

Region 6 - Enforcement & Compliance Assurance Division
INSPECTION REPORT

Inspection Date(s):	September 20-23, 2022	
Media Program:	Air	
Regulatory Program(s)	Clean Air Act Section 112(r) and 40 C.F.R. Part 68 Chemical Accident Prevention Provisions - Risk Management Plan (RMP)	
Company Name:	Lyondellbasell Industries (LYB)	
Facility Name:	Houston Refining LP	
Facility Physical Location:	12000 Lawndale	
(city, state, zip code)	Houston, Texas 77017	
Mailing address:	Same as above	
(city, state, zip code)		
County/Parish:	Harris County	
Facility Phone Number	(713) 321-4111	
Facility Contact:	Roel Munoz	Environmental Issues Manager
	Roel.Munoz@lyondellbasell.com	
FRS Number:	110058113704	
Identification/Permit Number:	Air Operating Permit ID: O-01372	
Media Identifier Number:	RMP 1000 0011 8133	
NAICS:	324110 (Petroleum Refineries)	
SIC:	2911	
Personnel participating in inspection:		
Justin McDowell	US EPA Region 6	Inspector
Howard Cole	US EPA Region 6	Inspector
Roel Munoz	LYB	Environmental Issues Manager
Michael Maldonado	LYB	Environmental Team Leader
Liz Manning	LYB	Process Safety & OE Manager
Jason Graves	LYB/ WAID	Consultant
Jeff Windham	LYB	Manager Health and Safety
Jeff Van	LYB	PSM Specialist
Mark Staes	LYB	Training Manager
Creed Potter	LYB	Process Safety Coordinator
Brian Duncan	LYB	Emergency Management Coordinator
Alvin Martin	LYB	Process Safety Representative
John Poti	LYB	PSM Specialist
Philip Oberbroeckig	LYB	Manager, Process Technician
Nicki Garza	LYB	Analyst, Process Technician
Treena Spells	LYB	Inspection Supervisor
Sydney Bowker	LYB	Electrical Engineer
Kerry Connevey	LYB	HRO PSM/PHA Specialist
EPA Lead Inspector Signature/Date		
	Justin McDowell	Date
Supervisor Signature/Date		
	Samuel Tate	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

United States Environmental Protection Agency (EPA) Region 6 inspectors Justin McDowell and Howard Cole arrived at the Houston Refining LP facility (Houston Refining) at 8:30 AM on Tuesday, September 20, 2022, for an announced inspection. I met with Roel Munoz (Environmental Issues Manager), and other Houston Refining employees for an opening meeting. I presented my credentials and informed Houston Refining personnel that this was an EPA inspection to determine compliance with the federal Chemical Accident Prevention Program. The scope of the inspection was a partial compliance evaluation (PCE), which included an evaluation of the facility's compliance with the Clean Air Act (CAA) Section 112(r) and the Chemical Accident Prevention Provisions in 40 C.F.R. Part 68 and the General Duty Clause. Houston Refining's Risk Management Plan (RMP) is listed as a Program Level Three facility. Mr. Alvin Martin, USW Steelworkers Union, is an employee representative pursuant to section 112(r)(6)(L) of the CAA who participated in this inspection.

FACILITY DESCRIPTION

Houston Refining is a full conversion fuels refinery with some petrochemical and lubricants production. A conversion refinery incorporates all the basic building blocks found in both topping and hydroskimming refineries, but it also features gas oil conversion plants such as catalytic cracking and hydrocracking units. The Houston refinery has crude and vacuum distillation units, delayed coking units, hydrodesulfurization units, reforming units, a fluid catalytic cracking unit, sulfur recovery units, solvent extraction and aromatics recovery units, lube oil treating units, and light-ends fractionation units. The refinery also has blending facilities for gasoline, caustic treating units, and various utility systems. The major products are gasoline, kerosene, diesel, heating oil, coke, aromatic solvents, pale oils, and food grade white oil. This manned facility operates 24 hours a day, 7 days a week, and employs approximately 800 full time employees.

