

Region 6 - Enforcement & Compliance Assurance Division
INSPECTION REPORT

Inspection Date(s):	July 20-23, 2021	
Media Program:	Air	
Regulatory Program(s)	Clean Air Act Section 112(r) and 40 Code of Federal Regulations (C.F.R.) Part 68 Chemical Accident Prevention Provisions – Risk Management Program (RMP)	
Company Name:	Celanese Ltd.	
Facility Name:	Celanese Clear Lake Plant	
Facility Physical Location:	9502 Bayport Blvd.	
(city, state, zip code)	Pasadena, Texas 77507	
Mailing address:	9502 Bayport Blvd.	
(city, state, zip code)	Pasadena, Texas 77507	
County/Parish:	Harris County	
Facility Phone Number	(281) 474-6200	
Facility Contact:	Joe Ross	Environmental Leader
	Joseph.Ross@celanese.com	
FRS Number:	110067040703	
Identification/Permit Number:	Air Operating Permit ID: O1893 / O1986	
Media Identifier Number:	1000 0009 9181 (EPA Facility Identifier)	
NAICS:	325199 All Other Basic Organic Chemical Manufacturing / 32512 Industrial Gas Manufacturing	
SIC:	N/A	
Personnel participating in inspection:		
Justin McDowell	EPA Region 6	Inspector
Howard Cole	EPA Region 6	Inspector
Stuart Hightower	Celanese	Site Director
Joseph Ross	Celanese	Environmental Manager
Tim Jensen	Celanese	Environmental Engineer
Ron Nowetner	Celanese	Fire Chief
Richard Rivera	Celanese	Occupational Safety
Nathan Nagel	Celanese	Principle Process Engineer
Jeremy Smith	Celanese	REG
Jim Muoir	Celanese	Sr. Process Engineer
Rhonda Perry	Celanese	Assistant General Counsel
EPA Lead Inspector Signature/Date		10/13/2021
	Justin McDowell	Date
Supervisor Signature/Date		10/13/2021
	Samuel Tates	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 Celanese Clear Lake Plant (Celanese) at 8:00 AM on Tuesday July 20, 2021, for an announced inspection. I met with Stuart Hightower, Joseph Ross, Tim Jensen, and Ron Nowetner for an opening meeting. I presented my credentials and informed Celanese 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. Celanese'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 Celanese plant is a non-union facility.

FACILITY DESCRIPTION

Celanese Clear Lake Plant is located at 9502 Bayport Blvd. in Pasadena, Texas 77507. The site consists of the Celanese Clear Lake plant, with co-located facilities owned or operated by Arkema, Linde, Clariant and Indorama (owned by Indorama and operated by Celanese). Celanese's regulated "All Other Basic Organic Chemical Manufacturing" process includes five RMP-Covered Units: CO-Propylene System, Ethylene Oxide (EO), Methanol (MeOH, a fifty percent Joint Venture with Mitsui which Celanese operates), Utilities, and Vinyl Acetate Monomer (VAM). The CO-Propylene unit has been idled for 1 year and has a re-start projection date in 2027 that leaves 4 process units operational. The total site consists of approximately 1000 employees that includes 400 Celanese employees and 200 Celanese resident contractors. Celanese's process includes three regulated toxic chemicals under the Risk Management Program – Vinyl Acetate (CAS#108-05-4); Ethylene oxide (CAS #75-21-8); and Ammonia (CAS#7664-41-7) and four regulated flammable chemicals under the Risk Management Program – Methane (CAS#74-82-8); Propylene (CAS#115-07-1); Acetaldehyde (CAS#75-07-0) and a Flammable Mixture. The plant is manned using a digital control system (DCS) and operates 24 hours a day, 365 days per year with the exception of a turnaround.

Section II – OBSERVATIONS

On Tuesday July 20, 2021, EPA inspectors were accompanied by Celanese personnel to conduct a driving tour of the site. We observed the process units and tank farm area and concluded to focus this inspection on the VAM and EO units. On Thursday July 22, 2021, we conducted a walking tour of the facility to the VAM and EO process units and control rooms. Prior to the tour, we were provided with piping and instrumentation drawings (P&IDs) of each process unit that assisted in the tour. Seven (7) photos were taken inside the EO unit; however, these photos are considered Confidential and are not included in this inspection report. A hot work/safe work permit also was completed for using the camera during the facility tour. Celanese provided the EPA inspection team with the Celanese contractor orientation video prior to making entry to the site.

Subpart A – General

40 C.F.R. § 68.10 Applicability – Celanese is the owner/operator of a stationary source that has more than threshold quantities of three regulated toxic substances (vinyl acetate, ethylene oxide and ammonia), and four regulated flammable substances (methane, propylene, acetaldehyde, and a flammable mixture) in the covered processes, as listed in 40 C.F.R. § 68.130, and, as such, is subject to the Chemical Accident Prevention Provisions. Celanese has two Title V Air Operating Permit IDs: O1893 and O1986, and is classified under the North American Industrial Classification System (NAICS) code 325199 as “All Other Basic Organic Chemical Manufacturing”. Celanese is subject to the Occupational Safety and Health Administration (OSHA) process safety management (PSM) standard, 29 C.F.R. § 1910.119, and has five (5) Program Level Three (3) processes under OSHA PSM.

