UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

In the Matter of:	)	
	)	
PVS Chemical Solutions, Inc.	)	**FINDING OF VIOLATION**
Chicago, Illinois	)	
	)	**EPA-5-25-IL-1**
Proceedings Pursuant to	)	
Section 113(a)(3) of the	)	
Clean Air Act, 42 U.S.C. § 7413(a)(3)	)	

FINDING OF VIOLATION

The U.S. Environmental Protection Agency is issuing this Finding of Violation under Section 113(a)(3) of the Clean Air Act (CAA), 42 U.S.C. § 7413(a)(3). The EPA finds that PVS Chemical Solutions, Inc. (PVS) is violating Section 112(r) of the Clean Air Act, 42 U.S.C. § 7412(r), and certain requirements of the Chemical Accident Prevention Provisions (CAPP), 40 C.F.R. Part 68, as follows:

Statutory and Regulatory Authority

Clean Air Act Section 112(r)

1. Section 112(r)(1) of the CAA, 42 U.S.C. § 7412(r)(1), provides that it shall be the objective of the regulations and programs authorized under Section 112(r) to prevent the accidental release and to minimize the consequences of any such release of any substance listed pursuant to Section 112(r)(3) of the CAA, or any other extremely hazardous substance.

2. Section 112(r)(3) of the CAA, 42 U.S.C. § 7412(r)(3), provides, in part, that the Administrator of the EPA shall promulgate, not later than 24 months after November 15, 1990, an initial list of 100 substances which, in the case of an accidental release, are known to cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment. The initial list shall include, among other substances, anhydrous ammonia, anhydrous sulfur dioxide, and sulfur trioxide.

3. Pursuant to Section 112(r)(3) of the CAA, the EPA initially promulgated a list of regulated substances, with threshold quantities for applicability, at 59 Fed. Reg. 4478 (January 31, 1994), which is codified, as amended, at 40 C.F.R. § 68.130. The list includes, among other substances, anhydrous ammonia, anhydrous sulfur dioxide, and oleum (fuming sulfuric acid) [sulfuric acid, mixture with sulfur trioxide].

4. Section 112(r)(7)(A) of the CAA, 42 U.S.C. § 7412(r)(7)(A), provides, in part, that the Administrator of the EPA is authorized to promulgate release prevention, detection, and correction requirements which may include monitoring, record-keeping, reporting, training, vapor recovery, secondary containment, and other design, equipment, work practice, and operation requirements.

5. Section 112(r)(7)(B) of the CAA, 42 U.S.C. § 7412(r)(7)(B), provides, in part, that within three years after November 15, 1990, the Administrator of the EPA shall promulgate reasonable regulations and appropriate guidance to provide, to the greatest extent practicable, for the prevention and detection of accidental releases of regulated substances and for the response to such releases by the owners or operators of the sources of such releases.

6. Pursuant to Section 112(r)(7) of the CAA, the EPA promulgated "Accidental Release Prevention Requirements: Risk Management Programs Under Clean Air Act Section 112(r)(7)," 61 Fed. Reg. 31668 (June 20, 1996), which is codified, as amended, at 40 C.F.R. Part 68.

7. Section 112(r)(7)(E) of the CAA, 42 U.S.C. § 7412(r)(7)(E), provides, in part, that after the effective date of any regulation or requirement promulgated pursuant to Section 112(r)(7) of the CAA, it shall be unlawful for any person to operate any stationary source in violation of such regulation or requirement.

