From: DTRA Ft Belvoir RD Mailbox Reachback
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center; fema-nwc@fema.dhs.gov; imaac@fema.dhs.gov
Cc: DTRA Ft Belvoir RD Mailbox Reachback
Subject: (REAL WORLD) IMAAC Updated Product Attached
Date: Tuesday, February 7, 2023 6:01:39 AM
Attachments: RFI_23-0081iU_IMAAC.pdf

CUI (with attachment)

Please see the attached document(s) regarding the IMAAC activation request for a train derailment and fire in East Palestine, OH. The product is also available on the IMAAC Portal page (https://www.cbrnresponder.net/app/index#imaac/modelrequest).

Please contact us directly with any technical questions you may have.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Date: 07FEB2023 1100Z

Version: Revision I

Changes: Adjusted buoyancy, Updated Wx

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081iU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 07FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 07FEB2023 Local (2030Z) 2. 1200 07FEB2023 Local (2030Z)
Executive Summary	• The largest AEGL-2 (serious injury possible) hazard area (HCl) extends about 150 feet away from the fire. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown**

Modeling Overview

- A breach of five mostly-full (70%) vinyl chloride containers is considered. This results in some level of combustion/explosion. Based on reports from the shipper, the estimated total load is approximately 3.5 cars' worth.
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

Caveats

- The partitioning of the various chemicals is not fully known. We have made the best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accounted for accurately.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling cannot account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

6:00 AM Breach (1100Z)
07 FEB 2023

Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Vinyl Chloride – 0600 Local

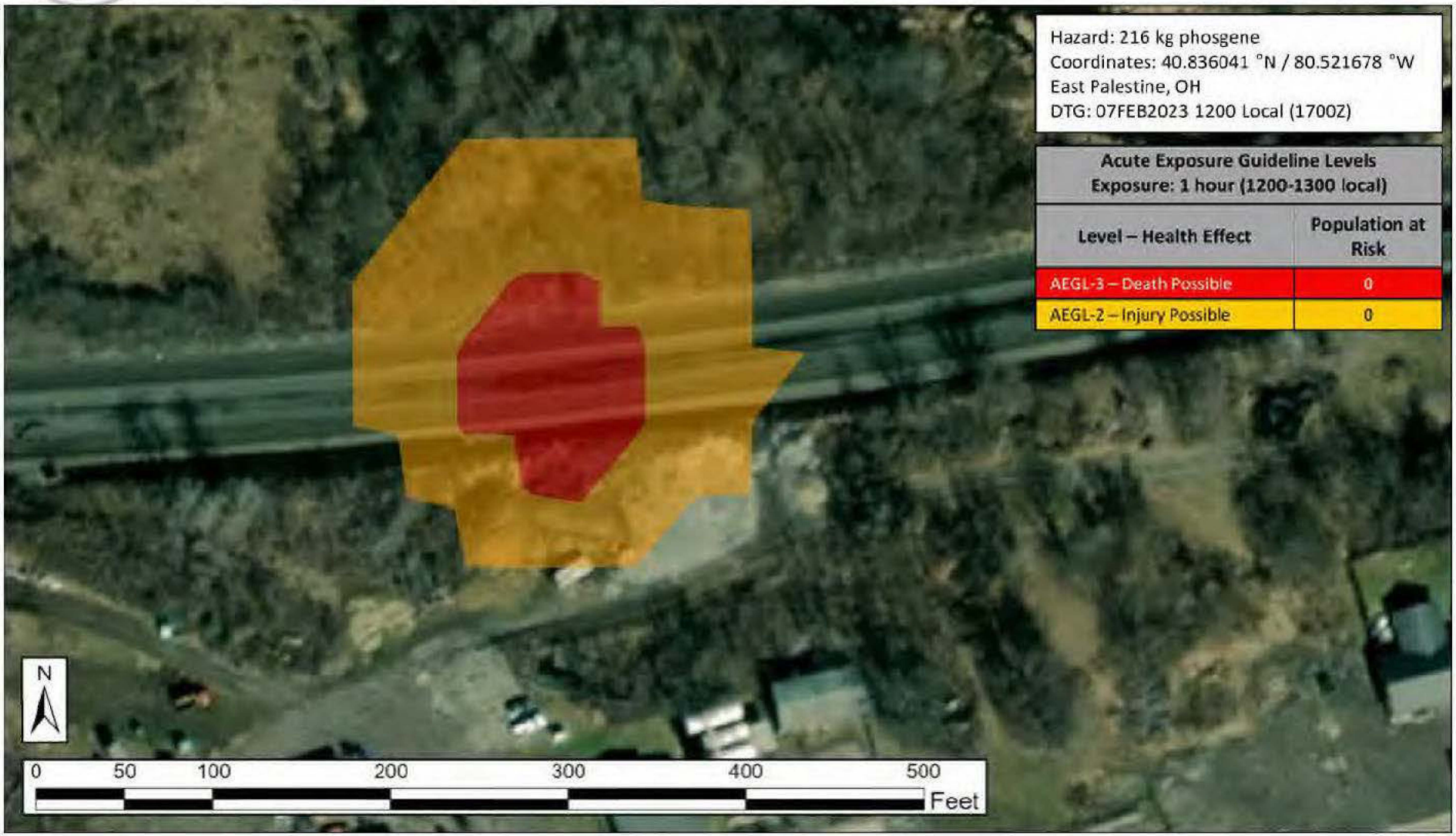


12:00 PM Breach (1700Z)
07 FEB 2023

Hydrogen Chloride – 1200 Local



Phosgene – 1200 Local



Vinyl Chloride – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

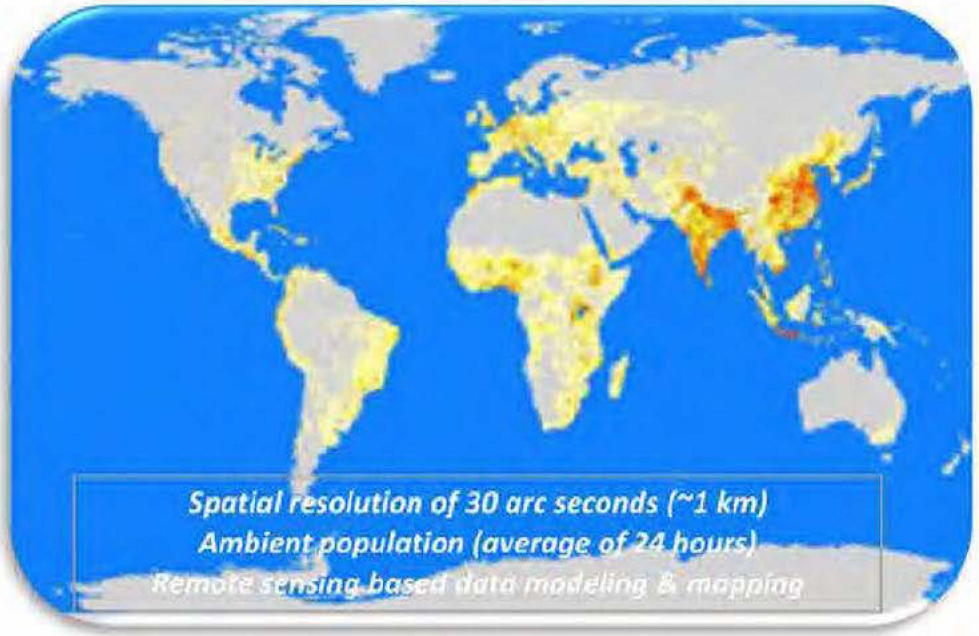
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From:	CWMDWatchDesk
To:	CWMDWatch-Summary
Cc:	CWMDWatchDesk
Subject:	(U//FOUO) CWMD Open-Source Report (9 March 2024)
Date:	Saturday, March 9, 2024 7:14:58 AM
Attachments:	image001.png (U--FOUO) CWMD Open-Source Report (09 March 2024).pdf

---

UNCLASSIFIED // ~~FOR OFFICIAL USE ONLY~~

Good Morning,
Please see attached the CWMD Open-Source Report for 9 Mar 2024.

RADIOLOGICAL/NUCLEAR:

- (08 March 2024 Reuters) [Ukraine] **Safety at Zaporizhzhia nuclear plant worsening, Ukraine says:** Safety at the Russian-held Zaporizhzhia nuclear power plant (ZNPP) in Ukraine is worsening daily, Ukraine's energy minister said on Friday, pledging to keep pressuring Russia at the U.N. nuclear watchdog to withdraw from the site. The International Atomic Energy Agency's 35-nation Board of Governors passed a resolution late on Thursday condemning Russia's occupation of Europe's biggest nuclear power plant and expressing "grave concern" at lack of staffing and maintenance two years after its capture. The IAEA, which has a small presence at the plant, says the situation at Zaporizhzhia remains precarious. The plant has lost all external power eight times in the last 18 months, forcing it to rely on diesel generators to cool the fuel in its reactors and avoid a potentially catastrophic meltdown. https://www.msn.com/en-us/news/world/safety-at-zaporizhzhia-nuclear-plant-worsening-ukraine-says/ar-BB1jz8He

- (08 March 2024 Newsweek) [Russia] **Putin Ally Suggests Nuclear Strikes on 3 NATO Members:** An ally of Russian President Vladimir Putin has suggested launching nuclear strikes on three members of the NATO military alliance—France, Germany and the United States. State TV host Vladimir Solovyov, one of the most-prominent figures in Kremlin-backed media, floated the idea on his show Evening with Vladimir Solovyov. The Daily Beast's Julia Davis shared an excerpt of the broadcast on Friday on X, formerly Twitter. Newsweek has contacted Russia's Foreign Ministry for comment by email. The idea that a nuclear war could break out amid the conflict in Ukraine has been floated by numerous Russian officials, including Dmitry Medvedev, Russia's former president and prime minister. https://www.msn.com/en-us/news/world/putin-ally-suggests-nuclear-strikes-on-3-nato-members/ar-BB1jxWAy

CHEMICAL:

- (08 March 2024 Reading Eagle) [Pennsylvania] **Fire contained at southeastern Berks chemical plant Arkema Inc:** Emergency crews rushed to the scene of a fire at a chemical factory in Exeter Township Thursday evening. Crews were

RADIOLOGICAL/NUCLEAR:

- (08 March 2024 Reuters) [Ukraine] **Safety at Zaporizhzhia nuclear plant worsening, Ukraine says:** Safety at the Russian-held Zaporizhzhia nuclear power plant (ZNPP) in Ukraine is worsening daily, Ukraine's energy minister said on Friday, pledging to keep pressuring Russia at the U.N. nuclear watchdog to withdraw from the site. The International Atomic Energy Agency's 35-nation Board of Governors passed a resolution late on Thursday condemning Russia's occupation of Europe's biggest nuclear power plant and expressing "grave concern" at lack of staffing and maintenance two years after its capture. The IAEA, which has a small presence at the plant, says the situation at Zaporizhzhia remains precarious. The plant has lost all external power eight times in the last 18 months, forcing it to rely on diesel generators to cool the fuel in its reactors and avoid a potentially catastrophic meltdown. https://www.msn.com/en-us/news/world/safety-at-zaporizhzhia-nuclear-plant-worsening-ukraine-says/ar-BB1jz8He

- (08 March 2024 Newsweek) [Russia] **Putin Ally Suggests Nuclear Strikes on 3 NATO Members:** An ally of Russian President Vladimir Putin has suggested launching nuclear strikes on three members of the NATO military alliance—France, Germany and the United States. State TV host Vladimir Solovyov, one of the most-prominent figures in Kremlin-backed media, floated the idea on his show Evening with Vladimir Solovyov. The Daily Beast's Julia Davis shared an excerpt of the broadcast on Friday on X, formerly Twitter. Newsweek has contacted Russia's Foreign Ministry for comment by email. The idea that a nuclear war could break out amid the conflict in Ukraine has been floated by numerous Russian officials, including Dmitry Medvedev, Russia's former president and prime minister. https://www.msn.com/en-us/news/world/putin-ally-suggests-nuclear-strikes-on-3-nato-members/ar-BB1jxWAy

CHEMICAL:

- (08 March 2024 Reading Eagle) [Pennsylvania] **Fire contained at southeastern Berks chemical plant Arkema Inc:** Emergency crews rushed to the scene of a fire at a chemical factory in Exeter Township Thursday evening. Crews were dispatched shortly after 7 p.m. for reports of a machine on fire at the Arkema Inc. facility, 1112 Lincoln Road. Firefighters ran multiple lines to extinguish the flames. Arkema is an international chemical and material producer with over 40 facilities in the U.S., according to the company's website. The company has several other sites in southeastern Pennsylvania. https://www.msn.com/en-us/news/other/fire-contained-at-southeastern-berks-chemical-plant-arkema-inc/ar-BB1jx0xV

- (07 March 2024 The Associated Press) [Ohio] **After Ohio train derailment, tank cars didn't need to be blown open to release chemical, NTSB says:** The decision to blow open five tank cars and burn the toxic chemical inside them after a freight train derailed in Eastern Ohio last year wasn't justified, the head of the National Transportation Safety Board told Congress Wednesday. But she said the key decision-makers who feared those tank cars were going to explode three days after the crash never had the information they needed. The vinyl chloride released that day, combined with all the other chemicals that spilled and caught fire after the derailment in East Palestine, Ohio, have left residents with lingering fears about possible long-term health consequences. Experts from the company that made the vinyl chloride inside those

tank cars, Oxy Vinyls, were telling contractors hired by Norfolk Southern railroad that they believed that no dangerous chemical reaction was happening, NTSB Chair Jennifer Homendy said. But Oxy Vinyls was left out of the command center. https://www.msn.com/en-us/news/us/after-ohio-train-derailment-tank-cars-didnt-need-to-be-blown-open-to-release-chemical-ntsb-says/ar-BB1js8vv

BIOLOGICAL:

- (08 March 2024 UPI) [Global] **Cheese company Sargento distances itself from listeria outbreak:** Wisconsin-based cheese company Sargento Foods said its products were safe and not included in a February recall that implicated one of their former partners, Rizo-Lopez Foods, Inc. In a statement Thursday, Sargento said it investigated its products in early February and determined that the recall impacted a limited amount of its food service and ingredients products, but did not impact Sargento-branded products. https://www.upi.com/Top_News/US/2024/03/08/sargento-cheese-not-included-recall/21617099051 38/

- (08 March 2024 Food Poisoning Bulletin) [New Jersey] **Mussels from Allen's Fisheries associated with outbreak in NJ:** FDA has issued a warning about certain mussels from Allen's Fisheries in Benoit's Cove, Newfoundland, Canada, that are associated with an outbreak in New Jersey. The pathogen or biotoxin that allegedly caused this outbreak has not been named, and the number of patients, their ages, illness onset dates, and whether or not anyone has been hospitalized was not mentioned in the alert. https://foodpoisoningbulletin.com/2024/mussels-from-allens-fisheries-associated-with-outbreak-in-nj/

MEDICAL:

- (08 March 2024 Live Science) [U.S.] **Parrot fever' outbreak in 5 European countries kills 5 people:** An outbreak of a respiratory infection that most often affects birds has killed five people in Europe, the World Health Organization (WHO) warns. During 2023 and the start of 2024, Austria, Denmark, Germany, Sweden and the Netherlands have reported an "unusual and unexpected increase" in cases of so-called parrot fever, beyond what's been seen in previous years, the WHO said in a statement Tuesday (March 5). In all, the illness has affected almost 90 people, with five deaths reported among them. https://www.livescience.com/health/viruses-infections-disease/parrot-fever-outbreak-in-5-european-countries-kills-5-people

- (07 March 2024 The Associated Press) [Wisconsin] **Medical examiner says two Wisconsin inmates died of fentanyl overdose, stroke:** Two of the four inmates found dead at Waupun Correctional Institution since June died of a drug overdose and a stroke, a medical examiner said Wednesday. Tyshun Lemons, 30, was found dead at the prison on Oct. 2. Cameron Williams, 24, was found dead there on Oct. 30. Dodge County Medical Examiner PJ Schoebel said in a telephone interview that Lemons overdosed on acetyl fentanyl, a potent opioid painkiller. He declined to comment on how Lemons obtained the fentanyl. https://www.msn.com/en-us/news/crime/medical-examiner-says-two-wisconsin-inmates-died-of-fentanyl-overdose-stroke/ar-BB1jrFMe

TERRORISM:

- (08 March 2024 ABC) [Yemen] **Suspected attack by Yemen's Houthi rebels sets off explosions ahead of a ship in the Gulf of Aden:** A suspected attack by Yemen's Houthi rebels on Friday set off explosions ahead of a vessel in the Gulf of Aden, authorities said. Friday's explosions came after a Houthi missile struck a commercial ship in the Gulf of Aden on Wednesday, killing three of its crew members and forcing survivors to abandon the vessel. It was the first fatal strike in a campaign of assaults by the Iranian-backed group over Israel's war on Hamas in the Gaza Strip. The Houthis describe the attacks as trying to pressure Israel into stopping the war, but their targets increasingly have little or nothing to do with the conflict. https://abcnews.go.com/International/wireStory/suspected-attack-yemens-houthi-rebels-sets-off-explosions-107924023

- (08 March 2024 The Associated Press) [Germany] **Germany's top prosecutor takes over Tesla fire investigation, suspecting terrorism:** Germany's top prosecutor has taken over the investigation into an alleged arson attack on the power supply of the electric car company Tesla near Berlin. A spokeswoman said there is an initial suspicion that a terrorist organization may have been involved in the attack. In such cases, the federal prosecutor's office, the top law enforcement agency in Germany, is responsible for the investigation. On Tuesday, production at Tesla's electric vehicle plant in Gruenheide came to a standstill and workers were evacuated after a power outage that officials suspected was caused by arson. https://www.msn.com/en-us/news/other/germanys-top-prosecutor-takes-over-tesla-fire-investigation-suspecting-terrorism/ar-BB1jyyvk

OTHER TOPICS (Leadership Directed):

- (08 March 2024 Breaking Defense) [U.K.] **UK pledges additional 10,000 FPV and one way attack drones for Ukraine:** The UK will supply Ukraine with an additional 10,000 drones under a new $159 million military aid package announced by British Defense Secretary Grant Shapps during a visit to Kyiv. Most of the unmanned aerial vehicles (UAV) set for delivery are First Person View (FPV) platforms, though a number of one way attack, surveillance and maritime drones will also be provided. The latest pledge is in addition to the $255 million drone package announced by London in January and February's move to co-lead an international drone coalition for Ukraine with Latvia. The European coalition is targeting production and delivery of 1 million drones to the war-torn country. "Britain steps up support to Ukraine today with a complete package of $414 million for cutting-edge drones to help fight Putin's illegal invasion," the UK Ministry of Defense (MoD) said in a Thursday statement. https://breakingdefense.com/2024/03/uk-pledges-additional-10000-fpv-and-one-way-attack-drones-for-ukraine/

V/r,

CWMD Watch Desk Officer
Current Operations and Integration
Operations Support Directorate
Countering Weapons of Mass Destruction
U.S. Department of Homeland Security
CWMD Desk: (202) 282-9262 (primary)

Desk 2: (202) 282-9126 / 8109
CWMDWatchDesk@hq.dhs.gov

This document is ~~FOR OFFICIAL USE ONLY (FOUO)~~. It contains information that may be exempt from public release under the Freedom of Information Act (5 U.S.C. 552). It is to be controlled, stored, handled, transmitted, distributed, and disposed of in accordance with DHS policy relating to ~~FOUO~~ information and is not to be released to the public or other personnel who do not have a valid "need-to-know" without prior approval of an authorized DHS official.

dispatched shortly after 7 p.m. for reports of a machine on fire at the Arkema Inc. facility, 1112 Lincoln Road. Firefighters ran multiple lines to extinguish the flames. Arkema is an international chemical and material producer with over 40 facilities in the U.S., according to the company's website. The company has several other sites in southeastern Pennsylvania. https://www.msn.com/en-us/news/other/fire-contained-at-southeastern-berks-chemical-plant-arkema-inc/ar-BB1jx0xV

- (07 March 2024 The Associated Press) [Ohio] **After Ohio train derailment, tank cars didn't need to be blown open to release chemical, NTSB says:** The decision to blow open five tank cars and burn the toxic chemical inside them after a freight train derailed in Eastern Ohio last year wasn't justified, the head of the National Transportation Safety Board told Congress Wednesday. But she said the key decision-makers who feared those tank cars were going to explode three days after the crash never had the information they needed. The vinyl chloride released that day, combined with all the other chemicals that spilled and caught fire after the derailment in East Palestine, Ohio, have left residents with lingering fears about possible long-term health consequences. Experts from the company that made the vinyl chloride inside those tank cars, Oxy Vinyls, were telling contractors hired by Norfolk Southern railroad that they believed that no dangerous chemical reaction was happening, NTSB Chair Jennifer Homendy said. But Oxy Vinyls was left out of the command center. https://www.msn.com/en-us/news/us/after-ohio-train-derailment-tank-cars-didnt-need-to-be-blown-open-to-release-chemical-ntsb-says/ar-BB1js8vv

