

TRIP REPORT

***Pacific Producer Ammonia Release
Tacoma, Pierce County, Washington
Contract No.: 68HE0720D0005
Task Order No.: 68HE0720F0147-31***



Prepared for:

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Prepared by:

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November 2023

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1 SITE DETAILS

Table 1-1 Site Information

Site Name:	Pacific Producer Ammonia Release
Location:	1510 E D St, Tacoma, Pierce County, WA, 98421
SSID:	10WT
Latitude, Longitude:	47.25002 North, -122.43089 West
Date(s) of Trip:	08/22/2023 – 08/23/2023

Notes:
SSID Site-Spill Identifier

2 PURPOSE

The U.S. Environmental Protection Agency (EPA) Region 10 activated Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START) contractor, under Contract No. 68HE0720D0005 and Task Order (TO) No. 68HE0720F0147-31, to support EPA during an emergency response action in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. START provided technical support services during an ammonia leak from a fish processing watercraft in Tacoma, Washington (**Figure 1**).

The objectives of the Pacific Producer Ammonia Release response were to:

- Establish primary constituents of concern (COCs) and their corresponding responder and public action levels.
- Perform Community Air Monitoring (CAM) via fixed and roving air monitoring stations to assess the impact of the ammonia release and subsequent removal activities in the vicinity of the Site, with a focus on nearby residential areas.
- Notify Unified Command via EPA if an exceedance is noted during CAM activities.
- Communicate findings to stakeholders, including EPA, United States Coast Guard (USCG), Washington Department of Ecology (Ecology), and the Potentially Responsible Party (PRP) East West Seafoods, to assist in decision making.

This Trip Report includes the following attachments associated with the tasks outlined above:

- Attachment A – Photographic Documentation

3 PARTICIPATING ORGANIZATIONS

Table 3-1 Participating Organizations

Agency/Company	Contact Persons	Role
EPA	Brooks Stanfield	EPA On-Scene Coordinator
	Brad Martin	EPA On-Scene Coordinator
START	Garret Hugel	Project Team Leader
	Morgan Larimer	Field Team Member
	Christopher Landrum	Field Team Member
	Xavier Franczyk	Field Team Member
USCG	Mark McDonnell	Federal On-Scene Coordinator
	Jason Potts	US Ecology Emergency Response Manager
Washington Department of Ecology	David Prator	State On-Scene Coordinator
	Courtney Serad	State On-Scene Coordinator

4 BACKGROUND

On Sunday, August 13, 2023, inspectors from the Tacoma Fire Department boarded the F/V Pacific Producer (hereafter referred to as the Site), a 169-foot, 472-ton fish processing watercraft, and identified an ammonia leak (Sailor, 2023). Ammonia is a common component of fish processing watercraft refrigeration systems and is stored in pressurized tanks. This watercraft has approximately 4,000 pounds of ammonia stored on board. Ecology and the Tacoma Fire Department initially responded to the incident and conducted on-site air monitoring, with contractors entering the watercraft to attempt to prevent the release of ammonia into the environment. A later inspection conducted by the USCG found corroded distribution piping stemming from the ammonia tanks that was determined to be the source of the leak. The cause of the damage to the piping is unknown; however, the Site has an extensive history of health and safety violations, receiving citations from Occupational Safety and Health Administration (OSHA) in 2012, 2014, 2018, and January of 2023 (U.S. Department of Labor, 2023). The watercraft had a previous ammonia leak reported in 2018, and the 2023 OSHA investigation resulted in 17 Serious and two Repeat Serious citations.

On August 22, 2023, Ecology requested further assistance for air monitoring from EPA due to changing conditions within the watercraft that required prompt offloading of the ammonia by USCG contractors. EPA and START arrived on scene in the late afternoon of Tuesday, August 22, 2023, to conduct CAM operations.

