

INSPECTION REPORT

Stationary Source	CITGO Corpus Christi Refinery East Plant CITGO Refining and Chemicals L.P.	
Facility Location	1801 Nueces Bay Blvd Corpus Christi, Texas 78407	
Media	Clean Air Act (CAA) – Section 112(r)(1) and (7) Risk Management Program (RMP)-40 CFR Part 68	
FRS Number	110000505640	
USEPA RMP Facility ID #	100000139566	
Latitude / Longitude	27.810556, -97.426944	
Dates of Inspection	December 11-15, 2023	
USEPA Inspection Coordinator	Diana Lundelius, U.S. EPA Region 6, Chemical Accident Enforcement Section	
Description of Activities	Inspection included the following activities: • Opening conference with facility representatives • On-site document review • Field verification of piping and instrumentation diagrams (P&IDs) and other field observations • Personnel interviews • Closing meeting with facility representatives	
Inspection Participants (on behalf of EPA)	Eastern Research Group, Inc. (ERG) • Anthony Gaglione • Brook McKeown • Brendan Scher	
Facility Participants	Veronica Fuentes, Manager Environmental Affairs Rick Mendoza, Environmental Air Programs Supervisor Joe Reyes, Safety and Health Manager Kevin Kenall, Manager Health, Safety, Security, & Environmental Protection (HSSE) See Attachment 1 for all facility participants	
For EPA – EPA Lead Inspector Signature/Date		
	Anthony Gaglione, ERG on behalf of EPA	Date
EPA Section Chief Signature/Date		
	Samuel Tates	Date

FACILITY/PROCESS DESCRIPTION

The CITGO Corpus Christi Refinery, located in Corpus Christi, Texas, is divided into the East Plant and the West Plant. The East Plant was the subject of this inspection. The East Plant is further subdivided into East Plant (EP) I and EP II.

The CITGO Corpus Christi Refinery East Plant (the Facility) was founded in 1935 as part of the Pontiac Refining Company. In 1990 it was purchased by a subsidiary of Petróleos de Venezuela, S.A. (PDVSA), the national oil company of Venezuela, and in 1992 it adopted the CITGO name. The Facility is located in a mixed-use urban and industrial area and covers approximately 890 acres. The CITGO Refinery East Plant employs approximately 576 full-time CITGO employees and approximately 1,051 contractors. The refinery operates 24 hours per day, 7 days per week and follows a four-crew, 12-hour shift schedule, with shift changes at 4:00 am and 4:00 pm for operations personnel. The operations personnel are represented by the United Steelworkers (USW) union.

The Facility has a rated crude oil refining capacity of 175,000 barrels per stream day (bpsd). The Facility refines a variety of crude oil grades, including light and heavy crude petroleum, and Facility personnel estimated its crude oil blend changes approximately every two to three days. The Facility was built to refine crude oils with high sulfur levels (sour crude) but has the ability to refine both low sulfur (sweet) and sour crude petroleum. The Facility's products include gasoline, petroleum distillates, liquefied petroleum gas (LPG), refined petrochemicals, elemental sulfur, coke, and refined mixed gas (i.e., still gas) products. The Facility also produces finished formulated gasoline and diesel formulated products that are loaded into trucks and shipped directly to retailers.

The Facility reported 16 Risk Management Program covered processes in its most recent risk management plan (RMP) registration submission dated March 2, 2020, as summarized in Table 1. Fifteen of the covered processes are Program 3 and one is Program 1. The refinery has two flares and one flare gas recovery (FGR) system, which are all tied together into a single flaring/relief system.

Process ID	Process Name	Program Level	Chemical	Category
1000105509	Cumene Unit	3	Flammable Mixture	Flammable
1000105510	FCCU No. 1	3	Flammable Mixture	Flammable
1000105511	Alkylation/Mole Sieve	3	Hydrogen fluoride (conc 50% or greater)	Toxic
			Flammable Mixture	Flammable
1000105512	Unibon Unit	3	Flammable Mixture	Flammable
			Hydrogen Sulfide	Toxic
1000105513	Crude/Vacuum Unit	3	Flammable Mixture	Flammable
1000105514	LPG	3	Flammable Mixture	Flammable
1000105515	No. 4 Platformer	3	Flammable Mixture	Flammable
1000105517	C4 Selective Hydrogenation Process (SHP) Unit	3	Flammable Mixture	Flammable

Process ID	Process Name	Program Level	Chemical	Category
1000105518	Fluidized Catalytic Cracking Unit (FCCU) No. 2	3	Flammable Mixture	Flammable
1000105519	Saturated Gas Plant	3	Flammable Mixture	Flammable
1000105520	Sulfur Recovery Unit (SRU)	3	Hydrogen Sulfide	Toxic
1000105522	Gasoline Hydrotreater	3	Flammable Mixture	Flammable
1000105523	HYDRAR	1	Flammable Mixture	Flammable
1000105524	FCC Gasoline Merox	3	Flammable Mixture	Flammable
1000105525	No. 4 Unifiner	3	Flammable Mixture	Flammable
1000105526	C3/C4 Splitter	3	Flammable Mixture	Flammable

PURPOSE OF THE INSPECTION

The inspection of the CITGO Corpus Christi Refinery East Plant occurred December 11, 2023, to December 15, 2023. The purpose of the inspection was to determine the Facility's implementation of, and compliance with, applicable requirements of the Clean Air Act (CAA) § 112(r)(7) and 40 CFR Part 68, Risk Management Program. The inspection focused on the following RMP-covered processes:

- Alkylation/Mole Sieve (Alky), RMP Process ID 1000105511;
- FCCU No. 2, RMP Process ID 1000105518; and
- SRU, RMP Process ID 1000105520.

The EPA selected the Alky covered process because it uses hydrogen fluoride (HF), a chemical identified as high risk under the EPA federal fiscal year (FY) 2024 to 2027 National Enforcement and Compliance Initiative (NECI) for Chemical Accident Risk Reduction. EPA selected the FCCU No. 2 covered process due to a known and established history of incidents and releases that have occurred in association with FCCUs at other U.S. refineries. The EPA selected the SRU covered process due to the Facility's RMP-reportable accident that occurred at the SRU on March 28, 2023.

In preparation for the inspection, Diana Lundelius of U.S. EPA Region 6 sent an electronic notice of inspection (NOI) and request for information (RFI) to the CITGO Environmental Affairs Manager on November 24, 2023. The RFI included a list of documentation that the inspection team intended to review upon their arrival at the CITGO refinery on December 11, 2023. The EPA NOI also informed CITGO of the right of employees and their representatives to participate in the inspection as provided by CAA § 112(r)(6)(L) and requested that CITGO inform employee representatives of the inspection and extend to them an invitation to participate. CITGO confirmed the receipt of the NOI on November 24, 2023.

OPENING CONFERENCE

The EPA Inspection Team arrived at the Facility at approximately 10:50 am CST on Monday, December 11, 2023. The EPA Inspection Team held an opening conference with Facility representatives at

approximately 11:05 am CST in the administration building. EPA Lead Inspector Gaglione initiated the opening conference by introducing the members of the inspection team and presenting credentials. Inspector Gaglione explained the purpose and scope of the inspection and proposed the schedule for the inspection and expected activities, which included personnel interviews, a driving tour of the Facility, walking tours of the Alky, FCCU No. 2, and SRU processes, and documentation requests and reviews. The opening conference included CITGO representatives who also participated throughout the inspection. The Attendance Sheet (see Attachment 1) includes all CITGO representatives who were either present at the opening conference and/or closing conference or participated in interviews during the inspection.

Inspector Gaglione and the Facility HSSE Manager signed the Notice of Inspection form (see Attachment 2) and the Receipt of Notice of Right to Claim Confidentiality form (see Attachment 3). The Facility made copies of the signed forms for its records and the EPA Inspection Team retained the originals on behalf of EPA.

INSPECTION OVERVIEW

CITGO representatives presented a safety orientation for the EPA Inspection Team and then escorted the EPA Inspection Team on a driving tour of the Facility. After the tour, Facility representatives gave an overview of the refinery. Throughout the week, the EPA Inspection Team conducted interviews with Facility personnel to discuss the implementation of and compliance with the requirements under the CAA § 112(r) Risk Management Program. The Attendance Sheet (see Attachment 1) tracked all personnel that participated in interviews with the EPA Inspection Team. While at the Facility, the inspection team performed a field walkdown of the Alky, FCCU No. 2, and SRU covered processes.

FIELD OBSERVATIONS

CITGO representatives escorted the EPA Inspection Team on a driving tour of the East Plant on Monday, December 11, 2023. On Tuesday, December 12, 2023, CITGO representatives escorted the EPA Inspection Team on a walking tour of the Alky, FCCU No. 2, and SRU covered processes, which included verifying the accuracy of piping and instrumentation diagrams (P&IDs). The EPA Inspection Team first attended a safety overview training related to the hazards present in the Alky unit before donning HF-specific personal protection equipment (PPE) and then entering the Alky unit inside the process unit boundaries. During the walking tour of these three covered processes, the EPA Inspection Team took 35 photographs of process equipment. The photographs were shared with CITGO, and the photograph log is provided in Attachment 4. Observations made during the walking tours include:

- Alky Unit observations:
 - The EPA Inspection Team observed a bleeder valve immediately downstream of the truck connection flange on the HF unloading line at the HF acid truck unloading station (Photographs 1 and 2 of Attachment 4). However, the acid storage drum (083V002B) P&ID (drawing number 83-4-8110G, revision 25; Bates 22-000009) does not show this bleeder valve.
 - The acid storage drum (083V002B) P&ID (drawing number 83-4-8110G, revision 25; Bates 22-000009) shows a local pressure indicator (PI) assembly, including a one-inch block valve and a

one-inch bleeder valve, immediately upstream of the truck connection flange on the nitrogen line at the HF acid truck unloading station. However, the EPA Inspection Team observed this local PI assembly, including the instrument line and both valves, to be missing in the field (Photographs 1 and 3 of Attachment 4).

- The acid storage drum (083V002B) P&ID (drawing number 83-4-8110G, revision 25; Bates 22-000009) shows a one-inch block valve and a one-inch bleeder valve immediately upstream of the truck connection flange on the nitrogen line at the HF acid truck unloading station. However, the EPA Inspection Team observed this block valve and bleeder valve to be missing in the field (Photographs 1 and 3 of Attachment 4).

- SRU observations:

The EPA Inspection Team observed a leaking steam trace tubing that was causing water to condense on the head of the acid gas knockout drum (052V001) (Photograph 16 of Attachment 4).

- FCCU No. 2 observations:

The main column receiver (031V005) P&ID (drawing number 31-4-8122D, revision 17; Bates 22-000237) shows three pressure safety valves (PSV) on 031V005: PSV-014-1, PSV-014-2, and PSV-014-3. The P&ID shows the block valve immediately upstream and immediately downstream of each PSV to be car-sealed open. However, the EPA Inspection Team observed the car seals on the upstream and downstream valves on PSV-014-1 and PSV-014-3 to be missing (Photograph 31 for the downstream valve of PSV-014-1, Photograph 32 for the upstream valve of PSV-014-1, Photographs 33 and 35 for the upstream valve of PSV-014-3, and Photograph 34 for the downstream valve of PSV-014-3, in Attachment 4).

DOCUMENTATION REVIEW

In preparation for the inspection, Diana Lundelius of U.S. EPA Region 6 sent an electronic NOI and RFI to the CITGO Environmental Affairs Manager, on November 24, 2023. The RFI included a list of documentation that the inspection team intended to review upon their arrival at the Facility on December 11, 2023. CITGO provided documentation in response to the RFI in a rolling production on December 5, December 6, December 7, and December 8, 2023, and a follow-up response on December 28, 2023. After the inspection, the EPA Inspection Team sent a request for additional documentation on December 30, 2023,¹ with a requested due date of February 9, 2024. CITGO provided documentation in response to the post-inspection document request in a rolling production on February 1, February 5, and February 8, 2024.

The EPA Inspection Team prepared an initial inspection report, signed on March 19, 2024, that was inclusive of the review of documentation provided in response to the November 24, 2023, RFI. That inspection report has been supplemented to prepare this investigation report, which is inclusive of the review of all documentation provided through February 8, 2024.

¹ The post-inspection document request was sent to CITGO via email on December 30, 2023, at approximately 12:58 am EST, which was December 29, 2023, approximately 11:58 pm CST.

40 CFR. PART 68 – CHEMICAL ACCIDENT PREVENTION PROVISIONS

40 CFR § 68.10 – Applicability

HYDRAR Program Level Applicability

CITGO reports in its RMP that the HYDRAR covered process is Program 1 and is covered for a regulated flammable mixture. Table 5-2 of CITGO's *Risk Management Plan Documentation* (Bates 05-000001 through 000249) states that the HYDRAR vessel CITGO evaluated for an off-site consequence analysis (OCA) worst-case release scenario (WCS) to determine the applicable program level was the stabilizer (019V008; Bates 05-000026). CITGO calculated a release quantity of 16,650 pounds (lbs) and distance-to-endpoint of 0.205 miles. The WCS documentation also provides the latitude and longitude of the vessel.

Appendix C of CITGO's *Risk Management Plan Documentation* provides maps of the WCS distance-to-endpoint for the HYDRAR stabilizer (Bates 05-000182 to 05-000184). The EPA Inspection Team reproduced these maps using MARPLOT. The EPA Inspection Team generated a MARPLOT map with the approximate location of the fence line between the CITGO East Plant and the neighboring Flint Hills Resources (FHR) facility. The other EPA generated map provides a close-up view of the southern portion of the 0.205-mile radius and the visible fence separating the CITGO East Plant and the FHR facility. These EPA Inspection Team's generated maps are consistent with the CITGO maps in Appendix C of the *Risk Management Plan Documentation*. Both sets of maps show the 0.205-mile radius crossing into the FHR facility fence line, an off site industrial public receptor in relation to the CITGO facility boundaries.

According to 40 CFR § 68.10(g)(2), a covered process can only be eligible for Program 1 requirements if the WCS distance to a toxic or flammable endpoint is less than the distance to any public receptor. 40 CFR 68.3 defines "public receptor" as "*offsite residences, institutions (e.g., schools, hospitals), industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release.*" Since the neighboring FHR facility is an industrial public receptor, the HYDRAR flammable WCS has a distance-to-endpoint that includes the distance to an off site public receptor. Therefore, the HYDRAR covered process does not meet the criteria to be designated as Program 1. In accordance with the criteria of 40 CFR § 68.10(i), the HYDRAR Unit meets the criteria of a Program 3 covered process instead.

C5 MEROX Unit Applicability

According to CITGO's *Risk Management Plan Documentation*, CITGO reported its C5 "Merox" (i.e., mercaptan oxidation) Unit as an RMP-covered process in its 2015 RMP (Bates 05-000041). According to its post-inspection document production, during its 2020 RMP update, CITGO determined that the C5 Merox Unit does not have greater than 10,000 lbs of a flammable regulated substance as the liquid-phase mixtures are exempted under 40 CFR § 68.115(b)(2)(i) and any mixtures that may be flammable

regulated mixtures are less than 10,000 lbs. Therefore, CITGO did not include the C5 Merox Unit as an RMP-covered process in its 2020 RMP (Bates 2-7-000001).

The EPA Inspection Team reviewed the liquid-phase and vapor-phase compositions and vapor pressure data (Bates 05-000062 to 05-000062) and the vessel dimension data and inventory calculations (Bates 05-000117 to 05-000118) for the C5 Merox Unit in CITGO's *Risk Management Plan Documentation*. After reviewing the data, the EPA Inspection Team identified the following additional information needed to fully evaluate applicability of the C5 Merox Unit:

- Process flow diagrams of the C5 Merox Unit;
- P&IDs of the vessels included in the C5 Merox Unit applicability analysis;
- The rationale and substantiation of the assumed values in the "liquid volume basis" column on each table in Bates 05-000117;
- CITGO should confirm the liquid-phase and vapor-phase compositions of the C5 Merox Unit. The EPA Inspection Team has unresolved questions regarding the composition data;
- CITGO should confirm the operating temperature and pressure of each vessel. The calculations show vessels operating at 650 °F and at pressures no greater than 275 psig (Bates 05-000117). However, a pentane-based substance (n-C5) would exist as a vapor, not a liquid, at these conditions. This conflicts with the liquid volumes provided in Bates 05-000117.
- After confirming compositions, operating temperatures, and pressures, the inventory calculations should be confirmed and revised if needed; and,
- Vapor pressure calculations should be updated and substantiated with the support documentation from experimental data and/or thermodynamic models used after confirming composition data and operating temperatures and pressures.

UDEX/ADP Units Applicability

According to CITGO's *Risk Management Plan Documentation*, CITGO reported its UDEX (UOP-Dow Extraction Unit 018) and ADP (aromatics disproportionation Unit 017) units as a single RMP-covered process in its 2015 RMP but did not report these units as RMP-covered processes in its 2020 RMP (Bates 05-000041). According to CITGO's post-inspection document production, the UDEX/ADP Units were considered RMP-covered processes in the 2015 RMP due to the presence of chlorine gas storage cylinders that were located within the boundaries of the UDEX/ADP Units. CITGO stated that, prior to its 2020 RMP update submittal, CITGO permanently removed the chlorine cylinders from the entire refinery, including the UDEX/ADP units (Bates 2-6-000001).

The EPA Inspection Team reviewed CITGO's East Plant 2015 RMP five-year update and confirmed that the UDEX/ADP Units were listed as a single Program 3 covered process, with chlorine as the only listed regulated substance. The EPA Inspection Team also reviewed CITGO's East Plant 2018 RMP update and confirmed that the UDEX/ADP Units were no longer listed as a covered process, and that chlorine was no longer included for any listed covered process.

