



Chemical Removal Completed at the Refinery on St. Croix

What is the status of the chemical's removal at the refinery?

Under EPA oversight, Port Hamilton Refinery and Transportation (PHRT) completed the removal of anhydrous ammonia, amines, and liquid petroleum gas (LPG) from the original units containing these materials at the facility. PHRT finished removing the anhydrous ammonia on May 14, the liquid amine on June 22, and the LPG on July 21. The large majority of these materials have been shipped off island. Remaining at the refinery as of August 10 are:

- a partially filled shipping container of liquid amine which is scheduled to be shipped off island by the end of August;
- three full shipping containers of LPG, which are expected to be shipped off-island by the week of August 14
- a partially filled shipping container of LPG, which will require further characterization of its contents and may delay shipment off-island until October; and
- 175,000 gallons of rinse water containing amines, called amine water rinsate, and 6,750 gallons of rinse water containing ammonia, called ammonia water rinsate; EPA and PHRT are discussing the final disposal of the water rinsate.

How much of the LPG has been removed?

Removal of the liquid LPG from facility equipment took place through June 10, at which point the work was paused due to the need for additional shipping containers. The additional shipping containers arrived at the facility, the off-loading of LPG from facility equipment resumed, and was completed on August 2, 2023. Approximately 26,700 gallons of LPG have been recovered from refinery units. Two shipping containers have been shipped off island, and three shipping containers are expected to be shipped off island by the week of August 14. A partially filled shipping container will require further characterization of its contents, which may delay shipment off island until October. While transferring the liquid LPG, vapors were routed to a thermal oxidizer, which burns or destroys the vapors.

How much amine was removed?

Under EPA oversight, specialized contractors removed approximately 327,112 gallons of rich amine liquid from facility equipment. Amine vapors are being treated on site, and cleaning solution is being collected in specialized containers for disposal.

How much ammonia was removed?

Under EPA oversight, specialized contractors transferred 8,400 gallons of liquid industrial grade ammonia into two shipping containers. The shipping containers were shipped off island on May 14. The shipment off island of the liquid ammonia marks significant progress in reducing the threat of a chemical release from the Port Hamilton Refinery. Approximately 6,750 gallons of ammonia rinse water, which was used to flush out any remaining ammonia, remain at the refinery for final disposal.



What is liquefied petroleum gas (LPG)?

Liquefied petroleum gas, or LPG, is a fuel gas which contains a flammable mixture of hydrocarbon gases. LPG is typically stored inside a pressure vessel to keep the gas in a liquid state. LPG generally has no odor unless a chemical is injected into the gas to cause it to smell. Odor-causing chemicals have not been added to the LPG stored at the facility, so no odors are associated with this material.

What are amines or rich amines?

An amine system uses a solution of specific chemicals, called alkylamines, to remove hydrogen sulfide and carbon dioxide from refinery gas streams. Removing hydrogen sulfide and carbon dioxide from the refinery gases improves safety, prevents corrosion, and meets environmental regulations. When hydrogen sulfide is present in the amine solution, it is considered a “rich” amine solution.

What is industrial grade or anhydrous ammonia?

Ammonia is a colorless gas with a very distinct odor. The odor of ammonia is familiar to many people because it is used in smelling salts, many household cleaners, and window-cleaning products. Anhydrous or industrial grade ammonia contains very little water and is much stronger than the ammonia used in household products. It was used at the refinery as an additive in a system that produced gasoline.

Is industrial grade ammonia dangerous?

Anhydrous ammonia is a dangerous industrial chemical. Symptoms related to the exposure of ammonia, in both liquid and gaseous states, include eye redness, throat and lung irritation, coughing, and a choking sensation.

Are rich amine solutions and LPG dangerous?

Amines typically have a fishy odor. Symptoms related to amine exposure include eye irritation and visual disturbances such as blurry vision. The amine solution at the facility contains hydrogen sulfide, a colorless gas with a very strong rotten egg odor. Low level exposure to concentrations of hydrogen sulfide can cause irritation to the eyes and respiratory system, dizziness, headaches, irritability, and nausea. Exposure to higher concentrations can result in tremors and convulsions.