Chemical Accident Prevention Provisions

Definitions

8. The CAPP, at 40 C.F.R. § 68.3, provide the following definitions:

a. "Stationary source" means, in part, any buildings, structures, equipment, installations, or substance emitting stationary activities which belong to the same industrial group, which are located on one or more contiguous properties, which are under the control of the same person (or persons under common control), and from which an accidental release may occur. The term stationary source does not apply to transportation, including storage incident to transportation, of any regulated substance or any other extremely hazardous substance under the provisions of this part. A stationary source includes transportation containers used for storage not incident to transportation and transportation containers connected to equipment at a stationary source for loading or unloading. Transportation includes, but is not limited to, transportation subject to oversight or regulation under 49 C.F.R. Parts 192, 193, or 195, or a state natural gas or hazardous liquid program for which the state has in effect a certification to the U.S. Department of Transportation under 49 U.S.C. § 60105.

b. "Regulated substance" means any substance listed pursuant to section 112(r)(3) of the CAA as amended in 40 C.F.R. § 68.130.

c. "Threshold quantity" means the quantity specified for regulated substances pursuant to Section 112(r)(5) of the CAA as amended, listed in 40 C.F.R. § 68.130 and determined to be present at a stationary source as specified in 40 C.F.R. § 68.115 of the CAPP.

d. "Process" means any activity involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities.

e. "Covered process" means a process that has a regulated substance present in more than a threshold quantity as determined under 40 C.F.R. § 68.115.

f. "Administrative controls" mean written procedural mechanisms used for hazard control.

g. "Mechanical integrity" means the process of ensuring that process equipment is fabricated from the proper materials of construction and is properly installed, maintained, and replaced to prevent failures and accidental releases.

Applicability and General Requirements

9. The CAPP, at 40 C.F.R. § 68.10(a)(3), require the owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under 40 C.F.R. § 68.115, to comply with the requirements of the CAPP no later than the date on which a regulated substance is first present above a threshold quantity in a process.

10. The CAPP, at 40 C.F.R. § 68.115(a), provide that a threshold quantity of a regulated substance listed in 40 C.F.R. § 68.130 is present at a stationary source if the total quantity of the regulated substance contained in a process exceeds the threshold.

11. Table 1 to 40 C.F.R. § 68.130 lists the following regulated toxic substances, among other substances:

a. Oleum[1] with a threshold limit of 10,000 pounds;

b. Anhydrous sulfur dioxide with a threshold limit of 5,000 pounds; and

c. Anhydrous ammonia with a threshold limit of 10,000 pounds;

12. The CAPP, at 40 C.F.R. § 68.10(l), provide that a covered process is subject to the Program 3 prevention program if the process does not meet the Program 1 process requirements, and if, among other things, the process is in North American Industry Classification System (NAICS) code 325188 or the process is subject to the U.S. Occupational Safety and Health Administration process safety management standard at 29 C.F.R. § 1910.119.

13. The CAPP, at 40 C.F.R. § 68.12(a), provide that the owner or operator of a stationary source subject to 40 C.F.R. Part 68 shall submit a single Risk Management Plan (RMP), as provided in 40 C.F.R. §§ 68.150 to 68.185, and that the RMP shall include a registration that reflects all covered processes.

[1] Table 1 to 40 C.F.R. § 68.130 refers to oleum as "oleum (fuming sulfuric acid) [sulfuric acid, mixture with sulfur trioxide]."

14. The CAPP, at 40 C.F.R. § 68.160(b)(7), require the RMP registration to include certain data for each covered process, including, among other things, the name and CAS number of each regulated substance held above the threshold quantity in the process and the maximum quantity of each regulated substance or mixture in the process (in pounds) to two significant digits.

15. The CAPP, at 40 C.F.R. § 68.12(d), identify additional requirements that the owner or operator of a stationary source with a process subject to Program 3 must meet, including, among other requirements, implementing the prevention requirements of 40 C.F.R. §§ 68.65 through 68.87.

Process Safety Information

16. The CAPP, at 40 C.F.R. § 68.65(d)(2), require the owner or operator of a Program 3 process to ensure and document that the process is designed and maintained in compliance with recognized and generally accepted good engineering practices (RAGAGEP).

Process Hazard Analysis

17. The CAPP, at 40 C.F.R. § 68.67(a), require the owner or operator of a Program 3 process to perform an initial process hazard analysis (PHA) on processes covered by 40 C.F.R. Part 68. The PHA must, among other things, identify, evaluate, and control the hazards involved in the process.