40 C.F.R. § 68.10 Program Eligibility – Celanese re-submitted an RMP registration as required under 40 C.F.R. 68.190 (b)(5) after completing a revised process hazard review due to a process change [40 C.F.R. 68.190 (b)(5)] on May 3, 2019. 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. Celanese’s next registration re-submittal is due on May 3, 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. § 68.15 Management – Celanese has developed a management system to oversee the implementation of risk management program elements, has documented persons responsible for implementing the individual requirements of the risk management program, and has defined the lines of authority using its RMP Management Standard Work Practice (SWP) list of responsibilities and organizational chart. Joe Ross, the Celanese Environmental Manager was the primary point of contact for this inspection.

Subpart B – Hazard Assessment

40 C.F.R. § 68.20 Applicability – Celanese has five (5) 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 Parameters – Celanese used RMP*Comp™ as the technique for modeling the release scenarios. For both the worst-case and alternative case scenarios involving toxics and 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 Worst-Case Release Scenario Analysis – Celanese analyzed and reported in the RMP one worst-case release scenario, estimated to create the greatest distance to endpoint, and resulting from an accidental release of a regulated toxic substance from a covered process under worst-case conditions and one worst-case release scenario, 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. The worst-case release quantity was determined as the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity released.

40 C.F.R. § 68.28 Alternative Release Scenario Analysis – Celanese identified and analyzed three toxic alternative release scenarios, one for each regulated toxic substance held in a covered process and one alternative release scenario to represent all flammable substances held in a covered process, using a scenario that is likely to occur. The flammable alternative case scenario listed is related to a release in the CO-PROPYLENE unit. This unit was acquired in February 2019 and taken out of service in February 2020 but is still included as the basis for the flammable alternative release scenario. The CO-PROPYLENE unit is not scheduled to go back on-line until approximately 2027. **[Area of Concern (AOC) 1 - § 68.28(a)]**

40 C.F.R. § 68.30 Defining Off-Site Impacts - Population – Celanese used the MARPLOT mapping program to define the affected off-site population. The documentation describes how the facility estimated 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. It also identified the presence of institutions, parks, and recreational areas, major commercial, office and industrial buildings in the RMP. The facility used the most recent 2010 Census data (estimated to two significant digits) in the documentation.

40 C.F.R. § 68.33 Defining Off-Site Impacts - Environment – Celanese identified environmental receptors within a circle where its center is the point of the release and a radius determined by the distance to endpoint. The plant relied on information provided on local United States Geographical Survey (U.S.G.S.) maps and data to identify environmental receptors.

40 C.F.R. § 68.36 Review and Update – Celanese 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, and the anticipated effects of the administrative controls and passive mitigation on the release quantity and rate were provided. The flammable alternative case scenario listed is related to a release in the CO-PROPYLENE unit. This unit was acquired in February 2019 and taken out of service in February 2020 but is still included as the basis for the flammable alternative release scenario. The CO-PROPYLENE unit is not scheduled to go back on-line until approximately 2027 (see AOC 1).

40 C.F.R. § 68.42 Five-year accident history – Celanese has not reported any accidental releases from covered processes that resulted in one or more of the following: on-site deaths, injuries, significant property damage on site, known off-site deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage in its accident history. The plant documented a non-applicability determination for an accident event that occurred on September 21, 2019.

Subpart D – Program 3 Prevention Program

40 C.F.R. § 68.65 Process Safety Information – Celanese 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. Safety Data Sheets for the process chemicals vinyl acetate monomer and ethylene oxide were provided, and detailed process safety information was provided that contains the following data for the hazards of the substances 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 a block flow diagram, 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 for each covered process. I reviewed documentation pertaining to the equipment of the process including: materials of construction, piping and instrumentation diagrams (P&IDs), electrical classification, relief system design and design basis (PSV systems), ventilation system design, design codes and standards employed, material and energy balances, and safety systems, including process interlocks and safety instrumentation systems (SIS) such as fire systems, deluge systems and lower explosive limit (LEL) alarms. The facility failed to have process safety information available for the following equipment in the VAM and EO process: specification data sheets, operations and maintenance manual for LEL Gas Detectors AT-05498 and AT-05499. [AOC 2 - § 68.65(a)]