Section II – OBSERVATIONS

Subpart A – General

40 C.F.R. § 68.10 Applicability – Houston Refining is the owner/operator of a stationary source that has more than a threshold quantity of regulated flammable substances (methane, ethylene, propane, isobutane, butane, isopentane, pentane, and flammable mixtures) in a covered process, as listed in 40 C.F.R. § 68.130; therefore, is subject to the Chemical Accident Prevention Provisions. Houston Refining is classified under the North American Industrial Classification System (NAICS) code 324110 (Petroleum Refineries). The facility is also subject to the Occupational Safety and Health Administration (OSHA) process safety management (PSM) standard, 29 C.F.R. § 1910.119. The facility does not store or manage any listed RMP-regulated toxic substances at or above the threshold quantities.

40 C.F.R. § 68.10 Program Eligibility – Houston Refining re-submitted an RMP registration five-year update under 40 C.F.R. § 68.190 on June 17, 2019. The next registration re-submittal is due on June 17, 2024, unless an update or correction is required by 40 C.F.R. § 68.190 or 40 C.F.R. § 68.195 prior to the five-year renewal date.

40 C.F.R. § 68.12 General requirements – The re-submitted RMP plan requires the facility to: develop and implement a management system; conduct a hazard assessment; implement the prevention requirements of 40 C.F.R. § 68.65 - § 68.67; develop and implement an emergency response program; and, include the data elements from 40 C.F.R. § 68.175 in their RMP.

40 C.F.R. § 68.15 Management – Houston Refining has developed a management system to oversee the implementation of the risk management program elements and provided an organizational chart that documents the lines of authority.

Subpart B – Hazard Assessment

40 C.F.R. § 68.20 Applicability – Houston Refining has thirty-one Program Level 3 processes subject to this subpart. The facility is required to prepare an off-site consequence analysis and complete the five-year accident history.

40 C.F.R. § 68.22 Off-site Consequence Analysis (OCA) Parameters – Houston Refining used RMP*Comp™ and PHAST (Process Heating Assessment and Survey Tool) 6.0 as the technique for modeling the release scenarios. For both the worst-case and alternative case scenarios involving flammables, the facility used the endpoints provided in Appendix A of 40 C.F.R. Part 68, appropriate wind speeds and stability classes, ambient temperatures and humidity values, values for height of the release, and surface roughness values for the release scenario analyses.

40 C.F.R. § 68.25 Worse-case Release Scenario Analysis – Houston Refining reported one worst-case release scenario for pentane, estimated to create the greatest distance to endpoint, and resulting from an accidental release of a regulated flammable substance from a covered process under worst-case conditions.

40 C.F.R. § 68.28 Alternative Release Scenario Analysis – Houston Refining identified and analyzed at least one alternative release scenario using pentane to represent all flammable substances held in covered processes.

40 C.F.R. § 68.30 Defining Offsite Impacts - Population – Houston Refining used the MARPLOT mapping program to define the affected off-site population, based on a circle with the point of release at the center. The facility used the most recent 2020 Census data, estimated to two significant digits, in the OCA documentation.

40 C.F.R. § 68.33 Defining Offsite Impacts - Environment – Houston Refining identified environmental receptors in the OCA, as determined by the distance to endpoint using methods such as local U.S. Geological Survey (U.S.G.S.) maps or any other data source containing U.S.G.S. data to identify environmental receptors.

40 C.F.R. § 68.36 Review and Update – Houston Refining has reviewed and updated the off-site consequence analyses at least once every five years.

40 C.F.R. § 68.39 Documentation – For the worst-case and alternative release scenarios, a description of the vessel or pipeline and substance selected, assumptions and parameters used, the rationale for selection, the anticipated effect of the administrative controls and passive mitigation on the release quantity, and the release rate were provided.

40 C.F.R. § 68.42 Five-year accident history – Houston Refining did not have any reportable accidents listed in the RMP registration at the time of the inspection.

Subpart D – Program 3 Prevention Program

40 C.F.R. § 68.65 Process Safety Information – Houston Refining compiled written process safety information, which includes information pertaining to the hazards of the regulated substances used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process. I reviewed the Safety Data Sheets for the process chemicals and products used, hydrogen-rich sour refinery gases and hydrotreated vacuum gas oil, that contain the following data for the hazards of each substance: toxicity information, permissible exposure limits, physical data, reactivity data, corrosivity data, thermal and chemical stability data, and the hazardous effects of inadvertent mixing of materials that could foreseeably occur. I reviewed documentation concerning the technology of the covered processes, which included block flow diagrams, process chemistry, maximum intended inventory, safe upper and lower limits for such items as temperatures, pressures, flows, or compositions, and, an evaluation of the consequences of deviation.