4.1 SITE DESCRIPTION

The Site consists of the Pacific Producer watercraft which, at the time of the leak, was docked at the now-defunct Martinac ship building facility (Sailor, 2023) on Tacoma's Thea Foss Waterway within Commencement Bay. The watercraft is adjacent to the City's densely populated downtown waterfront area, which includes a mixture of single-family homes, multi-family residential structures, and commercial businesses. A significant portion of the docked vessel was docked directly above a sediment cap installed as part of the Commencement Bay/Near Shore/Tideflats Superfund Site. Interstate 5 is one mile south of the Site, with a predominately residential neighborhood beyond that. Immediately south and east of the Site are commercial, industrial, and maritime businesses. Two hospitals (St. Joseph's Medical Center and CHI Franciscan Health),

three schools (Seabury Middle School, McCarver Elementary School, and Willie Stewart Academy), six daycares, and two senior residences are located within a one-mile radius of the watercraft. To the north and northeast of the Site, across Commencement Bay, are a large number of residences within the Browns Point and Northeast Tacoma neighborhoods.

4.2 PRIOR ACTIVITIES

Ecology responded to the ammonia release on August 16th and supported the response efforts using handheld air monitoring equipment (MultiRAE Pro) to determine the atmospheric conditions within the watercraft. US Ecology, a USCG contractor, initially attempted to release the compressed ammonia gas from the tanks in a controlled manner. This was ultimately abandoned due to concerns of a sudden uncontrolled release of the remaining ammonia in the tanks. Under the supervision of USCG, US Ecology began pumping carbon dioxide gas in the below-deck compartments of the watercraft to react with the ammonia gas to produce ammonium carbamate, a nonhazardous, inert white solid. Ecology initiated CAM operations due to concerns of that displaced ammonia gas from the carbon dioxide treatment might migrate to surrounding areas.

5 ESTABLISHMENT OF SITE SCREENING AND ACTION LEVELS

EPA determined site-specific screening and action levels for both worker health and safety and public health and safety. Worker health and safety levels were set based on the most protective of the OSHA Permissible Exposure Limits (PELs), National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), or the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs).

Action levels are determined based upon the duration time exposed to a COC. The time weighted average (TWA) is over an 8-hour period, the short-term exposure limit (STEL) is over a 15-minute span, and the ceiling limit (C) is not to be exceeded regardless of the amount of time spent in that environment.

Public health and safety levels were set using the EPA's Acute Exposure Guideline Levels (AEGLs), which provide specific concentrations of airborne chemicals to which health effects may occur, based upon the amount of time an individual may be exposed. Because residents had the potential to be exposed for an entire day, 8-hour AEGLs were selected. This is the longest time

period published in the AEGLs. AEGL-1 represents the threshold at which most individuals experience noticeable, but reversible, effects and discomfort from chemical exposure. AEGL-2 is the threshold where serious and lasting effects develop for most individuals. AEGL-3 is concentrations sufficient to cause critical illness and death (EPA, 2023) These criteria were used to evaluate data obtained from air monitoring instruments and make decisions for the safety of the community.

During the response, Unified Command, consisting of the EPA On-Scene Coordinator, USCG, and Ecology requested notification if ammonia concentrations reached or exceeded 10 parts per million (ppm). No additional actions were required at this level.

Table 5-1 Site Screening and Action Levels for Chemical Vapors

Hazard	Responder Action Level			Public Health Action Level		
	TWA	STEL	C	AEGL-1	AEGL-2	AEGL-3
Ammonia	25 ppm ^{1,2}	35 ppm ^{1,2}	N/A	30 ppm	110 ppm	390 ppm

Notes:
 AEGL Acute Exposure Guideline Level
 C ceiling limit
 N/A not applicable
 ppm parts per million
 STEL short-term exposure limit
 TWA time weighted average
 Source: ¹-NIOSH, ²-ACGIH

Additionally, oxygen was monitored to indicate any changes in carbon dioxide levels, as Region 10 does not have real-time monitoring capabilities for carbon dioxide. Since carbon dioxide displaces oxygen in the air, a decrease in oxygen corresponds to increasing carbon dioxide levels. For each analyte, site-specific action levels and corresponding actions for responders were determined should an exceedance occur (**Table 5-2**).