40 C.F.R. § 68.67 Process hazard analysis (PHA) – Celanese provided the PHA procedure manual (09-01-006) for EPA’s review. Celanese stated that they 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. Celanese conducts PHAs using the Hazard and Operability Study (HAZOP) technology but may supplement with the “What-if” checklist technology, depending on the scope and process covered by the PHA. Each PHA I reviewed addressed the hazards of the process and included: identification of any incident that had a likely potential for catastrophic consequences; engineering and administrative controls applicable to hazards and their interrelationships; consequences of failure of engineering and administrative controls; stationary source siting factors; human factors; and, an evaluation of a range of the possible safety and health effects of failed controls. Celanese conducts PHAs in two ways, named Type 1 and Type 2. Type 1 includes initial/new PHAs for major changes, and Type 2 PHAs include PHA revalidations. The *iCAP* system is used for documenting recommendations and action item resolution for PHAs, management of change, and compliance audits. Celanese did not provide documentation that a system was established: to promptly address the PHA review team’s findings and recommendations; to assure that the recommendations were resolved in a timely manner; to document what actions were to be taken; to confirm that corrective actions were completed as soon as possible; to develop a written schedule of when the corrective actions were to be completed; or, to communicate the actions to operating, maintenance, and other employees whose work assignments are in the covered process and who may be affected by the recommendations. The following PHA records did not include documentation to demonstrate that the required communications were made to maintenance or contract personnel: 2017 Shipping PHA; 2017 Utilities PHA; 2018 VAM Expansion; 2018 EO Purification and Storage; 2018 Praxair; and, 2018 T-33. In addition, the Action Number 10115-5 was due April 30, 2020, but was completed late on May 19, 2020.

Celanese failed to promptly address the team's findings and recommendations; assuring that the window breakage assessment and resulting recommendations were resolved in a timely manner and these actions were completed as soon as possible.

Celanese failed to establish a system to promptly address the team's findings and recommendations for the following actions items contained in the EO Purification and Storage Human Factors Checklist (2018 Revalidation). Celanese failed to assure that recommendations were resolved in a timely manner, the resolutions were documented; the actions to be taken were documented; the actions were completed as soon as possible; a written schedule of when these actions were to be completed was developed.

- i. Breathing air connections throughout the plant are still available. However, should any individual hook into air system, no air would be provided.
- ii. Team recommends generating FRS Part 10 for process safety alarms (See Addendum N) to improve compliance requirements within this addendum.
- iii. Recommend blue emergency beacons and horn at the flare have a PM so they are tested and kept up to working operation, so they work as designed (this was also addressed during the flare RAGAGEP review).
- iv. Develop an SOP for initiating IRS dump valves manual to ensure diluent methane is added prior to this occurrence. Alternatively add logic.

For the 2019 Vinyl Acetate PHA/VA Unit and VA/HACII Tank Farm PHA, Action #421127, Celanese failed to develop a written schedule of when the action items were to be completed.

Celanese failed to establish a system to promptly address the team's findings and recommendations contained in the 2019 Vinyl Acetate PHA to assure that the recommendations were resolved in a timely manner and the actions were completed as soon as possible. These recommendations include, but are not limited to, the following action items:

- i. 421130 resolve deficiencies associated with V-268 and PSV-350
- ii. 421132 Implement improved as-found inspection & testing process for VA PVRV's and PVMH's
- iii. 421138 Issue updated electrical classification for the VA Unit
- iv. 421139 Conduct training for all site personnel on lights/signs related to VA Unit Classification
- v. 421145 Perform and document MAWP/MAEP calculations for V-636. Document Name Plate
- vi. 421147 Install overpressure protection on V-1251

421154 Complete analysis of and document resolution to potential concerns with Arkema
[AOC 3- §68.67(e)]

40 C.F.R. § 68.69 Operating Procedures – Celanese has developed and implemented written operating procedures that provide instructions or steps for conducting activities associated with each covered process, consistent with the safety information. Each covered unit has a SharePoint site where operating procedures are stored. The only hard copy is maintained inside the control room for emergency operations only. If a procedure requires updates, the hard copy is updated along with the SharePoint version to assure accuracy. The facility has separate procedures developed to implement safe work practices such as lockout/tagout and confined space entry.

Celanese failed to perform car-seal inspections prior to startup of the VA Unit in July 2021 in accordance with the Car Seal Control Program. The Celanese Car Seal Control Program requires the following:
5.2.10. Prior to the commissioning of a new unit or start up after a turnaround an inspection of all Car Seals will be performed per Conduct of Operations (Tier III, 09-01-001). **[AOC 4- 68.69 (a)]**

The facility has not certified annually that the operating procedures are current and accurate to assure that they reflect current operating practice. The MeOH unit operating procedures were certified on November 9, 2016; November 15, 2017; August 7, 2018; and, September 6, 2019. The EO unit operating procedure certifications were completed on November 11, 2015; September 20, 2016; July 11, 2017; August 8, 2018; and, December 8, 2020. There was no certification provided for the year 2019. **[AOC 5- 68.69 (c)]**

40 C.F.R. § 68.71 Training – Celanese sends each new employee to the Houston Area Safety Council to receive site level process, hazard, and emergency response training. Each employee enters a *Basic Plus* training program (part of the initial unit trainings) which includes emphasis on safety and health hazards, emergency operations, and safe work practices. A combination of on-the-job training and exams are used in the progression of each trainee. A board of the trainee’s peers determines if each operator moves to the next level of training progression after each exam, review of unit drawings, and job review board interviews. Computer-based trainings are also used for items such as ladder safety, hearing protection, and various regulatory overviews. I selected five operators from the VAM covered process and five operators from the Ethylene Oxide covered process to review training records. Refresher training was not provided at least every three years, or more often if necessary, to each employee involved in operating a covered process to assure that the employee understands and adheres to the current operating procedures of the process, as shown in Table 1. **[AOC 6- § 68.71 (b)].** The records reviewed documented that each employee had received and understood the training, and contained the identity of the employee, date of the training, and the means used to verify that the employee understood the training.