I reviewed documentation pertaining to the equipment of each process, including materials of construction, piping and instrumentation diagrams (P&IDs), electrical classification, process safety valve (PSV) relief system design, design basis, design codes and standards employed, material and energy balances, and information on other safety systems. The piping and instrument diagram D-536-PID-0010AB did not depict blinded flanges on piping circuit 536 0114-2-02, or indicate that this piping circuit was abandoned and out-of-service, and that the pipe segment was a dead leg. **[AOC 1 – §68.65 (d)(1)(ii)]** The electrical classification map P&ID # E-0063 did not accurately document Class 1 Division 2 areas in Unit 732, in that a Class 1 Division 2 area depicted on the electrical classification map was not addressed in the map legend. **[AOC 2 – §68.65 (d)(1)(iii)]** Houston Refining did complete a compilation of written process safety information pertaining to over 400 pressure relief valves (PRVs) to ensure that the valves are appropriate and consistent with the design basis for the equipment and the overall relief system. **[AOC 3 – §68.65 (d)(1)(iv)]** Houston Refining failed to document that atmospheric PRVs relieve to a safe location in accordance with recognized and generally accepted good engineering practices (RAGAGEP) such as, but not limited to, American Petroleum Institute (API) standard 521 Section 5.8, and the Centre for Chemical Process Safety (CCPS) Guidelines for Pressure Relief and Effluent Handling Systems. **[AOC 4 – §68.65 (d)(2)]**

40 C.F.R. § 68.67 Process hazard analysis (PHA) – Houston Refining provided a PHA procedure for review, Process Hazard Analysis Procedure HSE-PSM-0005. Houston Refining performed initial PHAs that identified, evaluated, and controlled the hazards involved in the processes. The facility completes each PHA based on the five-year cycle from the previous PHA, as they are divided among the covered process units. The PHAs performed used the Hazard and Operability Study (HAZOP) methodology to identify hazards. The 2020 PHA was not appropriate to the complexity of the process in that it failed to address the process safety information gaps identified in the compliance audit findings, in the findings and recommendations from the pressure relief valve atmospheric relief study, and in the 2014 facility blast study. **[AOC 5 – § 68.67 (a)]**

The 2020 PHA facility siting checklist is not appropriate for the complexity of the process, as it does not evaluate and recommend controls for the hazards of the process in relation to proximity of other affected nearby structures or operations. The facility siting checklist does not address the findings and

recommendations from the pressure relief valve atmospheric relief study or the findings and recommendations of the 2014 blast study. **[AOC 5 – § 68.67 (a)]** The facility has not established a system to promptly address and document the team's findings and recommendations and assure that the recommendations are resolved in a timely manner. There are several recommendations open from the most recent PHA with a ranking of "B" that do not require a turnaround to complete. Unit 536 has open recommendations dating back to a previous 2016 PHA. **[AOC 6 – § 68.67 (e)]**

40 C.F.R. § 68.69 Operating Procedures – Houston Refining has developed and implemented written operating procedures that provide clear instructions for safely conducting activities involved in each covered process, consistent with the process safety information, and which address the required elements. The facility has also developed and implemented safe work practices to provide for the control of hazards during operations such as lockout/tagout and confined space entry. The following procedures were reviewed: 56-SOP-1001, 56-SOP-1003, 56-SOP-1004, 56-SOP-2031, 56-SOP-5001, 008-SOP-3001, 72-SOP-1001, 72-SOP-1002, 72-SOP-1003, 72-SOP-1010, 72-SOP-1015, 72-SOP-1017, 72-SOP-2066 and 72-EOP-5001. The procedures consisted of steps for each operating phase: initial startup; normal operations; temporary operations; emergency shutdown, including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner; emergency operations; normal shutdown; and, startup following a turnaround or after an emergency shutdown. The facility has not annually certified that the following operating procedures were current and accurate: 56-SOP-1001, 56-SOP-104, 56-SOP-5001, 008-SOP-3001 and 72-SOP-1001. **[AOC 7 – § 68.69(c)]**