BIOLOGICAL:

- (08 March 2024 UPI) [Global] **Cheese company Sargento distances itself from listeria outbreak:** Wisconsin-based cheese company Sargento Foods said its products were safe and not included in a February recall that implicated one of their former partners, Rizo-Lopez Foods, Inc. In a statement Thursday, Sargento said it investigated its products in early February and determined that the recall impacted a limited amount of its food service and ingredients products, but did not impact Sargento-branded products. https://www.upi.com/Top_News/US/2024/03/08/sargento-cheese-not-included-recall/2161709905138/

- (08 March 2024 Food Poisoning Bulletin) [New Jersey] **Mussels from Allen's Fisheries associated with outbreak in NJ:** FDA has issued a warning about certain mussels from Allen's Fisheries in Benoit's Cove, Newfoundland, Canada, that are associated with an outbreak in New Jersey. The pathogen or biotoxin that allegedly caused this outbreak has not been named, and the number of patients, their ages, illness onset dates, and whether or not anyone has been hospitalized was

not mentioned in the alert. https://foodpoisoningbulletin.com/2024/mussels-from-allens-fisheries-associated-with-outbreak-in-nj/

MEDICAL:

- (08 March 2024 Live Science) [U.S.] **Parrot fever' outbreak in 5 European countries kills 5 people:** An outbreak of a respiratory infection that most often affects birds has killed five people in Europe, the World Health Organization (WHO) warns. During 2023 and the start of 2024, Austria, Denmark, Germany, Sweden and the Netherlands have reported an "unusual and unexpected increase" in cases of so-called parrot fever, beyond what's been seen in previous years, the WHO said in a statement Tuesday (March 5). In all, the illness has affected almost 90 people, with five deaths reported among them. https://www.livescience.com/health/viruses-infections-disease/parrot-fever-outbreak-in-5-european-countries-kills-5-people

- (07 March 2024 The Associated Press) [Wisconsin] **Medical examiner says two Wisconsin inmates died of fentanyl overdose, stroke:** Two of the four inmates found dead at Waupun Correctional Institution since June died of a drug overdose and a stroke, a medical examiner said Wednesday. Tyshun Lemons, 30, was found dead at the prison on Oct. 2. Cameron Williams, 24, was found dead there on Oct. 30. Dodge County Medical Examiner PJ Schoebel said in a telephone interview that Lemons overdosed on acetyl fentanyl, a potent opioid painkiller. He declined to comment on how Lemons obtained the fentanyl. https://www.msn.com/en-us/news/crime/medical-examiner-says-two-wisconsin-inmates-died-of-fentanyl-overdose-stroke/ar-BB1jrFMe

TERRORISM:

- (08 March 2024 ABC) [Yemen] **Suspected attack by Yemen's Houthi rebels sets off explosions ahead of a ship in the Gulf of Aden:** A suspected attack by Yemen's Houthi rebels on Friday set off explosions ahead of a vessel in the Gulf of Aden, authorities said. Friday's explosions came after a Houthi missile struck a commercial ship in the Gulf of Aden on Wednesday, killing three of its crew members and forcing survivors to abandon the vessel. It was the first fatal strike in a campaign of assaults by the Iranian-backed group over Israel's war on Hamas in the Gaza Strip. The Houthis describe the attacks as trying to pressure Israel into stopping the war, but their targets increasingly have little or nothing to do with the conflict. https://abcnews.go.com/International/wireStory/suspected-attack-yemens-houthi-rebels-sets-off-explosions-107924023

- (08 March 2024 The Associated Press) [Germany] **Germany's top prosecutor takes over Tesla fire investigation, suspecting terrorism:** Germany's top

prosecutor has taken over the investigation into an alleged arson attack on the power supply of the electric car company Tesla near Berlin. A spokeswoman said there is an initial suspicion that a terrorist organization may have been involved in the attack. In such cases, the federal prosecutor's office, the top law enforcement agency in Germany, is responsible for the investigation. On Tuesday, production at Tesla's electric vehicle plant in Gruenheide came to a standstill and workers were evacuated after a power outage that officials suspected was caused by arson. https://www.msn.com/en-us/news/other/germanys-top-prosecutor-takes-over-tesla-fire-investigation-suspecting-terrorism/ar-BB1jyyvk

OTHER TOPICS (Leadership Directed):

- (08 March 2024 Breaking Defense) [U.K.] **UK pledges additional 10,000 FPV and one way attack drones for Ukraine:** The UK will supply Ukraine with an additional 10,000 drones under a new $159 million military aid package announced by British Defense Secretary Grant Shapps during a visit to Kyiv. Most of the unmanned aerial vehicles (UAV) set for delivery are First Person View (FPV) platforms, though a number of one way attack, surveillance and maritime drones will also be provided. The latest pledge is in addition to the $255 million drone package announced by London in January and February's move to co-lead an international drone coalition for Ukraine with Latvia. The European coalition is targeting production and delivery of 1 million drones to the war-torn country. "Britain steps up support to Ukraine today with a complete package of $414 million for cutting-edge drones to help fight Putin's illegal invasion," the UK Ministry of Defense (MoD) said in a Thursday statement. https://breakingdefense.com/2024/03/uk-pledges-additional-10000-fpv-and-one-way-attack-drones-for-ukraine/

V/r,

CWMD Watch Desk Officer
Current Operations
Operations Support Directorate
Countering Weapons of Mass Destruction
U.S. Department of Homeland Security
CWMD Desk: (202) 282-9262 (primary)
Desk 2: (202) 282-9126 / 8109

This document is FOR OFFICIAL USE ONLY (FOUO). It contains information that may be exempt from public release under the Freedom of Information Act (5 U.S.C. 552). It is to be controlled, stored, handled, transmitted, distributed, and disposed of in accordance with DHS policy relating to FOUO information and is not to be released to the public or other personnel who do not have a valid "need-to-know" without prior approval of an authorized DHS official.

RADIOLOGICAL/NUCLEAR:

- (08 March 2024 Reuters) [Ukraine] **Safety at Zaporizhzhia nuclear plant worsening, Ukraine says:** Safety at the Russian-held Zaporizhzhia nuclear power plant (ZNPP) in Ukraine is worsening daily, Ukraine's energy minister said on Friday, pledging to keep pressuring Russia at the U.N. nuclear watchdog to withdraw from the site. The International Atomic Energy Agency's 35-nation Board of Governors passed a resolution late on Thursday condemning Russia's occupation of Europe's biggest nuclear power plant and expressing "grave concern" at lack of staffing and maintenance two years after its capture. The IAEA, which has a small presence at the plant, says the situation at Zaporizhzhia remains precarious. The plant has lost all external power eight times in the last 18 months, forcing it to rely on diesel generators to cool the fuel in its reactors and avoid a potentially catastrophic meltdown. https://www.msn.com/en-us/news/world/safety-at-zaporizhzhia-nuclear-plant-worsening-ukraine-says/ar-BB1jz8He

- (08 March 2024 Newsweek) [Russia] **Putin Ally Suggests Nuclear Strikes on 3 NATO Members:** An ally of Russian President Vladimir Putin has suggested launching nuclear strikes on three members of the NATO military alliance—France, Germany and the United States. State TV host Vladimir Solovyov, one of the most-prominent figures in Kremlin-backed media, floated the idea on his show Evening with Vladimir Solovyov. The Daily Beast's Julia Davis shared an excerpt of the broadcast on Friday on X, formerly Twitter. Newsweek has contacted Russia's Foreign Ministry for comment by email. The idea that a nuclear war could break out amid the conflict in Ukraine has been floated by numerous Russian officials, including Dmitry Medvedev, Russia's former president and prime minister. https://www.msn.com/en-us/news/world/putin-ally-suggests-nuclear-strikes-on-3-nato-members/ar-BB1jxWAy

CHEMICAL:

- (08 March 2024 Reading Eagle) [Pennsylvania] **Fire contained at southeastern Berks chemical plant Arkema Inc:** Emergency crews rushed to the scene of a fire at a chemical factory in Exeter Township Thursday evening. Crews were dispatched shortly after 7 p.m. for reports of a machine on fire at the Arkema Inc. facility, 1112 Lincoln Road. Firefighters ran multiple lines to extinguish the flames. Arkema is an international chemical and material producer with over 40 facilities in the U.S., according to the company's website. The company has several other sites in southeastern Pennsylvania. https://www.msn.com/en-us/news/other/fire-contained-at-southeastern-berks-chemical-plant-arkema-inc/ar-BB1jx0xV

- (07 March 2024 The Associated Press) [Ohio] **After Ohio train derailment, tank cars didn't need to be blown open to release chemical, NTSB says:** The decision to blow open five tank cars and burn the toxic chemical inside them after a freight train derailed in Eastern Ohio last year wasn't justified, the head of the National Transportation Safety Board told Congress Wednesday. But she said the key decision-makers who feared those tank cars were going to explode three days after the crash never had the information they needed. The vinyl chloride released that day, combined with all the other chemicals that spilled and caught fire after the derailment in East Palestine, Ohio, have left residents with lingering fears about possible long-term health consequences. Experts from the company that made the vinyl chloride inside those

tank cars, Oxy Vinyls, were telling contractors hired by Norfolk Southern railroad that they believed that no dangerous chemical reaction was happening, NTSB Chair Jennifer Homendy said. But Oxy Vinyls was left out of the command center. https://www.msn.com/en-us/news/us/after-ohio-train-derailment-tank-cars-didnt-need-to-be-blown-open-to-release-chemical-ntsb-says/ar-BB1js8vv

BIOLOGICAL:

- (08 March 2024 UPI) [Global] **Cheese company Sargento distances itself from listeria outbreak:** Wisconsin-based cheese company Sargento Foods said its products were safe and not included in a February recall that implicated one of their former partners, Rizo-Lopez Foods, Inc. In a statement Thursday, Sargento said it investigated its products in early February and determined that the recall impacted a limited amount of its food service and ingredients products, but did not impact Sargento-branded products. https://www.upi.com/Top_News/US/2024/03/08/sargento-cheese-not-included-recall/2161709905138/

- (08 March 2024 Food Poisoning Bulletin) [New Jersey] **Mussels from Allen's Fisheries associated with outbreak in NJ:** FDA has issued a warning about certain mussels from Allen's Fisheries in Benoit's Cove, Newfoundland, Canada, that are associated with an outbreak in New Jersey. The pathogen or biotoxin that allegedly caused this outbreak has not been named, and the number of patients, their ages, illness onset dates, and whether or not anyone has been hospitalized was not mentioned in the alert. https://foodpoisoningbulletin.com/2024/mussels-from-allens-fisheries-associated-with-outbreak-in-nj/

MEDICAL:

- (08 March 2024 Live Science) [U.S.] **Parrot fever' outbreak in 5 European countries kills 5 people:** An outbreak of a respiratory infection that most often affects birds has killed five people in Europe, the World Health Organization (WHO) warns. During 2023 and the start of 2024, Austria, Denmark, Germany, Sweden and the Netherlands have reported an "unusual and unexpected increase" in cases of so-called parrot fever, beyond what's been seen in previous years, the WHO said in a statement Tuesday (March 5). In all, the illness has affected almost 90 people, with five deaths reported among them. https://www.livescience.com/health/viruses-infections-disease/parrot-fever-outbreak-in-5-european-countries-kills-5-people

- (07 March 2024 The Associated Press) [Wisconsin] **Medical examiner says two Wisconsin inmates died of fentanyl overdose, stroke:** Two of the four inmates found dead at Waupun Correctional Institution since June died of a drug overdose and a stroke, a medical examiner said Wednesday. Tyshun Lemons, 30, was found dead at the prison on Oct. 2. Cameron Williams, 24, was found dead there on Oct. 30. Dodge County Medical Examiner PJ Schoebel said in a telephone interview that Lemons overdosed on acetyl fentanyl, a potent opioid painkiller. He declined to comment on how Lemons obtained the fentanyl. https://www.msn.com/en-us/news/crime/medical-examiner-says-two-wisconsin-inmates-died-of-fentanyl-overdose-stroke/ar-BB1jrFMe

TERRORISM:

- (08 March 2024 ABC) [Yemen] **Suspected attack by Yemen's Houthi rebels sets off explosions ahead of a ship in the Gulf of Aden:** A suspected attack by Yemen's Houthi rebels on Friday set off explosions ahead of a vessel in the Gulf of Aden, authorities said. Friday's explosions came after a Houthi missile struck a commercial ship in the Gulf of Aden on Wednesday, killing three of its crew members and forcing survivors to abandon the vessel. It was the first fatal strike in a campaign of assaults by the Iranian-backed group over Israel's war on Hamas in the Gaza Strip. The Houthis describe the attacks as trying to pressure Israel into stopping the war, but their targets increasingly have little or nothing to do with the conflict. https://abcnews.go.com/International/wireStory/suspected-attack-yemens-houthi-rebels-sets-off-explosions-107924023

- (08 March 2024 The Associated Press) [Germany] **Germany's top prosecutor takes over Tesla fire investigation, suspecting terrorism:** Germany's top prosecutor has taken over the investigation into an alleged arson attack on the power supply of the electric car company Tesla near Berlin. A spokeswoman said there is an initial suspicion that a terrorist organization may have been involved in the attack. In such cases, the federal prosecutor's office, the top law enforcement agency in Germany, is responsible for the investigation. On Tuesday, production at Tesla's electric vehicle plant in Gruenheide came to a standstill and workers were evacuated after a power outage that officials suspected was caused by arson. https://www.msn.com/en-us/news/other/germanys-top-prosecutor-takes-over-tesla-fire-investigation-suspecting-terrorism/ar-BB1jyyvk

OTHER TOPICS (Leadership Directed):

- (08 March 2024 Breaking Defense) [U.K.] **UK pledges additional 10,000 FPV and one way attack drones for Ukraine:** The UK will supply Ukraine with an additional 10,000 drones under a new $159 million military aid package announced by British Defense Secretary Grant Shapps during a visit to Kyiv. Most of the unmanned aerial vehicles (UAV) set for delivery are First Person View (FPV) platforms, though a number of one way attack, surveillance and maritime drones will also be provided. The latest pledge is in addition to the $255 million drone package announced by London in January and February's move to co-lead an international drone coalition for Ukraine with Latvia. The European coalition is targeting production and delivery of 1 million drones to the war-torn country. "Britain steps up support to Ukraine today with a complete package of $414 million for cutting-edge drones to help fight Putin's illegal invasion," the UK Ministry of Defense (MoD) said in a Thursday statement. https://breakingdefense.com/2024/03/uk-pledges-additional-10000-fpv-and-one-way-attack-drones-for-ukraine/

V/r,

CWMD Watch Desk Officer
Current Operations and Integration
Operations Support Directorate
Countering Weapons of Mass Destruction
U.S. Department of Homeland Security
CWMD Desk: (202) 282-9262 (primary)

Desk 2: (202) 282-9126 / 8109
CWMDWatchDesk@hq.dhs.gov

This document is FOR OFFICIAL USE ONLY (FOUO). It contains information that may be exempt from public release under the Freedom of Information Act (5 U.S.C. 552). It is to be controlled, stored, handled, transmitted, distributed, and disposed of in accordance with DHS policy relating to FOUO information and is not to be released to the public or other personnel who do not have a valid "need-to-know" without prior approval of an authorized DHS official.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6)
Subject: FW: IMAAC Update
Date: Monday, February 6, 2023 1:14:00 PM
Attachments: RFI 23-0081qU IMAAC.pdf
HCL AEGL 1h.kmz
phosgene AEGL 1h.kmz
vinyl chloride AEGL 1h.kmz

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 1:10 PM
To: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: IMAAC Update

CUI

JOC,

Have attached an update of the IMAAC product. Please send to the distro list, and please also add (from the CST):

(b) (6)

Thank you.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

Date: 06FEB2023 1745Z

Version: Revision G

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081gU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 1 single railcar, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1400 06FEB2023 Local (1900Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

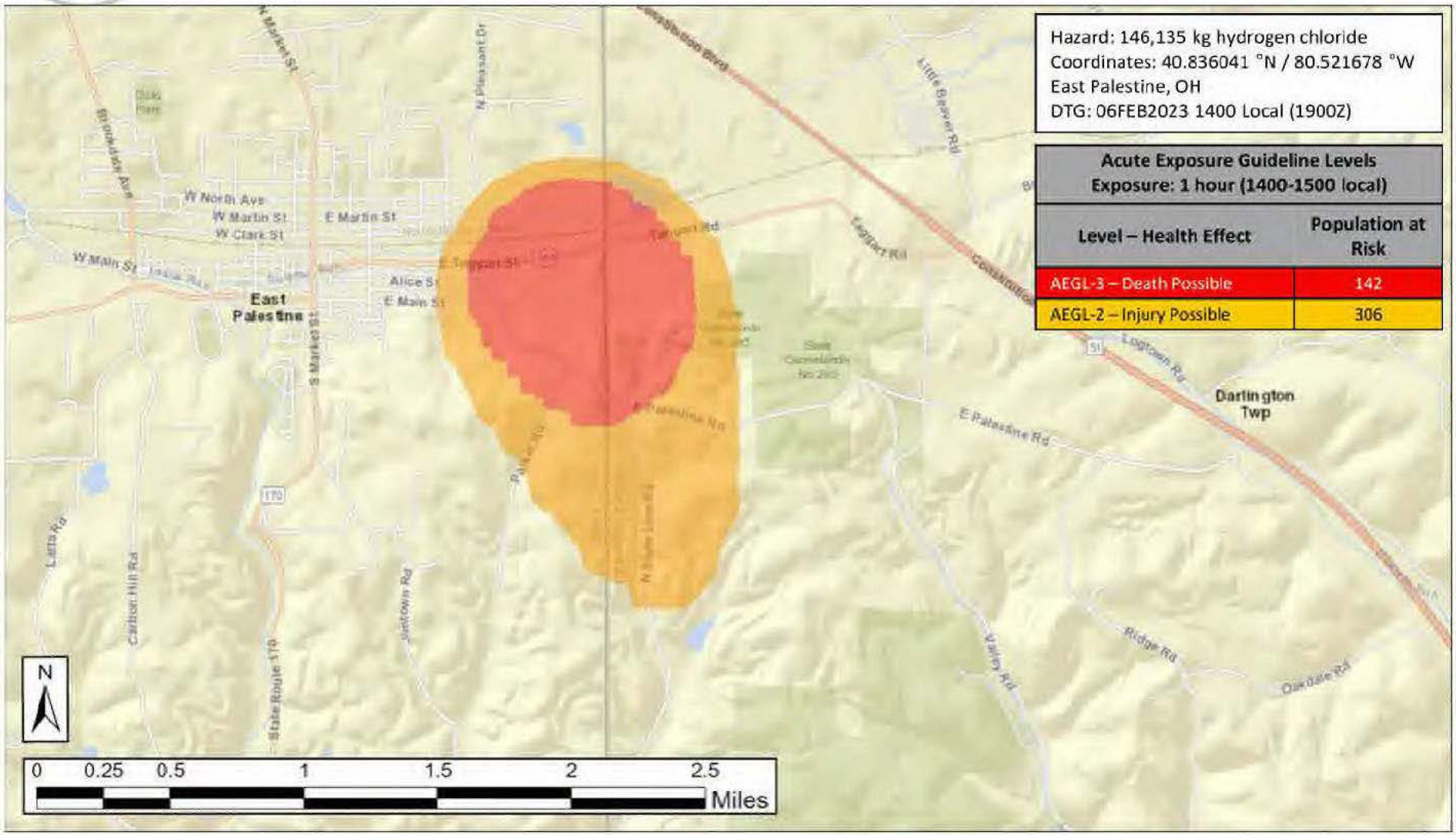
(b)(3)10USC130

- Blast effects from a BLEVE is provided.

