United States Environmental Protection Agency

Region 6 - Enforcement & Compliance Assurance Division

INSPECTION REPORT

Inspection Date(s):	August 2-5, 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:	**Olin Corporation**	
Facility Name:	**Blue Cube Operations LLC – Plaquemine Site**	
Facility Physical Location:	21255 LA-1 South	
(city, state, zip code)	Plaquemine, Louisiana 70765	
Mailing address:	21255 LA-1 South	
(city, state, zip code)	Plaquemine, Louisiana 70765	
County/Parish:	Iberville Parish	
Facility Phone Number	(225) 692-8493	
Facility Contact:	Stephen Ledoux	Site Leader
	sbledoux@olin.com	
FRS Number:	110070828281	
Identification/Permit Number:	Air Operating Permit ID: #2573, #2188	
Media Identifier Number:	RMP ID: 1000 0023 1536	
NAICS:	325180 (Other Basic Organic Chemical Manufacturing)	
SIC:	2812	
Personnel participating in inspection:		
Justin McDowell	US EPA Region 6	Lead Inspector
Keri Meyers	Louisiana Department of Environmental Quality (LDEQ)	Inspector
Jamie Vicknair	LDEQ	Inspector
Glen Jenkins	LDEQ	Inspector
Don Pulliam	Blue Cube	EH&S Manager
EPA Lead Inspector Signature/Date	JUSTIN MCDOWELL Digitally signed by JUSTIN MCDOWELL Date: 2022.11.10 18:47:13 -06'00'	
	Justin McDowell	Date
Supervisor Signature/Date	SAMUEL TATES Digitally signed by SAMUEL TATES Date: 2022.11.14 08:28:10 -06'00'	
	Samuel Tates	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

United States Environmental Protection Agency (EPA) Region 6 inspector Justin McDowell, and the Louisiana Department of Environmental Quality (LDEQ) inspectors Jamie Vicknair and Glen Jenkins, arrived at the Olin Corporation Blue Cube Operations LLC (BCO Plaq) facility at 9:00 AM on Tuesday, August 2, 2022, for an announced inspection. I met with Don Pulliam and other Blue Cube personnel for an opening meeting. I presented my credentials and informed Blue Cube 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), the Chemical Accident Prevention Provisions in 40 C.F.R. Part 68, and the General Duty Clause. On April 18, 2022, the Blue Cube facility experience and accidental release event which prompted this inspection. Blue Cube's Risk Management Plan (RMP) is listed as a Program Level Three (3), Title V facility. I inquired if an employee representative was available pursuant to section 112(r)(6)(L) of the CAA to participate in this inspection and was informed that the Blue Cube Plaquemine plant is a non-union facility.

FACILITY DESCRIPTION

The BCO Plaq site contains four (4) different process units which were previously part of The Dow Chemical Company's Louisiana Operations. Of the four (4) process units, only two (2) units are RMP covered processes: the Chlorine Unit and the Solvents/Ethylene Dichloride (EDC) Unit. There are four (4) regulated substances present at the facility that are above the threshold limits: chloroform [methane, trichloro-], chlorine, hydrogen chloride (anhydrous, as hydrochloric acid, and methyl chloride (chloromethane). Anhydrous hydrogen chloride is produced at BCO Plaq for internal use to make aqueous hydrogen chloride or is sold to customers to make silicone products. Most of the chlorine produced on site goes to captive users such as Dow, and the remaining product is shipped out via railcar. This site is part of a larger complex belonging to Dow Chemical, and is manned 24 hours a day, 7 days per week and has approximately 205 full time employees. The focus of this inspection included the Solvents/EDC unit and the Chlorine unit.

Section II – OBSERVATIONS

On Wednesday, August 3, 2022, I was accompanied by BCO Plaq personnel to conduct a driving tour of the site within the larger Dow Chemical complex. We toured the perimeter of the process and viewed the process units. Due to heavy rains and flooding during the week of the inspection, we did not physically enter the units.

Subpart A – General

40 C.F.R. § 68.10 Applicability – BCO Plaq is the owner/operator of a stationary source that has more than a threshold quantity of four regulated toxic substances (chlorine, hydrogen chloride (anhydrous), chloroform and methyl chloride in a covered process, as listed in 40 C.F.R. § 68.130; therefore, BCO Plaq is subject to the Chemical Accident Prevention Provisions. BCO Plaq has two Clean Air Act Title V Operating Permits (ID#2573 and ID#2188) and is covered by the North American Industrial Classification System (NAICS) codes 325180 (Other Basic Inorganic Chemical Manufacturing) and 325190 (Other Basic Organic Chemical Manufacturing). BCO Plaq is subject to the Occupational Safety and Health

Administration (OSHA) process safety management (PSM) standard, 29 C.F.R. § 1910.119, and has two (2) Program Level Three (3) processes.

40 C.F.R. § 68.10 Program Eligibility – BCO Plaq re-submitted an RMP Voluntary update on September 13, 2018. BCO Plaq's next registration re-submittal is due on September 13, 2023, 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 – BCO Plaq 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 – BCO Plaq has two 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 Offsite Consequence Analysis (OCA) Parameters – BCO Plaq used RMP*Comp modeling for all of the alternative release scenarios and for the worse-case release scenario. The prior submittal for an alternate scenario for chlorine was completed with *PHAST* modeling. This is the data that is reported in their current RMP submittal for the distance to endpoint and the receptors impacted. The RMP*Comp model for the chlorine alternate scenario gave a shorter distance to endpoint. BCO Plaq stated that they will use the RMP*Comp for all future scenarios and will update the hazard assessment sections of the RMP registration to reflect the RMP*Comp data. For both the worst-case and alternative case scenarios involving toxics, the facility used the endpoints provided in Appendix A of 40 C.F.R. Part 68, and appropriate values for wind speeds and stability classes, ambient temperatures and humidity, height of the release, and surface roughness for the release scenario analyses.