40 C.F.R. § 68.71 Training – Houston Refining provided verbal information regarding their operator training program. The site uses a variety of training methods, including instructor-led classroom sessions, on-the-job training with experienced personnel, and job specific training(JST). The EPA team requested training records to review for 10 operators in the 536 and 732 units. The facility provides new operators initial training, which includes an overview of the process and the operating procedures, as specified in § 68.69. The training includes process-specific safety and health hazards, emergency operations including shut down, and safe work practices applicable to the employee's job tasks. The facility consults with the employees involved in operating the process to determine the appropriate frequency of refresher training within a JST. The training program section titled "PSM/OE Employee Feedback on Refresher Training Frequency" asks each employee their preferred training frequency on JST procedure manuals. The choices are three years (PSM Max), two years, one year, or Other (define). EPA identified that refresher training had not been provided at least every three years to one employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures. **[AOC 8 – §68.71 (b)]**

40 C.F.R. § 68.73 Mechanical Integrity – Houston Refining failed to conduct internal and external inspections on Pentane Spheres 1, 2 and 3, as well as on the following pressure vessels: 536-D0001 (D-9563), 536-D0014 (D-9620), 536-D1001 (D-158640), 536-E0079E (E-3870E) and 536-T001 (T-4560). **[AOC 9 – §68.73 (d)(1)]** Houston Refining failed to conduct inspections and testing in accordance with recognized and generally accepted good engineering practices, such as American Petroleum Institute standards, for a number of fixed equipment and piping segments. **[AOC 10 – §68.73 (d)(2)]** Houston Refining did not correct deficiencies in over 145 atmospheric pressure relief valves that were outside acceptable limits, as well as deficiencies at fire monitors in the hydrocarbon removal unit (HRU). **[AOC 11 – §68.73 (e)]**

40 C.F.R. § 68.75 Management of Change (MOC) – Houston Refining provided procedures describing how the facility manages change, except for “replacements in kind”, to process chemicals, technology, equipment, procedures, and, changes to stationary sources that affect a covered process. The facility provided the Management of Change and Pre Start-Up Safety Review Procedure (PSM-MOC-001) with supporting appendices. The facility has not implemented its written procedures to manage change, except for “replacements in kind”. **[AOC 12 – § 68.75(a)]** EPA asked the facility how they manage changes to process equipment components, such as pipe clamps, wraps, or leak repair devices (LRD). The facility provided a procedure entitled “Leak Repair Device Fabrication, Installation, and Inspection” (INP-PRO-0102). Per section 1.1.7 of this procedure: “This document will provide management of change control and will be used in lieu of PSM-MOC-001, Management of Change and Pre-Start-Up Safety Review Procedure”. The INP-PRO-0102 procedure functions as a stand-alone procedure for the installation and removal of leak repair devices. The facility has thirty-four active leak repair devices in various service, including non-RMP service. These LRDs were installed in 2018 (2), 2019 (5), 2020 (20), 2021 (5) and 2022 (2). The following MOCs were requested for review: MOC-22-31, MOC-22-52, MOC-22-77, MOC-22-93, MOC-22-150, MOC-22-208. The MOC VisiumKMS database is the electronic program used to track MOCs. If training is required, a group verification record (GVR) is provided.

The following sections in the LRD procedure differ from, or do not support, the MOC implementation process: “section 1.3.2 - All or any part of this procedure may be waived with the written approval of the HRO Reliability Manager.”; “section 5.1.1 - LRDs are considered to be a temporary repair. The LRD is to be removed and the component permanently repaired at the earliest maintenance opportunity.”; “section 5.1.10 - Emergency Installations- For emergency situations, cases where a leak may pose serious safety or environmental exposure and immediate action is required, an LRD may be installed after obtaining verbal approval from the area Fixed Equipment Reliability Engineer and the Asset Manager or manager on call.”; “section 5.10.6 - When multiple LRDs are installed on the same piping/equipment in close proximity to each other, additional inspection shall be performed using automatic ultrasonic testing (AUT) or other methods to scan 100% of the affected piping. If additional damage is identified that exceeds the minimum required thickness for the operating conditions, an engineering assessment shall be performed to determine if the affected components/equipment require additional repairs or need to be removed from service.”; and, “section 5.11 - Inspection Frequency (After LRD Installation).” There are two MOCs related to the removal of LRDs: MOC-11-822 (Remove LRD type clamp and install high....) and MOC-18-235 (Remove 737LRD0057 from elbow area). The use of the separate LRD procedure contradicts the implementation of the broader MOC process outlined in PSM-MOC-001. **[AOC 12 – § 68.75(a)]**

