

United States Environmental Protection Agency / Region 4

Risk Management Program Inspection Report

Valero Memphis Refinery

Memphis, Tennessee

June 11-13, 2024

1.0 Introduction

The U.S. Environmental Protection Agency's efforts to reduce the likelihood and severity of chemical accidents include planning and legislative initiatives such as the National Contingency Plan, the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Accidental Release Prevention requirements under Section 112(r) of the Clean Air Act (CAA), as amended in 1990. This report outlines an inspection of the Risk Management Program (RMP) as mandated by Section 112(r)(7) of the CAA.

The focus of this inspection was to assess the RMP for the chemical distribution process at the Valero Memphis Refinery Facility located in Memphis, Shelby County, Tennessee. This Facility was selected for inspection because it hadn't been inspected under the RMP within the last five years and is an agency priority due to the use of hydrofluoric acid. The inspection, which was conducted on June 11-13, 2024, consisted of an examination of program documentation, as well as site reviews of various aspects of Facility operations. Personnel from the Facility participated throughout the inspection. Requested program documents were provided for further review off-site. This report will provide a background of the Facility and a listing of observations.

2.0 Background

The Valero Memphis Refinery is approximately 145-miles east of Little Rock, Arkansas, and 220-miles west of Nashville, Tennessee. The refinery has been upgraded since its acquisition in 2005, Valero has invested \$245 million upgrading the Facility to a highly efficient Facility with crude oil being supplied primarily through the Capline Pipeline and by barge and an additional pipeline that runs directly to the Memphis airport. The refinery's crude oil capacity is 195,000 barrels per day. Refinery products including gasoline, diesel products, and jet fuel, are primarily sold in the United States, United Kingdom, Canada, and Ireland markets on a wholesale basis. The Facility lists 285 full time employees in its most recent RMP submission. The oil refining process at the Facility is subject to the RMP requirements of 40 C.F.R. Part 68 and EPCRA Section 302. The Facility reported 15 covered processes subject to the requirements of EPA's RMP regulations in its most recent risk management plan submission, dated May 25, 2023, which are listed in Table 1, below. The Facility considers all 15 of these covered processes to be RMP Program 3 processes.

Table 1. RMP Covered processes for the Facility

Process ID	Description	Chemical CAS Number	Chemical	Quantity (lb)
1000131404	Cryogenic Unit II	00-11-11	Flammable Mixture	25,000
1000131405	Alkylation Unit	00-11-11	Flammable Mixture	870,000
		7664-39-3	Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater)	160,000
1000131406	Cryogenic Unit	00-11-11	Flammable Mixture	35,000
1000131407	FCC Unit	00-11-11	Flammable Mixture	990,000
1000131408	Gas Con	00-11-11	Flammable Mixture	980,000
1000131409	DHDS	00-11-11	Flammable Mixture	46,000
1000131410	Sat Gas Unit	00-11-11	Flammable Mixture	1,200,000
1000131411	Tank Farm	00-11-11	Flammable Mixture	22,000,000
1000131412	NHDS	00-11-11	Flammable Mixture	1,700,000
1000131413	CCR	00-11-11	Flammable Mixture	200,000
1000131414	Cat Gasoline Hydrocracker	00-11-11	Flammable Mixture	44,000
1000131415	Hydrocracking Unit	00-11-11	Flammable Mixture	120,000
1000131416	MSAT	00-11-11	Flammable Mixture	12,000
1000131417	West Crude Unit	00-11-11	Flammable Mixture	4,800
1000131418	East Crude Unit	00-11-11	Flammable Mixture	38,000

The background specifics are summarized as follows in Table 2.