Table 1

Celanese Clear Lake Plant Training Records		
Operator/ Unit	Training	Training Completion Dates
Operator JR (VAM)	Level 5 VAM Console Operator Progression (PO-36)	April 7, 2016
	Requalification (PO-36)	November 4, 2019
Operator KP (EO)		
Operator JJ (EO)		
Operator JM (EO)		
Harvey Hill (EO)		

40 C.F.R. § 68.73 Mechanical Integrity – I interviewed the mechanical integrity department personnel for both fixed and rotating equipment mechanical integrity program elements. For fixed equipment, *SAP* software is used for maintenance plans and due dates, and *PCMS* software is used for piping inspections and thickness readings. At the time of the inspection, Celanese had failed to perform corrosion-under-insulation (CUI) inspections for piping and pressure vessels in accordance with the Celanese Technical Directive, Corrosion-Under-Insulation TD-7. Celanese also failed to perform CUI inspections for piping every five years in accordance with the American Petroleum Institute (API) 570 Piping Inspection Code: *In-service Inspection, Rating, Repair, and Alteration of Piping Systems Section 6.4.*, as cited in the MI Procedure. Celanese failed to perform CUI inspections for pressure vessels every five years in accordance with the API 510 Pressure Vessel Inspection Code: *In-service Inspection, Rating, Repair, and Alteration Section 6.4 and 9.3.4.* Celanese failed to perform inspections of the following LEL and oxygen monitors quarterly from 1/2020 -4/2021 in accordance with the Celanese Mechanical Integrity program and good engineering practices. **[AOC 7- 68.73 (b)]** Celanese failed to perform ultrasonic (UT) testing on pressure vessels in accordance with the API 510 scheduled due dates. Celanese also failed to perform UT testing on piping circuits in accordance with the API 570 scheduled due dates. **[AOC 8A- 68.73 (d)(2)]**

Celanese failed to perform an internal or on-stream inspection of the following vessels in Table 2 every ten years in accordance with the API 510 Pressure Vessel Inspection Code: *In-service Inspection, Rating, Repair, and Alteration*. **[AOC 8B- 68.73 (d)(2)]**

Table 2

Equipment	Due Date
V-1566 Lean Flash Separator	4/8/21
V-1568 Rich Flash Separator	4/17/21
V-1570 Rich Flash Knockout	4/18/21
V-1765	4/14/21
T-29 Quench Bleed Stripper	4/6/21
V-98 Methane Heater H2O KO Pot	4/11/21
V-182 Stripper Tops Surge	4/12/21
V-156 C16 Suction to Knockout Pot	4/12/21
V-174, HE324 Condensate Pot	6/22/2021
T-111 EO Vent Scrubber	6/21/2021

Celanese failed to perform an external inspection of the following vessels in Table 3 every five years in accordance with the API 510 Pressure Vessel Inspection Code: *In-service Inspection, Rating, Repair, and Alteration*. [AOC 8B- 68.73 (d)(2)]

Table 3

External	Due Date
T-27 CO2 Stripper	4/13/21
T-28 EO Absorber	4/13/21
V-155 EO Rundown Tank	3/18/21
V-156 C10 Suction to Knockout Pot	4/7/21
V-180 EO Flare Knockout Drum	4/7/21
V-1566 Lean Flash Separator	4/8/21
V-1568 Rich Flash Separator	4/17/21
V-1570 Rich Flash Knockout	4/18/21
V-155 EO Rundown Tank	3/18/21
V-152 Stripper Tops Surge	4/7/21
T-104 Light Ends Column	4/19/21

Celanese failed to perform an inspection of the following pressure safety valves in Table 4, every five years or as necessary in accordance with Celanese's mechanical integrity program (MIP) requirements and the API 510 Pressure Vessel Inspection Code: *In-service Inspection, Rating, Repair, and Alteration*. [AOC 9- 68.73 (d)(3)]

Table 4

Equipment ID	Description	Due date	Date Completed	API/Celanese MIP Frequency
PSV-1228	HE-0876	1/20/21		5-year
PSV-1229	HE-0396	1/20/21		5-year
PSV-1673	V-899	6/6/21		3-year
PSV- 00464A	BFW Header	4/15/21		4-year
PSV-2937	EO Storage Sphere	7/12/21		3-year
PSR-2084	T-111 Overpressure	4/13/21		4-year
PSV-1710	T-111 Overpressure	4/13/21		4-year
PSV-331	Rundown Tank	5/10/21		4-year

Celanese failed to assure that the following LEL and oxygen detection monitors in Table 5, located in the VAM Unit, were operational. **[AOC 10- 68.73 (e)]** At the time of the inspection, these monitors were not functional.