I reviewed MOC 2019075-001, an MOC for electrical classification. The MOC was closed, however, an affected process drawing was only updated partially to show changes that were made. The owner failed to update process safety information required by § 68.65 accordingly, as changes to the electrical classification map were not accurately depicted, and management of change MOC# M2019075-001 was incorrectly closed-out. **[AOC 13 – § 68.75(d)]**

40 C.F.R. § 68.77 Pre-startup Safety Review (PSSR) – Houston Refining provided a PSSR review form. The facility provided pre-startup safety review records which included associated MOCs, which were also reviewed. The PSSRs documented that, when the facility installed a new stationary source, or significantly modified an existing source, a review was conducted prior to the introduction of newly regulated substances, including the appropriate communication elements and training.

40 C.F.R. § 68.79 Compliance Audits – Houston Refining certified that they evaluated compliance with the provisions of this subpart at least every three years to verify that procedures and practices developed under this subpart are adequate and are being followed. The compliance audits were conducted by at least one person knowledgeable in the process. The two most recent audit reports completed were conducted on June 6 to 10, 2022, and October 21 to November 1, 2019. The facility did not promptly determine and document an appropriate response to each of the findings of the compliance audits or document that deficiencies had been corrected. The reports documented findings related to §68.65 (d) relief valves and §68.73 (d)(1) inspections on process equipment in both the 2019 and 2022 reports. **[AOC 14 – § 68.79(d)]**

40 C.F.R. § 68.81 Incident Investigation – Houston Refining provided an incident investigation procedure (PSM-SOP-0002) for EPA’s review. The facility has investigated incidents which resulted in, or could reasonably have resulted in, a catastrophic release. I reviewed three incident investigation records - 610912, 615484 and 657501. For each of these incidents, the facility initiated the investigations no later than 48 hours following the incident. For each investigation reviewed, the investigation team consisted 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, who thoroughly investigated and analyzed each incident. Houston Refining has established the *IMPACT/ INTELEX* database system to promptly address, resolve and document incident report findings, recommendations, resolutions and corrective actions.

40 C.F.R. § 68.83 Employee Participation – Houston Refining has developed a written plan of action regarding the implementation of the employee participation required by this section. The document provided does not explain how the facility consults with employees for process hazard analyses, or for the development of the other RMP process safety management elements. **[AOC 15 – § 68.83(a)]** The plant has provided employee access to the process hazard analyses and all other information required to be developed under this rule in the facility’s human resources office (HRO) library.

40 C.F.R. § 68.85 Hot Work Permit – Houston Refining has an internal procedure that requires the facility to issue general work permits for hot work operations conducted on or near a covered process. Two general work permits reviewed did not document that the fire prevention and protection requirements of 29 CFR 1910.252(a) had been implemented prior to beginning the hot work operations. These were hot work permit HRO GWP 57405, “Finish bolt up on C2B standpipe and “weld support to hold C2 A standpipe and finish bolt up”. Welding was done only to the structure and not equipment, but the hot work permit did not include documentation of a fire watch. Permits HRO-GWP-54265, HRO-GWP-57664 and HRO-GWP-57702 had blank permit issuer signatures. **[AOC 16 – § 68.85(b)]**

40 C.F.R. § 68.87 Contractors – Houston Refining provided a Contractor Host and Contractor Safety procedure (HSE-FM-0038) for EPA’s review. The facility uses *ISNetWorld* and *GAPS* web applications to obtain and evaluate information regarding an owner or operator’s safety performance and programs when selecting a contractor.

Subpart E – Emergency Response

40 C.F.R. § 68.90 Applicability – Houston Refining is designated as a responding stationary source and is subject to the requirements of 68.93 to 68.95. Houston Refining uses the contractor Oil Mop Industry (OMI) for both emergency response assistance and response clean up. OMI can respond with 20 minutes of notification.