TABLE 2: Inspection Information Summary

Inspection Team

Lead Inspector: Jordan Noles, Environmental Protection Agency (EPA)

Inspector: Steven Ramirez, EPA

Inspector: Justin Stark, EPA

Inspector-in-Training: Callie Sotolongo, EPA

Inspector: Brook McKowen, Eastern Research Group (ERG)

Inspector: Amy Federoff, ERG

Inspector: Liam Prendergast, ERG

Date of Facility Visit: June 11-13, 2024

Facility Identification

Name: Valero Memphis Refinery
Street Address: 2385 Riverport Road
City: Memphis County: Shelby State: Tennessee Zip: 38109
EPA Facility ID No: 100000158107
Dun & Bradstreet (D&B) No: 199623414
Latitude: 35.085843
Longitude: -090.083385

Name, address and phone of corporate parent company:

Owner/Operator: Valero Energy Corporation
Mailing Address: 2385 Riverport Road
City: Memphis State: Tennessee Zip: 38109

Name, title, and email of person responsible for 40 C.F.R. Part 68 implementation:

Name: Eric Brown
Title: VP & GM
Phone: (901) 775-5708
Email: Eric.brown@valero.com

Name and title of emergency contact:

Name: Pamela Jackson
Title: HSE director
Phone: (901) 947-8405
Email: Pam.jackson@valero.com

Name and titles of stationary source personnel involved in site inspection (*accompanied site tours, provided documents and explanations*):

Name	Title	Phone	Email
Taryn Thomas	Valero Safety	(901) 774-3100	taryn.thomas@valero.com
Greg Swearingen	Valero Environmental	(901) 947-8348	greg.swearingen@valero.com
Garrett Lewis	Valero Technical training	(210) 748-5430	Garrett.lewis@valero.com
Karen Drewery Kerkove	Supervisor technical training	(901) 947-8543	Karen.drewery@valero.com
Michael Holt	FCC Superintendent	(901) 947-8543	Michael.holt@valero.com
Jeremy Gross	Manager Routine Maintenance	(901) 775-8841	Jeremy.gross@valero.com
James Bowen	Manager Maintenance Planning	(901) 947-8420	James.bowen@valero.com

Nick Fazio	Emergency Service Superintendent	(901) 484-8380	Nick.fazio@valero.com
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Shane Marton	Staff Control Systems Engineer	(901) 775-5783	Shane.morton@valero.com
George Harmon	USW PSM representative	N/A	George.harmon@valero.com
Melissa Thompson	Staff Process Safety Engineer	(901) 775-8876	Melissa.thompson@valero.com
Grant Parker	Manager Planning/Economics	(985) 445-6580	Grant.parker@valero.com
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Eric Brown	VP & GM	(901) 775-5708	Eric.brown@valero.com
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Barbara Keeler	Manager Refinery Process Safety	(901) 947-8437	Barbara.keeler@valero.com
Victor Torres	Complex Manager	(901) 947-8396	Victor.torres@valero.com
Cameron Ellis	Unit Superintendent	(901) 947-8344	Cameron.ellis@valero.com
Trevor Blanchard	Complex Manager	(901) 775-5947	Trevor.blanchard@valero.com
Willie Bishop	USW Heath and Safety Rep	(901) 488-4123	Willie.bishop@valero.com
Lucas Marion	USW Top Rep	(901) 592-8385	Lucas.marion@valero.com
Pamela Jackson	Valero HSE Director	(901) 947-8405	Pam.jackson@valero.com
David Reed	Valero Reliability	(901) 947-8555	David.reed2@valero.com
Chris Harrison	Valero Superintendent	(901) 917-8413	chrisharrison@valero.com
Leo Stawford	USW Local President	(901) 493-8344	Lstanford1984@yahoo.com
Mitchell Blave	Complex Manager	(901) 775-5727	Mitchell.blave@valero.com
Steve Brewer	Valero Environmental	(901) 947-8360	steve.brewer@valero.com

Note: This is not a union facility.