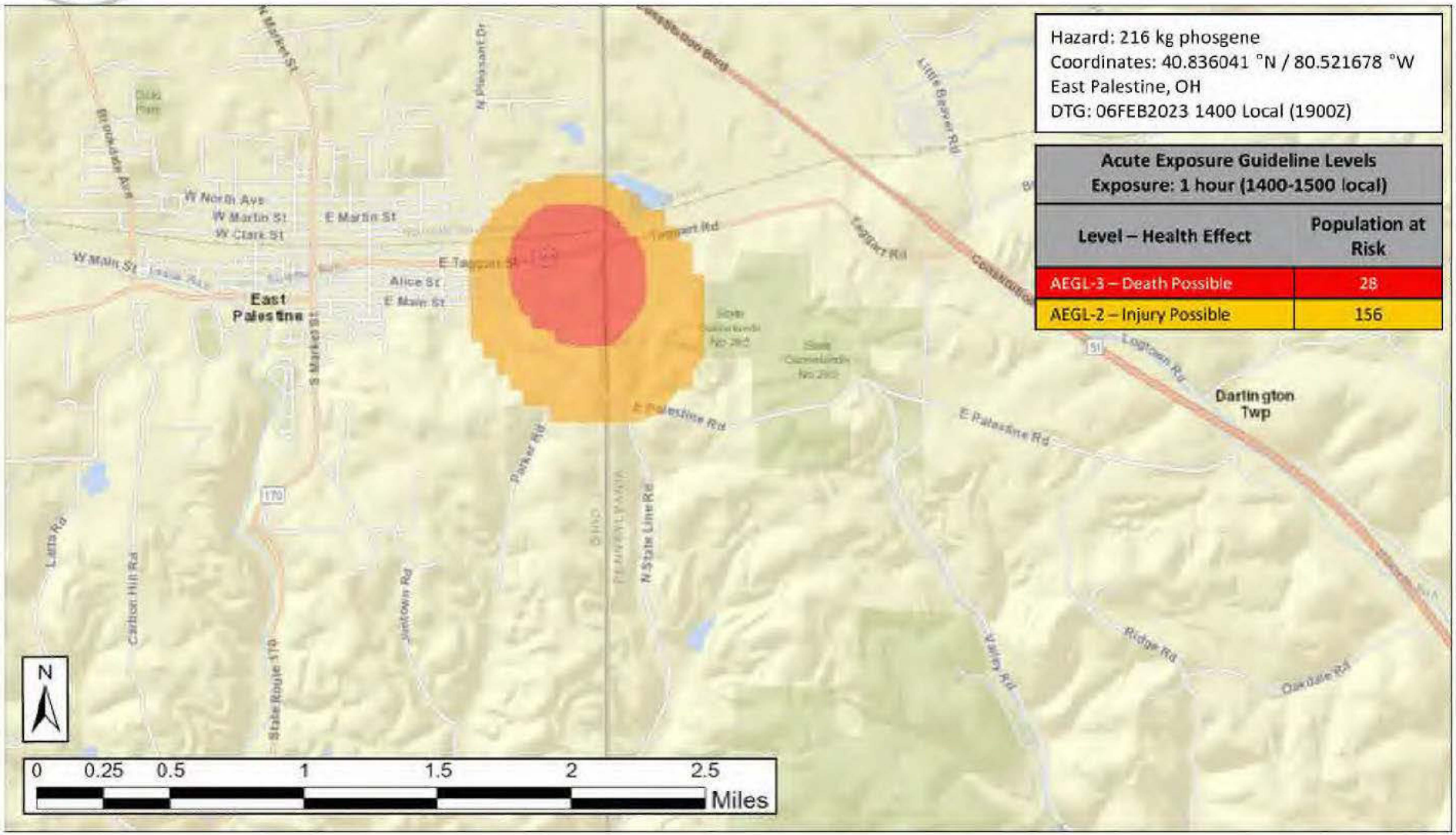
Caveats

- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

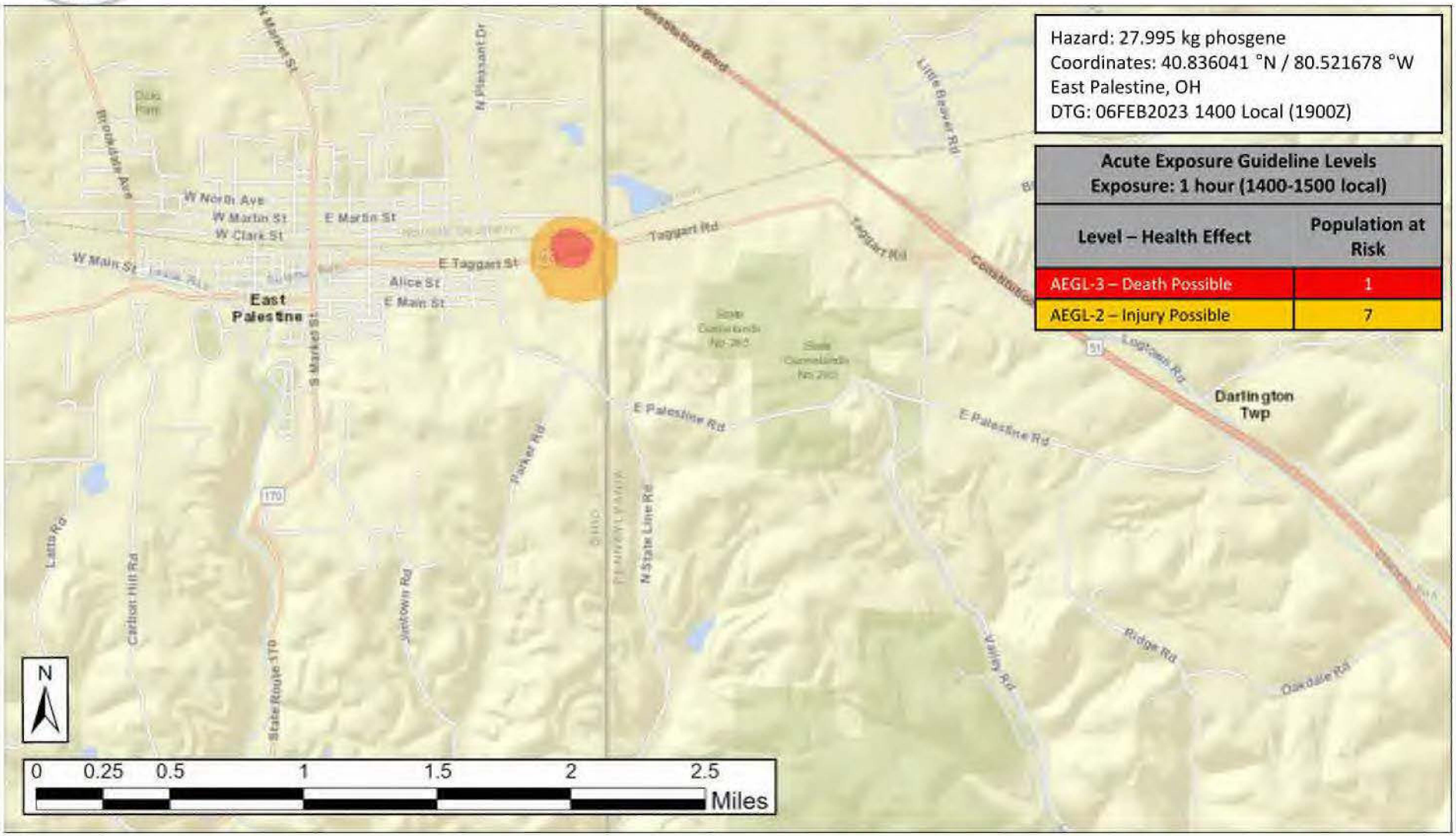
Hydrogen Chloride – 1400 Local



Phosgene – 1400 Local



Vinyl Chloride – 1400 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

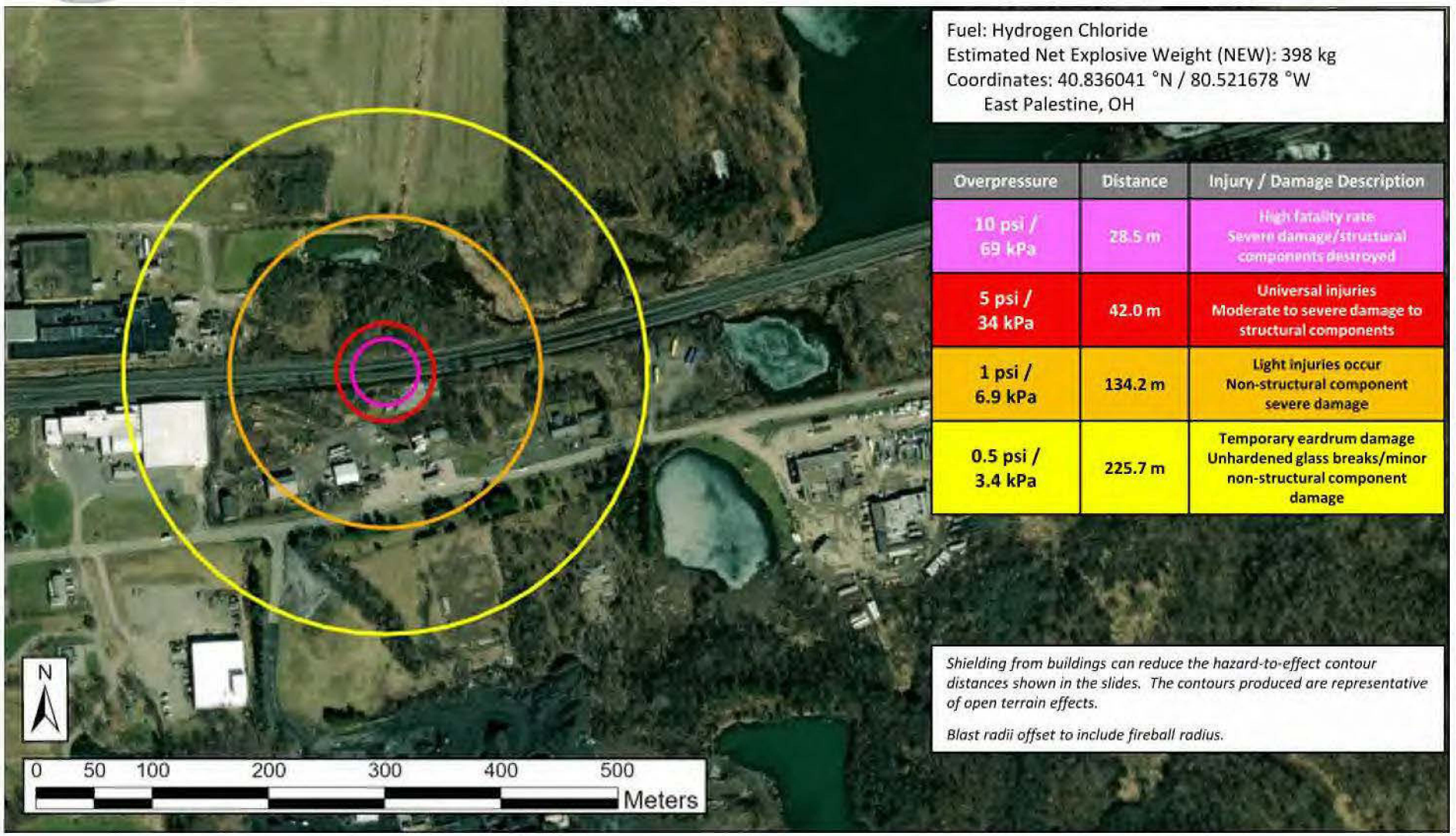
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

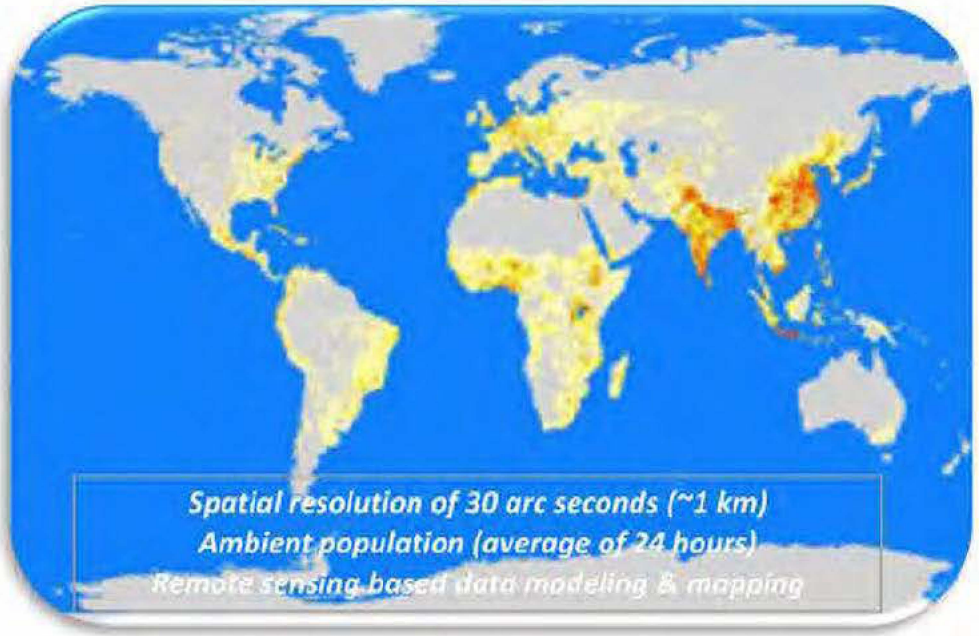
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: FW: RFI_23_0081iU_IMAAC **UPDATE**
Date: Tuesday, February 7, 2023 6:36:23 AM
Attachments: RFI_23-0081iU_IMAAC.pdf
RFI_23_0081iU_KMLs.ipz

Good Morning Ms. Edwards, et. al...

Please see attached updated IMAAC assessment product produced by the Technical
Reachback Team.

If you have any questions regarding this analysis, please contact our DTRA Reachback team directly (contact details in the original email message below) and reference the RFI number in the subject line.

Thanks...

(b) (6)
Contractor support to DTRA IT-KT
Fort Belvoir (FBVA), VA
DTRA HQ (JOC)
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Tuesday, February 7, 2023 6:01 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081iU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U to the distro list.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov

Date: 07FEB2023 1100Z

Version: Revision I

Changes: Adjusted buoyancy, Updated Wx

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081iU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 07FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 07FEB2023 Local (2030Z) 2. 1200 07FEB2023 Local (2030Z)
Executive Summary	• The largest AEGL-2 (serious injury possible) hazard area (HCl) extends about 150 feet away from the fire. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown**

Modeling Overview

- A breach of five mostly-full (70%) vinyl chloride containers is considered. This results in some level of combustion/explosion. Based on reports from the shipper, the estimated total load is approximately 3.5 cars' worth.
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

Caveats

- The partitioning of the various chemicals is not fully known. We have made the best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accounted for accurately.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling cannot account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

6:00 AM Breach (1100Z)
07 FEB 2023

Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Vinyl Chloride – 0600 Local

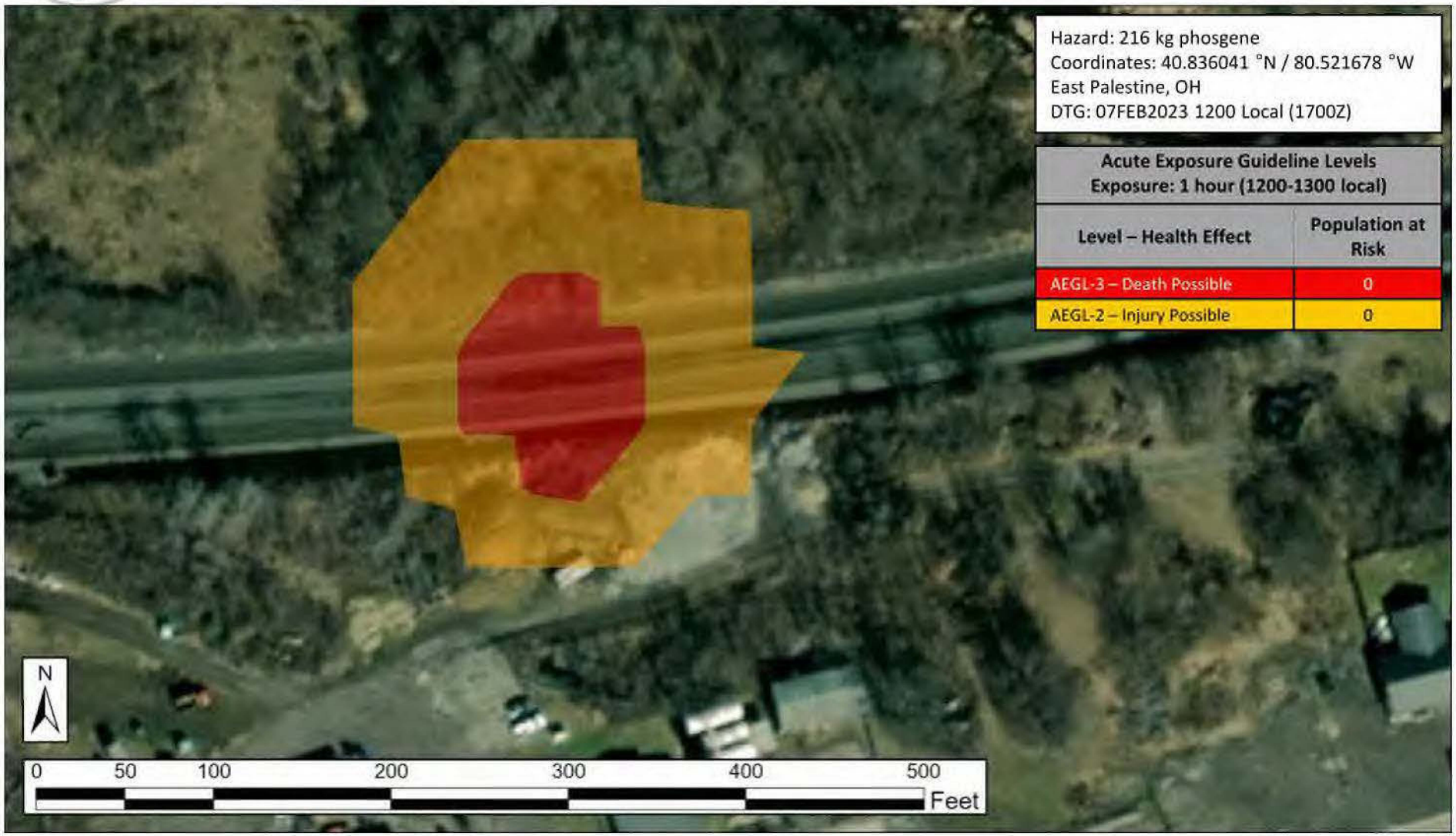


12:00 PM Breach (1700Z)
07 FEB 2023

Hydrogen Chloride – 1200 Local



Phosgene – 1200 Local



Vinyl Chloride – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

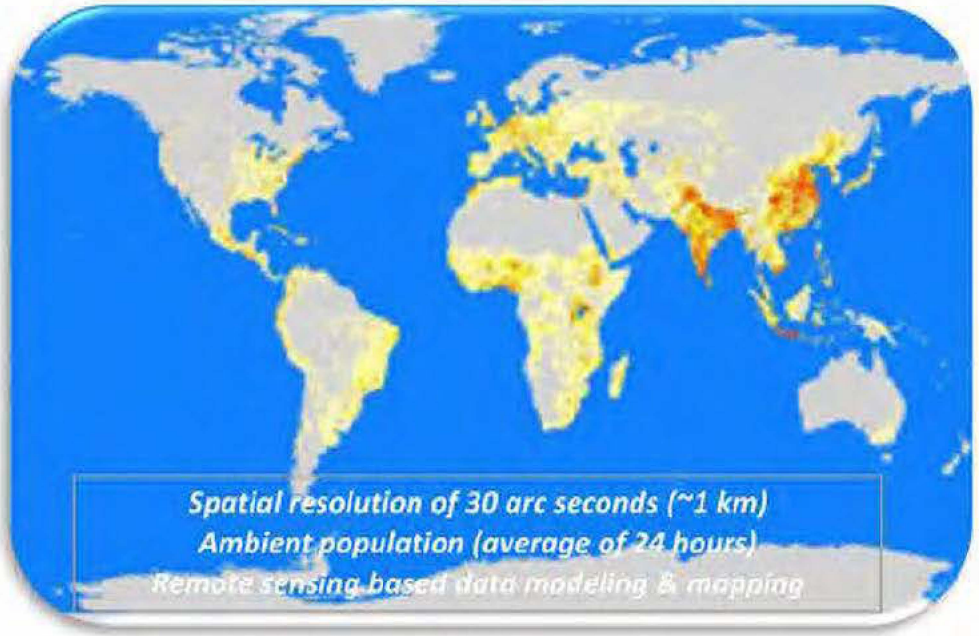
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

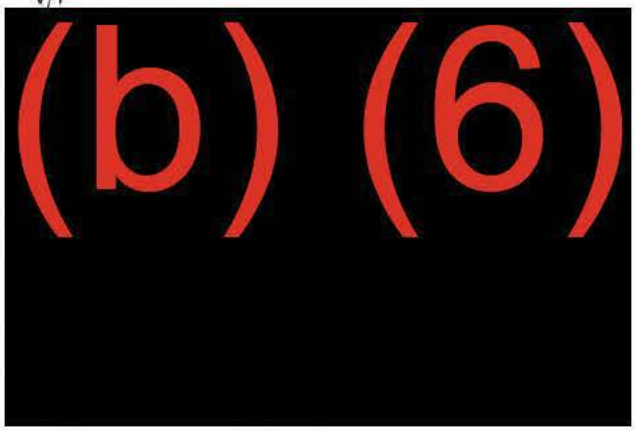
*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

R&D Directorate
Technical Reachback Division

From: (b) (6)
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Cc: Doster, Travis W CIV DTRA OI (USA)
Subject: (b) (6) Litigation Hold - East Palestine train derailment
Date: Tuesday, December 26, 2023 2:41:11 PM
Importance: High

(b) (2), (b) (5)

v/r



DTRA JOC
703-767-2000/3
JOC Homepage: https://opscenter.dtra.mil/AUTH/homepage/index.cfm
NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil

---

From: DTRA ETMS2, Unmanaged Mailbox <noreply.dtra@mail.mil>
Sent: Tuesday, December 26, 2023 2:22 PM
To: (b) (6) [redacted]
Subject: (b) (6) [redacted] | Litigation Hold - East Palestine train derailment

Classification: Unclassified

Either a new Tasker has been assigned to you or an existing Tasker assignment has been updated with additional information. Click the appropriate link to your assignment in either the OPR or OCR list below to access your copy of the Tasker.