40 C.F.R. § 68.93 Emergency Response Coordination Activities – Houston Refining has coordinated response needs with the local emergency planning commissions (LEPCs) and other response organizations to determine how the covered processes at the facility are addressed in the community's emergency response plan. The Houston Fire Department receives Tier II reports through the Harris County LEPC. Houston Refining is also a member of the Channel Industries Mutual Aid (CIMA). CIMA conducts drills and meetings, for which the facility sends a representative. The facility uses the Community Awareness Emergency Response (CAER) online system for the community to view posted messages and alerts from East Harris County Manufacturer's Association (EHCMA) member facilities regarding operational updates, and to send electronic notifications.

40 C.F.R. § 68.95 Emergency Response Program – Houston Refining provided sections of the Emergency Response plan, which EPA reviewed. When operators join the emergency response team, the new recruit class will spend one week conducting onsite training, which includes hazardous waste operations (HAZWOPER), response equipment, and emergency response procedures. The new response team members will then attend Texas A&M University's two-day initial classroom training, and afterwards return to join the rest of the full team for fire and hazardous materials hands-on response training. Additional rescue and emergency medical services training is provided separately for selected employees.

40 C.F.R. § 68.96 Emergency Response Exercises – Houston Refining provided documentation that the facility has conducted emergency response drills in coordination with local emergency planning and response organizations. These events included an emergency response accountability drill, an annual evacuation, and marine spill drills.

Subpart G – Risk Management Plan

40 C.F.R. § 68.190 Updates – Houston Refining's RMP registration renewal was re-submitted on June 17, 2019, as a five-year update, pursuant to 40 C.F.R. § 68.190 (b)(1).

40 C.F.R. § 68.195 Required corrections – Houston Refining's next RMP registration re-submission is due by June 17, 2024, unless an update or correction is required by 40 C.F.R. § 68.190 or 40 C.F.R. § 68.195 prior to the five-year renewal deadline.

Section III – AREAS OF CONCERN

Closing Meeting - On the last day of the inspection, September 23, 2022, I conducted a closing conference, during which I presented the following areas of concern identified during the inspection.

AOC 1 – 40 C.F.R §68.65(d)(1)(ii) Process safety information

“(d) 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).”

Houston Refining failed to ensure that piping and instrument diagrams are accurate. The piping and instrument diagram D-536-PID-0010AB did not depict blinded flanges on piping circuit 536 0114-2-02, or note that this piping circuit was abandoned and out of service, and that the piping segment was a dead leg.

AOC 2 - 68.65(d)(1)(iii) Process safety information

“(d) Information pertaining to the equipment in the process. (1) Information pertaining to the equipment in the process shall include: (iii) Electrical classification.”

The electrical classification map P&ID# E-0063 did not accurately document Class 1 Division 2 areas in Unit 732. Additionally, a Class 1 Division 2 area depicted on the electrical classification map was not included in the map legend.

AOC 3 - 68.65 (d)(1)(iv) Process safety information

“(d) Information pertaining to the equipment in the process. (1) Information pertaining to the equipment in the process shall include: (iv) Relief system design and design basis.”

The facility failed to compile and validate written process safety information for more than 350 pressure relief valves to ensure that the valves are appropriate and consistent with the design basis for the equipment where they are used, and with the overall relief system.

AOC 4 – 40 C.F.R §68.65 (d)(2) Process safety information

“(d) Information pertaining to the equipment in the process. (2) The owner or operator shall document that equipment complies with recognized and generally accepted good engineering practices.

The facility failed to document that more than 145 atmospheric PRVs relieve to a safe location, in accordance with recognized and generally accepted good engineering practices, such as, but not limited to, API 521 Section 5.8, CCPS Guidelines for Pressure Relief and Effluent Handling Systems, the July 15, 2019, Baker Risk Dispersion Modeling Report for Unit 134, and the June 7, 2022, LYB ARV Project Process Design Basis study.

AOC 5 – 40 C.F.R §68.67 (a) Process Hazard Analysis

“The owner or operator shall perform an initial process hazard analysis (hazard evaluation) on processes covered by this part. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. The owner or operator shall determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. The process hazard analysis shall be conducted as soon as possible, but not later than June 21, 1999. Process hazards analyses completed to comply with 29 CFR 1910.119(e) are acceptable as initial process hazards analyses. These process hazard analyses shall be updated and revalidated, based on their completion date.”