18. The CAPP, at 40 C.F.R. § 68.67(c), provide that the PHA required for a Program 3 process must address, among other things:

a. The hazards of the process;

b. Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases;[2]

c. Consequences of failure of engineering and administrative controls; and

d. Human factors.

19. The CAPP, at 40 C.F.R. § 68.67(f), provide, in part, that the PHA for a Program 3 process shall be updated and revalidated at least every five years after the completion of the initial PHA to assure that the PHA is consistent with the current process.

Operating Procedures

20. The CAPP, at 40 C.F.R. § 68.69(a), require the owner or operator of a Program 3 process to 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 that address at least the following elements:

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[2] On March 11, 2024, the EPA promulgated an amendment to 40 C.F.R. § 68.67(c)(3) requiring the PHA to also address standby or backup power for continuous operation of monitoring equipment associated with prevention and detection of accidental releases from covered processes. The compliance date for the provision is May 10, 2027. Therefore, the provision was not considered as part of this Finding of Violation. *See* 40 C.F.R. § 68.10(g)(1).

a. Steps for each operating phase;

b. Operating limits;

c. Safety and health considerations; and

d. Safety systems and their functions.

21. The CAPP, at 40 C.F.R. § 68.69(a)(1)(iv), require the steps for each operating phase within the written operating procedures developed and implemented for a Program 3 process to address emergency shutdown, including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.

22. The CAPP, at 40 C.F.R. § 68.69(a)(2), require the operating limits within the written operating procedures developed and implemented for a Program 3 process to address consequences of deviation and steps required to correct or avoid deviation.

23. The CAPP, at 40 C.F.R. § 68.69(d), require the owner or operator of a Program 3 process to develop and implement safe work practices to provide for the control of hazards during operations such as, among other practices, opening process equipment or piping. These safe work practices shall apply to employees and contractor employees.

Mechanical Integrity

24. The CAPP, at 40 C.F.R. § 68.73(a), provide that the mechanical integrity requirements set forth at 40 C.F.R. § 68.73(b) through (f) apply to certain equipment in Program 3 processes, including, among other things, piping systems (including piping components such as valves) and controls (including monitoring devices and sensors, alarms, and interlocks).

25. The CAPP, at 40 C.F.R. § 68.73(b), require the owner or operator of a Program 3 process to establish and implement written procedures to maintain the on-going integrity of process equipment.

26. The CAPP, at 40 C.F.R. § 68.73(d), provide the following inspection and testing requirements for equipment in a Program 3 process:

a. Inspections and tests shall be performed on process equipment;

b. Inspection and testing procedures shall follow RAGAGEP;

c. 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; and

d. The owner or operator shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of

the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.

Statement of Facts

27. PVS owns and operates a chemical manufacturing plant at 12260 South Carondolet Avenue, Chicago, Illinois (Facility) that produces oleum, anhydrous sulfur dioxide, sulfuric acid, and ammonium thiosulfate.

28. The Facility is a stationary source as defined at 40 C.F.R. § 68.3.

29. The EPA received a first-time RMP submission for the Facility on June 22, 1999.

30. PVS re-submitted an RMP for the Facility on February 11, 2022 (2022 RMP) that lists the following three Program 3 covered processes:

a. Oleum Process, which contains the regulated substance oleum at a quantity of 968,400 pounds;

b. Sulfur Dioxide Process, which contains the regulated substance anhydrous sulfur dioxide at a quantity of 1,614,000 pounds; and

c. Ammonia Thiosulfate Production Process (ATS Process), which contains the regulated substance anhydrous ammonia at a quantity of 907,440 pounds.

31. PVS has owned and operated the Oleum and Sulfur Dioxide Processes at the Facility for more than five years.

32. The 2022 RMP was re-submitted by PVS pursuant to 40 C.F.R. § 68.190(b)(4) to include the ATS Process as a new Program 3 covered process.