40 C.F.R. § 68.25 Worse-case Release Scenario Analysis – BCO Plaq analyzed and reported in the RMP registration one worst-case release scenario, estimated to create the greatest distance to endpoint, and resulting from an accidental release of a regulated toxic substance (hydrogen chloride) from a covered process under worst-case conditions. BCO Plaq analyzed but has not yet updated the RMP with one worst-case release scenario, estimated to create the greatest distance to endpoint resulting from an accidental release of a regulated flammable substance (propylene) from a covered process under worst-case conditions. This was a facility-identified issue shared with EPA already being actively managed to closure under a facility MOC with action to update the RMP plan by the end of November 2022. **[Area of Concern (AOC) 1 – §68.25 (a)(2)(ii)]**

40 C.F.R. § 68.28 Alternative Release Scenario Analysis – BCO Plaq identified and analyzed one toxic release scenario for each toxic substance. BCO Plaq analyzed but has not yet updated the RMP with at least one alternative release scenario to represent all flammable substances held in covered processes for propylene. **[AOC 2 – §68.28 (a)]** This was also shared with EPA during the inspection as a facility-

identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

40 C.F.R. § 68.30 Defining Offsite Impacts - Population – BCO Plaq used the *LandView5* model with the 2010 census data to describe how the facility estimates the population that would be affected in the distance to endpoint in the RMP, based on a circle with the point of release at the center. The next OCA will need to be updated with 2020 census data.

40 C.F.R. § 68.33 Defining Offsite Impacts - Environment – BCO Plaq identified environmental receptors within a circle where its center is the point of the release and a radius determined by the distance to endpoint.

40 C.F.R. § 68.36 Review and Update – BCO Plaq has not reviewed and updated the off-site consequence analyses at least once every five years with worst-case and alternative case scenarios for flammable substances. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022. **[AOC 3 – §68.36 (a)]**

40 C.F.R. § 68.39 Documentation – BCO Plaq did not have a description of the vessel or pipeline, or flammable substance selected for a worst-case or alternative case scenario with assumptions and parameters used, the rationale for selection, or the assumptions of any administrative controls or any passive mitigation that would limit the quantity that could be released. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022. **[AOC 4 – §68.39 (a)(b)(c)(d)(e)]**

40 C.F.R. § 68.42 Five-year accident history – BCO Plaq included four accidents dated May 4, 2022; April 18, 2022; January 3, 2018; and, September 7, 2017, that met the criteria of **§** 68.42. Each incident report contained the required necessary data.

Subpart D – Program 3 Prevention Program

40 C.F.R. § 68.65 Process Safety Information – BCO Plaq 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 (SDSs) for the process chemicals and final products, which include: methyl chloride; chlorine, liquid; hydrogen chloride, anhydrous gas, electronic grade; chloroform, fluorocarbon grade; and, Allyl-Lites that detail process safety information, and which include the following data for the hazards of the substance used: 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 process, which included block flow diagrams for the Per/Tet block and chlorine plant processes, process chemistry for the chlorine area cells compression purification scrubbers and for the hydrogen unit reactions, maximum intended inventory, safe upper and lower limits for parameters including temperatures, pressures, flows, and compositions, and an evaluation of the consequences of deviation. I also reviewed documentation pertaining to the equipment of the covered processes, including materials of construction, piping and

instrumentation diagrams (P&IDs), electrical classification, ventilation system design, design codes and standards employed, material and energy balances, and safety systems.

40 C.F.R. § 68.67 Process hazard analysis (PHA) – BCO Plaq performed initial PHAs that identified, evaluated, and controlled the hazards involved in the processes, and they strive to conduct their PHAs on a four-year rotation. The facility provided the Olin Management System Document 06.08.02.01 Process Hazard Analysis – Layers of Protection Analysis (PHA-LOPA) that describes the methodology used to evaluate the hazards of the process being analyzed. The Hazard and Operability Study (HAZOP) protocol is the primary methodology used to evaluate hazards during the PHAs. The facility has cardinal rules defined for general process safety throughout a process unit. The cardinal rules include the following principles: they are technology based; there are critical concepts; there is training that goes along with a specific process; key concepts are stressed; and, every three years review training modules on cardinal rules. I requested and reviewed the following PHAs: the RC PHA 2018 EDC, the Solvents/EDC-1 RC/PHA, and, the Olin Plaquemine Plant Site Logistics Process Hazard Analysis July 2019 PHA Summary Report and associated documents. The PHAs were performed by a team with expertise in engineering and process operations and included at least one employee who has experience and knowledge specific to the process being evaluated. The site has established a system to promptly address the team's PHA action item findings and recommendations, assure that the recommendations are resolved in a timely manner, and that resolutions are documented.