Table 5

LEL Monitors	
AT-03596 A LEL Detection	AT-03596 B LEL Detection
AT-19638 A LEL Detection	AT-05498 LEL Detection
AT-05499 LEL Detection	AT-32470 A LEL Detection
AT-32470 B LEL Detection	AT-32470 C LEL Detection
AT-32470 D LEL Detection	AT-32470 E LEL Detection
AT-32470 F LEL Detection	AT-32470 G LEL Detection
AT-32470 H LEL Detection	
O2 Monitors	
AT-26285 O2 Detection	AT-26286 O2 Detection

40 C.F.R. § 68.75 Management of Change (MOC) – Celanese has established and implemented written procedures to manage changes to process chemicals, technology, equipment, procedures, and changes to stationary sources that affect a covered process (MOC Procedure SWP). MOCs are typically permanent unless designated as a temporary MOC. Temporary MOCs have a time limit of one year and may be extended via the *iCAP* system, which also has the capability to route MOCs for approval. Celanese did not shall establish and implement written procedures to manage changes involving the installation of clamps on piping and fittings (i.e. pipe sections, elbows, valves, flanges, and gaskets) to stop leaks of process chemicals. **[AOC 11- 68.75 (a)]** Celanese did not implement written procedures to assure that the On-Stream Leak Repair Checklist SMP 12.02, WO 102064969; included the necessary time period for the installation of a pipe clamp on an 8” line with a 3/4” stub-out. **[AOC 12- 68.75 (b)]** Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change were not always trained prior to start up. **[AOC 13- 68.75 (c)]**

40 C.F.R. § 68.77 Pre-startup Safety Review (PSSR) – I reviewed Celanese’s selected pre-startup safety reviews for the 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 the newly regulated substances, including the appropriate communication elements and training.

40 C.F.R. § 68.79 Compliance Audits – Celanese provided their two most recent certified RMP Compliance Audit documents, completed on July 12, 2016, and June 11, 2019. The audit teams consisted of Celanese facility staff and corporate staff who are knowledgeable in the covered processes. The audit findings are documented in reports that were provided to me for review. At the time of the inspection, the facility had not promptly determined and documented an appropriate response to findings of the audits, nor documented that deficiencies had been corrected by the respective due dates (see Table 6) **[AOC 14 - §68.79(d)]**. The documentation provided for each audit only listed the findings and the audit team. The facility stated that the audit worksheets that detailed the elements and the covered process areas of the facility that were audited were discarded at the conclusion of each audit per company policy. At the time of the inspection, EPA could not determine what was evaluated during each audit due to the lack of sufficient documentation. **[AOC 15 - §68.79(e)]**

Table 6

Compliance Audit Findings		
Audit Date and Finding	Due Date	Completed Date
2016: Finding 3 – Mechanical Integrity- The site is not tracking due dates for MI recommendations.	07/31/2017	9/14/2017
2019: Finding 1 – PHA – The following PHA records did not include documentation to demonstrate that the required communications were made to maintenance or contract personnel; 2017 Shipping; 2017 Utilities; 2018 VAM Expansion; 2018 EO Purification and Storage; 2018 Praxiar; and, 2018 T-33.	4/30/2020	5/19/2020

40 C.F.R. § 68.81 Incident Investigation – Celanese has an incident management standard work practice procedure for both near-miss and incident reporting. Celanese has not investigated each incident that resulted in, or could reasonably have resulted in, a catastrophic release of a regulated substance. I believe the following incidents should have an incident investigation per this subpart for events on the following dates: March 25, 2021; September 14, 2020, October 6, 2020 and September 21, 2019
[AOC 16 - §68.81(a)]

40 C.F.R. § 68.83 Employee Participation – Celanese has developed a written plan of action regarding the implementation of the employee participation required by this section, which is integrated into the program elements (SWP 08-01-25). The plant has consulted with employees and their representatives on conducting and developing process hazard analyses, and on the development of the other elements of process safety management in chemical accident prevention provisions. The plant has provided access to process hazard analyses and all other information required to be developed under this rule.

40 C.F.R. § 68.85 Hot Work Permit – Celanese provided their hot work procedure that detailed guidance for hot work/safe work activities at the site. Hot work permits are retained for 30 days. I reviewed a sample of reports that consisted of welding/grinding over the last 30 days. The permits reviewed documented that fire prevention requirements were implemented, the dates authorized for hot work, and the object(s) upon which hot work was performed.

40 C.F.R. § 68.87 Contractors – Celanese uses the *ISNetWorld* contractor database to evaluate information regarding a contractor's safety performance and programs. Only contractors with a grade of "A" or "B" are approved to work on site. Any grades of a "C" or below requires a variance to work at Celanese and need an extra deviation form with mitigation provisions, including escort 100 percent of the time while on site. Contractors who are approved report to the Houston Area Safety Council (HASC) to receive both basic and Celanese site-specific training. The HASC educates contractors on the known fire, explosion, and/or toxic release hazards related to the contractor's work and the covered processes. The HASC also explains site-specific provisions of the Celanese emergency action program. Contractors are issued a badge to perform work on site daily, with the exception of nested contractors, who receive official access badges. The Celanese site implements safe work practices consistent with §68.69 (d), to control the entrance, presence and exit of the contractor owner or operator and contract employees via the badging system and security gate. Nested contractor access is turned off after 365 days to ensure renewal of required trainings at the HASC prior to the annual deadline.