Information Request and Inspection

33. On October 26–27, 2023, the EPA conducted an announced inspection of the Facility (Inspection).

34. Pursuant to Section 114(a) of the CAA, 42 U.S.C. § 7414(a), the EPA issued an Information Request to PVS on April 9, 2024, seeking information on the Risk Management Program at the Facility (April 2024 Request).

35. On June 10, 2024, PVS provided a response to the April 2024 Request (June 2024 Response).

36. The information gathered from the Inspection and the June 2024 Response includes, but is not limited to, the facts set forth below.

Oleum and Sulfur Dioxide Processes

37. PVS manufactures oleum in the Oleum Process by absorbing sulfur trioxide into a recirculating oleum solution within an absorber tower. The sulfur trioxide used in the Oleum Process is generated at the Facility from the combustion of molten sulfur to form sulfur dioxide and the subsequent oxidation of sulfur dioxide to sulfur trioxide.

38. PVS either transfers the oleum product to a storage tank or uses oleum as a starting material for the Sulfur Dioxide Process.

39. PVS manufactures anhydrous sulfur dioxide in the Sulfur Dioxide Process by reacting sulfur trioxide with a mixture of sulfuric acid and molten sulfur in the Primary and Secondary Reactors to form sulfur dioxide gas, which is then purified, cooled, compressed, and condensed to the final product. The sulfur trioxide used in the Sulfur Dioxide Process is generated at the Facility by vaporizing oleum produced by the Oleum Process.

40. Oleum and anhydrous sulfur dioxide products are both transported off-site via tanker truck and rail tank car.

41. PVS conducted a 5-year revalidation of a PHA covering both the Oleum and Sulfur Dioxide Processes in 2019 (2019 PHA).[3]

ATS Process

42. PVS manufactures ammonium thiosulfate in the ATS Process by first reacting anhydrous ammonia with sulfur dioxide in the Gassing Tank to produce the intermediate ammonium sulfite.

43. PVS subsequently transfers the ammonium sulfite solution to the Digest Tank, where it is neutralized with anhydrous ammonia and reacted with molten sulfur to produce ammonium thiosulfate.

44. The Facility receives the anhydrous ammonia used in the ATS Process via rail tank car.

45. The Gassing and Digest Tanks can be supplied with anhydrous ammonia either directly from the rail tank car unloading station or from an anhydrous ammonia storage tank.

Open-Ended Valves or Lines

46. For the purposes of this FOV, “open-ended valves or lines” means valves (except for pressure relief valves) that have one side of the valve seat open to the atmosphere, either directly or through open piping, without the use of a positive closure mechanism such as a blind, plug, or cap.

[3] At the time of the Inspection, PVS provided multiple versions of the PHA report that were dated September 18, 2018, January 24, 2019, February 7, 2019, and February 12, 2019. During the Inspection, PVS personnel stated that the PHA was conducted in 2019.

Open-Ended Valves or Lines within the Sulfur Dioxide Process

47. During the Inspection, the EPA inspectors observed the following open-ended valves or lines within the Sulfur Dioxide Process that relied on a single closed valve with no lock to contain regulated and other extremely hazardous substances:

a. 1/2" line off the Primary Reactor vapor product piping to an open hose coupling with a single closed ball valve downstream of the PI 360.107 pressure gauge;

b. Closed 1/2" threaded ball valve with no cap or plug on the sulfur dioxide vapor piping to the Brinks 13DM1 Demister;

c. Closed 1/2" threaded ball valve with no cap or plug attached to the PI 480.101 pressure gauge on the Brinks 13DM1 Demister;

d. Closed 1/2" threaded ball valve with no cap or plug attached to the PI 480.102 pressure gauge on the Brinks 13DM1 Demister;

e. 1/2" line off the sulfur dioxide compressor suction piping to an open hose coupling with a single closed ball valve upstream of the coupling; and

f. 3/4" line off the liquid sulfur dioxide transfer pump suction piping to an open hose coupling with a single closed ball valve upstream of the coupling.