Table 5-2 Community Air Monitoring Screening Levels

Analyte	Action Level	Action Level Basis	Field Action
Oxygen	< 19.5% and > 22.0%	Normal concentration of oxygen in ambient air	Report Exceedances to EPA On-Scene Coordinator for further direction

Notes:

% percent

6 HEALTH AND SAFETY

A site-specific Health and Safety Plan (HASP) was completed and a safety meeting was held prior to operations. During the emergency response, START continually monitored site conditions and evaluated the appropriate personal protective equipment (PPE) based on the hazard-specific action level summarized in Section 5. As there were no exceedances for the duration of the response, all work was conducted in Level D PPE.

7 FIELD ACTIVITY

EPA and START mobilized to the Site on August 22, 2023, and began emergency response air monitoring activities by 1830 hours. Monitoring activities continued until demobilization on August 23, 2023.

EPA activities at the Site can be broadly categorized into the following functional areas:

- Site Setup and Overview
- Initial Assessment
- Community Air Monitoring
- Final Site Inspection and Demobilization

Additional information for each of these categories is included in the following sections.

7.1 SITE SETUP AND OVERVIEW

EPA and START arrived on scene at approximately 1820 hours on August 22, 2023. A safety briefing with USCG, EPA, Ecology, and contractor US Ecology was held shortly after, followed by a site walk. During the site walk, it was noted that both the watercraft deck and the dock had numerous holes, creating a safety issue for responders. This was mitigated by providing responders with headlamps to illuminate their surroundings after dark. In addition, holes on the dock were marked with orange cones to increase visibility. Neither EPA nor START ever boarded the watercraft. Air monitoring activities were conducted from the dock or nearby shore.

7.2 INITIAL ASSESSMENT

Upon arrival, START deployed two AreaRAE Pros for stationary air monitoring. One was placed at the dock close to the watercraft. The other was placed on a tripod across the Thea Foss Waterway near a multifamily residence. No initial detections of any hazard were observed on either AreaRAE Pro.

7.3 COMMUNITY AIR MONITORING

START implemented CAM activities within the Site vicinity, using a combination of fixed air monitoring and roving air monitoring methods. Air monitoring continued until the morning of August 23, 2023.

7.3.1 Roving Air Monitoring

Roving air monitoring was conducted overnight during the response, primarily on the southwestern and western side of the Thea Foss Waterway. Eight locations were selected based on areas of population density with public access (**Figure 3**). Using a handheld MultiRAE Pro, roving teams of two START personnel collected an average reading of ammonia and oxygen concentrations over the course of approximately one minute. Measurements were recorded using the ArcGIS Field Maps application to mark the location of measurement collection. No exceedances of either parameter were observed throughout the response.

Table 7-1 Roving Air Monitoring Results Summary

Monitoring Station ID	Location Descriptor	Number of Readings	NH ₃ Average (ppm)	O ₂ Average (%)
RS01	21 st Street Park	3	0	20.9
RS02	Thea's Landing Waterfront	3	0	20.9
RS03	Fish Peddler	3	0	20.9
RS04	Tacoma Sea Scout Base	3	0	20.9
RS05	Foss Maritime Museum	3	0	20.9
RS06	Rock the Dock Pub & Grill	3	0	20.9

Monitoring Station ID	Location Descriptor	Number of Readings	NH ₃ Average (ppm)	O ₂ Average (%)
RS07	Thea's Park	2	0	20.9
RS08	E 11 th Street and E D Street	1	0	20.9

Notes:

% percent
E east
ID identification
NH₃ Ammonia
O₂ Oxygen
ppm parts per million

7.3.2 Fixed Air Monitoring

START established two fixed air monitoring stations consisting of an AreaRAE Pro unit equipped with ammonia and oxygen sensors on a tripod at approximate height of the adult breathing zone. Air stations were denoted by the prefix “AS” followed by a two-digit, consecutive number. AS-01 was located on the pier, near the bow of the watercraft, and AS-02 was situated across the Thea Foss Waterway, in front of a multi-family residence (**Figure 3**). The air stations were monitored remotely using Honeywell Safety Suite Responder software, allowing START to identify any action level exceedances from a command post in real time. The software was programmed to alarm if any exceedances of the site-specific action levels. No concentrations above the site-specific action levels were observed during the course of the response (**Table 7-2**).