LPG is a highly flammable gas that poses a fire hazard when improperly stored. Symptoms of exposure to LPG include headaches, drowsiness, and dizziness. Since LPG is heavier than the air, it will accumulate close to the ground.

Sulfur dioxide and nitrogen dioxide may be produced when using a thermal oxidizer to burn the LPG vapors. Sulfur dioxide is a nonflammable, colorless gas with a strong odor like burning rubber. Symptoms of exposure to sulfur dioxide may include difficulty breathing, changes in the ability to breathe deeply, and burning of the nose and throat. Nitrogen dioxide is nonflammable and colorless to brown-colored gas that has a strong, harsh odor. Low levels of nitrogen dioxide can irritate the eyes, nose, throat, and lungs, possibly causing coughing, shortness of breath, tiredness, and nausea.



For more information and answers to frequently asked health questions, visit the Agency for Toxic Substances and Disease Registry's Toxic Substance Portal: <https://www.atsdr.cdc.gov/toxfaqs/tfacts126.pdf>

Will all of the amine be removed from the facility?

Several containers of rinse water containing amines were generated as part of the amine removal process. EPA is in discussion with PHRT regarding the final disposal of this rinse water. EPA assessed the threat of a hydrogen sulfide release from this amine rinsate and has determined that the potential exposure levels are well below the standards EPA has used for the fence line and community air monitors for hydrogen sulfide. EPA stopped monitoring the air for hydrogen sulfide associated with the amines on August 2.

Will all of the ammonia be removed from the facility?

As part of the ammonia removal process, 27 containers with up to 275 gallons of rinse water that contains ammonia were generated. EPA is in discussion with PHRT regarding the final disposal of this rinse water. EPA has assessed the threat of an ammonia air release from this source and has determined the potential exposure levels are well below the same reference standards EPA has used for the fence line and community air monitors for ammonia.

How was the public protected during the removal process?

In addition to EPA personnel overseeing the chemicals removal work, EPA monitored the air around-the-clock. EPA displayed the real-time air monitoring results on [EPA's refinery on St Croix website: https://phrt-epa.hub.arcgis.com/](https://phrt-epa.hub.arcgis.com/). EPA will continue to coordinate closely with the government of the U.S. Virgin Islands emergency management and environmental agencies. The Virgin Islands Territorial Emergency Management Agency (VITEMA) is the coordinating agency of the U.S. Virgin Islands for emergency readiness and response.

Will EPA or other entities continue air monitoring in the community?

With the completion of the removal of anhydrous ammonia, amines and LPG from the facility, EPA suspended air monitoring of these chemicals. Information regarding EPA's air monitoring activities during removal operations can be found here: <https://phrt-epa.hub.arcgis.com/>, which is linked to from [EPA's Refinery on St. Croix website](#). Past air monitoring readings associated with the removal activities are available for review at [Viper Reporting \(epa.gov\)](https://www.epa.gov/viper-reporting). PHRT continues to monitor for SO₂ and H₂S at five sites throughout the community (see map below). EPA reviews that data on a daily basis (on business days) and provides a notification to VIDO, ATSDR and VIDPNR if any significant elevated levels are measured. "EPA can provide batch data pulls from the system that PHRT is using which can be done upon request."



Map of PHRT's Air Monitoring Locations



For more information, please visit:

EPA St. Croix Refinery Website: www.epa.gov/vi/refinery-st-croix-us-virgin-islands

VITEMA Website: www.vitema.vi.gov



If you have any questions or concerns, please contact:

Zeno Bain and **Philip Parker** at StCroix@epa.gov

EPA's Toll-free Hotline is staffed Monday through Friday 8 a.m. – 5 p.m.: (866) 462-4789

Sign up for alerts from VITEMA's Alert VI System at

<https://member.everbridge.net/892807736729008/new>.

Follow updates from local officials, including information provided at the weekly Governor's updates.

Monitor cell phone for notification broadcasts from local agencies, such as VITEMA