Table 1

PHA Schedule					
Business Unit	**Plant**	**Previous PHA**	**Current PHA**	**Frequency (years)**	**Next PHA Due**
Chlor-alkali	Chlorine	11/7/2016	11/3/2021	4	2025
EDC/VCM	EDC 1	12/8/2015	8/02/2018	4	2022
Logistics	LAO Site Logistics	12/8/2015	12/9/2019	4	2023
GCO	PerTet	12/8/2015	8/2/2018	4	2022

40 C.F.R. § 68.69 Operating Procedures – BCO Plaq 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 required elements. The following procedures were reviewed: Chlorine Plant Startup from Total Shutdown, A-Train Master Shutdown, A-Train Master Startup, B-Train Master Shutdown, B-Train Master Startup, Critical – Transfer-Chlorine Tank Car Loading, PSV and PRD Blocking Devices Operation Procedure, C-550 and C-650 Operation Procedures with steps for each operating phase, and Chlorine Plant Emergency Response Procedure. Consequences of deviation and steps required to correct or avoid deviation were included in each procedure, or else the procedure directed the reader to another document, Consequences of Deviation of Operating Limits, Reference ODMS 05.03.04. Properties of, and hazards presented by, the chemicals used in the processes were not addressed in each individual procedures or directed reference to SDSs in each individual procedure. Hazards present were mentioned in the Chlorine Plant Emergency Response Procedure, but not referenced in the other procedures reviewed. The facility stated that personnel are trained on the hazards present in a process. **[AOC 5 – §68.69 (a)(3)(i)]** Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment, are referenced in the LaO CAA Plant PPE Guidelines document. Some procedures state “if any physical contact or exposure occurs, report and seek medical treatment immediately!”, while other procedures have no information related to measures to be taken if physical contact or airborne exposure occurs, and there is no reference to the SDSs. **[AOC 6 – §68.69 (a)(3)(iii)]** All procedures are available in the *Documentum* online database. Emergency and critical procedures are

also available in the control room as hard copies. The 2019, 2020, and 2021 annual procedure certifications for the Chlorine Unit were furnished for EPA's review, as well as the procedures for Confined Space Entry Standard, the BCG Isolation of Energy Standard, and Hot Work Permits.

40 C.F.R. § 68.71 Training – BCO Plaq provided an overview of their training program. The site uses a variety of training methods which includes in-plant training, instructor-led classroom sessions, on-the-job training with experienced personnel, simulation trainings, a review of available process documentation, and *Saba* e-Learning modules. I requested training records for ten selected operators. The facility documented that initial training included emphasis on safety and health hazards, emergency operations - including shut down, and safe work practices applicable to the employee's job task. Refresher training has not been provided at least every three years, to certain employees involved in operating the Per Tet and EDC processes to assure that the employees understand and adhere to the current operating procedures. One operator took Per Tet Level 4 Operator training on December 1, 2018, but the refresher training due December 1, 2021, was not completed. A second operator took Per Tet Level 4 operator training on December 4, 2018, but refresher training due December 4, 2021, was not completed. The same second operators initial training for Level 5b in the EDC Unit was taken September 9, 2013. The only refresher training records the facility provided for this operator's Level 5b training was for May 31, 2022. The Per Tet operator took Level 4 training on December 4, 2018, but refresher training due December 4, 2021, was not completed. A third operator took Per Tet Level 5 operator training on November 28, 2018, but the refresher training due November 28, 2021, was not completed. The same third operator's initial training for Level 5b in the EDC Unit was taken in April 2011. The only refresher training records the facility provided for this operator's Level 5b training was May 31, 2022. This was similar to a finding from the 2022 internal company compliance audit of the Chlorine Unit. **[AOC 7 – §68.71 (b)]**

The facility states that they fulfill the requirement of consulting with the employees involved in operating the process to determine the appropriate frequency of refresher training by an anonymous survey given at least every three years. Employees are provided opportunity to respond and provide feedback on the adequacy of training and operating procedures. When evaluating survey results, the facility considers that employees that choose not to respond to the survey are in agreement with the current state of refresher training. Only 60 percent of the employees took the survey. There is no verifiable method to determine which employees requested more training and which were satisfied with the current three-year refresher training frequency. The leader must review the employee consultation responses to determine the adequacy of refresher training frequency. From this review, the leader must document that either the existing frequency is adequate to assure employees understand and adhere to the operating procedures or record the eMOC reference where the refresher training frequency was adjusted or record an AMT reference that includes actions taken to do further consultation and resolve path forward for refresher training frequency. The facility cannot determine which individuals participated in the surveys, unless a person voluntarily includes their name on the survey. **[AOC 8 – §68.71 (c)]**

40 C.F.R. § 68.73 Mechanical Integrity (MI) – BCO Plaq provided the *OASIS Asset Integrity Manual* and the Critical Rotation Equipment procedure that the facility has established and implemented to maintain the on-going integrity of process equipment. The company standardized procedures for maintaining rotation equipment is still in development and are scheduled to be completed in 2023.