Date of initial submission: August 19, 1999 (as Williams Refining LLC)

Date of most recent submissions: May 25, 2023

3.0 Observations

The inspection of the Valero Memphis Refinery evaluated various sections of the RMP regulations (40 C.F.R. Part 68, Program Level 3) and the inspection checklist included in "Guidance for Conducting Risk Management Programs Inspections under Clean Air Act Section 112(r)." The inspection began with an opening discussion of Facility operations. The discussion was followed by a tour of the Facility's chemical distribution process area. EPA inspectors then requested paperwork associated with the Facility's Risk Management Plan (RMP). The documents were reviewed by EPA inspectors on-site and provided for review off-site. An

inspection out-brief was conducted where EPA inspectors described their observations. Observations from the RMP inspection at the Valero Memphis, Facility are discussed below:

1. 40 C.F.R. § 68.15(c) requires that when responsibility for implementing individual requirements of this part is assigned to persons other than the person identified under paragraph (b) of this section, the names or positions of these people shall be documented and the lines of authority defined through an organization chart or similar document.
 - The Facility provided an organizational chart to show the personnel responsible for each element of the Facility's RMP compliance program in response to the pre-inspection information request provided by EPA on May 10, 2024. Facility personnel stated that the organizational chart was created specifically for the purpose of the inspection and was not kept as a record before receiving the request by the EPA inspection team. This indicates that the Facility had not historically documented the persons responsible for implementing individual RMP element requirements for the RMP covered processes present at the Facility. Additionally, the organizational chart listed job titles that did not match the actual job titles for the individuals responsible for the RMP elements at the Facility. For example, the organizational chart lists the job title of 'Director of Central Maintenance' as one of the responsible persons for implementing Mechanical Integrity. During the on-site portion of the inspection, Facility personnel clarified that the accurate job title for the person responsible for the Facility's Mechanical Integrity program was the 'Technical Service Director'.
2. 40 C.F.R. § 68.10(a)(3) requires the owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under § 68.115, to comply with the requirements of this part no later than the latest of the following dates: (3) The date on which a regulated substance is first present above a threshold quantity in a process.
 - Based on documentation reviewed to-date and information gathered from Facility personnel during the on-site inspection, the RMP covered processes at the Facility appear to exclude all piping and vessels after the header for the flare gas recovery process. Specifically, the piping and vessels that exist between the flare gas recovery header and the flaring system(s) and the flammables substances present therein are not considered as part of either the existing universe of the Facility's RMP covered processes or as a separate "flare gas system" covered process. As such, the Facility may not be adequately including the flare gas system as an individual covered process, or as part of an existing set of covered process(es), pursuant to the following:
 - Section 40 C.F.R. 68.3 states, "[Process] means any activity involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of

these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process.”

- Section 1.4 of General RMP Guidance – Chapter 1: General Applicability states, “Y[y]ou must also consider equipment, piping, hoses, or other interconnections that do not carry or contain the regulated substance, but that are important for accidental release prevention. Equipment or connections which contain utility services, process cooling water, steam, electricity, or other non-regulated substances may be considered part of a process if such equipment could cause a regulated substance release or interfere with mitigating the consequences of an accidental release.”
3. 40 C.F.R. § 68.42(a) requires the owner or operator to include in the five-year accident history all accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage.
- The Facility provided release estimate information that documented a release of liquid hydrocarbons that occurred between 02/14/2021 through 02/19/2021 from the North and South flare units in 2021 that resulted in offsite environmental damage. The Facility determined that the release event was initiated due to prolonged freezing temperatures that caused, “significant pipe and instrumentation freezing and subsequent unit trips/depressurizing to the flare system.” The Facility staff stated that the release resulted in liquid hydrocarbons falling from the South flare onto the ice covering and the shoreline of the adjacent Nonconnah Creek that required subsequent clean-up action. The release of liquid hydrocarbons to the adjacent creek resulted in offsite environmental damage, therefore, making this event reportable in the five-year accident history section of the RMP. To date, the Facility staff had not reported this release to their five-year accident history within their RMP submission.
4. 40 C.F.R. § 68.65(d)(1)(ii) requires the Information pertaining to the equipment in the process shall include piping and instrument diagrams (P&IDs);
- During the Facility walkthrough Inspectors identified discrepancies between P&IDs(based on those included in the listing provided and process equipment found in the field). Specifically, inspectors identified the following discrepancies:
 - P&ID No. 1006-d-2320 revision 41 (Acid Regeneration) for the HF bottoms line [2”HF-06442-AU1 (2” HC)] coming off of the acid regenerator (06-10-007), a pressure gage was observed in the field on a ¾” hand valve that was not present in the P&ID (See Photographs

No. VALERO-MM-EPA-RMP-004956 – CBI and VALERO-MM-EPA-RMP-004957 - CBI).

