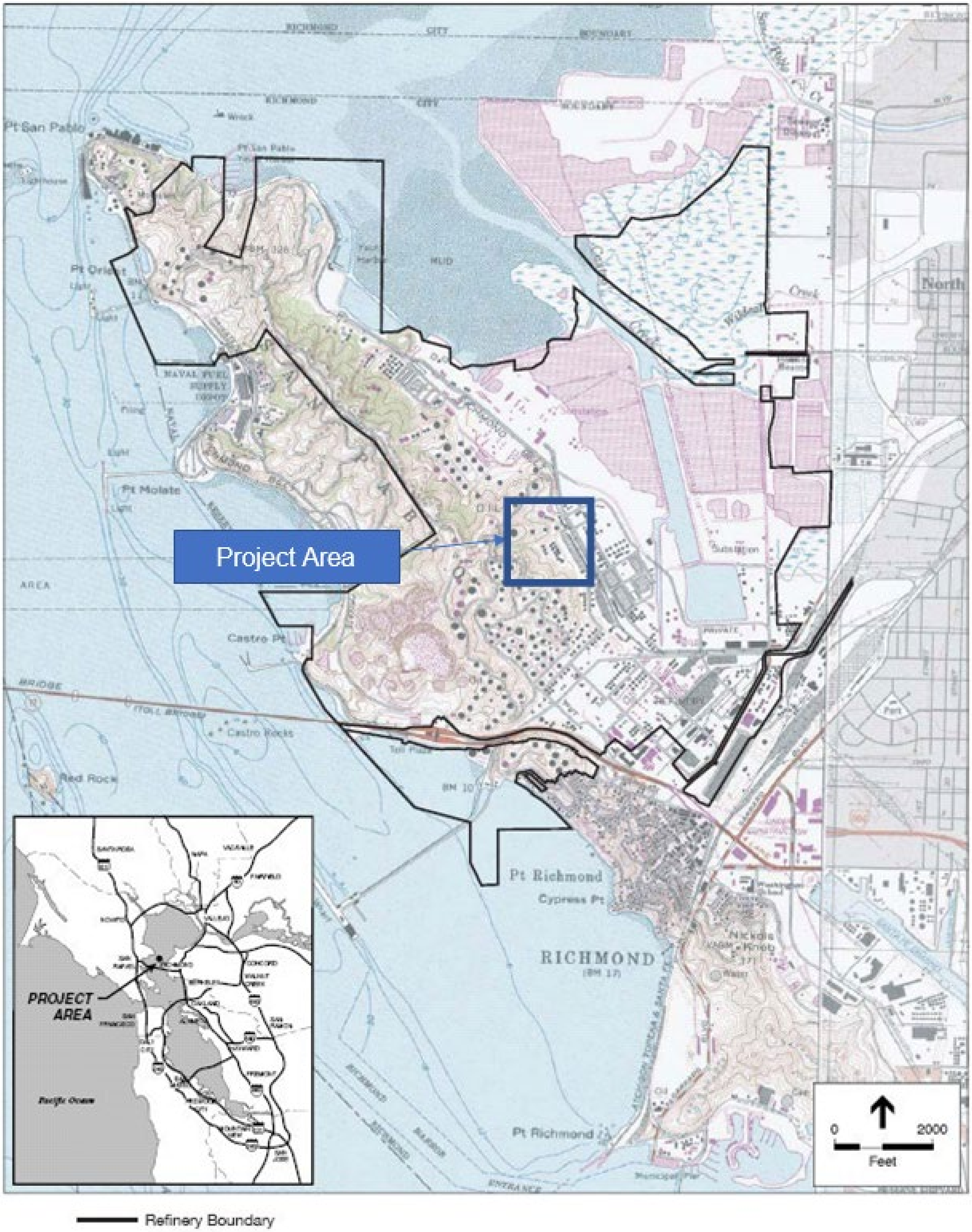
- Actual annual emissions reductions could be lower, but the calculations above show how high they can be in a given year.

Note: No net change in NOx, ROG or GHGs will occur.

Appendix A5: IC.5 - Wharf ERD replacement

A5.1 – Map
A5.2 - Data Management System (TBD)
A5.3 – Emission Calculation Spreadsheet

Appendix A5.1: Map – IC.5 Wharf ERD Replacement



Appendix A5.2: IC.5 Wharf ERD Replacement Data Management System (To Be Provided Later)

Appendix A5.3: IC. 5 - Wharf Emissions Reduction Device (ERD) Replacement Emissions Calculation Spreadsheet

Appendix A5.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.5 *Wharf ERD Replacement Calculations*

Emissions Factors			
		Units	Source
NOx	1.17	lb/1000 bbls loaded	Source Test, 2/3/2021, NST# 6324
PM2.5	0.00559	lb/MMBtu fired	AP 42, Ch. 1.4, Natural Gas Combustion, Table 1.4-2, Condensable PM
ROG	0	-	Will assume zero

Project	NOx (mTon/yr)	PM2.5 (mTon/yr)[1]	ROG (mTon/yr)	CO2e (mTon/yr)[2]
Wharf ERD Replacement	11.8	0.83	0	13629.49

1. The PM2.5 emission factor is from AP-42 for total and condensable. Since it is combustion emissions it is assumed that all PM is less than 1 micrometer and PM10 is equal to PM2.5. The AP-42 emission factor which is in SCF is converted to be based on BTU as this is more relevant by dividing by the natural gas standard heating value of 1020 Btu/SCF.

2. GHG emissions reduction calculations represent the elimination of combustion emissions (only), they assume zero % capture efficiency for CH or N_2O as vapor recovery control devices are not designed to capture these compounds.

Note: These calculations show emissions that would be eliminated by replacing the Wharf ERD with a noncombustion abatement system, the elimination of combustion results in a net reduction of GHG emissions

Legend	
(yellow)	Input
(pink)	Output (NOx, PM, ROG)
(orange)	Output (GHG)

IC.5 Wharf ERD - Inputs and Calculation Methodology for NOx

$$NOx\ \text{Emissions} = EFNOx \times \frac{Barrels\ Loaded}{1000} \times \frac{1}{2000 * 1.10231}$$

mTon/yr — $\frac{lb}{1000\ bbls\ loaded}$ — bbls — $\frac{ton * mTon}{lb * ton}$

$NOx\ Emissions$ = mass emissions for NOx (mTon/yr)

EF_{NOx} = emission factor for NOx from source test (lb/1000 bbls loaded)

$Barrels\ Loaded$ = barrels loaded and controlled by ERD (bbls)

IC.5 Wharf ERD - Inputs and Calculation Methodology for PM

$$PM\ \text{Emissions} = EFPM \times Total\ Firing\ Duty \times \frac{1}{2000 * 1.10231}$$

mTon/yr — $\frac{lb}{MMBtu\ fired}$ — MMBtu — $\frac{ton * mTon}{lb * ton}$

$PM\ Emissions$ = mass emissions for PM (mTon/yr)

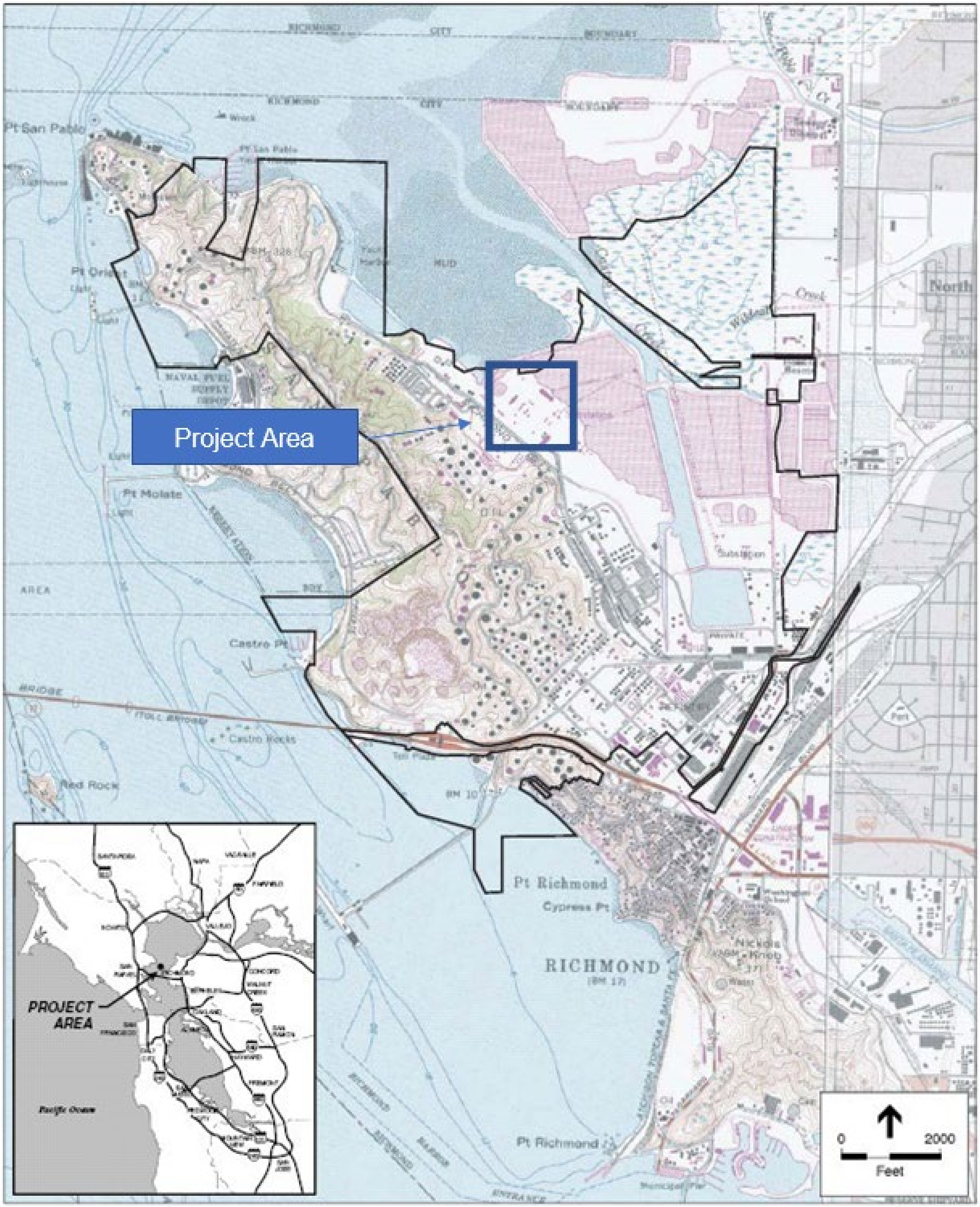
EF_{PM} = emission factor for PM from AP-42 factor (lb/MMBtu fired)

$Total\ Firing\ Duty$ = in MMBtu

Appendix A6: IC.6 - TKN Heater Optimization

A6.1 – Map
A6.2 – Data Management System
A6.3 – Emission Calculation Spreadsheet

Appendix A6.1: Map – IC6. TKN Heater Optimization



Refinery Boundary

Appendix A6.1: IC.6 - TKN Heater Optimization Data Management System

As the TKN is an existing plant within the Richmond Refinery, existing instrumentation is available to monitor real-time operations through Chevron's SCADA system. In addition, the TKN plant furnaces have Continuous Emissions Monitoring Systems (CEMS) that monitor real-time NO_x and O_2 emissions from the plant to establish the baseline as well as the post-project emission rates.

Chevron will use the Fuel Gas Flow Rate process data, and Exhaust Volumetric Flow Rate combined with the CEMS NOx, O2 and source test PM and ROG data to calculate emissions for both the baseline and post-project conditions. Instrumentation tags are provided below in the CEMS Pi Tags section of Figure A6.2 below.

To periodically validate the CEMS emissions instrumentation, Chevron conducts a Relative Accuracy Test Audit (RATA), and Cylinder Gas Audit, and conducts source testing for PM and ROG per existing BAAQMD permits. Finally, the Bay Area Air Quality Management District annually audits the emissions inventory (EI) per Rule 12-15 for the TKN.

Figure A6.2 – Data Sources, Management and Validation for IC.6

Appendix A6.2 - Richmond Refinery – I.C. 6- TKN Heater Optimization
Data Management System

Databases / Sources

Process Data	Emission Data	Validation
Furnace Firing Rates - CEMS DCS System (Pi Database)	Emission Measurements (CEMS and source testing)	Validation Processes

Utilization

Process Data	Emission Data	Validation
Inputs: Fuel Gas Flow rate (MMdscf/hr) – per furnace (CEMS / Pi tag – real-time monitoring) Exhaust Volumetric Flow Rate (MMdsfh)	**Inputs:** NOx concentration (ppm) – CEMS %O2 – CEMS PM source test – per BAAQMD Title 5 permit ROG source test – per BAAQMD Title 5 permit	**Inputs:** NOx CEMS Relative Accuracy Test Audit (RATA) NOx CEMS Cylinder Gas Audit – Quarterly Source tests for PM and ROG reviewed and approved by BAAQMD. Emission Inventory (annual) audit by BAAQMD (Rule 12-15).

CEMS Pi Tags

Fuel Gas Flowrate

Pi Tag (CEMS)	Furnace	Unit
74FC517	F-510	MMSCFD
74FC527	F-520	MMSCFD
74FC537	F-530	MMSCFD
	F-500	MMSCFD
75FC617	F-610	MMSCFD
75FC627	F-620	MMSCFD
75FC637	F-630	MMSCFD
	F-600	MMSCFD
76FC7346	F-730	MMSCFD
76FC7347	F-731	MMSCFD

List of PI tags

Pi Tag Label	Pi Tag (CEMS)	Unit	Furnace	Constituent
F500CEMSO2	74AI5100	PCT	F-500	O2
F500CEMSNOX	74AI5102	PPM	F-500	NOX
F600CEMSO2	75AI6100	PCT	F-600	O2
F600CEMSNOX	75AI6102	PPM	F-600	NOX
F730CEMSO2	76AI735	PCT	F-730	O2
F730CEMSNOX	76AI736	PPM	F-730	NOX
F731CEMSO2	76AI7351	PCT	F-731	O2
F731CEMSNOX	76AI7361	PPM	F-731	NOX

Calculations and Annual Report Template for IC.6a are shown in Appendix A.6

Data Retention: 5 years, minimum.

Appendix A6.3: IC.6 - TKN Heater Optimization Emissions Calculation Spreadsheet

BAY AREA AIR QUALITY
MANAGEMENT DISTRICT

375 Beale Street, Suite 600
San Francisco, CA 94105
(415) 771-6000
www.baaqmd.gov

ANNUAL PERMIT RENEWAL INVOICE

Invoice for Renewal Term 12/1/2021 to 12/1/2022

Page 15 of 34

BAAQMD regulations are available at www.baaqmd.gov or by calling (415) 749-4900.

Reported Source Emissions

For Renewal Period 12/1/2021 to 12/1/2022

		Annual Average lbs/day				
Source	**Facility Source Description**	**PM**	**Org**	**NOx**	**SO2**	**CO**
S4161	F-510 TKN Feed Furnace/Low NOx Burners	7.56	5.48	126.58	2.88	0.90
S4162	F-520 TKN Furnace/Low-NOx Burners	7.15	5.18	119.73	2.71	0.85
S4163	F-530 TKN Feed Furnace/Low NOx Burners	7.59	5.48	127.12	2.88	0.90
S4164	F-630 ISOCRACKER FEED FURNACE ISOMAX w/Ultra Low NOX Burners	4.30	3.10	19.95	1.62	0.36
S4165	F620 ISOCRACKER FEED FURNACE ISOMAX w/Ultra Low NOX Burners	4.25	3.07	19.75	1.61	0.36
S4166	F-610 ISOCRACKER FEED FURNACE ISOMAX w/Ultra Low NOX Burners	5.18	3.75	24.08	1.96	0.43
S4168	F-730 ISOCRACKER SPLITTER FEED FURNACE ISOMAX w/Ultra Low NOX Burners	22.44	16.22	75.89	8.49	6.66
S4169	F-731 ISOCRACKER REBOILER ISOMAX w/Ultra Low NOX Burners	30.14	21.75	116.71	11.40	2.21

Note: The net reduction in fuel consumption means a net reduction in GHGs.

Appendix A6.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.6 *TKN Heater Optimization*

Estima ion of emission reduction from installing impro ed heat exchangers at TKN Unit heaters and optimiz ng operation of the heaters.

Che ron is e aluating installing impro ed heat exchangers technologies hat could result in a 10-20% reduction in fuel consumption at furnaces F-510 F-520 and F-530 and further process impro emen s that would reduce fuel consumption by ano her 30% at all se en furnaces in the plant. Reduction n fuel consumpt on w ll result in an equi alent reduc ion in emissions from the furnaces.

Emissions Sources	NOx (mTon/yr)	PM2.5 (mTon/yr)	ROG (mTon/yr)	CO2e (mTon/yr)	Data Source
TKN Furnaces F-510 F-520 F-530	59.97	0.9	2.16	59 2	BAAQMD 12-15 Emissions In en ory RY2022 V 75 Fuel gas drum workbook Criteria GHG Summary tab.
TKN Furnaces w/10% fuel reduction F-510 F-520 F-530	5 0	0.8	1.9	53 97	BAAQMD 12-15 Emissions In en ory RY2022 V 75 Fuel gas drum workbook Criteria GHG Summary' tab with 10% reduction of exhaust and fuel gas flow
Emissions Reduction from ...	6.0	0.09	0.22	5.9	
All TKN F... F-510 F-520 F-530 F-610 F-620 F-630 F-730 F-731	103.7	3.9	5	2 6 288	BAAQMD 12-15 Emissions In en ory RY2022 V 75 Fuel gas drum workbook Criteria GHG Summary' tab.
All TKN Furnaces F-510 F-520 F-530 F-610 F-620 F-630 F-730 F-731 w 30% reduction from Optimizing Operations	72.6	2.7	3.3	172 02	BAAQMD 12-15 Emissions In en ory RY2022 V 75 Fuel gas drum workbook Criteria GHG Summary tab with 30% reduction of exhaust and fuel gas flow
Optimization of All	31.1	1.17	1.0	73 886	
Total IC Emissions Reductions	37 1	1.3	1.6	79 831	

Bas c emissions calculation formula Emissions factor*Fuel characteris ic (HHV)*Acti ity data (flow bbls loaded) see 12-15 PREDO

Notes regarding emissions calcula ions NOx emissions are calculated as funct on of furnace exhaust flow rate while PM and ROG are calculated as a func ion of furnace fuel gas flows (as referred to as firing rate). Therefore it s expected that a reduction in fuel consump ion will be e an equi alent reduction n NOx PM and ROG w ll occur from this projec .

RY2022 12-15 EI Data

	12-15 EI Calculation Basis			
	CEMS Readings	Source Test Value	Source Test Value	Firing Rate (AB32 MRR report)
Source	**NOX (lb/yr)**	**PM2 5 (lb/yr)**	**ROG (lb/yr)**	**CO2e (MT/yr)**
F-510 TKN Feed Furnace I	0 179 18	631.99	1 8.31	18 065
F-520 TKN Feed Furnace I	50 767 07	798.53	1 829.96	22 825
F-530 TKN Feed Furnace I	1 263 0	6 9.0	1 87.37	18 552
TOTAL (lb/yr)	132 209.29	2 079.55	765.6	
Phase 1 TOTAL (MT/yr)	**59.97**	**0 94**	**2.16**	**59 442**
Isocracker Feed Furnace Is	8 27 13	519.05	37 95	1 818
Isocracker Feed Furnace Is	9 368. 1	587.69	95 87	16 778
Isocracker Feed Furnace Is	10 29 50	6 5.79	5 89	18 37
F-730	29 795.25	2 233.69	1 88 .68	63 820
F-731	38 731.18	2 55 .3	2 155.22	72 99
TOTAL (lb/yr)	96 63. 7	6 5 0.56	5 518.60	
Phase 2 TOTAL (MT/yr)	**43.76**	**2 97**	**2.50**	**186 847**
Phases 1 and 2 TOTAL (I	**103.72**	**3 91**	**4.66**	**246 288**

EI spreadsheets below are subm tted to BAAQMD

CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

Legend: Input (yellow); Output (Nox, PM, ROG) (pink); Ouput (GHG) (orange)

		Fuel Flow Rate	NOX	PM	VOC	
Source Name:	F-500		CEMS	Source Test	Source Test	Notes/Source:
Source Descr./Location:	TKN Feed Furnace Isomax	Annual Exhaust Volumetric Flow (Source) 13849.47	CEMS	0.0021	0.0049	Rate (lb/MMBTU
BAAQMD Source #:	S-4161, S-4162, S-4163	Annual Fuel Flow (Source) 863.45	132,209.29	2,079.55	4,765.64	Annual (lb/yr)
Source Type:	Heater	Annual Fuel Flow (Sum Indiv Sources) 6,643.43	66.10	1.04	2.38	Annual (ton/yr)
Abatement:	None	Annual Fuel Flow (GHG Drum Meter) 0.00				Annual (MT/yr)

Time Period	Time Period	Fd	HHV	O2 w/ sub	NOX w/ sub	H2S	Total Sulfur Content	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	NOX	PM	VOC
Notes/Source		Calculated	Calorimeter	CEMS	CEMS	CEMS		EEPPR Equation 4-3 (20.95 O2%)	Scaled Rate	EEPPR Equation 4-1 (dry basis, convert to lb)	Source Test	Source Test
Category:		Fuel Data								Calculated		
Date	Hourly	(dscf/MMB	(Btu/scf)	(%)	(ppm)	%	ppm	(dscf/hr)	(MMdscf/I	(lb/hr)	(lb/hr)	(lb/hr)
1/1/2022	01-Jan-22 00:00:00	8,865	1,190	9.53	78.20	0.00000%	12.41	1,609,215	0.08	15.26	0.21	0.48
1/1/2022	01-Jan-22 01:00:00	8,865	1,190	9.56	77.93	0.00000%	12.41	1,613,202	0.08	15.24	0.21	0.48
1/1/2022	01-Jan-22 02:00:00	8,865	1,190	9.56	77.44	0.00000%	12.41	1,624,348	0.08	15.25	0.21	0.49

C.6 TKN Heater - Inputs and Calculation Methodology for NOx

$$NOx\ Emissions = Exhaust\ Volumetric\ Flow\ Rate \times \text{NOx Concentration} \times \frac{MW_{NO2}}{379.48\frac{dscf}{lb-mol}}$$

lb/hr — dscf/hr — ppm — $\frac{lb/lb-mol}{\frac{scf}{lb-mol}}$

$$Exhaust\ Volumetric\ Flow\ Rate = Fd \times HHV \times \text{Fuel Gas Flowrate} \times \frac{20.95}{20.95-\%O2}$$

dscf/hr — dscf/MMBtu — Btu/scf — MMdscf/hr

NOx Emissions mass emissions for NOx (lb/hr)

NOx Concentration ppm of NOx from CEMS

MW_{NO2} 46.01 lb/lb-mol constant

$379.48\frac{dscf}{lb-mol}$ conversion factor for ideal gases (scf/lb-mol) at 60 F and 1 atm

Exhaust Volumetric Flow Rate dscf/hr

Fd Emission factor (dscf/MMbtu) from EPA Method 19

HHV Btu/scf from fuel characteristics

Fuel Gas Flowrate MMdscf/hr from CEMS

%O2 percent O2 from CEMS

C.6 TKN Heater - Inputs and Calculation Methodology for PM, ROG

$$\text{Mass Emissions} = Fuel\ Gas\ Flowrate \times \text{HHV} \times Annual\ Exhaust\ Volumetric\ Flow\ Rate$$

lb/hr — MMdscf/hr — Btu/dscf — lb/MMBtu

Mass Emissions lb/hr for PM or ROG

Fuel Gas Flowrate MMdscf/hr from CEMS

HHV Btu/scf from fuel characteristics

Annual Exhaust Volumetric Flow Rate rate in lb/MMBTU from source test

C.6 TKN Heater - Inputs and Calculation Methodology for GHG

$$\text{GHG Emissions} = \frac{\textit{Annual Fuel Flow}}{\textit{Total Fuel Flow}} \times \textit{GHG EmissionsRFG}_{V\_75}$$

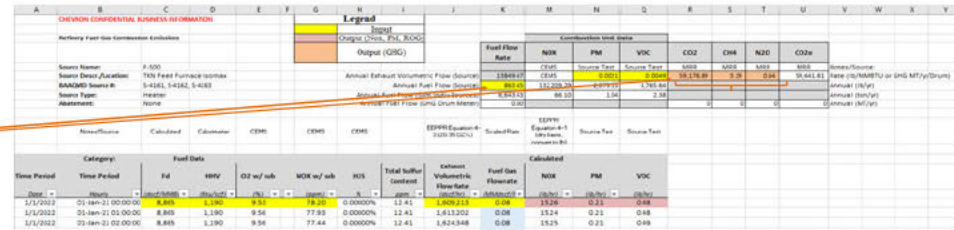
GHG Emissions *MT/year/fuel gas drum for CO2, CH4, N20*
Annual Fuel Flow *rate in lb/MMBTU from source test for TKN Feed Furnace*
Total Fuel Flow *rate in lb/MMBTU for all refinery furnaces, minus H2 Plant*
GHG EmissionsRFG $_{V\_75}$ in MT/yr per AB32 certification report; RFG V-475 minus H2 Plant per RY 2021 GHG Emissions

List of PI tags

PI Tag Label	PI Tag (CEMS)	Unit	Furnace	Constituent
F500CEMSO2	74AI5100	PCT	F-500	O2
F500CEMSNOX	74AI5102	PPM	F-500	NOX
F600CEMSO2	75AI6100	PCT	F-600	O2
F600CEMSNOX	75AI6102	PPM	F-600	NOX
F730CEMSO2	76AI735	PCT	F-730	O2
F730CEMSNOX	76AI736	PPM	F-730	NOX
F731CEMSO2	76AI7351	PCT	F-731	O2
F731CEMSNOX	76AI7361	PPM	F-731	NOX

Fuel Gas Flowrate

PI Tag (CEMS)	Furnace	Unit
74FC517	F-510	MMSCFD
74FC527	F-520	MMSCFD
74FC537	F-530	MMSCFD
	F-500	MMSCFD
75FC617	F-610	MMSCFD
75FC627	F-620	MMSCFD
75FC637	F-630	MMSCFD
	F-600	MMSCFD
76FC7346	F-730	MMSCFD
76FC7347	F-731	MMSCFD



CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

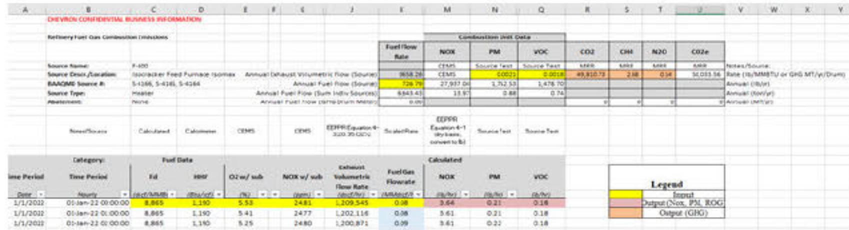
Legend: Input; Output (Nox, PM, ROG); Output (GHG)

Source Name: F-500
Source Desc./Location: TKN Feed Furnace Isomax
BAAQMD Source #: S-4161, S-4162, S-4163
Source Type: Heater
Abatement: None

	Fuel Flow Rate	NOX	PM	VOC	CO2	CH4	N2O	CO2e	Notes/Source
		CEMS	Source Test	Source Test	MRR	MRR	MRR	MRR	
Annual Exhaust Volumetric Flow (Source)	13849.47	CEMS	0.0021	0.0049	59,176.89	[illegible]	[illegible]	59,441.61	Rate (lb/MMBTU or GHG MT/yr/Drum)
Annual Fuel Flow (Source)	863.45	131,209.29	[illegible]	3,765.64					Annual (lb/yr)
Annual Fuel Flow (Sum Indiv Sources)	6,643.43	66.10	1.04	2.38					Annual (ton/yr)
Annual Fuel Flow (GHG Drum Meter)	0.00				0	0	0	0	Annual (MT/yr)

Time Period	Time Period	Fd	HHV	O2 w/ sub	NOX w/ sub	H2S	Total Sulfur Content	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	NOX	PM	VOC
Date	Hourly	(dscf/MMBtu)	(Btu/scf)	(%)	(ppm)	%	ppm	(dscf/hr)	(MMdscf/hr)	(lb/hr)	(lb/hr)	(lb/hr)
1/1/2022	01-Jan-21 00:00:00	8,865	1,190	9.53	78.20	0.00000%	12.41	1,609,213	0.08	1526	0.21	0.48
1/1/2022	01-Jan-21 01:00:00	8,865	1,190	9.56	77.93	0.00000%	12.41	1,613,202	0.08	1524	0.21	0.48
1/1/2022	01-Jan-21 02:00:00	8,865	1,190	9.56	77.44	0.00000%	12.41	1,624,348	0.08	1525	0.21	0.49

F-610 F-620 F-630



CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

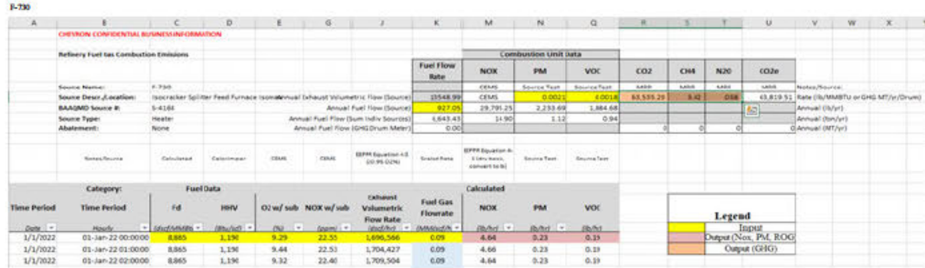
Source Name: F-600
Source Desc./Location: Isocracker Feed Furnace Isomax
BAAQMD Source #: S-4166, S-4165, S-4164
Source Type: Heater
Abatement: None

	Fuel Flow Rate	NOX	PM	VOC	CO2	CH4	N2O	CO2e	Notes/Source
		CEMS	Source Test	Source Test	MRR	MRR	MRR	MRR	
Annual Exhaust Volumetric Flow (Source)	9858.26	CEMS	0.0021	0.0018	49,810.73	2.68	0.14	50,033.56	Rate (lb/MMBTU or GHG MT/yr/Drum)
Annual Fuel Flow (Source)	726.79	27,937.04	1,752.53	1,478.70					Annual (lb/yr)
Annual Fuel Flow (Sum Indiv Sources)	6,643.43	13.97	0.88	0.74					Annual (ton/yr)
Annual Fuel Flow (GHG Drum Meter)	0.00				0	0	0	0	Annual (MT/yr)

Time Period	Time Period	Fd	HHV	O2 w/ sub	NOX w/ sub	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	NOX	PM	VOC
Date	Hourly	(dscf/MMBtu)	(Btu/scf)	(%)	(ppm)	(dscf/hr)	(MMdscf/hr)	(lb/hr)	(lb/hr)	(lb/hr)
1/1/2022	01-Jan-22 00:00:00	8,865	1,190	5.53	2481	1,209,545	0.08	3.64	0.21	0.18
1/1/2022	01-Jan-22 01:00:00	8,865	1,190	5.41	2477	1,202,116	0.08	3.61	0.21	0.18
1/1/2022	01-Jan-22 02:00:00	8,865	1,190	5.25	2480	1,200,871	0.09	3.61	0.22	0.18

Legend: Input; Output (Nox, PM, ROG); Output (GHG)

F-730



CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

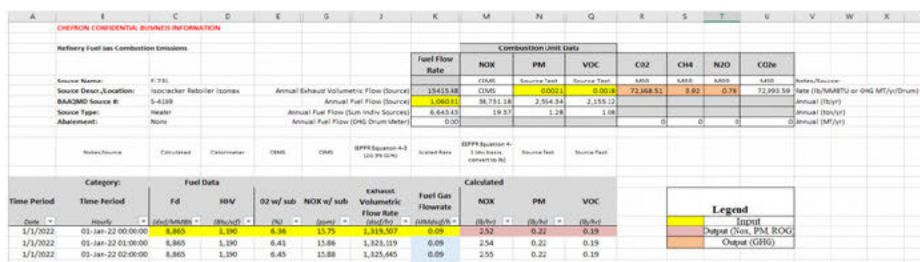
Source Name: F-730
Source Desc./Location: Isocracker Splitter Feed Furnace Isomax
BAAQMD Source #: S-4184
Source Type: Heater
Abatement: None

	Fuel Flow Rate	NOX	PM	VOC	CO2	CH4	N2O	CO2e	Notes/Source
		CEMS	Source Test	Source Test	MRR	MRR	MRR	MRR	
Annual Exhaust Volumetric Flow (Source)	13548.99	CEMS	0.0021	0.0018	63,535.29	3.42	0.68	63,819.51	Rate (lb/MMBTU or GHG MT/yr/Drum)
Annual Fuel Flow (Source)	927.05	29,791.25	2,233.69	1,884.68					Annual (lb/yr)
Annual Fuel Flow (Sum Indiv Sources)	6,643.43	14.90	1.12	0.94					Annual (ton/yr)
Annual Fuel Flow (GHG Drum Meter)	0.00				0	0	0	0	Annual (MT/yr)

Time Period	Time Period	Fd	HHV	O2 w/ sub	NOX w/ sub	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	NOX	PM	VOC
Date	Hourly	(dscf/MMBtu)	(Btu/scf)	(%)	(ppm)	(dscf/hr)	(MMdscf/hr)	(lb/hr)	(lb/hr)	(lb/hr)
1/1/2022	01-Jan-22 00:00:00	8,865	1,190	9.29	22.55	1,696,566	0.09	4.64	0.23	0.19
1/1/2022	01-Jan-22 01:00:00	8,865	1,190	9.44	22.53	1,704,427	0.09	4.66	0.23	0.19
1/1/2022	01-Jan-22 02:00:00	8,865	1,190	9.32	22.40	1,709,504	0.09	4.64	0.23	0.19

Legend: Input; Output (Nox, PM, ROG); Output (GHG)

F-731



CHEVRON CONFIDENTIAL BUSINESS INFORMATION

Refinery Fuel Gas Combustion Emissions

Source Name: F-731
Source Desc./Location: Isocracker Reboiler Isomax
BAAQMD Source #: S-4189
Source Type: Heater
Abatement: None

	Fuel Flow Rate	NOX	PM	VOC	CO2	CH4	N2O	CO2e	Notes/Source
		CEMS	Source Test	Source Test	MRR	MRR	MRR	MRR	
Annual Exhaust Volumetric Flow (Source)	15415.48	CEMS	0.0021	0.0018	72,368.51	3.92	0.78	72,693.59	Rate (lb/MMBTU or GHG MT/yr/Drum)
Annual Fuel Flow (Source)	1,060.31	38,731.18	2,554.34	2,155.12					Annual (lb/yr)
Annual Fuel Flow (Sum Indiv Sources)	6,643.43	19.37	1.28	1.08					Annual (ton/yr)
Annual Fuel Flow (GHG Drum Meter)	0.00				0	0	0	0	Annual (MT/yr)

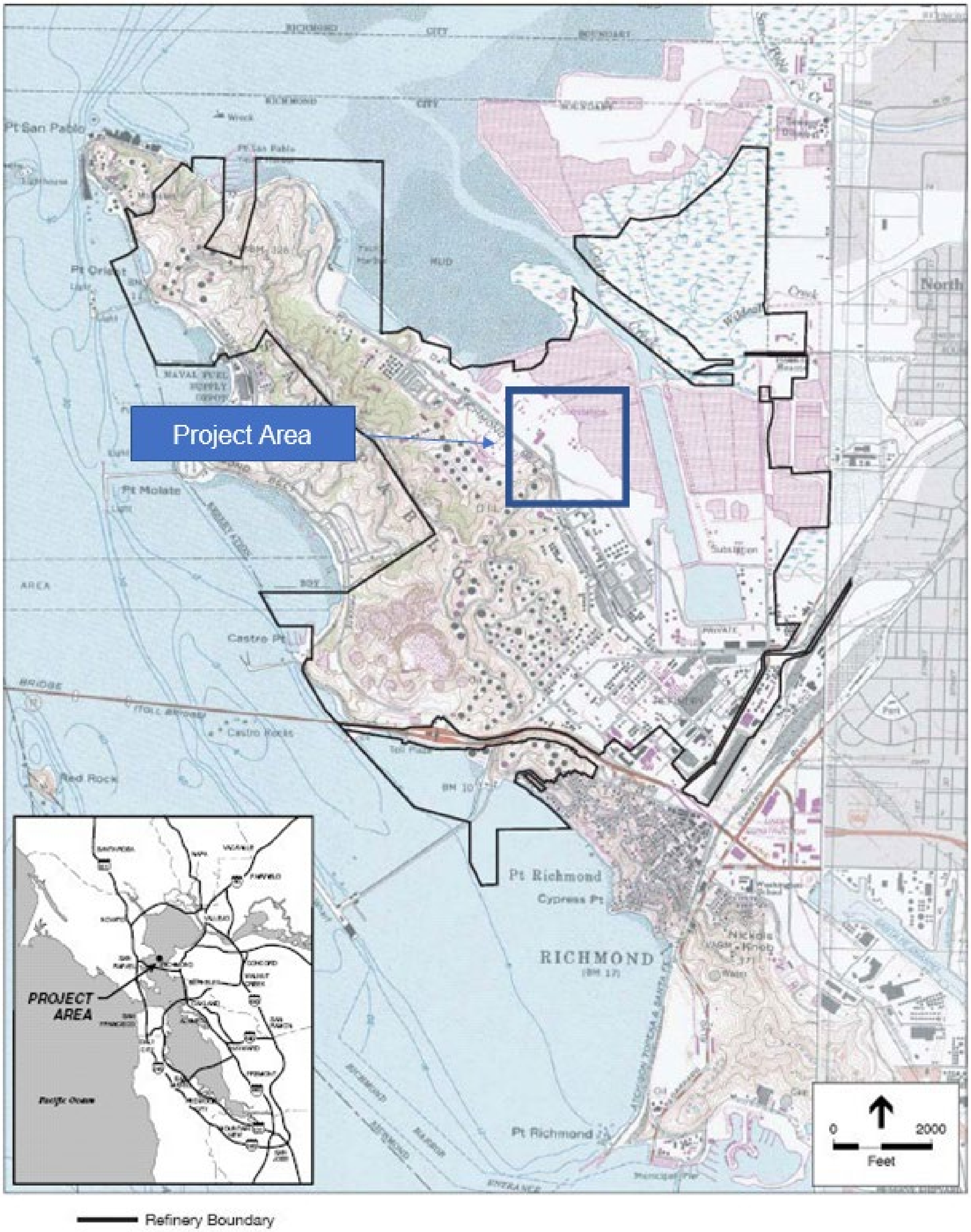
Time Period	Time Period	Fd	HHV	O2 w/ sub	NOX w/ sub	Exhaust Volumetric Flow Rate	Fuel Gas Flowrate	NOX	PM	VOC
Date	Hourly	(dscf/MMBtu)	(Btu/scf)	(%)	(ppm)	(dscf/hr)	(MMdscf/hr)	(lb/hr)	(lb/hr)	(lb/hr)
1/1/2022	01-Jan-22 00:00:00	8,865	1,190	6.36	15.75	1,319,507	0.09	2.52	0.22	0.19
1/1/2022	01-Jan-22 01:00:00	8,865	1,190	6.41	15.86	1,323,119	0.09	2.54	0.22	0.19
1/1/2022	01-Jan-22 02:00:00	8,865	1,190	6.45	15.88	1,325,645	0.09	2.55	0.22	0.19

Legend: Input; Output (Nox, PM, ROG); Output (GHG)

Appendix A7: IC.7 - North Ranch Diesel Engine Replacement

A7.1 – Map
A7.2 - Data Management System
A7.3 – Emission Calculation Spreadsheet
A7.4 – Useful Life Data

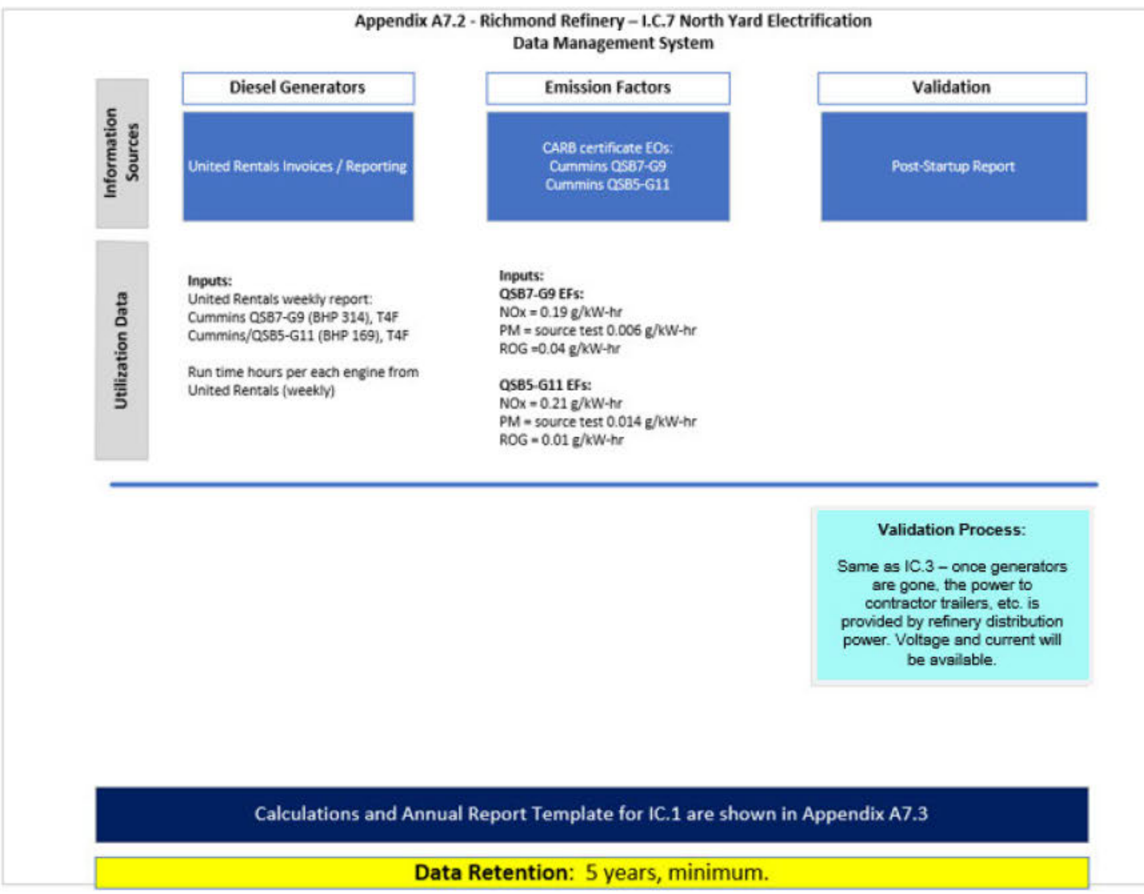
Appendix A7.1: Map - IC.7 - North Ranch Diesel Engine Replacement



Appendix A7.2: IC.7 - North Ranch Diesel Engine Replacement Data Management System

To establish the baseline emissions from the diesel generators prior to electrification, Chevron used weekly runtime reports from United Rentals (portable generator owner) with engine run-time hours. CARB Executive Order certificates for the diesel generator engines provided the NOx and ROG emission factors, and a source test provided the PM emission factor as inputs for the baseline calculations.

Following removal of the diesel generators due to construction of electrical service at the North Ranch area, there will no longer be generators on site, and United Rentals will not show the generators on its rental log to Chevon. Consequently, Chevron proposes to provide a post-project report documenting the electrical supply has been commissioned and generators are removed as data validation for the project. Project will be installing new SEL relays to demonstrate ongoing usage of the electrical services to the North Ranch area. The relays include functionality to show both voltage and current. We will run ammeter signal from this to INDX to trend usage.



Appendix A7.3: IC.7 - North Ranch Diesel Engine Replacement Emissions Calculation Spreadsheet

Appendix A7.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.7 *North Ranch Diesel Engine Replacement*

Legend	
	Input
	Output (NOx, PM, ROG)
	Output (GHG)

Engine	Emissions Factors NOx (g/BHP-hr)	PM (g/BHP-hr)	ROG (HC) (g/BHP-hr)	Engine Horsepower (BHP)	Engine Tier	Source
Cummins/QSB7-G9 (S4430)	1.42E-01	4.47E-03	2.98E-02	314	4F	NOx & ROG CARB certificate Cummins/QSB7-G9, PM Source test 0.006 g/KW-hr, results converted g/KW-hr to g/BHP-hr by dividing by 1.341
Cummins/QSB4.5-G11 (S4431)	1.57E-01	1.04E-02	7.46E-03	169	4F	NOx & ROG CARB certificate Cummins/QSB4.5-G11, PM Source test 0.014 g/KW-hr, results converted g/KW-hr to g/BHP-hr by dividing by 1.341

Emissions Sources	Engine Rating (bhp)	Annual Operating Hours (hr/yr)	NOx	PM2.5	ROG	Fuel usage (gal/y)	CO2e	CO2	CH4	N2O	Units	Data Source
Cummins/QSB7-G9 (S4430)	314	6,783.0	0.30	0.01	0.06	94745	970.27	967.01	0.0392	0.0078	mTon/yr	BAAQMD 12-15 Emissions Inventory RY2021, IC Engines workbook.
Cummins/QSB4.5-G11 (S4431)	169	5334.0	0.14	0.009	0.01	33604	344.14	342.98	0.0139	0.0028	mTon/yr	BAAQMD 12-15 Emissions Inventory RY2021, IC Engines workbook.
Total IC Emissions Reductions			0.44	0.019	0.07		1,314.40	1,309.99	0.05	0.01	mTon/yr	

Note: Per BAAQMD guidance, NOx and ROG emissions factor derived from NMHC NOx factor that assumes 95% NOx.
These calculations demonstrate the emissions that would be eliminated for installing electricity in this area and eliminating diesel generators currently used

Note: Once Diesel generators are removed form site and replaced with electric power there are no longer emissions and thus no tracking

Notes:
Run time from United Rentals weekly reports

IC.7 NR Engine Rep - Inputs and Calculation Methodology for NOx, PM, and ROG

Mass Emissions = *Emissions Standard* × *Engine Horsepower* × *Engine Run Time*/106

mTon *g/(BHP*hr)* *BHP* *hr* *g/mTon*

Mass Emissions = mass emissions for NOx, PM, and ROG (mTon)
Emissions Standard = in g/(HP*hr) for NOx, PM, and ROG
Engine Horsepower = in horsepower (HP)
Engine Run Time = in hours
10^6 = conversion factor from grams to mTons

IC.7 NR Engine Rep - Inputs and Calculation Methodology for GHG Emissions (CO2, CH4, N2O)

GHG = 1 × 10 − 3 × Fuel × *HHV* × *EF*
mTon mTon/kg gallons mmBtu/gallon kg CO2/mmBtu

GHG = mass emissions for CO2, CH4, or N2O (metric tons)
Fuel = Volume of the fuel combusted (gallons)
HHV = Default high heat value of the fuel from 40 CFR Part 98 Subpart C Appendix Table C-1
EF = Fuel-specific default emission factor (for CO2, CH4, of N2O), from 40 CFR Part 98 Subpart C Appendix Table C-1/C-2 (kg/mmBtu)

Source: 40 CFR Part 98 Subpart Chttps://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C

$$CO_2 = 1 x 10^{-3} * Fuel * HHV * EF \quad \text{(Eq. C-1)}$$

CO2 = Annual CO2 mass emissions for the specific fueltype (metric tons)
Fuel = Volume in gallons for liquid fuel
HHV = Default high heat value of the fuel, from Table C-1 of this subpart (mmBtu per mass or mmBtu per volume, as applicable)
EF = Fuel-specific default CO2 emission factor, from Table C-1 of this subpart (kg CO2/mmBtu)
1 × 10-3 = Conversion factor from kilograms to metric tons

Table C-1 to Subpart C of Part 98 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products-liquid	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96

$$CH_4 \ or \ N_2O = 1 x 10^{-3} * Fuel * HHV * EF \quad \text{(Eq. C-8)}$$

CH4 or N2O = Annual CH4 or N2O emissions from the combustion of a particular type of fuel (metric tons)
Fuel = Mass or volume of the fuel combusted, either from company records or directly measured by a fuel flow meter, as applicable (mass or volume per year)
HHV = Default high heat value of the fuel from Table C-1 of this subpart
EF = Fuel-specific default emission factor for CH4 or N2O, from Table C-2 of this subpart (kg CH4 or N2O per mmBtu)
1 × 10-3 = Conversion factor from kilograms to metric tons

Table C-2 to Subpart C of Part 98 Default CH_4 and N_2O Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum Products (All fuel types in Table C-1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Other Fuels-Solid	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels-Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels-Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels-Liquid (All fuel types in Table C-1)	1.1×10^{-03}	1.1×10^{-04}

NOx & ROG: CARB certificate Cummins/QSB7-G9

CALIFORNIA AIR RESOURCES BOARD	CUMMINS INC.	EXECUTIVE ORDER U-R-002-0675 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2018	JCEXL06.7AAL	6.7	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Direct Injection, Turbocharger, Charge Air Cooler, Electronic Control Module, Exhaust Gas Recirculation, Diesel Oxidation Catalyst, Selective Catalytic Reduction-Urea, Ammonia Oxidation Catalyst	Generator Set

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for non-methane hydrocarbon (NMHC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			NMHC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
130 ≤ kW ≤ 560	Tier 4 Final	STD	0.19	0.40	N/A	3.5	0.02	N/A	N/A	N/A
		CERT	0.04	0.19	--	0.00	0.01	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 26th day of October 2017.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

NOx & ROG: CARB certificate Cummins/QSB4.5-G11

California Environmental Protection Agency Air Resources Board	CUMMINS INC.	EXECUTIVE ORDER U-R-002-0664 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2018	JCEXL04.5AAJ	4.5	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Direct Injection, Turbocharger, Electronic Control Module, Exhaust Gas Recirculation, Diesel Oxidation Catalyst, Selective Catalytic Reduction – Urea, Ammonia Oxidation Catalyst	Generator Set

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			NMHC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
75 ≤ kW ≤ 560	Tier 4 Final	OPTIONAL STD	0.19	0.40	N/A	3.5	0.02	N/A	N/A	N/A
		CERT	0.01	0.21	--	0.00	0.01	--	--	--

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has complied with the more stringent set of standards from the various power categories in conformance with Section 1039.230 (e) of the "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Parts I-D" adopted October 20, 2005 and last amended October 25, 2012.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 5th day of September 2017.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

Source Test for PM Emission Factors

Chevron – Diesel Generator 4430
2019 Source Test Report

TABLE 1-1
SUMMARY OF AVERAGE COMPLIANCE RESULTS
CHEVRON RICHMOND
DIESEL GENERATOR 4430
SEPTEMBER 27, 2019

Parameter	Diesel Generator	Permit Limit
Unit Data:		
Rated KW	150	--
Voltage, V	208	--
Total Particulate Matter:		
gr/dscf	0.0011	--
gr/dscf @ 12% CO_2	0.0015	--
lb/hr	0.0019	0.0052*
g/KW-hr	0.006	0.01*

*Note: Per PTO Condition 27088, emission rates shall not exceed in g/KW-hr or lb/hr.

TABLE 4-2
RESULTS SUMMARY PARTICULATE EMISSIONS
CHEVRON RICHMOND
DIESEL GENERATOR 4431

Run Number:	Run 1	Run 2	Run 3	Average
Date:	8/21/20	8/21/20	8/21/20	--
Time:	1411-1511	1546-1646	1707-1807	--
Process Data:				
Rated KW	150	150	150	150
Voltage	208	208	208	208
Flue Gas:				
O_2, % volume dry	10.7	10.5	10.4	10.5
CO_2, % volume dry	7.4	7.6	7.7	7.6
Flue gas temperature °F	471	472	473	472
Moisture content, % volume	9.3	7.5	8.3	8.3
Volumetric flow rate, dscfm	318.3	327.4	321.7	322.5
Diesel Engine PM Emissions:				
gr/dscf	0.0020	0.0013	0.0017	0.0016
gr/dscf @ 12% CO_2	0.0032	0.0020	0.0026	0.0026
lb/hr	0.0054	0.0036	0.0046	0.0045
g/KW-hr	0.016	0.011	0.014	0.014

Appendix A7.4 Useful Life Data

What is the Lifespan of a Standby Generator?

A standby generator can last anywhere between 20 and 40 years, depending on the frequency of usage, as well as the extent of maintenance. That said, the lifespan of your generator will be largely governed by its brand, type and size. Over this span it can be used for anywhere between 15,000 to 30,000 hours without much hassle.

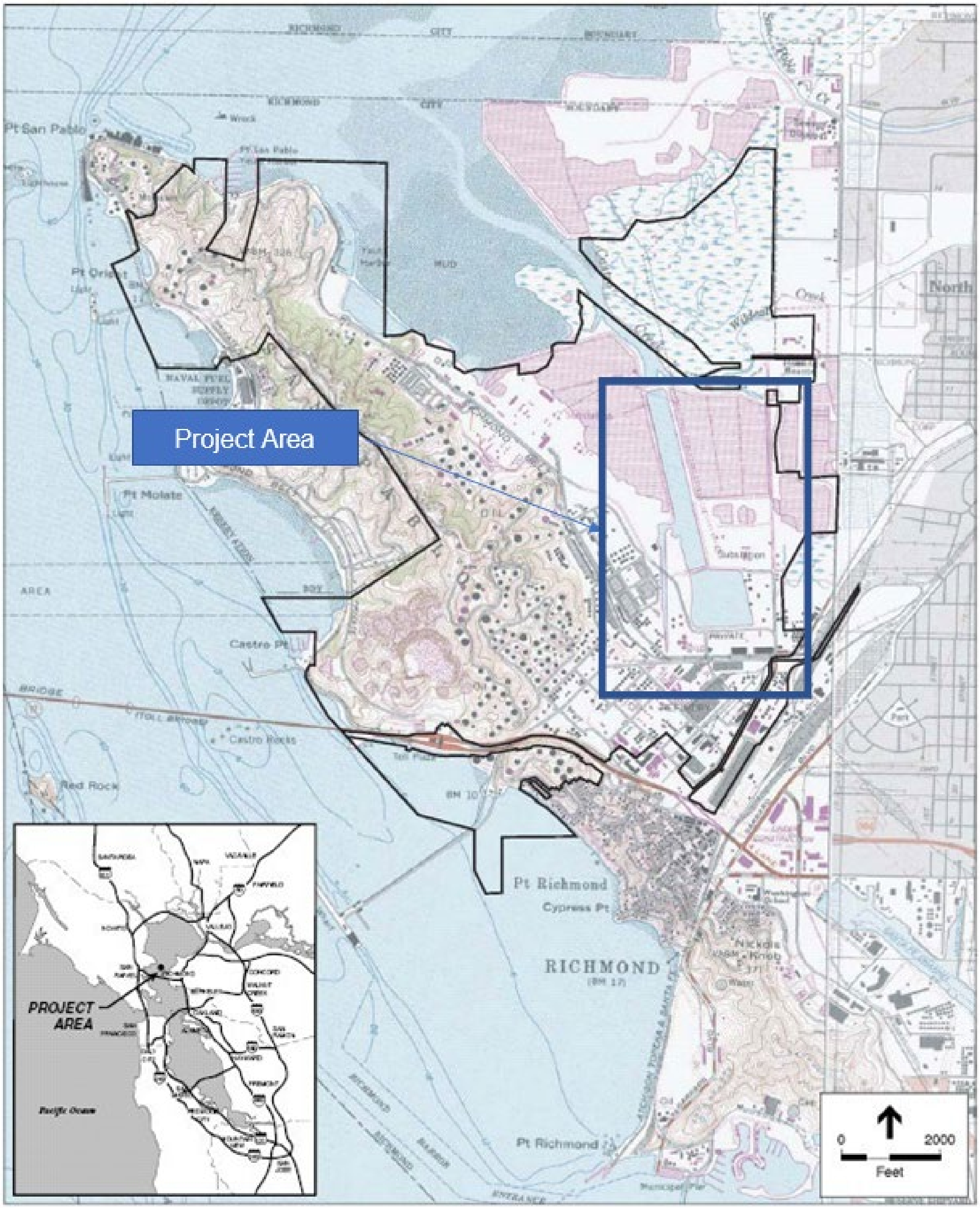
That said, you can extend the lifespan of your generator, by following a well-defined maintenance and repair schedule. Some points to remember in this regard are listed below–

Source: https://csdieselgenerators.com/how-long-does-a-standby-generator-last/

Appendix A8: IC.8 - Solar Electricity Project - General

A8.1 – Map
A8.2 - Data Management System
A8.3 – Emission Calculation Spreadsheet

Appendix A8.1: Map – IC.8 Solar Electricity Project - General



Refinery Boundary

Appendix A8.2: IC.8 Solar Electricity Project – General Data Management System (To Be Provided Later)

Appendix A8.3: IC. 8 Solar Electricity Project - General Emissions Calculation Spreadsheet

Appendix A8.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.8 *Solar General*

Emissions Factors for Grid Electricity

	[lb/MWh]	Source
NOx	0.435	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
PM2.5	0.024	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2018, California
ROG	0.025	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
CO2e	480.50	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
CO2e	692.25	CARB GHG, Regulated Emissions, and Energy Use in Transportation (GREET), 2022, CMAX area (California)

Project	MWh/year	NOx [mTon]	PM2.5 [mTon]	ROG [mTon]	CO2e, EPA Basis [mTon]	CO2e, CARB Basis [mTon]
Solar Project- General	35,000	6.91	0.38	0.40	7,628.22	10,990.00
Solar Project- Floating (only)	17,687	3.49	0.19	0.20	3,854.87	5,553.72

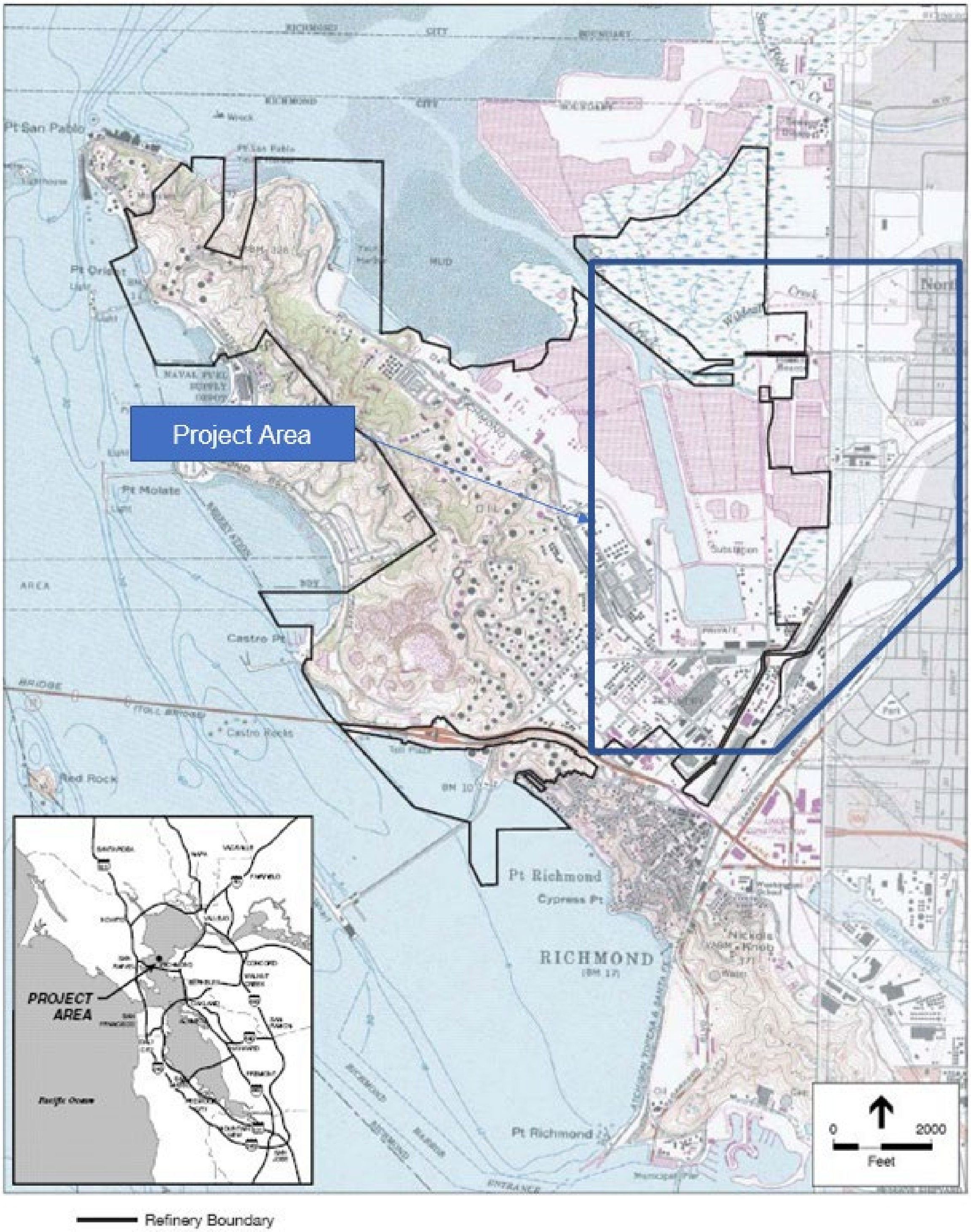
These calculations show the emissions that would be eliminated by displacing PG&E electricity with solar assuming 35,000 MWh and 17,687 MWh solar projects.

Note: Solar power will displace electricity generated b the COGENS

Appendix A9: IC.9 - Solar Electricity Project – Shore Power

A9.1 – Map
A9.2 - Data Management System (TBD)
A9.3 – Emission Calculation Spreadsheet

Appendix A9.1: Map – IC.9 Solar Electricity Project – Shore Power



Appendix A9.2: IC.9 - Solar Electricity Project – Shore Power Data Management System (To Be Provided Later)

Appendix A9.3: IC.9 - Solar Electricity Project - Shore Power Emissions Calculation Spreadsheet

Appendix A9.3 Emissions Calculation Spreadsheet
Chevron Richmond, IC.9 *Solar, Shore-Based*

Emissions Factors for Grid Electricity

	[lb/MWh]	Source
NOx	0.435	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
PM2.5	0.024	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2018, California
ROG	0.025	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
CO2e	480.50	US EPA Emissions & Generation Resource Integrated Database (eGRID), 2021, California
CO2e	692.25	CARB GHG, Regulated Emissions, and Energy Use in Transportation (GREET), 2022, CMAX area (California)

Project	MWh/year	NOx [mTon]	PM2.5 [mTon]	ROG [mTon]	CO2e, EPA Basis [mTon]	CO2e, CARB Basis [mTon]
Solar Project- Shore Based	20,000	3.95	0.22	0.23	4,358.98	6,280.00

These calculations show the emissions that would be eliminated by displacing PG&E electricity with solar assuming a 20,000 MWh MWh solar project.