Flares and Flare Gas Recovery System Applicability

According to CITGO's *Risk Management Plan Documentation*, CITGO reported its flare system as a single RMP-covered process in its 2015 RMP but did not report the flare system as an RMP-covered process in its 2020 RMP (Bates 05-000041). In its post-inspection document production, CITGO stated that "[t]he CITGO Corpus Christi East Plant's various flare stacks, seal pots, and flare headers (i.e., flare equipment) were represented in the 2015 risk management plan submittal as a single, separate covered process. In actuality, the various flare stacks (and their associated seal pots and header lines) are physically located within or adjacent to a number of different process unit areas and are operated and managed as part of those process areas, including from a PSM/process safety standpoint" (Bates 2-8-000001). CITGO further stated that, for its 2020 RMP, the flare system equipment services the following process areas (Bates 2-8-000001):

- Unit 018: CAROM/BTX (benzene-toluene-xylenes)²
- Unit 019: HYDRAR Unit
- Unit 028: Number 4 Unifiner
- Unit 038: Number 1 FCCU
- Unit 051: Amine Regeneration
- Unit 056: Tail Gas Treater

The post inspection RFI response does not mention if the flare gas recovery system, including the compressors and any associated knockout drums and piping, is included in the service to the designated units. Additionally, the RFI response document does not identify exactly which flare system equipment services each of the listed units. It is unclear if all flare system equipment components are included, or only certain ones, in the service allocations. The flare system includes two flare stacks (073ST001 and 073ST002), a seal drum for each flare stack (073V016 and 073V017), three knockout drums (073V006, 073V007, and 073V015), and associated piping. The flare system also includes a knockout drum and two slop oil surge drums that are identified as "out of service" (Bates 01.i-000016 to 01.i-000027). The EPA Inspection Team could not verify that any of these vessels are included in the inventory calculations provided in the *Risk Management Plan Documentation* (Bates 05-000044 to 05-000135). Therefore, additional details on the exact flare system equipment that services each process unit, and confirmation if the flare gas recovery system and the flare equipment beginning with the 073 nomenclature, are included in the service allocations is needed to fully evaluate CITGO's 2020 determinations of the flare system equipment for RMP applicability purposes.

The EPA Inspection Team has identified areas of concern (AOCs) at the end of this inspection report for this Subpart A § 68.10 – Applicability provision.

² "CAROM" or "carom" is the commercial name of a mixture of glycols used as a solvent in the UOP-Dow aromatics extraction process. CITGO uses the terms "UDEX" and "CAROM" interchangeably to refer to the UDEX process. The UDEX process together with the BTX towers and clay treaters comprise Unit 018.

40 CFR § 68.15 – Management Systems

40 CFR § 68.15(a) – Develop a Management System

The Facility maintains a management system for the implementation of the risk management program elements in Section 3 of its *Risk Management Plan Documentation* (Bates 05-000017 to 05-000018). The Facility maintains a supplemental organization chart that shows lines of authority for positions with delegated risk management program element responsibilities (Bates 04-000001). The Facility also maintains an overall organization chart that identifies all positions and persons employed at the refinery (Bates 01.g-000001 to 01.g-000081).

40 CFR § 68.15(b) – Assign a Qualified Person or Position that has Overall Responsibility

The Facility's management system (Bates 05-000017) states that “[t]he CITGO Corpus Christi Plant Manager maintains overall responsibility for the implementation of the risk management program, and delegates this responsibility to the CITGO Corpus Christi PSM [Process Safety Management] Manager.” This statement is unclear as to how the overall responsibility for the implementation of the Risk Management Program is delegated to another position. 40 CFR § 68.15(b) requires a facility to “assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements.” 40 CFR § 68.15(c) allows the responsibility for implementing individual requirements of the RMP to be delegated to persons other than the person identified under 68.15(b), but does not allow for the overall responsibility to be delegated to a person other than the person identified under 68.15(b). Therefore, the Facility failed to accurately assign a person or position that has overall responsibility for implementing and/or assigning the risk management program elements.

Additionally, the Facility's RMP organization chart (Bates 04-000001) identifies the Vice President (VP) and General Manager (GM) as the person with overall responsibility in terms of the lines of authority for implementing RMP program elements. The RMP organization chart does not identify any position called “PSM Manager”. Additionally, the Facility's RMP identifies the person responsible for Risk Management Program implementation as the Health, Safety, Security, and Environmental Protection (HSSE) Manager. Therefore, the position responsible for Risk Management Program implementation reported in the RMP is inconsistent with the position stated in the Facility's management system and organization chart.

40 CFR § 68.15 (c) – Responsibility for Individual Requirements Assigned to Other Persons

The Facility's Risk Management Program Management System organization chart (Bates 04-000001) identifies the following positions as having delegated responsibilities for the implementation of individual risk management program requirements. However, this organization chart does not identify a person or position with overall responsibility for implementation of the risk management program.

- Corpus Christi Manager HSSE: 40 CFR §§ 68.190 and 68.195.
- Corpus Christi Manager of Environmental Affairs: 40 CFR §§ 68.15, 68.22 to 68.42, and 68.79.

- Corpus Christi Safety and Health Manager: 40 CFR §§ 68.65, 68.67, 68.75, 68.77, 68.81, and 68.83. Note that the organization chart refers to 40 CFR § 68.65 as “safety assessment” rather than “process safety information.” The term “safety assessment” does not appear in 40 CFR § 68.65.
- Area Managers: 40 CFR § 68.69.
- Corpus Christi Training Manager: 40 CFR § 68.71.
- Corpus Christi Manager Reliability: 40 CFR § 68.73.
- Corpus Christi Field Safety and IH Activities Manager: 40 CFR §§ 68.85 and 68.87.
- Corpus Christi Emergency Planning & Response Manager: 40 CFR §§ 68.90 to 68.95.

The Facility’s management system (Bates 05-000017 to 05-000018) also identifies positions responsible for implementing individual Risk Management Program requirements in a table (Table 3-1). The position “PSM Manager,” a position that is not included in either of the Facility’s organization charts (Bates 01.g-000001 to 01.g-000081 and Bates 04-000001), is listed as the responsible position for nine individual program requirements. Additionally, for multiple individual program requirements, Table 3-1 lists general disciplines (i.e., Process Engineering, Project Engineering, Engineering, Process Controls, Mechanical Integrity, Safety, Operations, PSM, Maintenance, Procurement & Contracts, and Corporate HSE Audits) rather than specific staff positions. Furthermore, for multiple individual program requirements, Table 3-1 lists multiple disciplines and/or positions for each individual program requirement without clearly identifying the position that has the responsibility for implementing that requirement. Table 3-1 uses position titles in addition to PSM Manager that are not found in either organization chart, for example: Superintendent Refinery Technical Training; Inspections & Maintenance Superintendents; and Superintendent Emergency Services.

While the Facility has provided a Risk Management Program Management System organization chart (Bates 04-000001) that identifies delegated responsible positions with lines of authority for the implementation of individual risk management program requirements, this organization chart is inconsistent with Table 3-1 provided in Section 3 of the *Risk Management Plan Documentation* (Bates 05-000017 to 05-000018). While the positions in the Risk Management Program Management System organization chart (Bates 04-000001) align with the overall facility organization chart (Bates 01.g-000001 to 01.g-000081), the positions listed in Table 3-1 in the management system (Bates 05-000017 to 05-000018) do not align with the overall facility organization chart. Therefore, CITGO has failed to maintain an accurate and consistent management system (Bates 05-000017 to 05-000018) that meets the requirements under 40 CFR § 68.15(a), because the Table 3-1 positions and designations do not match either the management system organization chart (Bates 04-000001) or overall facility organization chart (Bates 01.g-000001 to 01.g-000081).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart A § 68.15 Management Systems provision.

40 CFR §§ 68.22 to 68.39 – Off Site Consequence Analysis (OCA)

The Facility reported in its RMP two WCSs for toxic regulated substances: one for HF and one for hydrogen sulfide (H₂S). The Facility reported one alternative release scenario (ARS) each for HF and H₂S. For flammable regulated substances, the Facility reported one WCS to represent all Program 3

covered processes and one WCS to represent its one Program 1 covered HYDRAR process. The Facility reported one flammable regulated substance ARS to represent all covered processes.

The Facility's methodology for conducting WCSs and ARSs, including the identification of affected vessels used in the scenarios, is described in Sections 5 and 6, respectively, of its *Risk Management Plan Documentation* (Bates 05-000001 through 000249). The Facility's identification of public receptors was performed by comparing WCS and ARS endpoints to published maps, 2010 U.S. Census data³, and public records via EPA's MARPLOT software. The environmental receptors considered were those located on the local U.S. Geological Survey (USGS) maps.

HF WCS

The HF WCS reported in the March 2020 RMP submission for the Alky covered process is described as a liquid spill and vaporization of 70 weight percent (wt %) liquid HF. The quantity released is 558,549 pounds (lbs) with a release rate of 55,855 pounds per minute (lbs/min) over 10 minutes. The Facility reported the scenario using EPA's RMP*Comp software to determine a worst-case distance to endpoint of 25 miles. The Facility's *Risk Management Plan Documentation* (Bates 05-000001 to 05-000249) provides additional details on the HF WCS. Table 5-3 of the WCS identifies the vessel used to model the HF WCS as the acid storage drum 083V002A (Bates 05-000028). Table 1-2a in the WCS for Unit 083-HF in the Alkylation Unit provides the vessel dimensions and mass quantity calculations for 083V002A (Bates 05-000132). The Facility assumed the acid storage drum to be liquid full and calculated a total HF inventory of 558,548 lbs. Table B-1b in the WCS provides chemical compositions for vessels modeled for the OCA. The liquid phase composition of vessel 083V002A is identified as 100 mole percent (mol %) HF (Bates 05-000068). The vapor phase composition of this vessel is identified as 100 mol % "water/inerts" (Bates 05-000069).

Appendix C of the Facility's *Risk Management Plan Documentation* provides screen captures of RMP*Comp calculations and Google Earth aerial imagery, and MARPLOT screen captures that show the plotted distance-to-endpoint radius. The RMP*Comp screen capture for the 083V002A HF WCS shows that the Facility modeled a "toxic liquid" threat type, using a released quantity of 558,549 lbs of 70 wt % HF, and calculated at a release rate of 39,100 lbs/min with a release duration of 10 minutes, and liquid temperature of 100 degrees Fahrenheit (°F) (Bates 05-000146).

Anhydrous HF has a normal boiling point of 67 °F.⁴ Since it boils at less than standard ambient temperature (approximately 77 °F), and less than the 100 °F temperature used in the WCS, anhydrous HF should be modeled as a gas liquefied under pressure to obtain accurate results. Therefore, the most accurate WCS evaluation of anhydrous HF would be as a toxic gas, not a toxic liquid, using the "hydrogen fluoride (anhydrous)" entry in RMP*Comp rather than the "hydrofluoric acid" toxic liquid entry. The correct release rate for anhydrous HF would be the released quantity divided by 10 minutes per 40 CFR § 68.25(c)(1).

³ The 2020 U.S. Census data did not become publicly available until September 2021.

⁴ *Hydrogen Fluoride*; National Institute of Standards and Technology (NIST); Standard Reference Database 69: *NIST Chemistry WebBook*; <https://webbook.nist.gov/cgi/cbook.cgi?ID=C7664393&Units=SI> (accessed January 24, 2024).

The Facility's WCS quantity released reported in its March 2020 RMP submission (558,549 lbs) is consistent with the underlying OCA documentation, and the release rate (55,855 lbs/min) and release duration (10 min) are consistent with 40 CFR § 68.25(c)(1). However, the reported release rate is inconsistent with the Facility's own underlying documentation of a gaseous release rate (39,100 lbs/min) produced in support of the development of its OCA. The calculated distance-to-endpoint (25 miles) and residential population reported in the RMP are consistent with the EPA Inspection Team's calculations using RMP*Comp and MARPLOT, and the quantity released provided by the Facility. However, the HF weight percent (70.0 wt %) and scenario type (liquid spill and vaporization) reported in the RMP are not an accurate release scenario representation, given that the HF in the vessel is anhydrous and under pressure at 100 wt %. The correct release scenario would be a pressurized toxic gas release per 40 CFR §§ 68.25(c)(1) and 68.165(b)(5).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart B §§ 68.22 to 68.39 – Off Site Consequence Analysis provision.

40 CFR § 68.42 – Five Year Accident History

CITGO reported one accident in its March 2, 2020, RMP submittal. The accident occurred in the SRU on March 28, 2023, during an SRU turnaround. The accident resulted in a release of 6 lbs of H₂S and one employee injury. The Facility submitted a correction to its RMP on August 17, 2023, to report this accident, which was less than six months after the date of the accident. However, the date of the accident was erroneously reported in the RMP correction as April 28, 2023. The Facility submitted a second correction to its RMP on November 29, 2023, to correct the date of the accident to March 28, 2023.

SRU March 28, 2023, Accident

For the SRU Program 3 covered process, both the August 17, 2023, and November 29, 2023, RMP corrections show the date of the most recent incident investigation as February 2, 2019, and the expected or actual date of completion of all changes resulting from the investigation as July 20, 2019 (see the Sulfur Recovery Unit subsection of Section 7 of the RMP registration). However, the incident investigation for the March 28, 2023, accident was completed on April 24, 2023 (Bates 07.a-000001-07 to 07.a-000032). The expected date of completion of all changes resulting from the investigation is December 31, 2023 (Bates 07.e-000001). Therefore, CITGO failed to correct its RMP within the required timeframe with the March 28, 2023, incident investigation date and other data specified by 40 CFR § 68.175(l), as required under 40 CFR § 68.195(a).

HYDRAR December 5, 2019, Accident

On December 5, 2019, an accidental release at the HYDRAR unit Reactor #3 outlet (vessel number 19V005) resulted in a flash vapor fire. A contractor conducting work at the reactor outlet received third-degree burns and required a five-day hospital stay in a hospital burn unit (Bates 2-43a-000002). The source of the release was not determined during the incident investigation but was suspected to

be either “1. Hydrogen leaking past the LOTO [lock out tag out] isolation valves; 2. Residual cyclohexane in the process that remained after the nitrogen purging; 3. Soluble hydrogen released from trace cyclohexane in the process piping” (Bates 2-43a-000006). This incident was not reported on the five-year accident history on the Facility’s RMP. Since the December 5, 2019, incident resulted in an on-site injury due to an accidental release from a covered process, CITGO failed to correct its RMP with the data required under 40 CFR §§ 68.168 and 68.175(l), and as required under 40 CFR § 68.195(a). Since the Facility’s next five-year update was submitted on March 2, 2020, which was less than six months after the accidental release, the Facility was required to submit the December 5, 2019, accidental release data by the time the RMP was updated under 40 CFR § 68.190, as required under 40 CFR § 68.195(a).

Unibon March 3, 2023, Incident

On March 3, 2023, a tubing fitting in hydrogen service for a flow meter at the Unibon unit reportedly failed due to corrosion under insulation, resulting in a hydrogen leak, which ignited and caused two other hydrogen ignition points due to flame impingement. The incident caused the unit to shut down. In the incident investigation documentation provided by CITGO, the incurred to-date mechanical economic impacts were estimated at approximately \$3,400,000 and were forecast to reach up to \$5,600,000 (Bates 2-43c-000032). All “accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site” are required to be included in a facility’s five-year accident history, per 40 CFR § 68.42(a). CITGO states in their *Risk Management Plan Documentation* that “[t]he CITGO Corpus Christi Refinery makes determinations of all potential accidental releases on a case-by-case basis for inclusion in the five-year accident history” (Bates 05-000019). EPA’s RMP guidance states that although an owner or operator determines whether on-site property damage as a result of an accidental release was significant, “the owner or operator should be able to document such a decision.”⁵ CITGO has not provided documentation as to whether this incident resulted in significant property damage on-site and, therefore, whether the incident is required to be included on the Facility’s five-year accident history.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart B § 68.42 – Five Year Accident History provision.

40 CFR § 68.65 – Process Safety Information (PSI)

In response to the pre-inspection RFI, the Facility provided the following PSI documentation for Alky Unit, FCCU No. 2, and SRU:

- Detailed process flow diagrams (Bates 21-000001 to 21-000026);
- P&IDs (Bates 22-000001 to 22-000380);
- Electrical classification drawings (Bates 23-000001 to 23-000005);
- Cause and effect diagrams (Bates 24-000001 to 24-000027);
- Safety data sheets (SDSs) (Bates 25.a-000001 to 25.a-001398);

⁵ What constitutes “significant property damage on site?”; U.S. Environmental Protection Agency (EPA); *Frequent Questions*; <https://www.epa.gov/rmp/what-constitutes-significant-property-damage-site> (accessed April 12, 2024).

- Narratives of process descriptions (Bates 25.b-000001 to 25.b-000077);
- Process chemistry documentation (Bates 25.c-000001 to 25.c-000024);
- Maximum intended inventories (Bates 25.d-000001 to 25.d-000063);
- Safe upper and lower limits and consequences of deviation (Bates 25.e-000001 to 25.e-000029);
- List of codes and standards used to design and maintain each process (Bates 25.g-000001);
- Material and energy balances (Bates 25.h-000001 to 25.h-000565); and,
- Safety systems and their functions (Bates 25.i-000001 to 25.i-000247).

In response to the post-inspection document request, the Facility provided the following additional PSI documentation: Relief system design and design basis for pressure safety valves PSV-014-1, PSV-014-2, and PSV-014-3 on 031V005 in the #2 FCCU (Bates 2-14-000001 to 2-14-000013).

See discussion of the P&ID verifications in the Field Observations section of this inspection report for findings and potential areas of concern identified based on the EPA Inspection Team's review of the Facility's PSI documentation conducted to-date.