Contractors conduct most of the maintenance inspections. A BCO Plaq lead inspector reviews the contractor's inspection reports. The contractor has six American Petroleum Institute (API) inspectors,

three nondestructive examination (NDE) technicians and two certified welder inspector (CWI) technicians. The BCO Plaq Systems Application and Products (SAP) maintenance management system schedules work orders for maintenance to conduct inspections. I verified that the lead BCO Plaq inspector is certified in API standards 510, 570 and 653, and the contractor supervisor is certified in API 510 and 570. The site does not have a flare but uses a scrubber for chlorine. The facility does have relief valves that vent chlorine to the scrubber, and solvents that are vented to afterburners or directly to the atmosphere. The only underground piping containing chemicals is the pipeline coming into the facility with brine raw product. For corrosion monitoring, the facility calculates remaining life and records the thickness data in a plant control management system (PCMS). Process piping has condition monitoring locations (CML) that are capped and used for repeat readings. All engineered pipe clamps and wraps were removed during the April 2022 turnaround. The time frame for temporary clamps requires evaluation for removal at the next maintenance opportunity. Temporary engineered clamps are entered into the SAP maintenance management system. Any temporary engineered clamp requires a new equipment ID and monthly preventative maintenance tasks. I requested the pipe clamp list for review the corresponding management of change actions. BCO Plaq sends pressure safety valves (PSVs) off site for inspecting and testing through a contractor. The contractor performs the relief ("pop") test and returns the valve with the report. The facility has several dual relief PSVs protected by an in-line spare. Based on the test report results, BCO Plaq makes the determination of taking the relief valve out of service or to have it repaired. All API inspections currently conducted at the facility are time based. I requested the mechanical integrity inspection records for the following equipment: C50-DCL-4102, C-650 compressor, C-550 compressor, C52, C62, C100, D-650, D-651, D-652, D-653, D-654, PSV-D653A, PSV-EC192B, PSV-E550A, PSV-550B, PSV-E551B, PSV-E650B, E650 heat exchanger, E653 heat exchangers, and fixed chlorine monitors.

40 C.F.R. § 68.75 Management of Change (MOC) – BCO Plaq has established written procedures to manage changes, except for "replacements in kind", to process chemicals, technology, equipment, and procedures, and for other changes to the stationary source that may affect a covered process. The MOCs reviewed assured 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. Employees involved in operating a process, and maintenance and contract employees whose job tasks will be affected by a change in the process, are informed of, and trained in, the change prior to start-up of the process or affected part of the process by electronic communications sent to affected personnel. I reviewed four MOCs on site. One MOC was initiated to "Install Engineering clamp on R-1C overhead line" and the P&ID was not updated to show the clamp present. **[AOC 9 – §68.75(d)]** The P&ID for the MOC created on May 26, 2022, had a leak clamp installed, but the P&ID had the installed clamp in red, therefore one MOC had the clamp on the drawing, and another did not.

40 C.F.R. § 68.77 Pre-startup Safety Review (PSSR) – BCO Plaq provided pre-startup safety review records for the associated MOCs reviewed. The PSSRs documented that, when the facility installed a new process at the stationary source, or significantly modified a process at an existing source, a review was conducted prior to the introduction of the newly regulated substances. The PSSRs included the appropriate required communication and notification elements to affected employees and contractors.

40 C.F.R. § 68.79 Compliance Audits – BCO Plaq 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:

- EHST Audit Program Olin, Chlor-Alkali Plant, dated July 7, 2022, Report # 22-0620-09 PSM, Internal Audit Report Process Safety Management and Risk Management Plan Certification Audit, performed May 2 – June 23, 2022, certified by Olin Corporation on July 7, 2022.
- EHST Audit Program Olin, Chlor-Alkali Plant, dated October 3, 2019, Report # 19-0819-013PSM, Internal Audit Report Process Safety Management and Risk Management Plan Certification Audit performed August 19- 23, 2019, certified by Olin Corporation.
- EHST Audit Program Olin, Plaquemine Site Infrastructure, dated January 24, 2020, Report # 19-1209-20PSM, Internal Audit Report Process Safety Management and Risk Management Plan Certification Audit, performed December 9- 12, 2019, certified by Olin Corporation. This was the first separate audit conducted for the whole site infrastructure. Previously this subject was included in the unit audits.

For one action item finding in 2019, "Operating Procedures 40 CFR § 68.69 Finding (f)1: This finding was inadvertently closed without properly addressing the finding. The error was identified by the company and documented as a finding in the company's 2022 internal compliance audit. The error was caught and corrected by unit personnel when they were preparing for the 2022 audit. Blue Cube provided records to demonstrate that the finding was corrected. The original recommendation completion was due November 8, 2019. The original closure date was November 11, 2019. The new closure date is June 20, 2022. **[AOC 10 – §68.79 (d)]**

40 C.F.R. § 68.81 Incident Investigation – BCO Plaq provided an incident investigation procedure, *Olin Management System Document Root Cause Analysis work process 05.04.05*.

40 C.F.R. § 68.83 Employee Participation – BCO Plaq has developed a written plan of action regarding the implementation of the employee participation required by this section, *Olin Management System Document 06.05.02.03 Employee Participation*.

40 C.F.R. § 68.85 Hot Work Permit – BCO Plaq provided the hot work permits procedure, Olin 06.05.03.06 Global Hot Work Standard, for EPA's review. I reviewed two (2) hot work permits that involved high energy hazards in the Chlorine Unit. One permit that began work on July 14, 2022, was not completed and closed out until July 26, 2022. The permit was not signed off by permit issuer for twelve days. **[AOC 11 – §68.85 (b)]**

40 C.F.R. § 68.87 Contractors – BCO Plaq uses the *ISNetWorld* contractor database to evaluate information regarding contractor safety performance and programs. Contractors attend the Alliance Safety Counsel, Dow Site Specific, and Olin Safety Indoctrination training sessions before performing work on site. Five contractor records were reviewed in *ISNetWorld.* The Olin Safety Indoctrination PowerPoint presentation content informs a contract owner or operator of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process, as well as the applicable provisions of the facility's emergency response program. Contractors take an exam after the presentation. The contractor must complete the Dow Site Specific training at the Alliance Safety Counsel before they are assigned an entry badge to gain site access. Contractors enter the facility through a designated contractor gate where they can enter and exit with a badge. A contractor's badge can be denied entry and turned off by the BCO Plaq contractor administrator if a contractor is no longer authorized, or if the system indicates that the contractor's training has expired. Contractor periodic evaluations are conducted by Olin's Contractor Field Observation team and documented on an excel spreadsheet. I reviewed contractor evaluations completed in 2022 and found them to be consistent with the elements of the facility's contractor oversight program.