Note: Solar power will displace electricity generated by the COGENS

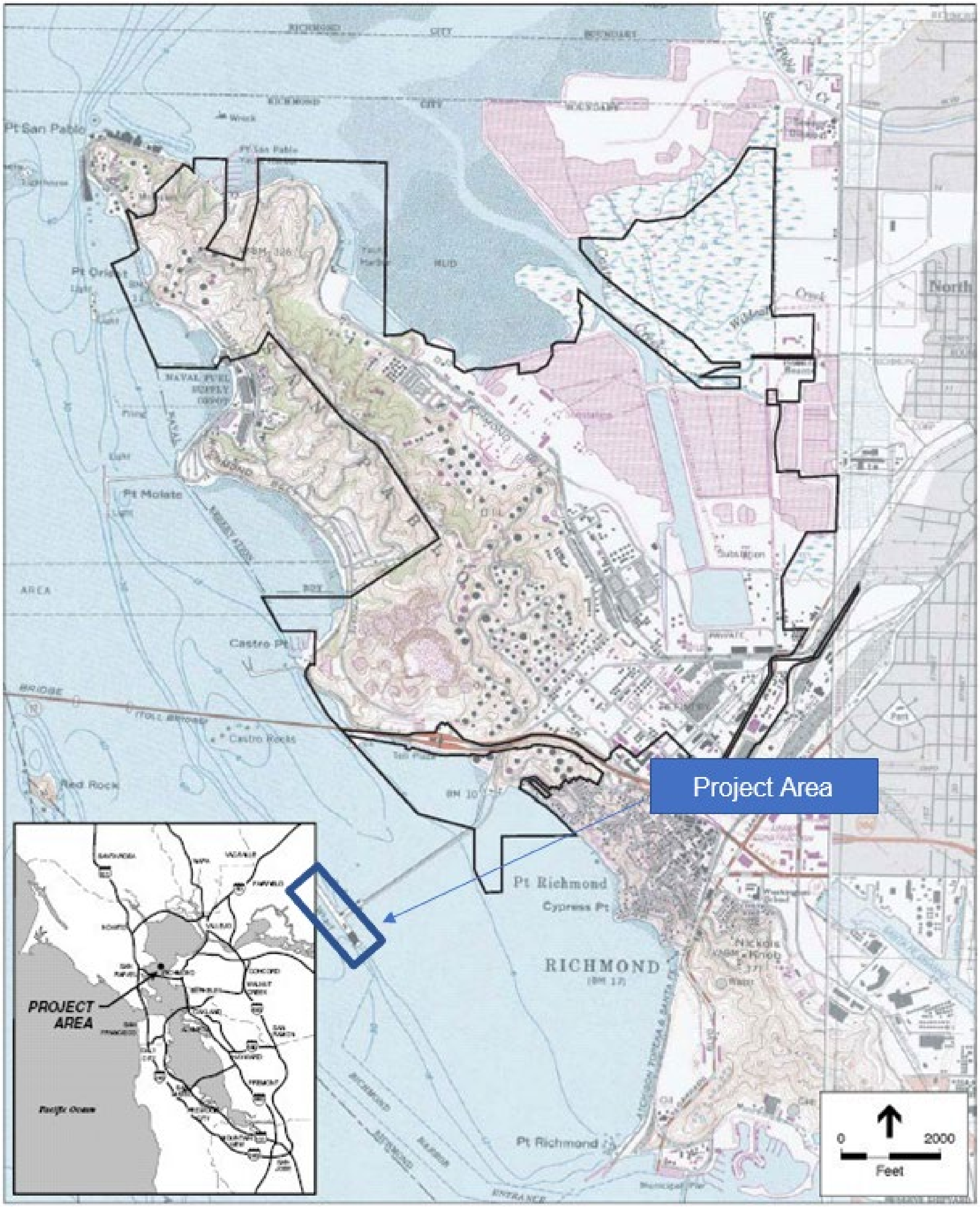
Appendix A10: IC.10 - Tier II or above certification on Auxiliary Engines (AE's) for ships

A10.1 – Map
A10.2 - Data Management System
A10.3 – Emission Calculation Spreadsheet

Inputs

Calculations

Appendix A10.1: Map - IC.10 - Tier II or above certification on Auxiliary Engines (AE's) for ships



Refinery Boundary

Appendix A10.2: IC.10 - Tier II or above certification on Auxiliary Engines (AE's) Data Management System

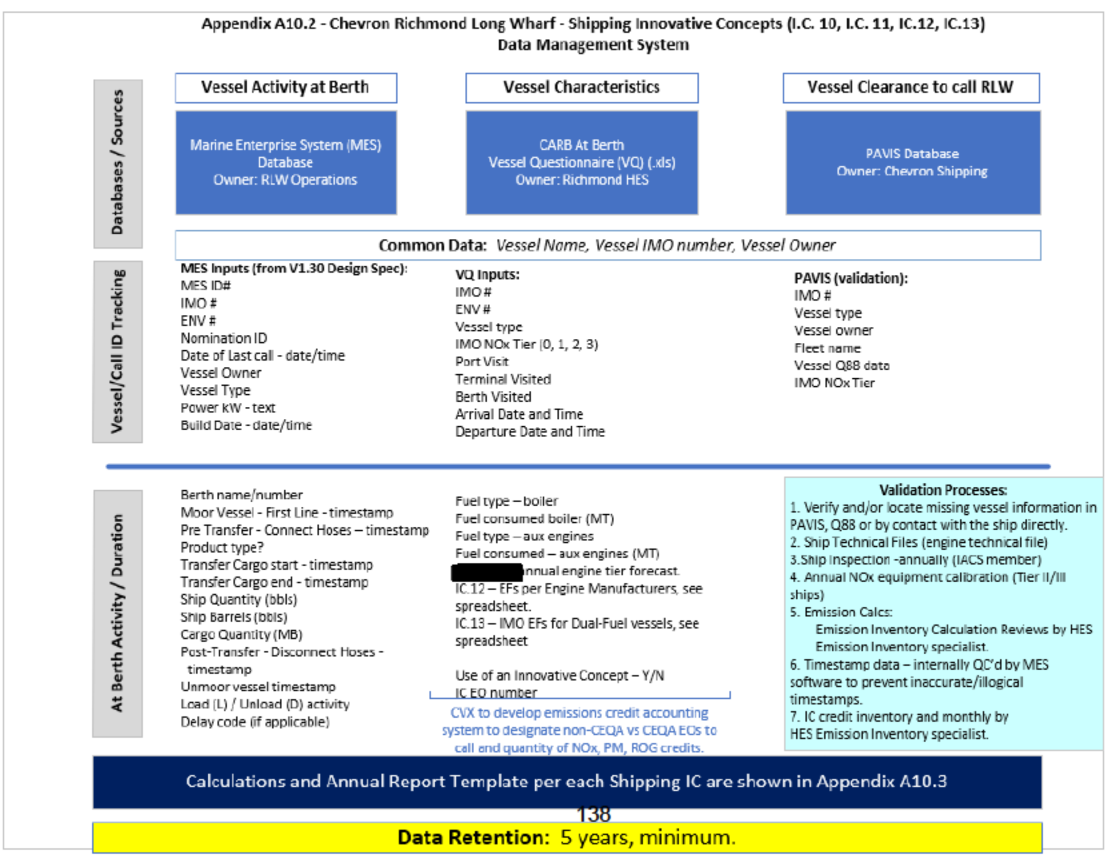
Chevron maintains a central database, called the Marine Enterprise System ("MES"), which tracks shipping activity from the initial cargo nomination to the vessel arrival, load or discharge of the nominated cargo at berth, concluding with the vessel departure (unmooring). As shown below, MES is the source of the majority of data inputs used to calculate vessel activity at berth, particularly timestamps for mooring and unmooring, cargo transfer start and finish, and total barrels transferred by cargo type, as well as vessel details such as IMO number, vessel owner and vessel type.

These vessel at berth activity inputs are common to not only the Baseline emissions calculations, but any vessel-related innovative concepts that require an estimate of emissions associated with at-berth activity, such as IC.10, IC.11, IC.12, IC.13 and IC.14.

In addition to the data inputs provided or derived from MES, Chevron uses the CARB at Berth Vessel Questionnaire (VQ) to supplement inputs to the Baseline calculations, which is an .xls workbook submitted by the vessel to CARB within 30 days of the vessel call, with a cc: to the Richmond Long Wharf. The VQ spreadsheet provides further details that may not be available through MES, such as the vessel type, IMO NOx Tier (0, 1, 2, 3) and can further support as a data quality check for timestamps provided in MES for vessel arrival date/time and departure date/time.

Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data If the data are not present in PAVIS, Chevron Shipping may also:

- Request additional data submission from vessels, by making this a requirement through changes in the Terminal Information Booklet, including request for information from the vessels Technical Files, as shown in the Validation Processes, below.



Appendix A10.3 –IC.10 Tier II or Above Certification on Auxiliary Engines Emission Calculation Spreadsheets

Appendix A10.3 Emissions Calculation Spreadsheet

Chevron Richmond, IC.10 - Tier II or above certification for Auxiliary Engines

Total Emissions and Reductions from Tier II Aux Engines (MT)	NOx (MT/Yr)	PM2.5 (MT/Yr)	ROG (MT/Yr)	*Additional Details*
Baseline Emissions with CARB default Emission Factor	46.96	0.58	1.77	*Total Aux engine emissions from vessel calls with Tier II Aux engines assuming CARB default baseline emission factors.*
Emissions using Tier II Emission Factor	35.73	0.58	1.77	*Total Aux engine emissions from vessel calls with Tier II Aux engines assuming Tier II emission factors. (Chevron has only assumed NOx reductions at this time)*
Emission reductions from IC.10	**11.23**	**0.00**	**0.00**	

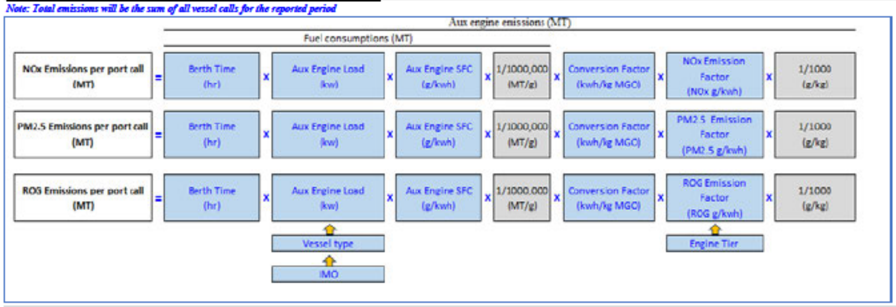
Illustration of how Chevron will only claim emission credit beyond business as usual

Total Emissions Reductions above Business as Usual	NOx (MT/Yr)	PM2.5 (MT/Yr)	ROG (MT/Yr)	*Additional Details*
Third Party Marine Broker Forecast for Tier II Adoption Rate (forecast for 2023)	45%	45%	45%	*Sample forecast acutal data will be provided from third party for the reported period*
Chevron's Tier II Adoption Rate	24%	24%	24%	*Chevron's Tier II adoption rate based on overall Tier II vessel calls for the reported period. (Chevron has only assumed NOx reductions at this time)*
Is Chevron's Tier II Adoption Rate Higher than Third Party Marine Broker Forecast	No	No	No	
Chevron's Claim "Beyond Business as Usual" Adoption Rate	0%	0%	0%	
Chevron's Emission Credit 'Beyond Business as Usual'	**0.00**	**0.00**	**0.00**	*This is an illustrative calculation based on the sample data provided. The intent is to demonstrate the calculation methodology.*

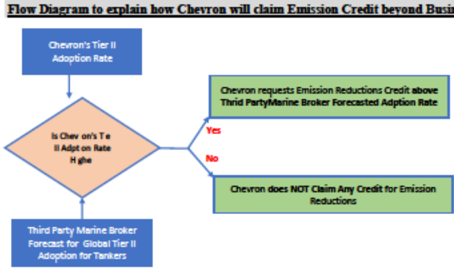
Estimated Annual NOx Emission Reduction Credit from IC.10	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Third Party Marine Broker forecast for Tier II Adoption Rate	45%	45%	45%	44%	43%	42%	41%	40%	40%	*Sample forecast actual data will be provided annually from third party*
Chevron's forecast for Tier II Adoption Rate	40%	41%	44%	46%	48%	51%	53%	56%	56%	
Chevron's forecast on beyond Business as Usual Adoption Rate	0.0%	0.0%	0.0%	2.0%	4.6%	8.9%	12.4%	15.8%	15.8%	
Chevron's forecast Emission Credit Beyond Business as Usual (MT/Yr)	0.00	0.00	0.00	0.90	2.12	4.08	5.67	7.26	7.26	*This is an illustrative calculation based on the sample data provided. The intent is to demonstrate the calculation methodology.*

Flow Chart to explain Emissions Calculations for Each Vessel Call

Note: Total emissions will be the sum of all vessel calls for the reported period



Flow Diagram to explain how Chevron will claim Emission Credit beyond Business as Usual



Inputs & Data Sources

Inputs	Sources
Aux Engine Load (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 9.* [1] *
Aux Boiler Load Idle and Pumping (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 10.* [1] *
Aux Engine SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] *
Aux Boiler SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Resutls, Appendix H, H53.* [2] *
Conversion Factor (kwh/kg MGO)	*Final Regulation Section 93130.17 (d) (1) (B)*
Aux Engine Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (1)* *2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] * *NOx: IMO 4th GHG Study, P.410.* [3]
Aux Boiler Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (2)* *Test results from engine manufacturer.* [4] *NOx: IMO 4th GHG Study, P.410.* [3]
Berth Time (Pumping and Idle)	It will be provided by vessel itself through Vessel Visit Report and incorprated into Chevron's own data management system
IMO	
Vessel Class	
Engine Tier	
Third Party Marine Broker Forecast for Enginer Tier Adoption Rate for Global Tankers	*Sample forecast from third party marine broker: acutal data will be updated annually for IC.10 and IC.11.*

Value

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Engine Load	1395	1050	832	986	689	1011

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Boiler Load Pumping	421	3089	3547	4976	8170	8262
Aux Boiler Load Idling	875	875	875	875	875	875

Aux Engine SFC (g/kwh)	217
Aux Engine SFC (g/kwh)	300
Conversion Factor (1/0.27) (kwh/kg MGO)	3.70

Aux Engine Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)**	ROG (g/kwh)**
CARB Baseline	0	13.80	0.17	0.52
Tier I	1	12.20	0.17	0.52
Tier II (IC.10)	2	10.50	0.17	0.52
Tier III (IC.11)	3	2.60	0.17	0.52
Chevron Lightering Vessels ***	TG	0.00	0.17	0.52
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.52

Aux Boiler Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)
CARB Base	No Upgrade	2.00	0.17	0.11
Burner Upgrade (IC.12)	Upgrade	0.27	0.17	0.11
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.11

Year	Tier III	Tier II	Tier I	Tier 0 and below	Total
2023 YTD	13%	45%	35%	8%	100%
2023	15%	45%	33%	8%	100%
2024	17%	45%	32%	7%	100%
2025	19%	45%	30%	7%	100%
2026	22%	44%	29%	6%	100%
2027	25%	43%	27%	6%	100%
2028	28%	42%	26%	5%	100%
2029	31%	41%	24%	5%	100%
2030	34%	40%	22%	5%	100%

Note

* Chevron is conducting representative exhaust emission analysis from engines of varied tiers (II/III) and Aux boilers. Based on results, Chevron might propose to CARB to use alternate engine load, SFC, and emission factors for calculation of emissions from Aux engines and Aux boilers.

** Chevron is presently not proposing lower emission factors for PM2.5 and ROG as we are not claiming any emission reductions for these items. As stated in the Terminal Plan, Chevron is planning to conduct representative sampling on Tier II/III Aux engines and Aux boilers. Based on test results, Chevron will approach CARB to include those emission reductions in IC calculations. New emission factors will be proposed based on OEM recommendations and test results.

*** Chevron Pacific Lightering vessels Pegasus and Polaris Voyagers have tier II AE. Since those vessels use steam Turbine Generators (TG) during cargo operation while at berth, so no NOx emissions are assumed for those vessels.

Links to documents that are referenced in this spreadsheet

1 Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)
2 2019 Update to Inventory for Ocean-Going Vessels At Berth_Methodology and Results (ca.gov)
3 https //www.imo.org/en/ourwork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx
4 Technical File for Burner Upgrade

Table 2.8: Auxiliary Boiler Load Defaults by Mode, kW

Vessel Type	Transit	Maneuvering	Berth Hotelling	Anchorage Hotelling
Auto Carrier	85	187	323	314
Bulk	52	122	156	156
Bulk - Heavy Load	35	94	125	125
Bulk - Self Discharging	44	103	132	132
Container - 1000	148	296	760	376
Container - 2000	79	142	323	180
Container - 3000	188	180	888	361
Container - 4000	161	335	490	487
Container - 5000	223	446	484	477
Container - 6000	280	544	761	757
Container - 8000	241	442	558	554
Container - 9000	286	526	555	513
Container - 10000	278	418	598	598
Container - 11000	202	362	456	463
Container - 12000	351	586	677	677
Container - 13000	257	357	580	594
Container - 14000	379	552	696	696
Container - 15000	259	395	402	402
Container - 16000	238	440	525	525
Container - 19000	38	144	848	848
Container - 23000	40	151	890	890
General Cargo	56	127	169	168
Ocean Tugboat (ATB/ITB)	0	0	0	0
Miscellaneous	54	109	140	140
RoRo	104	206	282	282
Tanker - Chemical	94	137	421	261
Tanker - Handysize	144	287	3,089	323
Tanker - Panamax	262	382	3,547	538
Tanker - Aframax	196	259	4,976	390
Tanker - Suezmax	144	99	8,170	516
Tanker - VLCC	240	116	8,262	467
Tanker - ULCC	235	322	10,718	366

Port of Long Beach *10* *October 2021*

Update to Inventory for Ocean-Going Vessels At Berth

Appendix A: Emission Factors
Emission Factors (all in g/kW*hr)

Engine type	Mode	Fuel type	Fuel S content (%)	Tier ID	CH4	N2O	NH3	ROG	CO	SOx	NOx	HC	PM 10	PM 2.5	CO2	TOG	Fuel Used
Auxiliary	At Berth	Distillate	0.1	0	0.008	0.033	0.001	0.520	1.10	0.424	13.800	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	1	0.008	0.033	0.001	0.520	1.10	0.424	12.200	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	2	0.008	0.033	0.001	0.520	1.10	0.424	10.500	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	3	0.008	0.033	0.001	0.520	1.10	0.424	2.600	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	0	0.008	0.033	0.001	0.520	1.10	1.273	13.800	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	1	0.008	0.033	0.001	0.520	1.10	1.273	12.200	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	2	0.008	0.033	0.001	0.520	1.10	1.273	10.500	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	3	0.008	0.033	0.001	0.520	1.10	1.273	2.600	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	1	0	0.008	0.033	0.001	0.520	1.10	4.242	13.800	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	1	0.008	0.033	0.001	0.520	1.10	4.242	12.200	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	2	0.008	0.033	0.001	0.520	1.10	4.242	10.500	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	3	0.008	0.033	0.001	0.520	1.10	4.242	2.600	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Residual	2.7	0	0.008	0.036	0.001	0.460	1.10	11.983	14.700	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	1	0.008	0.036	0.001	0.460	1.10	11.983	13.000	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	2	0.008	0.036	0.001	0.460	1.10	11.983	11.200	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	3	0.008	0.036	0.001	0.460	1.10	11.983	2.309	0.40	1.436	1.321	707	0.510	227
Boiler	At Berth	Distillate	0.1	99	0.002	0.045	0.006	0.110	0.20	0.587	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	0.3	99	0.002	0.045	0.006	0.110	0.20	1.636	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	1	99	0.002	0.045	0.006	0.110	0.20	1.760	1.995	0.10	0.589	0.542	934	0.130	300
Boiler	At Berth	Residual	2.7	99	0.002	0.049	0.006	0.110	0.20	16.100	2.100	0.10	1.465	1.348	950	0.130	305

Sources:

California Air Resources Board H-53

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To whom it may concern

Subject: Flue gas emission data of MF PA burners

The flue gas compositions including calculations are simulated as below table in general based on the actual measurements from Alfa Laval Test Centre in Aalborg.

Burner type	Fuel oil	Burner Load	O_2 Content*3	CO Content, Less than		NOx Content, Less than			CARB*4 Regulation, Max. NOx
		(%)	(%)	(ppm)	(mg/Nm^3)	(ppm)	(mg/Nm^3)	(g/kWh)	(g/kWh)
MF PA	MDO*1	100	4.0	10	13	120	246	0.27	0.4
		75	4.0	2	3	107	219	0.24	0.4
		50	5.0	2	3	96	197	0.22	0.4
		33	6.0	23	28	60	122	0.14	0.4
	LNG*2	100	4.0	10	13	60	123	0.13	0.4
		75	4.0	5	7	60	124	0.13	0.4
		50	5.0	3	3	59	121	0.12	0.4
		33	6.0	5	6	56	114	0.12	0.4

(Remarks)

- CO_2 content is not included due to combustion efficiency index.
- The local factors may affect the actual data measured on-site.

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine: Ox (g/kwh)	PM2.5 (g/kwh)	ROG (g/kw)	CARB Em ss on Facto s Aux Bo ler: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: Ox (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: NOx (MT)	PM2.5 MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler: Ox (MT)	PM2 5 (MT)	ROG (MT)
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/20/2021 20 29	7/23/2021 10 19	61.83	39.75	22.08	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	13.23	65.14	0.68	0.01	0.03	0.48	0.04	0.03	0.51	0.01	0.03	0.48	0.04	0.03
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/28/2021 3 29	7/31/2021 6 24	74.92	58.17	16.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.03	91.23	0.82	0.01	0.03	0.68	0.06	0.04	0.62	0.01	0.03	0.68	0.06	0.04
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/19/2021 13 54	4/20/2021 16 17	26.38	19.58	6.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.01	19.93	0.31	0.00	0.01	0.15	0.01	0.01	0.06	0.00	0.01	0.15	0.01	0.01
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/25/2021 14 50	4/28/2021 14 25	71.58	0.00	71.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	16.31	18.79	0.83	0.01	0.03	0.14	0.01	0.01	0.16	0.01	0.03	0.14	0.01	0.01
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/14/2021 10 06	5/18/2021 13 51	99.75	76.92	22.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	22.73	77.27	1.16	0.01	0.04	0.57	0.05	0.03	1.03	0.01	0.04	0.57	0.05	0.03
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/21/2021 6 06	5/22/2021 18 32	36.43	25.28	11.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.30	26.36	0.42	0.01	0.02	0.20	0.02	0.01	0.38	0.01	0.02	0.20	0.02	0.01
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/2/2021 14 09	1/3/2021 23 11	33.03	22.83	10.20	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	58.64	0.25	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/13/2021 9 17	1/14/2021 10 49	25.53	17.67	7.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	3.82	45.37	0.20	0.00	0.01	0.34	0.03	0.02	0.04	0.00	0.01	0.34	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	2/25/2021 1 33	2/26/2021 20 25	42.87	20.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.41	56.85	0.33	0.00	0.01	0.42	0.04	0.02	0.06	0.00	0.01	0.42	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	4/27/2021 22 58	4/29/2021 3 48	28.83	21.33	7.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.31	54.26	0.22	0.00	0.01	0.40	0.03	0.02	0.04	0.00	0.01	0.40	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	5/31/2021 6 35	6/1/2021 19 19	36.73	22.42	14.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.49	58.70	0.28	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/10/2021 18 40	6/12/2021 10 27	39.78	24.17	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.95	63.33	0.30	0.00	0.01	0.47	0.04	0.03	0.06	0.00	0.01	0.47	0.04	0.03
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/21/2021 22 06	6/23/2021 8 33	34.45	21.33	13.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.15	55.73	0.26	0.00	0.01	0.41	0.04	0.02	0.05	0.00	0.01	0.41	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/2/2021 23 45	7/5/2021 6 35	54.83	11.67	43.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.20	39.93	0.42	0.01	0.02	0.30	0.03	0.02	0.08	0.01	0.02	0.30	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/19/2021 19 12	7/21/2021 18 12	47.00	20.58	26.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.03	57.38	0.36	0.00	0.01	0.43	0.04	0.02	0.07	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	9/15/2021 20 30	9/17/2021 6 18	33.80	15.58	18.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.05	42.98	0.26	0.00	0.01	0.32	0.03	0.02	0.05	0.00	0.01	0.32	0.03	0.02
26	Af aMax	115,594	Chev on	Non-US	2.00	No Upg ade	1	10/4/2021 23 37	10/7/2021 9 11	57.57	0.00	57.57	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	12.32	15.11	0.63	0.01	0.02	0.11	0.01	0.01	0.48	0.01	0.02	0.11	0.01	0.01
31	Chem cal	35 210	Chev on	Non-US	1.00	No Upg ade	2	9/18/2021 6 30	9/18/2021 20 15	13.75	0.00	13.75	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.16	3.61	0.21	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
39	Af aMax	105,614	Chev on	Non-US	1.00	No Upg ade	1	10/13/2021 18 00	10/16/2021 9 21	63.35	46.92	16.43	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.55	74.35	0.69	0.01	0.03	0.55	0.05	0.03	0.61	0.01	0.03	0.55	0.05	0.03
42	P oduct	49 951	Chev on	Non-US	2.00	No Upg ade	2	2/4/2021 12 39	2/5/2021 6 31	17.87	7.25	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.07	9.51	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	2	3/2/2021 14 18	3/5/2021 6 24	64.10	0.00	64.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.61	16.83	0.75	0.01	0.03	0.12	0.01	0.01	0.66	0.01	0.03	0.12	0.01	0.01
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	9/27/2021 14 45	9/29/2021 19 49	53.07	0.00	53.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.09	13.93	0.62	0.01	0.02	0.10	0.01	0.01	0.55	0.01	0.02	0.10	0.01	0.01
49	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	2/3/2021 7 20	2/6/2021 7 11	71.85	0.00	71.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.37	18.86	0.84	0.01	0.03	0.14	0.01	0.01	0.74	0.01	0.03	0.14	0.01	0.01
51	Af aMax	115,392	Chev on	Non-US	1.00	No Upg ade	1	4/29/2021 0 10	5/2/2021 14 27	86.28	49.67	36.62	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	18.46	83.75	0.94	0.01	0.04	0.62	0.05	0.03	0.83	0.01	0.04	0.62	0.05	0.03
52	PanaMax	79 700	Chev on	Non-US	2.00	No Upg ade	3	12/4/2021 20 49	12/7/2021 6 13	57.40	0.00	57.40	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.36	15.07	0.53	0.01	0.02	0.11	0.01	0.01	0.40	0.01	0.02	0.11	0.01	0.01
53	Af aMax	105,335	Chev on	Non-US	1.00	No Upg ade	1	7/1/2021 18 17	7/4/2021 6 22	60.08	44.92	15.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.86	71.03	0.66	0.01	0.02	0.53	0.04	0.03	0.58	0.01	0.02	0.53	0.04	0.03
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	1/1/2021 8 59	1/2/2021 16 19	31.33	0.00	31.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.14	8.22	0.36	0.00	0.01	0.06	0.01	0.00	0.28	0.00	0.01	0.06	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	2/8/2021 5 50	2/9/2021 18 00	36.17	0.00	36.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.24	9.49	0.42	0.01	0.02	0.07	0.01	0.00	0.32	0.01	0.02	0.07	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	3/17/2021 2 48	3/19/2021 18 12	63.40	0.00	63.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.45	16.64	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	8/29/2021 2 48	9/1/2021 1 34	70.77	0.00	70.77	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.12	18.58	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	10/10/2021 3 22	10/11/2021 20 10	40.80	0.00	40.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.30	10.71	0.48	0.01	0.02	0.08	0.01	0.00	0.36	0.01	0.02	0.08	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	11/4/2021 17 57	11/6/2021 16 14	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.55	12.15	0.54	0.01	0.02	0.09	0.01	0.00	0.41	0.01	0.02	0.09	0.01	0.00
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	5/7/2021 0 43	5/8/2021 11 18	34.58	22.33	12.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.17	57.95	0.26	0.00	0.01	0.43	0.04	0.02	0.20	0.00	0.01	0.43	0.04	0.02
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	8/23/2021 23 48	8/26/2021 11 26	59.63	19.50	40.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	58.33	0.46	0.01	0.02	0.43	0.04	0.02	0.35	0.01	0.02	0.43	0.04	0.02
64	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/22/2021 17 46	12/24/2021 19 53	50.12	0.00	50.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.42	13.16	0.58	0.01	0.02	0.10	0.01	0.01	0.44	0.01	0.02	0.10	0.01	0.01
75	PanaMax	74 246	Chev on	Non-US	2.00	No Upg ade	1	6/19/2021 17 46	6/24/2021 13 42	115.93	0.00	115.93	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.93	30.43	1.07	0.01	0.04	0.23	0.02	0.01	0.81	0.01	0.04	0.23	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	7/11/2021 0 10	7/12/2021 12 11	36.02	21.75	14.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	6.50	26.89	0.33	0.00	0.01	0.20	0.02	0.01	0.25	0.00	0.01	0.20	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	10/10/2021 7 06	10/12/2021 8 32	49.43	16.83	32.60	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	26.47	0.46	0.01	0.02	0.20	0.02	0.01	0.35	0.01	0.02	0.20	0.02	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	3/21/2021 20 46	3/22/2021 17 19	20.55	8.92	11.63	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.40	16.36	0.22	0.00	0.01	0.12	0.01	0.01	0.17	0.00	0.01	0.12	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	1	4/6/2021 20 40	4/8/2021 18 49	46.15	36.92	9.23	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.87	57.53	0.50	0.01	0.02	0.43	0.04	0.02	0.38	0.01	0.02	0.43	0.04	0.02
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	5/13/2021 0 25	5/13/2021 21 15	20.83	10.42	10.42	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.46	18.28	0.23	0.00	0.01	0.14	0.01	0.01	0.17	0.00	0.01	0.14	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	6/12/2021 22 40	6/13/2021 15 55	17.25	9.50	7.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.69	16.22	0.19	0.00	0.01	0.12	0.01	0.01	0.14	0.00	0.01	0.12	0.01	0.01
82	SuezMax	158,826	Chev on	Non-US	1.00	No Upg ade	4	4/26/2021 10 23	4/27/2021 20 39	34.27	21.08	13.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	55.14	0.26	0.00	0.01	0.41	0.03	0.02	0.23	0.00	0.01	0.41	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	1	2/22/2021 20 45	2/25/2021 6 20	57.58	35.92	21.67	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.40	43.91	0.53	0.01	0.02	0.33	0.03	0.02	0.47	0.01	0.02	0.33	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	5/21/2021 22 29	5/22/2021 23 10	24.68	17.42	7.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.46	20.44	0.23	0.00	0.01	0.15	0.01	0.01	0.20	0.00	0.01	0.15	0.01	0.01
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	8/1/2021 6 37	8/2/2021 15 53	33.27	23.75	9.52	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.01	27.77	0.31	0.00	0.01	0.21	0.02	0.01	0.27	0.00	0.01	0.21	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/5/2021 20 22	8/7/2021 14 13	41.85	33.33	8.52	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.95	52.00	0.46	0.01	0.02	0.39	0.03	0.02	0.09	0.01	0.02	0.39	0.03	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/17/2021 8 33	8/22/2021 14 48	126.25	19.92	106.33	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	27.01	57.64	1.38	0.02	0.05	0.43	0.04	0.02	0.26	0.02	0.05	0.43	0.04	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	9/1/2021 6 17	9/5/2021 22 09	111.87	0.00	111.87	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	23.94	29.37	1.22	0.02	0.05	0.22	0.02	0.01	0.23	0.02	0.05	0.22	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	11/27/2021 15 13	12/1/2021 4 25	85.20	67.50	17.70	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.23	105.41	0.93	0.01	0.04	0.78	0.07	0.04	0.18	0.01	0.04	0.78	0.07	0.04
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	12/26/2021 5 31	12/28/2021 19 41	62.17	0.00	62.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	13.30	16.32	0.68	0.01	0.03	0.12	0.01	0.01	0.13	0.01	0.03	0.12	0.01	0.01
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/16/2021 18 51	9/19/2021 20 56	74.08	53.33	20.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.85	85.06	0.81	0.01	0.03	0.63	0.05	0.03	0.72	0.01	0.03	0.63	0.05	0.03
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/23/2021 14 34	9/26/2021 16 20	73.77	38.67	35.10	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.78	66.94	0.81	0.01	0.03	0.50	0.04	0.03	0.71	0.01	0.03	0.50	0.04	0.03
94	Chem cal	25 399	Chev on	Non-US	1.00	No Upg ade	2	11/9/2021 12 19	11/10/2021 18 32	30.22	0.00	30.22	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.15	7.93	0.47	0.01	0.02	0.06	0.00	0.00	0.41	0.01	0.02	0.06	0.00	0.00
95	P oduct	46 046	Chev on	Non-US	1.00	No Upg ade	2	7/13/2021 15 39	7/15/2021 23 09	55.50	0.00	55.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.65	14.57	0.65	0.01	0.02	0.11	0.01	0.01	0.57	0.01	0.02	0.11	0.01	0.01
96	P oduct	46 105	Chev on	Non-US	1.00	No Upg ade	2	8/11/2021 0 08	8/13/2021 16 05	63.95	0.00	63.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.57	16.79	0.74	0.01	0.03	0.12	0.01	0.01	0.66	0.01	0.03	0.12	0.01	0.01
99	P oduct	49 996	Chev on	Non-US	2.00	No Upg ade	1	1/13/2021 11 00	1/17/2021 1 55	86.92	0.00	86.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.80	22.82	1.01	0.01	0.04	0.17	0.01	0.01	0.77	0.01	0.04	0.17	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	1/31/2021 9 12	2/1/2021 14 44	29.53	19.58	9.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.73	20.76	0.34	0.00	0.01	0.15	0.01	0.01	0.34	0.00	0.01	0.15	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	2/1/2021 15 11	2/3/2021 12 15	45.07	0.00	45.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.27	11.83	0.52	0.01	0.02	0.09	0.01	0.00	0.52	0.01	0.02	0.09	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	4/30/2021 8 25	5/2/2021 0 27	40.03	0.00	40.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.12	10.51	0.47	0.01	0.02	0.08	0.01	0.00	0.47	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/15/2021 11 21	5/18/2021 21 57	82.60	32.08	50.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	18.82	42.99	0.96	0.01	0.04	0.32	0.03	0.02	0.96	0.01	0.04	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	5/18/2021 22 16	5/20/2021 13 35	39.32	0.00	39.32	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.96	10.32	0.46	0.01	0.02	0.08	0.01	0.00	0.46	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/30/2021 10 20	6/2/2021 7 14	68.90	37.00	31.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.70	42.66	0.80	0.01	0.03	0.32	0.03	0.02	0.80	0.01	0.03	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/8/2021 10 12	6/11/2021 14 22	76.17	49.08	27.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.35	52.59	0.89	0.01	0.03	0.39	0.03	0.02	0.89	0.01	0.03	0.39	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	6/17/2021 21 43	6/19/2021 15 42	41.98	32.42	9.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.57	32.55	0.49	0.01	0.02	0.24	0.02	0.01	0.49	0.01	0.02	0.24	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/19/2021 16 03	6/22/2021 9 36	65.55	19.92	45.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.94	30.44	0.76	0.01	0.03	0.23	0.02	0.01	0.76	0.01	0.03	0.23	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	7/2/2021 10 54	7/5/2021 14 33	75.65	55.75	19.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.24	56.89	0.88	0.01	0.03	0.42	0.04	0.02	0.88	0.01	0.03	0.42	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/6/2021 13 17	7/7/2021 10 00	20.72	0.00	20.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.72	5.44	0.24	0.00	0.01	0.04	0.00	0.00	0.24	0.00	0.01	0.04	0.00	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/14/2021 13 05	7/17/2021 18 40	77.58	60.92	16.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.68	60.83	0.90	0.01	0.03	0.45	0.04	0.02	0.90	0.01	0.03	0.45	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/25/2021 23 20	7/28/2021 8 08	56.80	32.42	24.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.94	36.44	0.66	0.01	0.02	0.27	0.02	0.01	0.66	0.01	0.02	0.27	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	8/3/2021 19 10	8/5/2021 12 23	41.22	34.50	6.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.39	33.73	0.48	0.01	0.02	0.25	0.02	0.01	0.48	0.01	0.02	0.25	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	9/19/2021 10 24	9/20/2021 19 01	32.62	24.50	8.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.43	24.83	0.38	0.00	0.01	0.18	0.02	0.01	0.38	0.00	0.01	0.18	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	9/22/2021 21 14	9/25/2021 4 12	54.97	0.00	54.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.52	14.43	0.64	0.01	0.02	0.11	0.01	0.01	0.64	0.01	0.02	0.11	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	11/17/2021 19 10	11/19/2021 11 25	40.25	14.08	26.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.17	19.92	0.47	0.01	0.02	0.15	0.01	0.01	0.47	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	1/4/2021 11 22	1/5/2021 15 30	28.13	17.33	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.41	18.90	0.33	0.00	0.01	0.14	0.01	0.01	0.33	0.00	0.01	0.14	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/5/2021 15 55	1/7/2021 20 38	52.72	0.00	52.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.01	13.84	0.61	0.01	0.02	0.10	0.01	0.01	0.61	0.01	0.02	0.10	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/17/2021 7 51	1/18/2021 10 26	26.58	15.25	11.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.06	17.11	0.31	0.00	0.01	0.13	0.01	0.01	0.31	0.00	0.01	0.13	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/28/2021 7 32	1/31/2021 2 00	66.47	35.83	30.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	41.25	0.77	0.01	0.03	0.31	0.03	0.02	0.77	0.01	0.03	0.31	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/5/2021 10 53	2/7/2021 8 12	45.32	21.08	24.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.33	25.90	0.53	0.01	0.02	0.19	0.02	0.01	0.53	0.01	0.02	0.19	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/13/2021 1 03	2/15/2021 19 10	66.12	24.00	42.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.06	33.30	0.77	0.01	0.03	0.25	0.02	0.01	0.77	0.01	0.03	0.25	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	2/22/2021 10 49	2/27/2021 4 00	113.18	32.75	80.43	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.79	51.46	1.32	0.02	0.05	0.38	0.03	0.02	1.32	0.02	0.05	0.38	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/7/2021 22 45	3/11/2021 18 10	91.42	40.08	51.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	20.83	50.62	1.06	0.01	0.04	0.37	0.03	0.02	1.06	0.01	0.04	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	3/23/2021 12 15	3/25/2021 10 19	46.07	29.67	16.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.50	31.80	0.54	0.01	0.02	0.24	0.02	0.01	0.54	0.01	0.02	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/25/2021 10 52	3/27/2021 6 30	43.63	0.00	43.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.94	11.45	0.51	0.01	0.02	0.08	0.01	0.00	0.51	0.01	0.02	0.08	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/4/2021 8 28	4/7/2021 2 55	66.45	30.58	35.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	37.76	0.77	0.01	0.03	0.28	0.02	0.02	0.77	0.01	0.03	0.28	0.02	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/12/2021 15 40	4/15/2021 18 23	74.72	34.92	39.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.02	42.80	0.87	0.01	0.03	0.32	0.03	0.02	0.87	0.01	0.03	0.32	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	4/21/2021 15 31	4/23/2021 11 41	44.17	0.00	44.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.06	11.59	0.51	0.01	0.02	0.09	0.01	0.00	0.51	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/23/2021 12 21	4/25/2021 18 31	54.17	23.25	30.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.34	29.66	0.63	0.01	0.02	0.22	0.02	0.01	0.63	0.01	0.02	0.22	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	5/2/2021 7 08	5/4/2021 11 02	51.90	39.50	12.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.83	39.86	0.60	0.01	0.02	0.30	0.03	0.02	0.60	0.01	0.02	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	5/10/2021 19 36	5/13/2021 19 00	71.40	40.17	31.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.27	45.42	0.83	0.01	0.03	0.34	0.03	0.02	0.83	0.01	0.03	0.34	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	8/6/2021 15 59	8/11/2021 4 46	108.78	42.50	66.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	24.79	56.78	1.27	0.02	0.05	0.42	0.04	0.02	1.27	0.02	0.05	0.42	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	8/23/2021 2 12	8/27/2021 2 20	96.13	43.00	53.13	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.90	53.80	1.12	0.01	0.04	0.40	0.03	0.02	1.12	0.01	0.04	0.40	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/1/2021 8 47	9/3/2021 12 39	51.87	11.00	40.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.82	20.92	0.60	0.01	0.02	0.15	0.01	0.01	0.60	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	9/9/2021 9 31	9/11/2021 4 20	42.82	0.92	41.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.76	11.85	0.50	0.01	0.02	0.09	0.01	0.00	0.50	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/19/2021 22 12	9/21/2021 8 43	34.52	11.58	22.93	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.86	16.75	0.40	0.00	0.02	0.12	0.01	0.01	0.40	0.00	0.02	0.12	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	10/1/2021 2 06	10/2/2021 4 15	26.15	0.00	26.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.96	6.86	0.30	0.00	0.01	0.05	0.00	0.00	0.30	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/2/2021 4 33	10/4/2021 10 45	54.20	8.08	46.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.35	19.60	0.63	0.01	0.02	0.15	0.01	0.01	0.63	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/16/2021 18 57	10/20/2021 16 55	93.97	54.42	39.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.41	60.81	1.09	0.01	0.04	0.45	0.04	0.02	1.09	0.01	0.04	0.45	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/1/2021 8 32	11/4/2021 1 20	64.80	49.25	15.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.76	49.72	0.75	0.01	0.03	0.37	0.03	0.02	0.75	0.01	0.03	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/4/2021 1 42	11/5/2021 2 20	24.63	0.00	24.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.61	6.47	0.29	0.00	0.01	0.05	0.00	0.00	0.29	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/13/2021 6 31	11/14/2021 13 06	30.58	24.75	5.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.97	24.47	0.36	0.00	0.01	0.18	0.02	0.01	0.36	0.00	0.01	0.18	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	11/14/2021 13 29	11/16/2021 2 21	36.87	15.50	21.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.40	19.97	0.43	0.01	0.02	0.15	0.01	0.01	0.43	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/21/2021 18 48	11/24/2021 8 12	61.40	23.75	37.65	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	13.99	31.89	0.72	0.01	0.03	0.24	0.02	0.01	0.72	0.01	0.03	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/1/2021 7 25	12/5/2021 23 15	111.83	35.25	76.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.48	52.77	1.30	0.02	0.05	0.39	0.03	0.02	1.30	0.02	0.05	0.39	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	12/14/2021 18 07	12/17/2021 20 14	74.12	31.50	42.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.89	40.38	0.86	0.01	0.03	0.30	0.03	0.02	0.86	0.01	0.03	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/23/2021 22 45	12/25/2021 14 15	39.50	27.92	11.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.00	28.91	0.46	0.01	0.02	0.21	0.02	0.01	0.46	0.01	0.02	0.21	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	12/25/2021 14 39	12/27/2021 8 44	42.08	0.00	42.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.59	11.05	0.49	0.01	0.02	0.08	0.01	0.00	0.49	0.01	0.02	0.08	0.01	0.00
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/17/2021 20 11	9/20/2021 1 20	53.15	19.08	34.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.95	55.72	0.41	0.01	0.02	0.41	0.04	0.02	0.00	0.01	0.02	0.41	0.04	0.02
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/13/2021 16 33	7/14/2021 10 29	17.93	7.83	10.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.09	9.91	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/19/2021 16 19	7/25/2021 20 08	147.82	16.75	131.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	33.68	49.93	1.72	0.02	0.06	0.37	0.03	0.02	1.31	0.02	0.06	0.37	0.03	0.02
112	P oduct	49 737	Chev on	Non-US	2.00	No Upg ade	2	8/29/2021 6 58	8/29/2021 23 14	16.27	0.00	16.27	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.71	4.27	0.19	0.00	0.01	0.03	0.00	0.00	0.14	0.00	0.01	0.03	0.00	0.00
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/7/2021 8 03	7/10/2021 12 10	76.12	0.00	76.12	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.29	19.98	0.83	0.01	0.03	0.15	0.01	0.01	0.74	0.01	0.03	0.15	0.01	0.01
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/12/2021 13 42	7/15/2021 3 11	61.48	0.00	61.48	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	16.14	0.67	0.01	0.03	0.12	0.01	0.01	0.59	0.01	0.03	0.12	0.01	0.01
133	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	2	7/10/2021 19 54	7/12/2021 20 28	48.57	0.00	48.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	11.07	12.75	0.57	0.01	0.02	0.09	0.01	0.01	0.11	0.01	0.02	0.09	0.01	0.01
134	P oduct	50 267	Chev on	Non-US	2.00	No Upg ade	2	4/17/2021 22 24	4/20/2021 12 02	61.63	0.00	61.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.04	16.18	0.72	0.01	0.03	0.12	0.01	0.01	0.55	0.01	0.03	0.12	0.01	0.01
136	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/18/2021 17 50	2/21/2021 7 20	61.50	0.00	61.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.01	16.14	0.72	0.01	0.03	0.12	0.01	0.01	0.54	0.01	0.03	0.12	0.01	0.01
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/7/2021 1 27	8/9/2021 11 13	57.77	42.42	15.35	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	43.34	0.67	0.01	0.03	0.32	0.03	0.02	0.59	0.01	0.03	0.32	0.03	0.02
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/14/2021 15 45	8/16/2021 2 25	34.67	26.83	7.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.90	26.92	0.40	0.00	0.02	0.20	0.02	0.01	0.36	0.00	0.02	0.20	0.02	0.01
142	Chem cal	35 058	Chev on	Non-US	2.00	No Upg ade	2	1/18/2021 13 05	1/18/2021 23 55	10.83	0.00	10.83	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.28	2.84	0.17	0.00	0.01	0.02	0.00	0.00	0.13	0.00	0.01	0.02	0.00	0.00
145	Chem cal	37 256	Chev on	Non-US	2.00	No Upg ade	2	2/24/2021 9 08	2/25/2021 8 49	23.68	0.00	23.68	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.17	6.22	0.37	0.00	0.01	0.05	0.00	0.00	0.28	0.00	0.01	0.05	0.00	0.00
160	SuezMax	156,654	Chev on	Non-US	1.00	No Upg ade	4	8/4/2021 9 16	8/6/2021 13 48	52.53	21.67	30.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.85	61.21	0.40	0.00	0.02	0.45	0.04	0.02	0.35	0.00	0.02	0.45	0.04	0.02
165	P oduct	46 554	Chev on	Non-US	1.00	No Upg ade	2	3/25/2021 12 50	3/27/2021 7 21	42.52	0.00	42.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.69	11.16	0.50	0.01	0.02	0.08	0.01	0.00	0.44	0.01	0.02	0.08	0.01	0.00
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	3/28/2021 2 55	3/31/2021 9 18	78.38	0.00	78.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.86	20.58	0.91	0.01	0.03	0.15	0.01	0.01	0.69	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	5/3/2021 22 06	5/7/2021 17 50	91.73	0.00	91.73	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.90	24.08	1.07	0.01	0.04	0.18	0.02	0.01	0.81	0.01	0.04	0.18	0.02	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	6/17/2021 14 07	6/19/2021 14 58	48.85	0.00	48.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.13	12.82	0.57	0.01	0.02	0.09	0.01	0.01	0.43	0.01	0.02	0.09	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	8/11/2021 6 25	8/14/2021 10 50	76.42	0.00	76.42	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.41	20.06	0.89	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	10/7/2021 3 05	10/9/2021 18 43	63.63	0.00	63.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.50	16.70	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
174	Chem cal	25 300	Chev on	Non-US	2.00	No Upg ade	2	7/12/2021 21 45	7/13/2021 13 23	15.63	0.00	15.63	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.73	4.10	0.24	0.00	0.01	0.03	0.00	0.00	0.18	0.00	0.01	0.03	0.00	0.00
175	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	12/17/2021 0 36	12/17/2021 22 16	21.67	11.50	10.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	13.33	0.25	0.00	0.01	0.10	0.01	0.01	0.05	0.00	0.01	0.10	0.01	0.01
183	P oduct	50 000	Chev on	Non-US	2.00	No Upg ade	3	8/21/2021 10 42	8/21/2021 21 32	10.83	0.00	10.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	2.47	2.84	0.13	0.00	0.00	0.02	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	6/30/2021 10 44	7/1/2021 3 05	16.35	0.00	16.35	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.95	4.29	0.25	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	10/7/2021 21 10	10/9/2021 7 16	34.10	0.00	34.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.32	8.95	0.53	0.01	0.02	0.07	0.01	0.00	0.40	0.01	0.02	0.07	0.01	0.00
190	PanaMax	68 439	Chev on	Non-US	1.00	No Upg ade	1	6/3/2021 18 19	6/6/2021 6 40	60.35	42.33	18.02	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.90	49.78	0.56	0.01	0.02	0.37	0.03	0.02	0.49	0.01	0.02	0.37	0.03	0.02
194	Chem cal	37 361	Chev on	Non-US	2.00	No Upg ade	2	4/15/2021 20 06	4/16/2021 10 12	14.10	0.00	14.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.27	3.70	0.22	0.00	0.01	0.03	0.00	0.00	0.17	0.00	0.01	0.03	0.00	0.00
198	Chem cal	33 641	Chev on	Non-US	1.00	No Upg ade	2	3/22/2021 5 39	3/22/2021 22 14	16.58	0.00	16.58	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	4.35	0.26	0.00	0.01	0.03	0.00	0.00	0.23	0.00	0.01	0.03	0.00	0.00
207	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	10/29/2021 9 09	10/30/2021 6 19	21.17	12.58	8.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.82	13.91	0.25	0.00	0.01	0.10	0.01	0.01	0.19	0.00	0.01	0.10	0.01	0.01
214	P oduct	51 393	Chev on	Non-US	1.00	No Upg ade	1	1/14/2021 13 23	1/15/2021 22 25	33.03	0.00	33.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.53	8.67	0.38	0.00	0.01	0.06	0.01	0.00	0.34	0.00	0.01	0.06	0.01	0.00

Port Calls & Calculation

Ship Number	CLASS	DWT	Chartered to	Flag US vs. Non-US	Aux Engine NOx Emission Tier	Boiler Type	Berth	Arrival Date/Time	Departure Date/Time	Total Berth (hrs)	Pumping (hrs)	Berth Time Non Pumping hr)	Aux Engine Load (kW)	Aux Boiler Load Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Emission Factors Aux Engine NOx (g/kwh)	CARB Aux Engine PM2.5 (g/kwh)	CARB Aux Engine ROG (g/kwh)	CARB Emission Factors Aux Boiler NOx (g/kwh)	CARB Aux Boiler PM2.5 (g/kwh)	CARB Aux Boiler ROG (g/kwh)	Emission Factors basis Chevron Innovative Concept Aux Engine NOx (g/kwh)	IC Aux Engine PM2.5 (g/kwh)	IC Aux Engine ROG (g/kwh)	Emission Factors basis Chevron Innovative Concept Aux Boiler NOx (g/kwh)	IC Aux Boiler PM2.5 (g/kwh)	IC Aux Boiler ROG (g/kwh)	Conversion Factor (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Emission Calc. based on CARB factors Aux. Engine NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on CARB factors Aux. Boiler NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on IC factors Aux. Engine NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on IC factors Aux. Boiler NOx (MT)	PM2.5 (MT)	ROG (MT)
219	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	5/31/2021 21 22	6/4/2021 2 21	76.98	0.00	76.98	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.54	20.21	0.90	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
220	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	4/12/2021 5 42	4/15/2021 13 22	79.67	0.00	79.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.15	20.91	0.93	0.01	0.03	0.15	0.01	0.01	0.17	0.01	0.03	0.15	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	4	10/1/2021 16 57	10/3/2021 20 52	51.92	32.33	19.58	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.11	53.41	0.57	0.01	0.02	0.40	0.03	0.02	0.43	0.01	0.02	0.40	0.03	0.02
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/3/2021 21 23	10/4/2021 22 08	24.75	7.08	17.67	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.30	15.21	0.27	0.00	0.01	0.11	0.01	0.01	0.21	0.00	0.01	0.11	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/7/2021 11 07	10/13/2021 9 35	142.47	68.00	74.47	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	30.48	121.06	1.56	0.02	0.06	0.90	0.08	0.05	1.19	0.02	0.06	0.90	0.08	0.05
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	11/5/2021 9 10	11/9/2021 4 57	91.78	0.00	91.78	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.64	24.09	1.00	0.01	0.04	0.18	0.02	0.01	0.76	0.01	0.04	0.18	0.02	0.01
228	SuezMax	149,995	Chev on	Non-US	3.00	No Upg ade	4	4/13/2021 13 43	4/15/2021 2 08	36.42	22.67	13.75	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.44	59.17	0.28	0.00	0.01	0.44	0.04	0.02	0.05	0.00	0.01	0.44	0.04	0.02
229	P oduct	51 745	Chev on	Non-US	1.00	No Upg ade	2	12/14/2021 0 28	12/16/2021 22 50	70.37	0.00	70.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.03	18.47	0.82	0.01	0.03	0.14	0.01	0.01	0.72	0.01	0.03	0.14	0.01	0.01
234	PanaMax	74 875	Chev on	Non-US	1.00	No Upg ade	1	4/2/2021 14 50	4/6/2021 6 28	87.63	0.00	87.63	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.82	23.00	0.81	0.01	0.03	0.17	0.01	0.01	0.71	0.01	0.03	0.17	0.01	0.01
236	P oduct	50 542	Chev on	Non-US	1.00	No Upg ade	1	5/2/2021 18 02	5/5/2021 19 34	73.53	0.00	73.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.75	19.30	0.86	0.01	0.03	0.14	0.01	0.01	0.76	0.01	0.03	0.14	0.01	0.01
237	P oduct	50 469	Chev on	Non-US	1.00	No Upg ade	2	5/23/2021 1 13	5/25/2021 13 13	60.00	0.00	60.00	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.67	15.75	0.70	0.01	0.03	0.12	0.01	0.01	0.62	0.01	0.03	0.12	0.01	0.01
238	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/19/2021 17 51	12/22/2021 16 25	70.57	0.00	70.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.08	18.52	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
241	P oduct	49 804	Chev on	Non-US	3.00	No Upg ade	3	2/21/2021 13 44	2/22/2021 8 12	18.47	10.50	7.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.21	11.82	0.22	0.00	0.01	0.09	0.01	0.00	0.04	0.00	0.01	0.09	0.01	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	3	1/21/2021 10 57	1/22/2021 3 40	16.72	0.00	16.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.81	4.39	0.19	0.00	0.01	0.03	0.00	0.00	0.15	0.00	0.01	0.03	0.00	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	2	1/24/2021 12 26	1/28/2021 1 27	85.02	0.00	85.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.37	22.32	0.99	0.01	0.04	0.17	0.01	0.01	0.75	0.01	0.04	0.17	0.01	0.01
248	Af aMax	115,909	Chev on	Non-US	1.00	No Upg ade	1	6/6/2021 8 35	6/13/2021 0 21	159.77	0.00	159.77	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	34.18	41.94	1.75	0.02	0.07	0.31	0.03	0.02	1.54	0.02	0.07	0.31	0.03	0.02
251	PanaMax	73 879	Chev on	Non-US	2.00	No Upg ade	4	6/13/2021 19 05	6/15/2021 0 15	29.17	20.33	8.83	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.27	23.96	0.27	0.00	0.01	0.18	0.02	0.01	0.20	0.00	0.01	0.18	0.02	0.01
253	P oduct	52 825	Chev on	Non-US	3.00	No Upg ade	3	4/15/2021 14 43	4/17/2021 6 17	39.57	0.00	39.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	9.02	10.39	0.46	0.01	0.02	0.08	0.01	0.00	0.09	0.01	0.02	0.08	0.01	0.00
255	P oduct	49 994	Chev on	Non-US	2.00	No Upg ade	3	7/7/2021 11 42	7/11/2021 13 48	98.10	0.00	98.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	22.35	25.75	1.14	0.01	0.04	0.19	0.02	0.01	0.87	0.01	0.04	0.19	0.02	0.01
258	Chem cal	26 029	Chev on	Non-US	2.00	No Upg ade	2	12/25/2021 1 55	12/25/2021 12 00	10.08	0.00	10.08	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.05	2.65	0.16	0.00	0.01	0.02	0.00	0.00	0.12	0.00	0.01	0.02	0.00	0.00
263	PanaMax	73 400	Chev on	Non-US	1.00	No Upg ade	1	6/13/2021 21 50	6/16/2021 16 25	66.58	54.50	12.08	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.02	61.17	0.61	0.01	0.02	0.45	0.04	0.02	0.54	0.01	0.02	0.45	0.04	0.02
264	P oduct	49 972	Chev on	Non-US	2.00	No Upg ade	2	6/4/2021 15 40	6/6/2021 10 45	43.08	0.00	43.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.82	11.31	0.50	0.01	0.02	0.08	0.01	0.00	0.38	0.01	0.02	0.08	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	1/27/2021 7 55	1/31/2021 0 12	88.28	25.25	63.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	20.12	39.95	1.03	0.01	0.04	0.30	0.03	0.02	0.19	0.01	0.04	0.30	0.03	0.02
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	2	2/2/2021 11 59	2/3/2021 19 06	31.12	0.00	31.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.09	8.17	0.36	0.00	0.01	0.06	0.01	0.00	0.07	0.00	0.01	0.06	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	2/26/2021 17 40	3/1/2021 13 58	68.30	0.00	68.30	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	15.56	17.93	0.80	0.01	0.03	0.13	0.01	0.01	0.15	0.01	0.03	0.13	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/11/2021 17 10	3/12/2021 11 06	17.93	9.75	8.18	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.09	11.18	0.21	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/22/2021 19 50	3/23/2021 13 15	17.42	9.17	8.25	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.97	10.66	0.20	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	4/3/2021 11 58	4/4/2021 7 30	19.53	10.73	8.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.45	12.26	0.23	0.00	0.01	0.09	0.01	0.00	0.20	0.00	0.01	0.09	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	6/16/2021 17 37	6/17/2021 15 40	22.05	11.25	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	13.26	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	7/10/2021 22 15	7/12/2021 11 08	36.88	18.83	18.05	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.40	22.19	0.43	0.01	0.02	0.16	0.01	0.01	0.38	0.01	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	8/15/2021 4 10	8/16/2021 15 06	34.93	18.92	16.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.96	21.73	0.41	0.01	0.02	0.16	0.01	0.01	0.36	0.01	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	8/24/2021 2 37	8/25/2021 6 14	27.62	17.00	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.29	18.54	0.32	0.00	0.01	0.14	0.01	0.01	0.28	0.00	0.01	0.14	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/13/2021 2 29	9/14/2021 3 33	25.07	11.92	13.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.71	14.50	0.29	0.00	0.01	0.11	0.01	0.01	0.26	0.00	0.01	0.11	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/28/2021 8 08	9/29/2021 6 35	22.45	12.08	10.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	13.92	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	10/30/2021 20 43	10/31/2021 19 48	23.08	16.58	6.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.26	17.07	0.27	0.00	0.01	0.13	0.01	0.01	0.24	0.00	0.01	0.13	0.01	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/1/2021 5 55	1/2/2021 9 23	27.47	18.08	9.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.11	46.79	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/7/2021 6 12	1/8/2021 9 28	27.27	19.25	8.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.08	49.29	0.21	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/19/2021 18 23	1/20/2021 15 13	20.83	9.75	11.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.11	26.81	0.16	0.00	0.01	0.20	0.02	0.01	0.00	0.00	0.01	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/25/2021 20 42	1/27/2021 9 09	36.45	25.33	11.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.45	65.01	0.28	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/4/2021 3 11	2/5/2021 8 14	29.05	19.58	9.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.34	50.48	0.22	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/11/2021 20 19	2/12/2021 22 01	25.70	16.92	8.78	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.84	43.77	0.20	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/23/2021 10 41	2/24/2021 11 40	24.98	16.72	8.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.74	43.14	0.19	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/2/2021 17 10	3/4/2021 0 15	31.08	19.58	11.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.65	51.02	0.24	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/11/2021 11 29	3/12/2021 7 24	19.92	10.67	9.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.98	28.57	0.15	0.00	0.01	0.21	0.02	0.01	0.00	0.00	0.01	0.21	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/19/2021 3 00	3/20/2021 15 16	36.27	20.58	15.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.42	54.57	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/28/2021 21 06	3/29/2021 21 08	24.03	14.08	9.95	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.59	37.13	0.18	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/3/2021 3 22	4/4/2021 15 20	35.97	21.00	14.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	55.40	0.27	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/18/2021 2 23	4/19/2021 6 29	28.10	19.08	9.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	49.14	0.21	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/3/2021 3 34	5/4/2021 16 41	37.12	20.25	16.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	54.06	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/19/2021 15 42	5/20/2021 16 23	24.68	18.33	6.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	46.60	0.19	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/26/2021 13 13	5/28/2021 11 26	46.22	18.75	27.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.91	53.17	0.35	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/5/2021 18 25	6/6/2021 20 10	25.75	19.25	6.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.85	48.89	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/19/2021 22 32	6/21/2021 6 27	31.92	21.67	10.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.77	55.80	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/29/2021 17 19	7/1/2021 2 05	32.77	16.50	16.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.90	44.71	0.25	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/9/2021 13 40	7/10/2021 16 17	26.62	20.50	6.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.98	51.85	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/16/2021 17 21	7/17/2021 20 10	26.82	19.75	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	50.26	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/27/2021 13 58	7/29/2021 1 08	35.17	16.58	18.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.26	45.52	0.27	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/7/2021 21 58	8/13/2021 17 50	139.87	14.17	125.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	20.91	67.72	1.07	0.01	0.04	0.50	0.04	0.03	0.00	0.00	0.04	0.50	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/19/2021 18 12	8/20/2021 18 52	24.67	16.33	8.33	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	42.22	0.19	0.00	0.01	0.31	0.03	0.02	0.00	0.00	0.01	0.31	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/26/2021 18 01	8/28/2021 6 50	36.82	17.58	19.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.50	48.15	0.28	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/4/2021 23 11	9/6/2021 9 18	34.12	18.50	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.10	49.44	0.26	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/10/2021 21 35	9/12/2021 0 25	26.83	18.17	8.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	46.80	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/25/2021 13 24	9/26/2021 17 52	28.47	17.50	10.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.26	45.77	0.22	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/4/2021 0 45	10/5/2021 1 41	24.93	17.92	7.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.73	45.76	0.19	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/12/2021 10 49	10/13/2021 8 19	21.50	16.00	5.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.21	40.66	0.16	0.00	0.01	0.30	0.03	0.02	0.00	0.00	0.01	0.30	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/17/2021 23 20	10/19/2021 1 44	26.40	20.08	6.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.95	50.88	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/31/2021 10 21	11/2/2021 22 27	60.10	19.08	41.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.99	57.54	0.46	0.01	0.02	0.43	0.04	0.02	0.00	0.00	0.02	0.43	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/12/2021 19 47	11/13/2021 21 13	25.43	19.50	5.93	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.80	49.35	0.19	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/19/2021 8 15	11/20/2021 20 21	36.10	17.50	18.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.40	47.77	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/28/2021 7 37	11/29/2021 15 48	32.18	22.17	10.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.81	56.96	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/6/2021 11 11	12/7/2021 4 25	17.23	10.17	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.58	26.77	0.13	0.00	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/13/2021 11 30	12/14/2021 9 52	22.37	14.75	7.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.34	38.15	0.17	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/19/2021 9 18	12/20/2021 13 22	28.07	17.75	10.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	46.21	0.21	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/24/2021 18 10	12/26/2021 7 19	37.15	16.83	20.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	46.59	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
289	Af aMax	114,809	Chev on	Non-US	1.00	No Upg ade	1	10/19/2021 23 14	10/25/2021 13 05	133.85	88.50	45.35	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	28.64	144.02	1.46	0.02	0.06	1.07	0.09	0.06	1.29	0.02	0.06	1.07	0.09	0.06
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/18/2021 14 00	1/19/2021 14 32	24.53	15.23	9.30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.67	39.78	0.19	0.00	0.01	0.29	0.03	0.02	0.17	0.00	0.01	0.29	0.03	0.02
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	2/19/2021 3 35	2/19/2021 19 45	16.17	8.43	7.73	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.42	22.70	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/12/2021 9 10	3/13/2021 7 46	22.60	7.92	14.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.38	23.26	0.17	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/27/2021 11 52	3/28/2021 8 14	20.37	8.00	12.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	22.85	0.16	0.00	0.01	0.17	0.01	0.01	0.14	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/9/2021 8 43	4/9/2021 23 14	14.52	8.33	6.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.17	22.05	0.11	0.00	0.00	0.16	0.01	0.01	0.10	0.00	0.00	0.16	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/12/2021 10 14	4/13/2021 2 30	16.27	8.58	7.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.43	23.05	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/25/2021 8 49	4/26/2021 8 10	23.35	8.08	15.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.49	23.82	0.18	0.00	0.01	0.18	0.01	0.01	0.16	0.00	0.01	0.18	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	5/25/2021 10 48	5/26/2021 9 44	22.93	7.75	15.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.43	22.98	0.18	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	7/26/2021 16 19	7/27/2021 11 47	19.47	6.50	12.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.91	19.34	0.15	0.00	0.01	0.14	0.01	0.01	0.13	0.00	0.01	0.14	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/9/2021 2 45	9/9/2021 23 18	20.55	6.50	14.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.07	19.62	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/22/2021 14 03	9/23/2021 10 25	20.37	6.67	13.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	19.94	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/30/2021 23 58	5/1/2021 20 02	20.07	7.00	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.00	20.59	0.15	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	8/28/2021 12 38	8/29/2021 2 53	14.25	7.25	7.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.13	19.61	0.11	0.00	0.00	0.15	0.01	0.01	0.10	0.00	0.00	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	10/6/2021 9 35	10/6/2021 23 47	14.20	6.83	7.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.12	18.68	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/11/2021 2 44	11/12/2021 3 14	24.50	7.33	17.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.66	22.48	0.19	0.00	0.01	0.17	0.01	0.01	0.17	0.00	0.01	0.17	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/29/2021 17 54	11/30/2021 8 42	14.80	7.00	7.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.21	19.20	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	6/25/2021 0 51	6/25/2021 15 31	14.67	7.75	6.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	20.81	0.11	0.00	0.00	0.15	0.01	0.01	0.11	0.00	0.00	0.15	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	7/18/2021 7 53	7/19/2021 17 26	33.55	11.83	21.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.02	34.70	0.26	0.00	0.01	0.26	0.02	0.01	0.26	0.00	0.01	0.26	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	10/19/2021 21 59	10/21/2021 9 14	35.25	7.58	27.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.27	25.85	0.27	0.00	0.01	0.19	0.02	0.01	0.27	0.00	0.01	0.19	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/15/2021 5 17	12/16/2021 8 32	27.25	6.58	20.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.07	21.56	0.21	0.00	0.01	0.16	0.01	0.01	0.21	0.00	0.01	0.16	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/29/2021 6 34	12/30/2021 8 42	26.13	6.92	19.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.91	22.00	0.20	0.00	0.01	0.16	0.01	0.01	0.20	0.00	0.01	0.16	0.01	0.01
294	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/29/2021 8 38	1/30/2021 8 10	23.53	6.42	17.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.52	20.22	0.18	0.00	0.01	0.15	0.01	0.01	0.16	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	1/15/2021 3 06	1/15/2021 22 55	19.82	6.75	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.96	19.97	0.15	0.00	0.01	0.15	0.01	0.01	0.15	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/2/2021 13 28	2/3/2021 13 16	23.80	7.58	16.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.56	22.84	0.18	0.00	0.01	0.17	0.01	0.01	0.18	0.00	0.01	0.17	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/16/2021 13 50	2/17/2021 2 15	12.42	5.83	6.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.86	16.03	0.09	0.00	0.00	0.12	0.01	0.01	0.09	0.00	0.00	0.12	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	3	3/5/2021 2 52	3/5/2021 17 30	14.63	6.42	8.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	17.88	0.11	0.00	0.00	0.13	0.01	0.01	0.11	0.00	0.00	0.13	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	5/17/2021 15 57	5/18/2021 14 37	22.67	6.83	15.83	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.39	20.90	0.17	0.00	0.01	0.15	0.01	0.01	0.17	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	8/15/2021 18 23	8/16/2021 7 08	12.75	6.75	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.91	18.12	0.10	0.00	0.00	0.13	0.01	0.01	0.10	0.00	0.00	0.13	0.01	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/5/2021 14 00	1/7/2021 2 11	36.18	17.42	18.77	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.41	47.61	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/16/2021 1 27	1/17/2021 4 20	26.88	20.08	6.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.02	51.01	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/21/2021 7 26	1/22/2021 16 21	32.92	22.75	10.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.92	58.43	0.25	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/1/2021 1 50	2/2/2021 4 10	26.33	19.25	7.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.94	49.04	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/8/2021 9 45	2/10/2021 6 15	44.50	20.42	24.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.65	56.36	0.34	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/17/2021 15 37	2/19/2021 1 15	33.63	22.08	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.03	57.16	0.26	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/14/2021 3 05	3/15/2021 12 23	33.30	21.75	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.98	56.34	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/23/2021 8 35	3/24/2021 10 25	25.83	19.83	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	50.19	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/30/2021 15 13	3/31/2021 22 26	31.22	20.83	10.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.67	53.79	0.24	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/7/2021 1 42	4/8/2021 6 25	28.72	18.00	10.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.29	46.93	0.22	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/16/2021 4 50	4/17/2021 12 20	31.50	21.58	9.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.71	55.50	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/21/2021 23 40	4/23/2021 6 36	30.93	21.58	9.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.62	55.36	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/9/2021 23 26	5/11/2021 15 18	39.87	17.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.96	49.49	0.30	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/23/2021 21 20	5/25/2021 8 09	34.82	21.92	12.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.21	57.10	0.27	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/6/2021 22 40	6/8/2021 14 14	39.57	17.33	22.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.92	48.32	0.30	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/17/2021 7 27	6/18/2021 14 53	31.43	23.08	8.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.70	58.77	0.24	0.00	0.01	0.44	0.04	0.02	0.00	0.00	0.01	0.44	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/25/2021 22 50	6/27/2021 3 59	29.15	12.50	16.65	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.36	35.01	0.22	0.00	0.01	0.26	0.02	0.01	0.00	0.00	0.01	0.26	0.02	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/14/2021 17 00	7/16/2021 4 31	35.52	25.08	10.43	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.31	64.22	0.27	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/22/2021 0 24	7/23/2021 9 22	32.97	20.50	12.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.93	53.52	0.25	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/2/2021 19 32	8/4/2021 6 45	35.22	22.08	13.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.27	57.57	0.27	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/14/2021 5 50	8/15/2021 13 53	32.05	20.00	12.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.79	52.18	0.24	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/22/2021 13 22	8/23/2021 21 21	31.98	21.75	10.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.78	56.00	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/31/2021 20 14	9/2/2021 6 25	34.18	19.92	14.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.11	52.56	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/7/2021 12 23	9/9/2021 0 44	36.35	22.33	14.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.43	58.42	0.28	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/14/2021 20 33	9/15/2021 18 17	21.73	14.25	7.48	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.25	36.89	0.17	0.00	0.01	0.27	0.02	0.02	0.00	0.00	0.01	0.27	0.02	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/21/2021 0 32	9/22/2021 12 15	35.72	20.50	15.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.34	54.24	0.27	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/28/2021 7 39	9/29/2021 18 24	34.75	18.08	16.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.20	48.70	0.27	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/7/2021 12 14	10/9/2021 23 31	59.28	22.17	37.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.86	64.07	0.45	0.01	0.02	0.47	0.04	0.03	0.00	0.01	0.02	0.47	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/15/2021 9 35	10/16/2021 20 05	34.50	19.92	14.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.16	52.64	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/21/2021 22 35	10/23/2021 0 23	25.80	17.08	8.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	44.16	0.20	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/6/2021 14 29	11/7/2021 22 13	31.73	15.83	15.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.74	42.98	0.24	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/16/2021 8 27	11/17/2021 20 28	36.02	21.42	14.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	56.32	0.28	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/23/2021 12 25	11/25/2021 11 35	47.17	23.75	23.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.05	64.36	0.36	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/3/2021 8 45	12/4/2021 12 42	27.95	19.92	8.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.18	50.92	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02