The 2020 PHA was not completed with appropriate methodology, considering the complexity of the process. The PHA failed to address the process safety information gaps identified in previous compliance audit findings, findings and recommendations from the 2019 pressure relief valve atmospheric relief study, and the 2014 facility blast study. The 2020 PHA facility siting checklist was not appropriate for the complexity of the process, as it did not evaluate and recommend controls for the hazards identified in the process. The facility siting checklist also did not address the findings and recommendations from the

2019 pressure relief valve atmospheric relief study, or the findings and recommendations of the 2014 blast study.

AOC 6 – 40 C.F.R §68.67 (e) Process Hazard Analysis

“(e) The owner or operator shall establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.”

There are several recommendations open from the most recent PHA that have a ranking of “B” that do not require a turnaround to complete. Unit 536 has open recommendations dating back to a previous PHA in 2016.

AOC 7 – 40 C.F.R §68.69 (c) Operating Procedures

“(c) The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to stationary sources. The owner or operator shall certify annually that these operating procedures are current and accurate.”

The following operating procedure certifications were not reviewed annually.

Operating Procedure Certifications		
Procedure	Previous Certification Date	Most Recent Certification Date
56-SOP-1001	3/24/2021	5/31/2022
56-SOP-104	2/14/2021	3/8/2022
56-SOP-5001	2/3/2021	7/5/2022
008-SOP-3001	1/6/2021	2/1/2022
72-SOP-1001	4/27/2021	7/18/2022

AOC 8 – 40 C.F.R §68.71(b) Training

“(b) *Refresher training.* Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The owner or operator, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.”

The following operator employee training records had not been refreshed at least every three years.

Refresher Training			
Employee	Initial Training	Next Training	Most Recent Training
David Salazar (536 Desalter)	5/22/2014	8/14/2018	7/21/2021

AOC 9– 40 C.F.R §68.73 (d)(1) Mechanical Integrity

“(d) Inspection and testing. (1) Inspections and tests shall be performed on process equipment.”

- Houston Refining failed to conduct internal and external inspections on Pentane Spheres: 1, 2 and 3.
- Houston Refining failed to conduct internal and external inspections on the following pressure vessels:
 - Horizontal Drum 536-D0001 (D-9563)
 - Vertical Drum 536-D0014 (D-9620)
 - Desalter 536-D1001 (D-158640)
 - Heat Exchanger 536-E0079E (E-3870E)
 - Tower 536-T001 (T-4560)

AOC 10– 40 C.F.R §68.73 Mechanical Integrity

“(d) Inspection and testing. (2) Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.”

- Houston Refining failed to conduct inspection and testing in accordance with recognized and generally accepted good engineering practices, such as API 510, for equipment vessel 536-T0001. Houston Refining failed to conduct ultrasonic testing on 536-T0001 at Condition Monitoring Location (CML) # 35, which should have been completed by May 13, 2022.
- Houston Refining failed to conduct inspection and testing in accordance with recognized and generally accepted good engineering practices, such as API 510, for Pentane Sphere-3. Houston Refining failed to conduct ultrasonic testing on Pentane Sphere-3 at Condition Monitoring Location (CML) # 31. Ultrasonic testing also should have been completed by April 13, 2022, for another CML where the projected minimum thickness would not meet the standard on or by September 24, 2022.
- Houston Refining failed to conduct an external inspection of piping circuit DL536 BLDN-1-04 in accordance with recognized and generally accepted good engineering practices, such as API 570. The Houston Refining inspection and test plan, in accordance with API 570, requires an external inspection of Class 1 piping every five years. The previous inspection of piping circuit DL-536 BLDN-1-04 was on August 25, 2014; hence, the next external inspection should have been completed by August 25, 2019. No record was provided to demonstrate that the external inspection had been performed as of September 19, 2022.
- Houston Refining failed to conduct inspection and testing in accordance with recognized and generally accepted good engineering practices for piping circuit DL-536 BLDN-1-07. Houston Refining failed to conduct additional ultrasonic testing on piping circuit DL-536 BLDN-1-07 at Condition Monitoring Location (CML) # 9 [536 BLDN-53]. Ultrasonic testing identified a CML in 2011 where the pipe thickness was determined to be below the acceptable minimum value. Additional testing was performed in 2012; however, no additional testing was performed after 2012, as of October 29, 2022.
- Houston Refining failed to conduct inspection and testing in accordance with recognized and generally accepted good engineering practices, such as API 570, for piping circuit DL536 0114-2-02. An April 25, 2019, external inspection determined this piping circuit to be abandoned-in-place and identified the segment as a dead leg. No external inspection was performed on piping circuit DL536 0114-2-02 as a dead leg in 2018, or at any time prior. No ultrasonic testing records were furnished for this piping circuit for the time period before it was abandoned in place or afterward.