Subpart E – Emergency Response

40 C.F.R. § 68.90 Applicability – The BCO Plaquemine Emergency Management Plan, Section 4.0 Responsibilities, and Section 4.5 Dow ES&S Incident Commander, state that: "Dow employee responsible for overall on-scene emergency event management…Develops strategy and coordinates resources during an emergency event and…Acts as liaison with the Emergency Operations Center". BCO Plaq has a contractual agreement with Dow, who acts as the official emergency response group for the larger complex that include the BCO Plaq facility. A percentage of Olin operators receive training for emergency response to assist Dow. This arrangement is not consistent with the emergency response activities deployed for an incident response on April 18, 2022, in which BCO Plaq operators responded with of Dow, under the direction of the Dow ES&S incident commander. **[AOC 12– §68.90 (a)(b)]**

40 C.F.R. § 68.93 Emergency Response Coordination Activities – BCO Plaq 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 facility provided documentation of coordination with the Iberville Parish LEPC. Certified mail receipts were provided for the2021 transmittal of the BCO Plaq Tier II chemical inventory report and Emergency Response Plan (ERP) to the Iberville LEPC and Fire Department, and for the 2022 transmittal of BCO Plaq's letter to the LDEQ Office of Environmental Compliance informing the agency that the Tier II chemical inventory reports had been submitted. The facility documented LEPC meetings on September 23, 2021, and November 18, 2021. The facility also provided an email that confirmed BCO Plaq employees received integrated training on Dow's National Incident Management System (NIMS)-Incident Command System (ICS)-Emergency Operation Center (EOC). The sign in sheet for BCO Plaq employees did not include phone numbers or email addresses. The Olin BCO Plaq environmental health and safety specialist said that the facility has created a new form that will capture all of the required organization and contact information.

40 C.F.R. § 68.95 Emergency Response Program – BCO Plaq is a tenant on the larger Dow Plaquemine complex and receives emergency services from Dow Environmental Safety and Security (ES&S). The Dow site emergency plan includes response to BCO Plaq-related incidents involving hazardous materials, fire, medical service, and rescue. Dow ES&S services also include preventative actions and notifications. The facility has a written Chlorine Plant Response Procedure that was last updated in August 2021. I also reviewed the Plaquemine Emergency Management Plan that was last updated in July 2021. The plan includes processes and procedures for implementing responses to relevant emergency incidents. There are defined responsibilities for facility leaders, emergency responders, and employees. Plant personnel participate in emergency response drills, and documentation was reviewed drills conducted in 2021 and 2022. Critiques were conducted after each drill and areas for improvement were identified.

Through a service agreement with Dow ES&S services, BCO Plaq furnishes lists of employees that serve as fire brigade members. However, there was no training documentation provided for the approximately ten BCO Plaq fire brigade members. Also, there was limited information in the written fire brigade policy portions of the emergency plan that define the roles of BCO Plaq's fire brigade. I reviewed the Incident Command training for two Incident Response Leaders who began employment in 2019. BCO Plaq is obligated to ensure the integration of e its plant emergency response plans with the Dow Complex's emergency plans and processes, crisis management policies, and Community Awareness and Emergency Response (CAER) activities.

The 2022 internal company compliance audit also identified the following similar deficiencies in the emergency response program: BCO Plaq has not prepared and maintained a statement or written policy which establishes the existence of a fire brigade; the basic organizational structure for the fire brigade is not described; the type, amount, and frequency of training to be provided to fire brigade members is not described; the expected number of members in the fire brigade is not included; and, the functions that the fire brigade is supposed to perform at the work place is not described. [29 CFR § 1910.119(n); 40 CFR § 68.95(a)(3); and 29 CFR § 1910.156(b)] **[AOC 13 – §68.95(a)]**

40 C.F.R. § 68.96 Emergency Response Exercises – BCO Plaq provided documentation that the facility conducts emergency response drills in coordination with local emergency planning and response organizations.

Subpart G – Risk Management Plan

40 C.F.R. § 68.190 Updates – BCO Plaq's RMP was last re-submitted on September 13, 2018. However, BCO Plaq had not revised and updated the RMP in accordance with § 68.150 for the addition of propylene above threshold quantity to an already covered process. **[AOC 14 – §68.190 (b)(3)]** Additionally, BCO Plaq had not revised and updated the RMP in accordance with § 68.150 for revising the off-site consequence analysis for flammable worst-case and alternative case scenarios to include propylene. This information was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022. **[AOC 15 – §68.190 (b)(6)]**

40 C.F.R. § 68.195 Required corrections – BCO Plaq's next RMP registration re-submission is due by September 13, 2023, 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 (August 5, 2022), I conducted a closing conference, during which I presented the areas of concern identified during the inspection. Areas of concern were added during the completion of the documentation review.