Overnight, the AreaRAE Pro at AS-01 began to experience oxygen sensor drift, a common phenomenon in high humidity environments. As it was raining during the response, this is the most probable cause. The sensor was recalibrated using “zero air”, a blend of nitrogen and oxygen gases, which resolved the sensor drift. The issue did not reoccur.

Table 7-2 Fixed Air Monitoring Station Averages

Time Span (hours)	AS-01 NH ₃ Average (ppm)	AS-02 NH ₃ Average (ppm)	Number of Exceedances ¹
2045 – 2245	0.19	0	0
2245 - 0045	0.27	0	0

Time Span (hours)	AS-01 NH ₃ Average (ppm)	AS-02 NH ₃ Average (ppm)	Number of Exceedances ¹
0045 - 0245	2	0	0
0245 - 0445	2	0	0
0445 - 0645	2	0	0
0645 - 0845	2	0	0

Notes:

¹ Based on site-specific screening and action level thresholds (see Table 5-1)

AS air station

NH₃ Ammonia

ppm parts per million

7.4 FINAL SITE CONDITIONS AND DEMOBILIZATION

On August 23, 2023, at 0920 hours, CTEH[®], a company contracted by the USCG arrived at the site to conduct CAM. Following a briefing of site conditions and earlier field activities, CTEH fully assumed CAM responsibilities while US Ecology continued to apply carbon dioxide gas to the ammonia leak. START and EPA departed the site at 0920 hours on August 23, 2023.

8 SUMMARY AND CONCLUSIONS

On August 22, 2023, EPA and START joined a multi-agency response to an ammonia leak on the F/V Pacific Producer, a fish processing watercraft docked in Tacoma, Washington. EPA and START provided support to Ecology and the USCG, who had been introducing carbon dioxide gas to treat an ammonia leak, by conducting air monitoring in the surrounding areas. START conducted roving and fixed air monitoring for ammonia and oxygen in air throughout the night of August 22, 2023, and into the morning of August 23, 2023. No exceedances of ammonia gas above site-specific action levels were observed, nor did oxygen concentrations identify an increase of carbon dioxide beyond normal ambient concentrations. CTEH, an environmental services contractor retained by the USCG, arrived on scene on the morning of August 23, 2023, and assumed CAM responsibilities for the remainder of the response. START and EPA demobilized from the site on August 23, 2023. No further EPA activities are anticipated at this time.

9 REFERENCES

Environmental Protection Agency (EPA). June 5, 2023. Ammonia Results – AEGL Program. Accessed September 2023.