Appendix A10.3

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine			CARB Em ss on Facto s Aux Bo ler			Em ss on Facto s basis Chevron Innovat veConcept Aux Engine			m ss on Facto s basis Chevron nnovat veConcept Aux Boiler			Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine			Em ss on Calc. based on CARB facto s Aux. Boiler			Em ss on Calc. based on IC factors Aux. Eng ne			Em ss on Calc. based on IC factors Aux. Boiler		
																		NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)				NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 MT)	ROG (MT)	NOx (MT)	PM2 5 (MT)	ROG (MT)
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/10/2021 15 28	12/11/2021 16 36	25.13	18.25	6 88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	3.76	46 54	0 19	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/21/2021 11 35	12/22/2021 22 18	34.72	22.42	12.30	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	5.19	58 17	0 27	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/31/2021 8 27	1/1/2022 0 00	15.55	11.00	4 55	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	2.32	28 16	0 12	0 00	0 00	0.21	0.02	0 01	0.00	0.00	0 00	0 21	0.02	0.01
301	P oduct	51 215	Chev on	Non-US	1.00	No Upg ade	3	1/16/2021 6 03	1/18/2021 2 10	44.12	0.00	44.12	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.05	11 58	0 51	0 01	0 02	0.09	0.01	0 00	0.45	0.01	0 02	0 09	0.01	0.00
307	SuezMax	149,992	Chev on	Non-US	2.00	No Upg ade	1	2/28/2021 9 22	3/2/2021 1 24	40.03	23.58	16.45	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.99	62 12	0 31	0 00	0 01	0.46	0.04	0 03	0.23	0.00	0 01	0 46	0.04	0.03
309	P oduct	46 938	Chev on	Non-US	1.00	No Upg ade	3	10/14/2021 22 05	10/16/2021 16 11	42.10	0.00	42.10	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.59	11 05	0 49	0 01	0 02	0.08	0.01	0 00	0.43	0.01	0 02	0 08	0.01	0.00
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	5/28/2021 14 39	6/2/2021 16 27	121.80	80.83	40.97	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	21.99	96 77	1 12	0 01	0 04	0 72	0.06	0 04	0.99	0.01	0 04	0 72	0.06	0.04
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/8/2021 10 29	8/15/2021 2 31	160.03	0.00	160.03	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	28.89	42 01	1 48	0 02	0 06	0 31	0.03	0 02	1.31	0.02	0 06	0 31	0.03	0.02
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/29/2021 13 53	8/31/2021 18 10	52.28	39.00	13.28	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.44	44 99	0 48	0 01	0 02	0.33	0.03	0 02	0.43	0.01	0 02	0 33	0.03	0.02
314	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	1/12/2021 23 18	1/16/2021 13 11	85.88	0.00	85.88	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 54	1 00	0 01	0 04	0.17	0.01	0 01	0.19	0.01	0 04	0 17	0.01	0.01
322	P oduct	49 901	Chev on	Non-US	2.00	No Upg ade	2	6/26/2021 17 58	6/28/2021 13 49	43.85	36.42	7 43	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.99	35 70	0 51	0 01	0 02	0.26	0.02	0 01	0.39	0.01	0 02	0 26	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	5/23/2021 6 14	5/27/2021 13 50	103.60	2.75	100.85	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.17	30 58	1 13	0 01	0 04	0.23	0.02	0 01	0.21	0.01	0 04	0 23	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	6/2/2021 18 18	6/3/2021 16 19	22.02	0.00	22.02	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.71	5.78	0 24	0 00	0 01	0.04	0.00	0 00	0.05	0.00	0 01	0 04	0.00	0.00
324	P oduct	50 908	Chev on	Non-US	2.00	No Upg ade	3	7/30/2021 11 10	8/2/2021 3 45	64.58	0.00	64.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.72	16 95	0 75	0 01	0 03	0.13	0.01	0 01	0.57	0.01	0 03	0 13	0.01	0.01
325	Af aMax	114,426	Chev on	Non-US	2.00	No Upg ade	4	6/27/2021 13 54	6/29/2021 15 24	49.50	28.17	21.33	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.59	47 65	0 54	0 01	0 02	0 35	0.03	0 02	0.41	0.01	0 02	0 35	0.03	0.02
268	PanaMax	69 684	Chev on	Non-US	1.00	No Upg ade	4	5/29/2021 21 35	5/31/2021 4 20	30.75	21.33	9 42	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.55	25 17	0 28	0 00	0 01	0.19	0.02	0 01	0.25	0.00	0 01	0 19	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	10/24/2021 2 08	10/29/2021 6 28	124.33	0.00	124.33	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	22.45	32 64	1 15	0 01	0 04	0.24	0.02	0 01	1.01	0.01	0 04	0 24	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	12/7/2021 10 41	12/9/2021 12 12	49.52	22.92	26.60	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	8.94	31 37	0 46	0 01	0 02	0.23	0.02	0 01	0.40	0.01	0 02	0 23	0.02	0.01
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/23/2021 18 45	6/26/2021 16 35	69.83	29.08	40.75	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.91	37 65	0 81	0 01	0 03	0.28	0.02	0 02	0.72	0.01	0 03	0 28	0.02	0.02
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/28/2021 17 40	6/30/2021 9 10	39.50	7.50	32.00	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.00	15 35	0 46	0 01	0 02	0.11	0.01	0 01	0.41	0.01	0 02	0 11	0.01	0.01
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	2	4/7/2021 5 57	4/8/2021 19 33	37.60	0.00	37.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.57	9.87	0 44	0 01	0 02	0.07	0.01	0 00	0.33	0.01	0 02	0 07	0.01	0.00
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	3	4/10/2021 19 54	4/12/2021 4 13	32.32	0.00	32.32	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.36	8.48	0 38	0 00	0 01	0.06	0.01	0 00	0.29	0.00	0 01	0 06	0.01	0.00
335	P oduct	50 222	Chev on	Non-US	1.00	No Upg ade	1	2/16/2021 0 05	2/19/2021 13 59	85.90	0.00	85.90	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 55	1 00	0 01	0 04	0.17	0.01	0 01	0.88	0.01	0 04	0 17	0.01	0.01
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	2	7/19/2021 0 55	7/20/2021 23 12	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.55	12 15	0 54	0 01	0 02	0.09	0.01	0 00	0.41	0.01	0 02	0 09	0.01	0.00
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	3	8/2/2021 5 35	8/3/2021 12 15	30.67	0.00	30.67	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.99	8.05	0 36	0 00	0 01	0.06	0.01	0 00	0.27	0.00	0 01	0 06	0.01	0.00
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	6/26/2021 11 02	6/28/2021 15 05	52.05	37.00	15.05	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.14	59 18	0 57	0 01	0 02	0.44	0.04	0 02	0.50	0.01	0 02	0 44	0.04	0.02
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	7/4/2021 8 57	7/5/2021 17 36	32.65	19.25	13.40	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	6.99	32 25	0 36	0 00	0 01	0.24	0.02	0 01	0.32	0.00	0 01	0 24	0.02	0.01
347	SuezMax	158,081	Chev on	Non-US	3.00	No Upg ade	4	5/13/2021 23 15	5/16/2021 23 28	72.22	24.33	47.88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	10.80	72 21	0 55	0 01	0 02	0.53	0.05	0 03	0.10	0.01	0 02	0 53	0.05	0.03
350	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/30/2021 1 23	12/31/2021 19 59	42.60	0.00	42.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.71	11 18	0 50	0 01	0 02	0.08	0.01	0 00	0.38	0.01	0 02	0 08	0.01	0.00
351	P oduct	51 213	Chev on	Non-US	1.00	No Upg ade	2	10/16/2021 23 19	10/19/2021 3 23	52.07	0.00	52.07	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.86	13 67	0 61	0 01	0 02	0.10	0.01	0 01	0.54	0.01	0 02	0 10	0.01	0.01
352	P oduct	51 228	Chev on	Non-US	1.00	No Upg ade	2	7/21/2021 2 35	7/23/2021 6 12	51.62	0.00	51.62	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.76	13 55	0 60	0 01	0 02	0.10	0.01	0 01	0.53	0.01	0 02	0 10	0.01	0.01
358	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	5/11/2021 10 21	5/14/2021 22 46	84.42	0.00	84.42	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.23	22 16	0 98	0 01	0 04	0 16	0.01	0 01	0.19	0.01	0 04	0 16	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	4/2/2021 13 18	4/4/2021 6 03	40.75	9.58	31.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.28	17 06	0 47	0 01	0 02	0.13	0.01	0 01	0.36	0.01	0 02	0 13	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	6/2/2021 10 08	6/3/2021 20 07	33.98	25.50	8 48	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.74	25 86	0 40	0 00	0 01	0.19	0.02	0 01	0.30	0.00	0 01	0 19	0.02	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	7/24/2021 1 13	7/26/2021 0 50	47.62	32.08	15.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.85	33 81	0 55	0 01	0 02	0.25	0.02	0 01	0.42	0.01	0 02	0 25	0.02	0.01
374	Af aMax	108,942	Chev on	Non-US	1.00	No Upg ade	1	8/23/2021 13 30	8/26/2021 12 24	70.90	53.75	17.15	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.17	84 74	0 78	0 01	0 03	0.63	0.05	0 03	0.69	0.01	0 03	0 63	0.05	0.03
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	2	5/4/2021 19 03	5/6/2021 18 35	47.53	0.00	47.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.83	12 48	0 55	0 01	0 02	0.09	0.01	0 01	0.49	0.01	0 02	0 09	0.01	0.01
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	3	9/11/2021 19 36	9/14/2021 8 22	60.77	0.00	60.77	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.85	15 95	0 71	0 01	0 03	0.12	0.01	0 01	0.63	0.01	0 03	0 12	0.01	0.01
379	P oduct	50 243	Chev on	Non-US	2.00	No Upg ade	3	12/10/2021 6 12	12/12/2021 11 29	53.28	0.00	53.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.14	13 99	0 62	0 01	0 02	0.10	0.01	0 01	0.47	0.01	0 02	0 10	0.01	0.01
385	P oduct	46 955	Chev on	Non-US	1.00	No Upg ade	3	3/11/2021 15 00	3/15/2021 6 30	87.50	0.00	87.50	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.94	22 97	1 02	0 01	0 04	0.17	0.01	0 01	0.90	0.01	0 04	0 17	0.01	0.01
388	P oduct	51 218	Chev on	Non-US	1.00	No Upg ade	3	3/27/2021 10 13	3/28/2021 1 06	14.88	7.25	7 63	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	3.39	8.72	0 17	0 00	0 01	0.06	0.01	0 00	0.15	0.00	0 01	0 06	0.01	0.00
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	2	5/19/2021 9 46	5/21/2021 9 21	47.58	0.00	47.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.84	12 49	0 55	0 01	0 02	0.09	0.01	0 01	0.42	0.01	0 02	0 09	0.01	0.01
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	3	9/16/2021 6 52	9/19/2021 6 20	71.47	0.00	71.47	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.28	18 76	0 83	0 01	0 03	0.14	0.01	0 01	0.63	0.01	0 03	0 14	0.01	0.01
390	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	11/27/2021 1 45	12/1/2021 10 54	105.15	0.00	105.15	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	23.96	27 60	1 22	0 02	0 05	0.20	0.02	0 01	0.93	0.02	0 05	0 20	0.02	0.01
391	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/21/2021 11 22	2/23/2021 12 25	49.05	0.00	49.05	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.18	12 88	0 57	0 01	0 02	0.10	0.01	0 01	0.43	0.01	0 02	0 10	0.01	0.01
392	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/16/2021 4 06	8/18/2021 11 30	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	5/13/2021 2 30	5/15/2021 9 26	54.93	0.00	54.93	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.52	14 42	0 64	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/27/2021 3 55	8/29/2021 1 15	45.33	0.00	45.33	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.33	11 90	0 53	0 01	0 02	0.09	0.01	0 00	0.40	0.01	0 02	0 09	0.01	0.00
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	9/3/2021 14 21	9/5/2021 1 11	34.83	0.00	34.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.94	9.14	0 41	0 00	0 02	0.07	0.01	0 00	0.31	0.00	0 02	0 07	0.01	0.00
394	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	6/8/2021 4 22	6/10/2021 12 20	55.97	0.00	55.97	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.75	14 69	0 65	0 01	0 02	0 11	0.01	0 01	0.50	0.01	0 02	0 11	0.01	0.01
395	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/27/2021 9 16	9/29/2021 21 06	59.83	0.00	59.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.63	15 71	0 70	0 01	0 03	0 12	0.01	0 01	0.53	0.01	0 03	0 12	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	3	3/17/2021 0 08	3/20/2021 16 18	88.17	0.00	88.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.09	23 14	1 03	0 01	0 04	0.17	0.01	0 01	0.78	0.01	0 04	0 17	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	4/20/2021 13 41	4/23/2021 10 43	69.03	0.00	69.03	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	15.73	18 12	0 80	0 01	0 03	0.13	0.01	0 01	0.61	0.01	0 03	0 13	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/30/2021 17 52	10/3/2021 1 16	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	5/12/2021 6 33	5/13/2021 1 10	18.62	0.00	18.62	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.64	4.89	0 29	0 00	0 01	0.04	0.00	0 00	0.22	0.00	0 01	0 04	0.00	0.00
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	8/18/2021 12 32	8/19/2021 9 15	20.72	0.00	20.72	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.27	5.44	0 32	0 00	0 01	0.04	0.00	0 00	0.24	0.00	0 01	0 04	0.00	0.00
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/18/2021 3 40	7/20/2021 11 22	55.70	0.00	55.70	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	11.92	14 62	0 61	0 01	0 02	0.11	0.01	0 01	0.11	0.01	0 02	0 11	0.01	0.01
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/23/2021 12 46	7/27/2021 23 25	106.65	0.00	106.65	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.82	28 00	1 17	0 01	0 04	0.21	0.02	0 01	0.22	0.01	0 04	0 21	0.02	0.01
409	P oduct	48 026	Chev on	Non-US	1.00	No Upg ade	2	10/3/2021 2 30	10/5/2021 1 05	46.58	0.00	46.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.61	12 23	0 54	0 01	0 02	0.09	0.01	0 00	0.48	0.01	0 02	0 09	0.01	0.00
205	Af aMax	114,820	Chev on	US	2.00	No Upg ade	4	9/27/2021 3 47	9/28/2021 4 21	24.57	14.08	10.48	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.26	23 78	0 27	0 00	0 01	0.18	0.01	0 01	0.20	0.00	0 01	0 18	0.01	0.01
411	Af aMax	112,186	Chev on	Non-US	2.00	No Upg ade	1	12/29/2021 8 03	1/1/2022 0 00	63.95	47.42	16.53	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.68	75 12	0 70	0 01	0 03	0.56	0.05	0 03	0.53	0.01	0 03	0 56	0.05	0.03

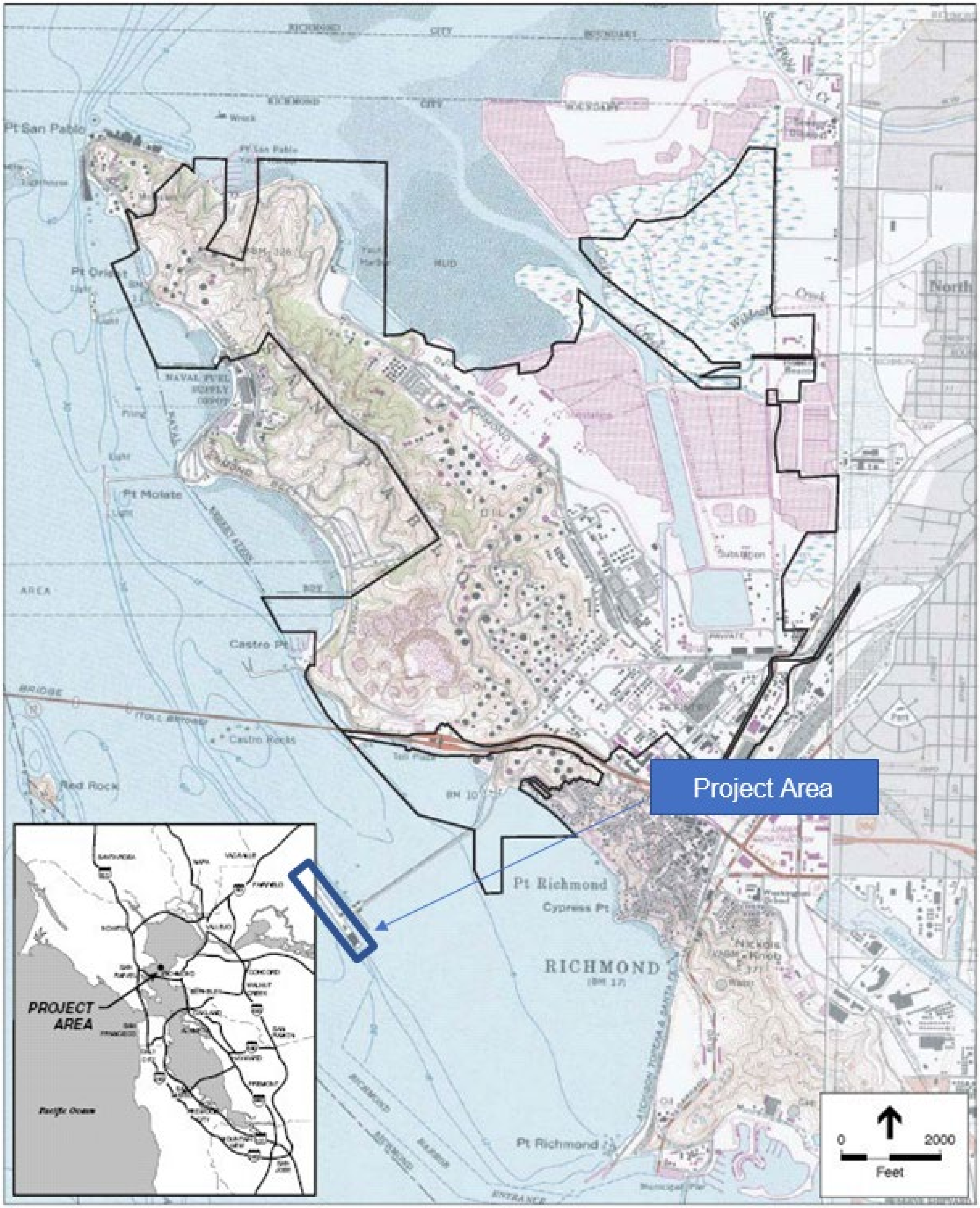
Appendix A11: IC.11 - Tier III or above certification on Auxiliary Engines (AE's) for ships

A11.1 – Map
A11.2 - Data Management System
A11.3 – Emission Calculation Spreadsheet

Inputs

Calculations

Appendix A11.1: Map – IC.11 Tier III or above certification on Auxiliary Engines (AE's) for ships



Refinery Boundary

Appendix A11.2: IC.11 Tier III or above certification on Auxiliary Engines (AE's) for ships Data Management System

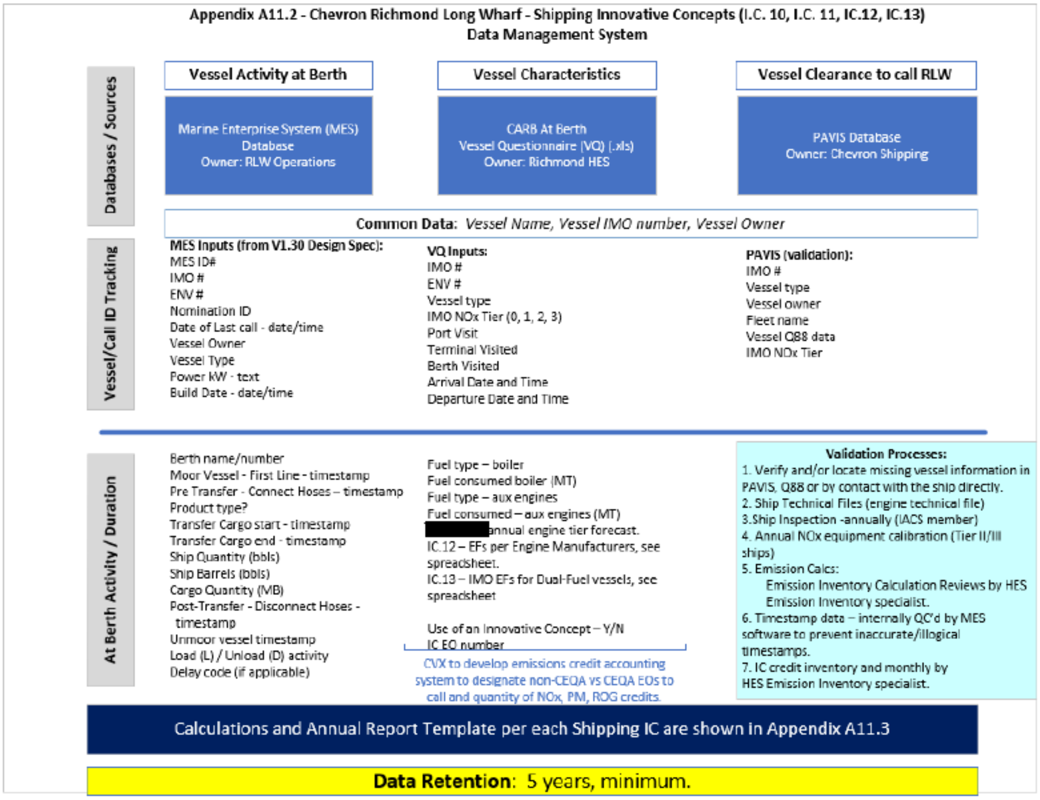
Chevron maintains a central database, called the Marine Enterprise System ("MES"), which tracks shipping activity from the initial cargo nomination to the vessel arrival, load or discharge of the nominated cargo at berth, concluding with the vessel departure (unmooring). As shown below, MES is the source of the majority of data inputs used to calculate vessel activity at berth, particularly timestamps for mooring and unmooring, cargo transfer start and finish, and total barrels transferred by cargo type, as well as vessel details such as IMO number, vessel owner and vessel type.

These vessel at berth activity inputs are common to not only the Baseline emissions calculations, but any vessel-related innovative concepts that require an estimate of emissions associated with at-berth activity, such as IC.10, IC.11, IC.12, IC.13 and IC.14.

In addition to the data inputs provided or derived from MES, Chevron uses the CARB at Berth Vessel Questionnaire (VQ) to supplement inputs to the Baseline calculations, which is an .xls workbook submitted by the vessel to CARB within 30 days of the vessel call, with a cc: to the Richmond Long Wharf. The VQ spreadsheet provides further details that may not be available through MES, such as the vessel type, IMO NOx Tier (0, 1, 2, 3) and can further support as a data quality check for timestamps provided in MES for vessel arrival date/time and departure date/time.

Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data. Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data If the data are not present in PAVIS, Chevron Shipping may also:

- Request additional data submission from vessels, by making this a requirement through changes in the Terminal Information Booklet, including request for information from the vessels Technical Files, as shown in the Validation Processes, below.


Appendix A11.2 - Chevron Richmond Long Wharf - Shipping Innovative Concepts (I.C. 10, I.C. 11, IC.12, IC.13)
Data Management System
Databases / Sources
Vessel Activity at Berth
Vessel Characteristics
Vessel Clearance to call RLW
Marine Enterprise System (MES) Database Owner: RLW Operations
CARB At Berth Vessel Questionnaire (VQ) (.xls) Owner: Richmond HES
PAVIS Database Owner: Chevron Shipping
Common Data: Vessel Name, Vessel IMO number, Vessel Owner
Vessel/Call ID Tracking
MES Inputs (from V1.30 Design Spec):
MES ID#
IMO #
ENV #
Nomination ID
Date of Last call - date/time
Vessel Owner
Vessel Type
Power kW - text
Build Date - date/time
VQ Inputs:
IMO #
ENV #
Vessel type
IMO NOx Tier (0, 1, 2, 3)
Port Visit
Terminal Visited
Berth Visited
Arrival Date and Time
Departure Date and Time
PAVIS (validation):
IMO #
Vessel type
Vessel owner
Fleet name
Vessel Q88 data
IMO NOx Tier
At Berth Activity / Duration
Berth name/number
Moor Vessel - First Line - timestamp
Pre Transfer - Connect Hoses – timestamp
Product type?
Transfer Cargo start - timestamp
Transfer Cargo end - timestamp
Ship Quantity (bbls)
Ship Barrels (bbls)
Cargo Quantity (MB)
Post-Transfer - Disconnect Hoses - timestamp
Unmoor vessel timestamp
Load (L) / Unload (D) activity
Delay code (if applicable)
Fuel type – boiler
Fuel consumed boiler (MT)
Fuel type – aux engines
Fuel consumed – aux engines (MT)
[redacted] annual engine tier forecast.
IC.12 – EFs per Engine Manufacturers, see spreadsheet.
IC.13 – IMO EFs for Dual-Fuel vessels, see spreadsheet
Use of an Innovative Concept – Y/N
IC EO number
CVX to develop emissions credit accounting system to designate non-CEQA vs CEQA EOs to call and quantity of NOx, PM, ROG credits.
Validation Processes:
1. Verify and/or locate missing vessel information in PAVIS, Q88 or by contact with the ship directly.
2. Ship Technical Files (engine technical file)
3. Ship Inspection -annually (IACS member)
4. Annual NOx equipment calibration (Tier II/III ships)
5. Emission Calcs:
Emission Inventory Calculation Reviews by HES Emission Inventory specialist.
6. Timestamp data – internally QC'd by MES software to prevent inaccurate/illogical timestamps.
7. IC credit inventory and monthly by HES Emission Inventory specialist.
Calculations and Annual Report Template per each Shipping IC are shown in Appendix A11.3
Data Retention: 5 years, minimum.

Appendix A11.3 – IC.11 Tier III or above certification on Auxiliary Engines (AE's) for Ships - Emissions Calculation Spreadsheet

Appendix A11.3 Emissions Calculation Spreadsheet

Chevron Richmond, IC.11 - Tier III or above certification for Auxiliary Engines

Total Emissions and Reductions from Tier III Aux Engines (MT)	NOx (MT/Yr)	PM2.5 (MT/Yr)	ROG (MT/Yr)	*Additional Details*
Baseline Emissions with CARB default Emission Factor	38.79	0.48	1.46	*Total Aux engine emission from vessel calls with Tier III Aux engines assuming CARB default baseline emission factors.*
Emissions using Tier III Emission Factor	3.63	0.48	1.46	*Total Aux engine emission from vessel calls with Tier III Aux engines assuming Tier III emission factors.(Chevron has only assumed NOx reductions at this time)*
Emission reductions from IC.11	**35.16**	**0.00**	**0.00**	

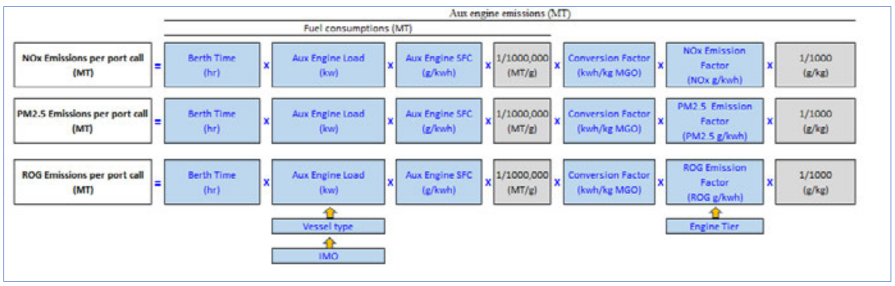
Illustration of how Chevron will only claim emission credit beyond business as usual

Total Emissions Reductions above Business as Usual (MT)	NOx (MT/Yr)	PM2.5 (MT/Yr)	ROG (MT/Yr)	*Additional Details*
Third Party Marine Broker Forecast for Tier III Adoption Rate (forecast for 2023)	13%	13%	13%	*Sample forecast acutal data will be provided from third party for the reported period*
Chevron's Tier III Adoption Rate	33%	33%	33%	*Chevron's Tier III adoption rate based on overall Tier III vessel calls for the reported period. (Chevron has only assumed NOx reductions at this time)*
Is Chevron's Tier III Adoption Rate Higher than Third Party Marine Broker Forecast	Yes	Yes	Yes	
Chevron's Claim "Beyond Business as Usual" Adoption Rate	20%	20%	20%	
Chevron's Emission Credit Beyond Business as Usual	**21.74**	**0.00**	**0.00**	*This is an illustrative calculation based on the sample data provided. The intent is to demonstrate the calculation methodology.*

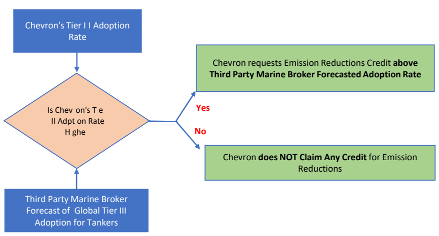
Estimated Annual NOx Emission Reduction Credit from IC.11	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Third Party Marine Broker **forecast** for Tier III Adoption Rate	15%	17%	19%	22%	25%	28%	31%	34%	34%	*Sample forecast actual data will be provided annually from third party*
Chevron's **forecast** for Tier III Adoption Rate	34%	34%	41%	47%	57%	60%	63%	65%	65%	
Chevron's **forecast** on beyond Business as Usual adoption rate	19.1%	17.9%	22.4%	25.8%	32.3%	32.6%	32 1%	31.5%	31.5%	
Chevron's **forecast** Emission Credit Beyond Business as Usual (MT/Yr)	**20.48**	**19.22**	**23.95**	**27 61**	**34.62**	**34.93**	**34.35**	**33.78**	**33.78**	*This is an illustrative calculation based on the sample data provided. The intent is to demonstrate the calculation methodology.*

Flow Chart to explain Emissions Calculations for Each Vessel Call

Note: Total emissions will be the sum of all vessel calls for the reported period



Flow Diagram for Emission Credit beyond Business as Usual



Inputs & Data Sources

Inputs	Sources
Aux Engine Load (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 9.* [1] *
Aux Boiler Load Idle and Pumping (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 10.* [1] *
Aux Engine SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] *
Aux Boiler SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Resutls, Appendix H, H53.* [2] *
Conversion Factor (kwh/kg MGO)	*Final Regulation Section 93130.17 (d) (1) (B)*
Aux Engine Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (1)* *2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] * *NOx: IMO 4th GHG Study, P.410.* [3]
Aux Boiler Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (2)* *Test results from engine manufacturer.* [4] *NOx: IMO 4th GHG Study, P.410.* [3]
Berth Time (Pumping and Idle) IMO Vessel Class Engine Tier	It will be provided by vessel itself through Vessel Visit Report and incorprated into Chevron's own data management system
Third Party Marine Broker Forecast for Enginer Tier Adoption Rate for Global Tankers	*Sample forecast from third party marine broker: acutal data will be updated annually for IC.10 and IC.11.*

Value

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Engine Load	1395	1050	832	986	689	1011

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Boiler Load Pumping	421	3089	3547	4976	8170	8262
Aux Boiler Load Idling	875	875	875	875	875	875

Aux Engine SFC (g/kwh)	217
Aux Engine SFC (g/kwh)	300
Conversion Factor (1/0.27) (kwh/kg MGO)	3.70

Aux Engine Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)**	ROG (g/kwh)**
CARB Baseline	0	13.80	0.17	0.52
Tier I	1	12.20	0.17	0.52
Tier II (IC.10)	2	10.50	0.17	0.52
Tier III (IC.11)	3	2.60	0.17	0.52
Chevron Lightering Vessels ***	TG	0.00	0.17	0.52
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.52

Aux Boiler Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)
CARB Base	No Upgrade	2.00	0.17	0.11
Burner Upgrade (IC.12)	Upgrade	0.27	0.17	0.11
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.11

Year	Tier III	Tier II	Tier I	Tier 0 and below	Total
2023 YTD	13%	45%	35%	8%	100%
2023	15%	45%	33%	8%	100%
2024	17%	45%	32%	7%	100%
2025	19%	45%	30%	7%	100%
2026	22%	44%	29%	6%	100%
2027	25%	43%	27%	6%	100%
2028	28%	42%	26%	5%	100%
2029	31%	41%	24%	5%	100%
2030	34%	40%	22%	5%	100%

Note

* Chevron is conducting representative exhaust emission analysis from engines of varied tiers (II/III) and Aux boilers. Based on results, Chevron might propose to CARB to use alternate engine load, SFC, and emission factors for calculation of emissions from Aux engines and Aux boilers.

** Chevron is presently not proposing lower emission factors for PM2.5 and ROG as we are not claiming any emission reductions for these items. As stated in the Terminal Plan, Chevron is planning to conduct representative sampling on Tier II/III Aux engines and Aux boilers. Based on test results, Chevron will approach CARB to include those emission reductions in IC calculations. New emission factors will be proposed based on OEM recommendations and test results.

*** Chevron Pacific Lightering vessels Pegasus and Polaris Voyagers have tier II AE. Since those vessels use steam Turbine Generators (TG) during cargo operation while at berth, so no NOx emissions are assumed for those vessels.

Links to documents that are referenced in this spreadsheet

1. Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)
2. 2019 Update to Inventory for Ocean-Going Vessels At Berth_Methodology and Results (ca.gov)
3. https //www.imo.org/en/ourwork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx
4. Technical File for Burner Upgrade

Table 2.8: Auxiliary Boiler Load Defaults by Mode, kW

Vessel Type	Transit	Maneuvering	Berth Hotelling	Anchorage Hotelling
Auto Carrier	85	187	323	314
Bulk	52	122	156	156
Bulk - Heavy Load	35	94	125	125
Bulk - Self Discharging	44	103	132	132
Container - 1000	148	296	760	376
Container - 2000	79	142	323	180
Container - 3000	188	180	888	361
Container - 4000	161	335	490	487
Container - 5000	223	446	484	477
Container - 6000	280	544	761	757
Container - 8000	241	442	558	554
Container - 9000	286	526	555	513
Container - 10000	278	418	598	598
Container - 11000	202	362	456	463
Container - 12000	351	586	677	677
Container - 13000	257	357	580	594
Container - 14000	379	552	696	696
Container - 15000	259	395	402	402
Container - 16000	238	440	525	525
Container - 19000	38	144	848	848
Container - 23000	40	151	890	890
General Cargo	56	127	169	168
Ocean Tugboat (ATB/ITB)	0	0	0	0
Miscellaneous	54	109	140	140
RoRo	104	206	282	282
Tanker - Chemical	94	137	421	261
Tanker - Handysize	144	287	3,089	323
Tanker - Panamax	262	382	3,547	538
Tanker - Aframax	196	259	4,976	390
Tanker - Suezmax	144	99	8,170	516
Tanker - VLCC	240	116	8,262	467
Tanker - ULCC	235	322	10,718	366

Port of Long Beach *10* *October 2021*

Update to Inventory for Ocean-Going Vessels At Berth

Appendix A: Emission Factors
Emission Factors (all in g/kW*hr)

Engine type	Mode	Fuel type	Fuel S content (%)	Tier ID	CH4	N2O	NH3	ROG	CO	SOx	NOx	HC	PM 10	PM 2.5	CO2	TOG	Fuel Used
Auxiliary	At Berth	Distillate	0.1	0	0.008	0.033	0.001	0.520	1.10	0.424	13.800	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	1	0.008	0.033	0.001	0.520	1.10	0.424	12.200	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	2	0.008	0.033	0.001	0.520	1.10	0.424	10.500	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	3	0.008	0.033	0.001	0.520	1.10	0.424	2.600	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	0	0.008	0.033	0.001	0.520	1.10	1.273	13.800	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	1	0.008	0.033	0.001	0.520	1.10	1.273	12.200	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	2	0.008	0.033	0.001	0.520	1.10	1.273	10.500	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	3	0.008	0.033	0.001	0.520	1.10	1.273	2.600	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	1	0	0.008	0.033	0.001	0.520	1.10	4.242	13.800	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	1	0.008	0.033	0.001	0.520	1.10	4.242	12.200	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	2	0.008	0.033	0.001	0.520	1.10	4.242	10.500	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	3	0.008	0.033	0.001	0.520	1.10	4.242	2.600	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Residual	2.7	0	0.008	0.036	0.001	0.460	1.10	11.983	14.700	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	1	0.008	0.036	0.001	0.460	1.10	11.983	13.000	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	2	0.008	0.036	0.001	0.460	1.10	11.983	11.200	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	3	0.008	0.036	0.001	0.460	1.10	11.983	2.309	0.40	1.436	1.321	707	0.510	227
Boiler	At Berth	Distillate	0.1	99	0.002	0.045	0.006	0.110	0.20	0.587	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	0.3	99	0.002	0.045	0.006	0.110	0.20	1.636	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	1	99	0.002	0.045	0.006	0.110	0.20	1.760	1.995	0.10	0.589	0.542	934	0.130	300
Boiler	At Berth	Residual	2.7	99	0.002	0.049	0.006	0.110	0.20	16.100	2.100	0.10	1.465	1.348	950	0.130	305

Sources:

California Air Resources Board H-53

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To whom it may concern

Subject: Flue gas emission data of MF PA burners

The flue gas compositions including calculations are simulated as below table in general based on the actual measurements from Alfa Laval Test Centre in Aalborg.

Burner type	Fuel oil	Burner Load	O_2 Content*3	CO Content, Less than		NOx Content, Less than			CARB*4 Regulation, Max. NOx
		(%)	(%)	(ppm)	(mg/Nm^3)	(ppm)	(mg/Nm^3)	(g/kWh)	(g/kWh)
MF PA	MDO*1	100	4.0	10	13	120	246	0.27	0.4
		75	4.0	2	3	107	219	0.24	0.4
		50	5.0	2	3	96	197	0.22	0.4
		33	6.0	23	28	60	122	0.14	0.4
	LNG*2	100	4.0	10	13	60	123	0.13	0.4
		75	4.0	5	7	60	124	0.13	0.4
		50	5.0	3	3	59	121	0.12	0.4
		33	6.0	5	6	56	114	0.12	0.4

(Remarks)
- CO_2 content is not included due to combustion efficiency index.
- The local factors may affect the actual data measured on-site.

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine: Ox (g/kwh)	CARB Em ss on Facto s Aux Engine: PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Engine: ROG (g/kw)	CARB Em ss on Facto s Aux Bo ler: NOx (g/kwh)	CARB Em ss on Facto s Aux Bo ler: PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Bo ler: ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: NOx (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: PM2.5 (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: NOx (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: PM2 5 (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: NOx (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: Ox (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: NOx (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: PM2.5 (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler: Ox (MT)	Em ss on Calc. based on IC factors Aux. Boiler: PM2 5 (MT)	Em ss on Calc. based on IC factors Aux. Boiler: ROG (MT)
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/20/2021 20 29	7/23/2021 10 19	61.83	39.75	22.08	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.23	65 14	0 68	0 01	0 03	0.48	0.04	0 03	0.51	0.01	0 03	0 48	0.04	0.03
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/28/2021 3 29	7/31/2021 6 24	74.92	58.17	16.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.03	91 23	0 82	0 01	0 03	0.68	0.06	0 04	0.62	0.01	0 03	0 68	0.06	0.04
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/19/2021 13 54	4/20/2021 16 17	26.38	19.58	6 80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	6.01	19 93	0 31	0 00	0 01	0.15	0.01	0 01	0.06	0.00	0 01	0 15	0.01	0.01
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/25/2021 14 50	4/28/2021 14 25	71.58	0.00	71.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	16.31	18 79	0 83	0 01	0 03	0.14	0.01	0 01	0.16	0.01	0 03	0 14	0.01	0.01
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	3	5/14/2021 10 06	5/18/2021 13 51	99.75	76.92	22.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	22.73	77 27	1 16	0 01	0 04	0.57	0.05	0 03	1.03	0.01	0 04	0 57	0.05	0.03
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/21/2021 6 06	5/22/2021 18 32	36.43	25.28	11.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	8.30	26 36	0 42	0 01	0 02	0.20	0.02	0 01	0.38	0.01	0 02	0 20	0.02	0.01
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/2/2021 14 09	1/3/2021 23 11	33.03	22.83	10.20	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.94	58 64	0 25	0 00	0 01	0.43	0.04	0 02	0.05	0.00	0 01	0 43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/13/2021 9 17	1/14/2021 10 49	25.53	17.67	7 87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	3.82	45 37	0 20	0 00	0 01	0.34	0.03	0 02	0.04	0.00	0 01	0 34	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	2/25/2021 1 33	2/26/2021 20 25	42.87	20.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	6.41	56 85	0 33	0 00	0 01	0.42	0.04	0 02	0.06	0.00	0 01	0 42	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	4/27/2021 22 58	4/29/2021 3 48	28.83	21.33	7 50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.31	54 26	0 22	0 00	0 01	0.40	0.03	0 02	0.04	0.00	0 01	0 40	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	5/31/2021 6 35	6/1/2021 19 19	36.73	22.42	14.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	5.49	58 70	0 28	0 00	0 01	0.43	0.04	0 02	0.05	0.00	0 01	0 43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/10/2021 18 40	6/12/2021 10 27	39.78	24.17	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	5.95	63 33	0 30	0 00	0 01	0.47	0.04	0 03	0.06	0.00	0 01	0 47	0.04	0.03
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/21/2021 22 06	6/23/2021 8 33	34.45	21.33	13.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	5.15	55 73	0 26	0 00	0 01	0.41	0.04	0 02	0.05	0.00	0 01	0 41	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/2/2021 23 45	7/5/2021 6 35	54.83	11.67	43.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	8.20	39 93	0 42	0 01	0 02	0.30	0.03	0 02	0.08	0.00	0 02	0 30	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/19/2021 19 12	7/21/2021 18 12	47.00	20.58	26.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	7.03	57 38	0 36	0 00	0 01	0.43	0.04	0 02	0.07	0.00	0 01	0 43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	9/15/2021 20 30	9/17/2021 6 18	33.80	15.58	18.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	5.05	42 98	0 26	0 00	0 01	0.32	0.03	0 02	0.05	0.00	0 01	0 32	0.03	0.02
26	Af aMax	115,594	Chev on	Non-US	2.00	No Upg ade	1	10/4/2021 23 37	10/7/2021 9 11	57.57	0.00	57.57	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.32	15 11	0 63	0 01	0 02	0.11	0.01	0 01	0.48	0.01	0 02	0 11	0.01	0.01
31	Chem cal	35 210	Chev on	Non-US	1.00	No Upg ade	2	9/18/2021 6 30	9/18/2021 20 15	13.75	0.00	13.75	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	4.16	3.61	0 21	0 00	0 01	0.03	0.00	0 00	0.19	0.00	0 01	0 03	0.00	0.00
39	Af aMax	105,614	Chev on	Non-US	1.00	No Upg ade	1	10/13/2021 18 00	10/16/2021 9 21	63.35	46.92	16.43	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.55	74 35	0 69	0 01	0 03	0.55	0.05	0 03	0.61	0.01	0 03	0 55	0.05	0.03
42	P oduct	49 951	Chev on	Non-US	2.00	No Upg ade	2	2/4/2021 12 39	2/5/2021 6 31	17.87	7.25	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.07	9.51	0 21	0 00	0 01	0.07	0.01	0 00	0.16	0.00	0 01	0 07	0.01	0.00
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	2	3/2/2021 14 18	3/5/2021 6 24	64.10	0.00	64.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	14.61	16 83	0 75	0 01	0 03	0.12	0.01	0 01	0.66	0.01	0 03	0 12	0.01	0.01
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	9/27/2021 14 45	9/29/2021 19 49	53.07	0.00	53.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	12.09	13 93	0 62	0 01	0 02	0.10	0.01	0 01	0.55	0.01	0 02	0 10	0.01	0.01
49	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	2/3/2021 7 20	2/6/2021 7 11	71.85	0.00	71.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	16.37	18 86	0 84	0 01	0 03	0.14	0.01	0 01	0.74	0.01	0 03	0 14	0.01	0.01
51	Af aMax	115,392	Chev on	Non-US	2.00	No Upg ade	1	4/29/2021 0 10	5/2/2021 14 27	86.28	49.67	36.62	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	18.46	83 75	0 94	0 01	0 04	0.62	0.05	0 03	0.83	0.01	0 04	0 62	0.05	0.03
52	PanaMax	79 700	Chev on	Non-US	2.00	No Upg ade	1	12/4/2021 20 49	12/7/2021 6 13	57.40	0.00	57.40	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.36	15 07	0 53	0 01	0 02	0.11	0.01	0 01	0.40	0.01	0 02	0 11	0.01	0.01
53	Af aMax	105,335	Chev on	Non-US	1.00	No Upg ade	1	7/1/2021 18 17	7/4/2021 6 22	60.08	44.92	15.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	12.86	71 03	0 66	0 01	0 02	0.53	0.04	0 03	0.58	0.01	0 02	0 53	0.04	0.03
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	1/1/2021 8 59	1/2/2021 16 19	31.33	0.00	31.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.14	8.22	0 36	0 00	0 01	0.06	0.01	0 00	0.28	0.00	0 01	0 06	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	2/8/2021 5 50	2/9/2021 18 00	36.17	0.00	36.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.24	9.49	0 42	0 00	0 02	0.07	0.01	0 00	0.32	0.00	0 02	0 07	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	3/17/2021 2 48	3/19/2021 18 12	63.40	0.00	63.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.45	16 64	0 74	0 01	0 03	0.12	0.01	0 01	0.56	0.01	0 03	0 12	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	8/29/2021 2 48	9/1/2021 1 34	70.77	0.00	70.77	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.12	18 58	0 82	0 01	0 03	0.14	0.01	0 01	0.63	0.01	0 03	0 14	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	10/10/2021 3 22	10/11/2021 20 10	40.80	0.00	40.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.30	10 71	0 48	0 01	0 02	0.08	0.01	0 00	0.36	0.01	0 02	0 08	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	11/4/2021 17 57	11/6/2021 16 14	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.55	12 15	0 54	0 01	0 02	0.09	0.01	0 00	0.41	0.01	0 02	0 09	0.01	0.00
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	5/7/2021 0 43	5/8/2021 11 18	34.58	22.33	12.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.17	57 95	0 26	0 00	0 01	0.43	0.04	0 02	0.20	0.00	0 01	0 43	0.04	0.02
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	8/23/2021 23 48	8/26/2021 11 26	59.63	19.50	40.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.92	58 33	0 46	0 01	0 02	0.43	0.04	0 02	0.35	0.01	0 02	0 43	0.04	0.02
64	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/22/2021 17 46	12/24/2021 19 53	50.12	0.00	50.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.42	13 16	0 58	0 01	0 02	0.10	0.01	0 01	0.44	0.01	0 02	0 10	0.01	0.01
75	PanaMax	74 246	Chev on	Non-US	2.00	No Upg ade	1	6/19/2021 17 46	6/24/2021 13 42	115.93	0.00	115.93	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.93	30 43	1 07	0 01	0 04	0.23	0.02	0 01	0.81	0.01	0 04	0 23	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	1	7/11/2021 0 10	7/12/2021 12 11	36.02	21.75	14.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.50	26 89	0 33	0 00	0 01	0.20	0.02	0 01	0.25	0.00	0 01	0 20	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	10/10/2021 7 06	10/12/2021 8 32	49.43	16.83	32.60	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.92	26 47	0 46	0 01	0 02	0.20	0.02	0 01	0.35	0.01	0 02	0 20	0.02	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	3/21/2021 20 46	3/22/2021 17 19	20.55	8.92	11.63	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.40	16 36	0 22	0 00	0 01	0.12	0.01	0 01	0.17	0.00	0 01	0 12	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	1	4/6/2021 20 40	4/8/2021 18 49	46.15	36.92	9 23	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.87	57 53	0 50	0 01	0 02	0.43	0.04	0 02	0.38	0.01	0 02	0 43	0.04	0.02
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	5/13/2021 0 25	5/13/2021 21 15	20.83	10.42	10.42	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.46	18 28	0 23	0 00	0 01	0.14	0.01	0 01	0.17	0.00	0 01	0 14	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	6/12/2021 22 40	6/13/2021 15 55	17.25	9.50	7 75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	3.69	16 22	0 19	0 00	0 01	0.12	0.01	0 01	0.14	0.00	0 01	0 12	0.01	0.01
82	SuezMax	158,826	Chev on	Non-US	1.00	No Upg ade	4	4/26/2021 10 23	4/27/2021 20 39	34.27	21.08	13.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.12	55 14	0 26	0 00	0 01	0.41	0.03	0 02	0.23	0.00	0 01	0 41	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	1	2/22/2021 20 45	2/25/2021 6 20	57.58	35.92	21.67	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.40	43 91	0 53	0 01	0 02	0.33	0.03	0 02	0.47	0.01	0 02	0 33	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	1	5/21/2021 22 29	5/22/2021 23 10	24.68	17.42	7 27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	4.46	20 44	0 23	0 00	0 01	0.15	0.01	0 01	0.20	0.00	0 01	0 15	0.01	0.01
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	8/1/2021 6 37	8/2/2021 15 53	33.27	23.75	9 52	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	6.01	27 77	0 31	0 00	0 01	0.21	0.02	0 01	0.27	0.00	0 01	0 21	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/5/2021 20 22	8/7/2021 14 13	41.85	33.33	8 52	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	8.95	52 00	0 46	0 01	0 02	0.39	0.03	0 02	0.09	0.01	0 02	0 39	0.03	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/17/2021 8 33	8/22/2021 14 48	126.25	19.92	106.33	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	27.01	57 64	1 38	0 02	0 05	0.43	0.04	0 02	0.26	0.02	0 05	0 43	0.04	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	9/1/2021 6 17	9/5/2021 22 09	111.87	0.00	111.87	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	23.94	29 37	1 22	0 02	0 05	0.22	0.02	0 01	0.23	0.02	0 05	0 22	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	11/27/2021 15 13	12/1/2021 4 25	85.20	67.50	17.70	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	18.23	105.41	0 93	0 01	0 04	0.78	0.07	0 04	0.18	0.01	0 04	0 78	0.07	0.04
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	12/26/2021 5 31	12/28/2021 19 41	62.17	0.00	62.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	13.30	16 32	0 68	0 01	0 03	0.12	0.01	0 01	0.13	0.01	0 03	0 12	0.01	0.01
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/16/2021 18 51	9/19/2021 20 56	74.08	53.33	20.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.85	85 06	0 81	0 01	0 03	0.63	0.05	0 03	0.72	0.01	0 03	0 63	0.05	0.03
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/23/2021 16 20	9/26/2021 16 26	73.77	38.67	35.10	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.78	66 94	0 81	0 01	0 03	0.50	0.04	0 03	0.71	0.01	0 03	0 50	0.04	0.03
94	Chem cal	25 399	Chev on	Non-US	1.00	No Upg ade	2	11/9/2021 12 19	11/10/2021 18 32	30.22	0.00	30.22	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.15	7.93	0 47	0 01	0 02	0.06	0.00	0 00	0.41	0.01	0 02	0 06	0.00	0.00
95	P oduct	46 046	Chev on	Non-US	1.00	No Upg ade	2	7/13/2021 15 39	7/15/2021 23 09	55.50	0.00	55.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	12.65	14 57	0 65	0 01	0 02	0.11	0.01	0 01	0.57	0.01	0 02	0 11	0.01	0.01
96	P oduct	46 105	Chev on	Non-US	1.00	No Upg ade	2	8/11/2021 0 08	8/13/2021 16 05	63.95	0.00	63.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	14.57	16 79	0 74	0 01	0 03	0.12	0.01	0 01	0.66	0.01	0 03	0 12	0.01	0.01
99	P oduct	49 996	Chev on	Non-US	2.00	No Upg ade	1	1/13/2021 11 00	1/17/2021 1 55	86.92	0.00	86.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	19.80	22 82	1 01	0 01	0 04	0.17	0.01	0 01	0.77	0.01	0 04	0 17	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	1/31/2021 9 12	2/1/2021 14 44	29.53	19.58	9 95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	6.73	20 76	0 34	0 00	0 01	0.15	0.01	0 01	0.34	0.00	0 01	0 15	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	2/1/2021 15 11	2/3/2021 12 15	45.07	0.00	45.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	10.27	11 83	0 52	0 01	0 02	0.09	0.01	0 00	0.52	0.01	0 02	0 09	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	4/30/2021 8 25	5/2/2021 0 27	40.03	0.00	40.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.12	10 51	0 47	0 01	0 02	0.08	0.01	0 00	0.47	0.01	0 02	0 08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/15/2021 11 21	5/18/2021 21 57	82.60	32.08	50.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	18.82	42 99	0 96	0 01	0 04	0.32	0.03	0 02	0.96	0.01	0 04	0 32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/18/2021 22 16	5/20/2021 13 35	39.32	0.00	39.32	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	8.96	10 32	0 46	0 01	0 02	0.08	0.01	0 00	0.46	0.01	0 02	0 08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/30/2021 10 20	6/2/2021 7 14	68.90	37.00	31.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	15.70	42 66	0 80	0 01	0 03	0.32	0.03	0 02	0.80	0.01	0 03	0 32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/8/2021 10 12	6/11/2021 14 22	76.17	49.08	27.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	17.35	52 59	0 89	0 01	0 03	0.39	0.03	0 02	0.89	0.01	0 03	0 39	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	6/17/2021 21 43	6/19/2021 15 42	41.98	32.42	9 57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.57	32 55	0 49	0 01	0 02	0.24	0.02	0 01	0.49	0.01	0 02	0 24	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/19/2021 16 03	6/22/2021 9 36	65.55	19.92	45.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	14.94	30 44	0 76	0 01	0 03	0.23	0.02	0 01	0.76	0.01	0 03	0 23	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	7/2/2021 10 54	7/5/2021 14 33	75.65	55.75	19.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	17.24	56 89	0 88	0 01	0 03	0.42	0.04	0 02	0.88	0.01	0 03	0 42	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/6/2021 13 17	7/7/2021 10 00	20.72	0.00	20.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	4.72	5.44	0 24	0 00	0 01	0.04	0.00	0 00	0.24	0.00	0 01	0 04	0.00	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/14/2021 13 05	7/17/2021 18 40	77.58	60.92	16.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	17.68	60 83	0 90	0 01	0 03	0.45	0.04	0 02	0.90	0.01	0 03	0 45	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/25/2021 23 20	7/28/2021 8 08	56.80	32.42	24.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	12.94	36 44	0 66	0 01	0 02	0.27	0.02	0 01	0.66	0.01	0 02	0 27	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	8/3/2021 19 10	8/5/2021 12 23	41.22	34.50	6 72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.39	33 73	0 48	0 01	0 02	0.25	0.02	0 01	0.48	0.01	0 02	0 25	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	9/19/2021 10 24	9/20/2021 19 01	32.62	24.50	8 12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	7.43	24 83	0 38	0 00	0 01	0.18	0.02	0 01	0.38	0.00	0 01	0 18	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	9/22/2021 21 14	9/25/2021 4 12	54.97	0.00	54.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	12.52	14 43	0 64	0 01	0 02	0.11	0.01	0 01	0.64	0.01	0 02	0 11	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	11/17/2021 19 10	11/19/2021 11 25	40.25	14.08	26.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.17	19 92	0 47	0 01	0 02	0.15	0.01	0 01	0.47	0.01	0 02	0 15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	1/4/2021 11 22	1/5/2021 15 30	28.13	17.33	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	6.41	18 90	0 33	0 00	0 01	0.14	0.01	0 01	0.33	0.00	0 01	0 14	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/5/2021 15 55	1/7/2021 20 38	52.72	0.00	52.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	12.01	13 84	0 61	0 01	0 02	0.10	0.01	0 01	0.61	0.01	0 02	0 10	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/17/2021 7 51	1/18/2021 10 26	26.58	15.25	11.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	6.06	17 11	0 31	0 00	0 01	0.13	0.01	0 01	0.31	0.00	0 01	0 13	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/28/2021 7 32	1/31/2021 2 00	66.47	35.83	30.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	15.14	41 25	0 77	0 01	0 03	0.31	0.03	0 02	0.77	0.01	0 03	0 31	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/5/2021 10 53	2/7/2021 8 12	45.32	21.08	24.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	10.33	25 90	0 53	0 01	0 02	0.19	0.02	0 01	0.53	0.01	0 02	0 19	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/13/2021 1 03	2/15/2021 19 10	66.12	24.00	42.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	15.06	33 30	0 77	0 01	0 03	0.25	0.02	0 01	0.77	0.01	0 03	0 25	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	2/22/2021 10 49	2/27/2021 4 00	113.18	32.75	80.43	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	25.79	51 46	1 32	0 02	0 05	0.38	0.03	0 02	1.32	0.02	0 05	0 38	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/7/2021 22 45	3/11/2021 18 10	91.42	40.08	51.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	20.83	50 62	1 06	0 01	0 04	0.37	0.03	0 02	1.06	0.01	0 04	0 37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	3/23/2021 12 15	3/25/2021 10 19	46.07	29.67	16.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	10.50	31 80	0 54	0 01	0 02	0.24	0.02	0 01	0.54	0.01	0 02	0 24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/25/2021 10 52	3/27/2021 6 30	43.63	0.00	43.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.94	11 45	0 51	0 01	0 02	0.08	0.01	0 00	0.51	0.01	0 02	0 08	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/4/2021 8 28	4/7/2021 2 55	66.45	30.58	35.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	15.14	37 76	0 77	0 01	0 03	0.28	0.02	0 02	0.77	0.01	0 03	0 28	0.02	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/12/2021 15 40	4/15/2021 18 23	74.72	34.92	39.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	17.02	42 80	0 87	0 01	0 03	0.32	0.03	0 02	0.87	0.01	0 03	0 32	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	4/21/2021 15 31	4/23/2021 11 41	44.17	0.00	44.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	10.06	11 59	0 51	0 01	0 02	0.09	0.01	0 00	0.51	0.01	0 02	0 09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/23/2021 12 21	4/25/2021 18 31	54.17	23.25	30.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	12.34	29 66	0 63	0 01	0 02	0.22	0.02	0 01	0.63	0.01	0 02	0 22	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	5/2/2021 7 08	5/4/2021 11 02	51.90	39.50	12.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	11.83	39 86	0 60	0 01	0 02	0.30	0.03	0 02	0.60	0.01	0 02	0 30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	5/10/2021 19 36	5/13/2021 19 00	71.40	40.17	31.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	16.27	45 42	0 83	0 01	0 03	0.34	0.03	0 02	0.83	0.01	0 03	0 34	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	8/6/2021 15 59	8/11/2021 4 46	108.78	42.50	66.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	24.79	56 78	1 27	0 02	0 05	0.42	0.04	0 02	1.27	0.02	0 05	0 42	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	8/23/2021 2 12	8/27/2021 2 20	96.13	43.00	53.13	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	21.90	53 80	1 12	0 01	0 04	0.40	0.03	0 02	1.12	0.01	0 04	0 40	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/1/2021 8 47	9/3/2021 12 39	51.87	11.00	40.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	11.82	20 92	0 60	0 01	0 02	0.15	0.01	0 01	0.60	0.01	0 02	0 15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	9/9/2021 9 31	9/11/2021 4 20	42.82	0.92	41.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.76	11 85	0 50	0 01	0 02	0.09	0.01	0 00	0.50	0.01	0 02	0 09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/19/2021 22 12	9/21/2021 8 43	34.52	11.58	22.93	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	7.86	16 75	0 40	0 00	0 02	0.12	0.01	0 01	0.40	0.00	0 02	0 12	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	10/1/2021 2 06	10/2/2021 4 15	26.15	0.00	26.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	5.96	6.86	0 30	0 00	0 01	0.05	0.00	0 00	0.30	0.00	0 01	0 05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/2/2021 4 33	10/4/2021 10 45	54.20	8.08	46.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	12.35	19 60	0 63	0 01	0 02	0.15	0.01	0 01	0.63	0.01	0 02	0 15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/16/2021 18 57	10/20/2021 16 55	93.97	54.42	39.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	21.41	60 81	1 09	0 01	0 04	0.45	0.04	0 02	1.09	0.01	0 04	0 45	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/1/2021 8 32	11/4/2021 1 20	64.80	49.25	15.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	14.76	49 72	0 75	0 01	0 03	0.37	0.03	0 02	0.75	0.01	0 03	0 37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/4/2021 1 42	11/5/2021 2 20	24.63	0.00	24.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	5.61	6.47	0 29	0 00	0 01	0.05	0.00	0 00	0.29	0.00	0 01	0 05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/13/2021 6 31	11/14/2021 13 06	30.58	24.75	5 83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	6.97	24 47	0 36	0 00	0 01	0.18	0.02	0 01	0.36	0.00	0 01	0 18	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	11/14/2021 13 29	11/16/2021 2 21	36.87	15.50	21.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	8.40	19 97	0 43	0 01	0 02	0.15	0.01	0 01	0.43	0.01	0 02	0 15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/21/2021 18 48	11/24/2021 8 12	61.40	23.75	37.65	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	13.99	31 89	0 72	0 01	0 03	0.24	0.02	0 01	0.72	0.01	0 03	0 24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/1/2021 7 25	12/5/2021 23 15	111.83	35.25	76.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	25.48	52 77	1 30	0 02	0 05	0.39	0.03	0 02	1.30	0.02	0 05	0 39	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	12/14/2021 18 07	12/17/2021 20 14	74.12	31.50	42.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	16.89	40 38	0 86	0 01	0 03	0.30	0.03	0 02	0.86	0.01	0 03	0 30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/23/2021 22 45	12/25/2021 14 15	39.50	27.92	11.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.00	28 91	0 46	0 01	0 02	0.21	0.02	0 01	0.46	0.01	0 02	0 21	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	12/25/2021 14 39	12/27/2021 8 44	42.08	0.00	42.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	13.80	0 17	0 52	2 00	0.17	0.11	3 70	9.59	11 05	0 49	0 01	0 02	0.08	0.01	0 00	0.49	0.01	0 02	0 08	0.01	0.00
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/17/2021 20 11	9/20/2021 1 20	53.15	19.08	34.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	7.95	55 72	0 41	0 01	0 02	0.41	0.04	0 02	0.00	0.01	0 02	0 41	0.04	0.02
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/13/2021 16 33	7/14/2021 10 29	17.93	7.83	10.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.09	9.91	0 21	0 00	0 01	0.07	0.01	0 00	0.16	0.00	0 01	0 07	0.01	0.00
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/19/2021 16 19	7/25/2021 20 08	147.82	16.75	131.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	33.68	49 93	1 72	0 02	0 06	0.37	0.03	0 02	1.31	0.02	0 06	0 37	0.03	0.02
112	P oduct	49 737	Chev on	Non-US	2.00	No Upg ade	2	8/29/2021 6 58	8/29/2021 23 14	16.27	0.00	16.27	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	3.71	4.27	0 19	0 00	0 01	0.03	0.00	0 00	0.14	0.00	0 01	0 03	0.00	0.00
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/7/2021 8 03	7/10/2021 12 10	76.12	0.00	76.12	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	16.29	19 98	0 83	0 01	0 03	0.15	0.01	0 01	0.74	0.01	0 03	0 15	0.01	0.01
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/12/2021 13 42	7/15/2021 3 11	61.48	0.00	61.48	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.16	16 14	0 67	0 01	0 03	0.12	0.01	0 01	0.59	0.01	0 03	0 12	0.01	0.01
133	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	2	7/10/2021 19 54	7/12/2021 20 28	48.57	0.00	48.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	11.07	12 75	0 57	0 01	0 02	0.09	0.01	0 01	0.11	0.01	0 02	0 09	0.01	0.01
134	P oduct	50 267	Chev on	Non-US	2.00	No Upg ade	2	4/17/2021 22 24	4/20/2021 12 02	61.63	0.00	61.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.04	16 18	0 72	0 01	0 03	0.12	0.01	0 01	0.55	0.01	0 03	0 12	0.01	0.01
136	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/18/2021 17 50	2/21/2021 7 20	61.50	0.00	61.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.01	16 14	0 72	0 01	0 03	0.12	0.01	0 01	0.54	0.01	0 03	0 12	0.01	0.01
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/7/2021 1 27	8/9/2021 11 13	57.77	42.42	15.35	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.16	43 34	0 67	0 01	0 03	0 32	0.03	0 02	0.59	0.01	0 03	0 32	0.03	0.02
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/14/2021 15 45	8/16/2021 2 25	34.67	26.83	7 83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	7.90	26 92	0 40	0 00	0 02	0 20	0.02	0 01	0.36	0.00	0 02	0 20	0.02	0.01
142	Chem cal	35 058	Chev on	Non-US	2.00	No Upg ade	2	1/18/2021 13 05	1/18/2021 23 55	10.83	0.00	10.83	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	3.28	2.84	0 17	0 00	0 01	0.02	0.00	0 00	0.13	0.00	0 01	0 02	0.00	0.00
145	Chem cal	37 256	Chev on	Non-US	2.00	No Upg ade	2	2/24/2021 9 08	2/25/2021 8 49	23.68	0.00	23.68	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.17	6.22	0 37	0 00	0 01	0.05	0.00	0 00	0.28	0.00	0 01	0 05	0.00	0.00
160	SuezMax	156,654	Chev on	Non-US	1.00	No Upg ade	4	8/4/2021 9 16	8/6/2021 13 48	52.53	21.67	30.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	7.85	61 21	0 40	0 00	0 02	0.45	0.04	0 02	0.35	0.00	0 02	0 45	0.04	0.02
165	P oduct	46 554	Chev on	Non-US	1.00	No Upg ade	2	3/25/2021 12 50	3/27/2021 7 21	42.52	0.00	42.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.69	11 16	0 50	0 01	0 02	0.08	0.01	0 00	0.44	0.01	0 02	0 08	0.01	0.00
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	3/28/2021 2 55	3/31/2021 9 18	78.38	0.00	78.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	17.86	20 58	0 91	0 01	0 03	0.15	0.01	0 01	0.69	0.01	0 03	0 15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	5/3/2021 22 06	5/7/2021 17 50	91.73	0.00	91.73	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.90	24 08	1 07	0 01	0 04	0.18	0.02	0 01	0.81	0.01	0 04	0 18	0.02	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	6/17/2021 14 07	6/19/2021 14 58	48.85	0.00	48.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.13	12 82	0 57	0 01	0 02	0.09	0.01	0 01	0.43	0.01	0 02	0 09	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	8/11/2021 6 25	8/14/2021 10 50	76.42	0.00	76.42	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	17.41	20 06	0 89	0 01	0 03	0.15	0.01	0 01	0.68	0.01	0 03	0 15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	10/7/2021 3 05	10/9/2021 18 43	63.63	0.00	63.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.50	16 70	0 74	0 01	0 03	0.12	0.01	0 01	0.56	0.01	0 03	0 12	0.01	0.01
174	Chem cal	25 300	Chev on	Non-US	2.00	No Upg ade	2	7/12/2021 21 45	7/13/2021 13 23	15.63	0.00	15.63	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.73	4.10	0 24	0 00	0 01	0.03	0.00	0 00	0.18	0.00	0 01	0 03	0.00	0.00
175	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	12/17/2021 0 36	12/17/2021 22 16	21.67	11.50	10.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.94	13 33	0 25	0 00	0 01	0.10	0.01	0 01	0.05	0.00	0 01	0 10	0.01	0.01
183	P oduct	50 000	Chev on	Non-US	2.00	No Upg ade	3	8/21/2021 10 42	8/21/2021 21 32	10.83	0.00	10.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	2.47	2.84	0 13	0 00	0 00	0.02	0.00	0 00	0.10	0.00	0 00	0 02	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	6/30/2021 10 44	7/1/2021 3 05	16.35	0.00	16.35	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.95	4.29	0 25	0 00	0 01	0.03	0.00	0 00	0.19	0.00	0 01	0 03	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	10/7/2021 21 10	10/9/2021 7 16	34.10	0.00	34.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.32	8.95	0 53	0 01	0 02	0.07	0.01	0 00	0.40	0.01	0 02	0 07	0.01	0.00
190	PanaMax	68 439	Chev on	Non-US	1.00	No Upg ade	1	6/3/2021 18 19	6/6/2021 6 40	60.35	42.33	18.02	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.90	49 78	0 56	0 01	0 02	0.37	0.03	0 02	0.49	0.01	0 02	0 37	0.03	0.02
194	Chem cal	37 361	Chev on	Non-US	2.00	No Upg ade	2	4/15/2021 20 06	4/16/2021 10 12	14.10	0.00	14.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.27	3.70	0 22	0 00	0 01	0.03	0.00	0 00	0.17	0.00	0 01	0 03	0.00	0.00
198	Chem cal	33 641	Chev on	Non-US	1.00	No Upg ade	2	3/22/2021 5 39	3/22/2021 22 14	16.58	0.00	16.58	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.02	4.35	0 26	0 00	0 01	0.03	0.00	0 00	0.23	0.00	0 01	0 03	0.00	0.00
207	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	10/29/2021 9 09	10/30/2021 6 19	21.17	12.58	8 58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	4.82	13 91	0 25	0 00	0 01	0.10	0.01	0 01	0.19	0.00	0 01	0 10	0.01	0.01
214	P oduct	51 393	Chev on	Non-US	1.00	No Upg ade	1	1/14/2021 13 23	1/15/2021 22 25	33.03	0.00	33.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	7.53	8.67	0 38	0 00	0 01	0.06	0.01	0 00	0.34	0.00	0 01	0 06	0.01	0.00