48. The open-ended valves or lines identified in paragraph 47, above, were accurately reflected in the piping and instrumentation diagrams provided by PVS at the time of the Inspection.

49. A closed ***and locked*** valve (or valves) with no blind, plug, or cap is generally considered the least effective method available to isolate a vessel or pipe, while more effective methods include the use of a double block and bleed valve system and the installation of a blind, plug, or cap. *See* Section 21.4.1 of *Lees' Loss Prevention in the Process Industries, Fourth Edition* and the March 2019 Edition of the *Process Safety Beacon* by the Center for Chemical Process Safety. A closed ***and unlocked*** valve, as was observed during the Inspection, is not listed as an effective isolation method by these documents.

50. Loss of containment through an unlocked and open-ended valve or line is a recognized hazard, but PVS did not evaluate the hazard of loss containment through the open-ended valves or lines in the Sulfur Dioxide Process during the 2019 PHA or at any other time prior to the Inspection.

ATS Process

51. During the Inspection, the EPA inspectors observed an open-ended valve on the anhydrous ammonia feed piping to the Gassing Tank within the ATS Process that was in the open position. The open valve relied on a single closed upstream valve with no lock to contain anhydrous ammonia.

52. During the Inspection, the EPA inspectors observed an open-ended line with two closed valves downstream of a pressure gauge located between the Digest Ammonia Throttling Valve and the Digest Ammonia Block Valve within the ATS Process. The "Normal Operations- Digest Tank Batch"

procedure provided by PVS at the time of the Inspection shows closed piping downstream of the pressure gauge, not an open-ended valve or line.

53. While PVS has developed a line and equipment opening (*i.e.*, line break) procedure that applies to covered processes at the Facility, the EPA did not find evidence during the Inspection demonstrating that the procedure had been implemented for opening of anhydrous ammonia feed piping to the Gassing and Digest Tanks within the ATS process.

Toxic Gas Detection Alarms

54. PVS has installed gas detectors at the Facility for ambient and/or fence line monitoring of sulfur dioxide and ammonia.

55. The gas detectors at the Facility are alarmed in the control room to notify PVS operators of a toxic gas detection event.

56. The gas detectors and their associated alarms (toxic gas detection alarms) are safety systems for the Program 3 processes at the Facility because they provide for the detection of releases of regulated substances.

Alarm Design and Maintenance

57. Toxic gas detection alarms at the Facility are equipment in a Program 3 process and therefore must be designed and maintained in compliance with RAGAGEP, as set forth at 40 C.F.R. § 68.65(d)(2).

58. Sources of RAGAGEP for safety alarms in the process industries include, but are not limited to, standards published by the International Electrotechnical Commission (IEC) and the International Society of Automation (ISA).

59. IEC 62682, *Management of Alarm Systems for the Process Industries*, is a consensus standard that addresses the development, design, installation, and management of alarm systems in the process industries.

60. IEC 62682:2022 states that an alarm philosophy document shall be developed to cover each alarm system and the document shall include, among other things:

a. Philosophy for alarm system performance monitoring (such as the objective for monitoring and assessment, the monitoring metrics and target values, guidance on frequency to review alarm system performance, and guidance on the approach to improve performance on the metrics);

b. Philosophy for testing of alarms (such as testing requirements based on alarm classes or other methods to ensure that the alarm continues to perform as designed); and

c. Philosophy for alarm response procedures (such as information to be included in alarm response procedures and the method to access the alarm response procedures).

61. PVS does not maintain an alarm log for toxic gas detector alarms and therefore does not have data to monitor and evaluate the performance of this alarm system.

62. During the 2019 PHA, PVS evaluated process control systems and alarms as part of a human factors checklist. The human factors checklist provides a series of guiding questions and the PHA team's responses related to alarms, including:

a. Q: "Are alarms displayed by priority and is the system designed to avoid alarm flood in an emergency?"
A: "No. Alarms are displayed by time, this is [adequate]."

b. Q: "Are critical alarms distinct and does the [standard operating procedure] have instructions on what the required operator response is to critical alarms?"
A: "No. Not an issue."

c. Q: "Is there an alarm review program in place which ensures that alarms levels are appropriate to the risk and which takes action to eliminate nuisance alarms?"
A: "No. Not an issue."