SRU Unit 53 P&IDs

In the post-inspection document request, the EPA Inspection Team requested P&IDs for the Shell Claus Off-Gas Treating (SCOT) Tail Gas Unit, also referred to as Unit 53⁶, which were provided by CITGO (Bates 2-09-000001 through 2-09-000010). During the 2023 SRU turnaround, which began in March 2023, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool with a new piping specification (1N1A5) at piping line 2''-AG-BE-266 on P&ID drawing number 53-4-8123I as part of Project 053MP-X307 (Bates 2-45-000001). A photograph of the piping that was planned for replacement was included with work order documentation provided by CITGO (Bates 2-45-000024). Email correspondence from the East Plant II SRU/Unibon Unit Supervisor on March 30, 2023, states that *"53MP-X307 is canceled from T/A [turnaround] work scope. Operations air gapped section of pipe,"* and includes a photograph of the piping section, which is shown as disconnected (Bates 2-45-000004 and 2-45-000005). However, P&ID drawing numbers 53-4-8123I, Revision 16, (Bates 2-09-000009) and 53-4-8123A, Revision 29, (Bates 2-09-000001) still show piping section 2''-AG-BE-266 as providing connection from the SCOT Reflux Accumulator (053V003) to the SCOT Heater (053H001). P&ID drawing number 53-4-8123I was not updated to reflect the air-gapping of line 2''-AG-BE-266 in the SRU covered process. Therefore, CITGO failed to maintain accurate PSI information pertaining to the equipment in the process as required by 40 CFR § 68.65(d)(1)(ii).

Description of the Alky Unit Open Path Laser Detectors

The Facility maintains safety system description *Alky HF Acid and LEL [Lower Explosive Limit] Mitigation Open Path Laser Detectors (Safety System)* (SS-083-009, Rev. 5, approved and effective February 7, 2022), which provides a description of the open path laser detectors used to detect airborne HF and

⁶ CITGO considers the SCOT Tail Gas Unit as part of the Sulfur Recovery Unit covered process reported on the Facility's RMP. Unit 51 Amine Regeneration, Unit 52 Sulfur Unit, Unit 53 SCOT Tail Gas Unit, Unit 54 Sour Water Stripper, and Unit 56 Tail Gas Treatment make up the Sulfur Recovery Unit covered process reported on the Facility's RMP (Bates 05-000041).

flammable atmospheres in the Alky Unit (Bates 2-31b-000001 to 2-31b-000003). Throughout this document, the unit of measure of HF for the laser detectors is described as parts per million (ppm) per meter (m), which is written as “ppm/m.” However, the actual unit of measure of HF for the laser detectors is a path-integral value expressed in units of concentration multiplied by distance (i.e., not divided by distance).

CITGO retained the services of HF Alkylation Consultants, LLC to conduct an audit of the refinery’s Alky Unit to determine its compliance with American Petroleum Institute (API) Recommended Practice (RP) 751 *Safe Operation of Hydrofluoric Acid Alkylation Units* on May 10 through 14, 2021 (Bates 32-000044 to 32-000079). Recommendation 39 of the audit report identified this error in the unit of measure of HF for the laser detectors and recommended the unit of measure be corrected to “ppm-m”. However, CITGO failed to correct this error in its process safety information in a timely manner.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.65 – Process Safety Information provision.

40 CFR § 68.67 – Process Hazard Analysis (PHA)

The Facility maintains a Corporate Process Safety Standard for conducting a PHA using the Hazard and Operability (HAZOP) study methodology (HSE-STD-PSM-003, revision 4; Bates 09-000001 to 09-000033). The EPA Inspection Team requested the following additional PHA standards in follow-up to the on-site inspection: the PHA risk matrix (HSE-TMP-PSM-001); the PHA risk matrix standard (HSE-STD-PSM-005); the safety instrumented systems standard (HSE-STD-PSM-002); the layers of protection analysis (LOPA) standard (HSE-STD-PSM-010); and, the what-if analysis policy (CSS-206).

In response to the pre-inspection RFI, the Facility provided a schedule of previously and planned completion dates of PHAs for covered processes (Bates 09.b, 09.c, 09.d-000001). This schedule states that the fifth revalidation of the PHA for the SRU, including the tail gas treating units (TGTUs) and fuel gas area, was completed in October 2016. The October 2016 PHA report further states that the presentation of the preliminary recommendations to the refinery Senior Management Team occurred on October 20, 2016. However, the report was not finalized until August 8, 2019 (Bates 26-000003). The PHA schedule states that the sixth revalidation of the SRU, TGTUs, and fuel gas area was broken into two separate PHAs – one for the SRU and TGTUs, and one for the fuel gas area. The PHA for the SRU/TGTUs was completed in May 2022 and the PHA for the fuel gas area was completed in August 2022. If the Facility is using the same completion date as the anniversary date for each of its PHAs, then the revalidation dates of May 2022 and August 2022 are more than five years after the previous October 2016 revalidation date. Therefore, CITGO failed to update and revalidate the PHAs for the SRU/TGTUs and fuel gas area at least every five years as required by 40 CFR § 68.67(f).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.67 – Process Hazard Analysis provision.

40 CFR § 68.69 – Operating Procedures

The refinery has developed written operating procedures for each of the refinery covered processes that include written instructions for different operating phases. Operating procedures vary in terms of providing health and safety information directly within the procedure or referring to other procedures or sources of information. Safe operating limits are maintained in separate documents from the operating procedures. CITGO has also developed separate safe practice standards covering all operating units for entering confined spaces and controlling energy sources (i.e., lockout/tagout). CITGO maintains a procedure for preparing, reviewing, and modifying operating procedures and safe practice standards (Bates 10-000001 to 10-000016, ADM-001, Plant Procedure Program). Additionally, CITGO maintains a standard for the rules and style used by writers of operating procedures at its facility (Bates 2-24-000001 to 2-24-000013).

Operating procedures are maintained electronically on the CITGO intranet Electronic Data Management System (EDMS). Operators can print working copies of procedures, which are considered valid for a one-time event. The Facility does not have a program to maintain hard copies of emergency operating procedures in the control room in the event of a power outage or computer information system interruption. Unit Supervisors are responsible for certifying and approving changes to operating procedures. Operating procedures and safe operating limits are reviewed annually, and safe practice standards are reviewed every three years. CITGO provided operating procedure and safe operating limit certifications for the past three years across all RMP Program 3 processes.

Review of Hardcopy Operating Procedures in the Control Room

During the walking tour of the control room the inspection team reviewed certain hard copy procedures for the Alky Unit. These Alky Unit hard copy procedures are maintained in a binder in a Shift Supervisor's office in the control room and are available to operators in the event the EDMS is inaccessible. However, the EPA Inspection Team did not observe any shutdown or emergency operations procedures in the binder. The EPA Inspection Team observed the Alky Unit procedure *Placing the Alkylation Unit on Circulation* (OPS-083-118 Revision 0), which had an approval and effective date of March 12, 2020, and a recertification date of January 22, 2022. CITGO provided the current version of procedure OPS-083-118 in response to the post-inspection document request (Bates 2-23-000001 to 2-23-000009). The current version of OPS-083-118 is Revision 3 with an approval, effective, and recertification date of August 10, 2023. Therefore, the hard copy procedure OPS-083-118 available to operators in the event the EDMS is inaccessible was not the current version of the procedure in effect at the time of the inspection.

Review of Emergency Shutdown Procedures

CITGO provided emergency shutdown procedures for the Alky, FCCU No. 2, and SRU units prior to the inspection. The Alky Unit procedure *Electrical Power Failure* (OPS-083-404, Rev. 1), dated March 17, 2005 (Bates 27-000013 to 27-000016), provides the procedures for responding to three different power loss scenarios. Scenario 3, *Power Loss to Field Controllers*, comprises two steps. Step 1 states: "SHUT DOWN the Unit before controllers go to fail-safe positions." Step 2 states: "FOLLOW instructions

for ‘Scenario 3’, using block valves around controllers to throttle process variables.” Step 2 instructs the user to follow the Scenario 3 instructions, but these two steps comprise the entirety of the Scenario 3 instructions. The Scenario 3 instructions do not include any steps to instruct the user in how to shut down the unit. Additionally, the Step 2 instruction to “us[e] block valves around controllers to throttle process variables” does not provide the specific references to the individual controllers, block valves, and process variables involved.

Review of Alky Unit Isobutane Recycle System Failure Procedure

The Alky Unit procedure *Isobutane Recycle System Failure* (OPS-083-405), dated October 19, 2009 (Bates 27-000017 to 27-000019), discusses the conditions under which the iso-recycle flow control bypass valve (083-HV-009) will open for the Alky unit. The note under Step 2 states that the flow bypass valve will open if the flow of the recycle line is below 55 thousand barrels per day (MBPD). The safe operating limits table for the Iso-Stripper Sidecut Circuit in the Alky Unit states that the minimum safe limit flow rate is 65 MBPD (Bates 25.e-000003). The operating limits stated in OPS-083-405 are outside of the safe operating limits documented in the Facility’s PSI. Therefore, the operating limits in the operating procedure are inconsistent with the Facility’s PSI for the covered process.

Review of Alky Unit Unloading HF Acid Truck Procedure

The Alky Unit procedure *Unloading HF Acid Truck* (OPS-083-800, Rev. 10), approved and effective on May 21, 2021 (Bates 27-000109 to 27-000119), provides the procedures for receiving a truck of HF and unloading the HF from the truck to one of the acid storage drums (083V002A and 083V002B).

CITGO retained the services of a third-party consultant to conduct an audit of the refinery’s Alky Unit on May 10, 2021, through May 14, 2021, to determine its compliance with API RP 751 *Safe Operation of Hydrofluoric Acid Alkylation Units* (Bates 32-000044 to 32-000079). Under recommendation number 26 of the audit report, the auditors identified improvements to CITGO’s *Unloading HF Acid Truck* procedure based on recommendations in Annex C and Annex G of the Fourth Edition (May 2013) of API RP 751.⁷ The following recommendations from the audit report were not addressed in CITGO’s current version (dated May 21, 2021) of the *Unloading HF Acid Truck* procedure. Each of the following quoted audit recommendations is followed by the EPA Inspection Team’s observations and discussion:

- “Verification that the HF and N₂ [nitrogen] piping are depressured [sic] prior to removing the blind flanges.”
 - Step 27 of the procedure instructs the operator to connect the nitrogen hose to the “load header” at the unit. Throughout the procedure, CITGO uses the term “load line” to refer to the HF unloading line at the unit, but presumably step 27 is instructing the operator to connect the nitrogen hose to the nitrogen supply line. Prior to step 27, the procedure does not instruct the operator to confirm the nitrogen line segment between the blind flange and the appropriately closed valves is depressurized. Nor does the procedure discuss the potential high-pressure hazard and the risk of injury if an operator attempts to remove a blind flange while the line is

⁷ The May 2021 API RP 751 audit of the Alky Unit used the fourth edition of API RP 751, published in May 2013. The fifth edition was not published until August 2021.

under pressure. The local pressure indicator shown on the P&ID as immediately upstream of the blind flange does not exist in the field (see Field Observations section). Therefore, an operator may not be able to verify if pressure exists in the nitrogen line at the blind flange.

- Step 31 instructs the operator to unbolt the blind flange on the HF unloading line at the unit, and step 32 instructs the operator to connect the HF hose to the HF unloading line. Similarly, as with step 27, the procedure does not instruct the operator to confirm the HF line segment between the blind flange and the appropriately closed valves is depressurized, nor does it discuss the potential high-pressure hazard and risk of injury. As with the nitrogen line, there is no local pressure indicator between the HF blind flange and the nearest block valve to determine if pressure exists.

- “Inspection of the flange connections and bolts prior to connecting the hoses.”
Steps 27, 31, and 32 do not include any instructions to the operator to inspect the flange connections and bolts prior to connecting the hoses. Annex C of API RP 751, at step 15, states that “[f]lange connections should be visually inspected” and “[t]he HF-unloading and nitrogen lines...should be connected to their respective openings using new, solid, 1/8 in.-thick PTFE or PTFE-encapsulated steel gaskets. B7 or B7M bolts should be used. If the bolts show evidence of corrosion or have been exposed to HF, they should be replaced with new bolts.” CITGO’s procedure does not instruct the operator to visually inspect the flange connections and bolts, or to use new bolts when connecting the hoses.
- “The desired setting of the nitrogen regulator (to avoid popping any relief valves).”
The procedure does not state the desired pressure setting of the nitrogen regulator nor does it instruct the operator to confirm that the nitrogen regulator is set at the correct pressure to ensure a nitrogen pressure safely below pressure relief valve settings. Annex G of API RP 751, at line-item number 5, states that “[t]o avoid venting HF-laden gas to the relief flare system, the nitrogen pressure regulator should be set below the HF storage vessel safety relief set pressure and below the test pressure of the unloading hoses.”
- “Checking the HF storage drum level after unloading to ensure the amount of HF unloaded is as expected.”
The procedure does not instruct the operator to check the HF storage drum level after unloading. Annex C of API RP 751, at step 23, states “[t]he HF level in the HF-storage vessel should be checked to ensure that the amount unloaded is equal to the amount delivered.”

In addition to the recommendations from the May 2021 audit, the EPA Inspection Team observed the following instances of lack of clarity and inconsistencies in the *Unloading HF Acid Truck* procedure.

- Attachment 1 of the procedure states the relief gas scrubber potassium hydroxide (KOH) strength should be greater than 3.0%. However, step 1 of the procedure instructs the operator to ensure the relief gas scrubber has a minimum KOH strength of 7%.
- Step 23 of the procedure states to “[v]erify Unload valve to the drum is not being used and is CLOSED.” Step 24 states to “[v]erify Unload valve to HF Acid Storage drum receiving Acid (083-V-002A/B) is OPENED.” As written, steps 23 and 24 conflict with each other, instructing the operator to verify the unload valve to the HF storage drum is both closed and opened. Step 23 is likely in error and should instruct the operator to verify the unload valve to the drum that is not being used is closed.

- Step 25 instructs the operator to open the nitrogen supply bleeder to the atmosphere to check for the presence of water. However, the procedure does not instruct the operator on required action to take if water is present, or to close the bleeder after checking for water. Additionally, the procedure does not specify which nitrogen bleeder to open - the bleeder upstream of the check valve or the bleeder downstream of the check valve.
- Step 28 instructs the operator to close the drain valves to the HF acid unloading station but does not identify the drain valves or their location.
- Step 37 instructs the operator to slowly open the nitrogen valve but does not specify which nitrogen valve - the gate or globe valve upstream of the check valve, the gate or globe valve downstream of the check valve, or the ball valve downstream of the check valve. Additionally, the EPA Inspection Team observed in the field that the ball valve downstream of the check valve was inoperable, as the valve handle was removed, and the valve had a tag that stated: "DO NOT OPERATE" (see Photographs 2 and 3 of Attachment 4). The procedure does not provide a warning to not use this valve or a reason why the valve should not be used.
- Step 38 instructs the operator to open the nitrogen valve to the line between the double block valves on the HF load line. However, there is a 2-inch valve on the nitrogen-to-HF "jump over" line, and a 1-inch valve on the nitrogen line upstream of the tee with the nitrogen-to-HF "jump over" line, and the procedure does not specify if only the 2-inch valve or the 1-inch valve (or both) must be opened.
- The procedure does not instruct the operator to open or to confirm that the two 2-inch valves on the line to the acid relief header are open, or to verify that there is flow to the acid relief header before beginning the nitrogen purge at steps 39 and 40. Likewise, the procedure does not instruct the operator to verify flow to the acid relief header before depressurizing the truck to the relief gas scrubber at step 60 or before purging the HF hose at step 63. Reduced or blocked flow to the acid relief header could prevent purging of oxygen from the hoses before unloading or prevent the depressurizing of the truck and purging of HF from the hoses after unloading.
- Steps 52 through 55 of the procedure instruct the operator to observe when the truck is empty of HF. Step 55 states: "IF the indications in Steps 34-36 are not present; VERIFY with HF Truck Driver that the Nitrogen is still OPEN to the HF Truck and has not been inadvertently CLOSED by the Driver without Operations knowledge. TROUBLESHOOT before proceeding." However, steps 34 to 36 address resetting the HF emergency close valve (083-UV-029D) and pressure testing the nitrogen and HF hoses. These steps are unrelated to the indications of the truck being empty of HF.

Based on the unaddressed recommendations from the third-party API RP 751 audit and the additional observations made by the EPA Inspection Team, the *Unloading HF Acid Truck* procedure still contains inconsistencies, lack of clarity, and steps that fail to address hazards as recommended by API RP 751. Therefore, the *Unloading HF Acid Truck* procedure does not provide sufficient clear instructions for safely conducting activities in the Alky Unit covered process.

Review of SRU Operating Procedures

CITGO provided shut down, cold startup, and normal operating procedures for the SRU in response to the post-inspection documentation request from EPA (Bates 2-22a-000001 to 2-22e-000003). Within these procedures, the EPA Inspection Team observed multiple instances where a valve or other piece

of equipment related to the tasks did not include a reference to both the equipment name and number. These observations are further summarized as follows.

In the *Claus Unit Shut Down* procedure (OPS-050-204 Rev. 11):

- Step 1.b (Bates 2-22a-000003) states: "OPEN Fuel Gas isolation valves." This is the first mention of the fuel gas isolation valves. However, no valve numbers are provided.
- Step 4 (Bates 2-22a-000003) states: "CLOSE Acid Gas isolation valves." This is the first mention of the acid gas isolation valves. However, no valve numbers are provided.
- Step 15 (Bates 2-22a-000004) states: "CLOSE 10-inch 50-lb Steam valve at the Boiler/Condenser." This is the first mention of the steam valve. However, no valve number is provided. Additionally, the reference to the steam uses "lb" rather than "psig" to refer to the pressure of the steam.
- Step 16 (Bates 2-22a-000004) states: "Utilize side BFW [boiler feed water] blowdown valve to lower Boiler Condenser level to 60% to eliminate possible exposure to hot condensate when opening 4" vent valve." This is the first mention of the BFW blowdown valve and the 4-inch vent valve. However, no valve numbers are provided.
- Step 22 (Bates 2-22a-000004 through 2-22a-000005) states: "When Thermal Reactor temperature approaches 300°F, CLOSE isolation valves on the Boiler Feed Water and open the blow down valve." This is the first mention of the BFW isolation valves. However, no valve numbers are provided.