AOC 1 – 40 C.F.R §68.25 (a)(2)(ii) Worst-case scenario analysis

"(a) The owner or operator shall analyze and report in the RMP: (2) For Program 2 and 3 processes: (ii) One worst-case release scenario that is estimated to create the greatest distance in any direction to an endpoint defined in § 68.22(a) resulting from an accidental release of regulated flammable substances from covered processes under worst-case conditions defined in § 68.22."

BCO Plaq analyzed but has not yet updated the RMP one worst-case release scenario, estimated to create the greatest distance to endpoint, and resulting from an accidental release of a regulated flammable substance (propylene) from a covered process under worst-case conditions. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 2 – 40 C.F.R §68.28 (a) Alternate release scenario analysis

"(a) The number of scenarios. The owner or operator shall identify and analyze at least one alternative release scenario for each regulated toxic substance held in a covered process(es) and at least one alternative release scenario to represent all flammable substances held in covered processes."

BCO Plaq analyzed but has not yet updated the RMP with at least one alternative release scenario to represent all flammable substances held in covered processes that includes propylene. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 3 – 40 C.F.R §68.36 (a) Review and update

"(a) The owner or operator shall review and update the off-site consequence analyses at least once every five years."

BCO Plaq has not reviewed and updated the off-site consequence analyses at least once every five years by the absence of a regulated flammable substance incorporated inside the worst-case and alternative case scenarios. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 4 – 40 C.F.R §68.39 (a)(b)(c)(d)(e) Documentation

"(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."

"(b) For alternative release scenarios, a description of the scenarios identified, assumptions and parameters used, and the rationale for the selection of specific scenarios; assumptions shall include use of any administrative controls and any mitigation that were assumed to limit the quantity that could be released. Documentation shall include the effect of the controls and mitigation on the release quantity and rate."

"(c) Documentation of estimated quantity released, release rate, and duration of release."

"(d) Methodology used to determine distance to endpoints."

"(e) Data used to estimate population and environmental receptors potentially affected."

BCO Plaq did not have a description of the vessel or pipeline and substance selected as worst-case or alternative case flammable, assumptions and parameters used, and the rationale for selection. The assumptions of any administrative controls and any passive mitigation that were assumed to limit the quantity that could be released were not present. This was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 5 – 40 C.F.R §68.69 (a)(3)(i) Operating Procedures

"(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. (3) Safety and health considerations: (i) Properties of, and hazards presented by, the chemicals used in the process."

Hazards present were mentioned in the Chlorine Unit Emergency Response Procedure but failed to be referenced in the other procedures. The facility stated personnel are trained on it.

AOC 6 – 40 C.F.R §68.69 (a)(3)(iii) Operating Procedures

"(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. (3) Safety and health considerations: (iii) Control measures to be taken if physical contact or airborne exposure occurs."

Some procedures state "if any physical contact or exposure occurs, report and seek medical treatment immediately!" while other procedures failed to have information related to measures to be taken if physical contact or airborne exposure occurs, and there is no reference to the SDSs in each individual procedure.

AOC 7 – 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 facility failed to provide refresher training 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. One operator took Per Tet Level 4 Operator training on December 1, 2018, and the refresher training for the course due December 1, 2021, was not completed. A second operator took Per Tet Level 4 operator training on December 4, 2018, and refresher training for the course due December 4, 2021, was not completed. The second operator's initial training for Level 5b (EDC) was taken September 9, 2013. The only refresher training records the facility provided for an operators' Level 5b training was May 31, 2022. A Per Tet operator took Per Tet Level 4 operator training on December 4, 2018, and refresher training for the course due December 4, 2021, was not completed. A third operator took Per Tet Level 5 operator training on November 28, 2018, and the refresher training for the course due November 28, 2021, was not completed. The third operator's initial training for Level 5b (EDC) was taken in April 2011. The only refresher training records the facility provided for the third operator's Level 5b training was May 31, 2022.

AOC 8 – 40 C.F.R §68.71 (c) Training

"(c) *Training documentation.* The owner or operator shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The owner or operator shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training."

- The facility states that they fulfill the requirement of consulting with the employees involved in operating the process to determine the appropriate frequency of refresher training by an anonymous survey given at least every three years. Employees are provided opportunity to respond and provide feedback on the adequacy of training and operating procedures. When evaluating survey results, the facility considers that employees that choose not to respond to the survey are in agreement with the current state of refresher training. Only 60 percent of the employees took the 2019 survey. There is no verifiable method to determine which employees requested more training and which were satisfied with the current three-year refresher training frequency. The leader must review the employee consultation responses to determine the adequacy of refresher training frequency. From this review, the leader must document that either the existing frequency is adequate to assure employees understand and adhere to the operating procedures or record the eMOC reference where the refresher training frequency was adjusted or record an AMT reference that includes actions taken to do further consultation and resolve path forward for refresher training frequency. The facility cannot determine who those people are unless the person puts their name on the survey (which is an option).

AOC 9 – 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."

One MOC was initiated to "Install Engineering clamp on R-1C overhead line" and the P&ID was not updated to show the clamp present. P&ID for MOC created on May 26, 2022, had a leak clamp installed, but the P&ID has the installed clamp in red. This was inconsistent between the two MOCs.

AOC 10 – 40 C.F.R §68.79 (d) Compliance Audits

"(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."