63. The 2019 PHA does not document what information was reviewed by the PHA team when completing the human factors checklist and does not reference any RAGAGEP used to determine that the lack of an alarm prioritization system, lack of distinct critical alarms, and lack of an alarm review program was not an issue.

Mechanical Integrity of Alarms

64. Gas detection alarms at the Facility are also subject to the mechanical integrity requirements for equipment in Program 3 processes, including the requirement to perform inspections and tests using procedures that follow RAGAGEP, as set forth at 40 C.F.R. § 68.73(d)(1) and (d)(2).

65. ANSI/ISA-84.91.01, *Identification and Mechanical Integrity of Process Safety Controls, Alarms, and Interlocks in the Process Industry Sector*, is a consensus standard that addresses the instruments that are classified as process safety safeguards by the authority having jurisdiction and establishes requirements for their mechanical integrity, including inspection/testing and documenting the inspection/test results.

66. ANSI/ISA-84.91.01-2021 states that process safety controls, alarms, and interlocks shall be included in a mechanical integrity program that uses periodic inspection/testing and preventive maintenance to maintain their integrity in the operating environment.

67. As a result of the April 2024 Request, PVS discovered that its sulfur dioxide alarms were erroneously configured to provide "high" and "high high" alarms at lower concentrations than intended by the alarm design.

Operating Procedures for Alarm Response

68. Neither the Oleum Process nor the Sulfur Dioxide Process operating procedures provided by PVS at the time of the Inspection address the sulfur dioxide detection alarms at the Facility and do not provide the information set forth at paragraphs 20 through 22, above:

a. Procedures for sulfur dioxide detector alarm response are not provided;

b. Sulfur dioxide detection levels under which emergency shutdown is required are not specified;

c. The safe operating limits for the sulfur dioxide detectors are not specified; and

d. The alarm levels for the sulfur dioxide detector alarms are not specified.

69. While the operating procedure for the ATS Process provided by PVS at the time of the Inspection titled "Emergency Operations- Anhydrous Ammonia Leak Shutdown" states that the detection of ammonia will trigger an alarm status to the programmable logic controller (PLC) to notify PVS operators of a leak, the ATS Process operating procedures do not provide the information set forth at paragraphs 20 through 22, above:

a. Procedures for ammonia detector alarm response are not provided;

b. Ammonia detection levels under which emergency shutdown is required are not specified;

c. The safe operating limits for the ammonia detectors are not specified; and

d. The alarm levels for the ammonia detector alarms are not specified.

70. PVS's narrative provided in the June 2024 Response stated that "there is no written procedure specific to responding to alarms…" in response to the April 2024 Request for operating procedures developed and implemented for responding to sulfur dioxide and ammonia detection alarms.

Mechanical Integrity of Piping Systems

71. The Oleum, Sulfur Dioxide, and ATS Processes each contain piping systems subject to the mechanical integrity requirements for equipment in Program 3 processes at 40 C.F.R. § 68.73.

72. Sources of RAGAGEP for inspecting and testing process piping include, but are not limited to, standards published by the American Petroleum Institute (API).

73. API 570, *Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems*, is an industry consensus standard that covers the inspection, rating, repair, and alteration procedures for metallic piping systems and their associated pressure-relieving devices that have been placed in-service.

74. API 570 applies to all piping systems for process fluids that are hazardous to personnel, such as hydrocarbons, and similar flammable or toxic fluid services and processes, unless specifically designated as optional by the code.

75. PVS provided an internal document titled EHS-500, *Process Safety Management/Risk Management Plan Management Program* during the Inspection and as part of the June 2024 Response.

76. The narrative provided by PVS in the June 2024 Response states that Section 12.3 of EHS-500 details the procedures that PVS follows at the Facility to ensure the on-going integrity of the covered processes in accordance with 40 C.F.R. § 68.73(b), including the piping systems for those processes.