In the *"B" Claus Unit Cold Startup* procedure (OPS-050-005 Rev. 10):

- Step 4 (Bates 2-22b-000005) states: "OPEN 4-inch Vent valve on top of Boiler/Condenser." This is the first mention of the vent valve. However, no valve number is provided.
- Step 5 (Bates 2-22b-000005) states: "OPEN Sulfur Trap Isolation valves." This is the first mention of the sulfur trap isolation valves. However, no valve numbers are provided.
- Step 6 (Bates 2-22b-000005) states: "PLACE Sulfur Header Steam Eductor in service." This is the first mention of the sulfur header steam eductor. However, no equipment number is provided.
- Step 8 (Bates 2-22b-000006) states: "PERFORM the following to place the Sulfur header level mechanism in service (if taken out of service): a. SET Instrument Air to Roto meter [*sic*] at 0.1-0.15 SCFH [standard cubic feet per hour]." This is the first mention of the instrument air rotameter. However, no instrument number is provided.
- Step 9 permissives subsection (Bates 2-22b-000006) provides a list of shutdown conditions and permissives to satisfy, including "Natural Gas to Pilot valve closed" and "Natural Gas to Main Burner closed." This is the first mention of the natural gas to pilot valve and the natural gas to main burner valve. However, no valve numbers are provided.
- Step 14 (Bates 2-22b-000008) states: "OPEN Stackmatch Gas and Air Isolation valves." This is the first mention of the Stackmatch gas and air isolation valves. However, no valve numbers are provided.
- Step 24 (Bates 2-22b-000009) states: "OPEN the following Isolation valves: 2-inch Gas Gate valve." This is the first mention of the 2-inch gas gate valve. However, no valve number is provided.

In the *No. 1 SCOT Heater and Reactor Start Up* procedure (OPS-050-007 Rev.14):

- Step 1 (Bates 2-22c-000003) states: "OPEN 3-inch vent on top of Waste heat exchanger (WHE) 100%." This is the first mention of the 3-inch vent. However, no valve number is provided.

- Step 3 under the “Stackmatch Pilot Light-Off” subsection (Bates 2-22c-000003) states: “OPEN Main Header Pilot Air isolation valve.” This is the first mention of the main header pilot air isolation valve. However, no valve number is provided.
- Step 4 under the “Stackmatch Pilot Light-Off” subsection (Bates 2-22c-000003) states: “OPEN Main Header Pilot Gas isolation valve.” This is the first mention of the main header pilot gas isolation valve. However, no valve number is provided.
- Step 5 under the “Stackmatch Pilot Light-Off” subsection (Bates 2-22c-000003) states: “OPEN both Air isolation valves at pilot.” This is the first mention of the air isolation valves at the pilot. However, no valve numbers are provided.
- Step 6 under the “Stackmatch Pilot Light-Off” subsection (Bates 2-22c-000003) states: “OPEN both Gas isolation valves at pilot.” This is the first mention of the gas isolation valves at the pilot. However, no valve numbers are provided.

In the *Amine Reclamation in the Main SCOT TGU and Aux Units* procedure (OPS-050-332 Rev.1):

- Step 1 states (Bates 2-22d-000004): “Fully OPEN block valves for the following streams: Amine supply and Amine return, Instrument Air supply, Cooling Water supply and Cooling Water return, Demineralized Water, Steam supply, Condensate return, Brine Return to Frac Tank, (The flow for each stream will be regulated at the ElectroSep Trailer by the ElectroSep Technician).” This is the first mention of each of these block valves. However, no valve numbers are provided.
- Additionally, the “Secondary Containment Requirements” subsection of the “Procedure” section (Bates 2-22d-000004) uses a numbered list of secondary containment requirements that presents confusion with the numbered procedure steps that immediately follow the secondary containment requirements. This procedure does not use any subsection heading or other formatting to clearly distinguish between the procedure steps and the secondary containment requirements.

In the *Amine Carbon Filter Changeout for Main, Auxiliary, No. 1 and No. 2 SCOT* procedure (OPS-050-103 Rev. 2):

- Step 1.a (Bates 2-22e-000002) states: “OPEN the filter bypass valve.” This is the first mention of the filter bypass valve. However, no valve number is provided.
- Step 1.b (Bates 2-22e-000002) states: “CLOSE the filter inlet valve.” This is the first mention of the filter inlet valve. However, no valve number is provided.
- Step 1.c (Bates 2-22e-000002) states: “CLOSE the filter outlet valve.” This is the first mention of the filter outlet valve. However, no valve number is provided.
- Step 3.a (Bates 2-22e-000002) states: “OPEN the ¾-inch filter vent valve.” This is the first mention of the ¾-inch filter vent valve. However, no valve number is provided.
- Step 3.b (Bates 2-22e-000002) states: “Slowly OPEN the filter drain valve.” This is the first mention of the filter drain valve. However, no valve number is provided.

The CITGO Procedure Writer’s Style Guide (Bates 2-24-000006) states: “*NOUN IDENTIFICATION – Most of the nouns used in action steps are equipment. Use both equipment name and number the first time. Equipment Numbers are in (). After the first noun and number usage, use one or the other in the remaining references, but be consistent.*” Therefore, the previously described SRU procedures provided by CITGO do not adhere to the writing style standards established in the CITGO Style Guide.

Additionally, the CITGO Procedure Writer’s Style Guide (Bates 2-24-000006) states: “*ABBREVIATIONS –*

Well-understood abbreviations are allowed. Consider the following examples: ... 'PSIG' instead of PSI, lbs. or #... Step 15 of the *Claus Unit Shut Down* procedure (OPS-050-204 Rev. 11) (Bates 2-22a-000004) denotes the steam pressure as “50-lb” rather than “50-psig”. Therefore, the *Claus Unit Shut Down* procedure does not adhere to the writing style standards established in the CITGO Style Guide.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.69 – Operating Procedures provision.

40 CFR § 68.71 – Training

CITGO has developed a Basic Operator Training (BOT) program for all new refinery operators. Training involves a page-by-page review of operating procedures with a learner and observer. Refresher training occurs annually and covers one-third of the relevant operating procedures for an operator on a rotating schedule such that every three years an operator will have undergone refresher training on all relevant operating procedures. Each review of operating procedures is accompanied by a test on the material, which requires a 100% passing grade. Operator training for the refinery is broken down by unit, and CITGO standard practice is to avoid having an operator with multiple unit qualifications at the same time. All refinery operator training, including temporary training, is documented in the TRAINS software program. CITGO provided the verification (Bates 2-25-000001) of refresher training for current SRU operators in the form of a table showing when each operator had most recently completed different courses.

During the March 28, 2023, SRU incident, an employee from CITGO's Corpus Christi West Plant was working on the East Plant 2 SRU during turnaround. The incident investigation findings for the March 28, 2023, SRU incident state: “Employee is not qualified under an abbreviated E-804 on the EP 2 SRU unit. Employee is qualified at the West Plant ULSD, MDH, Flare Gas Recovery, and SRU Units” (Bates 07.a-000018). At the time of the accident, CITGO reportedly did not have a formal procedure or standard for temporary operator training for cross-unit work during events such as a shutdown or turnaround. The typical practice was to have operators attend an “abbreviated E-804 training” for the unit, which encompassed a basic skills evaluation and review of hazards unique to the process, and which typically took one to two weeks to complete, depending on operator experience. The incident investigation report states: “A formal abbreviated E804 documented process or procedure does not exist for qualifying personnel to assist in other units or areas other than their process assigned units. An informal process is currently in place” (Bates 07.a-000018). The incident investigation noted key differences between the East and West Plant processes that the employee was not trained in, and which contributed to a hydrogen sulfide exposure. For example, the West Plant typically uses personal H₂S meters that cannot be turned off and have batteries that last two to three years. During the turnaround, the East Plant 2 SRU was using personal 4-gas meters which can be turned off. The employee involved in the incident was equipped with a 4-gas meter, which was not the personal protective equipment they were trained to use regularly as a West Plant employee. The 4-gas meter used by the employee was turned off at 1:02 am on March 28, 2023, and had not been turned on or bump tested at the beginning of the night shift (Bates 07.a-000016 to 07.a-000017). The employee involved in the March 28, 2023, SRU incident did not receive the abbreviated E-804 training to understand specific safety and health hazards and safe work practices for the East Plant SRU covered

process prior to conducting work in the area. Therefore, CITGO failed to properly train the employee as required by 40 CFR § 68.71(a)(1).

As a recommendation from the March 28, 2023, incident investigation (Bates 07.a-000025), CITGO developed a formal procedure for training employees on temporary assignments such as during turnarounds and shutdowns (*Requirements for Temporary Assignments for Outages*, HR-003 Revision 0, dated August 3, 2023 [Bates 2-26-000001 to 2-26-000003]).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.71 – Training provision.

40 CFR § 68.73 – Mechanical Integrity

CITGO maintains a Corporate Safety Standard (CSS) that governs the mechanical integrity program across all CITGO refineries, terminal and pipeline facilities, and lubricant manufacturing and packaging facilities (CSS-207; Bates 11-000001 to 11-000022). The CITGO Corpus Christi Refinery also maintains a site-specific mechanical integrity program standard (REL-ADM-001; Bates 11-000023 to 11-000046).

According to interviews with Facility personnel conducted during the inspection, the Facility currently follows API codes 510 and 570 for the inspection of pressure vessels and piping, respectively. The Facility does not currently implement a risk-based inspection (RBI) program for fixed equipment following API RP 580, although the Facility does plan to implement such a program in the future. The Facility plans to first implement an RBI program for its Crude Unit and Saturated Gas Plant (SGP) after their upcoming turnarounds. The Facility started collecting baseline and historical inspection data approximately one year ago in support of transitioning to RBI. The Facility currently uses the Plant Condition Management Software (PCMS) for managing inspection data and is employing a third-party contractor to support the Facility's planning for implementation of its RBI program. The Facility has also developed corrosion control documents (CCDs) for all units at the Facility and is in the process of revalidating them. The Facility plans to conduct five-year revalidations of the CCDs.

The Facility relies on contractors to provide support for all non-destructive evaluation (NDE) inspections. The Facility maintains a set of resident inspection contractors on site. Inspection contractors generate reports that document their NDE inspections and submit those reports to CITGO's fixed equipment inspectors for review and input into PCMS. The Facility also maintains buried piping throughout the Facility and has undertaken past projects to relocate buried piping aboveground when necessary. Facility personnel indicated that they have historically evaluated the integrity of buried piping via a pigging process, in which a pipeline inspection gauge ("pig") tool is transported through a section of piping to identify potential issues. Pigging evaluations have not been conducted on all buried piping. However, CITGO indicated it plans to install a pig launcher at the Facility to assist with future evaluations of buried piping.

The Facility uses an SAP⁸ software product to manage its inspection, testing, and preventative maintenance (ITPM) tasks for rotating equipment. Rotating equipment that is designated as critical has continuous online vibration monitoring. Non-critical rotating equipment is monitored for vibration monthly by vibration technicians in the Rotating Equipment Reliability Group. A criticality matrix is used for designating critical rotating equipment.

Alky Unit HF Acid and LEL Mitigation Detection System Trip Testing Procedure

CITGO maintains safety system description *Alky HF Acid and LEL Mitigation Detection System* (SS-083-008, Rev. 5, approved and effective February 7, 2022) (Bates 2-31a-000001 to 2-31a-000008). This safety system description includes the *Trip Testing Procedure*, which provides the procedure for testing and calibrating the HF and LEL point source detectors. This procedure states that any two of the point source detectors that detect at least 10% of the lower explosive limit (LEL) or at least 10 ppm of HF will activate the water cannons. This procedure states that the HF point source detectors are to be tested using 50 ppm of sulfur dioxide (SO₂) calibration gas over a calibration range of 0 to 12 ppm. The LEL point source detectors are to be calibrated over a range of 0 to 100% of LEL (the calibration gas is not specified).

CITGO provided the testing results for the HF and LEL detectors for the past one year in response to the post-inspection document request (Bates 2-32a-000001). The testing results for the HF detectors conducted on March 6, 2023, show that the calibration gas used was 10 ppm hydrogen chloride (HCl) in nitrogen. CITGO did not use the 50 ppm SO₂ calibration gas required by its testing procedure. The testing results for the LEL detectors conducted on March 2, 2023, show that propane was used as a calibration gas with a calibration range of 100 ppm and a setpoint of 10 ppm. The calibration range of 100 ppm and setpoint of 10 ppm are inconsistent with the calibration range of 0 to 100% of LEL and setpoint of 10% of LEL as required in the safety system description and testing procedure. Propane has an LEL of 2.1% (equivalent to 21,000 ppm).⁹ Ten percent of propane's LEL is equivalent to 2,100 ppm. CITGO did not calibrate the LEL detectors over the range and at the setpoint required by its testing procedure.

The testing results document states that the HF and LEL point source detectors are tested on a quarterly basis. However, in response to the request for testing for the past one year, CITGO's document shows only a single set of testing occurred over the one-year period: HF detectors were tested on March 6, 2023, and LEL detectors were tested on March 2, 2023. CITGO did not conduct the required testing for the second, third, and fourth quarters of 2023.

Alky HF De-Inventory Offline Test Procedure

CITGO maintains the *Alky HF De-Inventory Offline Test Procedure* (Revision 5, dated March 8, 2022) (Bates 2-31d-000001 to 2-31d-000203), which provides the procedure for off-line testing the Alky

⁸ Systems Analysis Program (SAP) [Development], <https://www.sap.com/index.html>.

⁹ *Propane*; The National Institute for Occupational Safety and Health (NIOSH); *NIOSH Pocket Guide to Chemical Hazards*; <https://www.cdc.gov/niosh/npg/npgd0524.html> (accessed April 14, 2024).

Unit's "HF Acid De-Inventory Safety System" (also known as a rapid acid de-inventory system [RADS]). In response to the post-inspection document request for the inspection and testing results from the past one year for the RADS, CITGO provided the checked off and signed test results for the testing completed on March 8, 2022 (Bates 2-32d-000001 to 2-32d-000202), which was performed as part of the commissioning of the RADS after it was installed during the Alky Unit turnaround conducted from January 17, 2022, to March 12, 2022 (Bates 20-000037 to 20-000039). During personnel interviews conducted during the inspection, CITGO personnel stated that the RADS was tested earlier in 2023 after a startup of the Alky Unit. However, CITGO did not provide any documentation of testing conducted in 2023.

Alky Unit and SRU Fixed Equipment Inspections

The EPA inspection team reviewed vessel and piping ultrasonic thickness (UT) testing data for the past twenty years for Acid Settlers No.1 and No.2 (083V003 and 083V0035) (Bates 2-33-000001 to 2-33-000011) and adjoining HF-containing piping circuits (Bates 2-34-000001 to 2-34-000095) in the Alky Unit, as well as the SCOT Reflux Accumulator (053V003) (Bates 2-37-000001 to 2-37-000005) and adjoining piping circuits in the SRU (Bates 2-38-000001 to 2-38-000036). Upon review of the UT testing data for the specified equipment across both of these covered processes, the EPA Inspection Team observed that frequent growth measurements were documented, where the thickness of the vessel wall or piping had increased as compared to prior readings. Several of the growth readings were coded with a lowercase "s", which indicates that "[r]eading used to compute Short Rate with special handling for growth" or lowercase "l", which indicates that "[r]eading used to compute Long Rate with special handling for growth" (see Bates 2-34-000060 for an example of the code definition). The documentation shows that growth readings in vessel and piping thickness were used to develop special short-term and long-term corrosion rates. The EPA Inspection Team did not request copies of CITGO's UT inspection procedures that define how growth readings are interpreted or handled. However, the number of growth readings observed and situations where consecutive growth readings were observed at the same corrosion monitoring location (CML) are potentially indicative of inaccurate UT readings.

SRU 2023 Turnaround

Leading into the 2023 turnaround for the SRU, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool at piping line 2"-AG-BE-266 on P&ID drawing number 53-4-8123I as part of Work Order 40952365 and Project 053MP-X307 (Bates 2-45-000001). On March 28, 2023, at approximately 7:30 PM, a West Plant SRU operations technician who was assisting with the 2023 East Plant SRU turnaround was "rodding out"¹⁰ a one-inch bleeder valve on the four-inch SCOT recycle line (4"-AG-BE-083-ST; P&ID drawing number 52-4-8112A) at the East Plant SRU in preparation for Project

¹⁰ "Rodding out" refers to clearing blockages from bleeder valves, vents, drains, and instrument taps. Rodding out may be done on a pipe or vessel that contains process material. Rod out tools are designed to maintain a seal while connected to the threaded connection but may need to be vented to the atmosphere after use to relieve captured process material. Rod out tools typically include a drill bit attached to the end of a bi-directional cable that is inserted and retracted through a shaft using a manually operated handle.

053MP-X307, when he lost consciousness due to an exposure to hydrogen sulfide (07.a-000003 to 07.a-000004).

A copy of the Chemical Cleaning Plan for the 2023 SRU turnaround indicates that the 4-inch SCOT recycle line, which connects the 053V003 overhead relief line to both the 052V001 acid gas knock-out drum and the 053H001 SCOT burner, was not marked to be cleaned and was designated to be isolated (Bates 2-46-000001 to 2-46-000005 and Bates 07.a-000009 to 07.a-000010). This 4-inch SCOT recycle line includes both piping line 4"-AG-BE-083-ST on which the employee was rodding out a one-inch bleeder and piping line 2"-AG-BE-266 scheduled for replacement. The work order list for the SCOT Unit during the 2023 turnaround indicates that the chemical cleaning work order was completed on March 27, 2023 (Bates 2-44-000003). A copy of the daily operations work list for the SRU turnaround from the evening of March 28, 2023, states: "53MP-X307 – working to steam out line to hand to maintenance" (Bates 07.a-000014). The task list for Work Order 40952365/Project 53MP-X307 does not include any steps for steaming out or cleaning the lines associated with the project (Bates 2-44-000002), and the lines were not otherwise included in the overall Chemical Cleaning Plan for the unit (Bates 2-46-000001 to 2-46-000005 and Bates 07.a-000009 to 07.a-000010).