Priority: Routine

Category: Directorate Director

Action: Appropriate Action

OPR:
N/A

OPR Suspense: N/A

For Release: No
For Response: No

OPR Instructions:
N/A

OCRs:
(b) (6)

OCR Suspense: 12/27/2023 14:00 (GMT-05:00) Eastern Time (US & Canada)

OCR Instructions:
OPAO: Please confirm if the JOC has any responsive documents on this incident. - V/R,(b) (6)

OPA
Action: Search for responsive documents related to train derailment near Palestine, Ohio and preserve responsive information.

Notify OI-OP and OI SACO if documents are found and they will provide additional guidance.

See details below for conducting search

Recommended OCR: All Agency Directorates and Staff Offices

External POC: DoD Office of General Counsel, Office of Information Counsel (OGC (OIC)). Do not contact directly - you Must work through DTRA OGC for questions/concerns/etc.

Action: Litigation Hold
1. Search for and preserve responsive information. See Search Instructions below.
2. Complete applicable MFR and email directly to the DTRA OGC POCs. (See MFR Templates in Supporting Documents). Do NOT upload responses to ETMS2.

OCR Instructions: The DoD OGC (OIC) has issued a Litigation Hold to DTRA. The Litigation Hold directs DTRA to search for and preserve all documents, records, or materials in the Agency's possession, custody or control, in any format including electronically stored information (ESI), files, holdings, documents, reports, recordings, databases, intelligence, or other information, whether classified or not, pertaining to a lawsuit filed by the State of Ohio and the United States (on behalf of the Environmental Protection

Agency (EPA)) against Norfolk Southern Railway Co. and Norfolk Southern Corp. (collectively, "Norfolk Southern") regarding a train derailment in East Palestine, Ohio, on February 3, 2023. (a copy of the complaint is in Original Documents).

This litigation hold applies to all personnel assigned to DTRA (military and civilian). The litigation hold also applies to contractor personnel who have information relevant to the above-referenced lawsuit in their possession, custody or control. Contractor personnel and their respective contracting officer's representative (COR) and/or contracting officer shall coordinate with each other to ensure that responsive documents, etc. are identified and preserved in accordance with the instructions in this tasker.

Failure to preserve potentially relevant information could result in sanctions against DoD and individuals personally.

Background: On February 3, 2023, a train operated by Norfolk Southern was carrying hazardous materials when it derailed in East Palestine, Ohio, and fire broke out. Residents of the town were evacuated due to hazardous materials that vented into the air and spilled on the ground, resulting in contamination of local waterways. The EPA and other agencies responded to the incident to ensure public health and environmental safety. To prevent an explosion, Norfolk Southern vented and burned the contents of several railcars containing hazardous chemicals. The U.S. seeks to hold Norfolk Southern accountable for unlawfully polluting the nation's waterways and to ensure that the company pays for the cost of environmental cleanup.

At the time of the incident, DTRA supported the Interagency Modeling and Atmospheric Assessment Center ("IMAAC"). IMAAC is the Department of Homeland Security (DHS) led interagency organization responsible for production, coordination, and dissemination of consequence predictions for atmospheric and waterborne hazardous material releases during actual or potential incidents requiring federal coordination. In support of DHS, DTRA serves as the designated technical operations hub for the IMAAC. DTRA support included generation of IMAAC modeling products in response to the incident. Other DTRA organizational units may or may not have generated documents in response to the incident.

(b) (2), (b) (5)

[redacted]

(b) (2), (b) (5) [redacted]

DTRA OGCs:
(b) (6) [redacted]

Attention OPR:

It is your responsibility to assign the OCRs, provide additional guidance (if necessary), and suspense dates.

According to DTRA Instruction 5100.05, Staff Action Management, it is the responsibility of the OPR to notify the initiator of the task within 24 hours of receipt of a tasker if it is believed that the OPR needs to be reassigned to another Directorate or Staff Office.

If an extension is needed, the OPR must request an extension from the task initiator, 2 days prior to the suspense date. Please note that extensions are not guaranteed. Only the OPR will be able to request an extension from the CS office if the CS office had initiated the task.

Info Copies:
(b) (6) [redacted]

Original Instructions:
OPA
Action: Search for responsive documents related to train derailment near Palestine, Ohio and preserve responsive information.

Notify OI-OP and OI SACO if documents are found and they will provide additional guidance.

See details below for conducting search

Recommended OCR: All Agency Directorates and Staff Offices

External POC: DoD Office of General Counsel, Office of Information Counsel (OGC (OIC)). Do not contact directly - you Must work through DTRA OGC for questions/concerns/etc.

Action: Litigation Hold
1. Search for and preserve responsive information. See Search Instructions below.
2. Complete applicable MFR and email directly to the DTRA OGC POCs. (See MFR Templates in Supporting Documents). Do NOT upload responses to ETMS2.

OCR Instructions: The DoD OGC (OIC) has issued a Litigation Hold to DTRA. The Litigation Hold directs DTRA to search for and preserve all documents, records, or materials in the Agency's possession, custody or control, in any format including electronically stored information (ESI), files, holdings, documents, reports, recordings, databases, intelligence, or other information, whether classified or not, pertaining to a lawsuit filed by the State of Ohio and the United States (on behalf of the Environmental Protection Agency (EPA)) against Norfolk Southern Railway Co. and Norfolk Southern Corp. (collectively, "Norfolk Southern") regarding a train derailment in East Palestine, Ohio, on February 3, 2023. (a copy of the complaint is in Original Documents).

This litigation hold applies to all personnel assigned to DTRA (military and civilian). The litigation hold also applies to contractor personnel who have information relevant to the above-referenced lawsuit in their possession, custody or control. Contractor personnel and their respective contracting officer's representative (COR) and/or contracting officer shall coordinate with each other to ensure that responsive documents, etc. are identified and preserved in accordance with the instructions in this tasker.

Failure to preserve potentially relevant information could result in sanctions against DoD and individuals personally.

Background: On February 3, 2023, a train operated by Norfolk Southern was carrying hazardous materials when it derailed in East Palestine, Ohio, and fire broke out. Residents of the town were evacuated due to hazardous materials that vented into the air and spilled on the ground, resulting in contamination of local waterways. The EPA and other agencies responded to the incident to ensure public health and environmental safety. To prevent an explosion, Norfolk Southern vented and burned the contents of several railcars containing hazardous chemicals. The U.S. seeks to hold Norfolk Southern accountable for unlawfully polluting the nation's waterways and to ensure that the company pays for the cost of environmental cleanup.

At the time of the incident, DTRA supported the Interagency Modeling and Atmospheric Assessment Center ("IMAAC"). IMAAC is the Department of Homeland Security (DHS) led interagency organization responsible for production, coordination, and dissemination of consequence predictions for atmospheric and waterborne hazardous material releases during actual or potential incidents requiring federal coordination. In support of DHS, DTRA serves as the designated technical operations hub for the IMAAC. DTRA support included generation of IMAAC modeling products in response to the incident. Other DTRA organizational units may or may not have generated documents in response to the incident.

Search Instructions:

1. Date Range: The Agency's preservation obligation includes the period on or after February 3, 2023, to

present.

(b) (2), (b) (5)

[redacted]

DTRA OGCs:

(b) (6) [redacted]

Attention OPR:

It is your responsibility to assign the OCRs, provide additional guidance (if necessary), and suspense dates.

According to DTRA Instruction 5100.05, Staff Action Management, it is the responsibility of the OPR to notify the initiator of the task within 24 hours of receipt of a tasker if it is believed that the OPR needs to be reassigned to another Directorate or Staff Office.

If an extension is needed, the OPR must request an extension from the task initiator, 2 days prior to the suspense date. Please note that extensions are not guaranteed. Only the OPR will be able to request an extension from the CS office if the CS office had initiated the task.

TMT Home

Classification: Unclassified

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6) [redacted]
Subject: FW: Updated Product
Date: Monday, February 6, 2023 3:34:00 PM
Attachments: RFI 23-0081hU IMAAC.pdf
1800 HCL AEGL 1h0.kml
1800 phosgene AEGL 1h0.kml
1800 VCL AEGL 1h0.kml
1530 HCL AEGL 1h0.kml
1530 phosgene AEGL 1h0.kml
1530 VCL AEGL 1h0.kml

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 3:20 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: FW: Updated Product

CUI

JOC,

Attached is a short-suspense update to the IMAAC product. Thank you.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
Sent: Monday, February 6, 2023 3:08 PM
(b) (6) [redacted]

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

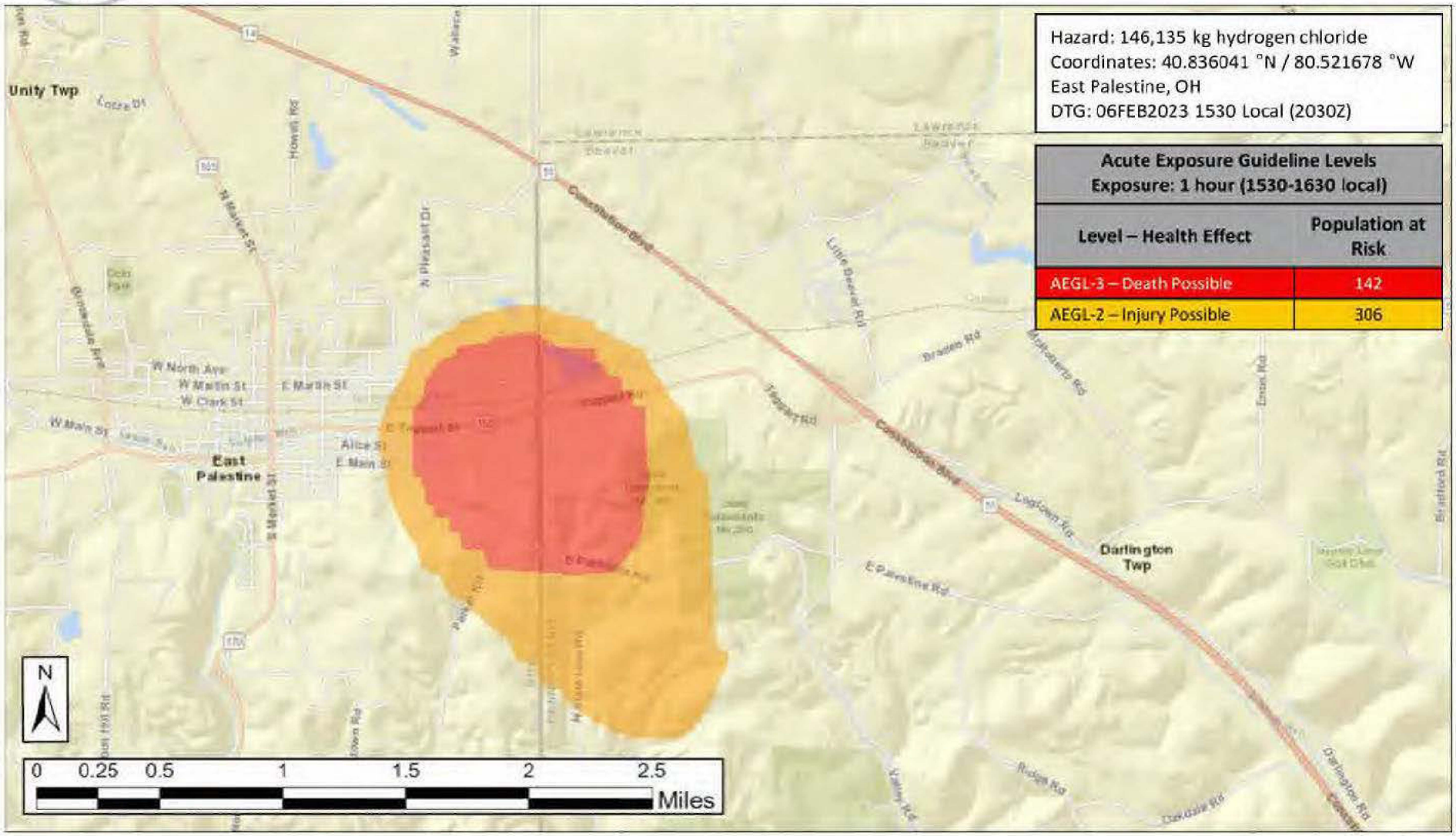
- Blast effects from a BLEVE is provided.

Caveats

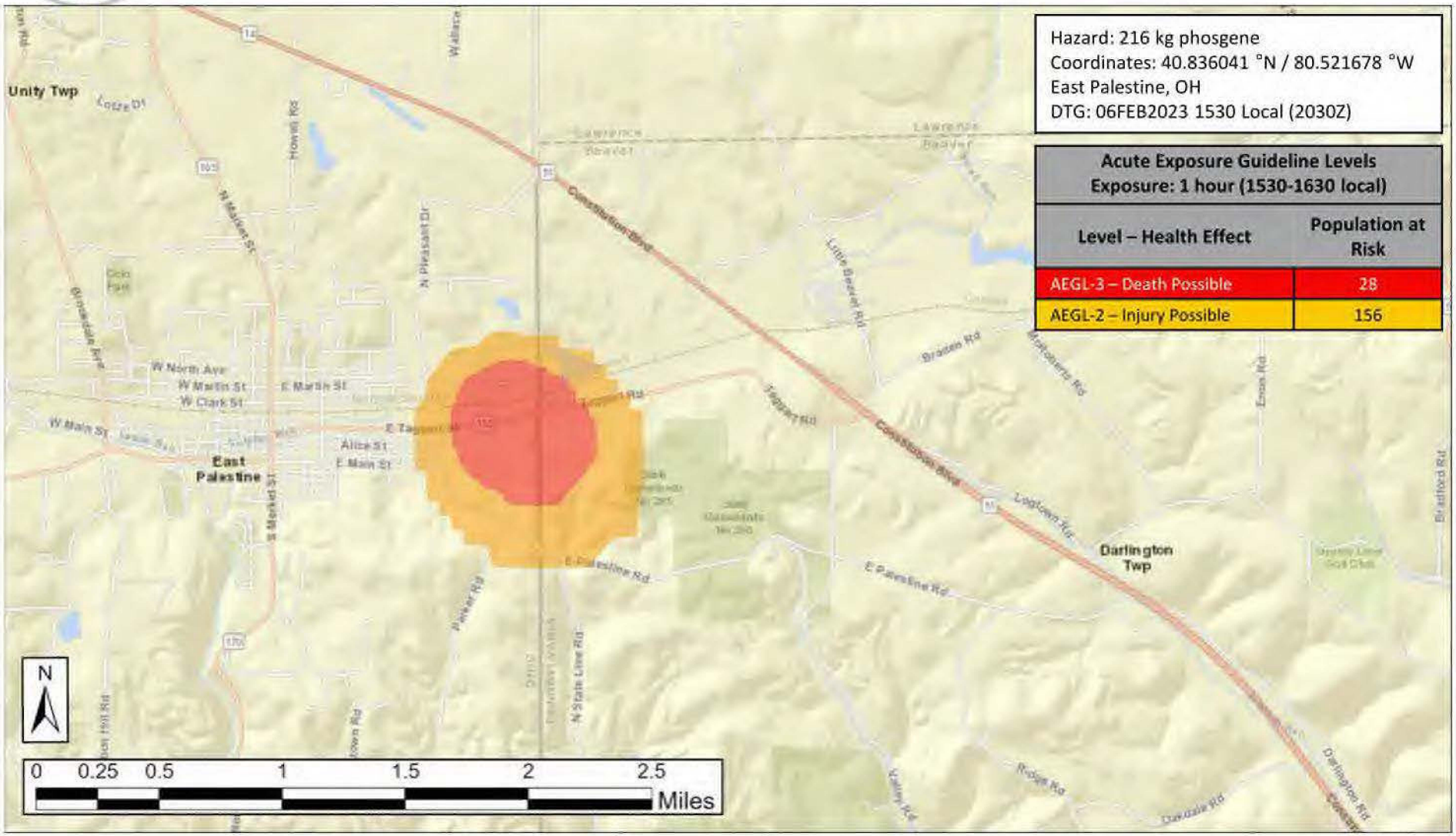
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

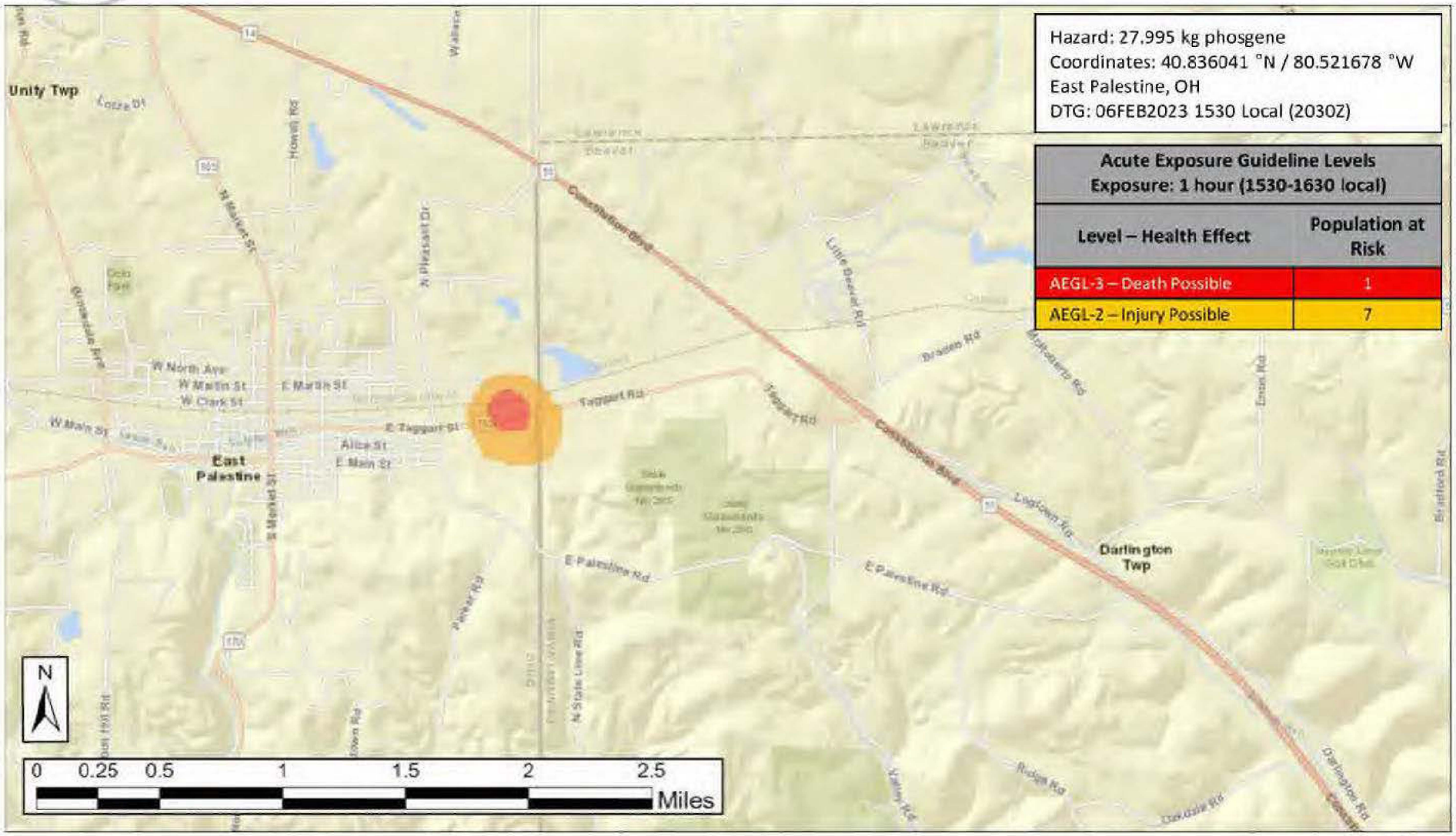
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