77. Section 12.3 of EHS-500 does not provide written procedures specific to maintaining the on-going integrity of in-service process piping for the covered processes at the Facility, such as a description of the inspections or tests that should be performed on piping systems or the frequency at which such inspections or tests should be performed.

78. General inspection criteria for maintaining the on-going integrity of process equipment are set forth at Section 12.3.3 of EHS-500 as follows [**emphasis added**]: "Inspection criteria must follow [RAGAGEP]. Examples include, but are not limited to: PVS standards, manufacturer instructions and ASTM/**API** standards…"

79. The narrative provided by PVS in the June 2024 Response states that PVS generally follows ASME B31.3, *Process Piping* as RAGAGEP for inspection and testing of piping systems.

80. Paragraph 300(c)(2) of ASME B31.3-2022 sets forth the intent of the code as follows: "This Code is not intended to apply to the operation, examination, inspection, testing, maintenance, or repair of piping that has been placed in service. See para. F300.1 for examples of standards that may apply in these situations. The provisions of this Code may optionally be applied for those purposes, although other considerations may also be necessary."

81. The guidance and precautionary considerations for piping that has been placed in service set forth at paragraph F300.1 of Appendix F to ASME B31.3-2022 states [**emphasis added**]: "Examples of industry standards that address piping that has been placed in service are ASME PCC-2, *Repair of Pressure Equipment and Piping*, and **API 570**, *Piping Inspection Code: In-service Inspection Rating, Repair, and Alteration of Piping Systems*."

82. API 570 generally requires external visual inspections to be performed on piping systems at least every five years and thickness measurements to be performed on piping systems at least every ten years (or at least every five years for fluid services that have the highest potential of resulting in an immediate emergency if a leak were to occur). *See* Table 1 of API 570.

83. Section 12.3.4 of EHS-500 states: "The results of inspections must be documented including the following information: Date, inspector, equipment name, item number, description of test, result of test and corrective actions taken. Inspection records must be retained for the life of the

equipment. The CMMS software will be used to assure the inspections have occurred while hard copies of the records will be kept in the equipment files."

84. In the June 2024 Response, PVS did not provide evidence that it had performed inspections or tests on in-service process piping in response to the EPA's request for documentation of all inspections and tests that PVS has performed on the piping systems of covered processes at the Facility from April 1, 2019 through the April 2024 Request.

Rail Tank Car Storage

85. PVS operates an on-site rail tank car storage process at the Facility for the storage of the regulated substances oleum and anhydrous sulfur dioxide.

86. PVS stores rail tank cars containing oleum and anhydrous sulfur dioxide at the Facility after the rail tank cars are disconnected from the Oleum or Sulfur Dioxide Processes and before the rail tank cars are connected to the motive power (*i.e.*, locomotive) that will transport the cars out of the Facility.

87. Rail tank car storage of oleum and anhydrous sulfur dioxide is part of PVS's stationary source because the transportation containers are used for storage not incident to transportation.

88. In the June 2024 Response, PVS provided a plot plan showing the locations at the Facility where rail tank cars may be stored.

89. Certain rail tank car storage locations that PVS identified on the plot plan are neither interconnected nor co-located with the Oleum or Sulfur Dioxide Processes, including Tracks 1, 2, 9, and 10.

90. EHS-500 provides the basis for the maximum intended inventories of oleum and anhydrous sulfur dioxide listed in the 2022 RMP as follows:

a. The maximum intended oleum inventory listed for the Oleum Process does not include any amount stored in rail tank cars; and

b. The maximum intended anhydrous sulfur dioxide inventory listed for the Sulfur Dioxide Process includes three rail tank cars containing 180,000 pounds of anhydrous sulfur dioxide each, or 540,000 pounds combined rail tank car storage.