Port Calls & Calculation

																		CARB Em ss on Facto s Aux Engine			CARB Em ss on Facto s Aux Bo ler			Em ss on Facto s basis Chevron Innovat veConcept Aux Engine			m ss on Facto s basis Chevron nnovat veConcept Aux Boiler						Em ss on Calc. based on CARB facto s Aux. Engine			Em ss on Calc. based on CARB facto s Aux. Boiler			Em ss on Calc. based on IC factors Aux. Eng ne			Em ss on Calc. based on IC factors Aux. Boiler		
Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 MT)	ROG (MT)	NOx (MT)	PM2 5 (MT)	ROG (MT)
219	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	5/31/2021 21 22	6/4/2021 2 21	76.98	0.00	76.98	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.54	20.21	0.90	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
220	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	4/12/2021 5 42	4/15/2021 13 22	79.67	0.00	79.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.15	20.91	0.93	0.01	0.03	0.15	0.01	0.01	0.17	0.01	0.03	0.15	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	4	10/1/2021 16 57	10/3/2021 20 52	51.92	32.33	19.58	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.11	53.41	0.57	0.01	0.02	0.40	0.03	0.02	0.43	0.01	0.02	0.40	0.03	0.02
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/3/2021 21 23	10/4/2021 22 08	24.75	7.08	17.67	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.30	15.21	0.27	0.00	0.01	0.11	0.01	0.01	0.21	0.00	0.01	0.11	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/7/2021 11 07	10/13/2021 9 35	142.47	68.00	74.47	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	30.48	121.06	1.56	0.02	0.06	0.90	0.08	0.05	1.19	0.02	0.06	0.90	0.08	0.05
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	11/5/2021 9 10	11/9/2021 4 57	91.78	0.00	91.78	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.64	24.09	1.00	0.01	0.04	0.18	0.02	0.01	0.76	0.01	0.04	0.18	0.02	0.01
228	SuezMax	149,995	Chev on	Non-US	3.00	No Upg ade	4	4/13/2021 13 43	4/15/2021 2 08	36.42	22.67	13.75	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.44	59.17	0.28	0.00	0.01	0.44	0.04	0.02	0.05	0.00	0.01	0.44	0.04	0.02
229	P oduct	51 745	Chev on	Non-US	1.00	No Upg ade	2	12/14/2021 0 28	12/16/2021 22 50	70.37	0.00	70.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.03	18.47	0.82	0.01	0.03	0.14	0.01	0.01	0.72	0.01	0.03	0.14	0.01	0.01
234	PanaMax	74 875	Chev on	Non-US	1.00	No Upg ade	1	4/2/2021 14 50	4/6/2021 6 28	87.63	0.00	87.63	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.82	23.00	0.81	0.01	0.03	0.17	0.01	0.01	0.71	0.01	0.03	0.17	0.01	0.01
236	P oduct	50 542	Chev on	Non-US	1.00	No Upg ade	1	5/2/2021 18 02	5/5/2021 19 34	73.53	0.00	73.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.75	19.30	0.86	0.01	0.03	0.14	0.01	0.01	0.76	0.01	0.03	0.14	0.01	0.01
237	P oduct	50 469	Chev on	Non-US	1.00	No Upg ade	2	5/23/2021 1 13	5/25/2021 13 13	60.00	0.00	60.00	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.67	15.75	0.70	0.01	0.03	0.12	0.01	0.01	0.62	0.01	0.03	0.12	0.01	0.01
238	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/19/2021 17 51	12/22/2021 16 25	70.57	0.00	70.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.08	18.52	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
241	P oduct	49 804	Chev on	Non-US	3.00	No Upg ade	3	2/21/2021 13 44	2/22/2021 8 12	18.47	10.50	7.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.21	11.82	0.22	0.00	0.01	0.09	0.01	0.00	0.04	0.00	0.01	0.09	0.01	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	3	1/21/2021 10 57	1/22/2021 3 40	16.72	0.00	16.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.81	4.39	0.19	0.00	0.01	0.03	0.00	0.00	0.15	0.00	0.01	0.03	0.00	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	2	1/24/2021 12 26	1/28/2021 1 27	85.02	0.00	85.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.37	22.32	0.99	0.01	0.04	0.17	0.01	0.01	0.75	0.01	0.04	0.17	0.01	0.01
248	Af aMax	115,909	Chev on	Non-US	1.00	No Upg ade	1	6/6/2021 8 35	6/13/2021 0 21	159.77	0.00	159.77	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	34.18	41.94	1.75	0.02	0.07	0.31	0.03	0.02	1.54	0.02	0.07	0.31	0.03	0.02
251	PanaMax	73 879	Chev on	Non-US	2.00	No Upg ade	4	6/13/2021 19 05	6/15/2021 0 15	29.17	20.33	8.83	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.27	23.96	0.27	0.00	0.01	0.18	0.02	0.01	0.20	0.00	0.01	0.18	0.02	0.01
253	P oduct	52 825	Chev on	Non-US	3.00	No Upg ade	3	4/15/2021 14 43	4/17/2021 6 17	39.57	0.00	39.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	9.02	10.39	0.46	0.01	0.02	0.08	0.01	0.00	0.09	0.01	0.02	0.08	0.01	0.00
255	P oduct	49 994	Chev on	Non-US	2.00	No Upg ade	3	7/7/2021 11 42	7/11/2021 13 48	98.10	0.00	98.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	22.35	25.75	1.14	0.01	0.04	0.19	0.02	0.01	0.87	0.01	0.04	0.19	0.02	0.01
258	Chem cal	26 029	Chev on	Non-US	2.00	No Upg ade	2	12/25/2021 1 55	12/25/2021 12 00	10.08	0.00	10.08	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.05	2.65	0.16	0.00	0.01	0.02	0.00	0.00	0.12	0.00	0.01	0.02	0.00	0.00
263	PanaMax	73 400	Chev on	Non-US	1.00	No Upg ade	1	6/13/2021 21 50	6/16/2021 16 25	66.58	54.50	12.08	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.02	61.17	0.61	0.01	0.02	0.45	0.04	0.02	0.54	0.01	0.02	0.45	0.04	0.02
264	P oduct	49 972	Chev on	Non-US	2.00	No Upg ade	2	6/4/2021 15 40	6/6/2021 10 45	43.08	0.00	43.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.82	11.31	0.50	0.01	0.02	0.08	0.01	0.00	0.38	0.01	0.02	0.08	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	1/27/2021 7 55	1/31/2021 0 12	88.28	25.25	63.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	20.12	39.95	1.03	0.01	0.04	0.30	0.03	0.02	0.19	0.01	0.04	0.30	0.03	0.02
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	2	2/2/2021 11 59	2/3/2021 19 06	31.12	0.00	31.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.09	8.17	0.36	0.00	0.01	0.06	0.01	0.00	0.07	0.00	0.01	0.06	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	2/26/2021 17 40	3/1/2021 13 58	68.30	0.00	68.30	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	15.56	17.93	0.80	0.01	0.03	0.13	0.01	0.01	0.15	0.01	0.03	0.13	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/11/2021 17 10	3/12/2021 11 06	17.93	9.75	8.18	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.09	11.18	0.21	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/22/2021 19 50	3/23/2021 13 15	17.42	9.17	8.25	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.97	10.66	0.20	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	4/3/2021 11 58	4/4/2021 7 30	19.53	10.73	8.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.45	12.26	0.23	0.00	0.01	0.09	0.01	0.00	0.20	0.00	0.01	0.09	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	6/16/2021 17 37	6/17/2021 15 40	22.05	11.25	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	13.26	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	7/10/2021 22 15	7/12/2021 11 08	36.88	18.83	18.05	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.40	22.19	0.43	0.01	0.02	0.16	0.01	0.01	0.38	0.01	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	8/15/2021 4 10	8/16/2021 15 06	34.93	18.92	16.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.96	21.73	0.41	0.01	0.02	0.16	0.01	0.01	0.36	0.01	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	8/24/2021 2 37	8/25/2021 6 14	27.62	17.00	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.29	18.54	0.32	0.00	0.01	0.14	0.01	0.01	0.28	0.00	0.01	0.14	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/13/2021 2 29	9/14/2021 3 33	25.07	11.92	13.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.71	14.50	0.29	0.00	0.01	0.11	0.01	0.01	0.26	0.00	0.01	0.11	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/28/2021 8 08	9/29/2021 6 35	22.45	12.08	10.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	13.92	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	10/30/2021 20 43	10/31/2021 19 48	23.08	16.58	6.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.26	17.07	0.27	0.00	0.01	0.13	0.01	0.01	0.24	0.00	0.01	0.13	0.01	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/1/2021 5 55	1/2/2021 9 23	27.47	18.08	9.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.11	46.79	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/7/2021 6 12	1/8/2021 9 28	27.27	19.25	8.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.08	49.29	0.21	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/19/2021 18 23	1/20/2021 15 13	20.83	9.75	11.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.11	26.81	0.16	0.00	0.01	0.20	0.02	0.01	0.00	0.00	0.01	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/25/2021 20 42	1/27/2021 9 09	36.45	25.33	11.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.45	65.01	0.28	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/4/2021 3 11	2/5/2021 8 14	29.05	19.58	9.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.34	50.48	0.22	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/11/2021 20 19	2/12/2021 22 01	25.70	16.92	8.78	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.84	43.77	0.20	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/23/2021 10 41	2/24/2021 11 40	24.98	16.72	8.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.74	43.14	0.19	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/2/2021 17 10	3/4/2021 0 15	31.08	19.58	11.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.65	51.02	0.24	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/11/2021 11 29	3/12/2021 7 24	19.92	10.67	9.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.98	28.57	0.15	0.00	0.01	0.21	0.02	0.01	0.00	0.00	0.01	0.21	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/19/2021 3 00	3/20/2021 15 16	36.27	20.58	15.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.42	54.57	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/28/2021 21 06	3/29/2021 21 08	24.03	14.08	9.95	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.59	37.13	0.18	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/3/2021 3 22	4/4/2021 15 20	35.97	21.00	14.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	55.40	0.27	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/18/2021 2 23	4/19/2021 6 29	28.10	19.08	9.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	49.14	0.21	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/3/2021 3 34	5/4/2021 16 41	37.12	20.25	16.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	54.06	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/19/2021 15 42	5/20/2021 16 23	24.68	18.33	6.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	46.60	0.19	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/26/2021 13 13	5/28/2021 11 26	46.22	18.75	27.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.91	53.17	0.35	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/5/2021 18 25	6/6/2021 20 10	25.75	19.25	6.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.85	48.89	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/19/2021 22 32	6/21/2021 6 27	31.92	21.67	10.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.77	55.80	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/29/2021 17 19	7/1/2021 2 05	32.77	16.50	16.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.90	44.71	0.25	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/9/2021 13 40	7/10/2021 16 17	26.62	20.50	6.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.98	51.85	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/16/2021 17 21	7/17/2021 20 10	26.82	19.75	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	50.26	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/27/2021 13 58	7/29/2021 1 08	35.17	16.58	18.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.26	45.52	0.27	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/7/2021 21 58	8/13/2021 17 50	139.87	14.17	125.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	20.91	67.72	1.07	0.01	0.04	0.50	0.04	0.03	0.00	0.00	0.01	0.50	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/19/2021 18 12	8/20/2021 18 52	24.67	16.33	8.33	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	42.22	0.19	0.00	0.01	0.31	0.03	0.02	0.00	0.00	0.01	0.31	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/26/2021 18 01	8/28/2021 6 50	36.82	17.58	19.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.50	48.15	0.28	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/4/2021 23 11	9/6/2021 9 18	34.12	18.50	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.10	49.44	0.26	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/10/2021 21 35	9/12/2021 0 25	26.83	18.17	8.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	46.80	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/25/2021 13 24	9/26/2021 17 52	28.47	17.50	10.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.26	45.77	0.22	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/4/2021 0 45	10/5/2021 1 41	24.93	17.92	7.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.73	45.76	0.19	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/12/2021 10 49	10/13/2021 8 19	21.50	16.00	5.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.21	40.66	0.16	0.00	0.01	0.30	0.03	0.02	0.00	0.00	0.01	0.30	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/17/2021 23 20	10/19/2021 1 44	26.40	20.08	6.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.95	50.88	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/31/2021 10 21	11/2/2021 22 27	60.10	19.08	41.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.99	57.54	0.46	0.01	0.02	0.43	0.04	0.02	0.00	0.00	0.02	0.43	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/12/2021 19 47	11/13/2021 21 13	25.43	19.50	5.93	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.80	49.35	0.19	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/19/2021 8 15	11/20/2021 20 21	36.10	17.50	18.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.40	47.77	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/28/2021 7 37	11/29/2021 15 48	32.18	22.17	10.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.81	56.96	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/6/2021 11 11	12/7/2021 4 25	17.23	10.17	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.58	26.77	0.13	0.00	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/13/2021 11 30	12/14/2021 9 52	22.37	14.75	7.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.34	38.15	0.17	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/19/2021 9 18	12/20/2021 13 22	28.07	17.75	10.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	46.21	0.21	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/24/2021 18 10	12/26/2021 7 19	37.15	16.83	20.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	46.59	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
289	Af aMax	114,809	Chev on	Non-US	1.00	No Upg ade	1	10/19/2021 23 14	10/25/2021 13 05	133.85	88.50	45.35	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	28.64	144.02	1.46	0.02	0.06	1.07	0.09	0.06	1.29	0.02	0.06	1.07	0.09	0.06
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/18/2021 14 00	1/19/2021 14 32	24.53	15.23	9.30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.67	39.78	0.19	0.00	0.01	0.29	0.03	0.02	0.17	0.00	0.01	0.29	0.03	0.02
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	2/19/2021 3 35	2/19/2021 19 45	16.17	8.43	7.73	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.42	22.70	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/12/2021 9 10	3/13/2021 7 46	22.60	7.92	14.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.38	23.26	0.17	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/27/2021 11 52	3/28/2021 8 14	20.37	8.00	12.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	22.85	0.16	0.00	0.01	0.17	0.01	0.01	0.14	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/9/2021 8 43	4/9/2021 23 14	14.52	8.33	6.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.17	22.05	0.11	0.00	0.00	0.16	0.01	0.01	0.10	0.00	0.00	0.16	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/12/2021 10 14	4/13/2021 2 30	16.27	8.58	7.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.43	23.05	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/25/2021 8 49	4/26/2021 8 10	23.35	8.08	15.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.49	23.82	0.18	0.00	0.01	0.18	0.01	0.01	0.16	0.00	0.01	0.18	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	5/25/2021 10 48	5/26/2021 9 44	22.93	7.75	15.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.43	22.98	0.18	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	7/26/2021 16 19	7/27/2021 11 47	19.47	6.50	12.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.91	19.34	0.15	0.00	0.01	0.14	0.01	0.01	0.13	0.00	0.01	0.14	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/9/2021 2 45	9/9/2021 23 18	20.55	6.50	14.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.07	19.62	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/22/2021 14 03	9/23/2021 10 25	20.37	6.67	13.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	19.94	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/30/2021 23 58	5/1/2021 20 02	20.07	7.00	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.00	20.59	0.15	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	8/28/2021 12 38	8/29/2021 2 53	14.25	7.25	7.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.13	19.61	0.11	0.00	0.00	0.15	0.01	0.01	0.10	0.00	0.00	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	10/6/2021 9 35	10/6/2021 23 47	14.20	6.83	7.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.12	18.68	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/11/2021 2 44	11/12/2021 3 14	24.50	7.33	17.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.66	22.48	0.19	0.00	0.01	0.17	0.01	0.01	0.17	0.00	0.01	0.17	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/29/2021 17 54	11/30/2021 8 42	14.80	7.00	7.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.21	19.20	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	6/25/2021 0 11	6/25/2021 15 31	14.67	7.75	6.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	20.81	0.11	0.00	0.00	0.15	0.01	0.01	0.11	0.00	0.00	0.15	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	7/18/2021 7 53	7/19/2021 17 26	33.55	11.83	21.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.02	34.70	0.26	0.00	0.01	0.26	0.02	0.01	0.26	0.00	0.01	0.26	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	10/19/2021 21 59	10/21/2021 9 14	35.25	7.58	27.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.27	25.85	0.27	0.00	0.01	0.19	0.02	0.01	0.27	0.00	0.01	0.19	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/15/2021 5 17	12/16/2021 8 32	27.25	6.58	20.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.07	21.56	0.21	0.00	0.01	0.16	0.01	0.01	0.21	0.00	0.01	0.16	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/29/2021 6 34	12/30/2021 8 42	26.13	6.92	19.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.91	22.00	0.20	0.00	0.01	0.16	0.01	0.01	0.20	0.00	0.01	0.16	0.01	0.01
294	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/29/2021 8 38	1/30/2021 8 10	23.53	6.42	17.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.52	20.22	0.18	0.00	0.01	0.15	0.01	0.01	0.16	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	1/15/2021 3 06	1/15/2021 22 55	19.82	6.75	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.96	19.97	0.15	0.00	0.01	0.15	0.01	0.01	0.15	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/2/2021 13 28	2/3/2021 13 16	23.80	7.58	16.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.56	22.84	0.18	0.00	0.01	0.17	0.01	0.01	0.18	0.00	0.01	0.17	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/16/2021 13 50	2/17/2021 2 15	12.42	5.83	6.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.86	16.03	0.09	0.00	0.00	0.12	0.01	0.01	0.09	0.00	0.00	0.12	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	3	3/5/2021 2 52	3/5/2021 17 30	14.63	6.42	8.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	17.88	0.11	0.00	0.00	0.13	0.01	0.01	0.11	0.00	0.00	0.13	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	5/17/2021 15 57	5/18/2021 14 37	22.67	6.83	15.83	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.39	20.90	0.17	0.00	0.01	0.15	0.01	0.01	0.17	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	8/15/2021 18 23	8/16/2021 7 08	12.75	6.75	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.91	18.12	0.10	0.00	0.00	0.13	0.01	0.01	0.10	0.00	0.00	0.13	0.01	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/5/2021 14 00	1/7/2021 2 11	36.18	17.42	18.77	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.41	47.61	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/16/2021 1 27	1/17/2021 4 20	26.88	20.08	6.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.02	51.01	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/21/2021 7 26	1/22/2021 16 21	32.92	22.75	10.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.92	58.43	0.25	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/1/2021 1 50	2/2/2021 4 10	26.33	19.25	7.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.94	49.04	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/8/2021 9 45	2/10/2021 6 15	44.50	20.42	24.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.65	56.36	0.34	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/17/2021 15 37	2/19/2021 1 15	33.63	22.08	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.03	57.16	0.26	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/14/2021 3 05	3/15/2021 12 23	33.30	21.75	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.98	56.34	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/23/2021 8 35	3/24/2021 10 25	25.83	19.83	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	50.19	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/30/2021 15 13	3/31/2021 22 26	31.22	20.83	10.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.67	53.79	0.24	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/7/2021 1 42	4/8/2021 6 25	28.72	18.00	10.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.29	46.93	0.22	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/16/2021 4 50	4/17/2021 12 20	31.50	21.58	9.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.71	55.50	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/21/2021 23 40	4/23/2021 6 36	30.93	21.58	9.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.62	55.36	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/9/2021 23 26	5/11/2021 15 18	39.87	17.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.96	49.49	0.30	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/23/2021 21 20	5/25/2021 8 09	34.82	21.92	12.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.21	57.10	0.27	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/6/2021 22 40	6/8/2021 14 14	39.57	17.33	22.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.92	48.32	0.30	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/17/2021 7 27	6/18/2021 14 53	31.43	23.08	8.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.70	58.77	0.24	0.00	0.01	0.44	0.04	0.02	0.00	0.00	0.01	0.44	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/25/2021 22 50	6/27/2021 3 59	29.15	12.50	16.65	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.36	35.01	0.22	0.00	0.01	0.26	0.02	0.01	0.00	0.00	0.01	0.26	0.02	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/14/2021 17 00	7/16/2021 4 31	35.52	25.08	10.43	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.31	64.22	0.27	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/22/2021 0 24	7/23/2021 9 22	32.97	20.50	12.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.93	53.52	0.25	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/2/2021 19 32	8/4/2021 6 45	35.22	22.08	13.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.27	57.57	0.27	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/14/2021 5 50	8/15/2021 13 53	32.05	20.00	12.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.79	52.18	0.24	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/22/2021 13 22	8/23/2021 21 21	31.98	21.75	10.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.78	56.00	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/31/2021 20 14	9/2/2021 6 25	34.18	19.92	14.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.11	52.56	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/7/2021 12 23	9/9/2021 0 44	36.35	22.33	14.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.43	58.42	0.28	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/14/2021 20 33	9/15/2021 18 17	21.73	14.25	7.48	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.25	36.89	0.17	0.00	0.01	0.27	0.02	0.02	0.00	0.00	0.01	0.27	0.02	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/21/2021 0 32	9/22/2021 12 15	35.72	20.50	15.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.34	54.24	0.27	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/28/2021 7 39	9/29/2021 18 24	34.75	18.08	16.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.20	48.70	0.27	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/7/2021 12 14	10/9/2021 23 31	59.28	22.17	37.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.86	64.07	0.45	0.01	0.02	0.47	0.04	0.03	0.00	0.01	0.02	0.47	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/15/2021 9 35	10/16/2021 20 05	34.50	19.92	14.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.16	52.64	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/21/2021 22 35	10/23/2021 0 23	25.80	17.08	8.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	44.16	0.20	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/6/2021 14 29	11/7/2021 22 13	31.73	15.83	15.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.74	42.98	0.24	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/16/2021 8 27	11/17/2021 20 28	36.02	21.42	14.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	56.32	0.28	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/23/2021 12 25	11/25/2021 11 35	47.17	23.75	23.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.05	64.36	0.36	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/3/2021 8 45	12/4/2021 12 42	27.95	19.92	8.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.18	50.92	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine			CARB Em ss on Facto s Aux Bo ler			Em ss on Facto s basis Chevron Innovat veConcept Aux Engine			m ss on Facto s basis Chevron nnovat veConcept Aux Boiler			Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine			Em ss on Calc. based on CARB facto s Aux. Boiler			Em ss on Calc. based on IC factors Aux. Eng ne			Em ss on Calc. based on IC factors Aux. Boiler		
																		NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)				NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 MT)	ROG (MT)	NOx (MT)	PM2 5 (MT)	ROG (MT)
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/10/2021 15 28	12/11/2021 16 36	25.13	18.25	6 88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	3.76	46 54	0 19	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/21/2021 11 35	12/22/2021 22 18	34.72	22.42	12.30	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	5.19	58 17	0 27	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/31/2021 8 27	1/1/2022 0 00	15.55	11.00	4 55	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	2.32	28 16	0 12	0 00	0 00	0.21	0.02	0 01	0.00	0.00	0 00	0 21	0.02	0.01
301	P oduct	51 215	Chev on	Non-US	1.00	No Upg ade	3	1/16/2021 6 03	1/18/2021 2 10	44.12	0.00	44.12	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.05	11 58	0 51	0 01	0 02	0.09	0.01	0 00	0.45	0.01	0 02	0 09	0.01	0.00
307	SuezMax	149,992	Chev on	Non-US	2.00	No Upg ade	1	2/28/2021 9 22	3/2/2021 1 24	40.03	23.58	16.45	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.99	62 12	0 31	0 00	0 01	0.46	0.04	0 03	0.23	0.00	0 01	0 46	0.04	0.03
309	P oduct	46 938	Chev on	Non-US	1.00	No Upg ade	3	10/14/2021 22 05	10/16/2021 16 11	42.10	0.00	42.10	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.59	11 05	0 49	0 01	0 02	0.08	0.01	0 00	0.43	0.01	0 02	0 08	0.01	0.00
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	5/28/2021 14 39	6/2/2021 16 27	121.80	80.83	40.97	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	21.99	96 77	1 12	0 01	0 04	0 72	0.06	0 04	0.99	0.01	0 04	0 72	0.06	0.04
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/8/2021 10 29	8/15/2021 2 31	160.03	0.00	160.03	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	28.89	42 01	1 48	0 02	0 06	0 31	0.03	0 02	1.31	0.02	0 06	0 31	0.03	0.02
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/29/2021 13 53	8/31/2021 18 10	52.28	39.00	13.28	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.44	44 99	0 48	0 01	0 02	0.33	0.03	0 02	0.43	0.01	0 02	0 33	0.03	0.02
314	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	1/12/2021 23 18	1/16/2021 13 11	85.88	0.00	85.88	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 54	1 00	0 01	0 04	0.17	0.01	0 01	0.19	0.01	0 04	0 17	0.01	0.01
322	P oduct	49 901	Chev on	Non-US	2.00	No Upg ade	2	6/26/2021 17 58	6/28/2021 13 49	43.85	36.42	7 43	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.99	35 70	0 51	0 01	0 02	0.26	0.02	0 01	0.39	0.01	0 02	0 26	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	5/23/2021 6 14	5/27/2021 13 50	103.60	2.75	100.85	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.17	30 58	1 13	0 01	0 04	0.23	0.02	0 01	0.21	0.01	0 04	0 23	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	6/2/2021 18 18	6/3/2021 16 19	22.02	0.00	22.02	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.71	5.78	0 24	0 00	0 01	0.04	0.00	0 00	0.05	0.00	0 01	0 04	0.00	0.00
324	P oduct	50 908	Chev on	Non-US	2.00	No Upg ade	3	7/30/2021 11 10	8/2/2021 3 45	64.58	0.00	64.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.72	16 95	0 75	0 01	0 03	0.13	0.01	0 01	0.57	0.01	0 03	0 13	0.01	0.01
325	Af aMax	114,426	Chev on	Non-US	2.00	No Upg ade	4	6/27/2021 13 54	6/29/2021 15 24	49.50	28.17	21.33	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.59	47 65	0 54	0 01	0 02	0.35	0.03	0 02	0.41	0.01	0 02	0 35	0.03	0.02
268	PanaMax	69 684	Chev on	Non-US	1.00	No Upg ade	4	5/29/2021 21 35	5/31/2021 4 20	30.75	21.33	9 42	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.55	25 17	0 28	0 00	0 01	0.19	0.02	0 01	0.25	0.00	0 01	0 19	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	10/24/2021 2 08	10/29/2021 6 28	124.33	0.00	124.33	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	22.45	32 64	1 15	0 01	0 04	0.24	0.02	0 01	1.01	0.01	0 04	0 24	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	12/7/2021 10 41	12/9/2021 12 12	49.52	22.92	26.60	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	8.94	31 37	0 46	0 01	0 02	0.23	0.02	0 01	0.40	0.01	0 02	0 23	0.02	0.01
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/23/2021 18 45	6/26/2021 16 35	69.83	29.08	40.75	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.91	37 65	0 81	0 01	0 03	0.28	0.02	0 02	0.72	0.01	0 03	0 28	0.02	0.02
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/28/2021 17 40	6/30/2021 9 10	39.50	7.50	32.00	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.00	15 35	0 46	0 01	0 02	0.11	0.01	0 01	0.41	0.01	0 02	0 11	0.01	0.01
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	2	4/7/2021 5 57	4/8/2021 19 33	37.60	0.00	37.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.57	9.87	0 44	0 01	0 02	0.07	0.01	0 00	0.33	0.01	0 02	0 07	0.01	0.00
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	3	4/10/2021 19 54	4/12/2021 4 13	32.32	0.00	32.32	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.36	8.48	0 38	0 00	0 01	0.06	0.01	0 00	0.29	0.00	0 01	0 06	0.01	0.00
335	P oduct	50 222	Chev on	Non-US	1.00	No Upg ade	1	2/16/2021 0 05	2/19/2021 13 59	85.90	0.00	85.90	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 55	1 00	0 01	0 04	0.17	0.01	0 01	0.88	0.01	0 04	0 17	0.01	0.01
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	2	7/19/2021 0 55	7/20/2021 23 12	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.55	12 15	0 54	0 01	0 02	0.09	0.01	0 00	0.41	0.01	0 02	0 09	0.01	0.00
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	3	8/2/2021 5 35	8/3/2021 12 15	30.67	0.00	30.67	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.99	8.05	0 36	0 00	0 01	0.06	0.01	0 00	0.27	0.00	0 01	0 06	0.01	0.00
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	6/26/2021 11 02	6/28/2021 15 05	52.05	37.00	15.05	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.14	59 18	0 57	0 01	0 02	0.44	0.04	0 02	0.50	0.01	0 02	0 44	0.04	0.02
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	7/4/2021 8 57	7/5/2021 17 36	32.65	19.25	13.40	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	6.99	32 25	0 36	0 00	0 01	0.24	0.02	0 01	0.32	0.00	0 01	0 24	0.02	0.01
347	SuezMax	158,081	Chev on	Non-US	3.00	No Upg ade	4	5/13/2021 23 15	5/16/2021 23 28	72.22	24.33	47.88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	10.80	72 21	0 55	0 01	0 02	0.53	0.05	0 03	0.10	0.01	0 02	0 53	0.05	0.03
350	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/30/2021 1 23	12/31/2021 19 59	42.60	0.00	42.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.71	11 18	0 50	0 01	0 02	0.08	0.01	0 00	0.38	0.01	0 02	0 08	0.01	0.00
351	P oduct	51 213	Chev on	Non-US	1.00	No Upg ade	2	10/16/2021 23 19	10/19/2021 3 23	52.07	0.00	52.07	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.86	13 67	0 61	0 01	0 02	0.10	0.01	0 01	0.54	0.01	0 02	0 10	0.01	0.01
352	P oduct	51 228	Chev on	Non-US	1.00	No Upg ade	2	7/21/2021 2 35	7/23/2021 6 12	51.62	0.00	51.62	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.76	13 55	0 60	0 01	0 02	0.10	0.01	0 01	0.53	0.01	0 02	0 10	0.01	0.01
358	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	5/11/2021 10 21	5/14/2021 22 46	84.42	0.00	84.42	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.23	22 16	0 98	0 01	0 04	0.16	0.01	0 01	0.19	0.01	0 04	0 16	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	4/2/2021 13 18	4/4/2021 6 03	40.75	9.58	31.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.28	17 06	0 47	0 01	0 02	0.13	0.01	0 01	0.36	0.01	0 02	0 13	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	6/2/2021 10 08	6/3/2021 20 07	33.98	25.50	8 48	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.74	25 86	0 40	0 00	0 01	0.19	0.02	0 01	0.30	0.00	0 01	0 19	0.02	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	7/24/2021 1 13	7/26/2021 0 50	47.62	32.08	15.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.85	33 81	0 55	0 01	0 02	0.25	0.02	0 01	0.42	0.01	0 02	0 25	0.02	0.01
374	Af aMax	108,942	Chev on	Non-US	1.00	No Upg ade	1	8/23/2021 13 30	8/26/2021 12 24	70.90	53.75	17.15	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.17	84 74	0 78	0 01	0 03	0.63	0.05	0 03	0.69	0.01	0 03	0 63	0.05	0.03
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	2	5/4/2021 19 03	5/6/2021 18 35	47.53	0.00	47.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.83	12 48	0 55	0 01	0 02	0.09	0.01	0 01	0.49	0.01	0 02	0 09	0.01	0.01
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	3	9/11/2021 19 36	9/14/2021 8 22	60.77	0.00	60.77	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.85	15 95	0 71	0 01	0 03	0.12	0.01	0 01	0.63	0.01	0 03	0 12	0.01	0.01
379	P oduct	50 243	Chev on	Non-US	2.00	No Upg ade	3	12/10/2021 6 12	12/12/2021 11 29	53.28	0.00	53.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.14	13 99	0 62	0 01	0 02	0.10	0.01	0 01	0.47	0.01	0 02	0 10	0.01	0.01
385	P oduct	46 955	Chev on	Non-US	1.00	No Upg ade	3	3/11/2021 15 00	3/15/2021 6 30	87.50	0.00	87.50	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.94	22 97	1 02	0 01	0 04	0.17	0.01	0 01	0.90	0.01	0 04	0 17	0.01	0.01
388	P oduct	51 218	Chev on	Non-US	1.00	No Upg ade	3	3/27/2021 10 13	3/28/2021 1 06	14.88	7.25	7 63	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	3.39	8.72	0 17	0 00	0 01	0.06	0.01	0 00	0.15	0.00	0 01	0 06	0.01	0.00
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	2	5/19/2021 9 46	5/21/2021 9 21	47.58	0.00	47.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.84	12 49	0 55	0 01	0 02	0.09	0.01	0 01	0.42	0.01	0 02	0 09	0.01	0.01
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	3	9/16/2021 6 52	9/19/2021 6 20	71.47	0.00	71.47	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.28	18 76	0 83	0 01	0 03	0.14	0.01	0 01	0.63	0.01	0 03	0 14	0.01	0.01
390	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	11/27/2021 1 45	12/1/2021 10 54	105.15	0.00	105.15	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	23.96	27 60	1 22	0 02	0 05	0.20	0.02	0 01	0.93	0.02	0 05	0 20	0.02	0.01
391	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/21/2021 11 22	2/23/2021 12 25	49.05	0.00	49.05	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.18	12 88	0 57	0 01	0 02	0.10	0.01	0 01	0.43	0.01	0 02	0 10	0.01	0.01
392	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/16/2021 4 06	8/18/2021 11 30	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	5/13/2021 2 30	5/15/2021 9 26	54.93	0.00	54.93	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.52	14 42	0 64	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/27/2021 3 55	8/29/2021 1 15	45.33	0.00	45.33	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.33	11 90	0 53	0 01	0 02	0.09	0.01	0 00	0.40	0.01	0 02	0 09	0.01	0.00
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	9/3/2021 14 21	9/5/2021 1 11	34.83	0.00	34.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.94	9.14	0 41	0 00	0 02	0.07	0.01	0 00	0.31	0.00	0 02	0 07	0.01	0.00
394	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	6/8/2021 4 22	6/10/2021 12 20	55.97	0.00	55.97	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.75	14 69	0 65	0 01	0 02	0 11	0.01	0 01	0.50	0.01	0 02	0 11	0.01	0.01
395	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/27/2021 9 16	9/29/2021 21 06	59.83	0.00	59.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.63	15 71	0 70	0 01	0 03	0 12	0.01	0 01	0.53	0.01	0 03	0 12	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	3	3/17/2021 0 08	3/20/2021 16 18	88.17	0.00	88.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.09	23 14	1 03	0 01	0 04	0.17	0.01	0 01	0.78	0.01	0 04	0 17	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	4/20/2021 13 41	4/23/2021 10 43	69.03	0.00	69.03	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	15.73	18 12	0 80	0 01	0 03	0.13	0.01	0 01	0.61	0.01	0 03	0 13	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/30/2021 17 52	10/3/2021 1 16	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	5/12/2021 6 33	5/13/2021 1 10	18.62	0.00	18.62	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.64	4.89	0 29	0 00	0 01	0.04	0.00	0 00	0.22	0.00	0 01	0 04	0.00	0.00
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	8/18/2021 12 32	8/19/2021 9 15	20.72	0.00	20.72	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.27	5.44	0 32	0 00	0 01	0.04	0.00	0 00	0.24	0.00	0 01	0 04	0.00	0.00
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/18/2021 3 40	7/20/2021 11 22	55.70	0.00	55.70	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	11.92	14 62	0 61	0 01	0 02	0.11	0.01	0 01	0.11	0.01	0 02	0 11	0.01	0.01
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/23/2021 12 46	7/27/2021 23 25	106.65	0.00	106.65	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.82	28 00	1 17	0 01	0 04	0.21	0.02	0 01	0.22	0.01	0 04	0 21	0.02	0.01
409	P oduct	48 026	Chev on	Non-US	1.00	No Upg ade	2	10/3/2021 2 30	10/5/2021 1 05	46.58	0.00	46.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.61	12 23	0 54	0 01	0 02	0.09	0.01	0 00	0.48	0.01	0 02	0 09	0.01	0.00
205	Af aMax	114,820	Chev on	US	2.00	No Upg ade	4	9/27/2021 3 47	9/28/2021 4 21	24.57	14.08	10.48	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.26	23 78	0 27	0 00	0 01	0.18	0.01	0 01	0.20	0.00	0 01	0 18	0.01	0.01
411	Af aMax	112,186	Chev on	Non-US	2.00	No Upg ade	1	12/29/2021 8 03	1/1/2022 0 00	63.95	47.42	16.53	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.68	75 12	0 70	0 01	0 03	0.56	0.05	0 03	0.53	0.01	0 03	0 56	0.05	0.03

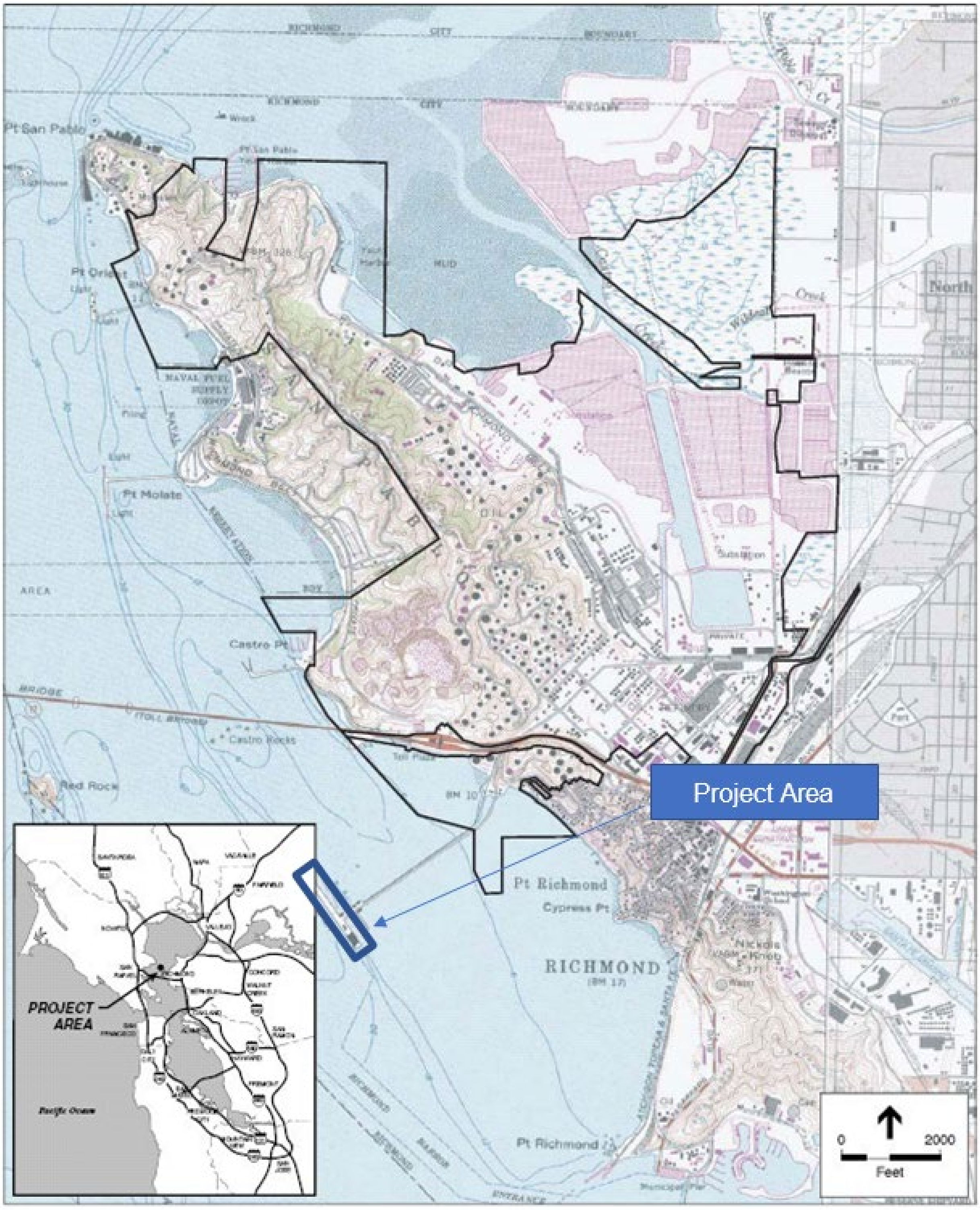
Appendix A12: IC.12 - Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for ships

A12.1 – Map
A12.2 - Data Management System
A12.3 – Emission Calculation Spreadsheet

Inputs

Calculations

Appendix A12.1: Map – IC.12 Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for Ships



Refinery Boundary

Appendix A12.2: IC.12 Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for Ships – Data Management System

Chevron maintains a central database, called the Marine Enterprise System ("MES"), which tracks shipping activity from the initial cargo nomination to the vessel arrival, load or discharge of the nominated cargo at berth, concluding with the vessel departure (unmooring). As shown below, MES is the source of the majority of data inputs used to calculate vessel activity at berth, particularly timestamps for mooring and unmooring, cargo transfer start and finish, and total barrels transferred by cargo type, as well as vessel details such as IMO number, vessel owner and vessel type.

These vessel at berth activity inputs are common to not only the Baseline emissions calculations, but any vessel-related innovative concepts that require an estimate of emissions associated with at-berth activity, such as IC.10, IC.11, IC.12, IC.13 and IC.14.

In addition to the data inputs provided or derived from MES, Chevron uses the CARB at Berth Vessel Questionnaire (VQ) to supplement inputs to the Baseline calculations, which is an .xls workbook submitted by the vessel to CARB within 30 days of the vessel call, with a cc: to the Richmond Long Wharf. The VQ spreadsheet provides further details that may not be available through MES, such as the vessel type, IMO NOx Tier (0, 1, 2, 3) and can further support as a data quality check for timestamps provided in MES for vessel arrival date/time and departure date/time.

Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data. If the data are not present in PAVIS, Chevron Shipping may also:

- Request additional data submission from vessels, by making this a requirement through changes in the Terminal Information Booklet, including request for information from the vessels Technical Files, as shown in the Validation Processes, below.

- Request vessel to submit detailed information on modifications made to the Auxiliary Boiler Combustion and Control system, to comply with this IC

Appendix A12.2 - Chevron Richmond Long Wharf - Shipping Innovative Concepts (I.C. 10, I.C. 11, IC.12, IC.13)
Data Management System

Databases / Sources

Vessel Activity at Berth	Vessel Characteristics	Vessel Clearance to call RLW
Marine Enterprise System (MES) Database Owner: RLW Operations	CARB At Berth Vessel Questionnaire (VQ) (.xls) Owner: Richmond HES	PAVIS Database Owner: Chevron Shipping

Common Data: *Vessel Name, Vessel IMO number, Vessel Owner*

Vessel/Call ID Tracking

MES Inputs (from V1.30 Design Spec):
MES ID#
IMO #
ENV #
Nomination ID
Date of Last call - date/time
Vessel Owner
Vessel Type
Power kW - text
Build Date - date/time

VQ Inputs:
IMO #
ENV #
Vessel type
IMO NOx Tier (0, 1, 2, 3)
Port Visit
Terminal Visited
Berth Visited
Arrival Date and Time
Departure Date and Time

PAVIS (validation):
IMO #
Vessel type
Vessel owner
Fleet name
Vessel Q88 data
IMO NOx Tier

At Berth Activity / Duration

Berth name/number
Moor Vessel - First Line - timestamp
Pre Transfer - Connect Hoses – timestamp
Product type?
Transfer Cargo start - timestamp
Transfer Cargo end - timestamp
Ship Quantity (bbls)
Ship Barrels (bbls)
Cargo Quantity (MB)
Post-Transfer - Disconnect Hoses - timestamp
Unmoor vessel timestamp
Load (L) / Unload (D) activity
Delay code (if applicable)

Fuel type – boiler
Fuel consumed boiler (MT)
Fuel type – aux engines
Fuel consumed – aux engines (MT)
[redacted]annual engine tier forecast.
IC.12 – EFs per Engine Manufacturers, see spreadsheet.
IC.13 – IMO EFs for Dual-Fuel vessels, see spreadsheet

Use of an Innovative Concept – Y/N
IC EO number

CVX to develop emissions credit accounting system to designate non-CEQA vs CEQA EOs to call and quantity of NOx, PM, ROG credits.

Validation Processes:
1. Verify and/or locate missing vessel information in PAVIS, Q88 or by contact with the ship directly.
2. Ship Technical Files (engine technical file)
3.Ship Inspection -annually (IACS member)
4. Annual NOx equipment calibration (Tier II/III ships)
5. Emission Calcs:
   Emission Inventory Calculation Reviews by HES Emission Inventory specialist.
6. Timestamp data – internally QC'd by MES software to prevent inaccurate/illogical timestamps.
7. IC credit inventory and monthly by HES Emission Inventory specialist.

Calculations and Annual Report Template per each Shipping IC are shown in Appendix A12.3

Data Retention: 5 years, minimum.

Appendix A12.3: IC.12 Upgraded Combustion and Control Systems for Auxiliary Boilers (AB's) for Ships – Emission Calculation Spreadsheets

Appendix A12.3 Emissions Calculation

Chevron Richmond, IC.12 - Upgraded Combustion and Control Systems for Auxiliary Boilers

IC.12 has not been implemented on any vessel till date. The technology is new and implementation of the technology requires Chevron to make modifications to vessels. Chevron will progress with this IC AFTER approval by CARB. Once approved Chevron will implement this IC in a phased manner on its owned, operated and chartered vessels as applicable. Below calculation is a demonstration and estimation of emission reductions from Aux boiler upgrades on Chevron's owned and operated lightering vessels that visit richmond. The calculations are based on 2021 vessel call activity at Richmond.

Estimated Emissions and Reductions from Upgraded Aux Boilers (MT/Yr)	NOx (MT/Yr)	PM2.5 (MT/Yr)	ROG (MT/Yr)	*Additional Details*
Baseline Emissions with CARB default Emission Factor	28.47	2.42	1.57	*Total Aux Boiler emission from vessels assuming CARB default baseline emission factors*
Emissions using Upgraded Aux Boiler Emission Factor	4.20	2.42	1.57	*Total Aux Boiler emission from vessels with upgraded Combustion and Control systems on Aux boilers assuming upgraded Aux Boiler emission factors* *(Chevron has only assumed NOx reductions at this time)*
Emission reductions from IC 12	**24.27**	**0.00**	**0.00**	

Estimated Annual NOx Emission Reduction Credit from IC 12	2023	2024	2025	2026	2027	2028	2029	2030	2031	*Additional Details*
Annual Emission Credit from Boiler Upgrade (MT/Yr)	0.00	0.00	24.27	24.27	26.42	28.89	28.89	28.89	28.89	The timing and amount of emission reductions is based on a hypothetical scenario. Chevron will present CARB with data (per the updated Innovative concept application) prior to claiming emission reductions

Flow Chart to explain Emissions Calculations for Each Vessel Call

Note: Total emissions will be the sum of all vessel calls of the reported period

Demo Calculation

Ship Number	CLASS	DWT	Chartered to	Flag US vs Non-US	Aux Engine Emission Tier	Boiler Type (New input)	Berth	Arrival Date/Time	Departure Date/Time	Total Berth (hrs)	Pumping (hrs)	Berth time Non-Pumping (hrs)	Aux Engine Load (kW)	Aux Boiler Load Pumping (kW)	Aux Boiler Load Non-Pumping (kW)	Aux Engine SFC (g/kWh)	Aux Boiler SFC (g/kWh)	CARB Emission Factors Aux Engine: NOx (g/kwh)	CARB Aux Engine: PM2.5 (g/kwh)	CARB Aux Engine: ROG (g/kwh)	CARB Emission Factors Aux Boiler: NOx (g/kwh)	CARB Aux Boiler: PM2.5 (g/kwh)	CARB Aux Boiler: ROG (g/kwh)	Emission Factors based on Chevron InnovativeConcept Aux Engine: NOx (g/kwh)	Innovative Aux Engine: PM2.5 (g/kwh)	Innovative Aux Engine: ROG (g/kwh)	Emission Factors based on Chevron InnovativeConcept Aux Boiler: NOx (g/kwh)	Innovative Aux Boiler: PM2.5 (g/kwh)	Innovative Aux Boiler: ROG (g/kwh)	Conversion factor (kwh/kg MGO)	Aux Fuel (MT)	Boiler Fuel (MT)	Emission Calc based on CARB factors Aux Engine: NOx (MT)	CARB Aux Engine: PM2.5 (MT)	CARB Aux Engine: ROG (MT)	Emission Calc based on CARB factors Aux Boiler: NOx (MT)	CARB Aux Boiler: PM2.5 (MT)	CARB Aux Boiler: ROG (MT)	Emission Calc based on IC factors Aux Engine: IC Aux E NOx (MT)	IC Aux E PM2.5 (MT)	IC Aux E ROG (MT)	Emission Calc based on IC factors Aux Boiler: IC Aux B NOx (MT)	IC Aux B PM2.5 (MT)	IC Aux B ROG (MT)
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	9/17/2021 20:11	9/20/2021 1:20	53.15	19.08	34.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.95	55.72	0.41	0.01	0.02	0.41	0.04	0.02	0.00	0.01	0.02	0.41	0.04	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	1/1/2021 5:55	1/2/2021 9:23	27.47	18.08	9.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.11	46.79	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	1/7/2021 6:12	1/8/2021 9:28	27.27	19.25	8.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.08	49.29	0.21	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	1/19/2021 18:23	1/20/2021 15:13	20.83	9.75	11.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.11	26.81	0.16	0.00	0.01	0.20	0.02	0.01	0.00	0.00	0.00	0.03	0.02	0.01
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	1/25/2021 20:42	1/27/2021 9:09	36.45	25.33	11.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.45	65.01	0.28	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.00	0.07	0.04	0.03
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	2/4/2021 3:11	2/5/2021 8:14	29.05	19.58	9.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.34	50.48	0.22	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	2/11/2021 20:19	2/12/2021 22:01	25.70	16.92	8.78	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.84	43.77	0.20	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	2/23/2021 10:41	2/24/2021 11:40	24.98	16.72	8.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.74	43.14	0.19	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	3/2/2021 17:10	3/4/2021 0:15	31.08	19.58	11.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.65	51.02	0.24	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	3/11/2021 11:29	3/12/2021 7:24	19.92	10.67	9.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	2.98	28.57	0.15	0.00	0.01	0.21	0.02	0.01	0.00	0.00	0.00	0.03	0.02	0.01
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	3/19/2021 3:00	3/20/2021 15:16	36.27	20.58	15.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.42	54.57	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	3/28/2021 21:06	3/29/2021 21:08	24.03	14.08	9.95	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.59	37.13	0.18	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.00	0.04	0.02	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	4/3/2021 3:22	4/4/2021 15:20	35.97	21.00	14.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.38	55.40	0.27	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.00	0.06	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	4/18/2021 2:23	4/19/2021 6:29	28.10	19.08	9.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.20	49.14	0.21	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	5/3/2021 3:34	5/4/2021 16:41	37.12	20.25	16.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.55	54.06	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	5/19/2021 15:42	5/20/2021 16:23	24.68	18.33	6.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.69	46.60	0.19	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	5/26/2021 13:13	5/28/2021 11:26	46.22	18.75	27.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	6.91	53.17	0.35	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	6/5/2021 18:25	6/6/2021 20:10	25.75	19.25	6.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.85	48.89	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	6/19/2021 22:32	6/21/2021 6:27	31.92	21.67	10.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.77	55.80	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	6/29/2021 17:19	7/1/2021 2:05	32.77	16.50	16.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.90	44.71	0.25	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	7/9/2021 13:40	7/10/2021 16:17	26.62	20.50	6.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.98	51.85	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	7/16/2021 17:21	7/17/2021 20:10	26.82	19.75	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.01	50.26	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	7/27/2021 13:58	7/29/2021 1:08	35.17	16.58	18.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.26	45.52	0.27	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	8/7/2021 21:58	8/13/2021 17:50	139.87	14.17	125.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	20.91	67.72	1.07	0.01	0.04	0.50	0.04	0.03	0.00	0.01	0.01	0.07	0.04	0.03
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	8/19/2021 18:12	8/20/2021 18:52	24.67	16.33	8.33	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.69	42.22	0.19	0.00	0.01	0.31	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	8/26/2021 18:01	8/28/2021 6:50	36.82	17.58	19.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.50	48.15	0.28	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	9/4/2021 23:11	9/6/2021 9:18	34.12	18.50	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.10	49.44	0.26	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	9/10/2021 21:35	9/12/2021 0:25	26.83	18.17	8.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.01	46.80	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	9/25/2021 13:24	9/26/2021 17:52	28.47	17.50	10.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.26	45.77	0.22	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	10/4/2021 0:45	10/5/2021 1:41	24.93	17.92	7.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.73	45.76	0.19	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	10/12/2021 10:49	10/13/2021 8:19	21.50	16.00	5.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.21	40.66	0.16	0.00	0.01	0.30	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	10/17/2021 23:20	10/19/2021 1:44	26.40	20.08	6.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.95	50.88	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	10/31/2021 10:21	11/2/2021 22:27	60.10	19.08	41.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	8.99	57.54	0.46	0.01	0.02	0.43	0.04	0.02	0.00	0.01	0.01	0.06	0.04	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	11/12/2021 19:47	11/13/2021 21:13	25.43	19.50	5.93	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.80	49.35	0.19	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	11/19/2021 8:15	11/20/2021 20:21	36.10	17.50	18.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.40	47.77	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	11/28/2021 7:37	11/29/2021 15:48	32.18	22.17	10.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.81	56.96	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	12/6/2021 11:11	12/7/2021 4:25	17.23	10.17	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	2.58	26.77	0.13	0.00	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.03	0.02	0.01
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	12/13/2021 11:30	12/14/2021 9:52	22.37	14.75	7.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.34	38.15	0.17	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.00	0.04	0.02	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	12/19/2021 9:18	12/20/2021 13:22	28.07	17.75	10.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.20	46.21	0.21	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
106	SuezMax	155,374	Chevron	Non-US	TG	Upgrade	4	12/24/2021 18:10	12/26/2021 7:19	37.15	16.83	20.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.55	46.59	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	1/5/2021 14:00	1/7/2021 2:11	36.18	17.42	18.77	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.41	47.61	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	1/16/2021 1:27	1/17/2021 4:20	26.88	20.08	6.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.02	51.01	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	1/21/2021 7:26	1/22/2021 16:21	32.92	22.75	10.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.92	58.43	0.25	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	2/1/2021 1:50	2/2/2021 4:10	26.33	19.25	7.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.94	49.04	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	2/8/2021 9:45	2/10/2021 6:15	44.50	20.42	24.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	6.65	56.36	0.34	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	2/17/2021 15:37	2/19/2021 1:15	33.63	22.08	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.03	57.16	0.26	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	3/14/2021 3:05	3/15/2021 12:23	33.30	21.75	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.98	56.34	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	3/23/2021 8:35	3/24/2021 10:25	25.83	19.83	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.86	50.19	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	3/30/2021 15:13	3/31/2021 22:26	31.22	20.83	10.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.67	53.79	0.24	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	4/7/2021 1:42	4/8/2021 6:25	28.72	18.00	10.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.29	46.93	0.22	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	4/16/2021 4:50	4/17/2021 12:20	31.50	21.58	9.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.71	55.50	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.00	0.06	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	4/21/2021 23:40	4/23/2021 6:36	30.93	21.58	9.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.62	55.36	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.00	0.06	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	5/9/2021 23:26	5/11/2021 15:18	39.87	17.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.96	49.49	0.30	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	5/23/2021 21:20	5/25/2021 8:09	34.82	21.92	12.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.21	57.10	0.27	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	6/6/2021 22:40	6/8/2021 14:14	39.57	17.33	22.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.92	48.32	0.30	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	6/17/2021 7:27	6/18/2021 14:53	31.43	23.08	8.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.70	58.77	0.24	0.00	0.01	0.44	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	6/25/2021 22:50	6/27/2021 3:59	29.15	12.50	16.65	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.36	35.01	0.22	0.00	0.01	0.26	0.02	0.01	0.00	0.00	0.00	0.04	0.02	0.01
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	7/14/2021 17:00	7/16/2021 4:31	35.52	25.08	10.43	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.31	64.22	0.27	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.00	0.06	0.04	0.03
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	7/22/2021 0:24	7/23/2021 9:22	32.97	20.50	12.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.93	53.52	0.25	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	8/2/2021 19:32	8/4/2021 6:45	35.22	22.08	13.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.27	57.57	0.27	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	8/14/2021 5:50	8/15/2021 13:53	32.05	20.00	12.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.79	52.18	0.24	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	8/22/2021 13:22	8/23/2021 21:21	31.98	21.75	10.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.78	56.00	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	8/31/2021 20:14	9/2/2021 6:25	34.18	19.92	14.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.11	52.56	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	9/7/2021 12:23	9/9/2021 0:44	36.35	22.33	14.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.43	58.42	0.28	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	9/14/2021 20:33	9/15/2021 18:17	21.73	14.25	7.48	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.25	36.89	0.17	0.00	0.01	0.27	0.02	0.02	0.00	0.00	0.00	0.04	0.02	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	9/21/2021 0:32	9/22/2021 12:15	35.72	20.50	15.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.34	54.24	0.27	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	9/28/2021 7:39	9/29/2021 18:24	34.75	18.08	16.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.20	48.70	0.27	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	10/7/2021 12:14	10/9/2021 23:31	59.28	22.17	37.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	8.86	64.07	0.45	0.01	0.02	0.47	0.04	0.03	0.00	0.01	0.01	0.06	0.04	0.03
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	10/15/2021 9:35	10/16/2021 20:05	34.50	19.92	14.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.16	52.64	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	10/21/2021 22:35	10/23/2021 0:23	25.80	17.08	8.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.86	44.16	0.20	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	11/6/2021 14:29	11/7/2021 22:13	31.73	15.83	15.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.74	42.98	0.24	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.00	0.04	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	11/16/2021 8:27	11/17/2021 20:28	36.02	21.42	14.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.38	56.32	0.28	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	11/23/2021 12:25	11/25/2021 11:35	47.17	23.75	23.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	7.05	64.36	0.36	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.00	0.06	0.04	0.03
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	12/3/2021 8:45	12/4/2021 12:42	27.95	19.92	8.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	4.18	50.92	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	12/10/2021 15:28	12/11/2021 16:36	25.13	18.25	6.88	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	3.76	46.54	0.19	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.00	0.05	0.03	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	12/21/2021 11:35	12/22/2021 22:18	34.72	22.42	12.30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	5.19	58.17	0.27	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.00	0.06	0.04	0.02
296	SuezMax	155,415	Chevron	Non-US	TG	Upgrade	4	12/31/2021 8:27	1/1/2022 0:00	15.55	11.00	4.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.17	0.27	0.17	0.11	3.70	2.32	28.16	0.12	0.00	0.00	0.21	0.02	0.01	0.00	0.00	0.00	0.03	0.02	0.01

Inputs & Data Sources

Inputs	Sources
Aux Engine Load (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 9.* [1] *

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Engine Load	1395	1050	832	986	689	1011

Inputs	Sources
Aux Boiler Load Idle and Pumping (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 10.* [1] *

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Boiler Load Pumping	421	3089	3547	4976	8170	8262
Aux Boiler Load Idling	875	875	875	875	875	875

Inputs	Sources	Value	
Aux Engine SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] *	Aux Engine SFC (g/kwh)	217
Aux Boiler SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Resutls, Appendix H, H53.* [2] *	Aux Engine SFC (g/kwh)	300
Conversion Factor (kwh/kg MGO)	*Final Regulation Section 93130.17 (d) (1) (B)*	Conversion Factor (1/0.27) (kwh/kg MGO)	3.70

Inputs	Sources
Aux Engine Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (1)* *2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] * *NOx: IMO 4th GHG Study, P.410.* [3]

Aux Engine Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)**	ROG (g/kwh)**
CARB Baseline	0	13.80	0.17	0.52
Tier I	1	12.20	0.17	0.52
Tier II (IC.10)	2	10.50	0.17	0.52
Tier III (IC.11)	3	2.60	0.17	0.52
Chevron Lightering Vessels ***	TG	0.00	0.17	0.52
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.52

Inputs	Sources
Aux Boiler Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (2)* *Test results from engine manufacturer.* [4] *NOx: IMO 4th GHG Study, P.410.* [3]

Aux Boiler Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)
CARB Base	No Upgrade	2.00	0.17	0.11
Burner Upgrade (IC.12)	Upgrade	0.27	0.17	0.11
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.11

Inputs	Sources
Berth Time (Pumping and Idle) IMO Vessel Class Engine Tier	It will be provided by vessel itself through Vessel Visit Report and incorprated into Chevron's own data management system
Third Party Marine Broker Forecast for Enginer Tier Adoption Rate for Global Tankers	***Sample forecast from third party marine broker:*** ***acutal data will be updated annually for IC.10 and IC.11.***

Year	Tier III	Tier II	Tier I	Tier 0 and below	Total
2023 YTD	13%	45%	35%	8%	100%
2023	15%	45%	33%	8%	100%
2024	17%	45%	32%	7%	100%
2025	19%	45%	30%	7%	100%
2026	22%	44%	29%	6%	100%
2027	25%	43%	27%	6%	100%
2028	28%	42%	26%	5%	100%
2029	31%	41%	24%	5%	100%
2030	34%	40%	22%	5%	100%

Note

* Chevron is conducting representative exhaust emission analysis from engines of varied tiers (II/III) and Aux boilers. Based on results, Chevron might propose to CARB to use alternate engine load, SFC, and emission factors for calculation of emissions from Aux engines and Aux boilers.