CITGO's safe practice standard (SPS) *Line Break* (SPS-115, dated August 29, 2019) establishes requirements and responsibilities for line breaking (Bates 2-47-000019 to 2-47-000043). Section 5.2.1 of SPS-115 states: *"The system/line/connection must be prepared for opening, which is defined as cleared, drained, vented and de-pressured. The steps that shall be completed to reach no leakage and no pressure prior to conducting an initial line break. Use Steam, Nitrogen, water or another inert material to push any hazardous materials to a safe location. Use chemical cleaning or other methods to neutralize acids, caustics, pyrophoric materials (e.g., iron sulfide scale) and remove hydrocarbon sludge, etc. prior to a line break"* (Bates 2-47-000030). A means to properly clean the piping segments associated with Work Order 40952365/Project 53MP-X307 was not established as required by SPS-115. Therefore, CITGO failed to implement its written procedures to properly clear the piping segments associated with Work Order 40952365/Project 53MP-X307, as required by 40 CFR § 68.73(b).

Furthermore, Section 3.15 of SPS-115 on *Joint Field Review Verification* states: *"The process used by the work crew representative and the operations representative to jointly confirm that potential hazards have been isolated and the equipment is secured. The representatives must jointly verify isolation by checking the implementation of the isolation procedure and by surveying the equipment or system for any unidentified potential hazards. Joint Field Review Verification is required for ALL Line Break Categories"* (Bates 2-47-000028). Per Section 3.15 of SPS-115, to complete the rodding out conducted by the employee on March 28, 2023, on the four-inch SCOT recycle line, a Joint Field Review Verification should have been conducted. Therefore, CITGO failed to implement its written procedures to conduct proper work authorization activities as required by 40 CFR § 68.73(b).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.73 – Mechanical Integrity provision.

40 CFR § 68.75 – Management of Change (MOC)

CITGO's MOC program is dictated by its MOC safe practice standard (SPS) SPS-005 (Bates 12-000001 to 12-000018). MOCs are initiated and tracked in the Facility's Enablon electronic system. MOCs can be initiated by any employee, and this person is referred to as the MOC Originator. Next, the MOC Responsible Supervisor (the Unit or Area Supervisor) reviews and approves or disapproves the MOC request. If the MOC request is approved, the MOC Equipment Owner (the Area Manager) reviews the MOC to ensure it meets the definition of a change, assigns the MOC level as basic or advanced, and authorizes the change to be implemented. An MOC Manager is then assigned to oversee the MOC. The assigned MOC Coordinator is responsible for ensuring that MOCs are properly closed. Changes to alarm trip points, changes of functional state, and distributed control system (DCS) tag alarm parameters are managed under SPS-027, Alarm Change. Temporary MOCs follow the same procedure as permanent MOCs but are valid for a period not to exceed 120 days. Emergency MOCs must be entered into Enablon and closed before the end of the MOC Originator's workday or shift. For all MOCs, post-startup action items not completed prior to initiation of a change should be completed within 120 days after change implementation. Facility personnel stated during the inspection that management approval is required to extend the completion of post-startup action items beyond 120 days.

Alky Unit Automated Acid De-Inventory System

The Facility provided documentation of the MOC #11689 (MOC.2022.011689) covering post-turnaround work on the automated acid de-inventory system in the Alky Unit (Bates 2-40-000188 to 2-40-000683). This MOC had the following post-startup action items that were identified as over 120 days overdue at the time of the document submittal (February 1, 2024):

- Action item "Car Seals Monitoring Database" (AP.2022.007436). This action item shows a revised due date of January 3, 2023 (the original due date is not indicated). The status is listed as "not started" and the deadline states that the action item is over one year late (Bates 2-40-000230).
- Action item "Materials of Construction (U1, U2, API 510, API 653, P&ID, Material Test Report, Parts List, Bill of Materials, Construction Drawings, Data Sheets, etc.)" (AP.2022.007438). The action item shows a revised due date of February 7, 2023 (the original due date is not indicated). The status is listed as "not started" and the deadline states that the action item is over 11 months late (Bates 2-40-000232).
- Action item "Relief System Design and Design Basis (Relief Valve Data Sheets, Inspection Frequency, Flare System Design Basis, Calculations, PPR Design Books, IPRISM Database)" (AP.2022.007439). The action item shows a revised due date of February 7, 2023 (the original due date is not indicated). The status is listed as "not started" and the deadline states that the action item is over 11 months late (Bates 2-40-000233).
- Action item "Preventive Maintenance Database/Schedules (PSMS, OIS)" (AP.2022.007440). The action item shows a revised due date of February 7, 2023 (the original due date is not indicated). The status is listed as "not started" and the deadline states that the action item is over 11 months late (Bates 2-40-000234).

CITGO failed to complete these four MOC action items by the established due dates and within the 120 days after change implementation, as required by SPS-005. Therefore, CITGO failed to implement its

written procedures to manage changes as required by 40 CFR § 68.75(a). Additionally, the car seals monitoring database, materials of construction, and relief system design and design basis action items are actions that also require updates to the Facility's process safety information. Since these three action items were overdue and incomplete at the time of the post inspection document submittal, CITGO failed to update its process safety information as required by 40 CFR § 68.75(d).

SRU 2023 Turnaround

Leading into the 2023 turnaround for the SRU, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool at pipping line 2"-AG-BE-266 on P&ID drawing number 53-4-8123I as part of Project 053MP-X307 (Bates 2-45-000001). The EPA Inspection Team requested the MOC associated with this work. However, CITGO responded that the "MOC associated with the work intended to be conducted on the 4" SCOT recycle line that required it to be cleaned during the 2023 SRU turnaround was cancelled" (Response to Request 45 in *First Supplemental Response to EPA Additional Information request December 29, 2023*).

As part of the documentation associated with Project 053MP-X307, CITGO provided email correspondence from the East Plant II SRU/Unibon Unit Supervisor on March 30, 2023, which stated: "53MP-X307 is canceled from T/A work scope. Operations air gapped section of pipe" and includes a photograph of the piping section, which is shown as disconnected (Bates 2-45-000004 to 2-45-000005). A photograph of the 2"-AG-BE-266 piping line that was planned to be replaced prior to turnaround was included with the work order documentation, showing that the piping was previously connected (Bates 2-45-000024). Therefore, air gapping the 2"-AG-BE-266 line was a change to the equipment of a Program 3 covered process and subject to the MOC procedure. Based on a review of the list of MOCs initiated from January 2019 to November 2023 (Bates 29-000001 to 29-000151), an MOC for air gapping the piping was not developed. Therefore, by not conducting an MOC for this change to equipment, CITGO failed to address the technical basis for the change, the impact of the change on safety and health, modifications to operating procedures, the necessary time period for the change, and authorization requirements for the change as required by 40 CFR § 68.75(b).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.75 – Management of Change (MOC) provision.

40 CFR § 68.77 – Pre-Startup Safety Review (PSSR)

CITGO maintains a PSSR safe practice standard (Bates 13-000001 to 13-000058, SPS-006). The PSSR Team Leader is typically the Area Supervisor, who is responsible for completing the PSSR process. The standard establishes three levels of PSSR review, each with their own checklists of increasing complexity. An MOC is assigned an appropriate level of PSSR review based on the complexity of the change. All critical items identified in the PSSR checklists must be signed-off and completed prior to final approval of the PSSR.

40 CFR § 68.79 – Compliance Audits

CITGO completed their most recent compliance audits of the covered processes at the Corpus Christi Refinery East Plant in January 2018 and May 2021, using audit teams with members from CITGO's corporate offices and other CITGO facilities, including third-party auditors for the May 2021 audit. The 2018 compliance audit returned 18 findings related to process safety information, process hazard analysis, operating procedures, training, contractor safety, mechanical integrity, management of change, emergency planning and response, and risk management plan submittal (Bates 14.a-000005 to 14.a-000007). The 2021 compliance audit returned 8 findings related to process safety information, process hazard analysis, operating procedures, mechanical integrity, incident investigations, emergency planning and response, and compliance audits (Bates 14.a-000015 to 14.a-000019).

In the January 2018 Compliance Audit (Bates 14.a-000001 to 14.a-000007), the Facility identified the following finding on the process hazard analysis program (finding # PHA-01): *"Based on a representative sampling of PHA action items in IMPACT, some action items in the sampling were closed before final completion. Examples of improper closure documentation included statements such as: 'P&IDs will be submitted for update, if necessary.'; 'An engineering study will be initiated.'; 'Notification (work order) has been sent.'; and, 'A capital project is working on it.'"* The Facility provided documentation of the 2018 compliance audit recommendations (Bates 14.b-000022 to 14.b-000028) and tracking of the action items for the recommendations (Bates 14.c-000033 to 14.c-000070). The Facility developed the action item number 100260776: *"Generate a procedure that will provide a means to address and manage PSM related recommendations and findings as required by 1910.119(e)(5); 68.67(e)"* (Bates 14.b-000025). The action item tracking documentation states the action taken as *"CCR Management and Tracking of Corrective and Preventive Actions (CAPA), SPS-040, describes the system for managing Action Items which originate from PHAs, as well as other PSM related sources"* with a completion date of January 22, 2019 (Bates 14.c-000057).

In the March 2021 Compliance Audit (Bates 14.a-000008 to 14.a-000021), the third-party auditor identified a similar finding on the process hazard analysis program (finding # PHA-01): *"PHA action items are being closed in the site tracking system before they are physically implemented."* The 2021 compliance audit also identified the following finding on compliance audits (finding # CA-01): *"Previous audits have made recommendations to address PHA, incident investigation, and audit recommendations in a timely manner. Multiple instances of recommendations were closed in IMPACT but found to be not yet completed or implemented. Closure comments indicate that work-orders, projects, or requests had been issued, however there is no documentation of actual completion. The procedure (CCR Procedure SPS-040) does not contain sufficient, explicit instructions to prevent action closure before actual implementation."*

The Facility provided documentation of the 2021 compliance audit recommendations (Bates 14.b-000029 to 14.b-000032) and tracking of the action items for the recommendations (Bates 14.c-000071 to 14.c-000088). In response to finding # CA-01, the Facility documented the following action taken, which was closed on November 11, 2021 (Bates 14.c-000083): *"Revised procedure to include following: NOTE: Action items cannot be closed until physically implemented, commissioned, and operational. Submitting a work notification or Engineering Work Request (EWR) is not sufficient for action item"*

closure.” In response to the March 2021 finding # PHA-01, the Facility documented the following action taken, which was closed on October 19, 2021 (Bates 14.c-000085): “Updated CCR PHA Procedure, SAFE-710.3, to include required CCR PSM Manager review and approval for CCR Unit PHAs. PSM Manager will approve all smaller type action items for closure (non-capital). Designated SMT member will approve all the PHA action items before they are placed into the tracking system.”

As identified in the 2021 compliance audit, the Facility’s response to the 2018 compliance audit PHA finding failed to correct the deficiency. The 2021 compliance audit also found that the 2018 compliance audit follow up action of revising procedure SPS-040 was insufficient, and the underlying deficiency had not been corrected. Therefore, the Facility failed to determine an appropriate response to address the PHA finding of the 2018 compliance audit and failed to correct the deficiency.

The Facility’s corporate procedure for compliance audits (HSE-ADM-003) states in Section 5.3.6.2: *“The facility shall promptly address each audit finding. The actions shall be tracked in a formal action tracking system. These action items shall remain open in the tracking system until completely implemented. For example, if a finding requires a procedure to be modified, the audit finding action item cannot be closed until the procedure has been modified, approved, and training has been conducted with the procedure implemented.”* (Bates 2-41-000001 to 2-41-000016). However, this procedure was issued on August 19, 2021, replacing the previous procedure CSS-201A, and therefore was not in effect at the time the Facility responded to the 2018 compliance audit findings.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.79 – Compliance Audits provision.

40 CFR § 68.81 – Incident Investigation

The Facility has an incident investigation procedure that covers process safety incidents subject to RMP as well as other incidents (Bates 15-000001 to 15-000034, SAFE-717.0). The incident investigation procedure (Bates 15-000013) states that: *“A [Process Safety Management] PSM/RMP incident investigation is required when: A PSM/RMP incident investigation shall be conducted when the quantities included in Attachment 4 list are between API [threshold quantity] (TQ) and PSM Threshold and/or RMP Threshold or greater (see Attachment 4); the incident or near miss involved an operating pressure 20% or greater above the maximum allowable working pressure; the incident or near miss involved an operating temperature 50°F or more above the maximum allowable working temperature; the incident meets the definition of an API Tier 1 Process Safety Event (Tier 1-PSE).”*

The incident investigation procedure establishes four levels of significance (Levels 0 to 3), with any incident that requires an RMP incident investigation defined as either Level 2 or 3. CITGO’s preferred method for conducting incident investigations is Cause Mapping. However, other techniques can be utilized as needed. Incidents and corrective actions are tracked in the Enablon software system. Based on the review by the EPA inspection team, CITGO’s procedure is unclear as to whether the criteria for conducting an RMP-applicable incident investigation would encompass all incidents that resulted in, or could reasonably result in, a catastrophic release.

The Facility stated that only one incident over the past five years met the definition of an RMP-reportable incident. On March 28, 2023, at approximately 7:30 PM, a West Plant SRU operations technician who was assisting with the 2023 East Plant SRU turnaround was rodding out¹⁰ a one-inch bleeder valve on the four-inch SCOT recycle line. The employee was doing the work alone, standing on another valve 33 inches above the ground, when the employee reportedly fell and lost consciousness due to exposure to hydrogen sulfide, which was assumed to have been released from the bleeder valve. At 7:32 PM, an operator noticed the unconscious employee and called for assistance. At 7:51 PM, the shift commander requested an ambulance be called. The employee was transferred by ambulance to the hospital and was released after being evaluated by the emergency room physician.

The incident investigation identified three root causes and four potential causes of the incident:

- Cause 1 – Employee was not wearing breathing air or self-contained breathing apparatus (SCBA).
- Cause 2 – Rod out tool disconnected from the four-inch SCOT Recycle line bleeder with the valve still open.
- Cause 3 – Four-inch SCOT recycle line not cleared.
- Potential Cause 1 – Poor communication.
- Potential Cause 2 – SCOT Recycle line bleeder had damaged threads.
- Potential Cause 3 – Personal four-gas meter was not bump tested and turned on.
- Potential Cause 4 – Organizational weakness.

Seven corrective actions were identified:

- Create learning teams to evaluate human error potential and how organizational processes and supervisory practices contributed to the event;
- Create employee video detailing incident, employee involvement, and lessons learned. Distribute to all operating business units for viewing;
- Develop E-804 formal documented process or procedure for qualifying personnel to assist in other units or areas other than their assigned process units;
- Develop computer-based training (CBT) describing H₂S and four-gas meter differences and employee responsibilities. Assign CBT training to all field personnel;
- Develop safety flash for SRU incident that emphasizes the importance of H₂S hazards, wearing proper PPE and tagging out damaged equipment;
- Clarify and train operators and op-technicians on roles and responsibilities for turnaround support for remaining SRU/Unibon turnaround; and,
- Review and revise as needed, procedures and SAFE training for use of reaming devices. All action items were closed or pending validation at the time of the inspection.

During the inspection, the EPA inspection team interviewed the lead investigator for the incident. Reportedly, the line that was being worked on was added to the chemical clean plan for the turnaround immediately prior to work commencing. Additionally, damaged threads had been identified on the bleeder valve the night before the employee came to do the work. However, these findings were not communicated to the employee. The employee from the West Plant performing the work also did not have approval or cross-training to work on the unit at the time of the incident but was nonetheless assigned to the job.

During the inspection, the EPA inspection team reviewed a list of all API Tier 1¹¹ incidents for the past five years. The EPA inspection team specifically held conversations with the CITGO investigation teams for the following additional incidents:

- May 2, 2021, Unibon Incident – A clamp on a hydrogen line leaked due to improper design. This leak caused the Unibon unit to shut down. As a result, CITGO replaced the affected section of the piping. Shortly after the replacement, a pinhole leak in the weld was identified.
- March 3, 2023, Unibon Incident – A tubing fitting in hydrogen service for a flow meter reportedly failed due to corrosion under insulation, resulting in a hydrogen leak that ignited. The tubing from that line then impinged on a flange joint on a hydrogen line at the outlet of the 1B reactor, which also resulted in a hydrogen leak that ignited. The fires from these leaks overheated a one-and-a-half-inch hydrogen line for a pressure differential instrument on the 1A reactor, which also failed. The incident caused the unit to shut down.

CITGO provided the incident investigation report for the March 3, 2023, Unibon incident (Bates 2-43c-000001 to 2-43c-000048). The incident involved two separate contractors, who were performing work on the unit in the vicinity of the failed tubing that initiated the incident. One of the potential root causes of the incident is stated as “tubing disturbed by contractor” (Bates 2-43c-000033). The Investigation Team included six individuals with the following titles: Corporate Reliability Manager, Inspection Supervisor, Routine Maintenance Manager, Process Consulting Manager, Process Safety Coordinator and Safety Coordinator (Bates 2-43c-000002). A contract employee was not included in the incident investigation team, as required by 40 CFR § 68.81(c), even though the incident involved work of the contractor.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart D § 68.81 – Incident Investigation provision.

40 CFR § 68.83 – Employee Participation

CITGO has developed a policy for employee participation (Bates No. 16-000001 to 16-000004, SAFE-710.1), dated June 14, 2000. The policy states that the Safety Manager or Occupational Health Supervisor and union employees each attend monthly meetings of the Health and Safety Committee, per the current provisions of the Facility’s labor agreement. Facility personnel indicated that MOCs are reviewed during the monthly meetings to evaluate any potential health and safety issues. The policy states that hourly employees also participate in PHAs, incident investigations, and periodic reviews of operating procedures. During the inspection, representatives from USW were present daily for interviews and the site walking tours.