91. Records of rail tank car storage at the Facility since April 1, 2021 provided in the June 2024 Response demonstrate that:

a. PVS stores a maximum of two oleum rail tank cars at the Facility with an oleum inventory of 404,800 pounds; and

b. PVS stores a maximum of five sulfur dioxide rail tank cars at the Facility with an anhydrous sulfur dioxide inventory of 891,800 pounds.

92. Rail tank car storage at the Facility is a covered process because it contains regulated toxic substances above the threshold quantities listed in Table 1 to 40 C.F.R. § 68.130.

93. The 2022 RMP does not include rail tank car storage of oleum as a covered process and does not include rail tank car storage of more than three anhydrous sulfur dioxide rail tank cars as a covered process.

Violations

94. Pursuant to Section 112(r)(7)(E) of the CAA, the violations set forth below are violations of the CAA.

Failure to Evaluate and Control Hazards of Open-Ended Valves or Lines

95. PVS failed to conduct a PHA that evaluated the hazard of loss of containment through the open-ended valves or lines in the Sulfur Dioxide Process during the 2019 PHA or any other time prior to the Inspection, in violation of 40 C.F.R. § 68.67(c).

96. PVS failed to implement safe work practices to provide for the control of hazards during opening process equipment by failing to close an open-ended valve on the anhydrous ammonia feed line to the Gassing Tank and failing to provide closed piping on the anhydrous ammonia feed line to the Digest Tank, as observed within the ATS Process at the time of the Inspection on October 27, 2023, in violation of 40 C.F.R. § 68.69(d).

Failure to Follow RAGAGEP, Evaluate Human Factors, or Develop and Implement Operating Procedures for Toxic Gas Detection Alarms

97. By failing to develop an alarm philosophy in accordance with IEC 62682 or any equivalent standard at any time, PVS failed to ensure and document that the toxic gas detection alarms at the Facility are designed and maintained in compliance with RAGAGEP, in violation of 40 C.F.R. § 68.65(d)(2).

98. PVS failed to conduct a PHA that adequately address human factors related to toxic gas detection alarms during the 2019 PHA or any other time through at least the Inspection, in violation 40 C.F.R. § 68.67(c)(6).

99. PVS failed to conduct inspections and tests on the sulfur dioxide detection alarms at the Facility to ensure that the alarms were properly installed and maintained at any time prior to the April 2024 Request, in violation of 40 C.F.R. § 68.73(d).

100. PVS failed to develop and implement written operating procedures for the Sulfur Dioxide and Oleum Processes that provide clear instructions for safely responding to sulfur dioxide detector alarms at all relevant times, in violation of 40 C.F.R. § 68.69(a).

101. PVS failed to develop and implement written operating procedures for the ATS Process that specify ammonia detection levels under which emergency shutdown is required, safe operating limits for the ammonia detectors, and the alarm levels for the ammonia detector alarms at all relevant times, in violation of 40 C.F.R. § 68.69(a).

Failure to Establish and Implement Mechanical Integrity Program for Piping Systems

102. PVS failed to establish and implement written procedures to maintain the on-going integrity of piping systems for the Program 3 processes at the Facility at all relevant times, in violation of 40 C.F.R. § 68.73(b).

103. PVS failed to conduct inspections and tests on Sulfur Dioxide Process piping systems in accordance with RAGAGEP at any time since at least April 1, 2019, in violation of 40 C.F.R. § 68.73(d).

104. PVS failed to conduct inspections and tests on Oleum Process piping systems in accordance with RAGAGEP at any time since at least April 1, 2019, in violation of 40 C.F.R. § 68.73(d).

Failure to Include Rail Tank Car Storage in RMP

105. By failing to include rail tank car storage of oleum and anhydrous sulfur dioxide as a covered process in its RMP filing, PVS failed to submit a single RMP, as provided in 40 C.F.R. §§ 68.150 to 68.185, that includes a registration that reflects all covered processes, in violation of 40 C.F.R. § 68.12(a).

MICHAEL HARRIS Digitally signed by MICHAEL HARRIS
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Michael D. Harris
Division Director
Enforcement and Compliance Assurance Division