** Chevron is presently not proposing lower emission factors for PM2.5 and ROG as we are not claiming any emission reductions for these items. As stated in the Terminal Plan, Chevron is planning to conduct representative sampling on Tier II/III Aux engines and Aux boilers. Based on test results, Chevron will approach CARB to include those emission reductions in IC calculations. New emission factors will be proposed based on OEM recommendations and test results.

*** Chevron Pacific Lightering vessels Pegasus and Polaris Voyagers have tier II AE. Since those vessels use steam Turbine Generators (TG) during cargo operation while at berth, so no NOx emissions are assumed for those vessels.

Links to documents that are referenced in this spreadsheet

1 Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)
2 2019 Update to Inventory for Ocean-Going Vessels At Berth_Methodology and Results (ca.gov)
3 https //www.imo.org/en/ourwork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx
4 Technical File for Burner Upgrade

Table 2.8: Auxiliary Boiler Load Defaults by Mode, kW

Vessel Type	Transit	Maneuvering	Berth Hotelling	Anchorage Hotelling
Auto Carrier	85	187	323	314
Bulk	52	122	156	156
Bulk - Heavy Load	35	94	125	125
Bulk - Self Discharging	44	103	132	132
Container - 1000	148	296	760	376
Container - 2000	79	142	323	180
Container - 3000	188	180	888	361
Container - 4000	161	335	490	487
Container - 5000	223	446	484	477
Container - 6000	280	544	761	757
Container - 8000	241	442	558	554
Container - 9000	286	526	555	513
Container - 10000	278	418	598	598
Container - 11000	202	362	456	463
Container - 12000	351	586	677	677
Container - 13000	257	357	580	594
Container - 14000	379	552	696	696
Container - 15000	259	395	402	402
Container - 16000	238	440	525	525
Container - 19000	38	144	848	848
Container - 23000	40	151	890	890
General Cargo	56	127	169	168
Ocean Tugboat (ATB/ITB)	0	0	0	0
Miscellaneous	54	109	140	140
RoRo	104	206	282	282
Tanker - Chemical	94	137	421	261
Tanker - Handysize	144	287	3,089	323
Tanker - Panamax	262	382	3,547	538
Tanker - Aframax	196	259	4,976	390
Tanker - Suezmax	144	99	8,170	516
Tanker - VLCC	240	116	8,262	467
Tanker - ULCC	235	322	10,718	366

Port of Long Beach *10* *October 2021*

Update to Inventory for Ocean-Going Vessels At Berth

Appendix A: Emission Factors
Emission Factors (all in g/kW*hr)

Engine type	Mode	Fuel type	Fuel S content (%)	Tier ID	CH4	N2O	NH3	ROG	CO	SOx	NOx	HC	PM 10	PM 2.5	CO2	TOG	Fuel Used
Auxiliary	At Berth	Distillate	0.1	0	0.008	0.033	0.001	0.520	1.10	0.424	13.800	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	1	0.008	0.033	0.001	0.520	1.10	0.424	12.200	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	2	0.008	0.033	0.001	0.520	1.10	0.424	10.500	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	3	0.008	0.033	0.001	0.520	1.10	0.424	2.600	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	0	0.008	0.033	0.001	0.520	1.10	1.273	13.800	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	1	0.008	0.033	0.001	0.520	1.10	1.273	12.200	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	2	0.008	0.033	0.001	0.520	1.10	1.273	10.500	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	3	0.008	0.033	0.001	0.520	1.10	1.273	2.600	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	1	0	0.008	0.033	0.001	0.520	1.10	4.242	13.800	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	1	0.008	0.033	0.001	0.520	1.10	4.242	12.200	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	2	0.008	0.033	0.001	0.520	1.10	4.242	10.500	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	3	0.008	0.033	0.001	0.520	1.10	4.242	2.600	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Residual	2.7	0	0.008	0.036	0.001	0.460	1.10	11.983	14.700	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	1	0.008	0.036	0.001	0.460	1.10	11.983	13.000	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	2	0.008	0.036	0.001	0.460	1.10	11.983	11.200	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	3	0.008	0.036	0.001	0.460	1.10	11.983	2.309	0.40	1.436	1.321	707	0.510	227
Boiler	At Berth	Distillate	0.1	99	0.002	0.045	0.006	0.110	0.20	0.587	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	0.3	99	0.002	0.045	0.006	0.110	0.20	1.636	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	1	99	0.002	0.045	0.006	0.110	0.20	1.760	1.995	0.10	0.589	0.542	934	0.130	300
Boiler	At Berth	Residual	2.7	99	0.002	0.049	0.006	0.110	0.20	16.100	2.100	0.10	1.465	1.348	950	0.130	305

Sources:

California Air Resources Board H-53

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To whom it may concern

Subject: Flue gas emission data of MF PA burners

The flue gas compositions including calculations are simulated as below table in general based on the actual measurements from Alfa Laval Test Centre in Aalborg.

Burner type	Fuel oil	Burner Load	O_2 Content*3	CO Content, Less than		NOx Content, Less than			CARB*4 Regulation, Max. NOx
		(%)	(%)	(ppm)	(mg/Nm³)	(ppm)	(mg/Nm³)	(g/kWh)	(g/kWh)
MF PA	MDO*1	100	4.0	10	13	120	246	0.27	0.4
		75	4.0	2	3	107	219	0.24	0.4
		50	5.0	2	3	96	197	0.22	0.4
		33	6.0	23	28	60	122	0.14	0.4
	LNG*2	100	4.0	10	13	60	123	0.13	0.4
		75	4.0	5	7	60	124	0.13	0.4
		50	5.0	3	3	59	121	0.12	0.4
		33	6.0	5	6	56	114	0.12	0.4

(Remarks)

- CO_2 content is not included due to combustion efficiency index.
- The local factors may affect the actual data measured on-site.

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine: Ox (g/kwh)	CARB Aux Engine: PM2.5 (g/kwh)	CARB Aux Engine: ROG (g/kw)	CARB Em ss on Facto s Aux Bo ler: NOx (g/kwh)	CARB Aux Bo ler: PM2.5 (g/kwh)	CARB Aux Bo ler: ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: NOx (g/kwh)	Chevron Aux Engine: PM2.5 (g/kwh)	Chevron Aux Engine: ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: NOx (g/kwh)	Chevron Aux Boiler: PM2 5 (g/kwh)	Chevron Aux Boiler: ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: Ox (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler: Ox (MT)	PM2 5 (MT)	ROG (MT)
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/20/2021 20 29	7/23/2021 10 19	61.83	39.75	22.08	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	13.23	65.14	0.68	0.01	0.03	0.48	0.04	0.03	0.51	0.01	0.03	0.48	0.04	0.03
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/28/2021 3 29	7/31/2021 6 24	74.92	58.17	16.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.03	91.23	0.82	0.01	0.03	0.68	0.06	0.04	0.62	0.01	0.03	0.68	0.06	0.04
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/19/2021 13 54	4/20/2021 16 17	26.38	19.58	6.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.01	19.93	0.31	0.00	0.01	0.15	0.01	0.01	0.06	0.00	0.01	0.15	0.01	0.01
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/25/2021 14 50	4/28/2021 14 25	71.58	0.00	71.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	16.31	18.79	0.83	0.01	0.03	0.14	0.01	0.01	0.16	0.01	0.03	0.14	0.01	0.01
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/14/2021 10 06	5/18/2021 13 51	99.75	76.92	22.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	22.73	77.27	1.16	0.01	0.04	0.57	0.05	0.03	1.03	0.01	0.04	0.57	0.05	0.03
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/21/2021 6 06	5/22/2021 18 32	36.43	25.28	11.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.30	26.36	0.42	0.01	0.02	0.20	0.02	0.01	0.38	0.01	0.02	0.20	0.02	0.01
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/2/2021 14 09	1/3/2021 23 11	33.03	22.83	10.20	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	58.64	0.25	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/13/2021 9 17	1/14/2021 10 49	25.53	17.67	7.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	3.82	45.37	0.20	0.00	0.01	0.34	0.03	0.02	0.04	0.00	0.01	0.34	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	2/25/2021 1 33	2/26/2021 20 25	42.87	20.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.41	56.85	0.33	0.00	0.01	0.42	0.04	0.02	0.06	0.00	0.01	0.42	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	4/27/2021 22 58	4/29/2021 3 48	28.83	21.33	7.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.31	54.26	0.22	0.00	0.01	0.40	0.03	0.02	0.04	0.00	0.01	0.40	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	5/31/2021 6 35	6/1/2021 19 19	36.73	22.42	14.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.49	58.70	0.28	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/10/2021 18 40	6/12/2021 10 27	39.78	24.17	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.95	63.33	0.30	0.00	0.01	0.47	0.04	0.03	0.06	0.00	0.01	0.47	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/21/2021 22 06	6/23/2021 8 33	34.45	21.33	13.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.15	55.73	0.26	0.00	0.01	0.41	0.04	0.02	0.05	0.00	0.01	0.41	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/2/2021 23 45	7/5/2021 6 35	54.83	11.67	43.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.20	39.93	0.42	0.01	0.02	0.30	0.03	0.02	0.08	0.01	0.02	0.30	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/19/2021 19 12	7/21/2021 18 12	47.00	20.58	26.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.03	57.38	0.36	0.00	0.01	0.43	0.04	0.02	0.07	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	9/15/2021 20 30	9/17/2021 6 18	33.80	15.58	18.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.05	42.98	0.26	0.00	0.01	0.32	0.03	0.02	0.05	0.00	0.01	0.32	0.03	0.02
26	Af aMax	115,594	Chev on	Non-US	2.00	No Upg ade	1	10/4/2021 23 37	10/7/2021 9 11	57.57	0.00	57.57	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	12.32	15.11	0.63	0.01	0.02	0.11	0.01	0.01	0.48	0.01	0.02	0.11	0.01	0.01
31	Chem cal	35 210	Chev on	Non-US	1.00	No Upg ade	2	9/18/2021 6 30	9/18/2021 20 15	13.75	0.00	13.75	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.16	3.61	0.21	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
39	Af aMax	105,614	Chev on	Non-US	1.00	No Upg ade	1	10/13/2021 18 00	10/16/2021 9 21	63.35	46.92	16.43	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.55	74.35	0.69	0.01	0.03	0.55	0.05	0.03	0.61	0.01	0.03	0.55	0.05	0.03
42	P oduct	49 951	Chev on	Non-US	2.00	No Upg ade	2	2/4/2021 12 39	2/5/2021 6 31	17.87	7.25	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.07	9.51	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	2	3/2/2021 14 18	3/5/2021 6 24	64.10	0.00	64.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.61	16.83	0.75	0.01	0.03	0.12	0.01	0.01	0.66	0.01	0.03	0.12	0.01	0.01
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	9/27/2021 14 45	9/29/2021 19 49	53.07	0.00	53.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.09	13.93	0.62	0.01	0.02	0.10	0.01	0.01	0.55	0.01	0.02	0.10	0.01	0.01
49	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	2/3/2021 7 20	2/6/2021 7 11	71.85	0.00	71.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.37	18.86	0.84	0.01	0.03	0.14	0.01	0.01	0.74	0.01	0.03	0.14	0.01	0.01
51	Af aMax	115,392	Chev on	Non-US	1.00	No Upg ade	1	4/29/2021 0 10	5/2/2021 14 27	86.28	49.67	36.62	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	18.46	83.75	0.94	0.01	0.04	0.62	0.05	0.03	0.83	0.01	0.04	0.62	0.05	0.03
52	PanaMax	79 700	Chev on	Non-US	2.00	No Upg ade	3	12/4/2021 20 49	12/7/2021 6 13	57.40	0.00	57.40	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.36	15.07	0.53	0.01	0.02	0.11	0.01	0.01	0.40	0.01	0.02	0.11	0.01	0.01
53	Af aMax	105,335	Chev on	Non-US	1.00	No Upg ade	1	7/1/2021 18 17	7/4/2021 6 22	60.08	44.92	15.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.86	71.03	0.66	0.01	0.02	0.53	0.04	0.03	0.58	0.01	0.02	0.53	0.04	0.03
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	1/1/2021 8 59	1/2/2021 16 19	31.33	0.00	31.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.14	8.22	0.36	0.00	0.01	0.06	0.01	0.00	0.28	0.00	0.01	0.06	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	2/8/2021 5 50	2/9/2021 18 00	36.17	0.00	36.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.24	9.49	0.42	0.01	0.02	0.07	0.01	0.00	0.32	0.01	0.02	0.07	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	3/17/2021 2 48	3/19/2021 18 12	63.40	0.00	63.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.45	16.64	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	8/29/2021 2 48	9/1/2021 1 34	70.77	0.00	70.77	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.12	18.58	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	10/10/2021 3 22	10/11/2021 20 10	40.80	0.00	40.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.30	10.71	0.48	0.01	0.02	0.08	0.01	0.00	0.36	0.01	0.02	0.08	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	11/4/2021 17 57	11/6/2021 16 14	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.55	12.15	0.54	0.01	0.02	0.09	0.01	0.01	0.41	0.01	0.02	0.09	0.01	0.01
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	5/7/2021 0 43	5/8/2021 11 18	34.58	22.33	12.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.17	57.95	0.26	0.00	0.01	0.43	0.04	0.02	0.20	0.00	0.01	0.43	0.04	0.02
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	8/23/2021 23 48	8/26/2021 11 26	59.63	19.50	40.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	58.33	0.46	0.01	0.02	0.43	0.04	0.02	0.35	0.01	0.02	0.43	0.04	0.02
64	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/22/2021 17 46	12/24/2021 19 53	50.12	0.00	50.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.42	13.16	0.58	0.01	0.02	0.10	0.01	0.01	0.44	0.01	0.02	0.10	0.01	0.01
75	PanaMax	74 246	Chev on	Non-US	2.00	No Upg ade	4	6/19/2021 17 46	6/24/2021 13 42	115.93	0.00	115.93	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.93	30.43	1.07	0.01	0.04	0.23	0.02	0.01	0.81	0.01	0.04	0.23	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	7/11/2021 0 10	7/12/2021 12 11	36.02	21.75	14.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	6.50	26.89	0.33	0.00	0.01	0.20	0.02	0.01	0.25	0.00	0.01	0.20	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	10/10/2021 7 06	10/12/2021 8 32	49.43	16.83	32.60	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	26.47	0.46	0.01	0.01	0.20	0.02	0.01	0.35	0.01	0.01	0.20	0.02	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	3/21/2021 20 46	3/22/2021 17 19	20.55	8.92	11.63	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.40	16.36	0.22	0.00	0.01	0.12	0.01	0.01	0.17	0.00	0.01	0.12	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	1	4/6/2021 20 40	4/8/2021 18 49	46.15	36.92	9.23	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.87	57.53	0.50	0.01	0.02	0.43	0.04	0.02	0.38	0.01	0.02	0.43	0.04	0.02
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	5/13/2021 0 25	5/13/2021 21 15	20.83	10.42	10.42	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.46	18.28	0.23	0.00	0.01	0.14	0.01	0.01	0.17	0.00	0.01	0.14	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	6/12/2021 22 40	6/13/2021 15 55	17.25	9.50	7.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.69	16.22	0.19	0.00	0.01	0.12	0.01	0.01	0.14	0.00	0.01	0.12	0.01	0.01
82	SuezMax	158,826	Chev on	Non-US	1.00	No Upg ade	4	4/26/2021 10 23	4/27/2021 20 39	34.27	21.08	13.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	55.14	0.26	0.00	0.01	0.41	0.03	0.02	0.23	0.00	0.01	0.41	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	1	2/22/2021 20 45	2/25/2021 6 20	57.58	35.92	21.67	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.40	43.91	0.53	0.01	0.02	0.33	0.03	0.02	0.47	0.01	0.02	0.33	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	5/21/2021 22 29	5/22/2021 23 10	24.68	17.42	7.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.46	20.44	0.23	0.00	0.01	0.15	0.01	0.01	0.20	0.00	0.01	0.15	0.01	0.01
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	8/1/2021 6 37	8/2/2021 15 53	33.27	23.75	9.52	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.01	27.77	0.31	0.00	0.01	0.21	0.02	0.01	0.27	0.00	0.01	0.21	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/5/2021 20 22	8/7/2021 14 13	41.85	33.33	8.52	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.95	52.00	0.46	0.01	0.02	0.39	0.03	0.02	0.09	0.01	0.02	0.39	0.03	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/17/2021 8 33	8/22/2021 14 48	126.25	19.92	106.33	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	27.01	57.64	1.38	0.02	0.05	0.43	0.04	0.02	0.26	0.02	0.05	0.43	0.04	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	9/1/2021 6 17	9/5/2021 22 09	111.87	0.00	111.87	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	23.94	29.37	1.22	0.02	0.05	0.22	0.02	0.01	0.23	0.02	0.05	0.22	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	11/27/2021 15 13	12/1/2021 4 25	85.20	67.50	17.70	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.23	105.41	0.93	0.01	0.04	0.78	0.07	0.04	0.18	0.01	0.04	0.78	0.07	0.04
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	12/26/2021 5 31	12/28/2021 19 41	62.17	0.00	62.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	13.30	16.32	0.68	0.01	0.03	0.12	0.01	0.01	0.13	0.01	0.03	0.12	0.01	0.01
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/16/2021 18 51	9/19/2021 20 56	74.08	53.33	20.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.85	85.06	0.81	0.01	0.03	0.63	0.05	0.03	0.72	0.01	0.03	0.63	0.05	0.03
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/23/2021 14 34	9/26/2021 16 20	73.77	38.67	35.10	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.78	66.94	0.81	0.01	0.03	0.50	0.04	0.03	0.71	0.01	0.03	0.50	0.04	0.03
94	Chem cal	25 399	Chev on	Non-US	1.00	No Upg ade	2	11/9/2021 12 19	11/10/2021 18 32	30.22	0.00	30.22	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.15	7.93	0.47	0.01	0.02	0.06	0.00	0.00	0.41	0.01	0.02	0.06	0.00	0.00
95	P oduct	46 046	Chev on	Non-US	1.00	No Upg ade	2	7/13/2021 15 39	7/15/2021 23 09	55.50	0.00	55.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.65	14.57	0.65	0.01	0.02	0.11	0.01	0.01	0.57	0.01	0.02	0.11	0.01	0.01
96	P oduct	46 105	Chev on	Non-US	1.00	No Upg ade	2	8/11/2021 0 08	8/13/2021 16 05	63.95	0.00	63.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.57	16.79	0.74	0.01	0.03	0.12	0.01	0.01	0.66	0.01	0.03	0.12	0.01	0.01
99	P oduct	49 996	Chev on	Non-US	2.00	No Upg ade	1	1/13/2021 11 00	1/17/2021 1 55	86.92	0.00	86.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.80	22.82	1.01	0.01	0.04	0.17	0.01	0.01	0.77	0.01	0.04	0.17	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	1/31/2021 9 12	2/1/2021 14 44	29.53	19.58	9.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.73	20.76	0.34	0.00	0.01	0.15	0.01	0.01	0.34	0.00	0.01	0.15	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	2/1/2021 15 11	2/3/2021 12 15	45.07	0.00	45.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.27	11.83	0.52	0.01	0.02	0.09	0.01	0.00	0.52	0.01	0.02	0.09	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	4/30/2021 8 25	5/2/2021 0 27	40.03	0.00	40.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.12	10.51	0.47	0.01	0.02	0.08	0.01	0.00	0.47	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/15/2021 11 21	5/18/2021 21 57	82.60	32.08	50.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	18.82	42.99	0.96	0.01	0.04	0.32	0.03	0.02	0.96	0.01	0.04	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	5/18/2021 22 16	5/20/2021 13 35	39.32	0.00	39.32	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.96	10.32	0.46	0.01	0.02	0.08	0.01	0.00	0.46	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/30/2021 10 20	6/2/2021 7 14	68.90	37.00	31.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.70	42.66	0.80	0.01	0.03	0.32	0.03	0.02	0.80	0.01	0.03	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/8/2021 10 12	6/11/2021 14 22	76.17	49.08	27.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.35	52.59	0.89	0.01	0.03	0.39	0.03	0.02	0.89	0.01	0.03	0.39	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	6/17/2021 21 43	6/19/2021 15 42	41.98	32.42	9.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.57	32.55	0.49	0.01	0.02	0.24	0.02	0.01	0.49	0.01	0.02	0.24	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/19/2021 16 03	6/22/2021 9 36	65.55	19.92	45.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.94	30.44	0.76	0.01	0.03	0.23	0.02	0.01	0.76	0.01	0.03	0.23	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	7/2/2021 10 54	7/5/2021 14 33	75.65	55.75	19.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.24	56.89	0.88	0.01	0.03	0.42	0.04	0.02	0.88	0.01	0.03	0.42	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/6/2021 13 17	7/7/2021 10 00	20.72	0.00	20.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.72	5.44	0.24	0.00	0.01	0.04	0.00	0.00	0.24	0.00	0.01	0.04	0.00	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/14/2021 13 05	7/17/2021 18 40	77.58	60.92	16.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.68	60.83	0.90	0.01	0.03	0.45	0.04	0.02	0.90	0.01	0.03	0.45	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/25/2021 23 20	7/28/2021 8 08	56.80	32.42	24.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.94	36.44	0.66	0.01	0.02	0.27	0.02	0.01	0.66	0.01	0.02	0.27	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	8/3/2021 19 10	8/5/2021 12 23	41.22	34.50	6.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.39	33.73	0.48	0.01	0.02	0.25	0.02	0.01	0.48	0.01	0.02	0.25	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	9/19/2021 10 24	9/20/2021 19 01	32.62	24.50	8.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.43	24.83	0.38	0.00	0.01	0.18	0.02	0.01	0.38	0.00	0.01	0.18	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	9/22/2021 21 14	9/25/2021 4 12	54.97	0.00	54.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.52	14.43	0.64	0.01	0.02	0.11	0.01	0.01	0.64	0.01	0.02	0.11	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	11/17/2021 19 10	11/19/2021 11 25	40.25	14.08	26.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.17	19.92	0.47	0.01	0.02	0.15	0.01	0.01	0.47	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	1/4/2021 11 22	1/5/2021 15 30	28.13	17.33	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.41	18.90	0.33	0.00	0.01	0.14	0.01	0.01	0.33	0.00	0.01	0.14	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/5/2021 15 55	1/7/2021 20 38	52.72	0.00	52.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.01	13.84	0.61	0.01	0.02	0.10	0.01	0.01	0.61	0.01	0.02	0.10	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/17/2021 7 51	1/18/2021 10 26	26.58	15.25	11.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.06	17.11	0.31	0.00	0.01	0.13	0.01	0.01	0.31	0.00	0.01	0.13	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/28/2021 7 32	1/31/2021 2 00	66.47	35.83	30.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	41.25	0.77	0.01	0.03	0.31	0.03	0.02	0.77	0.01	0.03	0.31	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/5/2021 10 53	2/7/2021 8 12	45.32	21.08	24.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.33	25.90	0.53	0.01	0.02	0.19	0.02	0.01	0.53	0.01	0.02	0.19	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/13/2021 1 03	2/15/2021 19 10	66.12	24.00	42.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.06	33.30	0.77	0.01	0.03	0.25	0.02	0.01	0.77	0.01	0.03	0.25	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	2/22/2021 10 49	2/27/2021 4 00	113.18	32.75	80.43	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.79	51.46	1.32	0.02	0.05	0.38	0.03	0.02	1.32	0.02	0.05	0.38	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/7/2021 22 45	3/11/2021 18 10	91.42	40.08	51.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	20.83	50.62	1.06	0.01	0.04	0.37	0.03	0.02	1.06	0.01	0.04	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	3/23/2021 12 15	3/25/2021 10 19	46.07	29.67	16.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.50	31.80	0.54	0.01	0.02	0.24	0.02	0.01	0.54	0.01	0.02	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/25/2021 10 52	3/27/2021 6 30	43.63	0.00	43.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.94	11.45	0.51	0.01	0.02	0.08	0.01	0.00	0.51	0.01	0.02	0.08	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/4/2021 8 28	4/7/2021 2 55	66.45	30.58	35.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	37.76	0.77	0.01	0.03	0.28	0.02	0.02	0.77	0.01	0.03	0.28	0.02	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/12/2021 15 40	4/15/2021 18 23	74.72	34.92	39.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.02	42.80	0.87	0.01	0.03	0.32	0.03	0.02	0.87	0.01	0.03	0.32	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	4/21/2021 15 31	4/23/2021 11 41	44.17	0.00	44.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.06	11.59	0.51	0.01	0.02	0.09	0.01	0.00	0.51	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/23/2021 12 21	4/25/2021 18 31	54.17	23.25	30.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.34	29.66	0.63	0.01	0.02	0.22	0.02	0.01	0.63	0.01	0.02	0.22	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	5/2/2021 7 08	5/4/2021 11 02	51.90	39.50	12.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.83	39.86	0.60	0.01	0.02	0.30	0.03	0.02	0.60	0.01	0.02	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	5/10/2021 19 36	5/13/2021 19 00	71.40	40.17	31.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.27	45.42	0.83	0.01	0.03	0.34	0.03	0.02	0.83	0.01	0.03	0.34	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	8/6/2021 15 59	8/11/2021 4 46	108.78	42.50	66.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	24.79	56.78	1.27	0.02	0.05	0.42	0.04	0.02	1.27	0.02	0.05	0.42	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	8/23/2021 2 12	8/27/2021 2 20	96.13	43.00	53.13	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.90	53.80	1.12	0.01	0.04	0.40	0.03	0.02	1.12	0.01	0.04	0.40	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/1/2021 8 47	9/3/2021 12 39	51.87	11.00	40.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.82	20.92	0.60	0.01	0.02	0.15	0.01	0.01	0.60	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	9/9/2021 9 31	9/11/2021 4 20	42.82	0.92	41.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.76	11.85	0.50	0.01	0.02	0.09	0.01	0.00	0.50	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/19/2021 22 12	9/21/2021 8 43	34.52	11.58	22.93	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.86	16.75	0.40	0.00	0.02	0.12	0.01	0.01	0.40	0.00	0.02	0.12	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	10/1/2021 2 06	10/2/2021 4 15	26.15	0.00	26.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.96	6.86	0.30	0.00	0.01	0.05	0.00	0.00	0.30	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/2/2021 4 33	10/4/2021 10 45	54.20	8.08	46.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.35	19.60	0.63	0.01	0.02	0.15	0.01	0.01	0.63	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/16/2021 18 57	10/20/2021 16 55	93.97	54.42	39.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.41	60.81	1.09	0.01	0.04	0.45	0.04	0.02	1.09	0.01	0.04	0.45	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/1/2021 8 32	11/4/2021 1 20	64.80	49.25	15.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.76	49.72	0.75	0.01	0.03	0.37	0.03	0.02	0.75	0.01	0.03	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/4/2021 1 42	11/5/2021 2 20	24.63	0.00	24.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.61	6.47	0.29	0.00	0.01	0.05	0.00	0.00	0.29	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/13/2021 6 31	11/14/2021 13 06	30.58	24.75	5.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.97	24.47	0.36	0.00	0.01	0.18	0.02	0.01	0.36	0.00	0.01	0.18	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	11/14/2021 13 29	11/16/2021 2 21	36.87	15.50	21.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.40	19.97	0.43	0.01	0.02	0.15	0.01	0.01	0.43	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/21/2021 18 48	11/24/2021 8 12	61.40	23.75	37.65	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	13.99	31.89	0.72	0.01	0.03	0.24	0.02	0.01	0.72	0.01	0.03	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	12/1/2021 7 25	12/5/2021 23 15	111.83	35.25	76.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.48	52.77	1.30	0.02	0.05	0.39	0.03	0.02	1.30	0.02	0.05	0.39	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	12/14/2021 18 07	12/17/2021 20 14	74.12	31.50	42.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.89	40.38	0.86	0.01	0.03	0.30	0.03	0.02	0.86	0.01	0.03	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/23/2021 22 45	12/25/2021 14 15	39.50	27.92	11.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.00	28.91	0.46	0.01	0.02	0.21	0.02	0.01	0.46	0.01	0.02	0.21	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	12/25/2021 14 39	12/27/2021 8 44	42.08	0.00	42.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.59	11.05	0.49	0.01	0.02	0.08	0.01	0.00	0.49	0.01	0.02	0.08	0.01	0.00
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/17/2021 20 11	9/20/2021 1 20	53.15	19.08	34.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.95	55.72	0.41	0.01	0.02	0.41	0.04	0.02	0.00	0.01	0.02	0.41	0.04	0.02
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/13/2021 16 33	7/14/2021 10 29	17.93	7.83	10.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.09	9.91	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/19/2021 16 19	7/25/2021 20 08	147.82	16.75	131.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	33.68	49.93	1.72	0.02	0.06	0.37	0.03	0.02	1.31	0.02	0.06	0.37	0.03	0.02
112	P oduct	49 737	Chev on	Non-US	2.00	No Upg ade	2	8/29/2021 6 58	8/29/2021 23 14	16.27	0.00	16.27	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.71	4.27	0.19	0.00	0.01	0.03	0.00	0.00	0.14	0.00	0.01	0.03	0.00	0.00
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/7/2021 8 03	7/10/2021 12 10	76.12	0.00	76.12	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.29	19.98	0.83	0.01	0.03	0.15	0.01	0.01	0.74	0.01	0.03	0.15	0.01	0.01
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/12/2021 13 42	7/15/2021 3 11	61.48	0.00	61.48	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	16.14	0.67	0.01	0.03	0.12	0.01	0.01	0.59	0.01	0.03	0.12	0.01	0.01
133	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	2	7/10/2021 19 54	7/12/2021 20 28	48.57	0.00	48.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	11.07	12.75	0.57	0.01	0.02	0.09	0.01	0.01	0.11	0.01	0.02	0.09	0.01	0.01
134	P oduct	50 267	Chev on	Non-US	2.00	No Upg ade	2	4/17/2021 22 24	4/20/2021 12 02	61.63	0.00	61.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.04	16.18	0.72	0.01	0.03	0.12	0.01	0.01	0.55	0.01	0.03	0.12	0.01	0.01
136	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/18/2021 17 50	2/21/2021 7 20	61.50	0.00	61.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.01	16.14	0.72	0.01	0.03	0.12	0.01	0.01	0.54	0.01	0.03	0.12	0.01	0.01
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/7/2021 1 27	8/9/2021 11 13	57.77	42.42	15.35	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	43.34	0.67	0.01	0.03	0.32	0.03	0.02	0.59	0.01	0.03	0.32	0.03	0.02
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/14/2021 15 45	8/16/2021 2 25	34.67	26.83	7.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.90	26.92	0.40	0.00	0.02	0.20	0.02	0.01	0.36	0.00	0.02	0.20	0.02	0.01
142	Chem cal	35 058	Chev on	Non-US	2.00	No Upg ade	2	1/18/2021 13 05	1/18/2021 23 55	10.83	0.00	10.83	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.28	2.84	0.17	0.00	0.01	0.02	0.00	0.00	0.13	0.00	0.01	0.02	0.00	0.00
145	Chem cal	37 256	Chev on	Non-US	2.00	No Upg ade	2	2/24/2021 9 08	2/25/2021 8 49	23.68	0.00	23.68	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.17	6.22	0.37	0.00	0.01	0.05	0.00	0.00	0.28	0.00	0.01	0.05	0.00	0.00
160	SuezMax	156,654	Chev on	Non-US	1.00	No Upg ade	4	8/4/2021 9 16	8/6/2021 13 48	52.53	21.67	30.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.85	61.21	0.40	0.00	0.02	0.45	0.04	0.02	0.35	0.00	0.02	0.45	0.04	0.02
165	P oduct	46 554	Chev on	Non-US	1.00	No Upg ade	2	3/25/2021 12 50	3/27/2021 7 21	42.52	0.00	42.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.69	11.16	0.50	0.01	0.02	0.08	0.01	0.00	0.44	0.01	0.02	0.08	0.01	0.00
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	2	3/28/2021 2 55	3/31/2021 9 18	78.38	0.00	78.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.86	20.58	0.91	0.01	0.03	0.15	0.01	0.01	0.69	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	5/3/2021 22 06	5/7/2021 17 50	91.73	0.00	91.73	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.90	24.08	1.07	0.01	0.04	0.18	0.02	0.01	0.81	0.01	0.04	0.18	0.02	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	6/17/2021 14 07	6/19/2021 14 58	48.85	0.00	48.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.13	12.82	0.57	0.01	0.02	0.09	0.01	0.01	0.43	0.01	0.02	0.09	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	8/11/2021 6 25	8/14/2021 10 50	76.42	0.00	76.42	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.41	20.06	0.89	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	10/7/2021 3 05	10/9/2021 18 43	63.63	0.00	63.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.50	16.70	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
174	Chem cal	25 300	Chev on	Non-US	2.00	No Upg ade	2	7/12/2021 21 45	7/13/2021 13 23	15.63	0.00	15.63	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.73	4.10	0.24	0.00	0.01	0.03	0.00	0.00	0.18	0.00	0.01	0.03	0.00	0.00
175	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	12/17/2021 0 36	12/17/2021 22 16	21.67	11.50	10.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	13.33	0.25	0.00	0.01	0.10	0.01	0.01	0.05	0.00	0.01	0.10	0.01	0.01
183	P oduct	50 000	Chev on	Non-US	2.00	No Upg ade	3	8/21/2021 10 42	8/21/2021 21 32	10.83	0.00	10.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	2.47	2.84	0.13	0.00	0.00	0.02	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	6/30/2021 10 44	7/1/2021 3 05	16.35	0.00	16.35	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.95	4.29	0.25	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	10/7/2021 21 10	10/9/2021 7 16	34.10	0.00	34.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.32	8.95	0.53	0.01	0.02	0.07	0.01	0.00	0.40	0.01	0.02	0.07	0.01	0.00
190	PanaMax	68 439	Chev on	Non-US	1.00	No Upg ade	1	6/3/2021 18 19	6/6/2021 6 40	60.35	42.33	18.02	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.90	49.78	0.56	0.01	0.02	0.37	0.03	0.02	0.49	0.01	0.02	0.37	0.03	0.02
194	Chem cal	37 361	Chev on	Non-US	2.00	No Upg ade	2	4/15/2021 20 06	4/16/2021 10 12	14.10	0.00	14.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.27	3.70	0.22	0.00	0.01	0.03	0.00	0.00	0.17	0.00	0.01	0.03	0.00	0.00
198	Chem cal	33 641	Chev on	Non-US	1.00	No Upg ade	2	3/22/2021 5 39	3/22/2021 22 14	16.58	0.00	16.58	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	4.35	0.26	0.00	0.01	0.03	0.00	0.00	0.23	0.00	0.01	0.03	0.00	0.00
207	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	10/29/2021 9 09	10/30/2021 6 19	21.17	12.58	8.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.82	13.91	0.25	0.00	0.01	0.10	0.01	0.01	0.19	0.00	0.01	0.10	0.01	0.01
214	P oduct	51 393	Chev on	Non-US	1.00	No Upg ade	1	1/14/2021 13 23	1/15/2021 22 25	33.03	0.00	33.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.53	8.67	0.38	0.00	0.01	0.06	0.01	0.00	0.34	0.00	0.01	0.06	0.01	0.00

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Engine NOx Emission Tier	Boiler Type	Berth	Arrival Date/Time	Departure Date/Time	Total Berth (hrs)	Pumping (hrs)	Berth Time Non Pumping hr)	Aux Engine Load (kW)	Aux Boiler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Emission Factors Aux Engine NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	CARB Emission Factors Aux Boiler NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Emission Factors basis Chevron Innovative Concept Aux Engine NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Emission Factors basis Chevron Innovative Concept Aux Boiler NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Conversion Factor (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Emission Calc. based on CARB factors Aux. Engine NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on CARB factors Aux. Boiler NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on IC factors Aux. Engine NOx (MT)	PM2.5 (MT)	ROG (MT)	Emission Calc. based on IC factors Aux. Boiler NOx (MT)	PM2.5 (MT)	ROG (MT)
219	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	5/31/2021 21 22	6/4/2021 2 21	76.98	0.00	76.98	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.54	20.21	0.90	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
220	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	4/12/2021 5 42	4/15/2021 13 22	79.67	0.00	79.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.15	20.91	0.93	0.01	0.03	0.15	0.01	0.01	0.17	0.01	0.03	0.15	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	4	10/1/2021 16 57	10/3/2021 20 52	51.92	32.33	19.58	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.11	53.41	0.57	0.01	0.02	0.40	0.03	0.02	0.43	0.01	0.02	0.40	0.03	0.02
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/3/2021 21 23	10/4/2021 22 08	24.75	7.08	17.67	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.30	15.21	0.27	0.00	0.01	0.11	0.01	0.01	0.21	0.00	0.01	0.11	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/7/2021 11 07	10/13/2021 9 35	142.47	68.00	74.47	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	30.48	121.06	1.56	0.02	0.06	0.90	0.08	0.05	1.19	0.02	0.06	0.90	0.08	0.05
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	11/5/2021 9 10	11/9/2021 4 57	91.78	0.00	91.78	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.64	24.09	1.00	0.01	0.04	0.18	0.02	0.01	0.76	0.01	0.04	0.18	0.02	0.01
228	SuezMax	149,995	Chev on	Non-US	3.00	No Upg ade	4	4/13/2021 13 43	4/15/2021 2 08	36.42	22.67	13.75	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.44	59.17	0.28	0.00	0.01	0.44	0.04	0.02	0.05	0.00	0.01	0.44	0.04	0.02
229	P oduct	51 745	Chev on	Non-US	1.00	No Upg ade	2	12/14/2021 0 28	12/16/2021 22 50	70.37	0.00	70.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.03	18.47	0.82	0.01	0.03	0.14	0.01	0.01	0.72	0.01	0.03	0.14	0.01	0.01
234	PanaMax	74 875	Chev on	Non-US	1.00	No Upg ade	1	4/2/2021 14 50	4/6/2021 6 28	87.63	0.00	87.63	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.82	23.00	0.81	0.01	0.03	0.17	0.01	0.01	0.71	0.01	0.03	0.17	0.01	0.01
236	P oduct	50 542	Chev on	Non-US	1.00	No Upg ade	1	5/2/2021 18 02	5/5/2021 19 34	73.53	0.00	73.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.75	19.30	0.86	0.01	0.03	0.14	0.01	0.01	0.76	0.01	0.03	0.14	0.01	0.01
237	P oduct	50 469	Chev on	Non-US	1.00	No Upg ade	2	5/23/2021 1 13	5/25/2021 13 13	60.00	0.00	60.00	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.67	15.75	0.70	0.01	0.03	0.12	0.01	0.01	0.62	0.01	0.03	0.12	0.01	0.01
238	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/19/2021 17 51	12/22/2021 16 25	70.57	0.00	70.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.08	18.52	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
241	P oduct	49 804	Chev on	Non-US	3.00	No Upg ade	3	2/21/2021 13 44	2/22/2021 8 12	18.47	10.50	7.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.21	11.82	0.22	0.00	0.01	0.09	0.01	0.01	0.04	0.00	0.01	0.09	0.01	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	3	1/21/2021 10 57	1/22/2021 3 40	16.72	0.00	16.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.81	4.39	0.19	0.00	0.01	0.03	0.00	0.00	0.15	0.00	0.01	0.03	0.00	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	2	1/24/2021 12 26	1/28/2021 1 27	85.02	0.00	85.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.37	22.32	0.99	0.01	0.04	0.17	0.01	0.01	0.75	0.01	0.04	0.17	0.01	0.01
248	Af aMax	115,909	Chev on	Non-US	1.00	No Upg ade	1	6/6/2021 8 35	6/13/2021 0 21	159.77	0.00	159.77	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	34.18	41.94	1.75	0.02	0.07	0.31	0.03	0.02	1.54	0.02	0.07	0.31	0.03	0.02
251	PanaMax	73 879	Chev on	Non-US	2.00	No Upg ade	4	6/13/2021 19 05	6/15/2021 0 15	29.17	20.33	8.83	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.27	23.96	0.27	0.00	0.01	0.18	0.02	0.01	0.20	0.00	0.01	0.18	0.02	0.01
253	P oduct	52 825	Chev on	Non-US	3.00	No Upg ade	3	4/15/2021 14 43	4/17/2021 6 17	39.57	0.00	39.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	9.02	10.39	0.46	0.01	0.02	0.08	0.01	0.00	0.09	0.01	0.02	0.08	0.01	0.00
255	P oduct	49 994	Chev on	Non-US	2.00	No Upg ade	3	7/7/2021 11 42	7/11/2021 13 48	98.10	0.00	98.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	22.35	25.75	1.14	0.01	0.04	0.19	0.02	0.01	0.87	0.01	0.04	0.19	0.02	0.01
258	Chem cal	26 029	Chev on	Non-US	2.00	No Upg ade	2	12/25/2021 1 55	12/25/2021 12 00	10.08	0.00	10.08	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.05	2.65	0.16	0.00	0.01	0.02	0.00	0.00	0.12	0.00	0.01	0.02	0.00	0.00
263	PanaMax	73 400	Chev on	Non-US	1.00	No Upg ade	1	6/13/2021 21 50	6/16/2021 16 25	66.58	54.50	12.08	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.02	61.17	0.61	0.01	0.02	0.45	0.04	0.02	0.54	0.01	0.02	0.45	0.04	0.02
264	P oduct	49 972	Chev on	Non-US	2.00	No Upg ade	2	6/4/2021 15 40	6/6/2021 10 45	43.08	0.00	43.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.82	11.31	0.50	0.01	0.02	0.08	0.01	0.00	0.38	0.01	0.02	0.08	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	1/27/2021 7 55	1/31/2021 0 12	88.28	25.25	63.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	20.12	39.95	1.03	0.01	0.04	0.30	0.03	0.02	0.19	0.01	0.04	0.30	0.03	0.02
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	2	2/2/2021 11 59	2/3/2021 19 06	31.12	0.00	31.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.09	8.17	0.36	0.00	0.01	0.06	0.01	0.00	0.07	0.00	0.01	0.06	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	2/26/2021 17 40	3/1/2021 13 58	68.30	0.00	68.30	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	15.56	17.93	0.80	0.01	0.03	0.13	0.01	0.01	0.15	0.01	0.03	0.13	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/11/2021 17 10	3/12/2021 11 06	17.93	9.75	8.18	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.09	11.18	0.21	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/22/2021 19 50	3/23/2021 13 15	17.42	9.17	8.25	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.97	10.66	0.20	0.00	0.01	0.08	0.01	0.00	0.18	0.00	0.01	0.08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	4/3/2021 11 58	4/4/2021 7 30	19.53	10.73	8.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.45	12.26	0.23	0.00	0.01	0.09	0.01	0.00	0.20	0.00	0.01	0.09	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	6/16/2021 17 37	6/17/2021 15 40	22.05	11.25	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	13.26	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	7/10/2021 22 15	7/12/2021 11 08	36.88	18.83	18.05	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.40	22.19	0.43	0.00	0.02	0.16	0.01	0.01	0.38	0.00	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	8/15/2021 4 10	8/16/2021 15 06	34.93	18.92	16.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.96	21.73	0.41	0.00	0.02	0.16	0.01	0.01	0.36	0.00	0.02	0.16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	8/24/2021 2 37	8/25/2021 6 14	27.62	17.00	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.29	18.54	0.32	0.00	0.01	0.14	0.01	0.01	0.28	0.00	0.01	0.14	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/13/2021 2 29	9/14/2021 3 33	25.07	11.92	13.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.71	14.50	0.29	0.00	0.01	0.11	0.01	0.01	0.26	0.00	0.01	0.11	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/28/2021 8 08	9/29/2021 6 35	22.45	12.08	10.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	13.92	0.26	0.00	0.01	0.10	0.01	0.01	0.23	0.00	0.01	0.10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	10/30/2021 20 43	10/31/2021 19 48	23.08	16.58	6.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.26	17.07	0.27	0.00	0.01	0.13	0.01	0.01	0.24	0.00	0.01	0.13	0.01	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/1/2021 5 55	1/2/2021 9 23	27.47	18.08	9.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.11	46.79	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/7/2021 6 12	1/8/2021 9 28	27.27	19.25	8.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.08	49.29	0.21	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/19/2021 18 23	1/20/2021 15 13	20.83	9.75	11.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.11	26.81	0.16	0.00	0.01	0.20	0.02	0.01	0.00	0.00	0.01	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/25/2021 20 42	1/27/2021 9 09	36.45	25.33	11.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.45	65.01	0.28	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/4/2021 3 11	2/5/2021 8 14	29.05	19.58	9.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.34	50.48	0.22	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/11/2021 20 19	2/12/2021 22 01	25.70	16.92	8.78	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.84	43.77	0.20	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/23/2021 10 41	2/24/2021 11 40	24.98	16.72	8.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.74	43.14	0.19	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/2/2021 17 10	3/4/2021 0 15	31.08	19.58	11.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.65	51.02	0.24	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/11/2021 11 29	3/12/2021 7 24	19.92	10.67	9.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.98	28.57	0.15	0.00	0.01	0.21	0.02	0.01	0.00	0.00	0.01	0.21	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/19/2021 3 00	3/20/2021 15 16	36.27	20.58	15.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.42	54.57	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/28/2021 21 06	3/29/2021 21 08	24.03	14.08	9.95	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.59	37.13	0.18	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/3/2021 3 22	4/4/2021 15 20	35.97	21.00	14.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	55.40	0.27	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/18/2021 2 23	4/19/2021 6 29	28.10	19.08	9.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	49.14	0.21	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/3/2021 3 34	5/4/2021 16 41	37.12	20.25	16.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	54.06	0.28	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/19/2021 15 42	5/20/2021 16 23	24.68	18.33	6.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	46.60	0.19	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/26/2021 13 13	5/28/2021 11 26	46.22	18.75	27.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.91	53.17	0.35	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/5/2021 18 25	6/6/2021 20 10	25.75	19.25	6.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.85	48.89	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/19/2021 22 32	6/21/2021 6 27	31.92	21.67	10.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.77	55.80	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/29/2021 17 19	7/1/2021 2 05	32.77	16.50	16.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.90	44.71	0.25	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/9/2021 13 40	7/10/2021 16 17	26.62	20.50	6.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.98	51.85	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/16/2021 17 21	7/17/2021 20 10	26.82	19.75	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	50.26	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/27/2021 13 58	7/29/2021 1 08	35.17	16.58	18.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.26	45.52	0.27	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/7/2021 21 58	8/13/2021 17 50	139.87	14.17	125.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	20.91	67.72	1.07	0.01	0.04	0.50	0.04	0.03	0.00	0.01	0.04	0.50	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/19/2021 18 12	8/20/2021 18 52	24.67	16.33	8.33	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.69	42.22	0.19	0.00	0.01	0.31	0.03	0.02	0.00	0.00	0.01	0.31	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/26/2021 18 01	8/28/2021 6 50	36.82	17.58	19.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.50	48.15	0.28	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/4/2021 23 11	9/6/2021 9 18	34.12	18.50	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.10	49.44	0.26	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/10/2021 21 35	9/12/2021 0 25	26.83	18.17	8.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.01	46.80	0.21	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/25/2021 13 24	9/26/2021 17 52	28.47	17.50	10.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.26	45.77	0.22	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/4/2021 0 45	10/5/2021 1 41	24.93	17.92	7.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.73	45.76	0.19	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/12/2021 10 49	10/13/2021 8 19	21.50	16.00	5.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.21	40.66	0.16	0.00	0.01	0.30	0.03	0.02	0.00	0.00	0.01	0.30	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/17/2021 23 20	10/19/2021 1 44	26.40	20.08	6.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.95	50.88	0.20	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/31/2021 10 21	11/2/2021 22 27	60.10	19.08	41.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.99	57.54	0.46	0.01	0.02	0.43	0.04	0.02	0.00	0.01	0.02	0.43	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/12/2021 19 47	11/13/2021 21 13	25.43	19.50	5.93	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.80	49.35	0.19	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/19/2021 8 15	11/20/2021 20 21	36.10	17.50	18.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.40	47.77	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/28/2021 7 37	11/29/2021 15 48	32.18	22.17	10.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.81	56.96	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/6/2021 11 11	12/7/2021 4 25	17.23	10.17	7.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	2.58	26.77	0.13	0.00	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/13/2021 11 30	12/14/2021 9 52	22.37	14.75	7.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.34	38.15	0.17	0.00	0.01	0.28	0.02	0.02	0.00	0.00	0.01	0.28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/19/2021 9 18	12/20/2021 13 22	28.07	17.75	10.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.20	46.21	0.21	0.00	0.01	0.34	0.03	0.02	0.00	0.00	0.01	0.34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/24/2021 18 10	12/26/2021 7 19	37.15	16.83	20.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.55	46.59	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
289	Af aMax	114,809	Chev on	Non-US	1.00	No Upg ade	1	10/19/2021 23 14	10/25/2021 13 05	133.85	88.50	45.35	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	28.64	144.02	1.46	0.02	0.06	1.07	0.09	0.06	1.29	0.02	0.06	1.07	0.09	0.06
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/18/2021 14 00	1/19/2021 14 32	24.53	15.23	9.30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.67	39.78	0.19	0.00	0.01	0.29	0.03	0.02	0.17	0.00	0.01	0.29	0.03	0.02
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	2/19/2021 3 35	2/19/2021 19 45	16.17	8.43	7.73	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.42	22.70	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/12/2021 9 10	3/13/2021 7 46	22.60	7.92	14.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.38	23.26	0.17	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/27/2021 11 52	3/28/2021 8 14	20.37	8.00	12.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	22.85	0.16	0.00	0.01	0.17	0.01	0.01	0.14	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/9/2021 8 43	4/9/2021 23 14	14.52	8.33	6.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.17	22.05	0.11	0.00	0.00	0.16	0.01	0.01	0.10	0.00	0.00	0.16	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/12/2021 10 14	4/13/2021 2 30	16.27	8.58	7.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.43	23.05	0.12	0.00	0.00	0.17	0.01	0.01	0.11	0.00	0.00	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/25/2021 8 49	4/26/2021 8 10	23.35	8.08	15.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.49	23.82	0.18	0.00	0.01	0.18	0.01	0.01	0.16	0.00	0.01	0.18	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	5/25/2021 10 48	5/26/2021 9 44	22.93	7.75	15.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.43	22.98	0.18	0.00	0.01	0.17	0.01	0.01	0.15	0.00	0.01	0.17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	7/26/2021 16 19	7/27/2021 11 47	19.47	6.50	12.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.91	19.34	0.15	0.00	0.01	0.14	0.01	0.01	0.13	0.00	0.01	0.14	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/9/2021 2 45	9/9/2021 23 18	20.55	6.50	14.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.07	19.62	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/22/2021 14 03	9/23/2021 10 25	20.37	6.67	13.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.05	19.94	0.16	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/30/2021 23 58	5/1/2021 20 02	20.07	7.00	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.00	20.59	0.15	0.00	0.01	0.15	0.01	0.01	0.14	0.00	0.01	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	8/28/2021 12 38	8/29/2021 2 53	14.25	7.25	7.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.13	19.61	0.11	0.00	0.00	0.15	0.01	0.01	0.10	0.00	0.00	0.15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	10/6/2021 9 35	10/6/2021 23 47	14.20	6.83	7.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.12	18.68	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/11/2021 2 44	11/12/2021 3 14	24.50	7.33	17.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.66	22.48	0.19	0.00	0.01	0.17	0.01	0.01	0.17	0.00	0.01	0.17	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/29/2021 17 54	11/30/2021 8 42	14.80	7.00	7.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	2.21	19.20	0.11	0.00	0.00	0.14	0.01	0.01	0.10	0.00	0.00	0.14	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	6/25/2021 0 51	6/25/2021 15 31	14.67	7.75	6.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	20.81	0.11	0.00	0.00	0.15	0.01	0.01	0.11	0.00	0.00	0.15	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	7/18/2021 7 53	7/19/2021 17 26	33.55	11.83	21.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.02	34.70	0.26	0.00	0.01	0.26	0.02	0.01	0.26	0.00	0.01	0.26	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	10/19/2021 21 59	10/21/2021 9 14	35.25	7.58	27.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.27	25.85	0.27	0.00	0.01	0.19	0.02	0.01	0.27	0.00	0.01	0.19	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/15/2021 5 17	12/16/2021 8 32	27.25	6.58	20.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.07	21.56	0.21	0.00	0.01	0.16	0.01	0.01	0.21	0.00	0.01	0.16	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/29/2021 6 34	12/30/2021 8 42	26.13	6.92	19.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.91	22.00	0.20	0.00	0.01	0.16	0.01	0.01	0.20	0.00	0.01	0.16	0.01	0.01
294	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/29/2021 8 38	1/30/2021 8 10	23.53	6.42	17.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	3.52	20.22	0.18	0.00	0.01	0.15	0.01	0.01	0.16	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	1/15/2021 3 06	1/15/2021 22 55	19.82	6.75	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.96	19.97	0.15	0.00	0.01	0.15	0.01	0.01	0.15	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/2/2021 13 28	2/3/2021 13 16	23.80	7.58	16.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.56	22.84	0.18	0.00	0.01	0.17	0.01	0.01	0.18	0.00	0.01	0.17	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/16/2021 13 50	2/17/2021 2 15	12.42	5.83	6.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.86	16.03	0.09	0.00	0.00	0.12	0.01	0.01	0.09	0.00	0.00	0.12	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	3	3/5/2021 2 52	3/5/2021 17 30	14.63	6.42	8.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	2.19	17.88	0.11	0.00	0.00	0.13	0.01	0.01	0.11	0.00	0.00	0.13	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	5/17/2021 15 57	5/18/2021 14 37	22.67	6.83	15.83	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	3.39	20.90	0.17	0.00	0.01	0.15	0.01	0.01	0.17	0.00	0.01	0.15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	8/15/2021 18 23	8/16/2021 7 08	12.75	6.75	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	1.91	18.12	0.10	0.00	0.00	0.13	0.01	0.01	0.10	0.00	0.00	0.13	0.01	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/5/2021 14 00	1/7/2021 2 11	36.18	17.42	18.77	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.41	47.61	0.28	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/16/2021 1 27	1/17/2021 4 20	26.88	20.08	6.80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.02	51.01	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/21/2021 7 26	1/22/2021 16 21	32.92	22.75	10.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.92	58.43	0.25	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/1/2021 1 50	2/2/2021 4 10	26.33	19.25	7.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.94	49.04	0.20	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/8/2021 9 45	2/10/2021 6 15	44.50	20.42	24.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	6.65	56.36	0.34	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/17/2021 15 37	2/19/2021 1 15	33.63	22.08	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.03	57.16	0.26	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/14/2021 3 05	3/15/2021 12 23	33.30	21.75	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.98	56.34	0.25	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/23/2021 8 35	3/24/2021 10 25	25.83	19.83	6.00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	50.19	0.20	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/30/2021 15 13	3/31/2021 22 26	31.22	20.83	10.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.67	53.79	0.24	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/7/2021 1 42	4/8/2021 6 25	28.72	18.00	10.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.29	46.93	0.22	0.00	0.01	0.35	0.03	0.02	0.00	0.00	0.01	0.35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/16/2021 4 50	4/17/2021 12 20	31.50	21.58	9.92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.71	55.50	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/21/2021 23 40	4/23/2021 6 36	30.93	21.58	9.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.62	55.36	0.24	0.00	0.01	0.41	0.03	0.02	0.00	0.00	0.01	0.41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/9/2021 23 26	5/11/2021 15 18	39.87	17.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.96	49.49	0.30	0.00	0.01	0.37	0.03	0.02	0.00	0.00	0.01	0.37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/23/2021 21 20	5/25/2021 8 09	34.82	21.92	12.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.21	57.10	0.27	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/6/2021 22 40	6/8/2021 14 14	39.57	17.33	22.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.92	48.32	0.30	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/17/2021 7 27	6/18/2021 14 53	31.43	23.08	8.35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.70	58.77	0.24	0.00	0.01	0.44	0.04	0.02	0.00	0.00	0.01	0.44	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/25/2021 22 50	6/27/2021 3 59	29.15	12.50	16.65	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.36	35.01	0.22	0.00	0.01	0.26	0.02	0.01	0.00	0.00	0.01	0.26	0.02	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/14/2021 17 00	7/16/2021 4 31	35.52	25.08	10.43	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.31	64.22	0.27	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/22/2021 0 24	7/23/2021 9 22	32.97	20.50	12.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.93	53.52	0.25	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/2/2021 19 32	8/4/2021 6 45	35.22	22.08	13.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.27	57.57	0.27	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/14/2021 5 50	8/15/2021 13 53	32.05	20.00	12.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.79	52.18	0.24	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/22/2021 13 22	8/23/2021 21 21	31.98	21.75	10.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.78	56.00	0.24	0.00	0.01	0.41	0.04	0.02	0.00	0.00	0.01	0.41	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/31/2021 20 14	9/2/2021 6 25	34.18	19.92	14.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.11	52.56	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/7/2021 12 23	9/9/2021 0 44	36.35	22.33	14.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.43	58.42	0.28	0.00	0.01	0.43	0.04	0.02	0.00	0.00	0.01	0.43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/14/2021 20 33	9/15/2021 18 17	21.73	14.25	7.48	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.25	36.89	0.17	0.00	0.01	0.27	0.02	0.02	0.00	0.00	0.01	0.27	0.02	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/21/2021 0 32	9/22/2021 12 15	35.72	20.50	15.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.34	54.24	0.27	0.00	0.01	0.40	0.03	0.02	0.00	0.00	0.01	0.40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/28/2021 7 39	9/29/2021 18 24	34.75	18.08	16.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.20	48.70	0.27	0.00	0.01	0.36	0.03	0.02	0.00	0.00	0.01	0.36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/7/2021 12 14	10/9/2021 23 31	59.28	22.17	37.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	8.86	64.07	0.45	0.01	0.02	0.47	0.04	0.03	0.00	0.01	0.02	0.47	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/15/2021 9 35	10/16/2021 20 05	34.50	19.92	14.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.16	52.64	0.26	0.00	0.01	0.39	0.03	0.02	0.00	0.00	0.01	0.39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/21/2021 22 35	10/23/2021 0 23	25.80	17.08	8.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	3.86	44.16	0.20	0.00	0.01	0.33	0.03	0.02	0.00	0.00	0.01	0.33	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/6/2021 14 29	11/7/2021 22 13	31.73	15.83	15.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.74	42.98	0.24	0.00	0.01	0.32	0.03	0.02	0.00	0.00	0.01	0.32	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/16/2021 8 27	11/17/2021 20 28	36.02	21.42	14.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	5.38	56.32	0.28	0.00	0.01	0.42	0.04	0.02	0.00	0.00	0.01	0.42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/23/2021 12 25	11/25/2021 11 35	47.17	23.75	23.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.05	64.36	0.36	0.00	0.01	0.48	0.04	0.03	0.00	0.00	0.01	0.48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/3/2021 8 45	12/4/2021 12 42	27.95	19.92	8.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	4.18	50.92	0.21	0.00	0.01	0.38	0.03	0.02	0.00	0.00	0.01	0.38	0.03	0.02