The facility failed to promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected. Action item (2019 finding – Operating Procedures 40 CFR 68.69 Finding (f)1: This finding was accidentally closed without properly addressing the finding. The error was identified by the company and documented as a finding in the company 2022 internal compliance audit, it was caught and corrected by the unit when they were preparing for the 2022 internal compliance audit. The auditors wrote the finding as corrected. The original finding was due November 8, 2019. The original closure date was November 11, 2019. The new closure date is June 20, 2022.

AOC 11 – 40 C.F.R §68.85 (b) Hot Work Permits

"(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."

One permit reviewed that began work on July 14, 2022, was not signed off by permit issuer until July 26, 2022.

AOC 12 – 40 C.F.R §68.90 (a)(b) Emergency Response – Applicability

"(a) ***Responding stationary source.*** Except as provided in paragraph (b) of this section, the owner or operator of a stationary source with Program 2 and Program 3 processes shall comply with the requirements of §§ 68.93, 68.95, and 68.96."

"(b) ***Non-responding stationary source.*** The owner or operator of a stationary source whose employees will not respond to accidental releases of regulated substances need not comply with § 68.95 of this part provided that."

The facility acts as both a responding facility and non-responding facility on a case by case basis. BCO Plaq members responded during the April 18, 2022, event but typically allows Dow to respond. Dow is responsible for responding to site emergency situations, including fires, leaks, spills, releases, odor complaints or any other events deemed to be an emergency to an Olin Facility or to the Site, or to have the potential to impact the community. An integrated emergency plan is within the Dow Site Emergency Plan. This plan describes how to coordinate initial incident communication during an event with local law enforcement or other responders or governmental agencies to acknowledge the occurrence of the BCO Plaq incident and Dow's response activities to the BCO Plaq incident. BCO Plaq is to only provide fire brigade training and integrate any brigade members into the overall response plan and NIMS structures. During the April 18, 2022, event, Blue Cube asserts that all actions were non-responding in nature.

AOC 13 – 40 C.F.R §68.95 (a) 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."

The 2022 internal compliance audit also found the deficiency in the emergency response program: The employer has not prepared and maintained a statement or written policy which establishes the existence of a fire brigade; the basic organizational structure; the type, amount, and frequency of training to be provided to fire brigade members; the expected number of members in the fire brigade; and the functions that the fire brigade is to perform at the workplace. [29 CFR **§** 1910.119(n); 40 CFR **§** 68.95(a)(3); and 29 CFR **§** 1910.156(b)]

AOC 14 – 40 C.F.R §68.190 (b)(3) Updates

"(b) The owner or operator of a stationary source shall revise and update the RMP submitted under § 68.150 as follows: (3) No later than the date on which a new regulated substance is first present in an already covered process above a threshold quantity."

BCO Plaq has not revised and updated the RMP submitted under § 68.150 as follows: (3) No later than the date on which a new regulated substance is first present in an already covered process above a threshold quantity for propylene. This information was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 15 – 40 C.F.R §68.190 (b)(6) Updates

"(b) The owner or operator of a stationary source shall revise and update the RMP submitted under § 68.150 as follows: (6) Within six months of a change that requires a revised off-site consequence analysis as provided in § 68.36."

BCO Plaq had not revised and updated the RMP submitted under § 68.150 as follows: (6) Within six months of a change that requires a revised off-site consequence analysis as provided in § 68.36 for flammable worst-case and alternative case scenarios for propylene. This information was shared with EPA during the inspection as a facility-identified issue already being actively managed to closure under facility MOC with action to update the RMP plan by end of November 2022.

AOC 16 – 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1) General Duty Clause

Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), otherwise known as the "General Duty Clause" states the following: "(r) Prevention of Accidental Releases (1) Purpose and General Duty – It shall be the objective of the regulations and programs authorized under this subsection to prevent the accidental release and to minimize the consequences of any such release of any substance listed pursuant to paragraph (3) or any other extremely hazardous substance. The owners and operators of stationary sources producing, processing, handling or storing such substances have a general duty, in the same manner and to the same extent as section 654, title 29 of the United States Code, to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental release which do occur."

There are reports received from Louisiana State Police and other agencies related to this incident. The following accounts were discussed with facility personnel.

On Wednesday August 3, 2022, I discussed the following issues with the Olin BCO Plaq Chlorine Process Production Leader and other BCO Plaq personnel regarding the release incident that occurred on April 18, 2022.

APRIL 18, 2022, Release Incident Summary:

After a 30-day shut down of the Chlorine Unit, operators began the process to restart the unit. The B-train had been shut down with no work performed on the compressor during the shutdown, but the compressor system was left under a nitrogen purge to keep dry (i.e., free of moisture). The Chlorine Unit has two similar trains, A-train and B-train, that both run concurrently to produce chlorine. Upon startup of the chlorine refrigeration compressor, the first attempt resulted in a high vibration trip, which led the operators to review data associated with the trip. After review of the process data, outside operator rounds, and information from interviewing outside operators, the process operations personnel tried a second start up attempt. On the second attempt, compressor C-650 came apart on one side, and created a release of chlorine with subsequent fire which impinged on a pipe rack adjacent to the compressor. An estimated 6,512 pounds of chlorine was released directly to atmosphere.