Subpart E – Emergency Response

40 C.F.R. § 68.90 Applicability – Celanese is designated as a “responding stationary source”, therefore this subpart is applicable.

40 C.F.R. § 68.93 Emergency Response Coordination Activities – Celanese coordinates with Channel Industries Mutual Aid (CIMA) Zone 4, Pasadena Fire Department, the Southwest Regional Local Emergency Planning Committee (LEPC), and the East Harris County Emergency Association. Drills and live emergency response events are conducted periodically, in which the Celanese site has the ability to assist with both equipment and a manpower crew. I was provided documentation related to the CIMA coordination meetings.

40 C.F.R. § 68.95 Emergency Response Program – Celanese has developed and implemented an emergency response program that includes the required elements. The program includes approximately 85 members in the emergency response team, with roughly 20-25 members per shift. The members are trained in exterior/interior firefighting, medical first-aid, personnel rescue, basic response training, and hazardous materials training. The site has one paramedic, several emergency medical technicians, and a dayshift registered nurse. The emergency response teams receive annual training at Texas A&M University. In addition, the facility conducts quarterly emergency training exercises which may include: hazardous materials, personnel rescue, response apparatus training, Texas A&M industrial training, and LaPorte fire field training. The emergency response equipment is maintained on the site via a third-party contractor. The contractor provides preventative maintenance on various response equipment, including the fire truck and deluge system.

40 C.F.R. § 68.96 Emergency Response Exercises – Celanese conducts annual drills for emergency response and security purposes, in addition to tabletop drills with the local Emergency Operations Center.

Subpart G – Risk Management Plan

40 C.F.R. § 68.190 Updates – Celanese’s RMP was re-submitted after a Revised PHA/Hazard Review due to process change, per 40 C.F.R. 68.190 (b)(5), on May 3, 2019.

40 C.F.R. § 68.195 Required corrections – Celanese’s next RMP registration re-submission is due by May 3, 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

AOC 1 – 40 C.F.R §68.28 (a)/ §68.36 (b)/ §68.39 (b) Hazard Assessment

“§68.28 Alternative 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.”

“§68.36 Review and update. (b) If changes in processes, quantities stored or handled, or any other aspect of the stationary source might reasonably be expected to increase or decrease the distance to the endpoint by a factor of two or more, the owner or operator shall complete a revised analysis within six months of the change and submit a revised risk management plan as provided in §68.190.”

“§68.39 Documentation. (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.”

The flammable alternative case scenario listed is related to a release in the CO-PROPYLENE unit. This unit was acquired around February 2019, and taken out of service around February 2020, but is still included as the basis for the flammable alternative release scenario. The CO-PROPYLENE unit is not scheduled to go back on-line until approximately 2027.

AOC 2 – 40 C.F.R §68.65(a) Process Safety Information

“(a) The owner or operator shall complete a compilation of written process safety information before conducting any process hazard analysis required by the rule. The compilation of written process safety information is to enable the owner or operator and the employees involved in operating the process to identify and understand the hazards posed by those processes involving regulated substances. This process safety information shall include 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.”

The facility failed to have process safety information available for the following equipment in the VAM and EO process: specification data sheets, operation, and the maintenance manual for LEL Gas Detectors AT-05498 and AT-05499.

AOC 3 – 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.”

The following PHA records did not include documentation to demonstrate that the required communications were made to affected maintenance or contract personnel: 2017 Shipping PHA; 2017 Utilities PHA; 2018 VAM Expansion; 2018 EO Purification and Storage; 2018 Praxair; and, 2018 T-33. In addition, the Action Number 10115-5 was due April 30, 2020, but was completed late on May 19, 2020.

Celanese failed to promptly address the team's findings and recommendations; assuring that the window breakage assessment and resulting recommendations were resolved in a timely manner and these actions were completed as soon as possible.

Celanese failed to establish a system to promptly address the team's findings and recommendations for the following actions items contained in the EO Purification and Storage Human Factors Checklist (2018 Revalidation). Celanese failed to assure that recommendations were resolved in a timely manner, the resolutions were documented; the actions to be taken were documented; the actions were completed as soon as possible; a written schedule of when these actions were to be completed was developed.

- v. Breathing air connections throughout the plant are still available. However, should any individual hook into air system, no air would be provided.
- vi. Team recommends generating FRS Part 10 for process safety alarms (See Addendum N) to improve compliance requirements within this addendum.
- vii. Recommend blue emergency beacons and horn at the flare have a PM so they are tested and kept up to working operation, so they work as designed (this was also addressed during the flare RAGAGEP review).
- viii. Develop an SOP for initiating IRS dump valves manual to ensure diluent methane is added prior to this occurrence. Alternatively add logic.

For the 2019 Vinyl Acetate PHA/VA Unit and VA/HAClI Tank Farm PHA, Action #421127, Celanese failed to develop a written schedule of when the action items were to be completed.