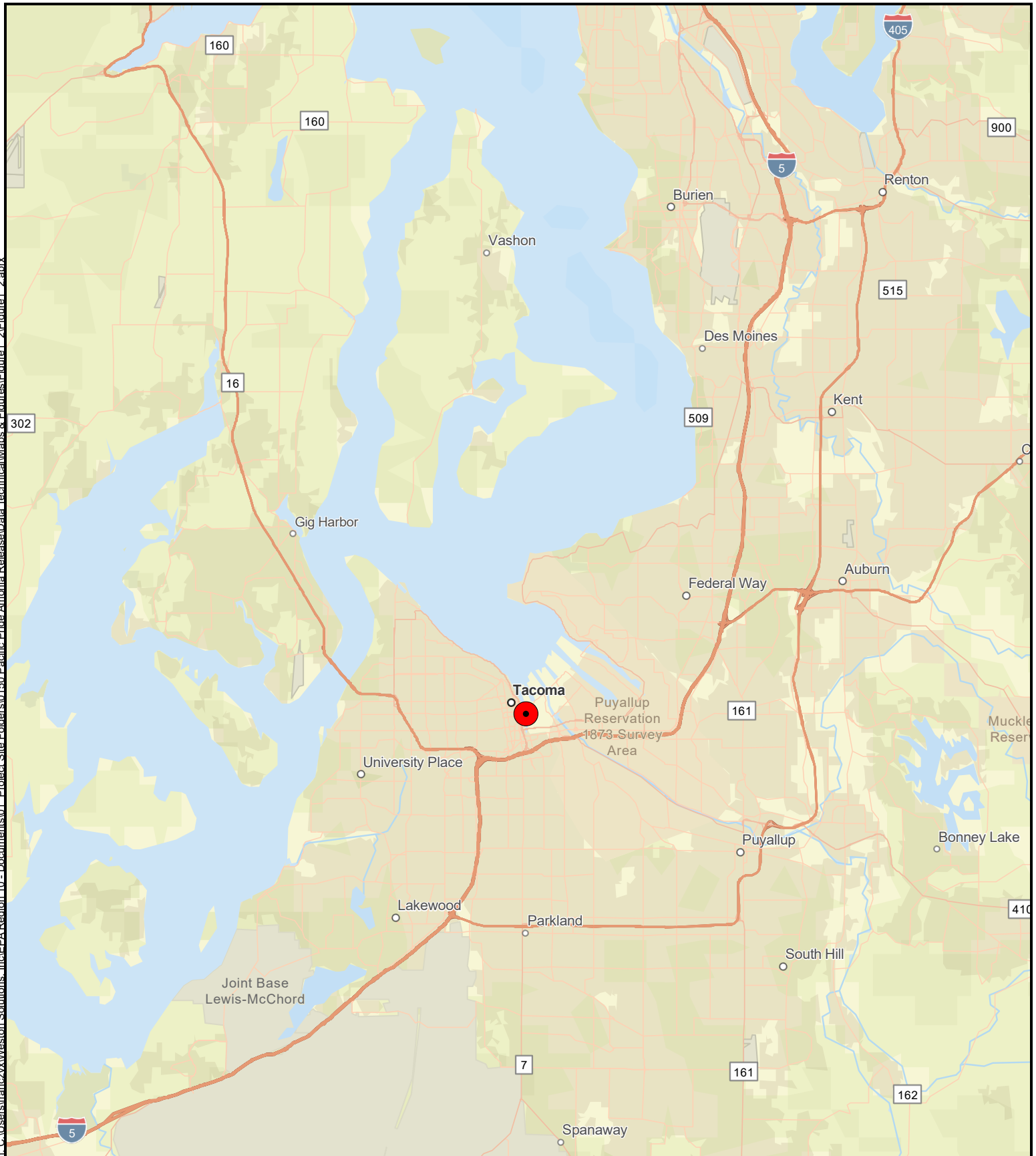
Environmental Protection Agency (EPA). May 30, 2023. About Acute Exposure Guideline Levels (AEGLS). Accessed September 2023,

National Institute for Occupational Safety and Health (NIOSH). October 30, 2019. NIOSH Pocket Guide to Chemical Hazards: Ammonia. Accessed September 2023.

Sailor, Craig. August 23, 2023. “Seafood ship with years of safety, health violations is leaking ammonia on Foss Waterway”. Published by the News Tribune, Tacoma, WA. Accessed September 14, 2023.



US Department of Labor. February 16, 2023. “Unsafe at sea: Inspection finds Kodiak seafood processing vessel’s operator continues to expose crews to a bounty of safety, health violations”. Accessed September 14, 2023.

SITE FIGURES



Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: ESRI World Street Map
Inset Background: ESRI Ocean Basemap
Task Order No.:
68HE0720F0147-31

Legend:

  Site Location

0 2.5 5 Miles

 **EPA Region 10**

 **Weston Solutions Inc.**
START V

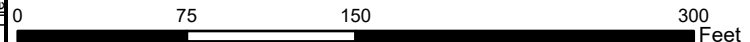
FIGURE 1
SITE LOCATION MAP
PACIFIC PRODUCER
AMMONIA RELEASE
TACOMA, PIERCE COUNTY, WA

October 2023

File: C:\Users\francz\Weston Solutions, Inc\EPA Region 10 - Documents\01 - Project Site Folders\0150 Pacific Pride Ammonia Release\Map & Figures\Figure 1 - 2.aprx



Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: NearMap 2023/08/13
Task Order No.:
68HE0720F0147-31