Appendix A12.3

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine NOx (g/kwh)	CARB Em ss on Facto s Aux Engine PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Engine ROG (g/kwh)	CARB Em ss on Facto s Aux Bo ler NOx (g/kwh)	CARB Em ss on Facto s Aux Bo ler PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Bo ler ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine NOx (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine PM2.5 (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler NOx (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler PM2 5 (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine NOx (MT)	Em ss on Calc. based on CARB facto s Aux. Engine PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Engine ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler NOx (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne NOx (MT)	Em ss on Calc. based on IC factors Aux. Eng ne PM2.5 MT)	Em ss on Calc. based on IC factors Aux. Eng ne ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler NOx (MT)	Em ss on Calc. based on IC factors Aux. Boiler PM2 5 (MT)	Em ss on Calc. based on IC factors Aux. Boiler ROG (MT)
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/10/2021 15 28	12/11/2021 16 36	25.13	18.25	6 88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	3.76	46 54	0 19	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/21/2021 11 35	12/22/2021 22 18	34.72	22.42	12.30	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	5.19	58 17	0 27	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/31/2021 8 27	1/1/2022 0 00	15.55	11.00	4 55	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	2.32	28 16	0 12	0 00	0 00	0.21	0.02	0 01	0.00	0.00	0 00	0 21	0.02	0.01
301	P oduct	51 215	Chev on	Non-US	1.00	No Upg ade	3	1/16/2021 6 03	1/18/2021 2 10	44.12	0.00	44.12	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.05	11 58	0 51	0 01	0 02	0.09	0.01	0 00	0.45	0.01	0 02	0 09	0.01	0.00
307	SuezMax	149,992	Chev on	Non-US	2.00	No Upg ade	1	2/28/2021 9 22	3/2/2021 1 24	40.03	23.58	16.45	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.99	62 12	0 31	0 00	0 01	0.46	0.04	0 03	0.23	0.00	0 01	0 46	0.04	0.03
309	P oduct	46 938	Chev on	Non-US	1.00	No Upg ade	3	10/14/2021 22 05	10/16/2021 16 11	42.10	0.00	42.10	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.59	11 05	0 49	0 01	0 02	0.08	0.01	0 00	0.43	0.01	0 02	0 08	0.01	0.00
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	5/28/2021 14 39	6/2/2021 16 27	121.80	80.83	40.97	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	21.99	96 77	1 12	0 01	0 04	0 72	0.06	0 04	0.99	0.01	0 04	0 72	0.06	0.04
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/8/2021 10 29	8/15/2021 2 31	160.03	0.00	160.03	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	28.89	42 01	1 48	0 02	0 06	0 31	0.03	0 02	1.31	0.02	0 06	0 31	0.03	0.02
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/29/2021 13 53	8/31/2021 18 10	52.28	39.00	13.28	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.44	44 99	0 48	0 01	0 02	0 33	0.03	0 02	0.43	0.01	0 02	0 33	0.03	0.02
314	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	1/12/2021 23 18	1/16/2021 13 11	85.88	0.00	85.88	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 54	1 00	0 01	0 04	0.17	0.01	0 01	0.19	0.01	0 04	0 17	0.01	0.01
322	P oduct	49 901	Chev on	Non-US	2.00	No Upg ade	2	6/26/2021 17 58	6/28/2021 13 49	43.85	36.42	7 43	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.99	35 70	0 51	0 01	0 02	0.26	0.02	0 01	0.39	0.01	0 02	0 26	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	5/23/2021 6 14	5/27/2021 13 50	103.60	2.75	100.85	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.17	30 58	1 13	0 01	0 04	0.23	0.02	0 01	0.21	0.01	0 04	0 23	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	6/2/2021 18 18	6/3/2021 16 19	22.02	0.00	22.02	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.71	5.78	0 24	0 00	0 01	0.04	0.00	0 00	0.05	0.00	0 01	0 04	0.00	0.00
324	P oduct	50 908	Chev on	Non-US	2.00	No Upg ade	3	7/30/2021 11 10	8/2/2021 3 45	64.58	0.00	64.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.72	16 95	0 75	0 01	0 03	0.13	0.01	0 01	0.57	0.01	0 03	0 13	0.01	0.01
325	Af aMax	114,426	Chev on	Non-US	2.00	No Upg ade	4	6/27/2021 13 54	6/29/2021 15 24	49.50	28.17	21.33	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.59	47 65	0 54	0 01	0 02	0 35	0.03	0 02	0.41	0.01	0 02	0 35	0.03	0.02
268	PanaMax	69 684	Chev on	Non-US	1.00	No Upg ade	4	5/29/2021 21 35	5/31/2021 4 20	30.75	21.33	9 42	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.55	25 17	0 28	0 00	0 01	0.19	0.02	0 01	0.25	0.00	0 01	0 19	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	10/24/2021 2 08	10/29/2021 6 28	124.33	0.00	124.33	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	22.45	32 64	1 15	0 01	0 04	0.24	0.02	0 01	1.01	0.01	0 04	0 24	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	12/7/2021 10 41	12/9/2021 12 12	49.52	22.92	26.60	832	3547	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	8.94	31 37	0 46	0 01	0 02	0.23	0.02	0 01	0.40	0.01	0 02	0 23	0.02	0.01
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/23/2021 18 45	6/26/2021 16 35	69.83	29.08	40.75	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.91	37 65	0 81	0 01	0 03	0.28	0.02	0 02	0.72	0.01	0 03	0 28	0.02	0.02
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/28/2021 17 40	6/30/2021 9 10	39.50	7.50	32.00	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.00	15 35	0 46	0 01	0 02	0.11	0.01	0 01	0.41	0.01	0 02	0 11	0.01	0.01
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	2	4/7/2021 5 57	4/8/2021 19 33	37.60	0.00	37.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.57	9.87	0 44	0 01	0 02	0.07	0.01	0 00	0.33	0.01	0 02	0 07	0.01	0.00
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	3	4/10/2021 19 54	4/12/2021 4 13	32.32	0.00	32.32	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.36	8.48	0 38	0 00	0 01	0.06	0.01	0 00	0.29	0.00	0 01	0 06	0.01	0.00
335	P oduct	50 222	Chev on	Non-US	1.00	No Upg ade	1	2/16/2021 0 05	2/19/2021 13 59	85.90	0.00	85.90	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 55	1 00	0 01	0 04	0.17	0.01	0 01	0.88	0.01	0 04	0 17	0.01	0.01
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	2	7/19/2021 0 55	7/20/2021 23 12	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.55	12 15	0 54	0 01	0 02	0.09	0.01	0 00	0.41	0.01	0 02	0 09	0.01	0.00
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	3	8/2/2021 5 35	8/3/2021 12 15	30.67	0.00	30.67	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.99	8.05	0 36	0 00	0 01	0.06	0.01	0 00	0.27	0.00	0 01	0 06	0.01	0.00
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	6/26/2021 11 02	6/28/2021 15 05	52.05	37.00	15.05	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.14	59 18	0 57	0 01	0 02	0.44	0.04	0 02	0.50	0.01	0 02	0 44	0.04	0.02
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	7/4/2021 8 57	7/5/2021 17 36	32.65	19.25	13.40	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	6.99	32 25	0 36	0 00	0 01	0.24	0.02	0 01	0.32	0.00	0 01	0 24	0.02	0.01
347	SuezMax	158,081	Chev on	Non-US	3.00	No Upg ade	4	5/13/2021 23 15	5/16/2021 23 28	72.22	24.33	47.88	689	8170	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	10.80	72 21	0 55	0 01	0 02	0.53	0.05	0 03	0.10	0.01	0 02	0 53	0.05	0.03
350	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/30/2021 1 23	12/31/2021 19 59	42.60	0.00	42.60	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.71	11 18	0 50	0 01	0 02	0.08	0.01	0 00	0.38	0.01	0 02	0 08	0.01	0.00
351	P oduct	51 213	Chev on	Non-US	1.00	No Upg ade	2	10/16/2021 23 19	10/19/2021 3 23	52.07	0.00	52.07	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.86	13 67	0 61	0 01	0 02	0.10	0.01	0 01	0.54	0.01	0 02	0 10	0.01	0.01
352	P oduct	51 228	Chev on	Non-US	1.00	No Upg ade	2	7/21/2021 2 35	7/23/2021 6 12	51.62	0.00	51.62	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.76	13 55	0 60	0 01	0 02	0.10	0.01	0 01	0.53	0.01	0 02	0 10	0.01	0.01
358	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	5/11/2021 10 21	5/14/2021 22 46	84.42	0.00	84.42	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.23	22 16	0 98	0 01	0 04	0 16	0.01	0 01	0.19	0.01	0 04	0 16	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	4/2/2021 13 18	4/4/2021 6 03	40.75	9.58	31.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.28	17 06	0 47	0 01	0 02	0.13	0.01	0 01	0.36	0.01	0 02	0 13	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	6/2/2021 10 08	6/3/2021 20 07	33.98	25.50	8 48	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.74	25 86	0 40	0 00	0 01	0.19	0.02	0 01	0.30	0.00	0 01	0 19	0.02	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	7/24/2021 1 13	7/26/2021 0 50	47.62	32.08	15.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.85	33 81	0 55	0 01	0 02	0.25	0.02	0 01	0.42	0.01	0 02	0 25	0.02	0.01
374	Af aMax	108,942	Chev on	Non-US	1.00	No Upg ade	1	8/23/2021 13 30	8/26/2021 12 24	70.90	53.75	17.15	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.17	84 74	0 78	0 01	0 03	0.63	0.05	0 03	0.69	0.01	0 03	0 63	0.05	0.03
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	2	5/4/2021 19 03	5/6/2021 18 35	47.53	0.00	47.53	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.83	12 48	0 55	0 01	0 02	0.09	0.01	0 01	0.49	0.01	0 02	0 09	0.01	0.01
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	3	9/11/2021 19 36	9/14/2021 8 22	60.77	0.00	60.77	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.85	15 95	0 71	0 01	0 03	0.12	0.01	0 01	0.63	0.01	0 03	0 12	0.01	0.01
379	P oduct	50 243	Chev on	Non-US	2.00	No Upg ade	3	12/10/2021 6 12	12/12/2021 11 29	53.28	0.00	53.28	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.14	13 99	0 62	0 01	0 02	0.10	0.01	0 01	0.47	0.01	0 02	0 10	0.01	0.01
385	P oduct	46 955	Chev on	Non-US	1.00	No Upg ade	3	3/11/2021 15 00	3/15/2021 6 30	87.50	0.00	87.50	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.94	22 97	1 02	0 01	0 04	0.17	0.01	0 01	0.90	0.01	0 04	0 17	0.01	0.01
388	P oduct	51 218	Chev on	Non-US	1.00	No Upg ade	3	3/27/2021 10 13	3/28/2021 1 06	14.88	7.25	7 63	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	3.39	8.72	0 17	0 00	0 01	0.06	0.01	0 00	0.15	0.00	0 01	0 06	0.01	0.00
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	2	5/19/2021 9 46	5/21/2021 9 21	47.58	0.00	47.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.84	12 49	0 55	0 01	0 02	0 09	0.01	0 01	0.42	0.01	0 02	0 09	0.01	0.01
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	3	9/16/2021 6 52	9/19/2021 6 20	71.47	0.00	71.47	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.28	18 76	0 83	0 01	0 03	0.14	0.01	0 01	0.63	0.01	0 03	0 14	0.01	0.01
390	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	11/27/2021 1 45	12/1/2021 10 54	105.15	0.00	105.15	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	23.96	27 60	1 22	0 02	0 05	0.20	0.02	0 01	0.93	0.02	0 05	0 20	0.02	0.01
391	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/21/2021 11 22	2/23/2021 12 25	49.05	0.00	49.05	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.18	12 88	0 57	0 01	0 02	0.10	0.01	0 01	0.43	0.01	0 02	0 10	0.01	0.01
392	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/16/2021 4 06	8/18/2021 11 30	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	5/13/2021 2 30	5/15/2021 9 26	54.93	0.00	54.93	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.52	14 42	0 64	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/27/2021 3 55	8/29/2021 1 15	45.33	0.00	45.33	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.33	11 90	0 53	0 01	0 02	0.09	0.01	0 00	0.40	0.01	0 02	0 09	0.01	0.00
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	9/3/2021 14 21	9/5/2021 1 11	34.83	0.00	34.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.94	9.14	0 41	0 00	0 02	0.07	0.01	0 00	0.31	0.00	0 02	0 07	0.01	0.00
394	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	6/8/2021 4 22	6/10/2021 12 20	55.97	0.00	55.97	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.75	14 69	0 65	0 01	0 02	0 11	0.01	0 01	0.50	0.01	0 02	0 11	0.01	0.01
395	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/27/2021 9 16	9/29/2021 21 06	59.83	0.00	59.83	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.63	15 71	0 70	0 01	0 03	0 12	0.01	0 01	0.53	0.01	0 03	0 12	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	3	3/17/2021 0 08	3/20/2021 16 18	88.17	0.00	88.17	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.09	23 14	1 03	0 01	0 04	0.17	0.01	0 01	0.78	0.01	0 04	0 17	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	4/20/2021 13 41	4/23/2021 10 43	69.03	0.00	69.03	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	15.73	18 12	0 80	0 01	0 03	0.13	0.01	0 01	0.61	0.01	0 03	0 13	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/30/2021 17 52	10/3/2021 1 16	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	5/12/2021 6 33	5/13/2021 1 10	18.62	0.00	18.62	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.64	4.89	0 29	0 00	0 01	0.04	0.00	0 00	0.22	0.00	0 01	0 04	0.00	0.00
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	8/18/2021 12 32	8/19/2021 9 15	20.72	0.00	20.72	1395	421	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.27	5.44	0 32	0 00	0 01	0.04	0.00	0 00	0.24	0.00	0 01	0 04	0.00	0.00
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/18/2021 3 40	7/20/2021 11 22	55.70	0.00	55.70	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	11.92	14 62	0 61	0 01	0 02	0.11	0.01	0 01	0.11	0.01	0 02	0 11	0.01	0.01
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/23/2021 12 46	7/27/2021 23 25	106.65	0.00	106.65	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.82	28 00	1 17	0 01	0 04	0.21	0.02	0 01	0.22	0.01	0 04	0 21	0.02	0.01
409	P oduct	48 026	Chev on	Non-US	1.00	No Upg ade	2	10/3/2021 2 30	10/5/2021 1 05	46.58	0.00	46.58	1050	3089	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.61	12 23	0 54	0 01	0 02	0.09	0.01	0 00	0.48	0.01	0 02	0 09	0.01	0.00
205	Af aMax	114,820	Chev on	US	2.00	No Upg ade	4	9/27/2021 3 47	9/28/2021 4 21	24.57	14.08	10.48	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.26	23 78	0 27	0 00	0 01	0.18	0.01	0 01	0.20	0.00	0 01	0 18	0.01	0.01
411	Af aMax	112,186	Chev on	Non-US	2.00	No Upg ade	1	12/29/2021 8 03	1/1/2022 0 00	63.95	47.42	16.53	986	4976	875	217	300	13.80	0.17	0 52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.68	75 12	0 70	0 01	0 03	0.56	0.05	0 03	0.53	0.01	0 03	0 56	0.05	0.03

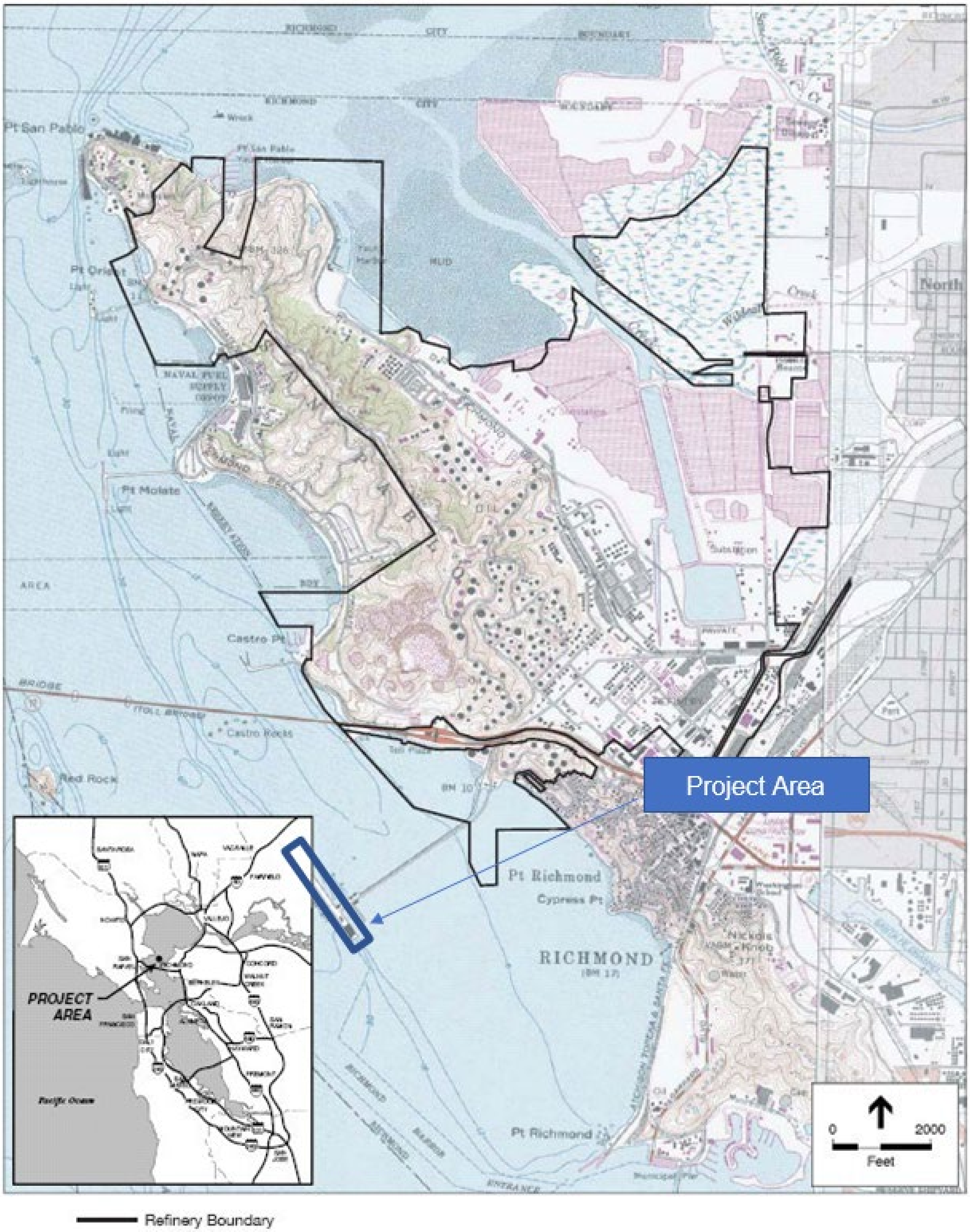
Appendix A13: IC.13 - Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)

A13.1 – Map
A13.2 - Data Management System
A13.3 – Emission Calculation Spreadsheet

Inputs

Calculations

Appendix A13.1: Map – IC.13 Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)



Appendix A13.2: IC.13 Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's) Data Management System

Chevron maintains a central database, called the Marine Enterprise System ("MES"), which tracks shipping activity from the initial cargo nomination to the vessel arrival, load or discharge of the nominated cargo at berth, concluding with the vessel departure (unmooring). As shown below, MES is the source of the majority of data inputs used to calculate vessel activity at berth, particularly timestamps for mooring and unmooring, cargo transfer start and finish, and total barrels transferred by cargo type, as well as vessel details such as IMO number, vessel owner and vessel type.

These vessel at berth activity inputs are common to not only the Baseline emissions calculations, but any vessel-related innovative concepts that require an estimate of emissions associated with at-berth activity, such as IC.10, IC.11, IC.12, IC.13 and IC.14.

In addition to the data inputs provided or derived from MES, Chevron uses the CARB at Berth Vessel Questionnaire (VQ) to supplement inputs to the Baseline calculations, which is an .xls workbook submitted by the vessel to CARB within 30 days of the vessel call, with a cc: to the Richmond Long Wharf. The VQ spreadsheet provides further details that may not be available through MES, such as the vessel type, IMO NOx Tier (0, 1, 2, 3) and can further support as a data quality check for timestamps provided in MES for vessel arrival date/time and departure date/time.

Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data. Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data If the data are not present in PAVIS, Chevron Shipping may also:

- Request additional data submission from vessels, by making this a requirement through changes in the Terminal Information Booklet, including request for information from the vessels Technical Files, as shown in the Validation Processes, below.

Appendix A13.2 - Chevron Richmond Long Wharf - Shipping Innovative Concepts (I.C. 10, I.C. 11, IC.12, IC.13)
Data Management System

Databases / Sources

Vessel Activity at Berth	Vessel Characteristics	Vessel Clearance to call RLW
Marine Enterprise System (MES) Database Owner: RLW Operations	CARB At Berth Vessel Questionnaire (VQ) (.xls) Owner: Richmond HES	PAVIS Database Owner: Chevron Shipping

Common Data: *Vessel Name, Vessel IMO number, Vessel Owner*

Vessel/Call ID Tracking

MES Inputs (from V1.30 Design Spec):
MES ID#
IMO #
ENV #
Nomination ID
Date of Last call - date/time
Vessel Owner
Vessel Type
Power kW - text
Build Date - date/time

VQ Inputs:
IMO #
ENV #
Vessel type
IMO NOx Tier (0, 1, 2, 3)
Port Visit
Terminal Visited
Berth Visited
Arrival Date and Time
Departure Date and Time

PAVIS (validation):
IMO #
Vessel type
Vessel owner
Fleet name
Vessel Q88 data
IMO NOx Tier

At Berth Activity / Duration

Berth name/number
Moor Vessel - First Line - timestamp
Pre Transfer - Connect Hoses – timestamp
Product type?
Transfer Cargo start - timestamp
Transfer Cargo end - timestamp
Ship Quantity (bbls)
Ship Barrels (bbls)
Cargo Quantity (MB)
Post-Transfer - Disconnect Hoses - timestamp
Unmoor vessel timestamp
Load (L) / Unload (D) activity
Delay code (if applicable)

Fuel type – boiler
Fuel consumed boiler (MT)
Fuel type – aux engines
Fuel consumed – aux engines (MT)
[redacted] annual engine tier forecast.
IC.12 – EFs per Engine Manufacturers, see spreadsheet.
IC.13 – IMO EFs for Dual-Fuel vessels, see spreadsheet

Use of an Innovative Concept – Y/N
IC EO number

CVX to develop emissions credit accounting system to designate non-CEQA vs CEQA EOs to call and quantity of NOx, PM, ROG credits.

Validation Processes:
1. Verify and/or locate missing vessel information in PAVIS, Q88 or by contact with the ship directly.
2. Ship Technical Files (engine technical file)
3.Ship Inspection -annually (IACS member)
4. Annual NOx equipment calibration (Tier II/III ships)
5. Emission Calcs:
   Emission Inventory Calculation Reviews by HES Emission Inventory specialist.
6. Timestamp data – internally QC'd by MES software to prevent inaccurate/illogical timestamps.
7. IC credit A13.3 onthly by HES Emissi cialist.

Calculations and Annual Report Template per each Shipping IC are shown in Appendix A13.3

Data Retention: 5 years, minimum.

Appendix A13.3 – IC.13 Dual-Fuel Tier III Auxiliary Engines (AE’s) and Auxiliary Boilers (AB’s) Emissions Calculation Spreadsheet

Appendix A13.3 Emissions Calculation Sp

Chevron Richmond, IC.13 - Dual-fuel Aux Engines and Aux Boilers

IC 13 has not yet been implemented. Once app o ed by CARB Che ron will execu e chartering strategies to bring dual fuel tankers into Cal fornia. Below calcula ion s a **hypothetical demonstration** and es imation of emission reduction (based on 2021 R chmond port call data) from upgrading Che ron's US flag essels to con ert them into dual fueled tankers .

otal Emiss ons and Reduct ons from Dual-fuel Aux Engines and Aux. Boilers (MT			
	NOx (MT Yr)	PM2.5 (MT/Yr)	ROG (MT Yr)
Baseline Em ssions using CARB default Emiss on Factor	6.18	1. 3	1 95
Emissions using Dual-fuel Emis ion Factor	10.9	1. 3	1 95
Em ssion Reduct ons from C.13	**35.24**	**0 00**	**0 00**

Add tional Details

Total emiss on f om vessels assum ng CARB d fault basel ne emission facto s

Total emission f om vessel calls with duel-fueld Aux eng nes and boile s assuming duel-fuel emission facto s (Chev on has only assumed NOx educ ions at th s t me)

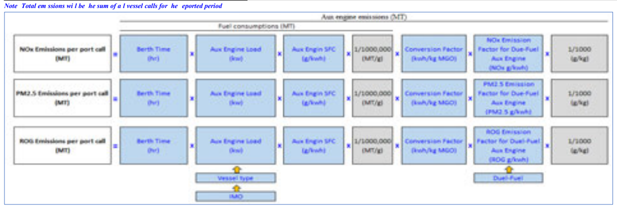
Estimated Annual NOx Em ssion Reduction Credit from IC 13									
	2023	2024	2025	2026	2027	2028	2029	2030	2031
Annual Emission Cred t f om Dual-fuel essels (MT/Yr)	0.00	0.00	0.00	35.2	55 85	55.85	55.85	55.85	55.85

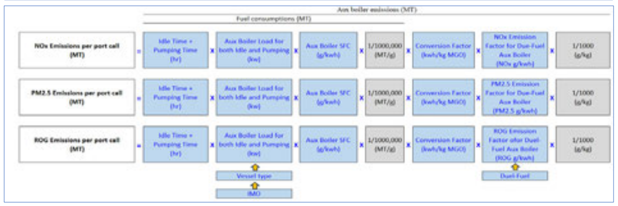
Addi ional Details

The timing and amount of emission reductions is based on a **hypothetical scenario**. Che ron wi l present CARB w th all data (per he updated Inno ati e concept applicat on) pr or to cla ming emission reduc ions

Flow Chart to explain Emissions Calculations for Each Vessel Call

Note Total em ssions wi l be he sum of a l vessel calls for he eported period





Demo Calculation

																		CARB Em ss on Facto s Aux Eng ne			CARB Em ss on Facto s Aux Bo ler			Em ss on Facto s basis Chevron Innovat veConcept Aux Engine			Em ss on Facto s basis Chevron InnovativeConcept Aux Bo ler						Em ss on Calc. based on CARB factors Aux. Engine			Em ss on Calc. based on CARB factors Aux. Boiler			Em s on Calc. based on IC factors Aux. Eng ne			Em ss on Calc. based on IC factors Aux. Boiler		
Ship Number	CLASS	DWT	Cha ered to	Flag US vs. Non US	Aux Engine Emission (assume T er II)	Boiler Type	Berth	Arr val Date/Time	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Berth Time Non Pump ng (hr)	Aux Engine Load (kW)	Aux Boiler Load - Pump ng (kw)	Aux Bo ler Load Non Pumping (kw)	Aux Eng ne SFC (g/kWh)	Aux. Bo ler SFC (g/kWh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2 5 (g/kwh)	ROG (g/kwh)	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Eng ne Fuel (MT)	Aux. Bo ler Fuel (MT)	NOx (MT)	PM2 5 MT)	ROG (MT)	NOx (MT)	PM2.5 (MT)	ROG MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)	NOx (MT)	PM2.5 (MT)	ROG (MT)
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	1/31/2021 9 12	2/1/2021 14 44	29.53	19.58	9.95	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	6 73	20 76	0 34	0.00	0 01	0.15	0 01	0.01	0.03	0 00	0.01	0 10	0 01	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	1	2/1 2021 15 11	2/3/2021 12 15	45.07	0.00	45.07	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	10.27	11 83	0 52	0.01	0 02	0.09	0 01	0.00	0.05	0 01	0.02	0 06	0 01	0 00
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	4/30/2021 8 25	5/2/2021 0 27	40.03	0.00	40.03	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 12	10 51	0 47	0.01	0 02	0.08	0 01	0.00	0.04	0 01	0.02	0 05	0 01	0 00
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	5/15/2021 11 21	5/18/2021 21 57	82.60	32.08	50.52	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	18.82	42 99	0 96	0.01	0 04	0.32	0 03	0.02	0.09	0 01	0.04	0 21	0 03	0 02
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	1	5/18/2021 22 16	5/20/2021 13 35	39.32	0.00	39.32	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	8 96	10 32	0 46	0.01	0 02	0.08	0 01	0.00	0.04	0 01	0.02	0 05	0 01	0 00
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	5/30/2021 10 20	6/2/2021 7 14	68.90	37.00	31.90	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	15.70	42 66	0 80	0.01	0 03	0.32	0 03	0.02	0.08	0 01	0.03	0 21	0 03	0 02
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	6/8 2021 10 12	6/11/2021 14 22	76.17	49.08	27.08	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	17.35	52 59	0 89	0.01	0 03	0.39	0 03	0.02	0.08	0 01	0.03	0 25	0 03	0 02
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	1	6/17/2021 21 43	6/19/2021 15 42	41.98	32.42	9.57	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 57	32 55	0 49	0.01	0 02	0.24	0 02	0.01	0.05	0 01	0.02	0 16	0 02	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	6/19/2021 16 03	6/22/2021 9 36	65.55	19.92	45.63	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	14.94	30 44	0 76	0.01	0 03	0.23	0 02	0.01	0.07	0 01	0.03	0 15	0 02	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	7/2 2021 10 54	7/5/2021 14 33	75.65	55.75	19.90	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	17.24	56 89	0 88	0.01	0 03	0.42	0 04	0.02	0.08	0 01	0.03	0 27	0 04	0 02
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	7/6 2021 13 17	7/7/2021 10 00	20.72	0.00	20.72	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	4 72	5.44	0 24	0.00	0 01	0.04	0 00	0.00	0.02	0 00	0.01	0 03	0 00	0 00
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	7/14/2021 13 05	7/17/2021 18 40	77.58	60.92	16.67	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	17.68	60 83	0 90	0.01	0 03	0.45	0 04	0.02	0.09	0 01	0.03	0 29	0 04	0 02
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	7/25/2021 23 20	7/28/2021 8 08	56.80	32.42	24.38	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	12.94	36 44	0 66	0.01	0 02	0.27	0 02	0.01	0.06	0 01	0.02	0 18	0 02	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	8/3 2021 19 10	8/5/2021 12 23	41.22	34.50	6.72	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 39	33 73	0 48	0.01	0 02	0.25	0 02	0.01	0.05	0 01	0.02	0 16	0 02	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	3	9/19/2021 10 24	9/20/2021 19 01	32.62	24.50	8.12	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	7 43	24 83	0 38	0.00	0 01	0.18	0 02	0.01	0.04	0 00	0.01	0 12	0 02	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	9/22/2021 21 14	9/25/2021 4 12	54.97	0.00	54.97	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	12.52	14 43	0 64	0.01	0 02	0.11	0 01	0.01	0.06	0 01	0.02	0 07	0 01	0 01
103	P oduct	46,094	Chev on	US	Dual Fuel	Dual Fuel	2	11/17/2021 19 10	11/19/2021 11 25	40.25	14.08	26.17	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 17	19 92	0 47	0.01	0 02	0.15	0 01	0.01	0.04	0 01	0.02	0 10	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	1/4 2021 11 22	1/5/2021 15 30	28.13	17.33	10.80	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	6 41	18 90	0 33	0.00	0 01	0.14	0 01	0.01	0.03	0 00	0.01	0 09	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	1/5 2021 15 55	1/7/2021 20 38	52.72	0.00	52.72	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	12.01	13 84	0 61	0.01	0 02	0.10	0 01	0.01	0.06	0 01	0.02	0 07	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	1/17/2021 7 51	1/18/2021 10 26	26.58	15.25	11.33	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	6 06	17 11	0 31	0.00	0 01	0.13	0 01	0.01	0.03	0 00	0.01	0 08	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	1/28/2021 7 32	1/31/2021 2 00	66.47	35.83	30.63	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	15.14	41 25	0 77	0.01	0 03	0.31	0 03	0.02	0.07	0 01	0.03	0 20	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	2/5 2021 10 53	2/7/2021 8 12	45.32	21.08	24.23	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	10.33	25 90	0 53	0.01	0 02	0.19	0 02	0.01	0.05	0 01	0.02	0 12	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	2/13/2021 1 03	2/15/2021 19 10	66.12	24.00	42.12	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	15.06	33 30	0 77	0.01	0 03	0.25	0 02	0.01	0.07	0 01	0.03	0 16	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	2/22/2021 10 49	2/27/2021 4 00	113 18	32.75	80.43	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	25.79	51 46	1 32	0.02	0 05	0.38	0 03	0.02	0.12	0 02	0.05	0 25	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	3/7 2021 22 45	3/11/2021 18 10	91.42	40.08	51.33	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	20.83	50 62	1 06	0.01	0 04	0.37	0 03	0.02	0.10	0 01	0.04	0 24	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	3/23/2021 12 15	3/25/2021 10 19	46.07	29.67	16.40	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	10.50	31 80	0 54	0.01	0 02	0.24	0 02	0.01	0.05	0 01	0.02	0 15	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	3/25/2021 10 52	3/27/2021 6 30	43.63	0.00	43.63	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 94	11 45	0 51	0.01	0 02	0.08	0 01	0.00	0.05	0 01	0.02	0 06	0 01	0 00
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	4/4/2021 8 28	4/7/2021 2 55	66.45	30.58	35.87	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	15.14	37 76	0 77	0.01	0 03	0.28	0 02	0.02	0.07	0 01	0.03	0 18	0 02	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	4/12/2021 15 40	4/15/2021 18 23	74.72	34.92	39.80	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	17.02	42 80	0 87	0.01	0 03	0.32	0 03	0.02	0.08	0 01	0.03	0 21	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	4/21/2021 15 31	4/23/2021 11 41	44.17	0.00	44.17	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	10.06	11 59	0 51	0.01	0 02	0.09	0 01	0.00	0.05	0 01	0.02	0 06	0 01	0 00
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	4/23/2021 12 21	4/25/2021 18 31	54.17	23.25	30.92	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	12.34	29 66	0 63	0.01	0 02	0.22	0 02	0.01	0.06	0 01	0.02	0 14	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	5/2/2021 7 08	5/4/2021 11 02	51.90	39.50	12.40	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	11.83	39 86	0 60	0.01	0 02	0.30	0 03	0.02	0.06	0 01	0.02	0 19	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	5/10/2021 19 36	5/13/2021 19 00	71.40	40.17	31.23	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	16.27	45 42	0 83	0.01	0 03	0.34	0 03	0.02	0.08	0 01	0.03	0 22	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	8/6 2021 15 59	8/11/2021 4 46	108 78	42.50	66.28	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	24.79	56 78	1 27	0.02	0 05	0.42	0 04	0.02	0.12	0 02	0.05	0 27	0 04	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	8/23/2021 2 12	8/27/2021 2 20	96.13	43.00	53.13	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	21.90	53 80	1 12	0.01	0 04	0.40	0 03	0.02	0.11	0 01	0.04	0 26	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	9/1/2021 8 47	9/3/2021 12 39	51.87	11.00	40.87	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	11.82	20 92	0 60	0.01	0 02	0.15	0 01	0.01	0.06	0 01	0.02	0 10	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	9/9/2021 9 31	9/11/2021 4 20	42.82	0.92	41.90	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 76	11 85	0 50	0.01	0 02	0.09	0 01	0.00	0.05	0 01	0.02	0 06	0 01	0 00
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	9/19/2021 22 12	9/21/2021 8 43	34.52	11.58	22.93	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	7 86	16 75	0 40	0.00	0 02	0.12	0 01	0.01	0.04	0 00	0.02	0 08	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	10/1/2021 2 06	10/2/2021 4 15	26.15	0.00	26.15	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	5 96	6.86	0 30	0.00	0 01	0.05	0 00	0.00	0.03	0 00	0.01	0 03	0 00	0 00
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	10/2/2021 4 33	10/4/2021 10 45	54.20	8.08	46.12	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	12.35	19 60	0 63	0.01	0 02	0.15	0 01	0.01	0.06	0 01	0.02	0 09	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	10/16/2021 18 57	10/20/2021 16 55	93.97	54.42	39.55	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	21.41	60 81	1 09	0.01	0 04	0.45	0 04	0.02	0.10	0 01	0.04	0 29	0 04	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	11/1/2021 8 32	11/4/2021 1 20	64.80	49.25	15.55	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	14.76	49 72	0 75	0.01	0 03	0.37	0 03	0.02	0.07	0 01	0.03	0 24	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	11/4/2021 1 42	11/5/2021 2 20	24.63	0.00	24.63	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	5 61	6 47	0 29	0.00	0 01	0.05	0 00	0.00	0.03	0 00	0.01	0 03	0 00	0 00
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	11/13/2021 6 31	11/14/2021 13 06	30.58	24.75	5.83	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	6 97	24 47	0 36	0.00	0 01	0.18	0 02	0.01	0.03	0 00	0.01	0 12	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	11/14/2021 13 29	11/16/2021 2 21	36.87	15.50	21.37	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	8 40	19 97	0 43	0.01	0 02	0.15	0 01	0.01	0.04	0 01	0.02	0 10	0 01	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	11/21/2021 18 48	11/24/2021 8 12	61.40	23.75	37.65	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	13.99	31 89	0 72	0.01	0 03	0.24	0 02	0.01	0.07	0 01	0.03	0 15	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	1	12/1/2021 7 25	12/5/2021 23 15	111 83	35.25	76.58	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	25.48	52 77	1 30	0.02	0 05	0.39	0 03	0.02	0.12	0 02	0.05	0 25	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	3	12/14/2021 18 07	12/17/2021 20 14	74.12	31.50	42.62	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	16.89	40 38	0 86	0.01	0 03	0.30	0 03	0.02	0.08	0 01	0.03	0 19	0 03	0 02
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	12/23/2021 22 45	12/25/2021 14 15	39.50	27.92	11.58	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 00	28 91	0 46	0.01	0 02	0.21	0 02	0.01	0.04	0 01	0.02	0 14	0 02	0 01
104	P oduct	46,069	Chev on	US	Dual Fuel	Dual Fuel	2	12/27/2021 14 39	12/29/2021 8 44	42.08	0.00	42.08	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 59	11 05	0 49	0.01	0 02	0.08	0 01	0.00	0.05	0 01	0.02	0 05	0 01	0 00
373	P oduct	49,094	Chev on	US	Dual Fuel	Dual Fuel	2	4/2 2021 13 18	4/4/2021 6 03	40.75	9.58	31.17	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	9 28	17 06	0 47	0.01	0 02	0.13	0 01	0.01	0.04	0 01	0.02	0 08	0 01	0 01
373	P oduct	49,094	Chev on	US	Dual Fuel	Dual Fuel	2	6/2 2021 10 08	6/3/2021 20 07	33.98	25.50	8.48	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	7 74	25 86	0 40	0.00	0 01	0.19	0 02	0.01	0.04	0 00	0.01	0 12	0 02	0 01
373	P oduct	49,094	Chev on	US	Dual Fuel	Dual Fuel	2	7/24/2021 1 13	7/26/2021 0 50	47.62	32.08	15.53	1050	3089	875	217	300	13.80	0 17	0.52	2.00	0 17	0 11	1.30	0.17	0.52	1.30	0.17	0.11	3.70	10.85	33 81	0 55	0.01	0 02	0.25	0 02	0.01	0.05	0 01	0.02	0 16	0 02	0 01

Inputs & Data Sources

Inputs	Sources
Aux Engine Load (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 9.* [1] *

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Engine Load	1395	1050	832	986	689	1011

Inputs	Sources
Aux Boiler Load Idle and Pumping (kw)	*2020 Air Emissions Inventory, Port of Long Beach, p. 10.* [1] *

(KW)	Chemical	Product	PanaMax	AfraMax	SuezMax	VLCC
Aux Boiler Load Pumping	421	3089	3547	4976	8170	8262
Aux Boiler Load Idling	875	875	875	875	875	875

Inputs	Sources	Value	
Aux Engine SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] *	Aux Engine SFC (g/kwh)	217
Aux Boiler SFC (g/kwh)	*2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Resutls, Appendix H, H53.* [2] *	Aux Engine SFC (g/kwh)	300
Conversion Factor (kwh/kg MGO)	*Final Regulation Section 93130.17 (d) (1) (B)*	Conversion Factor (1/0.27) (kwh/kg MGO)	3.70

Inputs	Sources
Aux Engine Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (1)* *2019 Update to Inventory for Ocean-Going Vessels At Berth: Methdology and Results, Appendix H, H53.* [2] * *NOx: IMO 4th GHG Study, P.410.* [3]

Aux Engine Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)**	ROG (g/kwh)**
CARB Baseline	0	13.80	0.17	0.52
Tier I	1	12.20	0.17	0.52
Tier II (IC.10)	2	10.50	0.17	0.52
Tier III (IC.11)	3	2.60	0.17	0.52
Chevron Lightering Vessels ***	TG	0.00	0.17	0.52
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.52

Inputs	Sources
Aux Boiler Emission Factor (g/kwh)	*Final Regulation Section 93130.5 (d) (2)* *Test results from engine manufacturer.* [4] *NOx: IMO 4th GHG Study, P.410.* [3]

Aux Boiler Tier	Engine Tier	NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)
CARB Base	No Upgrade	2.00	0.17	0.11
Burner Upgrade (IC.12)	Upgrade	0.27	0.17	0.11
Dual Fuel LNG (IC.13)	Dual Fuel	1.30	0.17	0.11

Inputs	Sources
Berth Time (Pumping and Idle) IMO Vessel Class Engine Tier	It will be provided by vessel itself through Vessel Visit Report and incorprated into Chevron's own data management system
Third Party Marine Broker Forecast for Enginer Tier Adoption Rate for Global Tankers	***Sample forecast from third party marine broker:*** ***acutal data will be updated annually for IC.10 and IC.11.***

Year	Tier III	Tier II	Tier I	Tier 0 and below	Total
2023 YTD	13%	45%	35%	8%	100%
2023	15%	45%	33%	8%	100%
2024	17%	45%	32%	7%	100%
2025	19%	45%	30%	7%	100%
2026	22%	44%	29%	6%	100%
2027	25%	43%	27%	6%	100%
2028	28%	42%	26%	5%	100%
2029	31%	41%	24%	5%	100%
2030	34%	40%	22%	5%	100%

Note

* Chevron is conducting representative exhaust emission analysis from engines of varied tiers (II/III) and Aux boilers. Based on results, Chevron might propose to CARB to use alternate engine load, SFC, and emission factors for calculation of emissions from Aux engines and Aux boilers.

** Chevron is presently not proposing lower emission factors for PM2.5 and ROG as we are not claiming any emission reductions for these items. As stated in the Terminal Plan, Chevron is planning to conduct representative sampling on Tier II/III Aux engines and Aux boilers. Based on test results, Chevron will approach CARB to include those emission reductions in IC calculations. New emission factors will be proposed based on OEM recommendations and test results.

*** Chevron Pacific Lightering vessels Pegasus and Polaris Voyagers have tier II AE. Since those vessels use steam Turbine Generators (TG) during cargo operation while at berth, so no NOx emissions are assumed for those vessels.

Links to documents that are referenced in this spreadsheet

1 Port-of-Long-Beach-Air-Emissions-Inventory-2019-2020_10.pdf (safety4sea.com)
2 2019 Update to Inventory for Ocean-Going Vessels At Berth_Methodology and Results (ca.gov)
3 https //www.imo.org/en/ourwork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx
4 Technical File for Burner Upgrade

Table 2.8: Auxiliary Boiler Load Defaults by Mode, kW

Vessel Type	Transit	Maneuvering	Berth Hotelling	Anchorage Hotelling
Auto Carrier	85	187	323	314
Bulk	52	122	156	156
Bulk - Heavy Load	35	94	125	125
Bulk - Self Discharging	44	103	132	132
Container - 1000	148	296	760	376
Container - 2000	79	142	323	180
Container - 3000	188	180	888	361
Container - 4000	161	335	490	487
Container - 5000	223	446	484	477
Container - 6000	280	544	761	757
Container - 8000	241	442	558	554
Container - 9000	286	526	555	513
Container - 10000	278	418	598	598
Container - 11000	202	362	456	463
Container - 12000	351	586	677	677
Container - 13000	257	357	580	594
Container - 14000	379	552	696	696
Container - 15000	259	395	402	402
Container - 16000	238	440	525	525
Container - 19000	38	144	848	848
Container - 23000	40	151	890	890
General Cargo	56	127	169	168
Ocean Tugboat (ATB/ITB)	0	0	0	0
Miscellaneous	54	109	140	140
RoRo	104	206	282	282
Tanker - Chemical	94	137	421	261
Tanker - Handysize	144	287	3,089	323
Tanker - Panamax	262	382	3,547	538
Tanker - Aframax	196	259	4,976	390
Tanker - Suezmax	144	99	8,170	516
Tanker - VLCC	240	116	8,262	467
Tanker - ULCC	235	322	10,718	366

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Update to Inventory for Ocean-Going Vessels At Berth

Appendix A: Emission Factors
Emission Factors (all in g/kW*hr)

Engine type	Mode	Fuel type	Fuel S content (%)	Tier ID	CH4	N2O	NH3	ROG	CO	SOx	NOx	HC	PM 10	PM 2.5	CO2	TOG	Fuel Used
Auxiliary	At Berth	Distillate	0.1	0	0.008	0.033	0.001	0.520	1.10	0.424	13.800	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	1	0.008	0.033	0.001	0.520	1.10	0.424	12.200	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	2	0.008	0.033	0.001	0.520	1.10	0.424	10.500	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.1	3	0.008	0.033	0.001	0.520	1.10	0.424	2.600	0.40	0.182	0.168	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	0	0.008	0.033	0.001	0.520	1.10	1.273	13.800	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	1	0.008	0.033	0.001	0.520	1.10	1.273	12.200	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	2	0.008	0.033	0.001	0.520	1.10	1.273	10.500	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	0.3	3	0.008	0.033	0.001	0.520	1.10	1.273	2.600	0.40	0.250	0.230	676	0.620	217
Auxiliary	At Berth	Distillate	1	0	0.008	0.033	0.001	0.520	1.10	4.242	13.800	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	1	0.008	0.033	0.001	0.520	1.10	4.242	12.200	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	2	0.008	0.033	0.001	0.520	1.10	4.242	10.500	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Distillate	1	3	0.008	0.033	0.001	0.520	1.10	4.242	2.600	0.40	0.489	0.450	676	0.620	217
Auxiliary	At Berth	Residual	2.7	0	0.008	0.036	0.001	0.460	1.10	11.983	14.700	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	1	0.008	0.036	0.001	0.460	1.10	11.983	13.000	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	2	0.008	0.036	0.001	0.460	1.10	11.983	11.200	0.40	1.436	1.321	707	0.510	227
Auxiliary	At Berth	Residual	2.7	3	0.008	0.036	0.001	0.460	1.10	11.983	2.309	0.40	1.436	1.321	707	0.510	227
Boiler	At Berth	Distillate	0.1	99	0.002	0.045	0.006	0.110	0.20	0.587	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	0.3	99	0.002	0.045	0.006	0.110	0.20	1.636	1.995	0.10	0.164	0.151	934	0.130	300
Boiler	At Berth	Distillate	1	99	0.002	0.045	0.006	0.110	0.20	1.760	1.995	0.10	0.589	0.542	934	0.130	300
Boiler	At Berth	Residual	2.7	99	0.002	0.049	0.006	0.110	0.20	16.100	2.100	0.10	1.465	1.348	950	0.130	305

Sources:

California Air Resources Board H-53

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To whom it may concern

Subject: Flue gas emission data of MF PA burners

The flue gas compositions including calculations are simulated as below table in general based on the actual measurements from Alfa Laval Test Centre in Aalborg.

Burner type	Fuel oil	Burner Load	O_2 Content*3	CO Content, Less than		NOx Content, Less than			CARB*4 Regulation, Max. NOx
		(%)	(%)	(ppm)	(mg/Nm³)	(ppm)	(mg/Nm³)	(g/kWh)	(g/kWh)
MF PA	MDO*1	100	4.0	10	13	120	246	0.27	0.4
		75	4.0	2	3	107	219	0.24	0.4
		50	5.0	2	3	96	197	0.22	0.4
		33	6.0	23	28	60	122	0.14	0.4
	LNG*2	100	4.0	10	13	60	123	0.13	0.4
		75	4.0	5	7	60	124	0.13	0.4
		50	5.0	3	3	59	121	0.12	0.4
		33	6.0	5	6	56	114	0.12	0.4

(Remarks)

- CO_2 content is not included due to combustion efficiency index.
- The local factors may affect the actual data measured on-site.

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine: Ox (g/kwh)	CARB Aux Engine: PM2.5 (g/kwh)	CARB Aux Engine: ROG (g/kw)	CARB Em ss on Facto s Aux Bo ler: NOx (g/kwh)	CARB Aux Bo ler: PM2.5 (g/kwh)	CARB Aux Bo ler: ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: NOx (g/kwh)	Chevron Aux Engine: PM2.5 (g/kwh)	Chevron Aux Engine: ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: NOx (g/kwh)	Chevron Aux Boiler: PM2 5 (g/kwh)	Chevron Aux Boiler: ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: NOx (MT)	CARB Aux. Engine: PM2.5 (MT)	CARB Aux. Engine: ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: Ox (MT)	CARB Aux. Boiler: PM2.5 (MT)	CARB Aux. Boiler: ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: NOx (MT)	IC Aux. Eng ne: PM2.5 MT)	IC Aux. Eng ne: ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler: Ox (MT)	IC Aux. Boiler: PM2 5 (MT)	IC Aux. Boiler: ROG (MT)
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/20/2021 20 29	7/23/2021 10 19	61.83	39.75	22.08	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	13.23	65.14	0.68	0.01	0.03	0.48	0.04	0.03	0.51	0.01	0.03	0.48	0.04	0.03
1	Af aMax	109,999	Chev on	Non-US	2.00	No Upg ade	1	7/28/2021 3 29	7/31/2021 6 24	74.92	58.17	16.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.03	91.23	0.82	0.01	0.03	0.68	0.06	0.04	0.62	0.01	0.03	0.68	0.06	0.04
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/19/2021 13 54	4/20/2021 16 17	26.38	19.58	6.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.01	19.93	0.31	0.00	0.01	0.15	0.01	0.01	0.06	0.00	0.01	0.15	0.01	0.01
8	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	3	4/25/2021 14 50	4/28/2021 14 25	71.58	0.00	71.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	16.31	18.79	0.83	0.01	0.03	0.14	0.01	0.01	0.16	0.01	0.03	0.14	0.01	0.01
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/14/2021 10 06	5/18/2021 13 51	99.75	76.92	22.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	22.73	77.27	1.16	0.01	0.04	0.57	0.05	0.03	1.03	0.01	0.04	0.57	0.05	0.03
9	P oduct	46 792	Chev on	Non-US	1.00	No Upg ade	1	5/21/2021 6 06	5/22/2021 18 32	36.43	25.28	11.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	8.30	26.36	0.42	0.01	0.02	0.20	0.02	0.01	0.38	0.01	0.02	0.20	0.02	0.01
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/2/2021 14 09	1/3/2021 23 11	33.03	22.83	10.20	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	58.64	0.25	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	1/13/2021 9 17	1/14/2021 10 49	25.53	17.67	7.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	3.82	45.37	0.20	0.00	0.01	0.34	0.03	0.02	0.04	0.00	0.01	0.34	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	2/25/2021 1 33	2/26/2021 20 25	42.87	20.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	6.41	56.85	0.33	0.00	0.01	0.42	0.04	0.02	0.06	0.00	0.01	0.42	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	4/27/2021 22 58	4/29/2021 3 48	28.83	21.33	7.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.31	54.26	0.22	0.00	0.01	0.40	0.03	0.02	0.04	0.00	0.01	0.40	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	5/31/2021 6 35	6/1/2021 19 19	36.73	22.42	14.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.49	58.70	0.28	0.00	0.01	0.43	0.04	0.02	0.05	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/10/2021 18 40	6/12/2021 10 27	39.78	24.17	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.95	63.33	0.30	0.00	0.01	0.47	0.04	0.03	0.06	0.00	0.01	0.47	0.04	0.03
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	6/21/2021 22 06	6/23/2021 8 33	34.45	21.33	13.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.15	55.73	0.26	0.00	0.01	0.41	0.04	0.02	0.05	0.00	0.01	0.41	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/2/2021 23 45	7/5/2021 6 35	54.83	11.67	43.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.20	39.93	0.42	0.01	0.02	0.30	0.03	0.02	0.08	0.01	0.02	0.30	0.03	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	7/19/2021 19 12	7/21/2021 18 12	47.00	20.58	26.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	7.03	57.38	0.36	0.00	0.01	0.43	0.04	0.02	0.07	0.00	0.01	0.43	0.04	0.02
24	SuezMax	157,135	Chev on	Non-US	3.00	No Upg ade	4	9/15/2021 20 30	9/17/2021 6 18	33.80	15.58	18.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	5.05	42.98	0.26	0.00	0.01	0.32	0.03	0.02	0.05	0.00	0.01	0.32	0.03	0.02
26	Af aMax	115,594	Chev on	Non-US	2.00	No Upg ade	1	10/4/2021 23 37	10/7/2021 9 11	57.57	0.00	57.57	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	12.32	15.11	0.63	0.01	0.02	0.11	0.01	0.01	0.48	0.01	0.02	0.11	0.01	0.01
31	Chem cal	35 210	Chev on	Non-US	1.00	No Upg ade	2	9/18/2021 6 30	9/18/2021 20 15	13.75	0.00	13.75	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.16	3.61	0.21	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
39	Af aMax	105,614	Chev on	Non-US	1.00	No Upg ade	1	10/13/2021 18 00	10/16/2021 9 21	63.35	46.92	16.43	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.55	74.35	0.69	0.01	0.03	0.55	0.05	0.03	0.61	0.01	0.03	0.55	0.05	0.03
42	P oduct	49 951	Chev on	Non-US	2.00	No Upg ade	2	2/4/2021 12 39	2/5/2021 6 31	17.87	7.25	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.07	9.51	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	2	3/2/2021 14 18	3/5/2021 6 24	64.10	0.00	64.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.61	16.83	0.75	0.01	0.03	0.12	0.01	0.01	0.66	0.01	0.03	0.12	0.01	0.01
43	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	9/27/2021 14 45	9/29/2021 19 49	53.07	0.00	53.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.09	13.93	0.62	0.01	0.02	0.10	0.01	0.01	0.55	0.01	0.02	0.10	0.01	0.01
49	P oduct	49 999	Chev on	Non-US	1.00	No Upg ade	3	2/3/2021 7 20	2/6/2021 7 11	71.85	0.00	71.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.37	18.86	0.84	0.01	0.03	0.14	0.01	0.01	0.74	0.01	0.03	0.14	0.01	0.01
51	Af aMax	115,392	Chev on	Non-US	1.00	No Upg ade	1	4/29/2021 0 10	5/2/2021 14 27	86.28	49.67	36.62	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	18.46	83.75	0.94	0.01	0.04	0.62	0.05	0.03	0.83	0.01	0.04	0.62	0.05	0.03
52	PanaMax	79 700	Chev on	Non-US	2.00	No Upg ade	1	12/4/2021 20 49	12/7/2021 6 13	57.40	0.00	57.40	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.36	15.07	0.53	0.01	0.02	0.11	0.01	0.01	0.40	0.01	0.02	0.11	0.01	0.01
53	Af aMax	105,335	Chev on	Non-US	1.00	No Upg ade	1	7/1/2021 18 17	7/4/2021 6 22	60.08	44.92	15.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.86	71.03	0.66	0.01	0.02	0.53	0.04	0.03	0.58	0.01	0.02	0.53	0.04	0.03
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	1/1/2021 8 59	1/2/2021 16 19	31.33	0.00	31.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.14	8.22	0.36	0.00	0.01	0.06	0.01	0.00	0.28	0.00	0.01	0.06	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	2/8/2021 5 50	2/9/2021 18 00	36.17	0.00	36.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.24	9.49	0.42	0.01	0.02	0.07	0.01	0.00	0.32	0.01	0.02	0.07	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	3/17/2021 2 48	3/19/2021 18 12	63.40	0.00	63.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.45	16.64	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	8/29/2021 2 48	9/1/2021 1 34	70.77	0.00	70.77	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	16.12	18.58	0.82	0.01	0.03	0.14	0.01	0.01	0.63	0.01	0.03	0.14	0.01	0.01
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	10/10/2021 3 22	10/11/2021 20 10	40.80	0.00	40.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.30	10.71	0.48	0.01	0.02	0.08	0.01	0.00	0.36	0.01	0.02	0.08	0.01	0.00
57	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	2	11/4/2021 17 57	11/6/2021 16 14	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.55	12.15	0.54	0.01	0.02	0.09	0.01	0.00	0.41	0.01	0.02	0.09	0.01	0.00
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	5/7/2021 0 43	5/8/2021 11 18	34.58	22.33	12.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	5.17	57.95	0.26	0.00	0.01	0.43	0.04	0.02	0.20	0.00	0.01	0.43	0.04	0.02
58	SuezMax	158,582	Chev on	Non-US	2.00	No Upg ade	4	8/23/2021 23 48	8/26/2021 11 26	59.63	19.50	40.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	58.33	0.46	0.01	0.02	0.43	0.04	0.02	0.35	0.01	0.02	0.43	0.04	0.02
64	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/22/2021 17 46	12/24/2021 19 53	50.12	0.00	50.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.42	13.16	0.58	0.01	0.02	0.10	0.01	0.01	0.44	0.01	0.02	0.10	0.01	0.01
75	PanaMax	74 246	Chev on	Non-US	2.00	No Upg ade	1	6/19/2021 17 46	6/24/2021 13 42	115.93	0.00	115.93	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.93	30.43	1.07	0.01	0.04	0.23	0.02	0.01	0.81	0.01	0.04	0.23	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	1	7/11/2021 0 10	7/12/2021 12 11	36.02	21.75	14.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	6.50	26.89	0.33	0.00	0.01	0.20	0.02	0.01	0.25	0.00	0.01	0.20	0.02	0.01
78	PanaMax	74 177	Chev on	Non-US	2.00	No Upg ade	4	10/10/2021 7 06	10/12/2021 8 32	49.43	16.83	32.60	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	8.92	26.47	0.46	0.01	0.02	0.20	0.02	0.01	0.35	0.01	0.02	0.20	0.02	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	3/21/2021 20 46	3/22/2021 17 19	20.55	8.92	11.63	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.40	16.36	0.22	0.00	0.01	0.12	0.01	0.01	0.17	0.00	0.01	0.12	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	4/6/2021 20 40	4/8/2021 18 49	46.15	36.92	9.23	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	9.87	57.53	0.50	0.01	0.02	0.43	0.04	0.02	0.38	0.01	0.02	0.43	0.04	0.02
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	5/13/2021 0 25	5/13/2021 21 15	20.83	10.42	10.42	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.46	18.28	0.23	0.00	0.01	0.14	0.01	0.01	0.17	0.00	0.01	0.14	0.01	0.01
79	Af aMax	114,762	Chev on	US	2.00	No Upg ade	4	6/12/2021 22 40	6/13/2021 15 55	17.25	9.50	7.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.69	16.22	0.19	0.00	0.01	0.12	0.01	0.01	0.14	0.00	0.01	0.12	0.01	0.01
82	SuezMax	158,826	Chev on	Non-US	1.00	No Upg ade	4	4/26/2021 10 23	4/27/2021 20 39	34.27	21.08	13.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.12	55.14	0.26	0.00	0.01	0.41	0.03	0.02	0.23	0.00	0.01	0.41	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	1	2/22/2021 20 45	2/25/2021 6 20	57.58	35.92	21.67	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.40	43.91	0.53	0.01	0.02	0.33	0.03	0.02	0.47	0.01	0.02	0.33	0.03	0.02
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	3	5/21/2021 22 29	5/22/2021 23 10	24.68	17.42	7.27	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	4.46	20.44	0.23	0.00	0.01	0.15	0.01	0.01	0.20	0.00	0.01	0.15	0.01	0.01
83	PanaMax	73 711	Chev on	Non-US	1.00	No Upg ade	4	8/1/2021 6 37	8/2/2021 15 53	33.27	23.75	9.52	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	6.01	27.77	0.31	0.00	0.01	0.21	0.02	0.01	0.27	0.00	0.01	0.21	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/5/2021 20 22	8/7/2021 14 13	41.85	33.33	8.52	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	8.95	52.00	0.46	0.01	0.02	0.39	0.03	0.02	0.09	0.01	0.02	0.39	0.03	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	8/17/2021 8 33	8/22/2021 14 48	126.25	19.92	106.33	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	27.01	57.64	1.38	0.02	0.05	0.43	0.04	0.02	0.26	0.02	0.05	0.43	0.04	0.02
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	9/1/2021 6 17	9/5/2021 22 09	111.87	0.00	111.87	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	23.94	29.37	1.22	0.02	0.05	0.22	0.02	0.01	0.23	0.02	0.05	0.22	0.02	0.01
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	11/27/2021 15 13	12/1/2021 4 25	85.20	67.50	17.70	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	18.23	105.41	0.93	0.01	0.04	0.78	0.07	0.04	0.18	0.01	0.04	0.78	0.07	0.04
88	Af aMax	115,166	Chev on	Non-US	3.00	No Upg ade	1	12/26/2021 5 31	12/28/2021 19 41	62.17	0.00	62.17	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	13.30	16.32	0.68	0.01	0.03	0.12	0.01	0.01	0.13	0.01	0.03	0.12	0.01	0.01
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/16/2021 18 51	9/19/2021 20 56	74.08	53.33	20.75	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.85	85.06	0.81	0.01	0.03	0.63	0.05	0.03	0.72	0.01	0.03	0.63	0.05	0.03
90	Af aMax	115,635	Chev on	Non-US	1.00	No Upg ade	1	9/23/2021 16 20	9/26/2021 16 26	73.77	38.67	35.10	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	15.78	66.94	0.81	0.01	0.03	0.50	0.04	0.03	0.71	0.01	0.03	0.50	0.04	0.03
94	Chem cal	25 399	Chev on	Non-US	1.00	No Upg ade	2	11/9/2021 12 19	11/10/2021 18 32	30.22	0.00	30.22	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.15	7.93	0.47	0.01	0.02	0.06	0.00	0.00	0.41	0.01	0.02	0.06	0.00	0.00
95	P oduct	46 046	Chev on	Non-US	1.00	No Upg ade	2	7/13/2021 15 39	7/15/2021 23 09	55.50	0.00	55.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	12.65	14.57	0.65	0.01	0.02	0.11	0.01	0.01	0.57	0.01	0.02	0.11	0.01	0.01
96	P oduct	46 105	Chev on	Non-US	1.00	No Upg ade	2	8/11/2021 0 08	8/13/2021 16 05	63.95	0.00	63.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	14.57	16.79	0.74	0.01	0.03	0.12	0.01	0.01	0.65	0.01	0.03	0.12	0.01	0.01
99	P oduct	49 996	Chev on	Non-US	2.00	No Upg ade	1	1/13/2021 11 00	1/17/2021 1 55	86.92	0.00	86.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	19.80	22.82	1.01	0.01	0.04	0.17	0.01	0.01	0.77	0.01	0.04	0.17	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	1/31/2021 9 12	2/1/2021 14 44	29.53	19.58	9.95	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.73	20.76	0.34	0.00	0.01	0.15	0.01	0.01	0.34	0.00	0.01	0.15	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	1	2/1/2021 15 11	2/3/2021 12 15	45.07	0.00	45.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.27	11.83	0.52	0.01	0.02	0.09	0.01	0.00	0.52	0.01	0.02	0.09	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	4/30/2021 8 25	5/2/2021 0 27	40.03	0.00	40.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.12	10.51	0.47	0.01	0.02	0.08	0.01	0.00	0.47	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/15/2021 11 21	5/18/2021 21 57	82.60	32.08	50.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	18.82	42.99	0.96	0.01	0.04	0.32	0.03	0.02	0.96	0.01	0.04	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/18/2021 22 16	5/20/2021 13 35	39.32	0.00	39.32	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.96	10.32	0.46	0.01	0.02	0.08	0.01	0.00	0.46	0.01	0.02	0.08	0.01	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	5/30/2021 10 20	6/2/2021 7 14	68.90	37.00	31.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.70	42.66	0.80	0.01	0.03	0.32	0.03	0.02	0.80	0.01	0.03	0.32	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/8/2021 10 12	6/11/2021 14 22	76.17	49.08	27.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.35	52.59	0.89	0.01	0.03	0.39	0.03	0.02	0.89	0.01	0.03	0.39	0.03	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	6/17/2021 21 43	6/19/2021 15 42	41.98	32.42	9.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.57	32.55	0.49	0.01	0.02	0.24	0.02	0.01	0.49	0.01	0.02	0.24	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	6/19/2021 16 03	6/22/2021 9 36	65.55	19.92	45.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.94	30.44	0.76	0.01	0.03	0.23	0.02	0.01	0.76	0.01	0.03	0.23	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	7/2/2021 10 54	7/5/2021 14 33	75.65	55.75	19.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.24	56.89	0.88	0.01	0.03	0.42	0.04	0.02	0.88	0.01	0.03	0.42	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/6/2021 13 17	7/7/2021 10 00	20.72	0.00	20.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	4.72	5.44	0.24	0.00	0.01	0.04	0.00	0.00	0.24	0.00	0.01	0.04	0.00	0.00
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/14/2021 13 05	7/17/2021 18 40	77.58	60.92	16.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.68	60.83	0.90	0.01	0.03	0.45	0.04	0.02	0.90	0.01	0.03	0.45	0.04	0.02
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	7/25/2021 23 20	7/28/2021 8 08	56.80	32.42	24.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.94	36.44	0.66	0.01	0.02	0.27	0.02	0.01	0.66	0.01	0.02	0.27	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	8/3/2021 19 10	8/5/2021 12 23	41.22	34.50	6.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.39	33.73	0.48	0.01	0.02	0.25	0.02	0.01	0.48	0.01	0.02	0.25	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	3	9/19/2021 10 24	9/20/2021 19 01	32.62	24.50	8.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.43	24.83	0.38	0.00	0.01	0.18	0.02	0.01	0.38	0.00	0.01	0.18	0.02	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	9/22/2021 21 14	9/25/2021 4 12	54.97	0.00	54.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.52	14.43	0.64	0.01	0.02	0.11	0.01	0.01	0.64	0.01	0.02	0.11	0.01	0.01
103	P oduct	46 094	Chev on	US	0.00	No Upg ade	2	11/17/2021 19 10	11/19/2021 11 25	40.25	14.08	26.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.17	19.92	0.47	0.01	0.02	0.15	0.01	0.01	0.47	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	1/4/2021 11 22	1/5/2021 15 30	28.13	17.33	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.41	18.90	0.33	0.00	0.01	0.14	0.01	0.01	0.33	0.00	0.01	0.14	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/5/2021 15 55	1/7/2021 20 38	52.72	0.00	52.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.01	13.84	0.61	0.01	0.02	0.10	0.01	0.01	0.61	0.01	0.02	0.10	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/17/2021 7 51	1/18/2021 10 26	26.58	15.25	11.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.06	17.11	0.31	0.00	0.01	0.13	0.01	0.01	0.31	0.00	0.01	0.13	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	1/28/2021 7 32	1/31/2021 2 00	66.47	35.83	30.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	41.25	0.77	0.01	0.03	0.31	0.03	0.02	0.77	0.01	0.03	0.31	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/5/2021 10 53	2/7/2021 8 12	45.32	21.08	24.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.33	25.90	0.53	0.01	0.02	0.19	0.02	0.01	0.53	0.01	0.02	0.19	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	2/13/2021 1 03	2/15/2021 19 10	66.12	24.00	42.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.06	33.30	0.77	0.01	0.03	0.25	0.02	0.01	0.77	0.01	0.03	0.25	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	2/22/2021 10 49	2/27/2021 4 00	113.18	32.75	80.43	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.79	51.46	1.32	0.02	0.05	0.38	0.03	0.02	1.32	0.02	0.05	0.38	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/7/2021 22 45	3/11/2021 18 10	91.42	40.08	51.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	20.83	50.62	1.06	0.01	0.04	0.37	0.03	0.02	1.06	0.01	0.04	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	3/23/2021 12 15	3/25/2021 10 19	46.07	29.67	16.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.50	31.80	0.54	0.01	0.02	0.24	0.02	0.01	0.54	0.01	0.02	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	3/25/2021 10 52	3/27/2021 6 30	43.63	0.00	43.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.94	11.45	0.51	0.01	0.02	0.08	0.01	0.00	0.51	0.01	0.02	0.08	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/4/2021 8 28	4/7/2021 2 55	66.45	30.58	35.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	15.14	37.76	0.77	0.01	0.03	0.28	0.02	0.02	0.77	0.01	0.03	0.28	0.02	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/12/2021 15 40	4/15/2021 18 23	74.72	34.92	39.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	17.02	42.80	0.87	0.01	0.03	0.32	0.03	0.02	0.87	0.01	0.03	0.32	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	4/21/2021 15 31	4/23/2021 11 41	44.17	0.00	44.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	10.06	11.59	0.51	0.01	0.02	0.09	0.01	0.00	0.51	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	4/23/2021 12 21	4/25/2021 18 31	54.17	23.25	30.92	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.34	29.66	0.63	0.01	0.02	0.22	0.02	0.01	0.63	0.01	0.02	0.22	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	5/2/2021 7 08	5/4/2021 11 02	51.90	39.50	12.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.83	39.86	0.60	0.01	0.02	0.30	0.03	0.02	0.60	0.01	0.02	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	5/10/2021 19 36	5/13/2021 19 00	71.40	40.17	31.23	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.27	45.42	0.83	0.01	0.03	0.34	0.03	0.02	0.83	0.01	0.03	0.34	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	8/6/2021 15 59	8/11/2021 4 46	108.78	42.50	66.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	24.79	56.78	1.27	0.02	0.05	0.42	0.04	0.02	1.27	0.02	0.05	0.42	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	8/23/2021 2 12	8/27/2021 2 20	96.13	43.00	53.13	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.90	53.80	1.12	0.01	0.04	0.40	0.03	0.02	1.12	0.01	0.04	0.40	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/1/2021 8 47	9/3/2021 12 39	51.87	11.00	40.87	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	11.82	20.92	0.60	0.01	0.02	0.15	0.01	0.01	0.60	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	9/9/2021 9 31	9/11/2021 4 20	42.82	0.92	41.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.76	11.85	0.50	0.01	0.02	0.09	0.01	0.00	0.50	0.01	0.02	0.09	0.01	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	9/19/2021 22 12	9/21/2021 8 43	34.52	11.58	22.93	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	7.86	16.75	0.40	0.00	0.02	0.12	0.01	0.01	0.40	0.00	0.02	0.12	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	10/1/2021 2 06	10/2/2021 4 15	26.15	0.00	26.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.96	6.86	0.30	0.00	0.01	0.05	0.00	0.00	0.30	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/2/2021 4 33	10/4/2021 10 45	54.20	8.08	46.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	12.35	19.60	0.63	0.01	0.02	0.15	0.01	0.01	0.63	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	10/16/2021 18 57	10/20/2021 16 55	93.97	54.42	39.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	21.41	60.81	1.09	0.01	0.04	0.45	0.04	0.02	1.09	0.01	0.04	0.45	0.04	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/1/2021 8 32	11/4/2021 1 20	64.80	49.25	15.55	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	14.76	49.72	0.75	0.01	0.03	0.37	0.03	0.02	0.75	0.01	0.03	0.37	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/4/2021 1 42	11/5/2021 2 20	24.63	0.00	24.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	5.61	6.47	0.29	0.00	0.01	0.05	0.00	0.00	0.29	0.00	0.01	0.05	0.00	0.00
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	11/13/2021 6 31	11/14/2021 13 06	30.58	24.75	5.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	6.97	24.47	0.36	0.00	0.01	0.18	0.02	0.01	0.36	0.00	0.01	0.18	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	11/14/2021 13 29	11/16/2021 2 21	36.87	15.50	21.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	8.40	19.97	0.43	0.01	0.02	0.15	0.01	0.01	0.43	0.01	0.02	0.15	0.01	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	11/21/2021 18 48	11/24/2021 8 12	61.40	23.75	37.65	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	13.99	31.89	0.72	0.01	0.03	0.24	0.02	0.01	0.72	0.01	0.03	0.24	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/1/2021 7 25	12/5/2021 23 15	111.83	35.25	76.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	25.48	52.77	1.30	0.02	0.05	0.39	0.03	0.02	1.30	0.02	0.05	0.39	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	3	12/14/2021 18 07	12/17/2021 20 14	74.12	31.50	42.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	16.89	40.38	0.86	0.01	0.03	0.30	0.03	0.02	0.86	0.01	0.03	0.30	0.03	0.02
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	1	12/23/2021 22 45	12/25/2021 14 15	39.50	27.92	11.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.00	28.91	0.46	0.01	0.02	0.21	0.02	0.01	0.46	0.01	0.02	0.21	0.02	0.01
104	P oduct	46 069	Chev on	US	0.00	No Upg ade	2	12/25/2021 14 39	12/27/2021 8 44	42.08	0.00	42.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3.70	9.59	11.05	0.49	0.01	0.02	0.08	0.01	0.00	0.49	0.01	0.02	0.08	0.01	0.00
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/17/2021 20 11	9/20/2021 1 20	53.15	19.08	34.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3.70	7.95	55.72	0.41	0.01	0.02	0.41	0.04	0.02	0.00	0.01	0.02	0.41	0.04	0.02
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/13/2021 16 33	7/14/2021 10 29	17.93	7.83	10.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.09	9.91	0.21	0.00	0.01	0.07	0.01	0.00	0.16	0.00	0.01	0.07	0.01	0.00
111	P oduct	49 995	Chev on	Non-US	2.00	No Upg ade	3	7/19/2021 16 19	7/25/2021 20 08	147.82	16.75	131.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	33.68	49.93	1.72	0.02	0.06	0.37	0.03	0.02	1.31	0.02	0.06	0.37	0.03	0.02
112	P oduct	49 737	Chev on	Non-US	2.00	No Upg ade	2	8/29/2021 6 58	8/29/2021 23 14	16.27	0.00	16.27	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.71	4.27	0.19	0.00	0.01	0.03	0.00	0.00	0.14	0.00	0.01	0.03	0.00	0.00
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/7/2021 8 03	7/10/2021 12 10	76.12	0.00	76.12	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	16.29	19.98	0.83	0.01	0.03	0.15	0.01	0.01	0.74	0.01	0.03	0.15	0.01	0.01
128	Af aMax	115,617	Chev on	Non-US	1.00	No Upg ade	1	7/12/2021 13 42	7/15/2021 3 11	61.48	0.00	61.48	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	16.14	0.67	0.01	0.03	0.12	0.01	0.01	0.59	0.01	0.03	0.12	0.01	0.01
133	P oduct	49 999	Chev on	Non-US	3.00	No Upg ade	2	7/10/2021 19 54	7/12/2021 20 28	48.57	0.00	48.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	11.07	12.75	0.57	0.01	0.02	0.09	0.01	0.01	0.11	0.01	0.02	0.09	0.01	0.01
134	P oduct	50 267	Chev on	Non-US	2.00	No Upg ade	2	4/17/2021 22 24	4/20/2021 12 02	61.63	0.00	61.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.04	16.18	0.72	0.01	0.03	0.12	0.01	0.01	0.55	0.01	0.03	0.12	0.01	0.01
136	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/18/2021 17 50	2/21/2021 7 20	61.50	0.00	61.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.01	16.14	0.72	0.01	0.03	0.12	0.01	0.01	0.54	0.01	0.03	0.12	0.01	0.01
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/7/2021 1 27	8/9/2021 11 13	57.77	42.42	15.35	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	13.16	43.34	0.67	0.01	0.03	0.32	0.03	0.02	0.59	0.01	0.03	0.32	0.03	0.02
138	P oduct	50 110	Chev on	Non-US	1.00	No Upg ade	2	8/14/2021 15 45	8/16/2021 2 25	34.67	26.83	7.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.90	26.92	0.40	0.00	0.02	0.20	0.02	0.01	0.36	0.00	0.02	0.20	0.02	0.01
142	Chem cal	35 058	Chev on	Non-US	2.00	No Upg ade	2	1/18/2021 13 05	1/18/2021 23 55	10.83	0.00	10.83	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	3.28	2.84	0.17	0.00	0.01	0.02	0.00	0.00	0.13	0.00	0.01	0.02	0.00	0.00
145	Chem cal	37 256	Chev on	Non-US	2.00	No Upg ade	2	2/24/2021 9 08	2/25/2021 8 49	23.68	0.00	23.68	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	7.17	6.22	0.37	0.00	0.01	0.05	0.00	0.00	0.28	0.00	0.01	0.05	0.00	0.00
160	SuezMax	156,654	Chev on	Non-US	1.00	No Upg ade	4	8/4/2021 9 16	8/6/2021 13 48	52.53	21.67	30.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.85	61.21	0.40	0.00	0.02	0.45	0.04	0.02	0.35	0.00	0.02	0.45	0.04	0.02
165	P oduct	46 554	Chev on	Non-US	1.00	No Upg ade	2	3/25/2021 12 50	3/27/2021 7 21	42.52	0.00	42.52	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	9.69	11.16	0.50	0.01	0.02	0.08	0.01	0.00	0.44	0.01	0.02	0.08	0.01	0.00
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	3/28/2021 2 55	3/31/2021 9 18	78.38	0.00	78.38	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.86	20.58	0.91	0.01	0.03	0.15	0.01	0.01	0.69	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	5/3/2021 22 06	5/7/2021 17 50	91.73	0.00	91.73	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	20.90	24.08	1.07	0.01	0.04	0.18	0.02	0.01	0.81	0.01	0.04	0.18	0.02	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	6/17/2021 14 07	6/19/2021 14 58	48.85	0.00	48.85	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	11.13	12.82	0.57	0.01	0.02	0.09	0.01	0.01	0.43	0.01	0.02	0.09	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	8/11/2021 6 25	8/14/2021 10 50	76.42	0.00	76.42	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	17.41	20.06	0.89	0.01	0.03	0.15	0.01	0.01	0.68	0.01	0.03	0.15	0.01	0.01
172	P oduct	49 800	Chev on	Non-US	2.00	No Upg ade	3	10/7/2021 3 05	10/9/2021 18 43	63.63	0.00	63.63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	14.50	16.70	0.74	0.01	0.03	0.12	0.01	0.01	0.56	0.01	0.03	0.12	0.01	0.01
174	Chem cal	25 300	Chev on	Non-US	2.00	No Upg ade	2	7/12/2021 21 45	7/13/2021 13 23	15.63	0.00	15.63	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.73	4.10	0.24	0.00	0.01	0.03	0.00	0.00	0.18	0.00	0.01	0.03	0.00	0.00
175	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	12/17/2021 0 36	12/17/2021 22 16	21.67	11.50	10.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3.70	4.94	13.33	0.25	0.00	0.01	0.10	0.01	0.01	0.05	0.00	0.01	0.10	0.01	0.01
183	P oduct	50 000	Chev on	Non-US	2.00	No Upg ade	3	8/21/2021 10 42	8/21/2021 21 32	10.83	0.00	10.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	2.47	2.84	0.13	0.00	0.00	0.02	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	6/30/2021 10 44	7/1/2021 3 05	16.35	0.00	16.35	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.95	4.29	0.25	0.00	0.01	0.03	0.00	0.00	0.19	0.00	0.01	0.03	0.00	0.00
187	Chem cal	26 198	Chev on	Non-US	2.00	No Upg ade	2	10/7/2021 21 10	10/9/2021 7 16	34.10	0.00	34.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	10.32	8.95	0.53	0.01	0.02	0.07	0.01	0.00	0.40	0.01	0.02	0.07	0.01	0.00
190	PanaMax	68 439	Chev on	Non-US	1.00	No Upg ade	1	6/3/2021 18 19	6/6/2021 6 40	60.35	42.33	18.02	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	10.90	49.78	0.56	0.01	0.02	0.37	0.03	0.02	0.49	0.01	0.02	0.37	0.03	0.02
194	Chem cal	37 361	Chev on	Non-US	2.00	No Upg ade	2	4/15/2021 20 06	4/16/2021 10 12	14.10	0.00	14.10	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.27	3.70	0.22	0.00	0.01	0.03	0.00	0.00	0.17	0.00	0.01	0.03	0.00	0.00
198	Chem cal	33 641	Chev on	Non-US	1.00	No Upg ade	2	3/22/2021 5 39	3/22/2021 22 14	16.58	0.00	16.58	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	5.02	4.35	0.26	0.00	0.01	0.03	0.00	0.00	0.23	0.00	0.01	0.03	0.00	0.00
207	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	10/29/2021 9 09	10/30/2021 6 19	21.17	12.58	8.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3.70	4.82	13.91	0.25	0.00	0.01	0.10	0.01	0.01	0.19	0.00	0.01	0.10	0.01	0.01
214	P oduct	51 393	Chev on	Non-US	1.00	No Upg ade	1	1/14/2021 13 23	1/15/2021 22 25	33.03	0.00	33.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3.70	7.53	8.67	0.38	0.00	0.01	0.06	0.01	0.00	0.34	0.00	0.01	0.06	0.01	0.00