Celanese failed to establish a system to promptly address the team's findings and recommendations contained in the 2019 Vinyl Acetate PHA to assure that the recommendations were resolved in a timely manner and the actions were completed as soon as possible. These recommendations include, but are not limited to, the following action items:

- i. 421130 resolve deficiencies associated with V-268 and PSV-350
- ii. 421132 Implement improved as-found inspection & testing process for VA PVRV's and PVMH's
- iii. 421138 Issue updated electrical classification for the VA Unit
- iv. 421139 Conduct training for all site personnel on lights/signs related to VA Unit Classification
- v. 421145 Perform and document MAWP/MAEP calculations for V-636. Document Name Plate
- vi. 421147 Install overpressure protection on V-1251
- vii. 421154 Complete analysis of and document resolution to potential concerns with Arkema

AOC 4 – 40 C.F.R §68.69 (a) Operating Procedures

“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.”

Celanese failed to perform car-seal inspections prior to startup of the VA Unit in July 2021 in accordance with the Car Seal Control Program. The Celanese Car Seal Control Program requires the following:

- 5.2.10. Prior to the commissioning of a new unit or start up after a turnaround an inspection of all Car Seals will be performed per Conduct of Operations (Tier III, 09-01-001).

AOC 5 – 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 facility has not certified annually that the operating procedures are current and accurate to assure that they reflect current operating practice. The MeOH unit operating procedures were not certified for 2020. The EO unit operating procedures were not certified for 2019.

AOC 6 – 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.”

Refresher training was not provided at least every three years to one VAM employee and three EO employees involved in operating the covered processes to assure that the employees understand and adhere to the current operating procedures of the process. (Refer to Table 1).

AOC 7 – 40 C.F.R §68.73 (b) Mechanical Integrity

“(b) *Written procedures.* The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.”

At the time of the inspection, Celanese had failed to perform CUI inspections for the following piping and pressure vessels in accordance with Celanese Technical Directive-Corrosion Under Insulation TD-7:

- Celanese failed to perform corrosive under insulation inspections for piping every five-years in accordance with API 570 Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems Section 6.4; and,

- Celanese failed to perform corrosive under insulation inspections for pressure vessels every five-years in accordance with API 510 Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration Section 6.4 and 9.3.4.
- Celanese failed to perform inspections of the following LEL and oxygen monitors quarterly from 1/2020 -4/2021 in accordance with the Celanese Mechanical Integrity program and good engineering practices.

LEL Monitors	
AT-03596 A LEL Detection	AT-03596 B LEL Detection
AT-19638 A LEL Detection	AT-05498 LEL Detection
AT-05499 LEL Detection	AT-32470 A LEL Detection
AT-32470 B LEL Detection	AT-32470 C LEL Detection
AT-32470 D LEL Detection	AT-32470 E LEL Detection
AT-32470 F LEL Detection	AT-32470 G LEL Detection
AT-32470 H LEL Detection	
O2 Monitors	
AT-26285 O2 Detection	AT-26286 O2 Detection

AOC 8A – 40 C.F.R §68.73 (d)(2) Mechanical Integrity

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

Failure to perform ultrasonic (UT) testing of the following pressure vessels in accordance with API 510 scheduled due date:

- HE-1618 head UT testing CML 4TS due date and remaining life 4/25/2121
- V-0190 shell/head/nozzle UT testing CML 1-9 due date 3/9/21, remaining life 3/9/2121
- V-1568 head/shell/nozzle UT testing CML 1-9 due date 4/8/21
- V-1569 head/shell/nozzle UT testing CML 1-5 due date 4/16/21
- V-0226 shell east UT testing CML 5 due date 1/28/21 and remaining life 1/28/21

Failure to perform ultrasonic (UT) testing of the following piping circuits in accordance with API 570 scheduled due date:

- 32PS01D-01 1.01 TML due date 2/23/20
- 32PS01D-02 1.01 TML due date 2/23/20
- 32PS01D-05 1.01 TML due date 2/23/20
- 32PS01D-05 1.01 TML due date 2/23/20

v. 32PS101A02 2.01 TML due date 8/27/20 and remaining life 8/27/20

AOC 8B – 40 C.F.R §68.73 (d)(2) Mechanical Integrity

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

Celanese failed to perform an internal or on-stream inspection of the following vessels every ten years in accordance with API 510 Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration.

Equipment	Due Date
V-1566 Lean Flash Separator	4/8/21
V-1568 Rich Flash Separator	4/17/21
V-1570 Rich Flash Knockout	4/18/21
V-1765	4/14/21
T-29 Quench Bleed Stripper	4/6/21
V-98 Methane Heater H2O KO Pot	4/11/21
V-182 Stripper Tops Surge	4/12/21
V-156 C16 Suction to Knockout Pot	4/12/21
V-174, HE324 Condensate Pot	6/22/2021
T-111 EO Vent Scrubber	6/21/2021

Celanese failed to perform an external inspection of the following vessels every five years in accordance with API 510 Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration.