- P&ID No. 1006-d-2120 revision 38 (Acid Loading Station) for the fresh acid loading line (2" P-06T0020-AT1), a 2" flange was observed between the check valve and the ¾" hand valve that was present on the P&ID but was not observed in the field (See Photographs No. VALERO-MM-EPA-RMP-004970 - CBI and VALERO-MM-EPA-RMP-004971 - CBI).
- P&ID No. 1006-d-2110 revision 12 (Acid Storage Tank) for the line to/from the acid storage tank (4" P-10712-BA5H):
 - A 6" flange between HV937b and HV937a was observed on the P&ID but not in the field (See Photograph No. VALERO-MM-EPA-RMP-004959 - CBI).
 - A 6" flange between HV937a and the Acid storage tank (06-10-023) was present on the P&ID but not observed in the field (See Photograph No. VALERO-MM-EPA-RMP-004959 - CBI).
 - A pressure gauge observed off of a 1" valve coming off of a 6" valve from the acid storage tank bottom was present in the field but not present in the P&ID (See Photographs No. VALERO-MM-EPA-RMP-004962 - CBI and VALERO-MM-EPA-RMP-004963 - CBI).
- P&ID No. 1026-d-2050 revision 30 (NHDS #2 Reactor) A pressure indicator coming off a ¾" line from the 3" FL-006092-AA2A (NI) line was observed in the field but not present in the P&ID (See Photographs No. VALERO-MM-EPA-RMP-004986 – CBI and VALERO-MM-EPA-RMP-004987 - CBI). A pressure indicator coming off a ¾" valve from the 14" reactor effluent was present in the P&ID but not observed in the field (See Photograph No. VALERO-MM-EPA-RMP-004985 – CBI).

5. 40 C.F.R. § 68.65(d)(2)-(3) requires the owner or operator to document that equipment complies with recognized and generally accepted good engineering practices. For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the owner or operator shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

- Due to the presence of hydrofluoric acid (HF acid) in the alkylation processes at the Valero Memphis Refinery, the Facility should be operating and maintaining the HF Alkylation Unit in accordance with applicable recognized and generally accepted good engineering practices (RAGAGEP), specifically American Petroleum Institute Recommended Practice (API RP) 751, *Safe Operation of*

Hydrofluoric Acid Alkylation Units (Fifth Edition, August 2021). The Facility documented that the two most recent API RP 751 audits were completed on 12/10/2019 and 4/19/2023. The dates of the two most recent API RP 751 audits are separated by a period greater than three (3) years. The time elapsed between the two most recent API RP 751 audits is inconsistent with the requirements of API RP 751, specifically:

- Section 4.2.2 of API RP 751 (2021) states, “Each operating unit shall be audited at least every 3 years.”

6. 40 C.F.R. § 68.67(c)(2) requires the process hazard analysis to address the identification of any previous incident which had a likely potential for catastrophic consequences.
 - The Facility completed their most recent FCC Unit (PHA) in August 2022, about four years after an incident involving the FCC Unit at the BP Husky Refinery in Superior, Wisconsin occurred on April 26, 2018. The Valero Memphis August 2022 PHA includes a list of reviewed internal incidents but does not reference any related external incidents reported at other refineries. The HAZOP-style worksheets consider multiple “no flow”, “less flow”, “more pressure”, “less pressure” scenarios that may cause flow reversal or reduced differential pressure between the reactor and catalyst regenerator and lists closing the slide valve as the primary safeguard in addition to shutting down the reactor and/or catalyst regenerator. Public information regarding the BP Husky Refinery explosion was released by the Chemical Safety Board (CSB) in August 2018 and December 2018 as part of the CSB’s ongoing investigation. The factual update released by the CSB in August 2018 describes the details of the incident and identified equipment and instrumentation issues that lead to the explosion. The factual update released by the CSB in December 2018 compared the FCC unit explosion at the BP Husky Refinery in Superior, Wisconsin to the February 2015 explosion at the ExxonMobil Refinery in Torrance, California that occurred in the electrostatic precipitator of the FCC unit. The December 2018 CSB report also summarized post-incident actions taken by the Torrance Refinery where they “Evaluated and established parameters, limits, and associated equipment to ensure an appropriate steam-induced pressure barrier for FCC Emergency Shutdown and Safe Park procedures.” The Valero Memphis August 2022 PHA does not consider CSB recommendations associated with past similar incidents that have occurred in FCC units such as implementing a steam-induced pressure barrier. The lack of information included in the PHA indicates that the Facility has not fully addressed previous incidents within the refining industry which had a likely potential for catastrophic consequences at the Valero Memphis Facility.
7. 40 C.F.R. § 68.67(c)(5) requires the process hazard analysis to address stationary source siting, including the placement of processes, equipment, and buildings within the facility, and hazards posed by proximate stationary sources, and accidental release consequences posed by proximity to the public and public receptors.