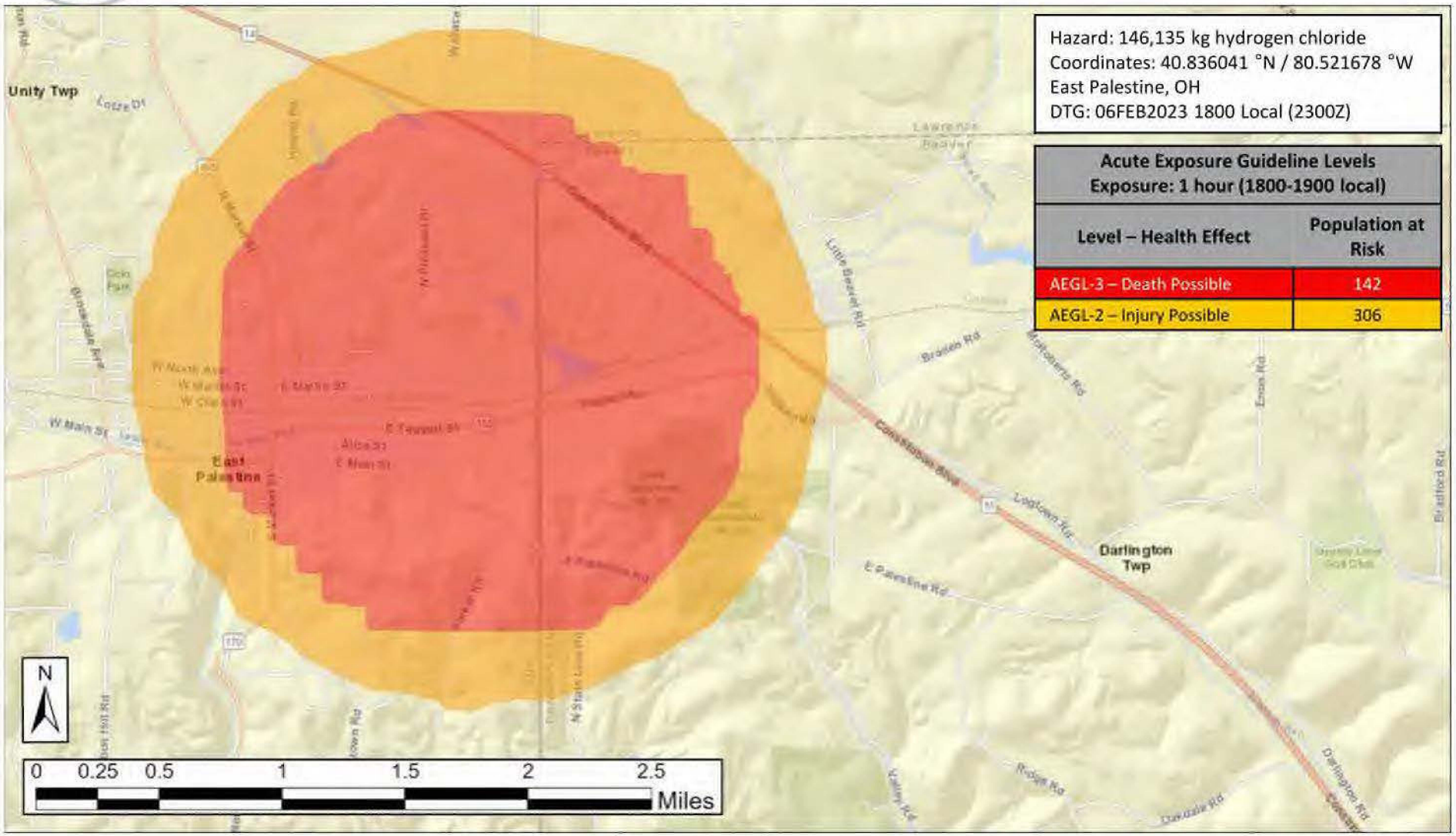


Vinyl Chloride – 1530 Local

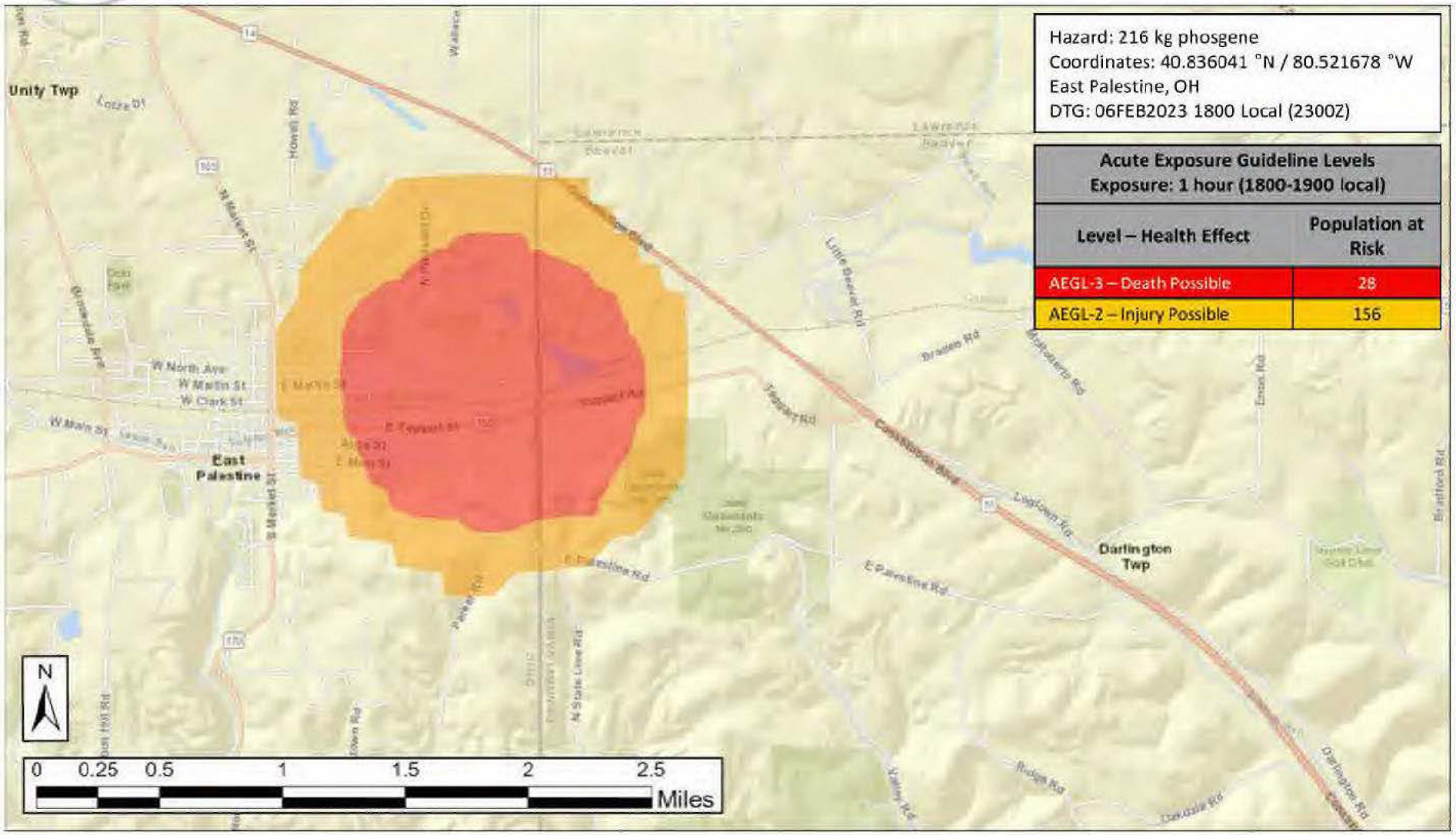


6:00PM Breach (2300Z)
06 FEB 2023

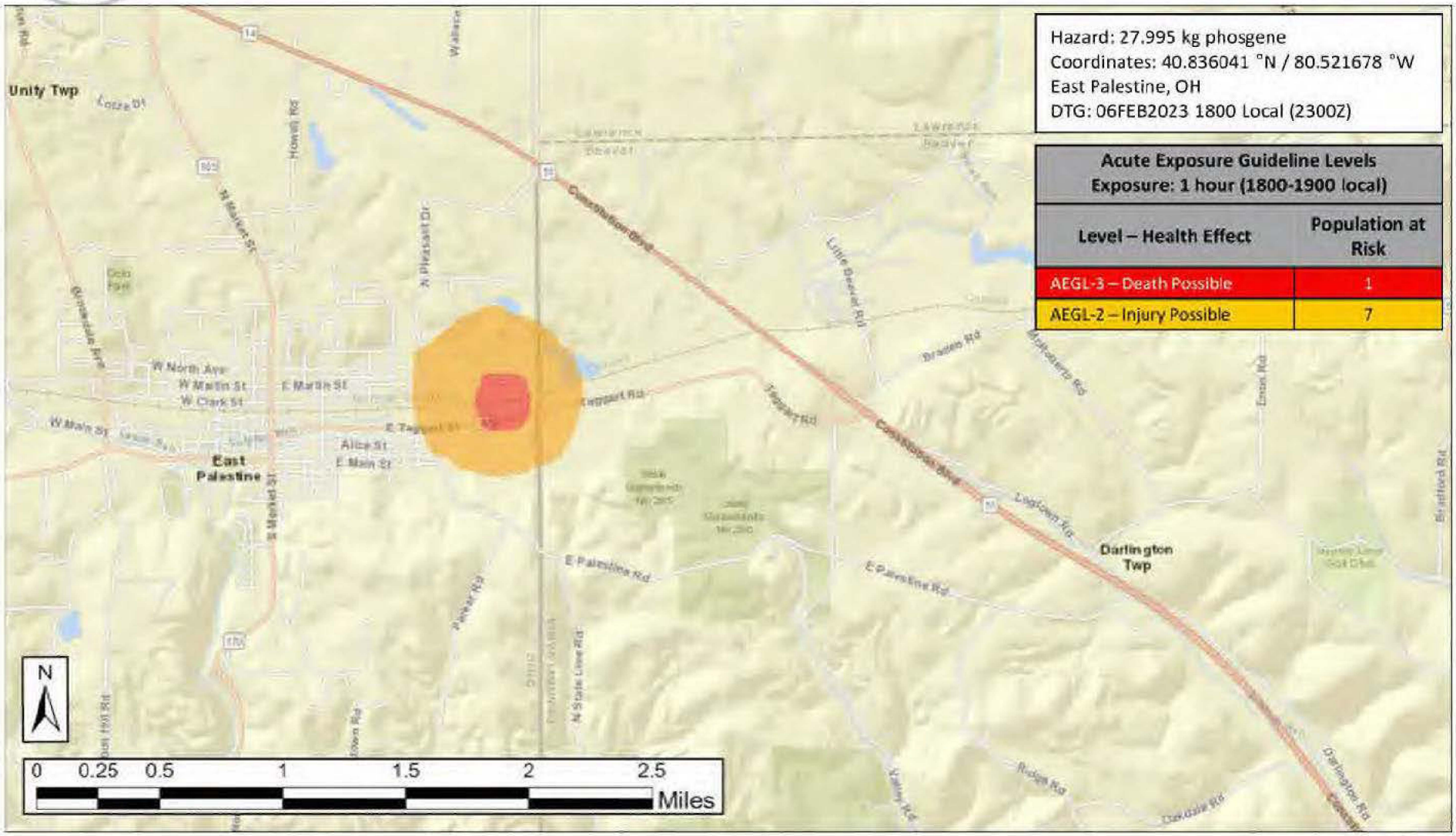
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

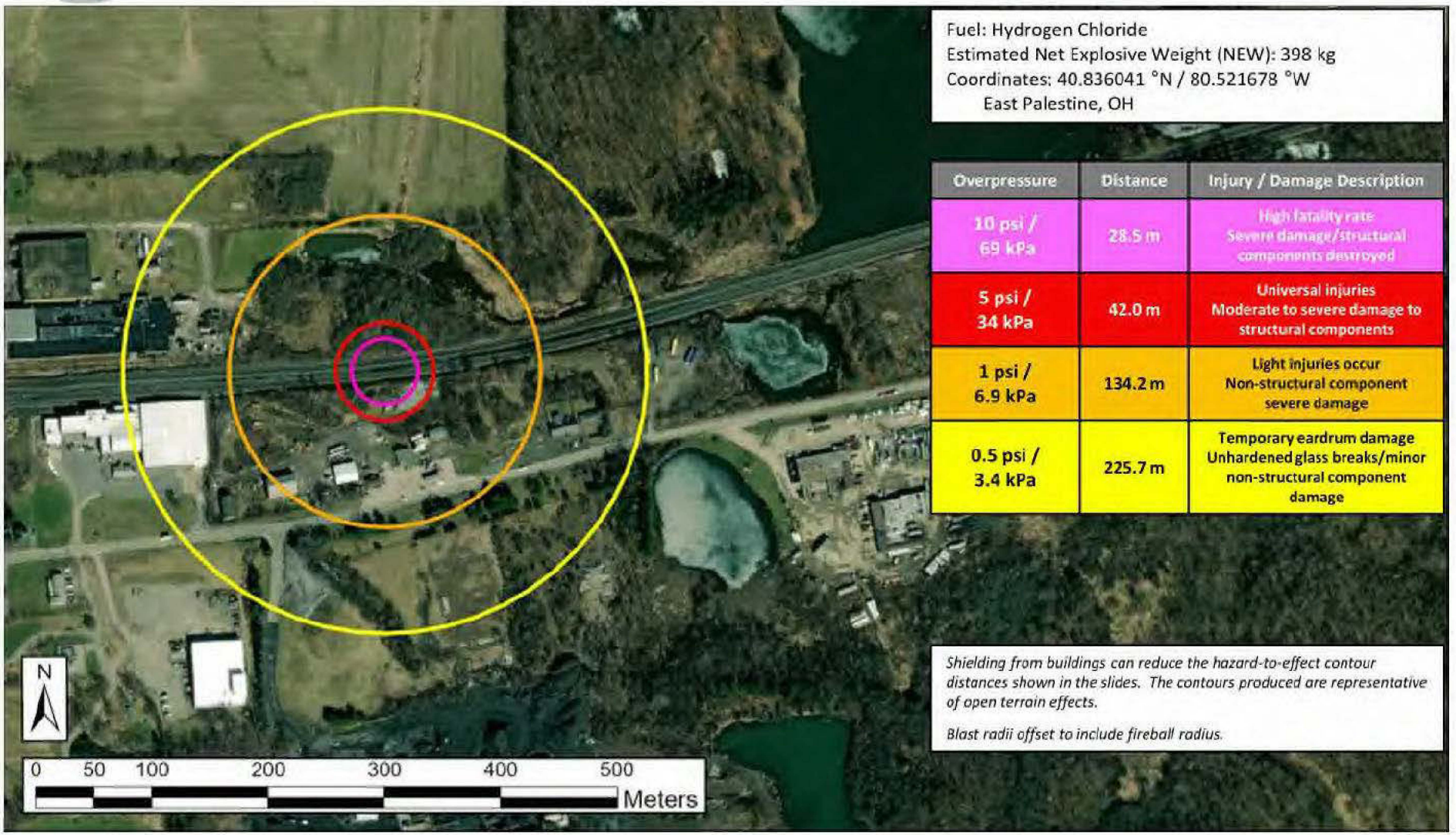
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

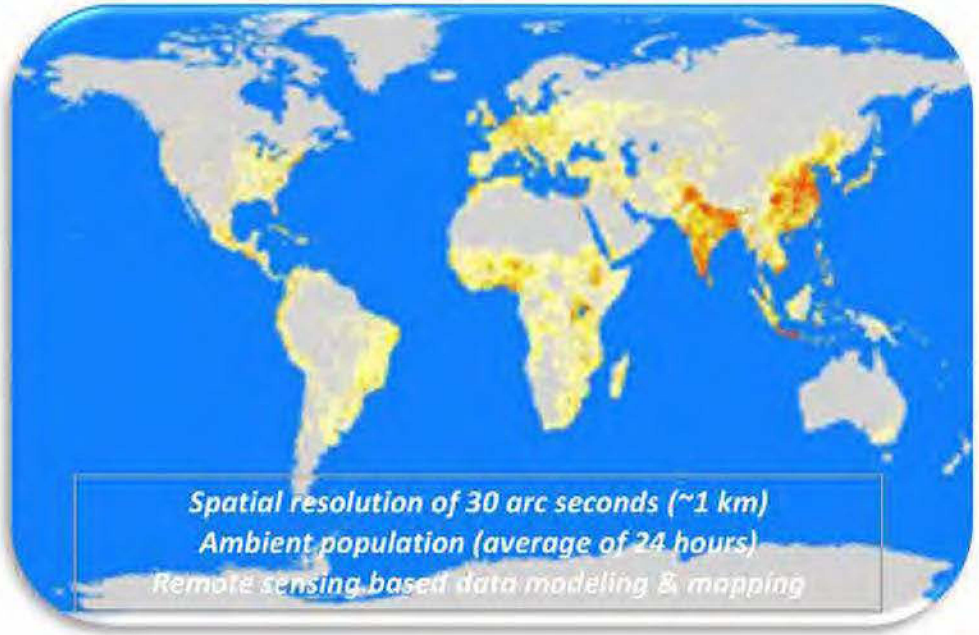
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

[redacted] (b) (6)

Subject: RE: Updated Product

Suspect it would burn faster than that. But the math seems okay.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

-----Original Message-----
From: [redacted] (b) (6)
Sent: Monday, February 6, 2023 2:57 PM
To: [redacted] (b) (6)

Subject: Re: Updated Product

Yes please.

I'd also love someone to check my math. I expect approximately 516,000 lbs would have been burned off (assuming 3 hour conservative burn time) and that there would be approximately 103,000 lbs left to burn by 1800.

180 min total burn (conservative
150 allotted burn time at 1800.

619,000 lbs remaining in tanks.
516,000 lbs burned at 150 minutes
103,000 lbs remaining.

(not an expert in this - just fulfilling an odd request).

Respectfully,

(b) (6)

Operations NCOIC

8202 S. Access Rd. Bldg. 946

Columbus, Oh 43217

Comm: 614-336-6080

Cell: 614-989-1219

(b) (6)

Emergency: 1-866-4-WMD-CST (1-866-496-3278)

From: (b) (6)
Sent: Monday, February 6, 2023 2:47 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; (b) (6)
Subject: [Non-DoD Source] RE: Updated Product

Great! Thank you very much.

(b) (6)
On-Scene Coordinator
US EPA
2565 Plymouth Road
Ann Arbor, MI 48105
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 2:43 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; (b) (6)
Subject: RE: Updated Product

ALCON,

Just saw on the governor's news conference that the plan is to conduct the operation at 1530 EST. So we are doing an update for that time.

We can also do an update for 1800 if that's still necessary.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 1:22 PM
To: (b) (6) [redacted]
Subject: Updated Product

ALCON,

We sent out an updated product to our Ops Center. They should be forwarding it to you shortly.

This analysis was based on a few changes:

(b)(3)10USC130 [redacted]

Please let us know if there's any questions or if the product doesn't show up within the next few minutes.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil

JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: RE: East Palestine Chem train derailment
Date: Thursday, February 16, 2023 12:18:10 PM
Attachments: RFI_23-0081hU_IMAAC.pdf

(b) (6),

The last update for the DTRA Hazard plot for the East Palestine Train derailment incident is attached.