External	Due Date
T-27 CO2 Stripper	4/13/21
T-28 EO Absorber	4/13/21
V-155 EO Rundown Tank	3/18/21
V-156 C10 Suction to Knockout Pot	4/7/21
V-180 EO Flare Knockout Drum	4/7/21
V-1566 Lean Flash Separator	4/8/21
V-1568 Rich Flash Separator	4/17/21
V-1570 Rich Flash Knockout	4/18/21
V-155 EO Rundown Tank	3/18/21
V-152 Stripper Tops Surge	4/7/21
T-104 Light Ends Column	4/19/21

AOC 9 – 40 C.F.R §68.73 (d)(3) Mechanical Integrity

“(d) *Inspection and testing.* (3) The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience.”

Celanese failed to perform an inspection of pressure safety valves every five years in accordance with API 510 Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration, or at the frequency necessary as determined by the facility.

Equipment	Description	Due Date	API / RAGAGEP Frequency
PSV-1228	HE-0876	1/20/21	5-year
PSV-1229	HE-0396	1/20/21	5-year
PSV-1673	V-899	6/6/21	3-year
PSV- 00464A	BFW Header	4/15/21	4-year
PSV-2937	EO Storage Sphere	7/12/21	3-year
PSR-2084	T-111 Overpressure	4/13/2021	4-year
PSV-1710	T-111 Overpressure	4/13/2021	4-year
PSV-331	Rundown Tank	5/10/21	4-year

AOC 10 – 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.”

Celanese failed to assure that the following LEL and Oxygen detection monitors located in the Vinyl Acetate Unit were operational:

LEL Monitors	
AT-03596 A LEL Detection	AT-03596 B LEL Detection
AT-19638 A LEL Detection	AT-05498 LEL Detection
AT-05499 LEL Detection	AT-32470 A LEL Detection
AT-32470 B LEL Detection	AT-32470 C LEL Detection
AT-32470 D LEL Detection	AT-32470 E LEL Detection
AT-32470 F LEL Detection	AT-32470 G LEL Detection
AT-32470 H LEL Detection	
O2 Monitors	
AT-26285 O2 Detection	AT-26286 O2 Detection

AOC 11 – 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.”

Celanese did not implement written procedures to manage change in that the basic chemistry and percentage composition of the service that was leaking was not completed on the On-Stream Leak Repair Checklist SMP 12.02, WO 102064969; for the installation of a pipe clamp on an 8” line with a 3/4” stub-out.

AOC 12 – 40 C.F.R §68.75 (b)(4) Management of Change

“(b) The procedures shall assure that the following considerations are addressed prior to any change: (4) Necessary time period for the change”

Celanese did not implement written procedures to assure that the On-Stream Leak Repair Checklist SMP 12.02, WO 102064969; included the necessary time period for the installation of a pipe clamp on an 8" line with a 3/4" stub-out.

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

"Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process."

Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change were not trained prior to start up for the following:

Unit	Date	MOC#
EO	1/31/2020	102009582
EO	2/3/2020	102009990
EO	3/2/2020	102013214
VA	4/11/2020	102025488
VA	7/25/2020	54849787
VA	7/25/2020	54849791
VA	7/25/2020	54849798
VA	7/27/2020	102048580
EO	9/27/2020	102064969
EO	11/23/2020	102079027
VA	12/2/2020	102081698
VA	12/7/2020	102082987
EO	1/8/2021	102090155
EO	1/17/2021	102093646

AOC 14 – 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 has not promptly determined and documented an appropriate response to each of the findings of the audit and documented that deficiencies had been corrected:

- 2016: Finding 3 – Mechanical Integrity - The site is not tracking due dates for corrective action recommendations; and,
- 2019: Finding 1 – PHA – The following PHA records did not include documentation to demonstrate that the required communications were made to affected maintenance or contract personnel; 2017 Shipping; 2017 Utilities; 2018 VAM Expansion; 2018 EO Purification and Storage; 2018 Praxair; and, 2018 T-33.

AOC 15 – 40 C.F.R §68.79 (e) Compliance Audits

“(e) The owner or operator shall retain the two (2) most recent compliance audit reports. This requirement does not apply to any compliance audit report that is more than five years old.”

Celanese failed to retain the complete 2016 and 2019 compliance audit reports. In response to our document request for the Celanese compliance audit findings and resolution, Celanese indicated that the actual audit report and worksheet documents had been destroyed in accordance with company document retention policy.

AOC 16 – 40 C.F.R §68.81 (a) Incident Investigations

“(a) The owner or operator shall investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release.”

I believe the following incidents should have an incident investigation per this subpart for events on the following dates: March 25, 2021; September 14, 2020, October 6, 2020, and September 21, 2019

Closing Meeting - EPA Region 6 inspectors Justin McDowell and Howard Cole conducted a closing conference at the Celanese Plant on July 23, 2021, after this inspection. During the closing conference, I reviewed the Areas of Concern noted during the inspection.

Section IV – FOLLOW UP

EPA Region 6 held a follow-up meeting with representative from the Celanese facility on Wednesday, September 1, 2021. Documents were received on September 14, 2021 in support of Area of Concern Findings.

Section V – LIST OF APPENDICES

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