Legend:
 Site Parcel Boundary



EPA Region 10



Weston Solutions Inc.
START V

FIGURE 2
SITE VICINITY MAP
PACIFIC PRODUCER
AMMONIA RELEASE
TACOMA, PIERCE COUNTY, WA




October 2023

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Coordinate System:
WGS 1984 Web Mercator Auxiliary Sphere
Source:
Background: ESRI World Imagery
Task Order No.:
68HE0720F0147-31

Legend:

-  Fixed Air Monitoring Station
-  Roving Air Monitoring Station
-  Vessel Location



0 500 1,000 2,000
Feet



EPA Region 10



Weston Solutions Inc.
START V

FIGURE 3
AIR MONITORING MAP
PACIFIC PRODUCER
AMMONIA RELEASE

TACOMA, PIERCE COUNTY, WA

October 2023

ATTACHMENT A

Photographic Documentation

Project Name: Pacific Producer Ammonia Release	Site Location: Tacoma, Pierce County, Washington	Project No. 68HE0720F0147-31
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<table> <tr> <td>Photo No. 1</td><td>Date: 08/22/2023</td></tr> <tr> <td colspan="2">Photo Coordinates</td></tr> <tr> <td>Lat</td><td>47.250397</td></tr> <tr> <td>Long</td><td>-122.432128</td></tr> <tr> <td colspan="2">Direction Photo Taken: Southwest</td></tr> <tr> <td colspan="2"> Description: Exterior of the F/V Pacific Producer, a fish processing watercraft with leaking ammonia tanks. </td></tr> </table>	Photo No. 1	Date: 08/22/2023	Photo Coordinates		Lat	47.250397	Long	-122.432128	Direction Photo Taken: Southwest		Description: Exterior of the F/V Pacific Producer, a fish processing watercraft with leaking ammonia tanks.		
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Photo Coordinates													
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Long	-122.432128												
Direction Photo Taken: Southwest													
Description: Exterior of the F/V Pacific Producer, a fish processing watercraft with leaking ammonia tanks.													
<table> <tr> <td>Photo No. 2</td><td>Date: 08/22/2023</td></tr> <tr> <td colspan="2">Photo Coordinates</td></tr> <tr> <td>Lat</td><td>47.250408</td></tr> <tr> <td>Long</td><td>-122.432031</td></tr> <tr> <td colspan="2">Direction Photo Taken: West</td></tr> <tr> <td colspan="2"> Description: View of the F/V Pacific Producer fishing watercraft. </td></tr> </table>	Photo No. 2	Date: 08/22/2023	Photo Coordinates		Lat	47.250408	Long	-122.432031	Direction Photo Taken: West		Description: View of the F/V Pacific Producer fishing watercraft.		
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Photo Coordinates													
Lat	47.250408												
Long	-122.432031												
Direction Photo Taken: West													
Description: View of the F/V Pacific Producer fishing watercraft.													

Project Name: Pacific Producer Ammonia Release	Site Location: Tacoma, Pierce County, Washington	Project No. 68HE0720F0147-31
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Photo No. 3	Date: 08/22/2023
Photo Coordinates	
Lat	47.25007
Long	-122.43405
Direction Photo Taken: Northeast	
Description: Stationary air monitoring station AS-02, with the F/V Pacific Producer visible in background.	



Photo No. 4	Date: 08/22/2023
Photo Coordinates	
Lat	47.25007
Long	-122.43405
Direction Photo Taken: Southwest	
Description: Alternate view of AS-02, with multifamily apartment unit in background.	



Project Name: Pacific Producer Ammonia Release	Site Location: Tacoma, Pierce County, Washington	Project No. 68HE0720F0147-31
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Photo No. 5	Date: 08/22/2023
Photo Coordinates	
Lat	47.249714
Long	-122.431778
Direction Photo Taken: Northwest	
Description: Overnight community air monitoring view from AS-01, situated on the dock near the F/V Pacific Producer.	