Very Respectfully,
(b) (6)
The MASY Group support to DTRA IT-KT
DTRA Joint Operations Center
(b) (6)
DTRA-JOC@mail.mil

-----Original Message-----
From: (b) (6)
Sent: Thursday, February 16, 2023 12:04 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: East Palestine Chem train derailment

Sir/Ma'am

This is (b) (6). I am requesting the unclassified DTRA Hazard plot for the 03FEB23 East Palestine Train derailment incident. Please let me know if there are any issues/concerns

Respectfully,

(b) (6)

Brigade CBRN Officer

75th Field Artillery Brigade

(b) (6)

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

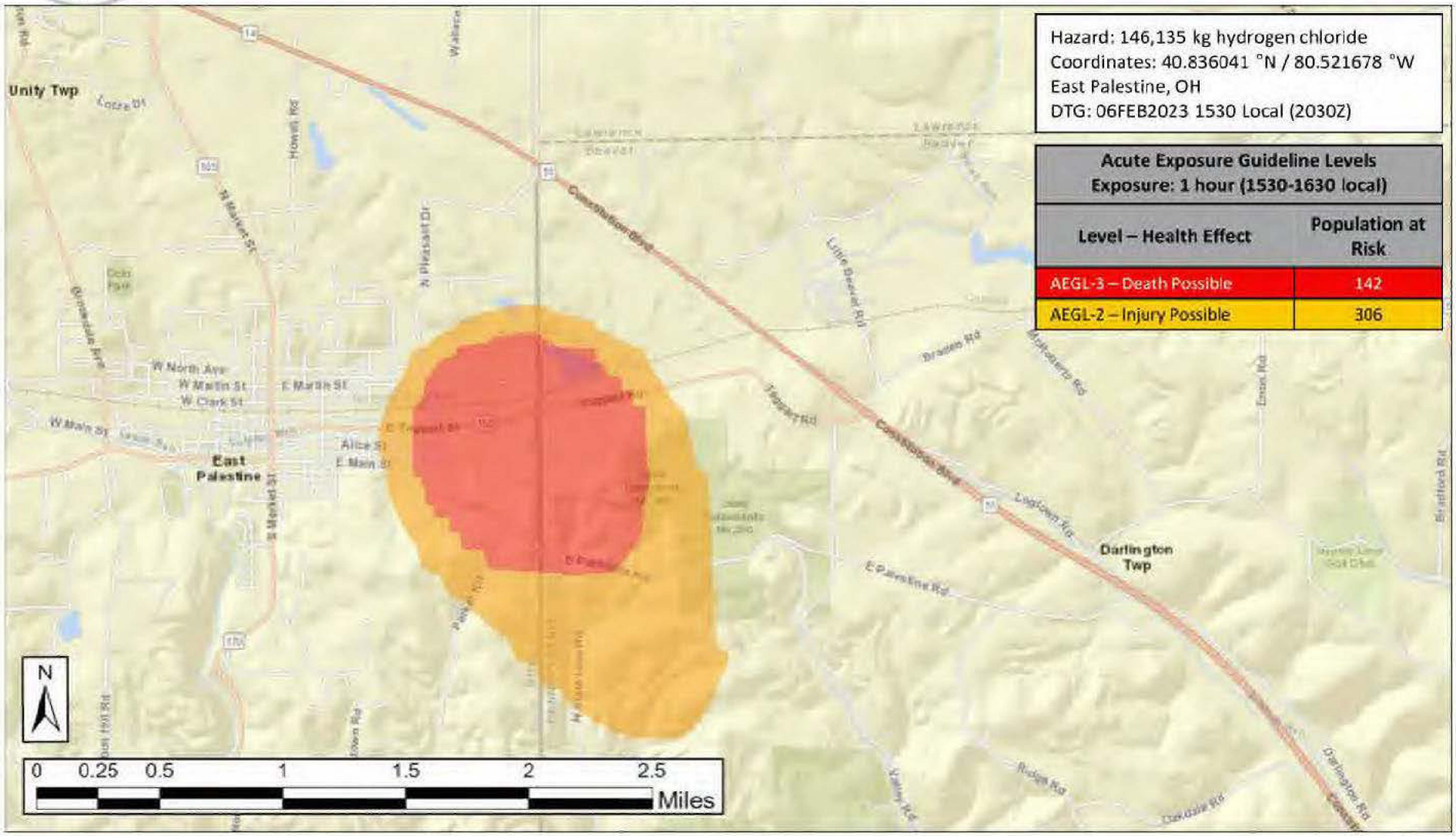
- Blast effects from a BLEVE is provided.

Caveats

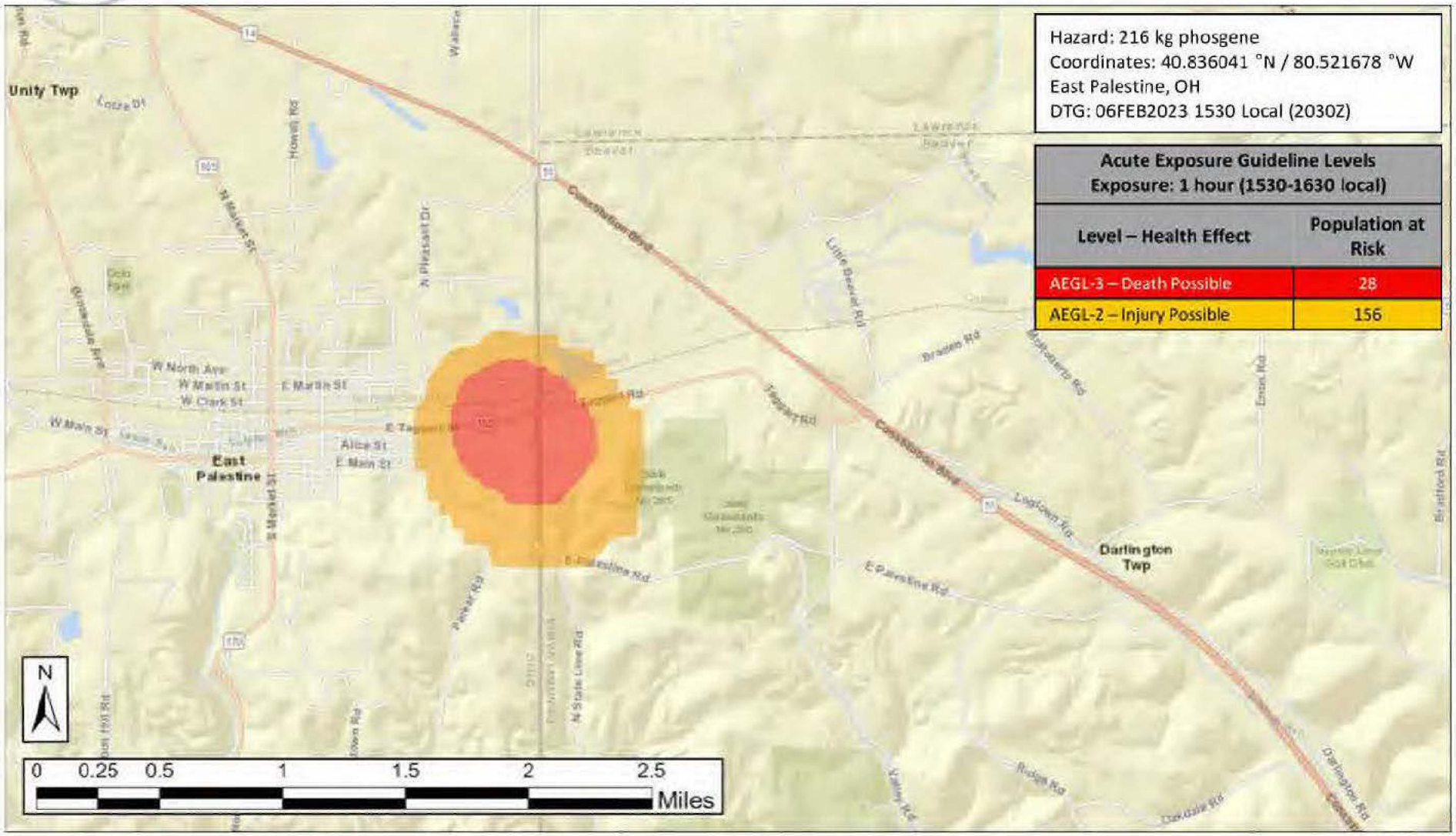
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

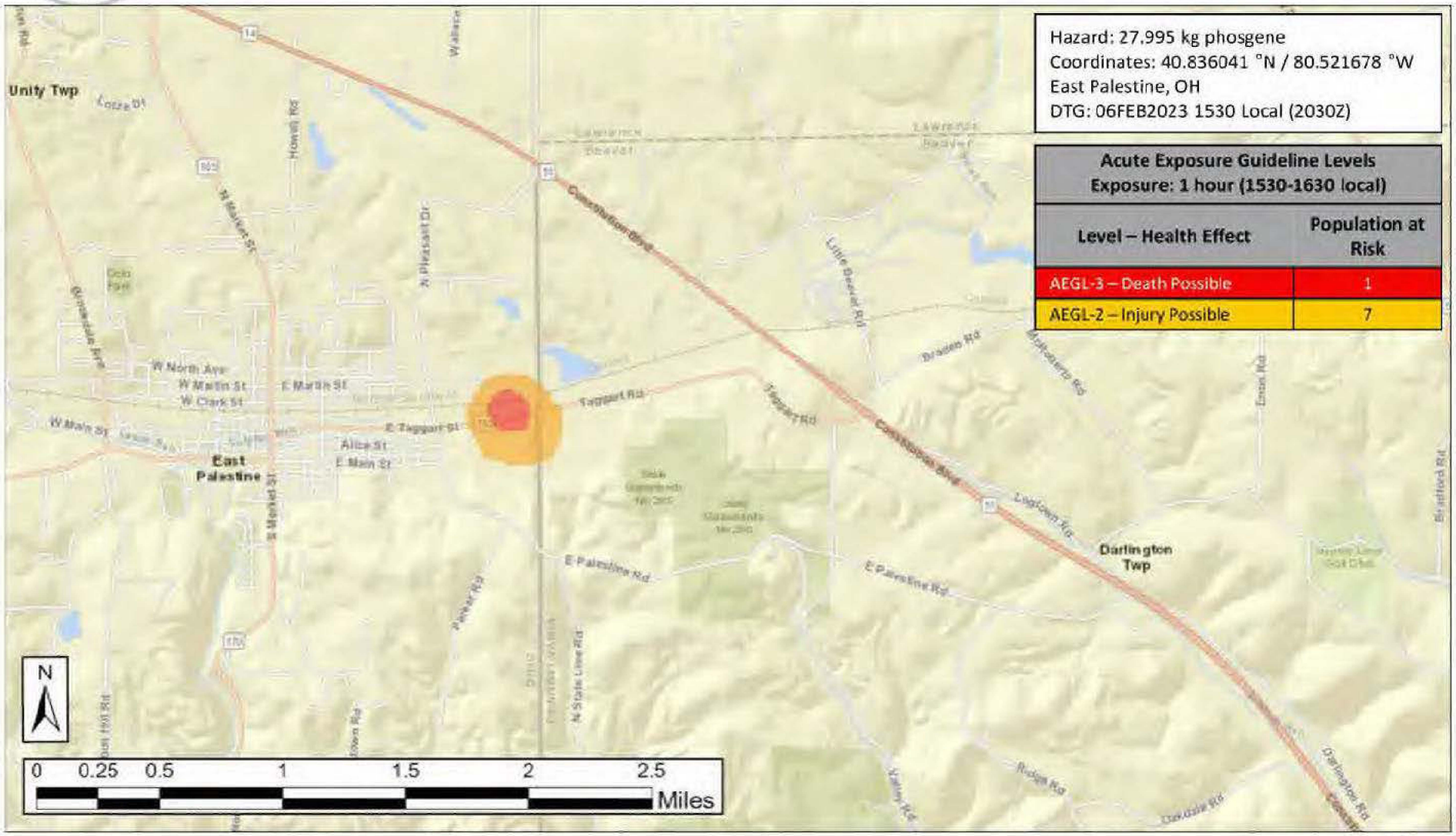
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

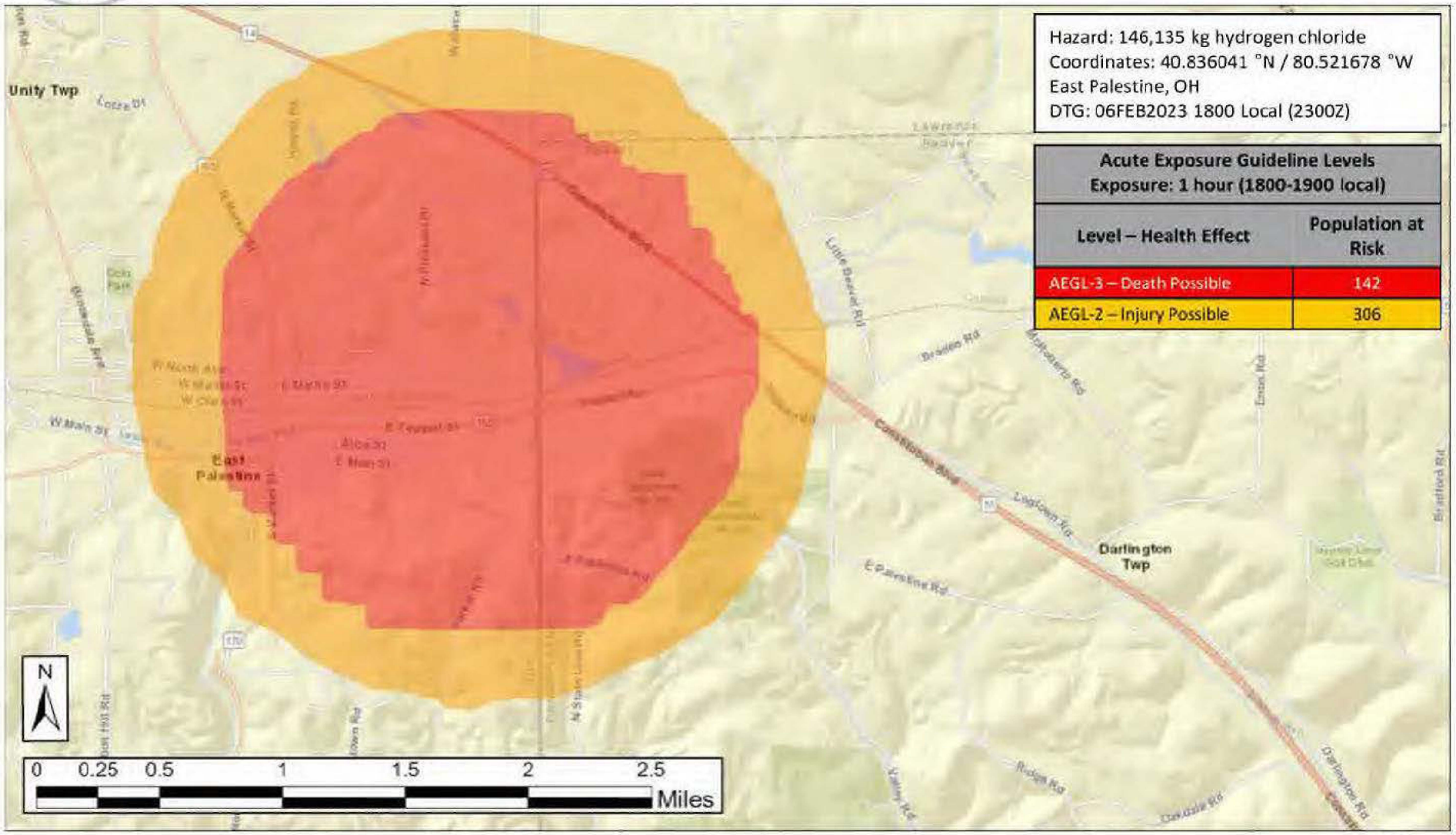


Vinyl Chloride – 1530 Local

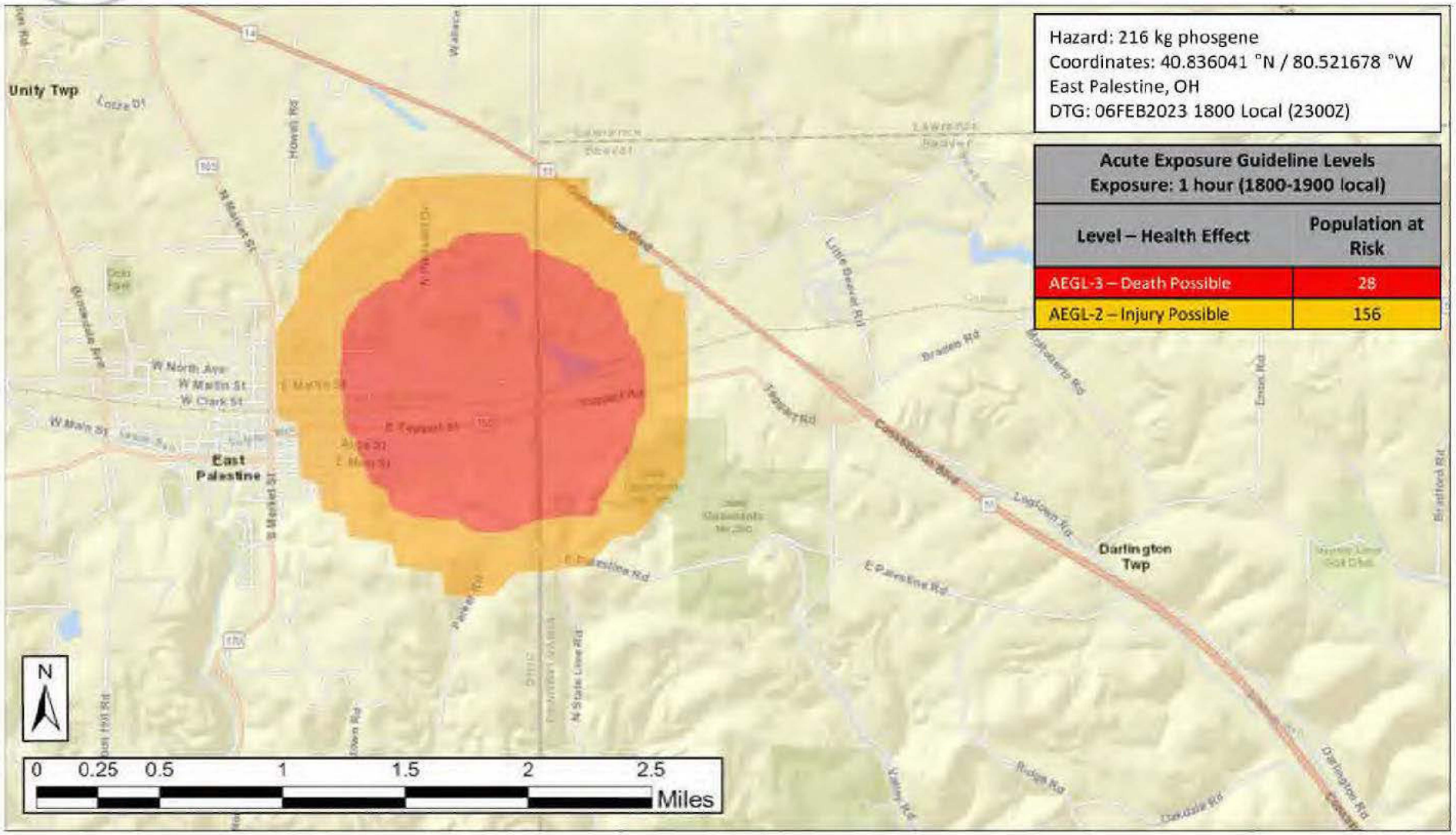


6:00PM Breach (2300Z)
06 FEB 2023

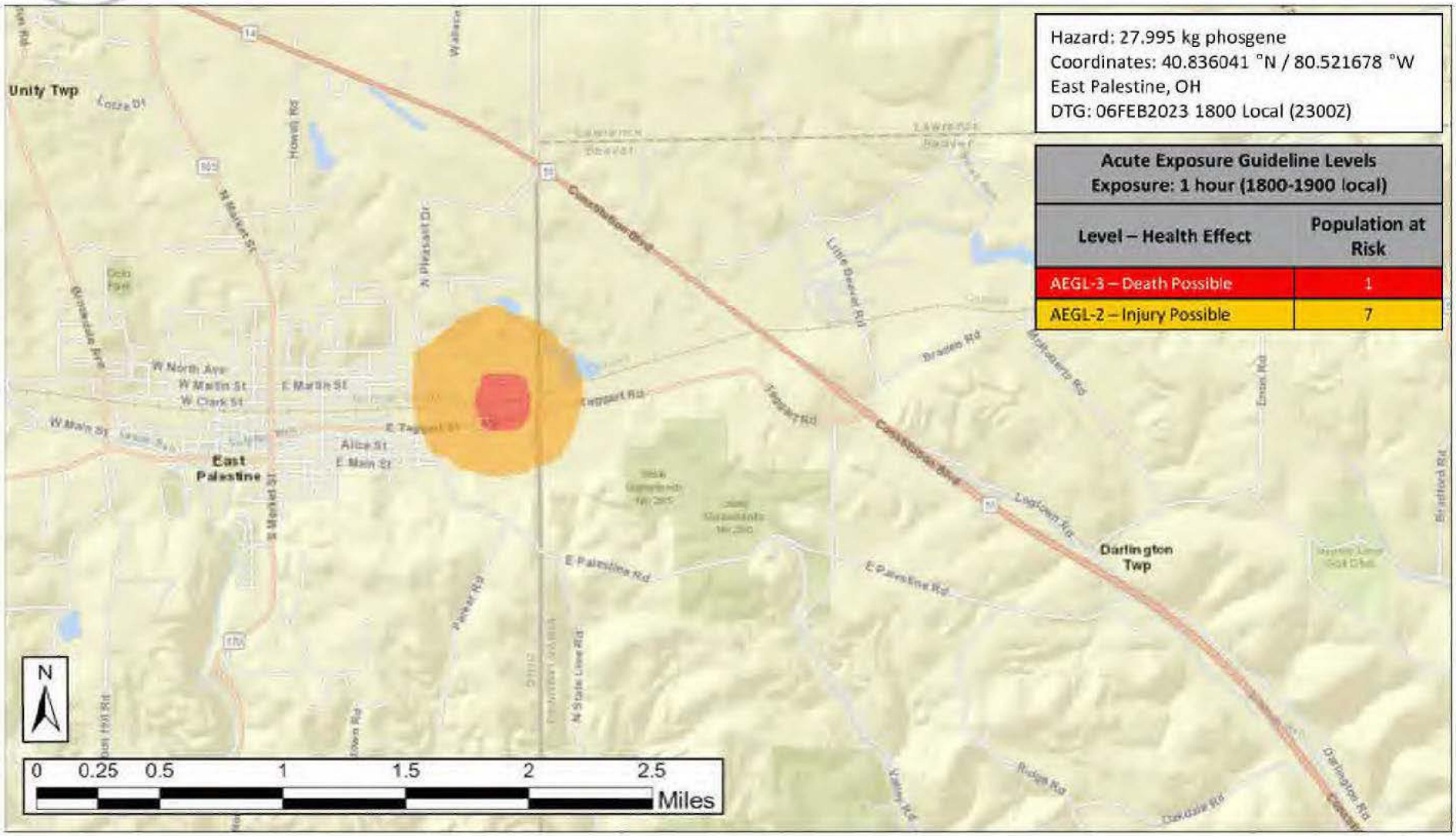
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