The B-train fire caused the A-train to shut down due to the fire's impact on A-train piping wires which were located in the pipe rack that was affected by the fire. BCO Plaq had recently completed maintenance to correct deficiencies in the piping of the C-650 compressor system. The C-650 compressor had been in service for approximately twenty-two years, and following release incident and fire, a new identical compressor was brought in to replace the previous one that had been in service. The results of an early internal investigation estimated that the fire was caused by burning air-borne chlorine that reacted with the compressor oil in the system. The chlorine detectors alarmed, and BCO Plaq operators responded to the fire using fixed equipment cool surrounding equipment, which was greater than approximately fifteen feet in height. BCO Plaq operators thereupon called Dow ES&S, who provided fire trucks and a fire brigade to respond. BCO operators in conjunction with the Dow fire brigade were able to put out the fire to avoid on-site injuries. A portion of Louisiana Highway 1 was closed off, and the LEPC issued a shelter-in-place advisory for the City of Plaquemine for that day. BCO Plaq Operations continued their efforts to divert chlorine vapors into a scrubber and cap the process pipelines contained in the pipe rack in order to mitigate the release in order to keep the chlorine from venting to atmosphere.

Factors contributing to the incident, as identified in BCO Plaq's internal investigation:

- Low sensitivity in the existing moisture analyzer at the existing location led to the gradual accumulation of moisture and ferric chloride to go undetected.
- Reduction in blowdown frequency on the evaporator contributed to blowdown line plugging. This reduced the capacity to manage ferric chloride accumulation in the refrigeration loop.
- The lack of procedural guidance on restarting the C-650 compressor following a vibration trip results in the operator to make a decision to restart without seeking mechanical maintenance input. The lack of evaluation by a mechanical maintenance representative led to the decision by the operator to restart after the vibration trip.
- Ferric chloride migrated during the first start up into the compressor system internally.
- Approximately a 7 second delay from the time that the vibration level is detected to the time when the control system trips the compressor offline contributed to vibration damage.

- Proximity of fuel source (bearing oil) contributed to the quantity of the chlorine released.

BCO Plaq's internal recommendations resulting from the investigation:

- Change the compressor vibration alarm and trip set points to align with Olin's internal most effective technology (MET) guidance.
- Determine an appropriate evaporator blowdown rate to prevent plugging and establish appropriate steps to ensure effective blowdown to avoid accumulation of ferric chloride.
- Determine the optimum location on the compressor system for accurate and reliable moisture detection capability. The moisture analyzer that was in place at the time of the event was not in the correct location to detect changes in moisture that accumulated inside of the compressor within the refrigeration system.
- Establish a reoccurring interval to verify the compressor and associated piping and suction vessels are not accumulating ferric chloride.
- Evaluate modifications to current fire protection strategy.
- Evaluate the viability of a liquid chlorine sample system as a means to detect accumulation of ferric chloride.
- Evaluate the viability of installing a suction strainer on the C-650 and C-550 chlorine compressors.
- Hardwire the Bentley vibration monitoring trip probe directly to motor relay.
- Increase the chlorine gas purge rate at the compressor system fin fans.
- Verify there is no internal ferric chloride accumulation in the suction piping and compressor before startup.
- Remove the control system timing delays from the Bentley vibration monitoring system to the shutdown controller logic.
- Replace the existing moisture analyzer with instrumentation capable of reliably detecting gradual increases in moisture content.
- Update the operating procedures for the startup of the C650, C550, C52, C62, and C100 compressors relative to restart following a mechanical trip.

May 4, 2022, Release incident:

This incident was related to the April 18, 2022, incident, only in that it involved replacing a pipe located in the pipe rack damaged by the April 18, 2022, fire. A nitrogen purge of the chlorine line had been ongoing for several weeks leading up to this incident. The nitrogen purge was removed and replaced with an air purge from the opposite direction which was purging for 15 minutes. While performing nearby operational work an operator experienced exposure to chlorine from this adjacent line that was being purged with air. Seven operators were on the compressor deck to help hook up a hose from the compressor to the scrubber. One of the seven employees performing the task was exposed while trying to exit the area around the scaffolding. The affected operator did not put on an escape respirator after smelling chlorine. No chlorine alarm sounded during the release. Later that night, employees replaced the valve that was suspected to have internal leak by without further incident. After Dow ES&S initially evaluated the operator affected by the chlorine exposure, the employee was taken to the nearby hospital emergency room to be treated for chlorine exposure. The employee was evaluated in the emergency room before he was released. He then visited the BCO Plaq corporate doctor.

Factors contributing to the incident, as identified in BCO Plaq's internal investigation:

- The line was purged with air for only 15 minutes, and work was allowed in close proximity to the air purging operation.
- No checks were performed to ensure that scaffolding doesn't hinder or block egress when it was erected, and a second path of egress was also obstructed due to scaffolding configuration.
- The affected operator exposed to chlorine did not don escape respirator quickly enough after detecting the smell of chlorine.
- The scrubber knock out pot valve leaked by chlorine vapor while the line was being purged.

BCO Plaq's recommendations resulting from the investigation:

- Consider developing a purge procedure.
- Consider means to ensure adequate egress while constructing and erecting scaffolds.
- Modify the scaffold around the C-550 compressor piping deck to ensure the path of egress is no longer obstructed.
- Replace the scrubber knock out pot valve that internally leaked.
- Review with affected personnel the importance of using an escape respirator to prevent chemical exposure when evacuating a release area.
- Procedure now in place to ensure employees don PPE for air the same working area as they would for nitrogen until system is adequately purged for a period of time.

Section IV – FOLLOW UP

The following information was received by EPA on August 15, 2022, after exiting the Facility on August 2, 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.