- During the winter of 2021, the Facility experienced a freeze event that resulted in a Facility-wide shut down and a release of liquid hydrocarbons from the flare. Since then, a PHA revalidation was completed in 2022 for the FCC Unit and in 2023 for the HF Alkylation Unit and the NHT Unit. Within the PHAs provided, the Facility identified a global node which is set, “to address issues that affect the entire unit.” All of the PHAs provided by the Facility to the EPA Inspection Team occurred after the major freeze event in 2021; however, none of the PHAs completed since 2021 address risks posed by potential environmental risks and do not incorporate stationary source siting considerations within the global node.
8. 40 C.F.R. § 68.69(a)(3)(iii) requires the owner or operator to consider safety and health considerations: Control measures to be taken if physical contact or airborne exposure occurs.
- Valero’s operating procedures do not include text defining the control measures to be taken if physical contact or airborne exposure occurs where Valero personnel may interact with HF acid in the alkylation unit. For example, in the operating procedure titled, *06-0804 Sampling HF Acid using Swagelok Sample Station – Level 2*, there are identified safety and environmental precautions that list out the required personal protective equipment (PPE) and describe the hazards of HF acid but do not provide instruction for personnel if exposure to HF acid occurs. As such, the Facility’s operating procedures do not provide sufficient information for Facility personnel regarding the control measures that personnel should take if physical contact and/or airborne exposure occurs.
9. 40 C.F.R. § 68.73(d)(1)-(2) requires the owner or operator to perform inspections and tests on process equipment. Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.
- Due to the presence of HF acid in the alkylation processes at the Valero Memphis Refinery, the Facility should follow inspection and testing requirements described by API RP 751, *Safe Operation of Hydrofluoric Acid Alkylation Units* (Fifth Edition, August 2021). The Facility relies on a Rapid Acid Transfer System (RATS) to respond to a HF acid release or emergency in the alkylation unit. During the inspection, Facility staff acknowledged that they have tested instrumentation logic and functionality of individual equipment but have not activated the RATS with HF acid for testing. The Facility provided operating procedures for *06-0419 RATS Test Activation* and *06-0421 RATS Component Testing Requirements* that describe testing the RATS and individual pieces of equipment throughout the RATS. The Facility has procedures for testing the HF acid RATS but has not completed testing of the HF acid RATS to ensure that it directs the HF acid into a separate vessel within 15 minutes as required in API RP 751 (2021), specifically:

- Section 9.6.3 of API RP 751 (2021) states, “For a system to be considered RATS, the total duration from when a leak is first detected to when the HF acid inventory is secured in a separate vessel(s) should not be more than 15 minutes. The duration should include:
 - 1) the time required to notice that an HF leak has occurred,
 - 2) the time required to decide to activate the system,
 - 3) the time required to activate the system,
 - 4) the time for all the valves to move to proper position once the system is activated,
 - 5) the time required to transfer the HF to a secure location,
 - 6) the time for the system to recognize that the de-inventory process is complete,
 - 7) the time to close the valves to isolate the inventory.”

Inspection Report,

Prepared by:

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Callie Sotolongo, Inspector
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Todd Groendyke, Section Chief
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