The EPA Inspection Team does not have any areas of concern at this time based on documentation reviewed to-date.

¹¹ American Petroleum Institute (API) Guide to Reporting Process Safety Events (Version 3.1), Section 3.1, states: “A Tier 1 Process Safety Event (T-1 PSE) is a loss of primary containment (LOPC) with the greatest consequence as defined by API RP 754. A T-1 PSE is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials (e.g. steam, hot water, nitrogen, compressed CO₂, or compressed air), from a process that results in one or more of the consequences listed” in the Guide.

40 CFR § 68.85 – Hot Work Permits

CITGO has developed and implemented a Facility hot work procedure (Bates 17-000001 to 17-000032) that applies to all employees and contractors who perform hot work within regulated areas of the CITGO Corpus Christi Refinery. The program requires all employees to obtain a hot work permit from the operating unit in which the work will be conducted. Prior to the issuance of the hot work permit, the procedure requires the Equipment Owner and Person Responsible for Performing Work (PRPW) to isolate equipment to be worked on with combustible gas meter verification. The Equipment Owner and PRPW are also required to survey the area and monitor potential hydrocarbon leak sources, perform atmospheric testing throughout the hot work area, and clean equipment (such as process tubes) of any hydrocarbons. Additional precautions required by the procedure include removing any combustible material from ignition sources, performing welding within the confines of a fire-resistant welding box, and utilizing mechanical ventilation in the hot work area. At the completion of the hot work job, the permit must be closed out by the equipment owner and PRPW.

The EPA Inspection Team does not have any areas of concern at this time based on documentation reviewed to-date.

40 CFR § 68.87 – Contractors

CITGO outlines its contractor safety policy in the Contractor Safety Standard SAFE-700.1 Rev. 4 (Bates No. 18.a-000001 to 18.a-000009). CITGO requires all contractors to subscribe to ISNetworld (ISN), a third-party contractor safety data management provider, to become qualified to perform work at the refinery. Contractors that request to work at the refinery must receive an ISN Dashboard Grade of “B” or better based on several criteria, including previous experience at CITGO Corpus Christi Refinery, safe work procedures, employee training and documentation, safety program, accident statistics, and incident rates. Contractors with ISN Dashboard Grades of “C” may perform work at the refinery with a waiver approved by the Business Unit HSSE Manager or Designee. Contractors with a grade of “Needs Improvement” may only perform work with a waiver approved by the Business Unit Vice President or General Manager. Before a contractor begins work, the contractor’s personnel must attend and successfully complete training at the Contractors Safety Council of the Coastal Bend Inc. (CSC). This training includes general orientation, site specific orientation, permit signer training, H₂S awareness, and asbestos awareness. CITGO uses three types of audits to monitor contractor performance: contractor self-audits, safety observation audits, and PSM compliance audits.

CITGO provided documentation showing its most recent safety evaluations for two contractors (Bates 2-49-000001 to 2-49-000009 and Bates 2-49-000010 to 2-49-000018). These evaluations consisted of a checklist of evaluations of different safety elements including use of PPE, adherence to lock out tag out procedures, and operation of vehicles.

The EPA Inspection Team does not have any areas of concern at this time based on documentation reviewed to-date.

40 CFR § 68.95 – Emergency Response

The CITGO Corpus Christi Refinery is a responding facility and has the capability to address emergency situations, including fires, chemical releases, and medical emergencies involving CITGO employees and on-site contractors. The refinery has seven full-time emergency response personnel and 64 trained members of the emergency response team (ERT). CITGO is a member of the Refinery Terminal Fire Company (RTFC), which is a team of paid professional industrial fire fighters that are shared among several facilities in the area. Firefighting equipment includes one fire truck, two quick attack trucks, one emergency support vehicle, and one rescue truck (currently being refurbished). CITGO maintains HF acid treatment kits, which contain calcium gluconate, at the ERT building as well as in the Alky Unit. Water spray cannons connected to the fire water system are located in and around the HF Alky unit to contain an HF release from the unit. RTFC maintains the SCBAs located throughout the refinery.

All trained responders initially receive a two-week training and routinely attend quarterly eight-hour class/drill and annual hazardous material and site-specific training. A subset of the trained responders annually attends firefighter training at Texas A&M Fire School. CITGO meets quarterly with the Nueces County Local Emergency Planning Committee (LEPC) and Corpus Christi Fire Department at meetings held by the LEPC and provided documentation of attendance of these meetings. CITGO personnel were not sure if CITGO submits its emergency response plan (ERP) to local agencies on an annual basis, and the EPA Inspection Team requested documentation, if available, of any submissions from the past three years.

The 2018 API RP 751 audit report identified that fire water is provided to the Alky unit by four pumps with a total capacity of 16,000 gallons per minute (gpm). The fire water capacity was designed to operate with at least three pumps with a total capacity of 12,000 gpm. However, pump performance has degraded, which now requires a 4-pump operation to provide 12,000 gpm. The Deputy Fire Chief stated that the Facility has several other portable back-up pumps that can provide additional water flow if one of the four main pumps goes down to deliver the required flow. The back-up pumps are tested weekly.

In the post-inspection document request, the EPA Inspection Team requested documentation of the annual submission of the Facility's Emergency Response Plan with local emergency planning and response organizations for 2021, 2022, and 2023. In CITGO's *Third Supplemental Response to EPA Additional Information Request December 29, 2023*, in response to Request 50, CITGO stated: "*No documentation of annual submission of the Emergency Response Plan with the LEPC and response organizations. The Emergency Response and Planning Manager formally submitted a copy to LEPC on February 1, 2024. An annual task reminder will be entered into the refinery's electronic tracking system (Enablon) to formally submit a copy to LEPC and response organizations annually. CITGO will also submit to LEPC and response organizations when updates are made.*"

CITGO did not conduct annual coordination with local emergency planning and response organizations in 2021, 2022 and 2023, including the submission of the Facility's Emergency Response Plan, as required by 40 CFR § 68.93(a) and (b).

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart E § 68.95 – Emergency Response provision.

40 CFR § 68.190 – Risk Management Plan Updates

CITGO submitted RMPs to EPA in 1999, 2004, 2009, 2010, 2015, 2018, and 2020. The 2004, 2009, 2015, and 2020 submissions were five-year updates. The 2010 and 2018 submissions were voluntary updates. CITGO submitted its most recent RMP on March 2, 2020. CITGO submitted updates on August 17, 2023, and November 29, 2023, to correct its Accident History section. See additional discussion on the RMP in this inspection report in the sections on Management Systems (40 CFR § 68.15), Off Site Consequence Analysis (40 CFR § 68.22), and Five-Year Accident History (40 CFR § 68.42).

40 CFR § 68.195 – Required Corrections

CITGO provided copies of reportable quantity release reports submitted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and under the Emergency Planning and Community Right-to-Know Act (EPCRA) since January 1, 2019. During the inspection, CITGO personnel stated that these records only covered releases to air. The EPA Inspection Team requested documentation of any CERCLA or EPCRA reportable release to any media since January 1, 2019, in the post-inspection document request. These will be further evaluated under § 68.42, § 68.81 and § 68.195. The EPA Inspection Team also requested documentation for notifications to the LEPC for releases that occurred on February 14, 2021, March 3, 2023, and April 23, 2023, as well as any procedures or policies that identify who is responsible for making agency notifications in the event of a reportable quantity release of an RMP regulated chemical or another extremely hazardous substance.

The EPA Inspection Team has identified AOCs at the end of this inspection report for this Subpart G § 68.195 – Required Corrections provision.

CLOSING CONFERENCE

The EPA Inspection Team held a closing conference with Facility representatives at approximately 11:40 am CST on December 15, 2023, at the administration building. Inspector Gaglione initiated the closing conference by summarizing the inspection activities that occurred during the week and thanked the Facility personnel for their time and cooperation. Inspector Gaglione summarized the next steps in the inspection process, which include a follow-up document request and the estimated timing of the delivery of the inspection report to CITGO. Inspector Gaglione stated that the EPA Inspection Team did not have any areas of concern to share at that time. If EPA or the EPA Inspection Team identified any areas of concern after further reviewing the inspection observation findings or additional documentation furnished by CITGO, these would be stated in the inspection report.

The Attendance Sheet (see Attachment 1) record includes all CITGO personnel present at the closing conference. Inspector Gaglione completed the Confidential Business Information (CBI) Notice form to identify documents in the EPA Inspection Team's possession for which the Facility claimed CBI, but which were not previously included in the Facility's CBI claims in the pre-inspection documentation production (see Attachment 5). This documentation included the hard copy East Plant plot plan and

the 35 inspection photographs taken by the EPA Inspection Team. The CITGO Facility Safety and Health Manager signed the CBI form. The Facility made a copy for its records and the EPA Inspection Team retained the original.

AREAS OF CONCERN

[AOC 1] Applicability, 40 CFR § 68.10(g)(2) – *Program 1 eligibility requirements. A covered process is eligible for Program 1 requirements as provided in § 68.12(b) if it meets all of the following requirements: (2) The distance to a toxic or flammable endpoint for a worst-case release assessment conducted under subpart B and § 68.25 is less than the distance to any public receptor, as defined in § 68.3.*

CITGO reported in its RMP that the HYDRAR covered process is Program 1. However, the HYDRAR flammable WCS has a distance-to-endpoint that includes the distance to the neighboring FHR facility, which is an off-site industrial facility included in the definition of public receptor. Therefore, the HYDRAR unit does not meet the Program 1 criteria, and in accordance with 40 CFR § 68.10(i), the HYDRAR covered process meets the criteria and is subject to Program 3 requirements. CITGO incorrectly reported its HYDRAR covered process in the RMP registration as Program 1 rather than Program 3.

[AOC 2] Management, 40 § CFR 68.15(a) – *The owner or operator of a stationary source with processes subject to Program 2 or Program 3 shall develop a management system to oversee the implementation of the risk management program elements.*

CITGO has failed to maintain the accuracy of its management system (Bates 05-000017 to 05-000018) developed under 40 CFR § 68.15(a). The Risk Management Plan Documentation Table 3-1 is inconsistent with the management system organization chart (Bates 04-000001) and the overall facility organization chart (Bates 01.g-000001 to 01.g-000081) as related to assignment of RMP element implementation oversight.

[AOC 3] Management, 40 CFR § 68.15(b) – *The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements.*

CITGO's written management system (Bates 05-000017 to 05-000018) states that the "CITGO Corpus Christi Plant Manager maintains overall responsibility for the implementation of the risk management program, and delegates this responsibility to the CITGO Corpus Christi PSM Manager." The Facility has failed to clearly identify a person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements in accordance with 40 CFR § 68.15(b). A position that both maintains overall responsibility for and delegates the same responsibility to another position creates a conflict for clearly identifying which position is primarily responsible.

[AOC 4] OCA Documentation, 40 CFR § 68.39(a) – *The owner or operator shall maintain the following records on the offsite consequence analyses: (a) For worst-case scenarios, a description of the vessel or pipeline and substance selected as worst case, assumptions and parameters used, and the rationale for selection; assumptions shall include use of any administrative controls and any passive mitigation that were assumed to limit the quantity that could be released. Documentation shall include the anticipated effect of the controls and mitigation on the release quantity and rate.*

CITGO's documentation of its HF WCS includes assumptions that the released substance is 70 wt % HF, resulting in a toxic liquid release (Bates 05-000146). However, these assumptions are not consistent with the actual characteristics of the released substance modeled, which is 100 wt % HF (Bates 05-000068) that is normally a gas at ambient temperature based on its normal boiling point. Therefore, CITGO failed to accurately represent the modeled conditions and assumptions used for the HF WCS.

[AOC 5] OCA Documentation, 40 CFR § 68.39(c) – *The owner or operator shall maintain the following records on the offsite consequence analyses: (c) Documentation of estimated quantity released, release rate, and duration of release.*

CITGO's HF WCS documentation includes a release rate of 39,100 lbs/min (Bates 05-000146). However, this release rate is incorrect and is not consistent with the release rate of 55,855 lbs/min reported in the RMP. Therefore, CITGO failed to accurately document the release rate in the RMP registration used for the HF WCS.

[AOC 6] Process Safety Information (PSI), 40 CFR 68.65(d)(1)(ii) – *Information pertaining to the equipment in the process. (1) Information pertaining to the equipment in the process shall include: (ii) Piping and instrument diagrams (P&ID's).*

During the field verification of equipment noted on P&IDs, the EPA Inspection Team observed inaccuracies in the acid storage drum (083V002B) P&ID (drawing number 83-4-8110G, revision 25; Bates 22-000009) and the main column receiver (031V005) P&ID (drawing number 31-4-8122D, revision 17; Bates 22-000237). Therefore, CITGO failed to maintain accurate PSI.

[AOC 7] Process Hazard Analysis (PHA), 40 CFR § 68.67(f) - *At least every five (5) years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated by a team meeting the requirements in paragraph (d) of this section, to assure that the process hazard analysis is consistent with the current process. Updated and revalidated process hazard analyses completed to comply with 29 CFR 1910.119(e) are acceptable to meet the requirements of this paragraph.*

The Facility's PHA schedule states that the fifth revalidation of the PHA for the SRU (including the tail gas treating units [TGTUs] and fuel gas area) was completed in October 2016 (Bates 09.b, 09.c, 09.d-000001). The PHA schedule states that the sixth revalidation of the SRU, TGTUs, and fuel gas area was broken into two separate PHAs: One for the SRU and TGTUs and one for the fuel gas area. The PHA for the SRU/TGTUs was completed in May 2022 and the PHA for the fuel gas area was completed in August 2022. The revalidation dates of May 2022 and August 2022 are greater than five years after the

October 2016 revalidation date. Therefore, CITGO failed to update and revalidate the PHAs for the SRU/TGTUs and fuel gas area at least every five years as required by 40 CFR § 68.67(f).

[AOC 8] Operating Procedures, 40 CFR § 68.69(a)(1)(v) – *(a) The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements. (1) Steps for each operating phase: (v) Emergency operations.*

The Alky Unit procedure *Electrical Power Failure* (OPS-083-404, Rev. 1), dated March 17, 2005 (Bates 27-000013 to 27-000016), provides the procedures for responding to three different power loss scenarios. Scenario 3, *Power Loss to Field Controllers*, comprises two steps. Step 1 states: “SHUT DOWN the Unit before controllers go to fail-safe positions.” Step 2 states: “FOLLOW instructions for ‘Scenario 3’, using block valves around controllers to throttle process variables.” Step 2 instructs the user to follow the Scenario 3 instructions, but these two steps comprise the entirety of the Scenario 3 instructions. The Scenario 3 instructions do not include any steps to instruct the user in how to shut down the unit. Additionally, the Step 2 instruction to “us[e] block valves around controllers to throttle process variables” does not provide the specific references to the individual controllers, block valves, and process variables involved. Therefore, CITGO failed to develop operating procedures that provide clear instructions for safely conducting emergency operation during power loss activities in each covered process.

[AOC 9] Operating Procedures, 40 CFR § 68.69(a)(2) – *(a) The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements. (2) Operating limits.*

Procedure OPS-083-405 “Isobutane Recycle Stream Failure”, dated October 19, 2009, (See Bates No. 27-000017 through 27-000019) discusses the conditions under which the iso-recycle flow control bypass valve (083-HV-009) will open for the Alky unit. The note under Step 2 states that the flow by-pass valve will open if the flow of the recycle line is below 55 MBPD. The safe operating limits table for the Iso-Stripper Sidecut Circuit in the Alky Unit states that the minimum safe operating flow is 65 MBPD (See Bates No. 25.e-000003). The operating limits within OPS-083-405 are outside of the safe operating limits; therefore, the operating limits in the operating procedure are inconsistent with the process safety information.

[AOC 10] Compliance Audits, 40 CFR § 68.79(d) – *The owner or operator shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.*

As identified in the 2021 compliance audit, the Facility’s response to the 2018 compliance audit PHA finding failed to correct the deficiency. The 2021 compliance audit found the 2018 compliance audit action of revising procedure SPS-040 to be insufficient and the underlying deficiency had not been corrected. Therefore, the Facility failed to determine an appropriate response to address the PHA finding of the 2018 compliance audit and failed to correct the deficiency.

[AOC 11] Registration, 40 CFR 68.160(b)(5) – *(b) The registration shall include the following data: (5) The name and title of the person or position with overall responsibility for RMP elements and implementation, and (optional) the e-mail address for that person or position.*

CITGO's written management system (Bates 05-000017 to 05-000018) states that the "CITGO Corpus Christi Plant Manager maintains overall responsibility for the implementation of the risk management program, and delegates this responsibility to the CITGO Corpus Christi PSM Manager." However, the Facility's RMP identifies the person responsible for Risk Management Program implementation as the Health, Safety, Security, and Environmental Protection (HSSE) Manager. Therefore, the person and position responsible for Risk Management Program implementation reported in the RMP is inconsistent with the position stated in the Facility's management system.

[AOC 12] Off Site Consequence Analysis, 40 CFR § 68.165(b)(2) and (5) – *The owner or operator shall submit the following data: (2) Percentage weight of the chemical in a liquid mixture (toxics only);...(5) Scenario (explosion, fire, toxic gas release, or liquid spill and evaporation).*

CITGO reported in its RMP for the HF WCS that the HF is 70 wt % in a liquid mixture and the scenario is a liquid spill and vaporization. However, these are incorrect because the released substance is 100 wt % HF (Bates 05-000068), which is normally a gas at ambient temperature based on its normal boiling point and, therefore, must be assumed to be released as a gas per 40 CFR § 68.25(c)(1). Therefore, CITGO failed to accurately submit the required data in its RMP.