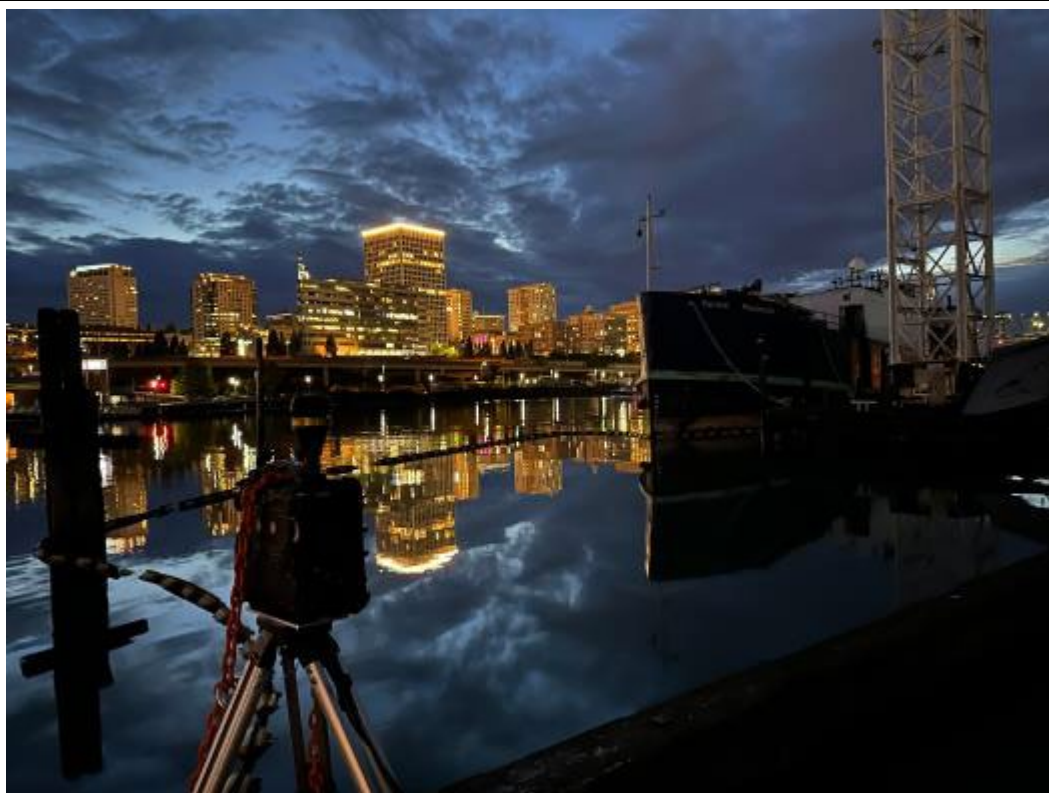


Photo No. 6	Date: 08/22/2023
Photo Coordinates	
Lat	47.250381
Long	-122.431283
Direction Photo Taken: West	
Description: Carbon dioxide compressed gas tanks. Gas was pumped into the watercraft to react with leaking ammonia and form a nonhazardous byproduct.	



Project Name: Pacific Producer Ammonia Release	Site Location: Tacoma, Pierce County, Washington	Project No. 68HE0720F0147-31
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Photo No. 7	Date: 08/23/2023
Photo Coordinates	
Lat	47.249703
Long	-122.431733
Direction Photo Taken: Northwest	
Description: View from AS-01, with F/V Pacific Producer watercraft visible in background.	



Photo No. 8	Date: 08/23/2023
Photo Coordinates	
Lat	47.253403
Long	-122.435317
Direction Photo Taken: South	
Description: Carbon dioxide compressed gas tanks.	



Project Name: Pacific Producer Ammonia Release	Site Location: Tacoma, Pierce County, Washington	Project No. 68HE0720F0147-31
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Photo No. 9		Date: 08/23/2023	
Photo Coordinates			
Lat	47.25035		
Long	-122.431306		
Direction Photo Taken: South			
Description: Stern of the F/V Pacific Producer watercraft with ammonia tanks.			

Photo No. 10		Date: 08/23/2023	
Photo Coordinates			
Lat	47.249981		
Long	-122.433961		
Direction Photo Taken: Northeast			
Description: F/V Pacific Producer watercraft, moored at the Martinac Shipbuilding dock on the Thea Foss waterway.			