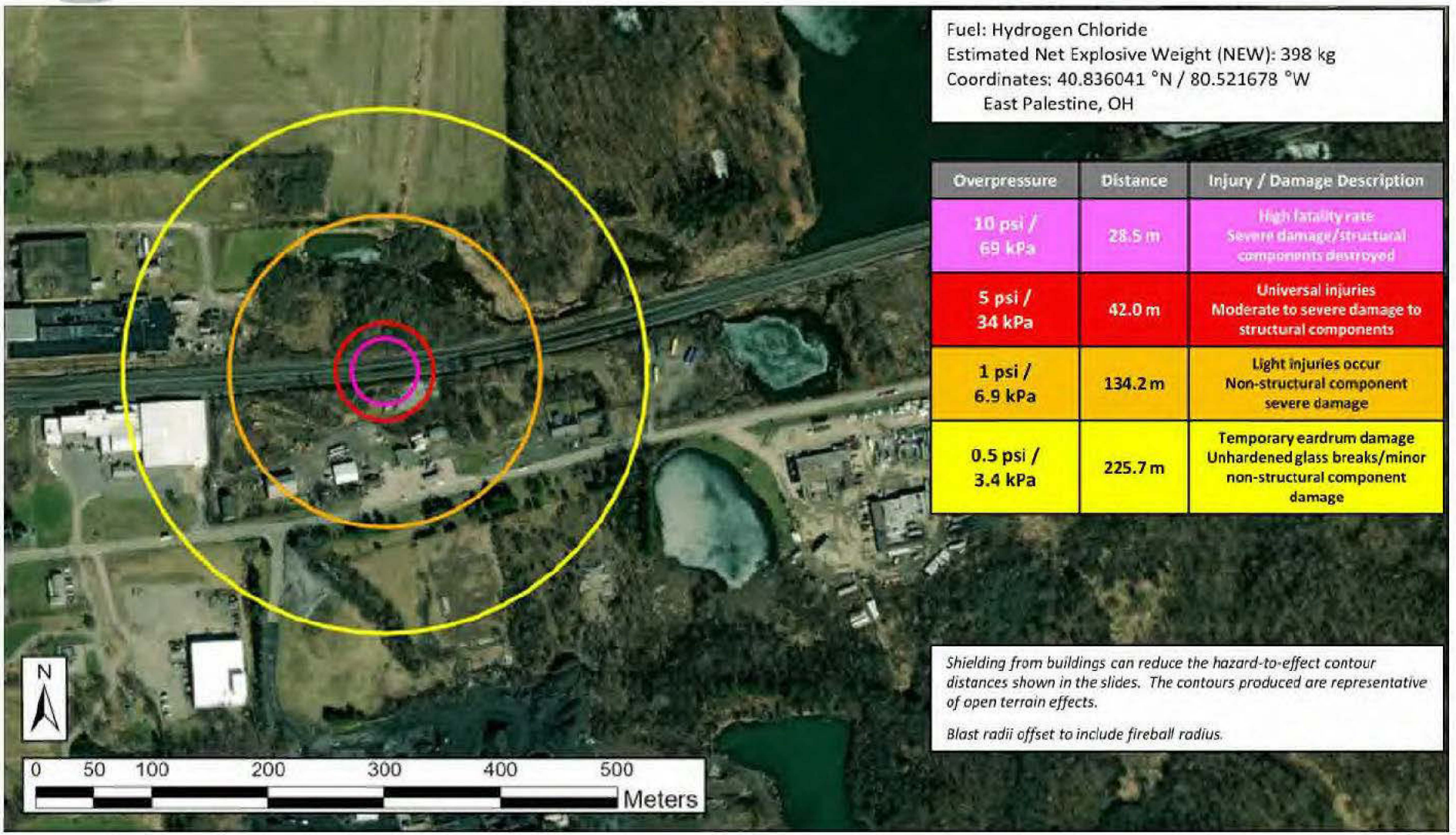
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

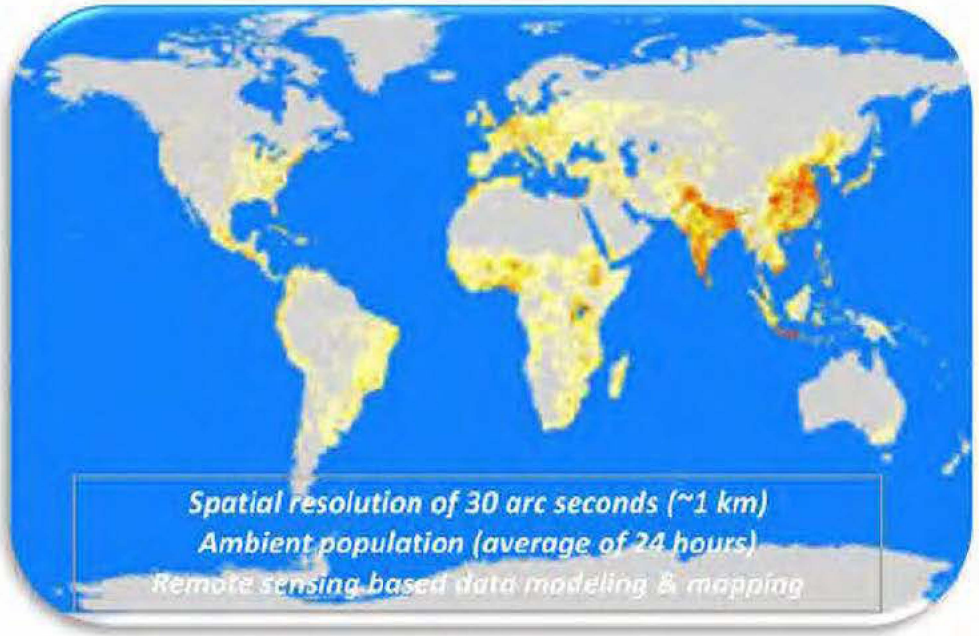
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 06FEB2023 1745Z

Version: Revision G

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081gU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 1 single railcar, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1400 06FEB2023 Local (1900Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

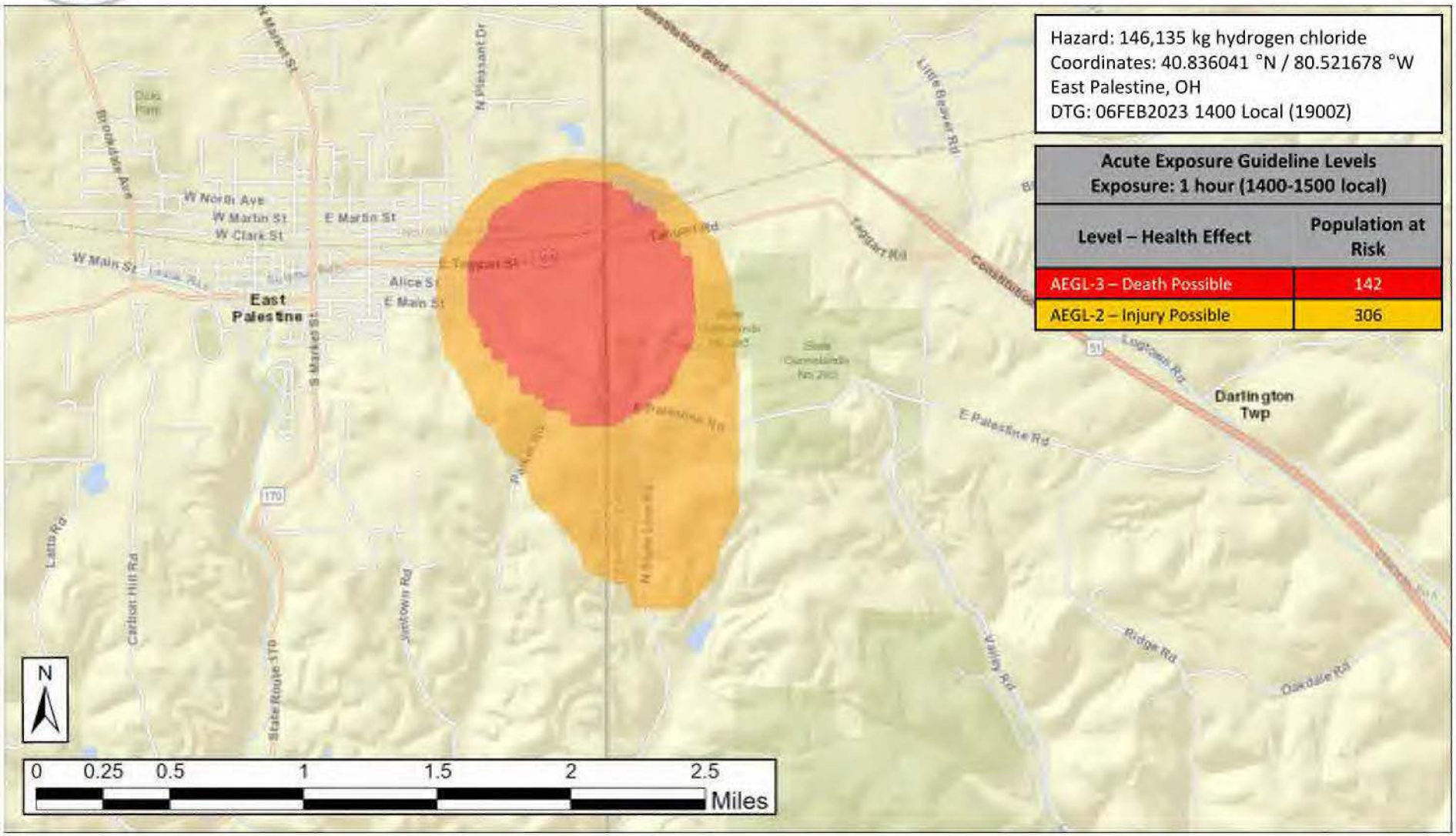
(b)(3)10USC130

- Blast effects from a BLEVE is provided.