[AOC 13] Required Corrections, 40 CFR § 68.195(a) – *The owner or operator of a stationary source for which a RMP was submitted shall correct the RMP as follows: (a) New accident history information – For any accidental release meeting the five-year accident history reporting criteria of § 68.42 and occurring after April 9, 2004, the owner or operator shall submit the data required under §§ 68.168, 68.170(j), and 68.175(l) with respect to that accident within six months of the release or by the time the RMP is updated under § 68.190, whichever is earlier.*

For the SRU Program 3 covered process, both the August 17, 2023, and November 29, 2023, RMP corrections show the date of the most recent incident investigation as February 2, 2019, and the expected or actual date of completion of all changes resulting from this investigation as July 20, 2019 (see the Sulfur Recovery Unit subsection of Section 7). However, the incident investigation for the March 28, 2023, accident was completed on April 24, 2023 (Bates 07.a-000001-07 to 07.a-000032). The expected date of completion of all changes resulting from the investigation was December 31, 2023 (Bates 07.e-000001). Therefore, CITGO failed to correct its RMP with the March 28, 2023, incident data specified by 40 CFR § 68.175(l), and required under 40 CFR § 68.195(a).

[AOC 14] Process Safety Information (PSI), 40 CFR 68.65(d)(1)(ii) – *Information pertaining to the equipment in the process. (1) Information pertaining to the equipment in the process shall include: (ii) Piping and instrument diagrams (P&ID's).*

During the 2023 SRU turnaround, which began in March 2023, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool with a new piping specification (1N1A5) at piping line 2''-AG-BE-266 on P&ID drawing number 53-4-8123I as part of Project 053MP-X307 (Bates 2-45-000001). Email correspondence from the East Plant II SRU/Unibon Unit Supervisor on March 30, 2023, states that "53MP-X307 is canceled from T/A work scope. Operations air gapped section of pipe" and includes a photograph of the piping section, which is shown as disconnected (Bates 2-45-000004 and 2-45-000005). P&ID drawing numbers 53-4-8123I, Revision 16, (Bates 2-09-000009) and 53-4-8123A, Revision 29, (Bates 2-09-000001) still show piping section 2''-AG-BE-266 as providing connection from the SCOT Reflux Accumulator (053V003) to the SCOT Heater (053H001). P&ID drawing number 53-4-8123I was not updated to reflect the air-gapping of line 2''-AG-BE-266 in the SRU covered process unit and, therefore, CITGO failed to maintain accurate process safety information pertaining to the equipment in the process as required by 40 CFR § 68.65(d)(1)(ii).

[AOC 15] Process Safety Information, 40 CFR § 68.65(d)(1)(viii) – *Information pertaining to the equipment in the process. (1) Information pertaining to the equipment in the process shall include: (viii) Safety systems (e.g. interlocks, detection or suppression systems).*

The Facility maintains safety system description *Alky HF Acid and LEL [Lower Explosive Limit] Mitigation Open Path Laser Detectors (Safety System)* (SS-083-009, Rev. 5, approved and effective February 7, 2022), which provides a description of the open path laser detectors used to detect airborne HF and flammable atmospheres in the Alky Unit (Bates 2-31b-000001 to 2-31b-000003). Throughout this document, the unit of measure of HF for the laser detectors is described as parts per million (ppm) per meter (m), which is written as "ppm/m." However, the actual unit of measure of HF for the laser detectors is a path-integral value expressed in units of concentration multiplied by distance (not divided by distance). Recommendation 39 of CITGO's May 2021 API RP 751 audit report identified this error in the unit of measure of HF and recommended the unit of measure be corrected to "ppm-m". However, CITGO failed to correct this error in its process safety information, and therefore also failed to maintain accurate information pertaining to the safety systems of the Alky Unit covered process.

[AOC 16] Operating Procedures, 40 CFR § 68.69(a) – *The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements.*

CITGO provided the Alky Unit procedure *Unloading HF Acid Truck* (OPS-083-800, Rev. 10), approved and effective on May 21, 2021 (Bates 27-000109 to 27-000119), which provides the procedures for receiving a truck of HF and unloading the HF from the truck to one of the acid storage drums (083V002A and 083V002B). Based on the unaddressed recommendations from the API RP 751 audit and the additional observations made by the EPA Inspection Team, the *Unloading HF Acid Truck* procedure contains inconsistencies, lack of clarity, and steps that fail to address hazards, as recommended by API RP 751. Therefore, the *Unloading HF Acid Truck* procedure does not provide clear instructions for safely conducting activities in the Alky Unit covered process.

[AOC 17] Operating Procedures, 40 CFR § 68.69(a) – *The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements.*

CITGO provided documentation of the following operating procedures for the SRU:

- *Claus Unit Shut Down* procedure (OPS-050-204 Rev. 11) (Bates 2-22a-000001 to 2-22a-000005);
- *“B” Claus Unit Cold Startup* procedure (OPS-050-005 Rev. 10) (Bates 2-22b-000001 to 2-22b-000013);
- *No. 1 SCOT Heater and Reactor Start Up* procedure (OPS-050-007 Rev.14) (Bates 2-22c-000001 to 2-22c-000007);
- *Amine Reclamation in the Main SCOT TGU and Aux Units* procedure (OPS-050-332 Rev.1) (Bates 2-22d-000001 to 2-22d-000006); and,
- *Amine Carbon Filter Changeout for Main, Auxiliary, No. 1 and No. 2 SCOT* procedure (OPS-050-103 Rev. 2) (Bates 2-22e-000001 to 2-22e-000003).

Within these procedures, there were multiple instances where a valve or other piece of equipment which did not include a reference to both the equipment name and number. For example, the *Claus Unit Shut Down* procedure Step 4 (Bates 2-22a-000003) states: “CLOSE Acid Gas isolation valves” with no indication of the valve number. The CITGO Procedure Writer’s Style Guide (Bates 2-24-000005) states: “NOUN IDENTIFICATION – Most of the nouns used in action steps are equipment. Use both equipment name and number the first time. Equipment Numbers are in (). After the first noun and number usage, use one or the other in the remaining references, but be consistent.” Therefore, the referenced SRU procedures provided by CITGO do not adhere to the writing style standards established in the CITGO Style Guide.

Additionally, the CITGO Procedure Writer’s Style Guide (Bates 2-24-000006) states: “ABBREVIATIONS – Well-understood abbreviations are allowed. Consider the following examples: ... ‘PSIG’ instead of PSI, lbs. or #...” Step 15 of the *Claus Unit Shut Down* procedure (OPS-050-204 Rev. 11) (Bates 2-22a-000004) denotes the steam pressure as “50-lb” rather than “50-psig”. Therefore, the *Claus Unit Shut Down* procedure does not adhere to the writing style standards established in the CITGO Style Guide.

In the *Amine Reclamation in the Main SCOT TGU and Aux Units* procedure (OPS-050-332 Rev.1), the “Secondary Containment Requirements” subsection of the “Procedure” section (Bates 2-22d-000004) includes a numbered list of secondary containment requirements that may be confused with the numbered procedure steps which immediately follow. This procedure does not use any subsection heading or other formatting to clearly distinguish between the procedure steps and the secondary containment requirements.

Based on the above observations, CITGO failed to develop written operating procedures that provide clear instructions for safely conducting activities involved in each covered process.

[AOC 18] Operating Procedures, 40 CFR § 68.69(b) – *Operating procedures shall be readily accessible to employees who work in or maintain a process.*

During the walking tour of the control room the inspection team reviewed certain hard copy procedures for the Alky Unit. These Alky Unit hard copy procedures are maintained in a binder in a Shift Supervisor's office in the control room and are available to operators in the event the EDMS is inaccessible. The EPA Inspection Team observed the Alky Unit procedure *Placing the Alkylation Unit on Circulation* (OPS-083-118 Revision 0), which had an approval and effective date of March 12, 2020, and a recertification date of January 22, 2022. CITGO provided the current version of procedure OPS-083-118 in response to the post-inspection document request (Bates 2-23-000001 to 2-23-000009). The current version of OPS-083-118 is Revision 3 with an approval, effective, and recertification date of August 10, 2023. Therefore, the hard copy procedure OPS-083-118 available to operators in the event the EDMS is inaccessible was not the current version of the procedure in effect at the time. Therefore, CITGO failed to ensure the current version of the operating procedure was readily accessible to operators at the time of the inspection.

[AOC 19] Training, 40 CFR § 68.71(a)(1) – *Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in § 68.69. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.*

During the March 28, 2023, SRU incident, an employee from CITGO's Corpus Christi West Plant was working on the East Plant 2 SRU during a turnaround. The incident investigation findings for the March 28, 2023, SRU incident state: "Employee is not qualified under an abbreviated E-804 on the EP 2 SRU unit. Employee is qualified at the West Plant ULSD, MDH, Flare Gas Recovery, and SRU Units" (Bates 07.a-000018). The employee involved in the March 28, 2023, SRU incident did not receive the required abbreviated E-804 training to understand specific safety and health hazards and safe work practices for the East Plant SRU covered process prior to conducting work in the area. Therefore, CITGO failed to properly train the employee as required by 40 CFR § 68.71(a)(1).

[AOC 20] Mechanical Integrity, 40 CFR § 68.73(b) – *Written procedures. The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.*

CITGO provided the testing results for the HF and LEL detectors for the past one year in response to the post-inspection document request (Bates 2-32a-000001). The testing results for the HF detectors conducted on March 6, 2023, show that the calibration gas used was 10 ppm hydrogen chloride (HCl) in nitrogen. CITGO did not use the 50 ppm SO₂ calibration gas required by its testing procedure. Therefore, CITGO failed to implement its established, written procedures to maintain the ongoing integrity of process equipment.

The testing results for the LEL detectors conducted on March 2, 2023, show that propane was used as a calibration gas with a calibration range of 100 ppm and a setpoint of 10 ppm. The calibration range of 100 ppm and setpoint of 10 ppm are inconsistent with the calibration range of 0 to 100% of LEL and

setpoint of 10% of LEL as required in the safety system description and testing procedure. Propane has an LEL of 2.1% (equivalent to 21,000 ppm). Ten percent of propane's LEL is equivalent to 2,100 ppm. CITGO did not calibrate the LEL detectors over the range and at the setpoint required by its testing procedure. Therefore, CITGO failed to implement its established, written procedures to maintain the ongoing integrity of process equipment.

[AOC 21] Mechanical Integrity, 40 CFR § 68.73(d)(1) – *Inspection and testing. Inspections and tests shall be performed on process equipment.*

The HF and LEL point source detectors testing results document (Bates 2-32a-000001) states that these detectors are tested on a quarterly basis. However, in response to the request for testing for the past one year, CITGO's document showed only a single set of testing occurred over the one-year period: HF detectors were tested on March 6, 2023, and LEL detectors were tested on March 2, 2023. CITGO failed to conduct the required testing on the affected process equipment for the second, third, and fourth quarters of 2023.

[AOC 22] Mechanical Integrity, 40 CFR § 68.73(d)(4) – *The owner or operator shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.*

During personnel interviews conducted during the inspection, CITGO personnel stated that the RADS was tested earlier in 2023 after a startup of the Alky Unit. CITGO did not provide any documentation of testing conducted in 2023; therefore, CITGO failed to document each inspection and test that has been performed on process equipment.

[AOC 23] Mechanical Integrity, 40 CFR § 68.73(b) – *Written procedures. The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.*

Leading into the 2023 turnaround for the SRU, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool at piping line 2"-AG-BE-266 on P&ID drawing number 53-4-81231 as part of Work Order 40952365 and Project 053MP-X307 (Bates 2-45-000001). However, based on a review of the 2023 SRU turnaround Chemical Cleaning Plan, the turnaround work order list and the individual tasks associated with Work Order 409523/Project 053MP, CITGO did not provide a means for steaming out or cleaning the lines associated with the project, and the lines were not otherwise included in the overall Chemical Cleaning Plan for the unit. Section 5.2.1 of the safe practice standard *Line Break* (SPS-115, dated August 29, 2019) establishes requirements and responsibilities for clearing lines prior to line breaking. A means to properly clean the piping segments associated with Work Order 40952365/Project 53MP-X307 was not established as required by SPS-115. Therefore, CITGO failed to implement its written procedures to properly clear the piping segments associated with Work Order 40952365/Project 53MP-X307, as required by 40 CFR § 68.73(b).

[AOC 24] Mechanical Integrity, 40 CFR § 68.73(b) – *Written procedures. The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.*

Section 3.15 of SPS-115 on *Joint Field Review Verification* requires a Joint Field Review Verification to confirm that potential hazards have been isolated and that equipment has been secured for all line break categories (Bates 2-47-000028). Per Section 3.15 of SPS-115, to complete the rodding out on the four-inch SCOT recycle line conducted by the employee on March 28, 2023, a Joint Field Review Verification should have been conducted. However, no documentation was provided to confirm that this was completed. Therefore, CITGO failed to implement its written procedures to conduct proper work authorization activities as required by 40 CFR § 68.73(b).

[AOC 25] Management of Change, 40 CFR § 68.75(a) – *The owner or operator shall establish and implement written procedures to manage changes (except for “replacements in kind”) to process chemicals, technology, equipment, and procedures; and, changes to stationary sources that affect a covered process.*

CITGO’s MOC program is dictated by its MOC safe practice standard (SPS) SPS-005 (Bates 12-000001 to 12-000018). For all MOCs, post-startup action items not completed prior to initiation of a change should be completed within 120 days after change implementation. Facility personnel stated during the inspection that management approval is required to extend the completion of post-startup action items beyond 120 days. MOC #11689 (MOC.2022.011689) covering post-turnaround work on the automated acid de-inventory system in the Alky Unit (Bates 2-40-000188 to 2-40-000683) had the following post-startup action items that were identified as over 120 days overdue at the time of the post inspection document submittal (February 1, 2024):

- Action item “Car Seals Monitoring Database” (AP.2022.007436) is over one year late (Bates 2-40-000230).
- Action item “Materials of Construction (U1, U2, API 510, API 653, P&ID, Material Test Report, Parts List, Bill of Materials, Construction Drawings, Data Sheets, etc.)” (AP.2022.007438) is over 11 months late (Bates 2-40-000232).
- Action item “Relief System Design and Design Basis (Relief Valve Data Sheets, Inspection Frequency, Flare System Design Basis, Calculations, PPR Design Books, IPRISM Database)” (AP.2022.007439) is over 11 months late (Bates 2-40-000233).
- Action item “Preventive Maintenance Database/Schedules (PSMS, OIS)” (AP.2022.007440) is over 11 months late (Bates 2-40-000234).

CITGO failed to complete these four MOC action items by the established due dates and within 120 days after change implementation as required by SPS-005. Therefore, CITGO failed to implement its written procedures to manage changes as required by 40 CFR § 68.75(a).

[AOC 26] Management of Change, 40 CFR § 68.75(d) – *If a change covered by this paragraph results in a change in the process safety information required by § 68.65 of this part, such information shall be updated accordingly.*

MOC #11689 (MOC.2022.011689) covering post-turnaround work on the automated acid de-inventory system in the Alky Unit (Bates 2-40-000188 to 2-40-000683) had the following post-startup action items that were identified as over 120 days overdue at the time of the post inspection document submittal (February 1, 2024):

- Action item “Car Seals Monitoring Database” (AP.2022.007436) is over one year late (Bates 2-40-000230).
- Action item “Materials of Construction (U1, U2, API 510, API 653, P&ID, Material Test Report, Parts List, Bill of Materials, Construction Drawings, Data Sheets, etc.)” (AP.2022.007438) is over 11 months late (Bates 2-40-000232).
- Action item “Relief System Design and Design Basis (Relief Valve Data Sheets, Inspection Frequency, Flare System Design Basis, Calculations, PPR Design Books, IPRISM Database)” (AP.2022.007439) is over 11 months late (Bates 2-40-000233).

These three action items also required updates to the Facility’s process safety information. Since these three action items were overdue and incomplete at the time of the post inspection document submittal, CITGO failed to update its process safety information as required by 40 CFR § 68.75(d).

[AOC 27] Management of Change, 40 CFR § 68.75(b) – *The procedures shall assure that the following considerations are addressed prior to any change: (1) The technical basis for the proposed change; (2) Impact of change on safety and health; (3) Modifications to operating procedures; (4) Necessary time period for the change; and, (5) Authorization requirements for the proposed change.*

Leading into the 2023 turnaround for the SRU, CITGO planned to replace thinning 2-inch piping and install a new 2-inch flanged spool at pipping line 2”-AG-BE-266 on P&ID drawing number 53-4-81231 as part of Project 053MP-X307 (Bates 2-45-000001). However, CITGO cancelled the planned piping replacement and instead air gapped the line (Bates 2-45-000004 to 2-45-000005). Air gapping this line was still considered a change to the equipment. However, CITGO did not conduct an MOC for this change. Therefore, CITGO failed to address the technical basis for the change, the impact of the change on safety and health, modifications to operating procedures, the necessary time period for the change, and authorization requirements for the change, as required by 40 CFR § 68.75(b).

[AOC 28] Incident Investigation, 40 CFR § 68.81(c) – *An incident investigation team shall be established and consist of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident.*

The March 3, 2023, Unibon incident involved two separate contractors who were performing work on the unit in the vicinity of the failed tubing that initiated the incident. One of the potential causes of the incident is stated as “tubing disturbed by contractor” (Bates 2-43c-000033). The investigation team for the incident did not include a contract employee, even though the incident involved work of the

contractor. Therefore, CITGO failed to establish a complete incident investigation team as required by 40 CFR § 68.81(c).

[AOC 29] Emergency Response, 40 CFR 68.93(a) and (b) – *The owner or operator of a stationary source shall coordinate response needs with local emergency planning and response organizations to determine how the stationary source is addressed in the community emergency response plan and to ensure that local response organizations are aware of the regulated substances at the stationary source, their quantities, the risks presented by covered processes, and the resources and capabilities at the stationary source to respond to an accidental release of a regulated substance.*

(a) Coordination shall occur at least annually, and more frequently if necessary, to address changes: At the stationary source; in the stationary source's emergency response and/or emergency action plan; and/or in the community emergency response plan.