Appendix A13.3

Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	CARB Em ss on Facto s Aux Bo ler: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler: NOx (g/kwh)	PM2.5 (g/kwh)	ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne: NOx (MT)	PM2.5 (MT)	ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler: NOx (MT)	PM2 5 (MT)	ROG (MT)
219	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	5/31/2021 21 22	6/4/2021 2 21	76.98	0.00	76.98	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	17.54	20 21	0 90	0 01	0 03	0.15	0.01	0.01	0.68	0.01	0.03	0 15	0.01	0.01
220	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	4/12/2021 5 42	4/15/2021 13 22	79.67	0.00	79.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	18.15	20 91	0 93	0 01	0 03	0.15	0.01	0.01	0.17	0.01	0.03	0 15	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	4	10/1/2021 16 57	10/3/2021 20 52	51.92	32.33	19.58	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	11.11	53 41	0 57	0 01	0 02	0.40	0.03	0.02	0.43	0.01	0.02	0 40	0.03	0.02
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/3/2021 21 23	10/4/2021 22 08	24.75	7.08	17.67	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	5.30	15 21	0 27	0 00	0 01	0.11	0.01	0.01	0.21	0.00	0.01	0 11	0.01	0.01
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	10/7/2021 11 07	10/13/2021 9 35	142.47	68.00	74.47	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	30.48	121.06	1 56	0 02	0 06	0.90	0.08	0.05	1.19	0.02	0.06	0 90	0.08	0.05
225	Af aMax	114,780	Chev on	Non-US	2.00	No Upg ade	1	11/5/2021 9 10	11/9/2021 4 57	91.78	0.00	91.78	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	19.64	24 09	1 00	0 01	0 04	0.18	0.02	0.01	0.76	0.01	0.04	0 18	0.02	0.01
228	SuezMax	149,995	Chev on	Non-US	3.00	No Upg ade	4	4/13/2021 13 43	4/15/2021 2 08	36.42	22.67	13.75	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	5.44	59 17	0 28	0 00	0 01	0.44	0.04	0.02	0.05	0.00	0.01	0.44	0.04	0.02
229	P oduct	51 745	Chev on	Non-US	1.00	No Upg ade	2	12/14/2021 0 28	12/16/2021 22 50	70.37	0.00	70.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	16.03	18 47	0 82	0 01	0 03	0.14	0.01	0.01	0.72	0.01	0.03	0.14	0.01	0.01
234	PanaMax	74 875	Chev on	Non-US	1.00	No Upg ade	1	4/2/2021 14 50	4/6/2021 6 28	87.63	0.00	87.63	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	15.82	23 00	0 81	0 01	0 03	0.17	0.01	0.01	0.71	0.01	0.03	0 17	0.01	0.01
236	P oduct	50 542	Chev on	Non-US	1.00	No Upg ade	1	5/2/2021 18 02	5/5/2021 19 34	73.53	0.00	73.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	16.75	19 30	0 86	0 01	0 03	0.14	0.01	0.01	0.76	0.01	0.03	0 14	0.01	0.01
237	P oduct	50 469	Chev on	Non-US	1.00	No Upg ade	2	5/23/2021 1 13	5/25/2021 13 13	60.00	0.00	60.00	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	13.67	15 75	0 70	0 01	0 03	0.12	0.01	0.01	0.62	0.01	0.03	0 12	0.01	0.01
238	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/19/2021 17 51	12/22/2021 16 25	70.57	0.00	70.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	16.08	18 52	0 82	0 01	0 03	0.14	0.01	0.01	0.63	0.01	0.03	0 14	0.01	0.01
241	P oduct	49 804	Chev on	Non-US	3.00	No Upg ade	3	2/21/2021 13 44	2/22/2021 8 12	18.47	10.50	7 97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	4.21	11 82	0 22	0 00	0 01	0.09	0.01	0.01	0.04	0.00	0.01	0 09	0.01	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	3	1/21/2021 10 57	1/22/2021 3 40	16.72	0.00	16.72	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	3.81	4.39	0 19	0 00	0 01	0.03	0.00	0.00	0.15	0.00	0.01	0 03	0.00	0.00
245	P oduct	51 034	Chev on	Non-US	2.00	No Upg ade	2	1/24/2021 12 26	1/28/2021 1 27	85.02	0.00	85.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	19.37	22 32	0 99	0 01	0 04	0.17	0.01	0.01	0.75	0.01	0.04	0 17	0.01	0.01
248	Af aMax	115,909	Chev on	Non-US	1.00	No Upg ade	1	6/6/2021 8 35	6/13/2021 0 21	159.77	0.00	159.77	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	34.18	41 94	1 75	0 02	0 07	0.31	0.03	0.02	1.54	0.02	0.07	0 31	0.03	0.02
251	PanaMax	73 879	Chev on	Non-US	2.00	No Upg ade	4	6/13/2021 19 05	6/15/2021 0 15	29.17	20.33	8 83	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	5.27	23 96	0 27	0 00	0 01	0.18	0.02	0.01	0.20	0.00	0.01	0 18	0.02	0.01
253	P oduct	52 825	Chev on	Non-US	3.00	No Upg ade	3	4/15/2021 14 43	4/17/2021 6 17	39.57	0.00	39.57	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	9.02	10 39	0 46	0 01	0 02	0.08	0.01	0.00	0.09	0.01	0.02	0 08	0.01	0.00
255	P oduct	49 994	Chev on	Non-US	2.00	No Upg ade	3	7/7/2021 11 42	7/11/2021 13 48	98.10	0.00	98.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	22.35	25 75	1 14	0 01	0 04	0.19	0.02	0.01	0.87	0.01	0.04	0 19	0.02	0.01
258	Chem cal	26 029	Chev on	Non-US	2.00	No Upg ade	2	12/25/2021 1 55	12/25/2021 12 00	10.08	0.00	10.08	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	3.05	2.65	0 16	0 00	0 01	0.02	0.00	0.00	0.12	0.00	0.01	0 02	0.00	0.00
263	PanaMax	73 400	Chev on	Non-US	1.00	No Upg ade	1	6/13/2021 21 50	6/16/2021 16 25	66.58	54.50	12.08	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	12.02	61 17	0 61	0 01	0 02	0.45	0.04	0.02	0.54	0.01	0.02	0 45	0.04	0.02
264	P oduct	49 972	Chev on	Non-US	2.00	No Upg ade	2	6/4/2021 15 40	6/6/2021 10 45	43.08	0.00	43.08	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	10.50	0.17	0.52	2.00	0.17	0.11	3 70	9.82	11 31	0 50	0 01	0 02	0.08	0.01	0.00	0.38	0.01	0.02	0 08	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	1/27/2021 7 55	1/31/2021 0 12	88.28	25.25	63.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	20.12	39 95	1 03	0 01	0 04	0.30	0.03	0.02	0.19	0.01	0.04	0 30	0.03	0.02
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	2	2/2/2021 11 59	2/3/2021 19 06	31.12	0.00	31.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	7.09	8.17	0 36	0 00	0 01	0.06	0.01	0.00	0.07	0.00	0.01	0 06	0.01	0.00
269	P oduct	50 332	Chev on	Non-US	3.00	No Upg ade	3	2/26/2021 17 40	3/1/2021 13 58	68.30	0.00	68.30	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	2.60	0.17	0.52	2.00	0.17	0.11	3 70	15.56	17 93	0 80	0 01	0 03	0.13	0.01	0.01	0.15	0.01	0.03	0 13	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/11/2021 17 10	3/12/2021 11 06	17.93	9.75	8 18	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	4.09	11 18	0 21	0 00	0 01	0.08	0.01	0 00	0.18	0.00	0 01	0 08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	3/22/2021 19 50	3/23/2021 13 15	17.42	9.17	8 25	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.97	10 66	0 20	0 00	0 01	0.08	0.01	0 00	0.18	0.00	0 01	0 08	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	4/3/2021 11 58	4/4/2021 7 30	19.53	10.73	8 80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	4.45	12 26	0 23	0 00	0 01	0.09	0.01	0 00	0.20	0.00	0 01	0 09	0.01	0.00
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	6/16/2021 17 37	6/17/2021 15 40	22.05	11.25	10.80	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	5.02	13 26	0 26	0 00	0 01	0.10	0.01	0 01	0.23	0.00	0 01	0 10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	7/10/2021 22 15	7/12/2021 11 08	36.88	18.83	18.05	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	8.40	22 19	0 43	0 01	0 02	0.16	0.01	0 01	0.38	0.01	0 02	0 16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	8/15/2021 4 10	8/16/2021 15 06	34.93	18.92	16.02	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	7.96	21 73	0 41	0 01	0 02	0.16	0.01	0 01	0.36	0.01	0 02	0 16	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	3	8/24/2021 2 37	8/25/2021 6 14	27.62	17.00	10.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	6.29	18 54	0 32	0 00	0 01	0.14	0.01	0 01	0.28	0.00	0 01	0 14	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/13/2021 2 29	9/14/2021 3 33	25.07	11.92	13.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	5.71	14 50	0 29	0 00	0 01	0.11	0.01	0 01	0.26	0.00	0 01	0 11	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	9/28/2021 8 08	9/29/2021 6 35	22.45	12.08	10.37	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	5.12	13 92	0 26	0 00	0 01	0.10	0.01	0 01	0.23	0.00	0 01	0 10	0.01	0.01
271	P oduct	46 817	Chev on	US	1.00	No Upg ade	1	10/30/2021 20 43	10/31/2021 19 48	23.08	16.58	6 50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	5.26	17 07	0 27	0 00	0 01	0.13	0.01	0 01	0.24	0.00	0 01	0 13	0.01	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/1/2021 5 55	1/2/2021 9 23	27.47	18.08	9 38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.11	46 79	0 21	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/7/2021 6 12	1/8/2021 9 28	27.27	19.25	8 02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.08	49 29	0 21	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/19/2021 18 23	1/20/2021 15 13	20.83	9.75	11.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.11	26 81	0 16	0 00	0 01	0.20	0.02	0 01	0.00	0.00	0 01	0 20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	1/25/2021 20 42	1/27/2021 9 09	36.45	25.33	11.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.45	65 01	0 28	0 00	0 01	0.48	0.04	0 03	0.00	0.00	0 01	0 48	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/4/2021 3 11	2/5/2021 8 14	29.05	19.58	9 47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.34	50 48	0 22	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/11/2021 20 19	2/12/2021 22 01	25.70	16.92	8 78	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.84	43 77	0 20	0 00	0 01	0.32	0.03	0 02	0.00	0.00	0 01	0 32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	2/23/2021 10 41	2/24/2021 11 40	24.98	16.72	8 27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.74	43 14	0 19	0 00	0 01	0.32	0.03	0 02	0.00	0.00	0 01	0 32	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/2/2021 17 10	3/4/2021 0 15	31.08	19.58	11.50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.65	51 02	0 24	0 00	0 01	0.38	0.03	0 02	0.00	0.00	0 01	0 38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/11/2021 11 29	3/12/2021 7 24	19.92	10.67	9 25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	2.98	28 57	0 15	0 00	0 01	0.21	0.02	0 01	0.00	0.00	0 01	0 21	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/19/2021 3 00	3/20/2021 15 16	36.27	20.58	15.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.42	54 57	0 28	0 00	0 01	0.40	0.03	0 02	0.00	0.00	0 01	0 40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	3/28/2021 21 06	3/29/2021 21 08	24.03	14.08	9 95	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.59	37 13	0 18	0 00	0 01	0.28	0.02	0 02	0.00	0.00	0 01	0 28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/3/2021 3 22	4/4/2021 15 20	35.97	21.00	14.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.38	55 40	0 27	0 00	0 01	0.41	0.03	0 02	0.00	0.00	0 01	0 41	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	4/18/2021 2 23	4/19/2021 6 29	28.10	19.08	9 02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.20	49 14	0 21	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/3/2021 3 34	5/4/2021 16 41	37.12	20.25	16.87	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.55	54 06	0 28	0 00	0 01	0.40	0.03	0 02	0.00	0.00	0 01	0 40	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/19/2021 15 42	5/20/2021 16 23	24.68	18.33	6 35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.69	46 60	0 19	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	5/26/2021 13 13	5/28/2021 11 26	46.22	18.75	27.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	6.91	53 17	0 35	0 00	0 01	0.39	0.03	0 02	0.00	0.00	0 01	0 39	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/5/2021 18 25	6/6/2021 20 10	25.75	19.25	6 50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.85	48 89	0 20	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/19/2021 22 32	6/21/2021 6 27	31.92	21.67	10.25	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.77	55 80	0 24	0 00	0 01	0.41	0.04	0 02	0.00	0.00	0 01	0 41	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	6/29/2021 17 19	7/1/2021 2 05	32.77	16.50	16.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.90	44 71	0 25	0 00	0 01	0.33	0.03	0 02	0.00	0.00	0 01	0 33	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/9/2021 13 40	7/10/2021 16 17	26.62	20.50	6 12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.98	51 85	0 20	0 00	0 01	0.38	0.03	0 02	0.00	0.00	0 01	0 38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/16/2021 17 21	7/17/2021 20 10	26.82	19.75	7 07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.01	50 26	0 20	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	7/27/2021 13 58	7/29/2021 1 08	35.17	16.58	18.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.26	45 52	0 27	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/7/2021 21 58	8/13/2021 17 50	139.87	14.17	125.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	20.91	67 72	1 07	0 01	0 04	0.50	0.04	0 03	0.00	0.01	0 04	0 50	0.04	0.03
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/19/2021 18 52	8/20/2021 18 52	24.67	16.33	8 33	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.69	42 22	0 19	0 00	0 01	0.31	0.03	0 02	0.00	0.00	0 01	0 31	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	8/26/2021 18 01	8/28/2021 6 50	36.82	17.58	19.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.50	48 15	0 28	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/4/2021 23 11	9/6/2021 9 18	34.12	18.50	15.62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.10	49 44	0 26	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/10/2021 21 35	9/12/2021 0 25	26.83	18.17	8 67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.01	46 80	0 21	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	9/25/2021 13 24	9/26/2021 17 52	28.47	17.50	10.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.26	45 77	0 22	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/4/2021 0 45	10/5/2021 1 41	24.93	17.92	7 02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.73	45 76	0 19	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/12/2021 10 49	10/13/2021 8 19	21.50	16.00	5 50	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.21	40 66	0 16	0 00	0 01	0.30	0.03	0 02	0.00	0.00	0 01	0 30	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/17/2021 23 20	10/19/2021 1 44	26.40	20.08	6 32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.95	50 88	0 20	0 00	0 01	0.38	0.03	0 02	0.00	0.00	0 01	0 38	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	10/31/2021 10 21	11/2/2021 22 27	60.10	19.08	41.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	8.99	57 54	0 46	0 01	0 02	0.43	0.04	0 02	0.00	0.01	0 02	0 43	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/12/2021 19 47	11/13/2021 21 13	25.43	19.50	5 93	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.80	49 35	0 19	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/19/2021 8 15	11/20/2021 20 21	36.10	17.50	18.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.40	47 77	0 28	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	11/28/2021 7 37	11/29/2021 15 48	32.18	22.17	10.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.81	56 96	0 25	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/6/2021 11 11	12/7/2021 4 25	17.23	10.17	7 07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	2.58	26 77	0 13	0 00	0 00	0.20	0.02	0 01	0.00	0.00	0 00	0 20	0.02	0.01
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/13/2021 11 30	12/14/2021 9 52	22.37	14.75	7 62	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.34	38 15	0 17	0 00	0 01	0.28	0.02	0 02	0.00	0.00	0 01	0 28	0.02	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/19/2021 9 18	12/20/2021 13 22	28.07	17.75	10.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.20	46 21	0 21	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
106	SuezMax	155,374	Chev on	Non-US	TG	No Upg ade	4	12/24/2021 18 10	12/26/2021 7 19	37.15	16.83	20.32	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.55	46 59	0 28	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
289	Af aMax	114,809	Chev on	Non-US	1.00	No Upg ade	4	10/19/2021 23 14	10/25/2021 13 05	133.85	88.50	45.35	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	28.64	144.02	1 46	0 02	0 06	1.07	0.09	0 06	1.29	0.02	0 06	1 07	0.09	0.06
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/18/2021 14 00	1/19/2021 14 32	24.53	15.23	9 30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.67	39 78	0 19	0 00	0 01	0.29	0.03	0 02	0.17	0.00	0 01	0 29	0.03	0.02
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	2/19/2021 3 35	2/19/2021 19 45	16.17	8.43	7 73	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.42	22 70	0 12	0 00	0 00	0.17	0.01	0 01	0.11	0.00	0 00	0 17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/12/2021 9 10	3/13/2021 7 46	22.60	7.92	14.68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.38	23 26	0 17	0 00	0 01	0.17	0.01	0 01	0.15	0.00	0 01	0 17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	3/27/2021 11 52	3/28/2021 8 14	20.37	8.00	12.37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.05	22 85	0 16	0 00	0 01	0.17	0.01	0 01	0.14	0.00	0 01	0 17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/9/2021 8 43	4/9/2021 23 14	14.52	8.33	6 18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.17	22 05	0 11	0 00	0 00	0.16	0.01	0 01	0.10	0.00	0 00	0 16	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/12/2021 10 14	4/13/2021 2 30	16.27	8.58	7 68	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.43	23 05	0 12	0 00	0 00	0.17	0.01	0 01	0.11	0.00	0 00	0 17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/25/2021 8 49	4/26/2021 8 10	23.35	8.08	15.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.49	23 82	0 18	0 00	0 01	0.18	0.01	0 01	0.16	0.00	0 01	0 18	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	5/25/2021 10 48	5/26/2021 9 44	22.93	7.75	15.18	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.43	22 98	0 18	0 00	0 01	0.17	0.01	0 01	0.15	0.00	0 01	0 17	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	7/26/2021 16 19	7/27/2021 11 47	19.47	6.50	12.97	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.91	19 34	0 15	0 00	0 01	0.14	0.01	0 01	0.13	0.00	0 01	0 14	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/9/2021 2 45	9/9/2021 23 18	20.55	6 50	14.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.07	19 62	0 16	0 00	0 01	0.15	0.01	0 01	0.14	0.00	0 01	0 15	0.01	0.01
291	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	9/22/2021 14 03	9/23/2021 10 25	20.37	6.67	13.70	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.05	19 94	0 16	0 00	0 01	0.15	0.01	0 01	0.14	0.00	0 01	0 15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	4/30/2021 23 58	5/1/2021 20 02	20.07	7.00	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.00	20.59	0 15	0 00	0 01	0.15	0.01	0 01	0 14	0.00	0 01	0 15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	8/28/2021 12 38	8/29/2021 2 53	14.25	7.25	7 00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.13	19.61	0 11	0 00	0 00	0.15	0.01	0 01	0 10	0.00	0.00	0 15	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	10/6/2021 9 35	10/6/2021 23 47	14.20	6.83	7 37	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.12	18 68	0 11	0 00	0 00	0.14	0.01	0 01	0.10	0.00	0 00	0 14	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/11/2021 2 44	11/12/2021 3 14	24.50	7.33	17.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.66	22 48	0 19	0 00	0 01	0.17	0.01	0 01	0.17	0.00	0 01	0 17	0.01	0.01
292	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	11/29/2021 17 54	11/30/2021 8 42	14.80	7.00	7 80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	2.21	19 20	0 11	0 00	0 00	0.14	0.01	0 01	0.10	0.00	0 00	0 14	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	6/25/2021 0 51	6/25/2021 15 31	14.67	7.75	6 92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	2.19	20 81	0 11	0 00	0 00	0.15	0.01	0 01	0.11	0.00	0 00	0 15	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	7/18/2021 7 53	7/19/2021 17 26	33.55	11.83	21.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	5.02	34 70	0 26	0 00	0 01	0.26	0.02	0 01	0.26	0.00	0 01	0 26	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	10/19/2021 21 59	10/21/2021 9 14	35.25	7.58	27.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	5.27	25 85	0 27	0 00	0 01	0.19	0.02	0 01	0.27	0.00	0 01	0 19	0.02	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/15/2021 5 17	12/16/2021 8 32	27.25	6.58	20.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	4.07	21 56	0 21	0 00	0 01	0.16	0.01	0 01	0.21	0.00	0 01	0 16	0.01	0.01
293	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	12/29/2021 6 34	12/30/2021 8 42	26.13	6.92	19.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	3.91	22 00	0 20	0 00	0 01	0.16	0.01	0 01	0.20	0.00	0 01	0 16	0.01	0.01
294	SuezMax	141,740	Chev on	US	1.00	No Upg ade	4	1/29/2021 8 38	1/30/2021 8 10	23.53	6.42	17.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	12.20	0.17	0.52	2.00	0.17	0.11	3 70	3.52	20 22	0 18	0 00	0 01	0.15	0.01	0 01	0.16	0.00	0 01	0 15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	1/15/2021 3 06	1/15/2021 22 55	19.82	6.75	13.07	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	2.96	19 97	0 15	0 00	0 01	0.15	0.01	0 01	0.15	0.00	0 01	0 15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/2/2021 13 28	2/3/2021 13 16	23.80	7.58	16.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	3.56	22 84	0 18	0 00	0 01	0.17	0.01	0 01	0.18	0.00	0 01	0 17	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	2/16/2021 13 50	2/17/2021 2 15	12.42	5.83	6 58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	1.86	16 03	0 09	0 00	0 00	0.12	0.01	0 01	0.09	0.00	0 00	0 12	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	3	3/5/2021 2 52	3/5/2021 17 30	14.63	6.42	8 22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	2.19	17 88	0 11	0 00	0 00	0.13	0.01	0 01	0.11	0.00	0 00	0 13	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	5/17/2021 15 57	5/18/2021 14 37	22.67	6.83	15.83	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	3.39	20 90	0 17	0 00	0 01	0.15	0.01	0 01	0.17	0.00	0 01	0 15	0.01	0.01
295	SuezMax	141,740	Chev on	US	0.00	No Upg ade	4	8/15/2021 18 23	8/16/2021 7 08	12.75	6.75	6 00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	13.80	0.17	0.52	2.00	0.17	0.11	3 70	1.91	18 12	0 10	0 00	0 00	0.13	0.01	0 01	0.10	0.00	0 00	0 13	0.01	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/5/2021 14 00	1/7/2021 2 11	36.18	17.42	18.77	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.41	47 61	0 28	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/16/2021 1 27	1/17/2021 4 20	26.88	20.08	6 80	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.02	51 01	0 21	0 00	0 01	0.38	0.03	0 02	0.00	0.00	0 01	0 38	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	1/21/2021 7 26	1/22/2021 16 21	32.92	22.75	10.17	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.92	58 43	0 25	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/1/2021 1 50	2/2/2021 4 10	26.33	19.25	7 08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.94	49 04	0 20	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/8/2021 9 45	2/10/2021 6 15	44.50	20.42	24.08	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	6.65	56 36	0 34	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	2/17/2021 15 37	2/19/2021 1 15	33.63	22.08	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.03	57 16	0 26	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/14/2021 15 35	3/15/2021 22 23	33.30	21.75	11.55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.98	56 34	0 25	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/23/2021 8 35	3/24/2021 10 25	25.83	19.83	6 00	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.86	50 19	0 20	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	3/30/2021 15 13	3/31/2021 22 26	31.22	20.83	10.38	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.67	53 79	0 24	0 00	0 01	0.40	0.03	0 02	0.00	0.00	0 01	0 40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/7/2021 1 42	4/8/2021 6 25	28.72	18.00	10.72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.29	46 93	0 22	0 00	0 01	0.35	0.03	0 02	0.00	0.00	0 01	0 35	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/16/2021 4 50	4/17/2021 12 20	31.50	21.58	9 92	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.71	55 50	0 24	0 00	0 01	0.41	0.03	0 02	0.00	0.00	0 01	0 41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	4/21/2021 23 40	4/23/2021 6 16	30.93	21.58	9 35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.62	55 36	0 24	0 00	0 01	0.41	0.03	0 02	0.00	0.00	0 01	0 41	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/9/2021 23 26	5/11/2021 15 18	39.87	17.83	22.03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.96	49 49	0 30	0 00	0 01	0.37	0.03	0 02	0.00	0.00	0 01	0 37	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	5/23/2021 21 20	5/25/2021 8 09	34.82	21.92	12.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.21	57 10	0 27	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/6/2021 22 40	6/8/2021 14 14	39.57	17.33	22.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.92	48 32	0 30	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/17/2021 7 27	6/18/2021 14 53	31.43	23.08	8 35	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.70	58 77	0 24	0 00	0 01	0.44	0.04	0 02	0.00	0.00	0 01	0 44	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	6/25/2021 22 50	6/27/2021 3 59	29.15	12.50	16.65	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.36	35 01	0 22	0 00	0 01	0.26	0.02	0 01	0.00	0.00	0 01	0 26	0.02	0.01
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/14/2021 17 00	7/16/2021 4 31	35.52	25.08	10.43	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.31	64 22	0 27	0 00	0 01	0.48	0.04	0 03	0.00	0.00	0 01	0 48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	7/22/2021 0 24	7/23/2021 9 22	32.97	20.50	12.47	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.93	53 52	0 25	0 00	0 01	0.40	0.03	0 02	0.00	0.00	0 01	0 40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/2/2021 19 32	8/4/2021 6 45	35.22	22.08	13.13	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.27	57 57	0 27	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/14/2021 5 50	8/15/2021 13 53	32.05	20.00	12.05	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.79	52 18	0 24	0 00	0 01	0.39	0.03	0 02	0.00	0.00	0 01	0 39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/22/2021 13 22	8/23/2021 21 21	31.98	21.75	10.23	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.78	56 00	0 24	0 00	0 01	0.41	0.04	0 02	0.00	0.00	0 01	0 41	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	8/31/2021 20 14	9/2/2021 6 25	34.18	19.92	14.27	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.11	52 56	0 26	0 00	0 01	0.39	0.03	0 02	0.00	0.00	0 01	0 39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/7/2021 12 23	9/9/2021 0 44	36.35	22.33	14.02	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.43	58 42	0 28	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/14/2021 20 33	9/15/2021 18 17	21.73	14.25	7 48	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.25	36 89	0 17	0 00	0 01	0.27	0.02	0 02	0.00	0.00	0 01	0 27	0.02	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/21/2021 0 32	9/22/2021 12 15	35.72	20.50	15.22	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.34	54 24	0 27	0 00	0 01	0.40	0.03	0 02	0.00	0.00	0 01	0 40	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	9/28/2021 7 39	9/29/2021 18 24	34.75	18.08	16.67	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.20	48 70	0 27	0 00	0 01	0.36	0.03	0 02	0.00	0.00	0 01	0 36	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/7/2021 12 14	10/9/2021 23 31	59.28	22.17	37.12	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	8.86	64 07	0 45	0 01	0 02	0.47	0.04	0 03	0.00	0.01	0 02	0 47	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/15/2021 9 35	10/16/2021 20 05	34.50	19.92	14.58	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.16	52 64	0 26	0 00	0 01	0.39	0.03	0 02	0.00	0.00	0 01	0 39	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	10/21/2021 22 35	10/23/2021 0 23	25.80	17.08	8 72	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	3.86	44 16	0 20	0 00	0 01	0.33	0.03	0 02	0.00	0.00	0 01	0 33	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/6/2021 14 29	11/7/2021 22 13	31.73	15.83	15.90	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.74	42 98	0 24	0 00	0 01	0.32	0.03	0 02	0.00	0.00	0 01	0 32	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/16/2021 8 27	11/17/2021 20 28	36.02	21.42	14.60	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	5.38	56 32	0 28	0 00	0 01	0.42	0.04	0 02	0.00	0.00	0 01	0 42	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	11/23/2021 12 25	11/25/2021 11 35	47.17	23.75	23.42	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	7.05	64 36	0 36	0 00	0 01	0.48	0.04	0 03	0.00	0.00	0 01	0 48	0.04	0.03
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/3/2021 8 45	12/4/2021 12 42	27.95	19.92	8 03	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0.11	0.00	0.17	0.52	2.00	0.17	0.11	3 70	4.18	50 92	0 21	0 00	0 01	0.38	0.03	0 02	0.00	0.00	0 01	0 38	0.03	0.02

Appendix A13.3

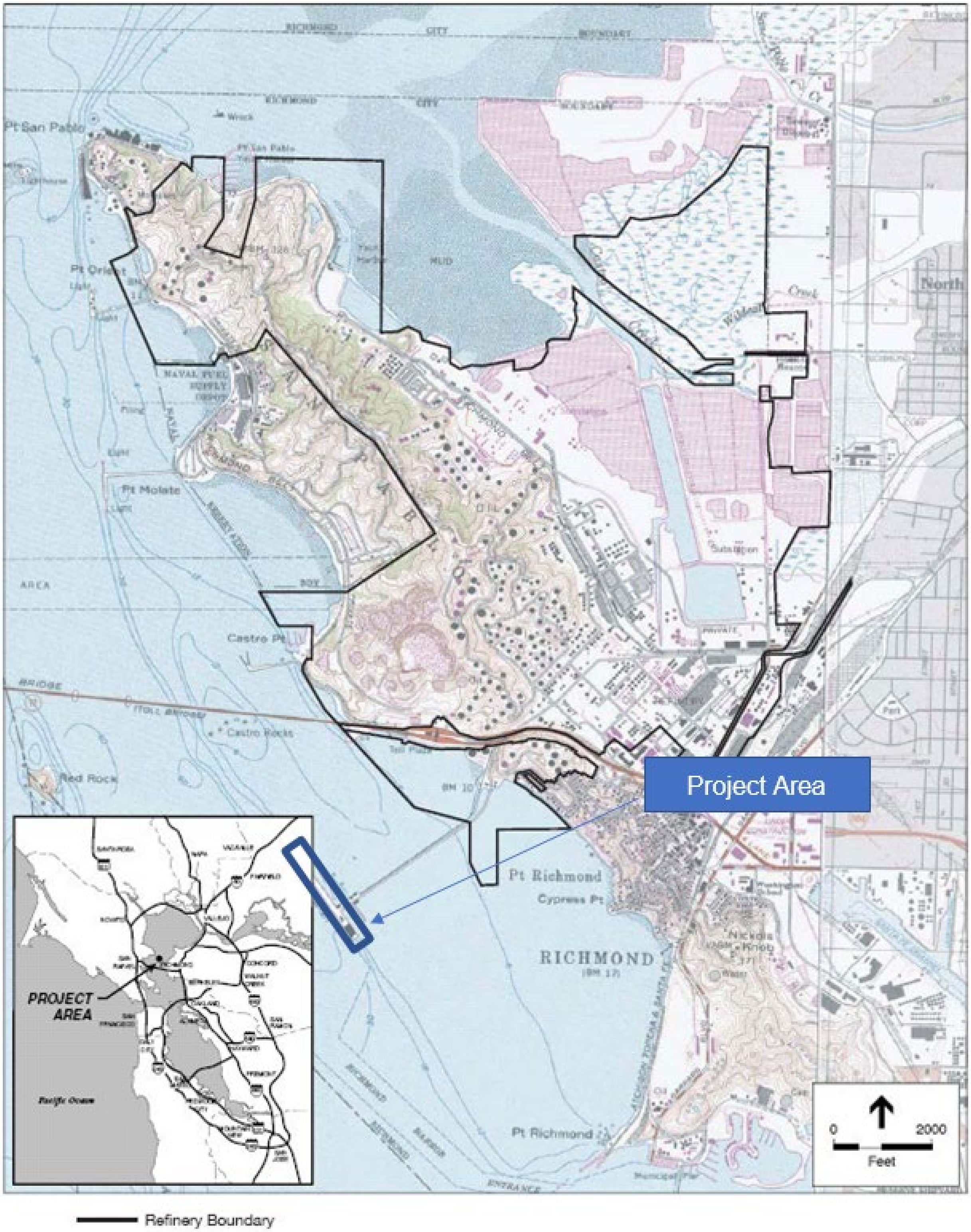
Port Calls & Calculation

Ship Number	CLASS	DWT	Charered to	Flag US vs. Non-US	Aux Eng ne NOx Emission Tier	Boiler Type	Berth	Arr val Date/T me	Departure Date/T me	Total Berth (hrs)	Pumping (hrs)	Ber h T me Non Pump ng hr)	Aux Engine Load (kW)	Aux Bo ler Load - Pumping	Aux Boiler Load-Non Pumping (kw)	Aux Engine SFC (g/kWh)	Aux Boil SFC (g/kWh)	CARB Em ss on Facto s Aux Engine NOx (g/kwh)	CARB Em ss on Facto s Aux Engine PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Engine ROG (g/kwh)	CARB Em ss on Facto s Aux Bo ler NOx (g/kwh)	CARB Em ss on Facto s Aux Bo ler PM2.5 (g/kwh)	CARB Em ss on Facto s Aux Bo ler ROG (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine NOx (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine PM2.5 (g/kwh)	Em ss on Facto s basis Chevron Innovat veConcept Aux Engine ROG (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler NOx (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler PM2 5 (g/kwh)	m ss on Facto s basis Chevron nnovat veConcept Aux Boiler ROG (g/kwh)	Conve s on Facto (kwh/kg MGO)	Aux Fuel (MT)	Boil Fuel (MT)	Em ss on Calc. based on CARB facto s Aux. Engine NOx (MT)	Em ss on Calc. based on CARB facto s Aux. Engine PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Engine ROG (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler NOx (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler PM2.5 (MT)	Em ss on Calc. based on CARB facto s Aux. Boiler ROG (MT)	Em ss on Calc. based on IC factors Aux. Eng ne NOx (MT)	Em ss on Calc. based on IC factors Aux. Eng ne PM2.5 MT)	Em ss on Calc. based on IC factors Aux. Eng ne ROG (MT)	Em ss on Calc. based on IC factors Aux. Boiler NOx (MT)	Em ss on Calc. based on IC factors Aux. Boiler PM2 5 (MT)	Em ss on Calc. based on IC factors Aux. Boiler ROG (MT)
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/10/2021 15 28	12/11/2021 16 36	25.13	18.25	6 88	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	3.76	46 54	0 19	0 00	0 01	0.34	0.03	0 02	0.00	0.00	0 01	0 34	0.03	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/21/2021 11 35	12/22/2021 22 18	34.72	22.42	12.30	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	5.19	58 17	0 27	0 00	0 01	0.43	0.04	0 02	0.00	0.00	0 01	0 43	0.04	0.02
296	SuezMax	155,415	Chev on	Non-US	TG	No Upg ade	4	12/31/2021 8 27	1/1/2022 0 00	15.55	11.00	4 55	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	0.00	0 17	0 52	2 00	0.17	0.11	3 70	2.32	28 16	0 12	0 00	0 00	0.21	0.02	0 01	0.00	0.00	0 00	0 21	0.02	0.01
301	P oduct	51 215	Chev on	Non-US	1.00	No Upg ade	3	1/16/2021 6 03	1/18/2021 2 10	44.12	0.00	44.12	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.05	11 58	0 51	0 01	0 02	0.09	0.01	0 00	0.45	0.01	0 02	0 09	0.01	0.00
307	SuezMax	149,992	Chev on	Non-US	2.00	No Upg ade	1	2/28/2021 9 22	3/2/2021 1 24	40.03	23.58	16.45	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.99	62 12	0 31	0 00	0 01	0.46	0.04	0 03	0.23	0.00	0 01	0 46	0.04	0.03
309	P oduct	46 938	Chev on	Non-US	1.00	No Upg ade	3	10/14/2021 22 05	10/16/2021 16 11	42.10	0.00	42.10	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.59	11 05	0 49	0 01	0 02	0.08	0.01	0 00	0.43	0.01	0 02	0 08	0.01	0.00
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	5/28/2021 14 39	6/2/2021 16 27	121.80	80.83	40.97	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	21.99	96 77	1 12	0 01	0 04	0 72	0.06	0 04	0.99	0.01	0 04	0 72	0.06	0.04
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/8/2021 10 29	8/15/2021 2 31	160.03	0.00	160.03	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	28.89	42 01	1 48	0 02	0 06	0 31	0.03	0 02	1.31	0.02	0 06	0 31	0.03	0.02
313	PanaMax	74 251	Chev on	Non-US	1.00	No Upg ade	1	8/29/2021 13 53	8/31/2021 18 10	52.28	39.00	13.28	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.44	44 99	0 48	0 01	0 02	0.33	0.03	0 02	0.43	0.01	0 02	0 33	0.03	0.02
314	P oduct	50 192	Chev on	Non-US	3.00	No Upg ade	2	1/12/2021 23 18	1/16/2021 13 11	85.88	0.00	85.88	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 54	1 00	0 01	0 04	0.17	0.01	0 01	0.19	0.01	0 04	0 17	0.01	0.01
322	P oduct	49 901	Chev on	Non-US	2.00	No Upg ade	2	6/26/2021 17 58	6/28/2021 13 49	43.85	36.42	7 43	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.99	35 70	0 51	0 01	0 02	0.26	0.02	0 01	0.39	0.01	0 02	0 26	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	5/23/2021 6 14	5/27/2021 13 50	103.60	2.75	100.85	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.17	30 58	1 13	0 01	0 04	0.23	0.02	0 01	0.21	0.01	0 04	0 23	0.02	0.01
323	Af aMax	111,964	Chev on	Non-US	3.00	No Upg ade	1	6/2/2021 18 18	6/3/2021 16 19	22.02	0.00	22.02	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	4.71	5.78	0 24	0 00	0 01	0.04	0.00	0 00	0.05	0.00	0 01	0 04	0.00	0.00
324	P oduct	50 908	Chev on	Non-US	2.00	No Upg ade	3	7/30/2021 11 10	8/2/2021 3 45	64.58	0.00	64.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	14.72	16 95	0 75	0 01	0 03	0.13	0.01	0 01	0.57	0.01	0 03	0 13	0.01	0.01
325	Af aMax	114,426	Chev on	Non-US	2.00	No Upg ade	4	6/27/2021 13 54	6/29/2021 15 24	49.50	28.17	21.33	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.59	47 65	0 54	0 01	0 02	0.35	0.03	0 02	0.41	0.01	0 02	0 35	0.03	0.02
268	PanaMax	69 684	Chev on	Non-US	1.00	No Upg ade	4	5/29/2021 21 35	5/31/2021 4 20	30.75	21.33	9 42	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	5.55	25 17	0 28	0 00	0 01	0 19	0.02	0 01	0.25	0.00	0 01	0 19	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	10/24/2021 2 08	10/29/2021 6 28	124.33	0.00	124.33	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	22.45	32 64	1 15	0 01	0 04	0.24	0.02	0 01	1.01	0.01	0 04	0 24	0.02	0.01
329	PanaMax	74 999	Chev on	Non-US	1.00	No Upg ade	4	12/7/2021 10 41	12/9/2021 12 12	49.52	22.92	26.60	832	3547	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	8.94	31 37	0 46	0 01	0 02	0.23	0.02	0 01	0.40	0.01	0 02	0 23	0.02	0.01
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/23/2021 18 45	6/26/2021 16 35	69.83	29.08	40.75	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.91	37 65	0 81	0 01	0 03	0.28	0.02	0 02	0.72	0.01	0 03	0 28	0.02	0.02
270	P oduct	50 000	Chev on	Non-US	1.00	No Upg ade	2	6/28/2021 17 40	6/30/2021 9 10	39.50	7.50	32.00	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	9.00	15 35	0 46	0 01	0 02	0.11	0.01	0 01	0.41	0.01	0 02	0 11	0.01	0.01
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	2	4/7/2021 5 57	4/8/2021 19 33	37.60	0.00	37.60	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	8.57	9.87	0 44	0 01	0 02	0.07	0.01	0 00	0.33	0.01	0 02	0 07	0.01	0.00
333	P oduct	50 378	Chev on	Non-US	2.00	No Upg ade	3	4/10/2021 19 54	4/12/2021 4 13	32.32	0.00	32.32	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.36	8.48	0 38	0 00	0 01	0.06	0.01	0 00	0.29	0.00	0 01	0 06	0.01	0.00
335	P oduct	50 222	Chev on	Non-US	1.00	No Upg ade	1	2/16/2021 0 05	2/19/2021 13 59	85.90	0.00	85.90	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.57	22 55	1 00	0 01	0 04	0.17	0.01	0 01	0.88	0.01	0 04	0 17	0.01	0.01
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	2	7/19/2021 0 55	7/20/2021 23 12	46.28	0.00	46.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.55	12 15	0 54	0 01	0 02	0.09	0.01	0 00	0.41	0.01	0 02	0 09	0.01	0.00
339	P oduct	49 635	Chev on	Non-US	2.00	No Upg ade	3	8/2/2021 5 35	8/3/2021 12 15	30.67	0.00	30.67	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.99	8.05	0 36	0 00	0 01	0.06	0.01	0 00	0.27	0.00	0 01	0 06	0.01	0.00
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	6/26/2021 11 02	6/28/2021 15 05	52.05	37.00	15.05	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.14	59 18	0 57	0 01	0 02	0.44	0.04	0 02	0.50	0.01	0 02	0 44	0.04	0.02
345	Af aMax	107,081	Chev on	Non-US	1.00	No Upg ade	1	7/4/2021 8 57	7/5/2021 17 36	32.65	19.25	13.40	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	6.99	32 25	0 36	0 00	0 01	0.24	0.02	0 01	0.32	0.00	0 01	0 24	0.02	0.01
347	SuezMax	158,081	Chev on	Non-US	3.00	No Upg ade	4	5/13/2021 23 15	5/16/2021 23 28	72.22	24.33	47.88	689	8170	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	10.80	72 21	0 55	0 01	0 02	0.53	0.05	0 03	0.10	0.01	0 02	0 53	0.05	0.03
350	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	3	12/30/2021 1 23	12/31/2021 19 59	42.60	0.00	42.60	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.71	11 18	0 50	0 01	0 02	0.08	0.01	0 00	0.38	0.01	0 02	0 08	0.01	0.00
351	P oduct	51 213	Chev on	Non-US	1.00	No Upg ade	2	10/16/2021 23 19	10/19/2021 3 23	52.07	0.00	52.07	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.86	13 67	0 61	0 01	0 02	0.10	0.01	0 01	0.54	0.01	0 02	0 10	0.01	0.01
352	P oduct	51 228	Chev on	Non-US	1.00	No Upg ade	2	7/21/2021 2 35	7/23/2021 6 12	51.62	0.00	51.62	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	11.76	13 55	0 60	0 01	0 02	0.10	0.01	0 01	0.53	0.01	0 02	0 10	0.01	0.01
358	P oduct	47 499	Chev on	Non-US	3.00	No Upg ade	3	5/11/2021 10 21	5/14/2021 22 46	84.42	0.00	84.42	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	19.23	22 16	0 98	0 01	0 04	0 16	0.01	0 01	0.19	0.01	0 04	0 16	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	4/2/2021 13 18	4/4/2021 6 03	40.75	9.58	31.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	9.28	17 06	0 47	0 01	0 02	0.13	0.01	0 01	0.36	0.01	0 02	0 13	0.01	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	6/2/2021 10 08	6/3/2021 20 07	33.98	25.50	8 48	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.74	25 86	0 40	0 00	0 01	0.19	0.02	0 01	0.30	0.00	0 01	0 19	0.02	0.01
373	P oduct	49 094	Chev on	US	2.00	No Upg ade	2	7/24/2021 1 13	7/26/2021 0 50	47.62	32.08	15.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.85	33 81	0 55	0 01	0 02	0.25	0.02	0 01	0.42	0.01	0 02	0 25	0.02	0.01
374	Af aMax	108,942	Chev on	Non-US	1.00	No Upg ade	1	8/23/2021 13 30	8/26/2021 12 24	70.90	53.75	17.15	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	15.17	84 74	0 78	0 01	0 03	0.63	0.05	0 03	0.69	0.01	0 03	0 63	0.05	0.03
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	2	5/4/2021 19 03	5/6/2021 18 35	47.53	0.00	47.53	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.83	12 48	0 55	0 01	0 02	0.09	0.01	0 01	0.49	0.01	0 02	0 09	0.01	0.01
378	P oduct	50 263	Chev on	Non-US	1.00	No Upg ade	3	9/11/2021 19 36	9/14/2021 8 22	60.77	0.00	60.77	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	13.85	15 95	0 71	0 01	0 03	0.12	0.01	0 01	0.63	0.01	0 03	0 12	0.01	0.01
379	P oduct	50 243	Chev on	Non-US	2.00	No Upg ade	3	12/10/2021 6 12	12/12/2021 11 29	53.28	0.00	53.28	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.14	13 99	0 62	0 01	0 02	0.10	0.01	0 01	0.47	0.01	0 02	0 10	0.01	0.01
385	P oduct	46 955	Chev on	Non-US	1.00	No Upg ade	3	3/11/2021 15 00	3/15/2021 6 30	87.50	0.00	87.50	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	19.94	22 97	1 02	0 01	0 04	0.17	0.01	0 01	0.90	0.01	0 04	0 17	0.01	0.01
388	P oduct	51 218	Chev on	Non-US	1.00	No Upg ade	3	3/27/2021 10 13	3/28/2021 1 06	14.88	7.25	7 63	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	3.39	8.72	0 17	0 00	0 01	0.06	0.01	0 00	0.15	0.00	0 01	0 06	0.01	0.00
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	2	5/19/2021 9 46	5/21/2021 9 21	47.58	0.00	47.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.84	12 49	0 55	0 01	0 02	0.09	0.01	0 01	0.42	0.01	0 02	0 09	0.01	0.01
389	P oduct	51 737	Chev on	Non-US	2.00	No Upg ade	3	9/16/2021 6 52	9/19/2021 6 20	71.47	0.00	71.47	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	16.28	18 76	0 83	0 01	0 03	0.14	0.01	0 01	0.63	0.01	0 03	0 14	0.01	0.01
390	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	11/27/2021 1 45	12/1/2021 10 54	105.15	0.00	105.15	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	23.96	27 60	1 22	0 02	0 05	0.20	0.02	0 01	0.93	0.02	0 05	0 20	0.02	0.01
391	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	2/21/2021 11 22	2/23/2021 12 25	49.05	0.00	49.05	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	11.18	12 88	0 57	0 01	0 02	0.10	0.01	0 01	0.43	0.01	0 02	0 10	0.01	0.01
392	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/16/2021 4 06	8/18/2021 11 30	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	5/13/2021 2 30	5/15/2021 9 26	54.93	0.00	54.93	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.52	14 42	0 64	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	8/27/2021 3 55	8/29/2021 1 15	45.33	0.00	45.33	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	10.33	11 90	0 53	0 01	0 02	0.09	0.01	0 00	0.40	0.01	0 02	0 09	0.01	0.00
393	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	9/3/2021 14 21	9/5/2021 1 11	34.83	0.00	34.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	7.94	9.14	0 41	0 00	0 02	0.07	0.01	0 00	0.31	0.00	0 02	0 07	0.01	0.00
394	P oduct	49 999	Chev on	Non-US	2.00	No Upg ade	2	6/8/2021 4 22	6/10/2021 12 20	55.97	0.00	55.97	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.75	14 69	0 65	0 01	0 02	0 11	0.01	0 01	0.50	0.01	0 02	0 11	0.01	0.01
395	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/27/2021 9 16	9/29/2021 21 06	59.83	0.00	59.83	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.63	15 71	0 70	0 01	0 03	0.12	0.01	0 01	0.53	0.01	0 03	0 12	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	3	3/17/2021 0 08	3/20/2021 16 18	88.17	0.00	88.17	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	20.09	23 14	1 03	0 01	0 04	0.17	0.01	0 01	0.78	0.01	0 04	0 17	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	4/20/2021 13 41	4/23/2021 10 43	69.03	0.00	69.03	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	15.73	18 12	0 80	0 01	0 03	0.13	0.01	0 01	0.61	0.01	0 03	0 13	0.01	0.01
396	P oduct	49 757	Chev on	Non-US	2.00	No Upg ade	2	9/30/2021 17 52	10/3/2021 1 16	55.40	0.00	55.40	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	12.62	14 54	0 65	0 01	0 02	0.11	0.01	0 01	0.49	0.01	0 02	0 11	0.01	0.01
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	5/12/2021 6 33	5/13/2021 1 10	18.62	0.00	18.62	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.64	4.89	0 29	0 00	0 01	0.04	0.00	0 00	0.22	0.00	0 01	0 04	0.00	0.00
399	Chem cal	26 175	Chev on	Non-US	2.00	No Upg ade	2	8/18/2021 12 32	8/19/2021 9 15	20.72	0.00	20.72	1395	421	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	6.27	5.44	0 32	0 00	0 01	0.04	0.00	0 00	0.24	0.00	0 01	0 04	0.00	0.00
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/18/2021 3 40	7/20/2021 11 22	55.70	0.00	55.70	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	11.92	14 62	0 61	0 01	0 02	0.11	0.01	0 01	0.11	0.01	0 02	0 11	0.01	0.01
401	Af aMax	114,218	Chev on	Non-US	3.00	No Upg ade	1	7/23/2021 12 46	7/27/2021 23 25	106.65	0.00	106.65	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	2.60	0 17	0 52	2 00	0.17	0.11	3 70	22.82	28 00	1 17	0 01	0 04	0.21	0.02	0 01	0.22	0.01	0 04	0 21	0.02	0.01
409	P oduct	48 026	Chev on	Non-US	1.00	No Upg ade	2	10/3/2021 2 30	10/5/2021 1 05	46.58	0.00	46.58	1050	3089	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	12.20	0 17	0 52	2 00	0.17	0.11	3 70	10.61	12 23	0 54	0 01	0 02	0.09	0.01	0 00	0.48	0.01	0 02	0 09	0.01	0.00
205	Af aMax	114,820	Chev on	US	2.00	No Upg ade	4	9/27/2021 3 47	9/28/2021 4 21	24.57	14.08	10.48	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	5.26	23 78	0 27	0 00	0 01	0.18	0.01	0 01	0.20	0.00	0 01	0 18	0.01	0.01
411	Af aMax	112,186	Chev on	Non-US	2.00	No Upg ade	1	12/29/2021 8 03	1/1/2022 0 00	63.95	47.42	16.53	986	4976	875	217	300	13.80	0.17	0.52	2.00	0.17	0 11	10.50	0 17	0 52	2 00	0.17	0.11	3 70	13.68	75 12	0 70	0 01	0 03	0.56	0.05	0 03	0.53	0.01	0 03	0 56	0.05	0.03

Appendix A14: IC.14 - Shore Power or Stack Capture for Barges and Tug Boats

A14.1 – Map
A14.2 - Data Management System (TBD)
A14.3 – Emission Calculation Spreadsheet
Inputs
Calculations

Appendix A14.1: Map - IC.14 Shore Power or Stack Capture for Barges and Tug Boats



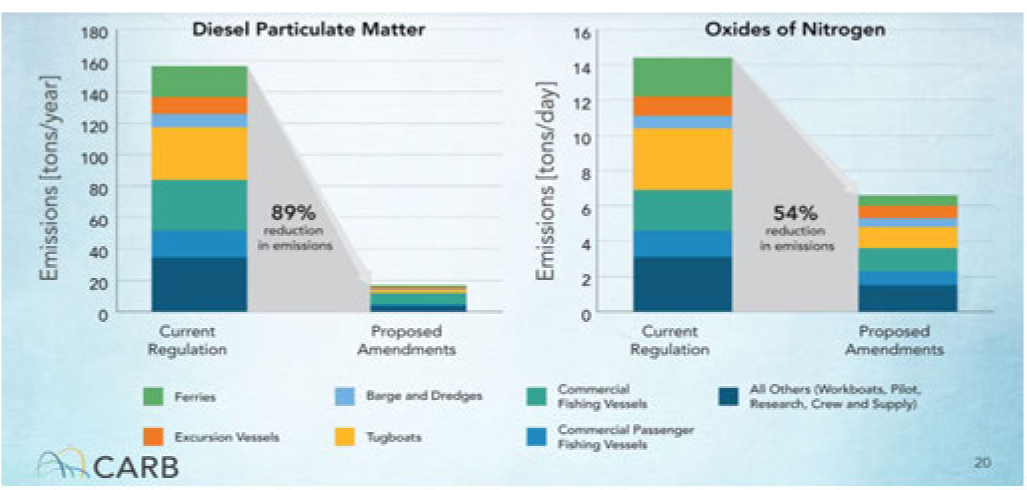
Appendix A14.2: IC.14 Shore Power or Stack Capture for Barges and Tug Boats Data Management System (To Be Provided Later)

Appendix A14.3: Shore Power or Stack Capture for Barges and Tug Boats Emissions Calculation Workbook

- As a baselines for this IC project, RLW emissions calculated as part of the "2021 Update to the Emissions Inventory for Commercial Harbor Craft: Methodology and Results" by CARB are used.
- Assumes that the CARB Commercial Harbor Craft rule will reduce NOx by 54%, PM by 89% and ROG by 54% (same as NOx) percent. See below.
- Assumes that stack capture and/or shore power will further reduce emissions by 50%. True reduction will be higher but this is a conservative estimate.