AOC 11– 40 C.F.R §68.73(e) Mechanical Integrity

“(e) Equipment deficiencies. The owner or operator shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in §68.65) before further use or in a safe and timely manner when necessary, means are taken to assure safe operation.”

- Lyondell-Houston Refining did not correct deficiencies in over 145 atmospheric pressure relief valves that are outside acceptable limits, as defined by the June 7, 2022, LYB ARV Project Process Design Basis study.
- Lyondell-Houston Refining did not correct deficiencies in fire monitors in the HRU that are outside acceptable limits before further use, or in a safe and timely manner when necessary means are taken to assure safe operation. The following issues were identified with fire monitors in the HRU Unit between March 2019 and August 2021 for affected monitors 135 (Allendale), 136, 233, 234, 536, 537, 138, 533, 636, 732,833, and 834:
 - The fire monitors do not have 3-inch and 6-inch valves;
 - the fire monitors do not have nozzles;
 - the fire monitors have noticeable rust and corrosion;
 - several fire monitors are out-of-service;
 - several fire monitors provide no water;
 - several fire monitors have pinhole leaks;
 - several fire monitors need to be replaced; and,
 - the fire monitors need additional inspections.

AOC 12 – 40 C.F.R §68.75 (a) Management of Change

“(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.”

Pipe clamps are installed via the LDR Procedure, instead of through the formal change management process. The LDR procedure allows a clamp to be installed as an “emergency installation” with only undocumented verbal consent. There were two MOCs for the removal of clamps:

- MOC to remove LRD clamp MOC 11-822
- MOC- Remove 737LRD0057 from elbow area MOC-18-235

AOC 13 – 40 C.F.R §68.75 (d) Management of Change

“(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.”

Houston Refining failed to update process safety information required by § 68.65 for changes to electrical classification map P&ID # E-0063 that were not accurately depicted, such that management of change MOC# M2019075-001 was incorrectly closed-out.

AOC 14 - 40 C.F.R §68.79 (d) Compliance Audit

“(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.”

There were findings from the 2019 audit included in the 2022 audit related to §68.65 (d) relief valves and §68.73 (d)(1) inspections on process equipment.

AOC 15 - 40 C.F.R §68.83 (a) Employee participation

“The owner or operator shall develop a written plan of action regarding the implementation of the employee participation required by this section.”

The written plan provided does not explain how the facility consults with employees for process hazard analyses, or for the development of the other RMP process safety management elements.

AOC 16 - 40 C.F.R §68.85 (b) Hot work permit

“(b) The permit shall document that the fire prevention and protection requirements in 29 CFR 1910.252(a) have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations.”

Hot work permit HRO GWP 57405 for weld support did not include documentation of a fire watch. Permits were completed with blank issuer signature fields.

AOC 17 – 40 C.F.R §68.95 (a)(2) Emergency Response

“(a) The owner or operator shall develop and implement an emergency response program for the purpose of protecting public health and the environment. Such program shall include the following elements: (2) Procedures for the use of emergency response equipment and for its inspection, testing, and maintenance.”

Houston Refining failed to implement its written procedures for the inspection and testing of emergency response equipment requiring monthly inspections. Inspections and tests of the HRO Unit 536 Deluge System 1-8 were not performed in March 2022 and September 2021. The facility also failed to implement its written procedures for the inspection and testing of emergency response equipment requiring semi-annual inspections. Inspections and tests of the HRO Fire Monitors were not performed in March 2021 or in 2022, for the following Units: 135 (Allendale), 136, 233, 234, 536, and 537; 138, 533, 636, 732, 833, and 834.

Section IV – POST-INSPECTION FOLLOW UP

EPA received the following additional information on November 3, 2022, after completing the inspection on September 23, 2022: Confidential Business Information and additional supporting data related to the Areas of Concern documented in this report.

Section V – LIST OF APPENDICES

There are no photos, videos, or other appendices in this report.