(b) Coordination shall include providing to the local emergency planning and response organizations: The stationary source's emergency response plan if one exists; emergency action plan; updated emergency contact information; and other information necessary for developing and implementing the local emergency response plan. For responding stationary sources, coordination shall also include consulting with local emergency response officials to establish appropriate schedules and plans for field and tabletop exercises required under § 68.96(b). The owner or operator shall request an opportunity to meet with the local emergency planning committee (or equivalent) and/or local fire department as appropriate to review and discuss those materials.

CITGO did not conduct annual coordination with local emergency planning and response organizations in 2021, 2022 and 2023, including the submission of the Facility's Emergency Response Plan, as required by 40 CFR § 68.93(a) and (b).

[AOC 30] Required Corrections, 40 CFR § 68.195(a) – *The owner or operator of a stationary source for which a RMP was submitted shall correct the RMP as follows: (a) New accident history information – For any accidental release meeting the five-year accident history reporting criteria of § 68.42 and occurring after April 9, 2004, the owner or operator shall submit the data required under §§ 68.168, 68.170(j), and 68.175(l) with respect to that accident within six months of the release or by the time the RMP is updated under § 68.190, whichever is earlier.*

On December 5, 2019, an accidental release at the HYDRAR unit Reactor #3 outlet (vessel number 19V005) resulted in a flash vapor fire. A contractor conducting work at the reactor outlet received third-degree burns and required a five-day hospital stay in a hospital burn unit (Bates 2-43a-000002). This incident was not reported on the five-year accident history on the Facility's RMP. Since the December 5, 2019, incident resulted in an on-site injury due to an accidental release from a covered process, CITGO failed to correct its RMP with the data required under 40 CFR §§ 68.168 and 68.175(l), as required under 40 CFR § 68.195(a). Since the Facility's next five-year update was submitted on March 2, 2020, which was less than six months after the accidental release, the Facility was required to submit the December 5, 2019, accidental release data by the time the RMP was updated under 40 CFR § 68.190, as required by 40 CFR § 68.195(a).

[AOC 31] 40 CFR § 68.42(a) – Five Year Accident History - *The owner or operator shall 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.*

On March 3, 2023, a tubing fitting in hydrogen service for a flow meter at the Unibon unit reportedly failed due to corrosion under insulation, resulting in a hydrogen leak which ignited and caused two other hydrogen ignition points due to flame impingement, shutting down the unit. In the incident investigation documentation provided by CITGO, the incurred mechanical economic impacts were estimated at approximately \$3,400,000 and forecast to reach up to \$5,600,000 (Bates 2-43c-000032). CITGO has not provided documentation of a determination as to whether this incident resulted in significant property damage on site, and if the incident should be included in the Facility's reportable five-year accident history.

LIST OF ATTACHMENTS

Attachment 1: Attendance Sheet

Attachment 2: Signed Notice of Inspection

Attachment 3: Signed Receipt of Notice of Right to Claim Confidentiality

Attachment 4: Photograph Log

Attachment 5: Signed Confidential Business Information Notice with Claimed CBI



INSPECTION ATTENDANCE SHEET

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region 6

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) §103;
Emergency Planning and Community Right-to-Know Act (EPCRA) §302-312; and
Clean Air Act §112r General Duty Clause (GDC) and Risk Management Program (RMP)

DATE/TIME:

December 11 to 15, 2023

FACILITY NAME:

CITGO Corpus Christi Refinery East Plant

Inspector Name:
Anthony Gaglione

FACILITY ADDRESS:

1801 Nueces Bay Blvd.
Corpus Christi, Texas 78407

NAME	AFFILIATION/TITLE	PHONE	EMAIL
Rick Mendoza	CITGO ENV Air Programs Supv.		
VERONICA FUENTES	CITGO Manager Env Affairs		
Will Straub	CITGO Safety Spc - Fire Prot.		
Adam Ibarra	Citgo Safety Mgr		
Derrick Gradney	Citgo Corporate HSE		
Jesse Trevino	CITGO GM Tech Serv		
Kevin Kenall	CITGO HSE Manager		
Joe Angel Reyes	CITGO Safety & Health Manager		
Elbert Ocaña	CITGO Corporate Counsel		
Miguel Centeno	CITGO Process Env Mgmt		
CHRIS MAJEK	CITGO RELIABILITY MANAGER		

DATE/TIME: December 11 to 15, 2023		FACILITY NAME: CITGO Corpus Christi Refinery East Plant	
NAME	AFFILIATION/TITLE	PHONE	EMAIL
Joe A. Crawford Jr.	CC Sr. Refining Consultant		
Nate Clark	EPI Area Manager		
Cal Quarles	Manager HR		
Zach Ballard	Area Supervisor FCCU/Satbo		
Kenny Karl	Technical Dept.		
Anthony Gaglione	Inspector/ERG for EPA		
Brendan Scher	Inspector/ERG for EPA		
Brook McKown	Inspr / ERG		
Adrian Aráiza	Corporate Env/Mgr ^{Services}		
Bill Booth	Sr. Corporate Counsel		
Louis Buatt	Outside counsel ^{Refining Ops} for CITGO		
Toni Cordova	PSM Advisor		
Rolando Guzman	#2 FCCU Operator / PSM		
Robert Cirilo	Alky / Cumene Operator		
Ryan Spradling	IH Supervisor		
Charles Willis	SAFETY COORDINATOR		
Gerardo Villarreal	EPI Refinery Excellence Mgr		
Jesse A. Trammel	Alky / Cumene Supervisor		

DATE/TIME: December 11 to 15, 2023		FACILITY NAME: CITGO Corpus Christi Refinery East Plant	
NAME	AFFILIATION/TITLE	PHONE	EMAIL
Ruben Molina Jr.	CITGO Reliability Engineer		
PAUL WESTBROOK	CITGO INSPECTOR		
Matt Milanowski	CITGO CORR. & Piping Engr		
Jacob Cann	CITGO Process Control Engr.		
Lance Moore	Control System CITGO Specialist Supervisor		
DONNIE COOPER	CITGO Safety		
MARIO CRUZ	CITGO Reliability Engineer		
Aaron Indridson	CITGO Ops Manager		
Raul UNDA	CITGO Fixed Equip. Group Lead		
Tom Winkler (Online TEAMS)	CITGO Training Coordinator		
Matt Saethoff	Gen ops /		
Rudy Ramirez	Shift Superintendent / Ops Mgr		



NOTICE OF INSPECTION

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region 6

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) §103;
Emergency Planning and Community Right-to-Know Act (EPCRA) §§302-312; and
Clean Air Act §112r Risk Management Program (CAA RMP)

DATE/TIME:

December 11 to 15, 2023

FACILITY NAME:

CITGO Corpus Christi Refinery East Plant

LEAD INSPECTOR:

Anthony Gaglione

FACILITY ADDRESS:

1801 Nueces Bay Blvd.
Corpus Christi, Texas 78407

REASON FOR INSPECTION: U.S. EPA is conducting this inspection for the purpose of determining compliance with the requirements of Section 103(e) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 302 through 312 of the Emergency Planning and Community Right-to-Know Act (EPCRA), and Section 112(r) of the Clean Air Act (CAA).

The scope of this inspection may include but is not limited to reviewing and obtaining copies of documents and records; interviews and taking of statements; reviewing of chemical manufacturing, importing, processing, and/or use facilities, including waste handling and treatment operations; taking samples and photographs; and any other inspection activities necessary to determine compliance with the Acts.

INSPECTOR SIGNATURE**NAME**

Anthony Gaglione

RECIPIENT SIGNATURE**NAME**

Kevin Kenall

TITLE

Inspector

DATE SIGNED

12/11/2023

TITLE

HSSE Manager

DATE SIGNED

12/11/23



RECEIPT OF NOTICE OF RIGHT TO CLAIM CONFIDENTIALITY

U.S. ENVIRONMENTAL PROTECTION AGENCY

Region 6

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) §103;
Emergency Planning and Community Right-to-Know Act (EPCRA) §§302-312; and
Clean Air Act §112r Risk Management Program (CAA RMP)

DATE/TIME:

December 11 to 15, 2023

FACILITY NAME:

CITGO Corpus Christi Refinery East Plant

LEAD INSPECTOR:

Anthony Gaglione

FACILITY ADDRESS:

1801 Nueces Bay Blvd.
Corpus Christi, Texas 78407

Notice of Right to Claim Confidentiality: You may assert a business confidentiality claim covering all or part of the information requested during the course of this inspection, as provided in 40 C.F.R. §2.203(b). To make a confidentiality claim, submit the requested information and indicate that you are making a claim of confidentiality. Any document over which you make a claim of confidentiality should be marked by either attaching a cover sheet stamped or typed with a legend to indicate the intent to claim confidentiality. The stamp or typed legend or other suitable form of notice should employ language such as "trade secret" or "proprietary" or "company confidential" and indicate a date if any when the information should no longer be treated as confidential.

All confidentiality claims are subject to agency verification and must be made in accordance with 40 C.F.R. §2.208 which provides in part that you satisfactorily show that you have taken reasonable measures to protect the confidentiality of the information and that you intend to continue to do so; and that the information is not and has not been, reasonably obtainable by legitimate means without your consent.

NOTE: Signature of this Receipt of Notice of Right to Claim Confidentiality verifies only that such notice has been received and does not waive that right.

INSPECTOR SIGNATURE

RECIPIENT SIGNATURE

NAME

Anthony Gaglione

NAME

Kevin Kenal

TITLE

Inspector

DATE SIGNED

12/11/2023

TITLE

HSSE Manager

DATE SIGNED

12/11/23

PHOTOGRAPH LOG

Facility	CITGO Corpus Christi Refinery East Plant
Facility Location	Corpus Christi, Texas
Photographers	Brook McKeown; Anthony Gaglione
Camera Equipment	Nikon Coolpix W300 (Serial Number 30015522)
Inspection and Photograph Date(s)	12/12/2023

Photo ID	Camera ID	Photograph Date	Description
1	DSCN2764.JPG	12/12/2023	HF acid truck unloading station in the HF Alkylation Unit.
2	DSCN2765.JPG	12/12/2023	HF acid unloading line for the HF acid truck unloading station with bleeder valve in the HF Alkylation Unit.
3	DSCN2766.JPG	12/12/2023	Nitrogen connection line for the HF acid truck unloading station in the HF Alkylation Unit.
4	DSCN2767.JPG	12/12/2023	083V005 (Acid Settler No. 2) acid boot with clamp in the HF Alkylation Unit.
5	DSCN2768.JPG	12/12/2023	083V005 (Acid Settler No. 2) acid boot with clamp (left) and acid circulation valve (right) in the HF Alkylation Unit.
6	DSCN2769.JPG	12/12/2023	083V005 (Acid Settler No. 2) acid boot with clamp (right) and acid deinventory valve (left) in the HF Alkylation Unit.
7	DSCN2770.JPG	12/12/2023	083V005 (Acid Settler No. 2) north end reactor effluent inlet with clamp on flange in the HF Alkylation Unit.
8	DSCN2771.JPG	12/12/2023	083V005 (Acid Settler No. 2) south end reactor effluent inlet with clamp on flange in the HF Alkylation Unit.
9	DSCN2772.JPG	12/12/2023	083V005 (Acid Settler No. 2) north end reactor effluent inlet with clamp on flange in the HF Alkylation Unit.
10	DSCN2773.JPG	12/12/2023	083V005 (Acid Settler No. 2) south end reactor effluent inlet with clamp on flange in the HF Alkylation Unit.
11	DSCN2774.JPG	12/12/2023	HF acid sample station on the acid circulation line in the HF Alkylation Unit.
12	DSCN2775.JPG	12/12/2023	HF acid sample station on the acid circulation line in the HF Alkylation Unit.
13	DSCN2776.JPG	12/12/2023	HF acid sample station on the acid circulation line in the HF Alkylation Unit.
14	DSCN2777.JPG	12/12/2023	052V001 (acid gas knock-out drum) in the Sulfur Recovery Unit.
15	DSCN2778.JPG	12/12/2023	1-inch bleeder valve on the acid gas line from the SCOT reflux accumulator (line 4"-AG-BE-083-ST) that was the site of the March 28, 2023 RMP-reportable accident in the Sulfur Recovery Unit.

Inspection Date: 12/12/2023
Facility: CITGO Corpus Christi Refinery East Plant

R6 Enforcement and Compliance Assurance Division
PHOTOGRAPH LOG

Photo ID	Camera ID	Photograph Date	Description
16	DSCN2779.JPG	12/12/2023	Leaking steam trace tubing with water condensation and solids observed on head of 052V001 in the Sulfur Recovery Unit.
17	DSCN2780.JPG	12/12/2023	1-inch bleeder valve on the acid gas line from the SCOT reflux accumulator (line 4"-AG-BE-083-ST) that was the site of the March 28, 2023 RMP-reportable accident in the Sulfur Recovery Unit.
18	DSCN2781.JPG	12/12/2023	053V003 (SCOT reflux accumulator) in the Sulfur Recovery Unit.
19	DSCN2782.JPG	12/12/2023	053V003 (SCOT reflux accumulator) with close-up of top nozzles in the Sulfur Recovery Unit.
20	DSCN2783.JPG	12/12/2023	Regenerated catalyst slide valve (31TV006) in the No. 2 Fluid Catalytic Cracking Unit.
21	DSCN2784.JPG	12/12/2023	Regenerated catalyst slide valve (31TV006) in the No. 2 Fluid Catalytic Cracking Unit.
22	DSCN2785.JPG	12/12/2023	Regenerated catalyst piping below slide valve and upstream of reactor-stripper lower section with external corrosion observed in the No. 2 Fluid Catalytic Cracking Unit.
23	DSCN2786.JPG	12/12/2023	Regenerated catalyst slide valve (31TV006) hydraulic skid and local control panel in the No. 2 Fluid Catalytic Cracking Unit.
24	DSCN2787.JPG	12/12/2023	Regenerated catalyst slide valve (31TV006) local control panel in the No. 2 Fluid Catalytic Cracking Unit.
25	DSCN2788.JPG	12/12/2023	Spent catalyst slide valve (31LV201) hydraulic skid and local control panel in the No. 2 Fluid Catalytic Cracking Unit.
26	DSCN2789.JPG	12/12/2023	Steam hose observed laying on floor of platform, with damaged braiding observed, next to the spent catalyst slide valve (31LV201) hydraulic skid in the No. 2 Fluid Catalytic Cracking Unit.
27	DSCN2790.JPG	12/12/2023	Spent catalyst slide valve (31LV201) in the No. 2 Fluid Catalytic Cracking Unit.
28	DSCN2791.JPG	12/12/2023	16-inch motor-operated valve on the 031P018A (main column bottoms pump) suction line with wire wrap on the bonnet-to-body flange in the No. 2 Fluid Catalytic Cracking Unit.
29	DSCN2792.JPG	12/12/2023	16-inch motor-operated valve on the 031P018A (main column bottoms pump) suction line with wire wrap on the bonnet-to-body flange in the No. 2 Fluid Catalytic Cracking Unit.
30	DSCN2793.JPG	12/12/2023	Close-up view of 16-inch motor-operated valve on the 031P018A (main column bottoms pump) suction line with wire wrap on the bonnet-to-body flange in the No. 2 Fluid Catalytic Cracking Unit.

Inspection Date: 12/12/2023

Facility: CITGO Corpus Christi Refinery East Plant

R6 Enforcement and Compliance Assurance Division

PHOTOGRAPH LOG

Photo ID	Camera ID	Photograph Date	Description
31	DSCN2794.JPG	12/12/2023	Pressure safety valves PSV-014-1, PSV-014-2, and PSV-014-3 (left to right) on top of 031V005 (main column receiver) in the No. 2 Fluid Catalytic Cracking Unit.
32	DSCN2795.JPG	12/12/2023	6-inch block valve upstream of PSV-014-1 on 031V005 (main column receiver) with no car seal observed in the No. 2 Fluid Catalytic Cracking Unit.
33	DSCN2796.JPG	12/12/2023	6-inch block valves upstream of PSV-014-2 (front) and PSV-014-3 (back) on 031V005 (main column receiver) with car seal observed on PSV-014-2 block valve and no car seal observed on PSV-014-3 block valve in the No. 2 Fluid Catalytic Cracking Unit.
34	DSCN2797.JPG	12/12/2023	6-inch block valve on discharge of PSV-014-3 on 031V005 (main column receiver) with no car seal observed in the No. 2 Fluid Catalytic Cracking Unit.
35	DSCN2798.JPG	12/12/2023	6-inch block valve upstream of PSV-014-3 on 031V005 (main column receiver) with no car seal observed in the No. 2 Fluid Catalytic Cracking Unit.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
PROPRIETARY/CONFIDENTIAL BUSINESS INFORMATION NOTICE

Facility: CITGO Corpus Christi Refinery East Plant	
Facility Address: 1801 Nueces Bay Blvd. Corpus Christi, TX 78407	
Facility Representative with authority to make a CBI claim (print name & title): Joe A. Reyes SAFETY and HEALTH MANAGER	Date: 12/15/2023
	Signature (Optional): 
	Phone/email:

EPA Inspector (print): Anthony Gaglione Address: [mailing or courier address appropriate for inspector and/or inspector's Document Control Officer]	Date: 12/15/2023
	Phone:
	Email:

Part B of this Notice explained how to identify information claimed as CBI. You or the inspector may use this box to list and generally describe any CBI claims.

Example: Internal layout of facility.

The following are claimed as confidential business information:

- 1) Hardcopies of the East Plant Plot Plan, drawing # EDMS MAP2.
- 2) Inspection photos - All inspection photos, which number from DSCN2764.JPG through DSCN2798.JPG. A total of 35 photos.