Baseline Emissions			
Year	NOX (MTPY)	PM (MTPY)	HC (MTPY)
2027	95.34	3.21	6.06
2028	95.13	3.19	6.02
2029	94.85	3.18	5.96
2030	94.40	3.15	5.89
2031	93.73	3.12	5.81
2032	93.03	3.08	5.71
2033	92.31	3.04	5.62
2034	91.56	3.00	5.53
2035	90.81	2.96	5.44
2036	90.02	2.91	5.34
2037	89.14	2.86	5.24
2038	88.25	2.81	5.14
2039	87.37	2.76	5.04
2040	86.51	2.72	4.94
2041	85.65	2.67	4.85
2042	84.81	2.62	4.75
2043	83.99	2.58	4.66
2044	83.19	2.53	4.57
2045	82.33	2.49	4.48
2046	81.43	2.45	4.39
2047	80.53	2.41	4.30
2048	79.64	2.36	4.21
2049	78.71	2.32	4.12
2050	77.78	2.28	4.03

IC Project Reduction			
Year	NOX (MTPY)	PM (MTPY)	HC (MTPY)
2027	21.93	0.18	1.39
2028	21.88	0.18	1.38
2029	21.81	0.17	1.37
2030	21.71	0.17	1.36
2031	21.56	0.17	1.34
2032	21.40	0.17	1.31
2033	21.23	0.17	1.29
2034	21.06	0.16	1.27
2035	20.89	0.16	1.25
2036	20.70	0.16	1.23
2037	20.50	0.16	1.21
2038	20.30	0.15	1.18
2039	20.10	0.15	1.16
2040	19.90	0.15	1.14
2041	19.70	0.15	1.11
2042	19.51	0.14	1.09
2043	19.32	0.14	1.07
2044	19.13	0.14	1.05
2045	18.94	0.14	1.03
2046	18.73	0.13	1.01
2047	18.52	0.13	0.99
2048	18.32	0.13	0.97
2049	18.10	0.13	0.95
2050	17.89	0.13	0.93



Note: The net reduction in PG&E electricity usage means a net reduction in GHGs.

Appendix B: Emissions Equivalency - Baseline Emissions

Richmond Long Wharf (RLW) operations vary from year to year, with on average more than 135 unique vessels calling RLW annually and those vessels comprise nearly 420 total annual vessel calls to the terminal. Some vessels are frequent callers doing routine work, and others are spot charters that may only call Richmond Long Wharf on a single visit and never return. Richmond Long Wharf activity also varies based on the refinery operations – if there is a large refinery maintenance event affecting a particular plant, there may be less activity at a given berth that receives products to feed that plant, and corresponding increase in activity at a different berth to compensate for the loss of the plant during the maintenance event. Consequently, each year is a unique set of circumstances associated with refinery operation and vessel calls, and therefore, emissions. For purposes of the Baseline Emissions, Chevron evaluated “high”, “low’ and “average” operational years from 2016-2022. We found that 2016 was representative of an “average” year in terms of vessel activity, 2019 was a high year, and 2021 was a low activity year, due in part to the effects of the pandemic and labor issues.

Emissions Equivalency: To establish equivalency, the Application should provide three main components for each of the outlined sub-concepts:

B.1: Baseline Emissions Calculations Data Management System

B.2: Baseline Emissions Estimates and Summary per section 93130.17 (b)(1)(C): “Estimate of the vessel emissions planned to be covered under the Innovative Concept for each pollutant NOx, PM 2.5, and ROG by multiplying the emission factor for a pollutant found in section 93130.5(d) of this Control Measure by the expected number of vessel visits, average visit duration, and expected power used during an average visit.”

B.3: An estimate of reductions that would be achieved under direct compliance with the regulation, in absence of any Innovative Concept (generally referred to as **Direct Compliance Estimates**).

B.4: An estimate of reductions achieved by the proposed Innovative Concept (generally referred to as **Innovative Concept Estimates**).

APPENDIX B.1 – Baseline Emissions Calculations Data Management System

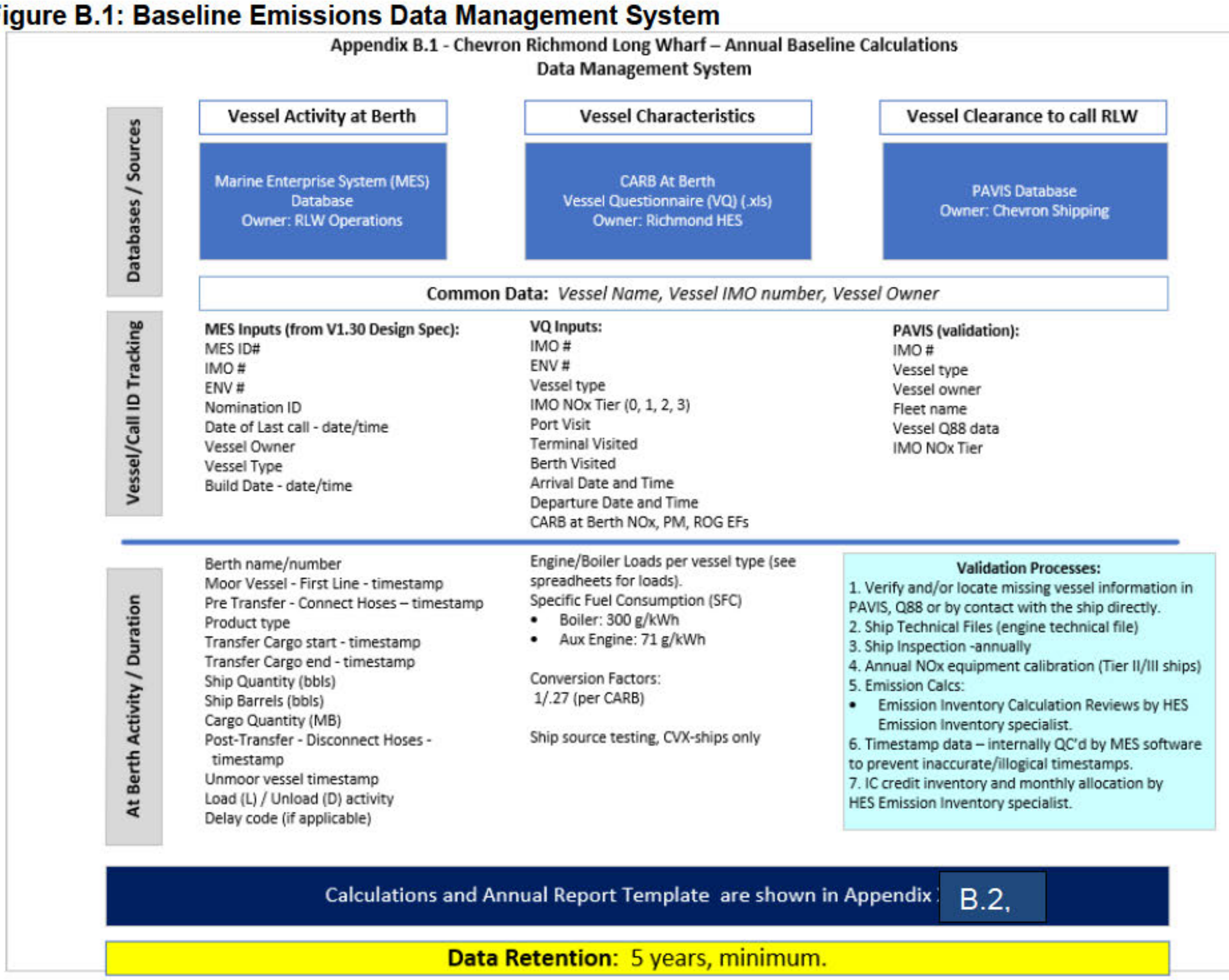
Chevron maintains a central database, called the Marine Enterprise System ("MES"), which tracks shipping activity from the initial cargo nomination to the vessel arrival, load or discharge of the nominated cargo at berth, concluding with the vessel departure (unmooring). As shown below, MES is the source of the majority of data inputs used to calculate vessel activity at berth, particularly timestamps for mooring and unmooring, cargo transfer start and finish, and total barrels transferred by cargo type, as well as vessel details such as IMO number, vessel owner and vessel type.

These vessel at berth activity inputs are common to not only the Baseline emissions calculations, but any vessel-related innovative concepts that require an estimate of emissions associated with at-berth activity, such as IC.10, IC.11, IC.12, IC.13 and IC.14.

In addition to the data inputs provided or derived from MES, Chevron uses the CARB at Berth Vessel Questionnaire (VQ) to supplement inputs to the Baseline calculations, which is an .xls workbook submitted by the vessel to CARB within 30 days of the vessel call, with a cc: to the Richmond Long Wharf. The VQ spreadsheet provides further details that may not be available through MES, such as the vessel type, IMO NOx Tier (0, 1, 2, 3) and can further support as a data quality check for timestamps provided in MES for vessel arrival date/time and departure date/time.

Finally, if there are fields missing in the CARB at Berth VQ, Chevron can typically locate missing information about the vessel itself through its PAVIS database (owned/maintained by Chevron Shipping), which is used for vessel clearance data. If the data are not present in PAVIS, Chevron Shipping may also search vessel Technical Files or reach out to the vessel directly to obtain information on vessel design such as current NOx tier, and annual calibration for Tier II/Tier III vessels as shown in the Validation Processes, below.

Figure B.1: Baseline Emissions Data Management System



APPENDIX B.2 – Baseline Emissions Estimates and Summary

Appendix B.2.1

Summary of Baseline Emissions Estimates, Direct Compliance Emission Estimates and Innovate Concept Estimates

Since there is a range of potential emissions dependent on traffic across the wharf, the Baseline and Direct Compliance Emissions estimates are given on the basis of:
(1) High utilization represented by 2019 data; (2) Averge utilization represented by 2016 data; and (3) low utilization represented by 2021 data.

Emissions Reduction Summary

NOx		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
Baseline Emissions	Max (2019)	274.9	274 9	274.9	274 9	274.9	274 9	274.9	274.9	274.9	274.9		
	Ave (2016)	253.7	253.7	253.7	253.7	253.7	253.7	253.7	253.7	253.7	253.7		
	Low (2021)	245.2	245 2	245.2	245 2	245.2	245 2	245.2	245.2	245.2	245.2		
Required Emissions Reduction	Max (2019)	0	0	0	0	0	219.4	219.4	219.4	219.4	219.4		
	Ave (2016)	0	0	0	0	0	202 5	202.5	202.5	202.5	202.5		
	Low (2021)	0	0	0	0	0	195.7	195.7	195.7	195.7	195.7		
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	34.4	45.2		
	Ave (2016)	0	0	0	0	0	0	0	0	52.7	62.6		
	Low (2021)	0	0	0	0	0	0	0	0	47.5	58.5		
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	198.3	198.3	198.3		
	Ave (2016)	0	0	0	0	0	0	0	183.1	183.1	183.1		
	Low (2021)	0	0	0	0	0	0	0	177.1	177.1	177.1		
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	198.3		
	Ave (2016)	0	0	0	0	0	0	0	0	0	183.1		
	Low (2021)	0	0	0	0	0	0	0	0	0	177.1		
Total IC NOx Reduction		36.2	84 5	119.8	175.1	186.0	258 2	261.7	261.3	236.4	236.4		
Banked Emission Credits		36.2	120 8	240.5	415.7	601.6						601.6	Remaining
						601.6						601.6	Pre-2027
						601.6						601.6	Credits

NOx: Shore Power estimated emissions reduction does not meet the CARB at Berth CAECS Emission reduction target for NOx due to only controling aux engine emissions, and the necessity to wait for fleet turnover of ships being shore power capable. Capture & Control estimated emissions reduction does not meet the target when potential VIE's and TIE's are taken into accout, and do not come close until forecasted in-service date of 2029 (Barge Based) or 2031 (shore-based).

Chevron's IC portfolio meets and exceeeds the NOx CAECS Emission reduction target with reductions beginning in 2022.

$PM_{2.5}$		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
Baseline Emissions	Max (2019)	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1		
	Ave (2016)	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7		
	Low (2021)	9.0	9 0	9.0	9 0	9.0	9 0	9.0	9.0	9.0	9.0		
Required Emissions Reduction	Max (2019)	0	0	0	0	0	8 3	8.3	8.3	8.3	8.3		
	Ave (2016)	0	0	0	0	0	8 0	8.0	8.0	8.0	8.0		
	Low (2021)	0	0	0	0	0	7.4	7.4	7.4	7.4	7.4		
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0.4	0.6		
	Ave (2016)	0	0	0	0	0	0	0	0	0.6	0.8		
	Low (2021)	0	0	0	0	0	0	0	0	0.6	0.7		
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	7.7	7.7	7.7		
	Ave (2016)	0	0	0	0	0	0	0	7.4	7.4	7.4		
	Low (2021)	0	0	0	0	0	0	0	6.9	6.9	6.9		
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	7.7		
	Ave (2016)	0	0	0	0	0	0	0	0	0	7.4		
	Low (2021)	0	0	0	0	0	0	0	0	0	6.9		
Total IC PM2.5 Reduction		0.9	2 0	3.4	4 8	5.2	5 2	5.2	5.2	4.6	4.6		
Banked Emission Credits / Consumption		0.9	2 9	6.3	11.1	16.3	-3.1	-3.1	-3.1	-3.7	-3.4	0.0	Remaining
						16.3	-2 8	-2.8	-2.8	-3.4	-3.4	1.3	Pre-2027
						16.3	-2 2	-2.2	-2.2	-2.8	-2.8	4.0	Credits
IC Reduction with Credit Usage							8 3	8.3	8.3	8.3	8.0		
							8 0	8.0	8.0	8.0	8.0		
							7.4	7.4	7.4	7.4	7.4		

PM2.5: Shore Power estimated emissions reduction does not meet the CARB at Berth CAECS Emission reduction target for PM2.5 due to only controling aux engine emissions, and the necessity to wait for fleet turnover of ships being shore power capable. Capture & Control estimated emissions reduction does not meet the target when potential VIE's and TIE's are taken into accout, and do not come close until forecasted in-service date of 2029 (Barge Based) or 2031 (shore-based).

With credits banked from IC's implemented pre-2027, Chevron's IC portfolio meet the PM2.5 CAECS Emission reduction target throughout the first compliance period with credits remaining at the end of 2031 in the ave and low cases, and potentially in the max case with potential additional reductions not presently included in the forecast.

Appendix B.2.1
Summary of Baseline Emissions Estimates, Direct Compliance Emission Estimates and Innovate Concept Estimates

ROG		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
Baseline Emissions	Max (2019)	11.9	11 9	11.9	11 9	11.9	11 9	11.9	11 9	11.9	11.9		
	Ave (2016)	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1		
	Low (2021)	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7		
Required Emissions Reduction	Max (2019)	0	0	0	0	0	9.7	9.7	9.7	9.7	9.7		
	Ave (2016)	0	0	0	0	0	9 0	9.0	9.0	9.0	9.0		
	Low (2021)	0	0	0	0	0	8.7	8.7	8.7	8.7	8.7		
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	1.3	1.7		
	Ave (2016)	0	0	0	0	0	0	0	0	2.0	2.4		
	Low (2021)	0	0	0	0	0	0	0	0	1.8	2.2		
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	8.6	8.6	8.6		
	Ave (2016)	0	0	0	0	0	0	0	8.0	8.0	8.0		
	Low (2021)	0	0	0	0	0	0	0	7.7	7.7	7.7		
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	8.6		
	Ave (2016)	0	0	0	0	0	0	0	0	0	8.0		
	Low (2021)	0	0	0	0	0	0	0	0	0	7.7		
Total IC ROG Reduction		1.8	7.4	13.2	13 9	14.3	15 9	15.9	15 9	14.6	14.6		
Banked Emission Credits		1.8	9 2	22.4	36 3	50.6						50.6	Remaining
						50.6						50.6	Pre-2027
						50.6						50.6	Credits

ROG: Shore Power estimated emissions reduction does not meet the CARB at Berth CAECS Emission reduction target for ROG due to only controling aux engine emissions, and the necessity to wait for fleet turnover of ships being shore power capable. Capture & Control also falls slighty short of meeting the emission reduction targets even after the forecasted in-service date of 2029 (barge-based) and 2031 (shore-based). In additional to potential VIE's and TIE's, based on the assumption 90% Capture efficiency and 90% Control efficiency for ROG in addition to uncontrolled emissions during connection and disconnection, capture & control falls slightly short of the required reduction which is slighly above 81%

Chevron's IC portfolio meets and exceeeds the ROG CAECS Emission reduction target as early as 2024.

GHG		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Emissions	Max (2019)	51,412	51,412	51,412	51,412	51,412	51,412	51,412	51,412	51,412	51,412
	Ave (2016)	49,118	49,118	49,118	49,118	49,118	49,118	49,118	49,118	49,118	49,118
	Low (2021)	45,594	45,594	45,594	45,594	45,594	45,594	45,594	45,594	45,594	45,594
Required Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	0
	Ave (2016)	0	0	0	0	0	0	0	0	0	0
	Low (2021)	0	0	0	0	0	0	0	0	0	0
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	1,561	2,655
	Ave (2016)	0	0	0	0	0	0	0	0	2,304	2,536
	Low (2021)	0	0	0	0	0	0	0	0	2,056	2,369
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	-8,588	-8,588	-8,588
	Ave (2016)	0	0	0	0	0	0	0	-8,461	-8,461	-8,461
	Low (2021)	0	0	0	0	0	0	0	-47	-47	-47
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	-8,588
	Ave (2016)	0	0	0	0	0	0	0	0	0	-8,461
	Low (2021)	0	0	0	0	0	0	0	0	0	-9,155
Total IC GHG Reduction		345	2,086	51,383	98,482	109,573	157,218	157,218	157,218	156,984	156,984

GHG: Chevron's IC's far exceed the GHG emissions reductions of all of the CAECS. Capture & Control results in an increase in GHG emissions due to the emissions from the Inert Gas System (IGS).

Appendix B.2.1

Summary of Baseline Emissions Estimates, Direct Compliance Emission Estimates and Innovate Concept Estimates

Cumulative Emissions Reduction Summary

NOx Cumulative Emissions Reduction		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Emissions	Max (2019)	274.9	549.7	274.9	274 9	274.9	274 9	274.9	274.9	274.9	274.9
	Ave (2016)	253.7	507 3	761.0	1014.6	1268.3	1522 0	1775.6	2029 3	2283.0	2536.6
	Low (2021)	245.2	490 5	735.7	980 9	1226.1	1471.4	1716.6	1961 8	2207.0	2452.3
Required Emissions Reduction	Max (2019)	0	0	0	0	0	219.4	438.7	658.1	877.4	1096.8
	Ave (2016)	0	0	0	0	0	202 5	404.9	607.4	809.8	1012.3
	Low (2021)	0	0	0	0	0	195.7	391.4	587.1	782.8	978.5
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	34.4	79.6
	Ave (2016)	0	0	0	0	0	0	0	0	52.7	115.3
	Low (2021)	0	0	0	0	0	0	0	0	47.5	106.0
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	198.3	396.7	595.0
	Ave (2016)	0	0	0	0	0	0	0	183.1	366.2	549.2
	Low (2021)	0	0	0	0	0	0	0	177.1	354.3	531.4
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	198.3
	Ave (2016)	0	0	0	0	0	0	0	0	0	183.1
	Low (2021)	0	0	0	0	0	0	0	0	0	177.1
Total IC NOx Reduction		36.2	120 8	240.5	415.7	601.6	859 9	1121.6	1382 9	1619.3	1855.7

$PM_{2.5}$ Cumulative Emissions Reduction		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Emissions	Max (2019)	10.1	20.1	30.2	40 2	50.3	60 3	70.4	80.4	90.5	100.6
	Ave (2016)	9.7	19 3	29.0	38.7	48.3	58 0	67.6	77 3	87.0	96.6
	Low (2021)	9.0	18 0	27.0	36 0	45.0	54 0	63.0	72.1	81.1	90.1
Required Emissions Reduction	Max (2019)	0	0	0	0	0	8 3	16.6	24 8	33.1	41.4
	Ave (2016)	0	0	0	0	0	8 0	15.9	23 9	31.8	39.8
	Low (2021)	0	0	0	0	0	7.4	14.8	22 3	29.7	37.1
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0.4	1.0
	Ave (2016)	0	0	0	0	0	0	0	0	0.6	1.4
	Low (2021)	0	0	0	0	0	0	0	0	0.6	1.3
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	7.7	15.4	23.0
	Ave (2016)	0	0	0	0	0	0	0	7.4	14.8	22.1
	Low (2021)	0	0	0	0	0	0	0	6.9	13.8	20.6
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	7.7
	Ave (2016)	0	0	0	0	0	0	0	0	0	7.4
	Low (2021)	0	0	0	0	0	0	0	0	0	6.9
Total IC PM2.5 Reduction		0.9	2 9	6.3	11.1	16.3	21 5	26.7	31 9	36.5	41.1

Appendix B.2.1
Summary of Baseline Emissions Estimates, Direct Compliance Emission Estimates and Innovate Concept Estimates

ROG Cumulative Emissions Reduction		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Emissions	Max (2019)	11.9	23 9	35.8	47 8	59.7	71.7	83.6	95.6	107.5	119.5
	Ave (2016)	11.1	22 2	33.3	44 5	55.6	66.7	77.8	88 9	100.0	111.2
	Low (2021)	10.7	21 3	32.0	42.7	53.3	64 0	74.7	85 3	96.0	106.7
Required Emissions Reduction	Max (2019)	0	0	0	0	0	9.7	19.4	29.1	38.8	48.5
	Ave (2016)	0	0	0	0	0	9 0	18.1	27.1	36.1	45.2
	Low (2021)	0	0	0	0	0	8.7	17.3	26 0	34.7	43.3
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	1.3	3.0
	Ave (2016)	0	0	0	0	0	0	0	0	2.0	4.3
	Low (2021)	0	0	0	0	0	0	0	0	1.8	4.0
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	8.6	17.2	25.9
	Ave (2016)	0	0	0	0	0	0	0	8.0	16.1	24.1
	Low (2021)	0	0	0	0	0	0	0	7.7	15.4	23.1
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	8.6
	Ave (2016)	0	0	0	0	0	0	0	0	0	8.0
	Low (2021)	0	0	0	0	0	0	0	0	0	7.7
Total IC ROG Reduction		1.8	9 2	22.4	36 3	50.6	66 5	82.3	98 2	112.8	127.4

GHG Cumulative Emissions Reduction		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Emissions	Max (2019)	51,412	102,824	154,236	205,648	257,060	308,472	359,884	411,296	462,708	514,120
	Ave (2016)	49,118	98,237	147,355	196,473	245,592	294,710	343,828	392,947	442,065	491,183
	Low (2021)	45,594	91,188	136,781	182,375	227,969	273,563	319,157	364,750	410,344	455,938
Required Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	0
	Ave (2016)	0	0	0	0	0	0	0	0	0	0
	Low (2021)	0	0	0	0	0	0	0	0	0	0
Shore Power Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	1,561	4,216
	Ave (2016)	0	0	0	0	0	0	0	0	2,304	4,840
	Low (2021)	0	0	0	0	0	0	0	0	2,056	4,425
Barge Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	-8,588	-17,177	-25,765
	Ave (2016)	0	0	0	0	0	0	0	-8,461	-16,922	-25,383
	Low (2021)	0	0	0	0	0	0	0	-47	-93	-140
Shore-Based Capture & Control Emissions Reduction	Max (2019)	0	0	0	0	0	0	0	0	0	-8,588
	Ave (2016)	0	0	0	0	0	0	0	0	0	-8,461
	Low (2021)	0	0	0	0	0	0	0	0	0	-9,155
Total IC GHG Reduction		345	2,431	53,814	152,297	261,870	419,088	576,306	733,524	890,508	1,047,492

Appendix B.2.2

Baseline Emissions Reduction

Since there is a range of potential emissions dependent on traffic across the wharf, the Baseline and Direct Compliance Emissions estimates are given on the basis of (1) High utilization represented by 2019 data; (2) Averge utilization represented by 2016 data; and (3) low utilization represented by 2021 data.

Baseline Emissions Reduction - Inputs and Calculation Methodology for NOx, PM, and ROG Emissions Reductions

$$Baseline\ Emissions\ Reduction\ = \sum(Total\ Baseline\ Emissions\ - Total\ Required\ Emissions)$$

For each vessel class:

Total Baseline Emissions = Aux Engines Emissions (MT) + Boiler Emissions (MT)

*Total Aux Engine Emissions (MT)= Aux Engines Fuel consumed (MT) * (1 kwh/0.27 MGO) * EF (g/KWh) / 1000*

*Aux Engines Fuel Consumed (MT) = Number of Calls * Berth Hrs (hrs) * Load (kw) * SFC (g/KWh) / (1000000 g/MT)*

*Boiler Fuel Consumed (MT) = (Fuel Consumed during Discharge + Fuel Consumed during non-discharge berth time) * Specific Fuel Consumption Factor / 1000000*

*= (Boiler Load Pumping (kw) * Discharge Hrs (hrs)) + Boiler Load Other (kW) (Berth Hrs - Discharge Hrs) * SFC (g/KWh) / (1000000 g/MT)*

*Boiler Emissions (MT) = Fuel consumed (MT) * (1 kwh/0.27 MGO) * Emission Factor (g/KWh) / 1000*

Emissions Reduction = mass emissions reduction for NOx, PM, or ROG (metric tons)

EF = Emission Factor for NOx, PM, or ROG (g/kWh)

SFC = Specific Fuel Consumption (g/kWh)

For GHG Emissions:

Total Emissions (MT) = Total Aux Engine Emissions (MT) + Total Boiler Emissions (MT)

*Total Aux Engine Emissions (MT) = Berth Hrs (hrs) * GHG EF (g/kWh) * Boiler Aux Load (kW) * (1 MT / 1,000,000 g)*

*Total Boiler Emissions (MT) = (Boiler Load Pumping (kW) * Discharge Hrs (hrs) + Boiler Load Other (kW) * (Berth Hrs - Discharge Hrs)) * GHG Emission Factor (g/kWh) * (1 MT/1,000,000 g)*

Turbo Generator (TG) Emissions = 0

Input	Source	Vessel Type (kW)					
		Chemica	Product	Panamax	Aframax	SuezMax	VLCC
Aux Engine Load per vessel	Starcrest 2020 PoLB Loads	1395	1050	832	986	689	1011
Aux Boiler Pumping Load per Vessel Type		421	3089	3547	4976	8170	8262
Other Aux Boiler Load per		875	875	875	875	875	875
Aux Engine SFC	H53, Appendix H 2019 Update to Inventory for Ocean-going vessels at Berth Methodology and Results	271 g/kWh					
Boiler SFC		300 g/kWH					
Conversion factor for kg fuel to kWh	(Section 93130.171(d)(1)(B)	1kwh/0.27 kg MGO					

Emission Factors - Carb at Berth Baseline

Source	g/kWh		
	NOx	$PM_{2.5}$	ROG
Aux Engi	13.8	0.17	0.52
Boilers	2	0.17	0.11

Emission Factors - CAECS required

Source	g/kWh		
	NOx	$PM_{2.5}$	ROG
Aux Engi	2.8	0.03	0.1
Boilers	0.4	0.03	0.02

Emissions Factors for GHG

Source	g/kWh			
	CO2	CH4	N2O	CO2e
Aux Engi	696	0.008	0.029	704.8
Boilers	962	0.002	0.075	984.4
MSD-ED	657	0.010	0.029	665.9

Specie	GWP
CO2	1
CH4	25
N2O	298

From GREET2022 for California

Specie	GWP
CH4	0.005
N2O	0.001
CO2	162.1
CO2e	162.6

Appendix B.2.2

Baseline Emissions Reduction

Baseline Emissions - High (2019)

	Inputs: Number of Calls	Average of Berth (hrs)	Average of Discharge (hrs)	Boiler Aux Load (kW)	Boil Load (kW) Pumping	Aux SFC (g/kWh)	Boil Load (kW) Other	Boiler SFC (g/kWh)	Calculations: Sum of Aux Fuel (MT)	Sum of Boil Fuel (MT)	CARB-at-Berth Baseline Emissions – Aux Engine (MT): CARB At-Berth Baseline Aux Engine NOx	CARB AT-Berth Baseline Aux Engine PM2.5	CARB AT-Berth Baseline Aux Engine ROG	Boiler (MT): CARB AT-Berth Baseline Boiler NOx	CARB AT-Berth Baseline Boiler PM2.5	CARB AT-Berth Baseline Boiler ROG	Total (MT): CARB AT-Berth Baseline Total NOx	CARB AT-Berth Baseline Total PM2.5	CARB AT-Berth Baseline Total ROG	CARB-at-Berth Required Emissions – Aux Engine (MT): Required CARB At-Berth Aux Engine NOx	Required CARB At-Berth Aux Engine PM2.5	Required CARB At-Berth Aux Engine ROG	Boiler (MT): Required CARB At-Berth Boiler NOx	Required CARB At-Berth Boiler PM2.5	Required CARB At-Berth Boiler ROG	Total (MT): Required CARB At-BerthTotal NOx	Required CARB At-Berth Total PM2.5	Required CARB At-Berth Total ROG	CARB-at-Berth Emissions Reduction – Total (MT): CARB At-Berth Baseline Emissions Reduction on Total NOx	CARB At-Berth Baseline Emissions Reduction on Total PM2.5	CARB At Berth Baseline Emissions Reduction on Total ROG	GHG Emissions – Total (MT): Calc Aux Engine CO2e	Calc Boiler CO2e	Calc Total CO2e
2019	**417**	**41.59**	**15.61**	**938.88**	**4625.94**	**216.9**	**875**	**300**	3,582	12,388																								
AfraMax	**81**	**40.33**	**19.43**	**986**	**4976**	**217**	**875**	**300**	699	2,794	35.72	0.44	1.35	20.69	1.76	1.14	56.42	2.20	2.48	7.25	0.08	0.26	4.14	0.31	0.21	11.39	0.39	0.47	45.03	1.81	2.02	2,270	9,167	11,437
Chemical	**18**	**21.52**	**4.31**	**1395**	**421**	**217**	**875**	**300**	117	91	5.99	0.07	0.23	0.68	0.06	0.04	6.67	0.13	0.26	1.22	0.01	0.04	0.14	0.01	0.01	1.35	0.02	0.05	5.32	0.11	0.21	381	299	680
PanaMax	**50**	**59.38**	**30.76**	**832**	**3547**	**217**	**875**	**300**	536	2,012	27.40	0.34	1.03	14.90	1.27	0.82	42.30	1.60	1.85	5.56	0.06	0.20	2.98	0.22	0.15	8.54	0.28	0.35	33.76	1.32	1.50	1,741	6,602	8,344
Product	**167**	**48.01**	**10.16**	**1050**	**3089**	**217**	**875**	**300**	1,827	3,231	93.37	1.15	3.52	23.93	2.03	1.32	117.30	3.18	4.83	18.94	0.20	0.68	4.79	0.36	0.24	23.73	0.56	0.92	93.57	2.62	3.92	5,934	10,602	16,536
SuezMax	**101**	**26.77**	**16.06**	**689**	**8170**	**216.6**	**875**	**300**																										
Aux	40	19.76	9.08	689	8170	217	875	300	118	1,003	6.04	0.07	0.23	7.43	0.63	0.41	13.47	0.71	0.64	1.23	0.01	0.04	1.49	0.11	0.07	2.71	0.12	0.12	10.76	0.58	0.52	384	3,290	3,674
MSD-ED	3	39.08	21.08	689	8170	205	875	300	17	169	0.85	0.01	0.03	1.25	0.11	0.07	2.10	0.12	0.10	0.17	0.00	0.01	0.25	0.02	0.01	0.42	0.02	0.02	1.68	0.10	0.08	54	555	609
PAL	58	30.96	20.61	689	8170	217	875	300	269	3,088	13.72	0.17	0.52	22.87	1.94	1.26	36.60	2.11	1.78	2.78	0.03	0.10	4.57	0.34	0.23	7.36	0.37	0.33	29.24	1.74	1.45	0	10,132	10,132
Total Emissions - High (2019)											183.09	2.26	6.90	91.76	7.80	5.05	274.85	10.06	11.95	37.15	0.40	1.33	18.35	1.38	0.92	55.50	1.77	2.24	219.35	8.28	9.70	10,763	40,649	51,412

Baseline Emissions - Ave (2016)

	Inputs: Number of Calls	Average of Berth (hrs)	Average of Discharge (hrs)	Boiler Aux Load (kW)	Boil Load (kW) Pumping	Aux SFC (g/kWh)	Boil Load (kW) Other	Boiler SFC (g/kWh)	Calculations: Sum of Aux Fuel (MT)	Sum of Boil Fuel (MT)	CARB-at-Berth Baseline Emissions – Aux Engine (MT): CARB At-Berth Baseline Aux Engine NOx	CARB AT-Berth Baseline Aux Engine PM2.5	CARB AT-Berth Baseline Aux Engine ROG	Boiler (MT): CARB AT-Berth Baseline Boiler NOx	CARB AT-Berth Baseline Boiler PM2.5	CARB AT-Berth Baseline Boiler ROG	Total (MT): CARB AT-Berth Baseline Total NOx	CARB AT-Berth Baseline Total PM2.5	CARB AT-Berth Baseline Total ROG	CARB-at-Berth Required Emissions – Aux Engine (MT): Required CARB At-Berth Aux Engine NOx	Required CARB At-Berth Aux Engine PM2.5	Required CARB At-Berth Aux Engine ROG	Boiler (MT): Required CARB At-Berth Boiler NOx	Required CARB At-Berth Boiler PM2.5	Required CARB At-Berth Boiler ROG	Total (MT): Required CARB At-BerthTotal NOx	Required CARB At-Berth Total PM2.5	Required CARB At-Berth Total ROG	CARB-at-Berth Emissions Reduction – Total (MT): CARB At-Berth Baseline Emissions Reduction on Total NOx	CARB At-Berth Baseline Emissions Reduction on Total PM2.5	CARB At Berth Baseline Emissions Reduction on Total ROG	GHG Emissions – Total (MT): Calc Aux Engine CO2e	Calc Boiler CO2e	Calc Total CO2e
2016	**378**	**40.90**	**18.26**	**935.93**	**4665.95**	**217.0**	**875**	**300**	3,203	12,146																								
AfraMax	**25**	**57.37**	**21.91**	**986**	**4976**	**217**	**875**	**300**	307	1,050	15.68	0.19	0.59	7.78	0.66	0.43	23.46	0.85	1.02	3.18	0.03	0.11	1.56	0.12	0.08	4.74	0.15	0.19	18.73	0.70	0.83	997	3,447	4,444
Chemical	**16**	**26.04**	**1.96**	**1395**	**421**	**217**	**875**	**300**	126	105	6.45	0.08	0.24	0.78	0.07	0.04	7.22	0.15	0.29	1.31	0.01	0.05	0.16	0.01	0.01	1.46	0.03	0.05	5.76	0.12	0.23	410	345	754
PanaMax	**27**	**62.87**	**41.11**	**832**	**3547**	**217**	**875**	**300**	306	1,335	15.66	0.19	0.59	9.89	0.84	0.54	25.56	1.03	1.13	3.18	0.03	0.11	1.98	0.15	0.10	5.16	0.18	0.21	20.40	0.85	0.92	995	4,382	5,377
Product	**196**	**44.44**	**16.33**	**1050**	**3089**	**217**	**875**	**300**	1,984	4,412	101.43	1.25	3.82	32.68	2.78	1.80	134.11	4.03	5.62	20.58	0.22	0.73	6.54	0.49	0.33	27.12	0.71	1.06	107.00	3.32	4.56	6,446	14,478	20,924
SuezMax	**114**	**28.09**	**17.64**	**689**	**8170**	**217.0**	**875**	**300**																										
Aux	45	19.08	10.46	689	8170	217	875	300	128	1,255	6.56	0.08	0.25	9.30	0.79	0.51	15.86	0.87	0.76	1.33	0.01	0.05	1.86	0.14	0.09	3.19	0.15	0.14	12.67	0.72	0.62	417	4,120	4,537
PAL	69	33.97	22.33	689	8170	217	875	300	350	3,987	17.91	0.22	0.67	29.53	2.51	1.62	47.44	2.73	2.30	3.63	0.04	0.13	5.91	0.44	0.30	9.54	0.48	0.43	37.90	2.25	1.87	0	13,083	13,083
Total Emissions - Ave (2016)											163.69	2.02	6.17	89.97	7.65	4.95	253.66	9.66	11.12	33.21	0.36	1.19	17.99	1.35	0.90	51.21	1.71	2.09	202.45	7.96	9.03	9,265	39,854	49,118

Appendix B.2.2

Baseline Emissions Reduction

Baseline Emissions - Low (2021)

	Inputs: Number of Calls	Inputs: Average of Berth (hrs)	Inputs: Average of Discharge (hrs)	Inputs: Boiler Aux Load (kW)	Inputs: Boil Load (kW) Pumping	Inputs: Aux SFC (g/kWh)	Inputs: Boil Load (kW) Other	Inputs: Boiler SFC (g/kWh)	Calculations: Sum of Aux Fuel (MT)	Calculations: Sum of Boil Fuel (MT)	CARB-at-Berth Baseline Emissions, Aux Engine (MT): CARB AT-Berth Baseline Aux Engine NOx	CARB AT-Berth Baseline Aux Engine PM2.5	CARB AT-Berth Baseline Aux Engine ROG	CARB-at-Berth Baseline Emissions, Boiler (MT): CARB AT-Berth Baseline Boiler NOx	CARB AT-Berth Baseline Boiler PM2.5	CARB AT-Berth Baseline Boiler ROG	CARB-at-Berth Baseline Emissions, Total (MT): CARB AT-Berth Baseline Total NOx	CARB AT-Berth Baseline Total PM2.5	CARB AT-Berth Baseline Total ROG
2021	**335**	**46.62**	**15.15**	**913.14**	**5064.21**	**217.0**	**875**	**300**	3,186	11,119									
AfraMax	**35**	**68.79**	**26.18**	**986**	**4976**	**217**	**875**	**300**	515	1,759	26.33	0.32	0.99	13.03	1.11	0.72	39.36	1.43	1.71
Chemical	**12**	**18.72**	**0.00**	**1395**	**421**	**217**	**875**	**300**	68	59	3.48	0.04	0.13	0.44	0.04	0.02	3.91	0.08	0.16
PanaMax	**17**	**68.05**	**23.35**	**832**	**3547**	**217**	**875**	**300**	209	622	10.67	0.13	0.40	4.61	0.39	0.25	15.28	0.52	0.66
Product	**149**	**53.63**	**11.69**	**1050**	**3089**	**217**	**875**	**300**	1,821	3,255	93.07	1.15	3.51	24.11	2.05	1.33	117.18	3.20	4.83
SuezMax	**122**	**31.45**	**16.54**	**689**	**8170**	**217.0**	**875**	**300**											
Aux	45	28.49	12.63	689	8170	217	875	300	192	1,580	9.80	0.12	0.37	11.70	0.99	0.64	21.50	1.12	1.01
PAL	77	33.18	18.83	689	8170	217	875	300	382	3,843	19.52	0.24	0.74	28.47	2.42	1.57	47.99	2.66	2.30
Total Emissions - Low (2021)											162.86	2.01	6.14	82.36	7.00	4.53	245.23	9.01	10.67

	CARB-at-Berth Required Emissions, Aux Engine (MT): Required CARB At-Berth Aux Engine NOx	Required CARB At-Berth Aux Engine PM2.5	Required CARB At-Berth Aux Engine ROG	CARB-at-Berth Required Emissions, Boiler (MT): Required CARB At-Berth Boiler NOx	Required CARB At-Berth Boiler PM2.5	Required CARB At-Berth Boiler ROG	CARB-at-Berth Required Emissions, Total (MT): Required CARB At-BerthTotal NOx	Required CARB At-Berth Total PM2.5	Required CARB At-Berth Total ROG	CARB-at-Berth Emissions Reduction, Total (MT): CARB At-Berth Baseline Emissions Reduction on Total NOx	CARB At-Berth Baseline Emissions Reduction on Total PM2.5	CARB At Berth Baseline Emissions Reduction on Total ROG	GHG Emissions, Total (MT): Calc Aux Engine CO2e	Calc Boiler CO2e	Calc Total CO2e
2021															
AfraMax	5.34	0.06	0.19	2.61	0.20	0.13	7.95	0.25	0.32	31.41	1.18	1.39	1,673	5,773	7,446
Chemical	0.71	0.01	0.03	0.09	0.01	0.00	0.79	0.01	0.03	3.12	0.07	0.13	221	194	414
PanaMax	2.17	0.02	0.08	0.92	0.07	0.05	3.09	0.09	0.12	12.19	0.43	0.53	678	2,040	2,719
Product	18.88	0.20	0.67	4.82	0.36	0.24	23.71	0.56	0.92	93.47	2.63	3.92	5,914	10,681	16,595
SuezMax															
Aux	1.99	0.02	0.07	2.34	0.18	0.12	4.33	0.20	0.19	17.17	0.92	0.82	623	5,185	5,807
PAL	3.96	0.04	0.14	5.69	0.43	0.28	9.66	0.47	0.43	38.34	2.19	1.88	0	12,612	12,612
Total Emissions - Low (2021)	33.04	0.35	1.18	16.47	1.24	0.82	49.52	1.59	2.00	195.71	7.42	8.66	9,109	36,484	45,594

APPENDIX B.3 – Direct Compliance Estimates

Appendix B.3

Direct Compliance Emission Estimates

Since there is a range of potential emissions dependent on traffic across the wharf, the Baseline and Direct Compliance Emissions estimates are given on the basis of:
(1) High utilization represented by 2019 data; (2) Averge utilization represented by 2016 data; and (3) low utilization represented by 2021 data.

Shore Power Emissions Reduction

Shore Power - Inputs and Calculation Methodology for NOx, PM, and ROG Emissions Reductions

For each Vessel call,

$Shore\ Power\ Emissions\ Reduction\ = (Baseline\ Total\ Emissions\ - (Controlled\ Aux\ Emissions\ - Uncontrolled\ emissions\ during\ connection\ \&\ disconnection)$) * % of Fleet Shore Power capable

$Total\ Shore\ Power\ Emissions\ Reduction$ = ∑Shore Power Emissions Reduction for all shore power capable vessels $* \ (1 - VIE\% \ - TIE\%)$

Baseline Total Emissions = See Baseline Calcs

*Controlled Aux Emissions = Baseline Total Emissions * (Control Efficiency)*

Uncontrolled Aux Emissions = (Aux Engines Fuel Consumed (MT) / Berth hrs (hrs) (1 kWh/0.27 MGO) * Emission Factor g/kwh * (Connection-Disconnect Hrs) / 1000 kg/MT)*

Emissions Reduction = mass emissions reduction for NOx, PM, or ROG (metric tons)

EF = Emission Factor for NOx, PM, or ROG (g/kWh)

For GHG Emissions, For each vessel:

*Controlled Aux Emissions = (Aux Load * EF g/kwh * (Connection-Disconnect Hrs) / 1000000 g/MT)*

*Uncontrolled Aux Emissions = (Aux Load ** EF_{GREET} *g/kwh * (Berth Hours - Connection-Disconnect Hrs) / 1000000 g/MT)*

Emissions Reduction = Baseline Total Emissions - (Controlled Emissions - Uncontrolled Emissions)

EF = Emission Factor for CO2e

EF_{GREET} *= Emission Factor for CO2e from GREET2022 for California*

Assumptions:

- Shore Power In service Date 1/1/2030
- 4 Chevron ships retrofit for Shore power by 1/1/30
- Phase-In of remaining Chevron ships, and non-Chevron ships:
  - Assumes Aframax/Suezmax 15 years from build date, product ships 20 years, but not before 2030
- Control only Aux emissions, no impact on boiler emissions
- Total time assumed for connection and disconnection = 3 hrs (2 hrs connection + 1 hrs disconnection)

	Inputs								Calculations					
	Calls	CARB AT-Berth Baseline Aux Engine NOx	CARB AT-Berth Baseline Aux Engine PM2.5	CARB AT-Berth Baseline Aux Engine ROG	% VIE's	% TIE's	Total Aux Fuel (from Baseline Calc)	Hours/call (from Baseline Calc Inputs)	Uncontrolled Aux Emissions - NOx	Overall Shore Power Nox Reduction (100% Fleet Turnover)	Uncontrolled Aux Emissions - PM2.5	Overall Shore Power PM2.5 Reduction (100% Fleet Turnover)	Uncontrolled Aux Emissions - ROG	Overall Shore Power ROG Reduction (100% Fleet Turnover)
2019 (High)	417	**183.09**	**2.26**	**6.90**	5%	5%	3,582	41.6	13.2	170	0.163	2.09	0.49763	6.4
2016 (Ave)	378	**163.69**	**2.02**	**6.17**	5%	5%	3,203	40.9	12.0	152	0.148	1.87	0.45244	5.7
2021 (Low)	335	**162.86**	**2.01**	**6.14**	5%	5%	3,186	46.6	10.5	152	0.129	1.88	0.39493	5.7

	Inputs					Calculations	
	Calls	Baseline Aux Engines GHG (from baseline calc)	Ave Boiler Aux Load (kW) (non TG)	Ave Berth Hours/call (from Baseline Calc Inputs)	Ave Discharge Hours/call	Reduced Aux Emissions - GHG	Overall Shore Power GHG Reduction (100% Fleet Turnover)
2019 (High)	417	**10,763**	**982**	41.6	15.6	3,056	7,708
2016 (Ave)	378	**9,265**	**1,002**	40.9	18.3	2,636	6,629
2021 (Low)	335	**9,109**	**989**	46.6	15.1	2,513	6,596

Emission Reduction from Fleet Turnover (MT)		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Fleet Turnover (%) - Cumulative (2019)		0	0	0	0	0	0	0	0	22.5%	27.4%
Fleet Turnover (%) - Cumulative (2016)		0	0	0	0	0	0	0	0	38.6%	42.5%
Fleet Turnover (%) - Cumulative (2021)		0	0	0	0	0	0	0	0	34.6%	39.9%
	Max (2019)	0	0	0	0	0	0	0	0	34.4	45.2
Shore Power NOx Reduction	Ave (2016)	0	0	0	0	0	0	0	0	52.7	62.6
	Low (2021)	0	0	0	0	0	0	0	0	47.5	58.5
	Max (2019)	0	0	0	0	0	0	0	0	0.42	0.56
Shore Power PM2.5 Reduction	Ave (2016)	0	0	0	0	0	0	0	0	0.65	0.77
	Low (2021)	0	0	0	0	0	0	0	0	0.59	0.72
	Max (2019)	0	0	0	0	0	0	0	0	1.30	1.70
Shore Power ROG Reduction	Ave (2016)	0	0	0	0	0	0	0	0	1.99	2.36
	Low (2021)	0	0	0	0	0	0	0	0	1.79	2.20
	Max (2019)	0	0	0	0	0	0	0	0	1,561	2,655
Shore Power GHG Reduction	Ave (2016)	0	0	0	0	0	0	0	0	2,304	2,536
	Low (2021)	0	0	0	0	0	0	0	0	2,056	2,369

Capture & Control Emission Reduction

Capture & Control - Inputs and Calculation Methodology for NOx, PM, and ROG Emissions Reductions

$$Capture\ \&\ Control\ Emissions\ Reduction\ = (Basline\ Total\ Emissions\ *\ Capture\ Efficiency\ *\ Control\ Efficiency\ *\ (1 - VIE\% - TIE\%) - Startup/shutdown\ hrs\ *\ lbs/hr\ /\ 2204.6\ lbs/MT\ *\ \#\ of\ calls\ ) *\ (1 - VIE\% - TIE\%)$$

Emissions Reduction = mass emissions reduction for NOx, PM, or ROG (metric tons)
EF = Emission Factor for NOx, PM, or ROG (g/kWh)

Assumptions:
Barge-Base Capture & Control In service Date 1/1/2029
Shore-Based Capture & Control In service Date 1/1/2031
Control Efficiencies/Emissions Calculations. Source: EO AB-15-01 for CAEM METS-1 (for NOx, PM2.5); CAEM Process model for ROG
Capture Efficiency = 90%
Control Efficiency:
NOx: 90%
PM2.5: 95%
ROG: 90%
Emissions Rate from the METS-1 diesel generators during start-up and shutdown are uncontrolled,
and estimated to be 5.95 lbs per hour NOx (Uncontrolled METS-1 NOx Emission Rate)
and 0.18 lbs per hour PM2.5 (Uncontrolled METS-1 $PM_{2.5}$ Emission Rate)
estimated to be 0.25 lbs per hour ROG per CAEM System process model
Start-up and shutdown (total hours): 2 hours

GHG Emissions Calculations:
No control on GHG
Inert Gas emissions: Based on reheat fuel consumption (gph) from CAEM System models, assumes 10X reheat (conservative estimate, can be 20X)
For each berth, GHG Emissions (MT) = Reheat fuel consumption (gal/hr) * ship calls * berth hrs * 10 * 10.20468 (kg CO2/gal diesel) * 1MT / 1000 kg
10.20468 kg CO2/gal diesel (source: Table C-1, USEPA Greenhouse Gas Reporting Rule (40 CFR Part 98), Fuel emission factor for Distillate Fuel Oil No. 2)

	Inputs													Calculated Emission Reductions			
	Calls	CARB AT-Berth Baseline Total NOx	CARB AT-Berth Baseline Total PM2.5	CARB AT-Berth Baseline Total ROG	Capture Efficiency	Control Efficiency NOx	Control Efficiency PM2.5	Control Efficiency ROG	Uncontrolled METS-1 NOx Emission rate (lbs/hr)	Uncontrolled METS-1 PM Emission rate (lbs/hr)	Uncontrolled METS-1 ROG Emission rate (lbs/hr)	% VIE's	% TIE's	NOx Emissions Reduction	PM2.5 Emissions Reduction	ROG Emission Reduction	GHG Emissions from IGS (MT)
2019 (High)	417	**274.85**	**10.06**	**11.95**	90%	90%	95%	90%	5.95	0.18	0.25	5%	5%	**198**	**7.7**	**8.6**	8,588
2016 (Ave)	378	**253.66**	**9.66**	**11.12**	90%	90%	95%	90%	5.95	0.18	0.25	5%	5%	**183**	**7.4**	**8.0**	8,461
2021 (Low)	335	**245.23**	**9.01**	**10.67**	90%	90%	95%	90%	5.95	0.18	0.25	5%	5%	**177**	**6.9**	**7.7**	9,155

		2019			2016			2021		
Estimated Inert Gas GHG Emission	reheat fuel consumption (gph)	**Ship Calls**	**Ave Hrs at Berth**	**CO2 Emissions (MT)**	**Ship Calls**	**Ave Hrs at Berth**	**CO2 Emissions (MT)**	**Ship Calls**	**Ave Hrs at Berth**	**CO2 Emissions (MT)**
System #1	5.8	43	63.0	1,605	86	52.9	2,695	62.00	67.1	2,464
System #2	5.8	145	47.7	4,097	99	45.0	2,636	13.00	**20.4**	157
System #3	6.5	3	20.0	40	69	41.2	1,885	125.00	**54.6**	4,532
System #4	3.2	154	35.0	1,758	113	28.2	1,042	15.00	**38.4**	188
System #5	4.7	72	31.5	1,089	11	38.6	204	120.00	**31.5**	1,814
		417	41.6	8,588	378	40.9	8,461	335	46.6	9,155

APPENDIX B.4 – Innovative Concepts Estimates

Appendix B.4

IC Emissions Reduction

Innovative Concepts (ICs) - See individual calculations provided for emissions inputs and metholodology in Appendix A

Assumptions:

For basis of IC Emission reductions shown here, Chevron's base IC Portfolio:

Non-CEQA ICs:

1. Newer Locomotive (50% emissions reduction beginning in 2030)
3. Diesel Air Compressors Replacement
6. TKN Heater Optimization
7. North Ranch Diesel Engine Replacement
10. Tier II or above certification on Auxiliary Engines (AE’s) for ships
11. Tier III or above certification on Auxiliary Engines (AE’s) for ships
12. Upgraded Combustion and Control systems for Auxiliary Boilers (AB’s) for ships

ICs Requiring CEQA:

2. Boiler Replacement Project
5. Wharf ERD replacement
8. Solar Electricity Project - General

Emission Reductions are calculated from in sevice date until the end of the first compliance period, 12/31/31

Emission Reductions from IC's 4,9,13,14 excluded from totals; uncertainty in implementation by end of first compliance period

NOx

Emissions Reduction	Est In Service Date	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Requires CEQA / Non-CEQA	Credit Generation Prior to 2027
1. Newer Locomotive	4/7/2022	36.2	49.1	49.1	49.1	49.1	49.1	49.1	49.1	24.6	24.6	Non-CEQA	232.8
2. Boiler Replacement Project	12/31/2026	0.0	0.0	0.0	0.0	0.2	63.2	63.2	63.2	63.2	63.2	CEQA	0.2
3. Diesel Air Compressors Replacement	7/1/2023	0.0	13.9	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	Non-CEQA	96.6
4. FCC Ammonia Optimization	1/1/2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
5. Wharf ERD replacement	12/31/2024	0.0	0.0	0.0	11.8	11.8	11.8	11.8	11.8	11.8	11.8	CEQA	23.6
6. TKN Heater Optimization	6/1/2024	0.0	0.0	21.7	37.1	37.1	37.1	37.1	37.1	37.1	37.1	Non-CEQA	95.9
7. North Ranch Diesel Engine Replacement	3/31/2024	0.0	0.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Non-CEQA	1.2
8. Solar Electricity Project - General	12/31/2025	0.0	0.0	0.0	0.0	6.9	6.9	6.9	6.9	6.9	6.9	CEQA	6.9
9. Solar Electricity Project - Shore Power	1/1/2030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	CEQA	0.0
10. Tier II or above certification on Auxiliary Engines (AE’s) for ships	1/1/2023	0.0	0.0	0.0	0.0	0.7	1.5	3.0	4.1	5.4	5.4	Non-CEQA	0.7
11. Tier III or above certification on Auxiliary Engines (AE’s) for ships	1/1/2023	0.0	21.5	21.0	24.8	27.9	34.2	33.7	32.2	30.6	30.6	Non-CEQA	95.2
12. Upgraded Combustion and Control systems for Auxiliary Boilers (AB’s) for ships	1/1/2025	0.0	0.0	0.0	24.3	24.3	26.4	28.9	28.9	28.9	28.9	Non-CEQA	48.5
13. Dual-Fuel Tier III Auxiliary Engines (AE’s) and Auxiliary Boilers (AB’s)	9/1/2025	0.0	0.0	0.0	0.0	35.2	55.9	55.9	55.9	55.9	55.9	Non-CEQA	35.2
14. Shore Power/Stack Capture for Barges and Tug Boats	12/31/2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.0	22.0	Non-CEQA	0.0
Total IC's NOx Reduction [(1)]		**36.2**	**84.5**	**119.8**	**175.1**	**186.0**	**258.2**	**261.7**	**261.3**	**236.4**	**236.4**		**601.6**

(1) IC's 4,9,13,14 excluded from totals; uncertainty in implementation by end of first compliance period

Appendix B.4

IC Emissions Reduction

$PM_{2.5}$

Emissions Reduction	Est In Service Date	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	Requires CEQA / Non-CEQA	Credit Generation Prior to 2027
1. Newer Locomotive	4/7/2022	0.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.6	0.6	Non-CEQA	5.8
2. Boiler Replacement Project	12/31/2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CEQA	0.0
3. Diesel Air Compressors Replacement	7/1/2023	0.0	0.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Non-CEQA	5.1
4. FCC Ammonia Optimization	1/1/2026	0.0	0.0	0.0	0.0	103.0	103.0	103.0	103.0	103.0	103.0	Non-CEQA	103.0
5. Wharf ERD replacement	12/31/2024	0.0	0.0	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	CEQA	1.7
6. TKN Heater Optimization	6/1/2024	0.0	0.0	0.8	1.3	1.3	1.3	1.3	1.3	1.3	1.3	Non-CEQA	3.4
7. North Ranch Diesel Engine Replacement	3/31/2024	0 00	0 00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	Non-CEQA	0.1
8. Solar Electricity Project - General	12/31/2025	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	CEQA	0.4
9. Solar Electricity Project - Shore Power	1/1/2030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	CEQA	0.0
10. Tier II or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
11. Tier III or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
12. Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for ships	1/1/2025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
13. Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)	9/1/2025	0.0	0.0	0.0	0.0	35.2	55.9	55.9	55.9	55.9	55.9	Non-CEQA	35.2
14. Shore Power/Stack Capture for Barges and Tug Boats	12/31/2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	Non-CEQA	0.0
Total IC's PM2.5 Reduction (1)		**0.9**	**2.0**	**3.4**	**4.8**	**5.2**	**5.2**	**5.2**	**5.2**	**4.6**	**4.6**		**16.3**

(1) IC's 4,9,13,14 excluded from totals; uncertainty in implementation by end of first compliance period

ROG

Emissions Reduction	Est In Service Date	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	Requires CEQA / Non-CEQA	Credit Generation Prior to 2027
1. Newer Locomotive	4/7/2022	1.8	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.3	1.3	Non-CEQA	11.8
2. Boiler Replacement Project	12/31/2026	0.0	0.0	0.0	0.0	0.0	1.6	1.6	1.6	1.6	1.6	CEQA	0.0
3. Diesel Air Compressors Replacement	7/1/2023	0.0	4.9	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	Non-CEQA	34.0
4. FCC Ammonia Optimization	1/1/2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
5. Wharf ERD replacement	12/31/2024	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CEQA	0.0
6. TKN Heater Optimization	6/1/2024	0.0	0.0	0.9	1.6	1.6	1.6	1.6	1.6	1.6	1.6	Non-CEQA	4.1
7. North Ranch Diesel Engine Replacement	3/31/2024	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Non-CEQA	0.2
8. Solar Electricity Project - General	12/31/2025	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	CEQA	0.4
9. Solar Electricity Project - Shore Power	1/1/2030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	CEQA	0.0
10. Tier II or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
11. Tier III or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
12. Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for ships	1/1/2025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
13. Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)	9/1/2025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Non-CEQA	0.0
14. Shore Power/Stack Capture for Barges and Tug Boats	12/31/2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	Non-CEQA	0.0
Total IC's ROG Reduction (1)		**1.8**	**7.4**	**13.2**	**13.9**	**14.3**	**15.9**	**15.9**	**15.9**	**14.6**	**14.6**		**50.6**

(1) IC's 4,9,13,14 excluded from totals; uncertainty in implementation by end of first compliance period

Appendix B.4

IC Emissions Reduction

GHG

Emissions Reduction	Est In Service Date	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	Requires CEQA / Non-CEQA
1. Newer Locomotive	4/7/2022	345	468	468	468	468	468	468	468.1	234	234	Non-CEQA
2. Boiler Replacement Project	12/31/2026	0	0	0	0	131	47,776	47,776	47,775.6	47,776	47,776	CEQA
3. Diesel Air Compressors Replacement	7/1/2023	0	1,618	3,210	3,210	3,210	3,210	3,210	3,209.7	3,210	3,210	Non-CEQA
4. FCC Ammonia Optimization	1/1/2026	0	0	0	0	0	0	0	0.0	0	0	Non-CEQA
5. Wharf ERD replacement	12/31/2024	0	0	37	13,629	13,629	13,629	13,629	13,629.5	13,629	13,629	CEQA
6. TKN Heater Optimization	6/1/2024	0	0	46,677	79,831	79,831	79,831	79,831	79,830.6	79,831	79,831	Non-CEQA
7. North Ranch Diesel Engine Replacement	3/31/2024	0	0	991	1,314	1,314	1,314	1,314	1,314.4	1,314	1,314	Non-CEQA
8. Solar Electricity Project - General	12/31/2025	0	0	0	30	10,990	10,990	10,990	10,990.0	10,990	10,990	CEQA
9. Solar Electricity Project - Shore Power	1/1/2030	0	0	0	0	0	0	0	0	6,280	6,280	CEQA
10. Tier II or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0	0	0	0	0	0	0	0	0	0	Non-CEQA
11. Tier III or above certification on Auxiliary Engines (AE's) for ships	1/1/2023	0	0	0	0	0	0	0	0	0	0	Non-CEQA
12. Upgraded Combustion and Control systems for Auxiliary Boilers (AB's) for ships	1/1/2025	0	0	0	0	0	0	0	0	0	0	Non-CEQA
13. Dual-Fuel Tier III Auxiliary Engines (AE's) and Auxiliary Boilers (AB's)	9/1/2025	0	0	0	0	0	0	0	0	0	0	Non-CEQA
14. Shore Power/Stack Capture for Barges and Tug Boats	12/31/2029	0	0	0	0	0	0	0	0	0	0	Non-CEQA
Total IC's GHG Reduction (1)		**345**	**2,086**	**51,383**	**98,482**	**109,573**	**157,218**	**157,218**	**157,218**	**156,984**	**156,984**	

(1) IC's 4,9,13,14 excluded from totals; uncertainty in implementation by end of first compliance period