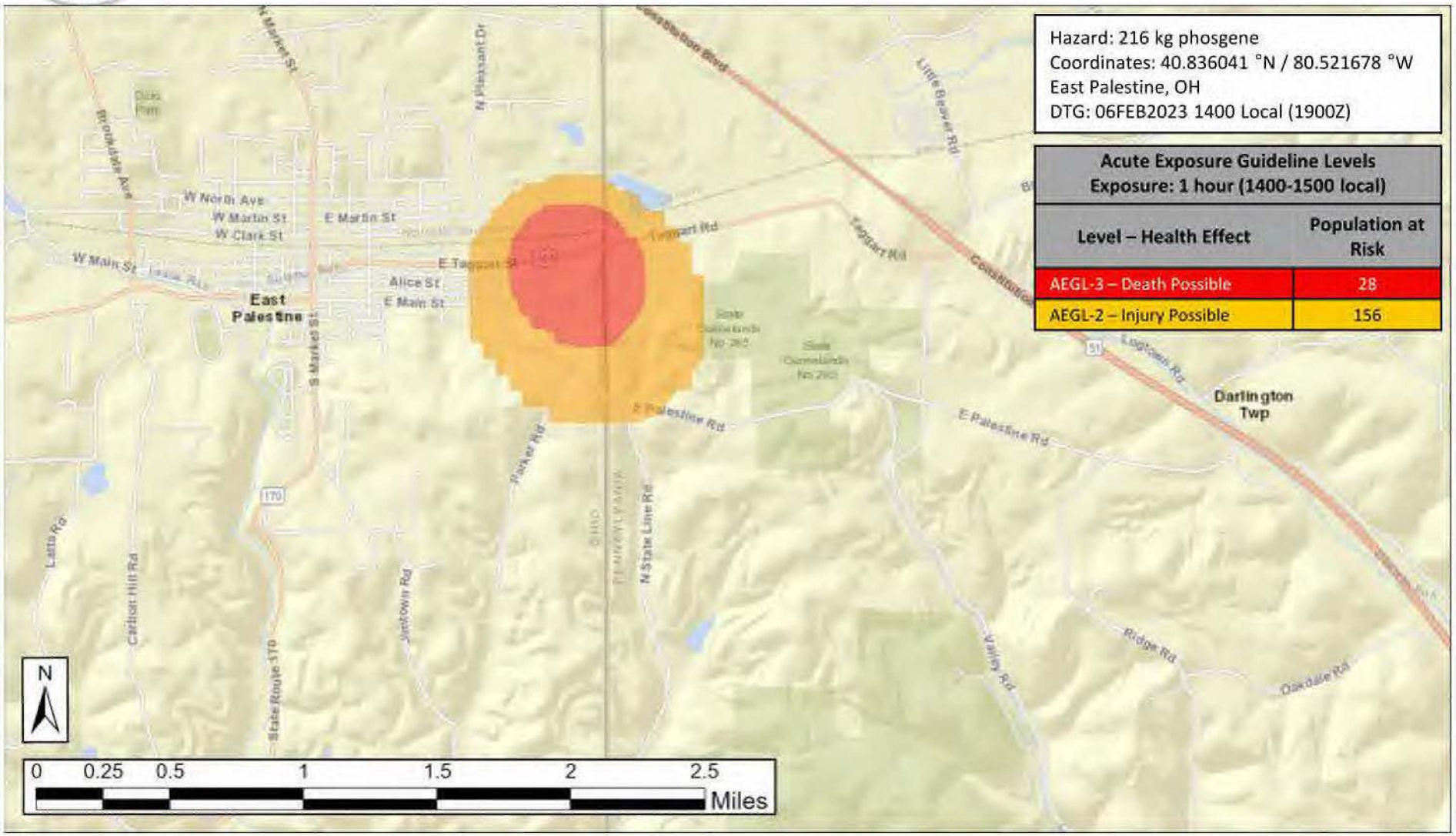
Caveats

- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

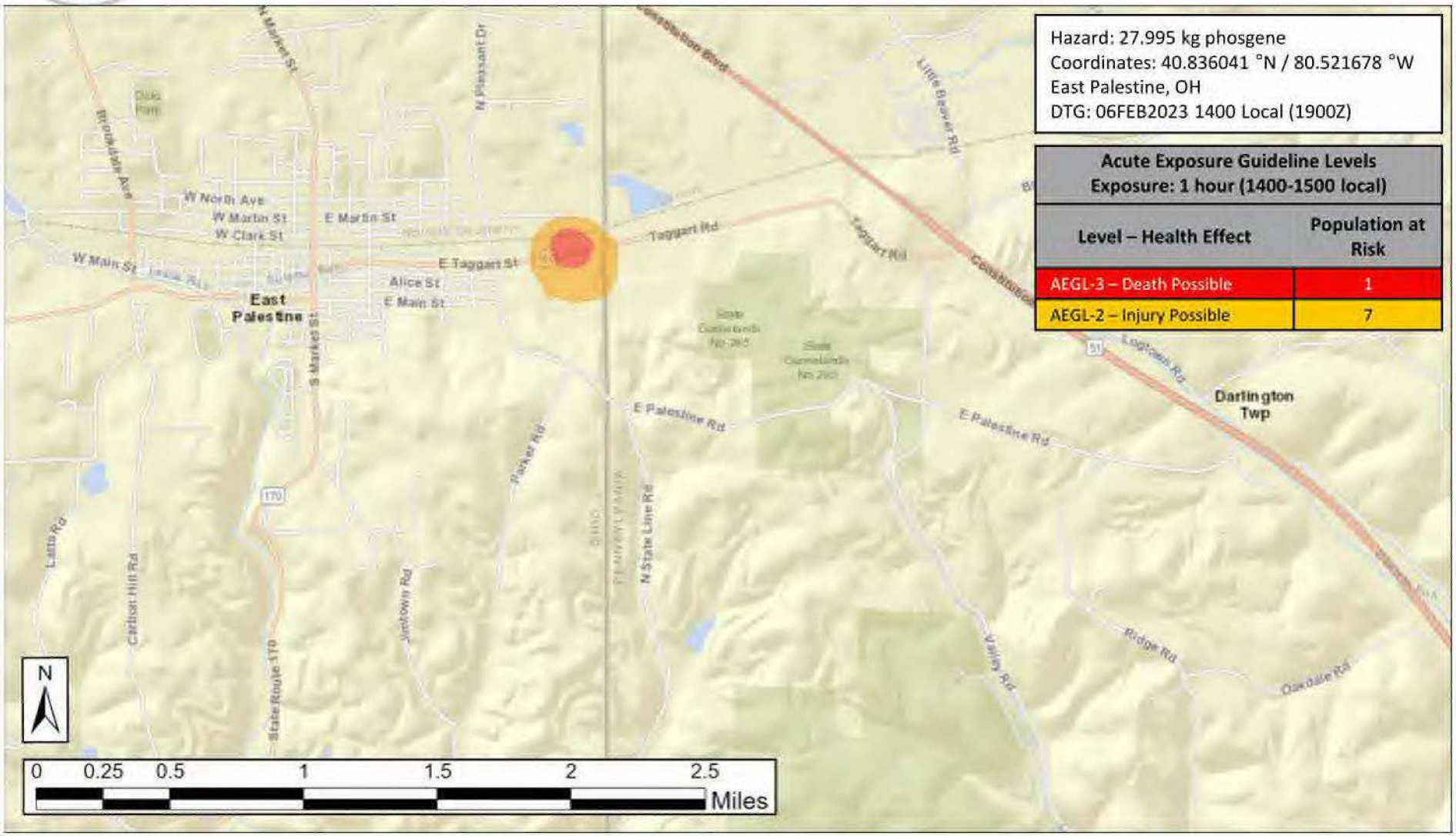
Hydrogen Chloride – 1400 Local



Phosgene – 1400 Local



Vinyl Chloride – 1400 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

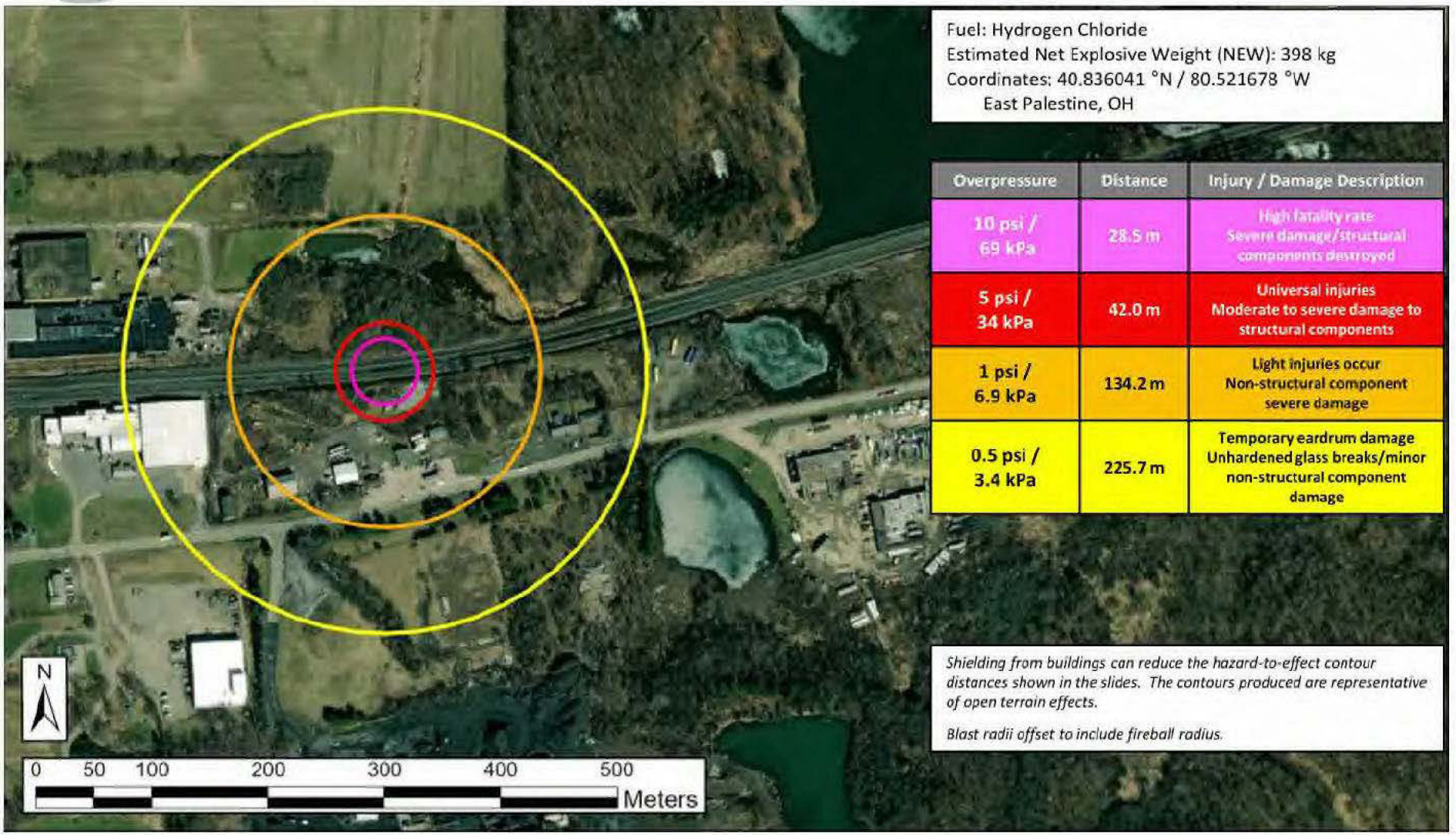
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

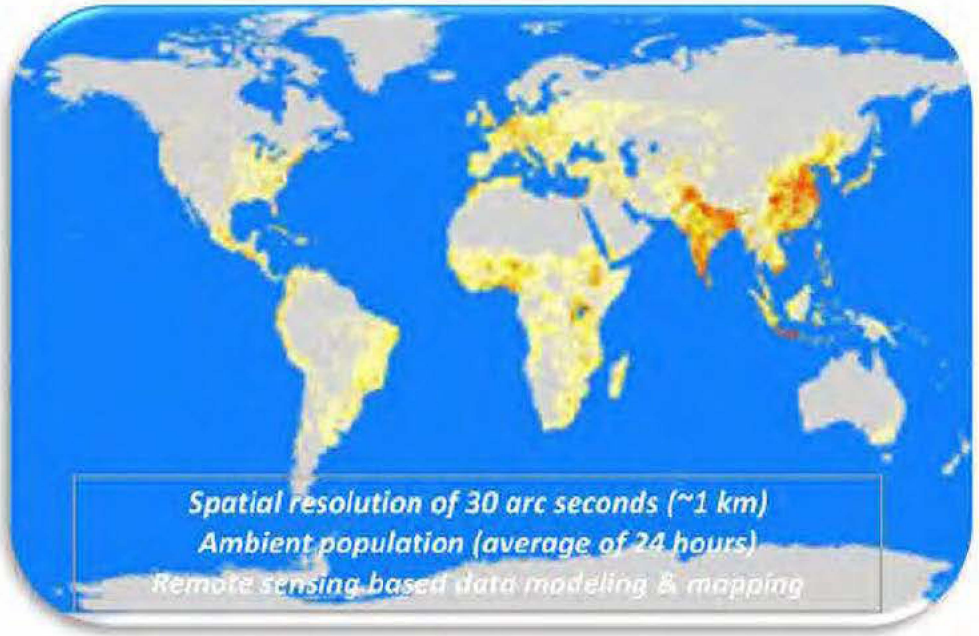
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

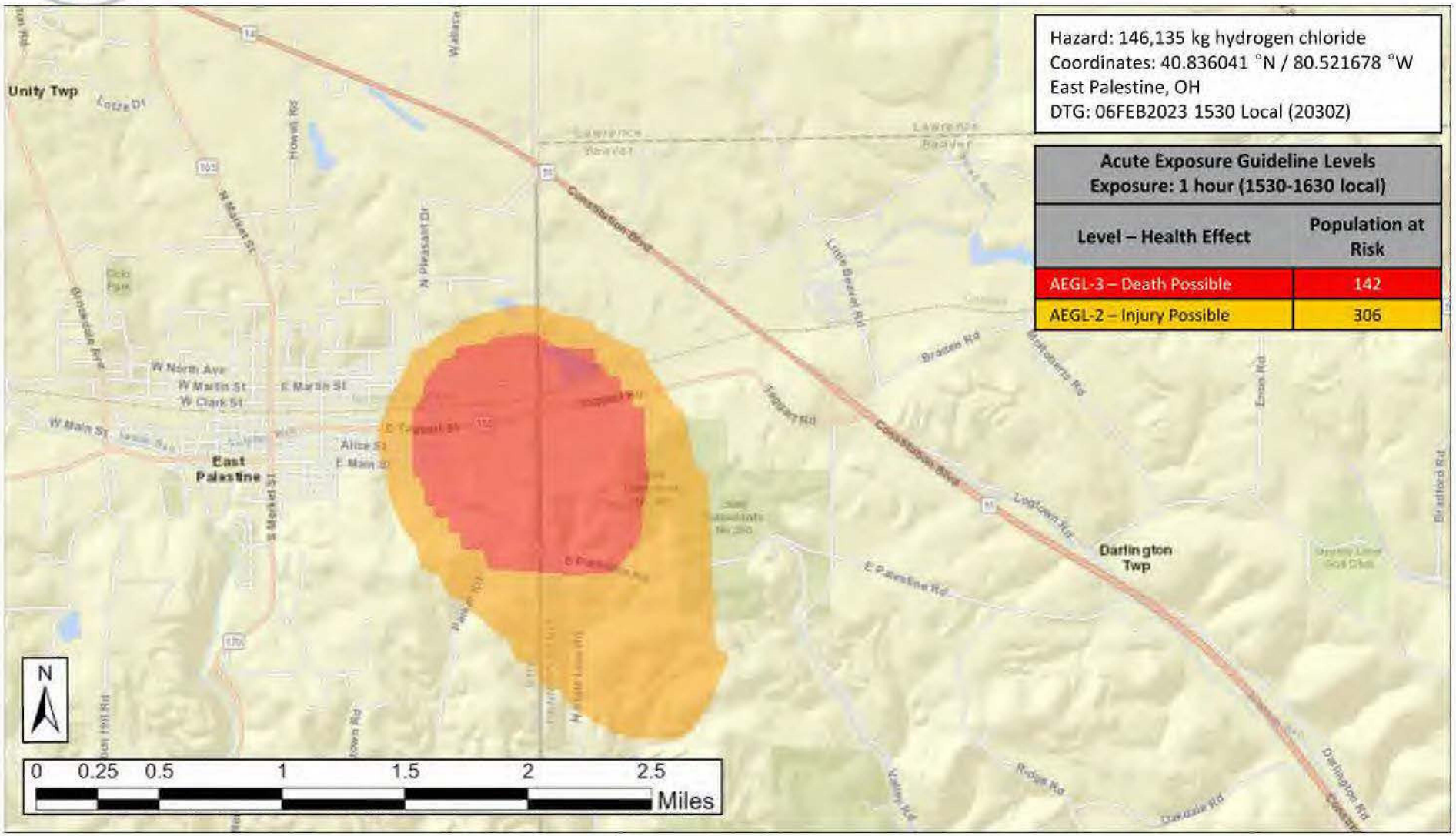
- Blast effects from a BLEVE is provided.

Caveats

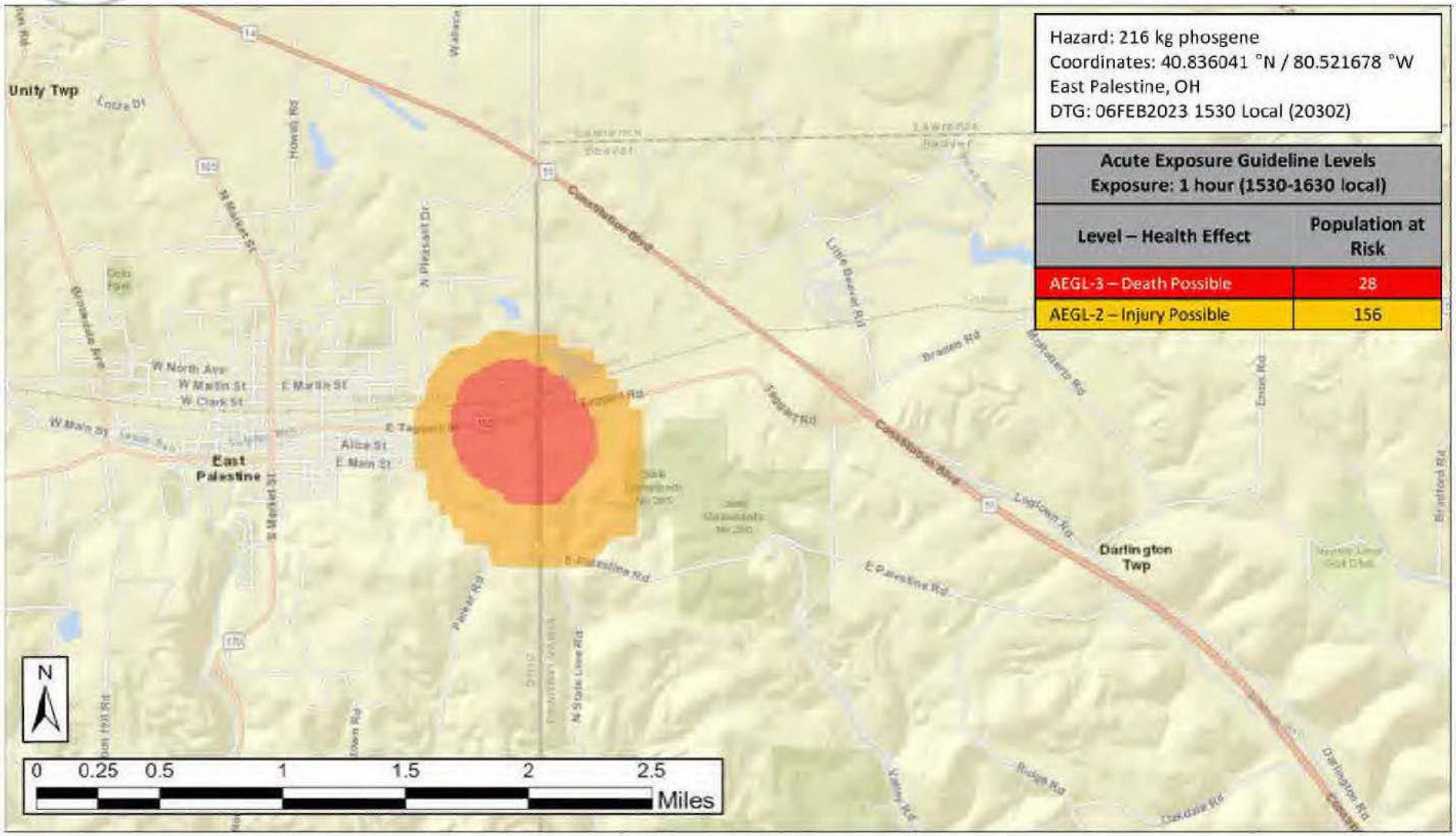
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

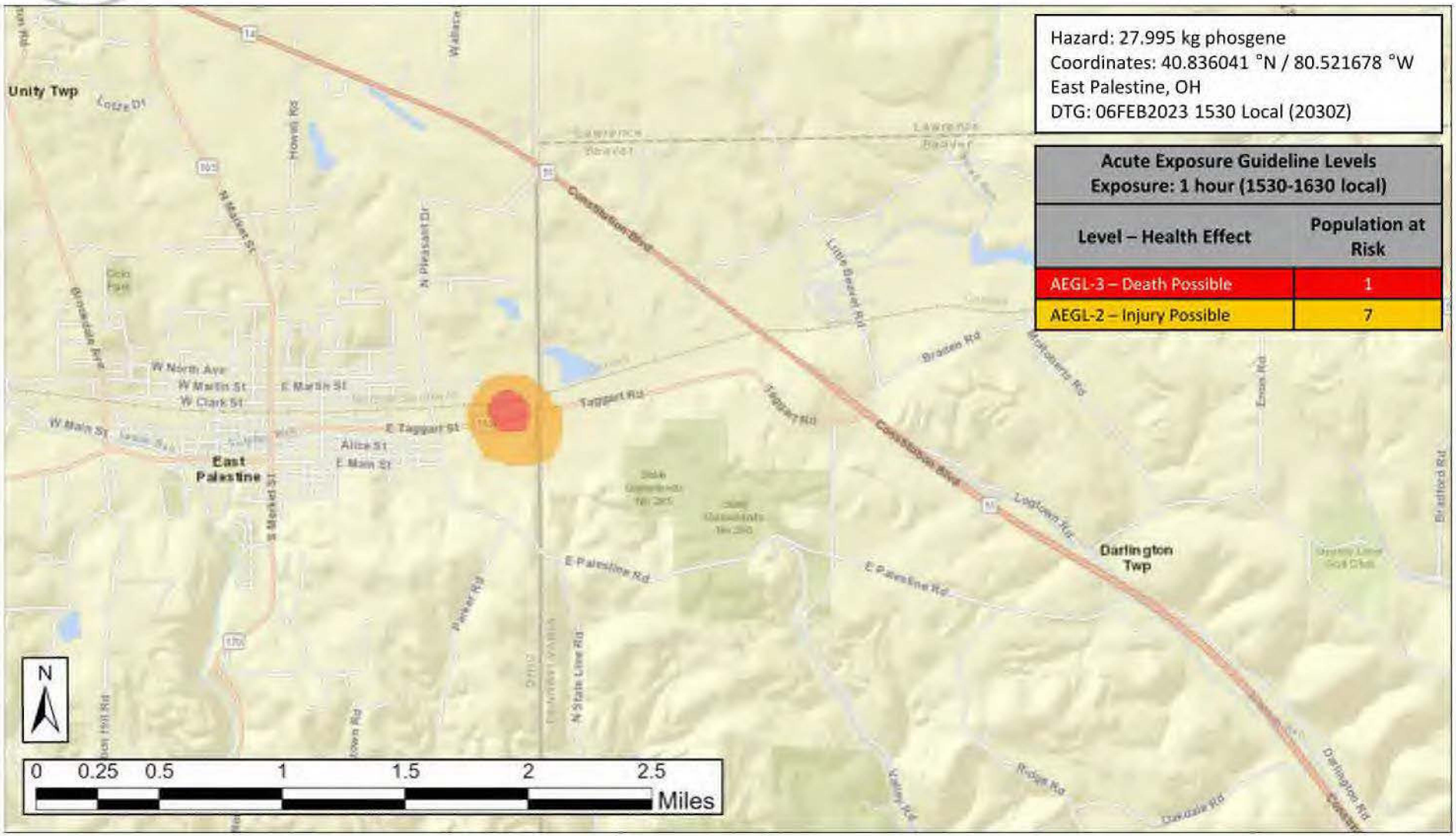
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

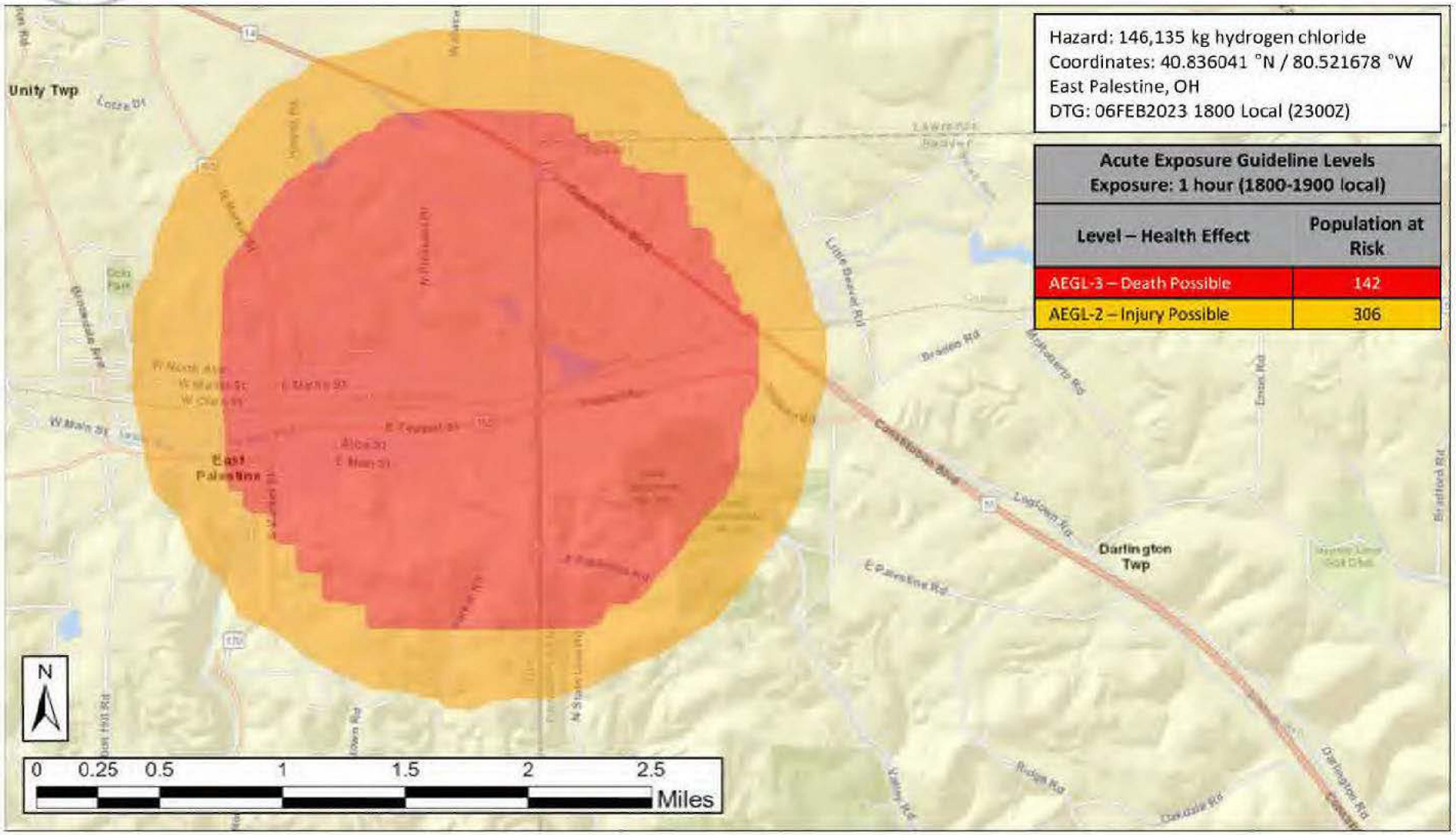


Vinyl Chloride – 1530 Local

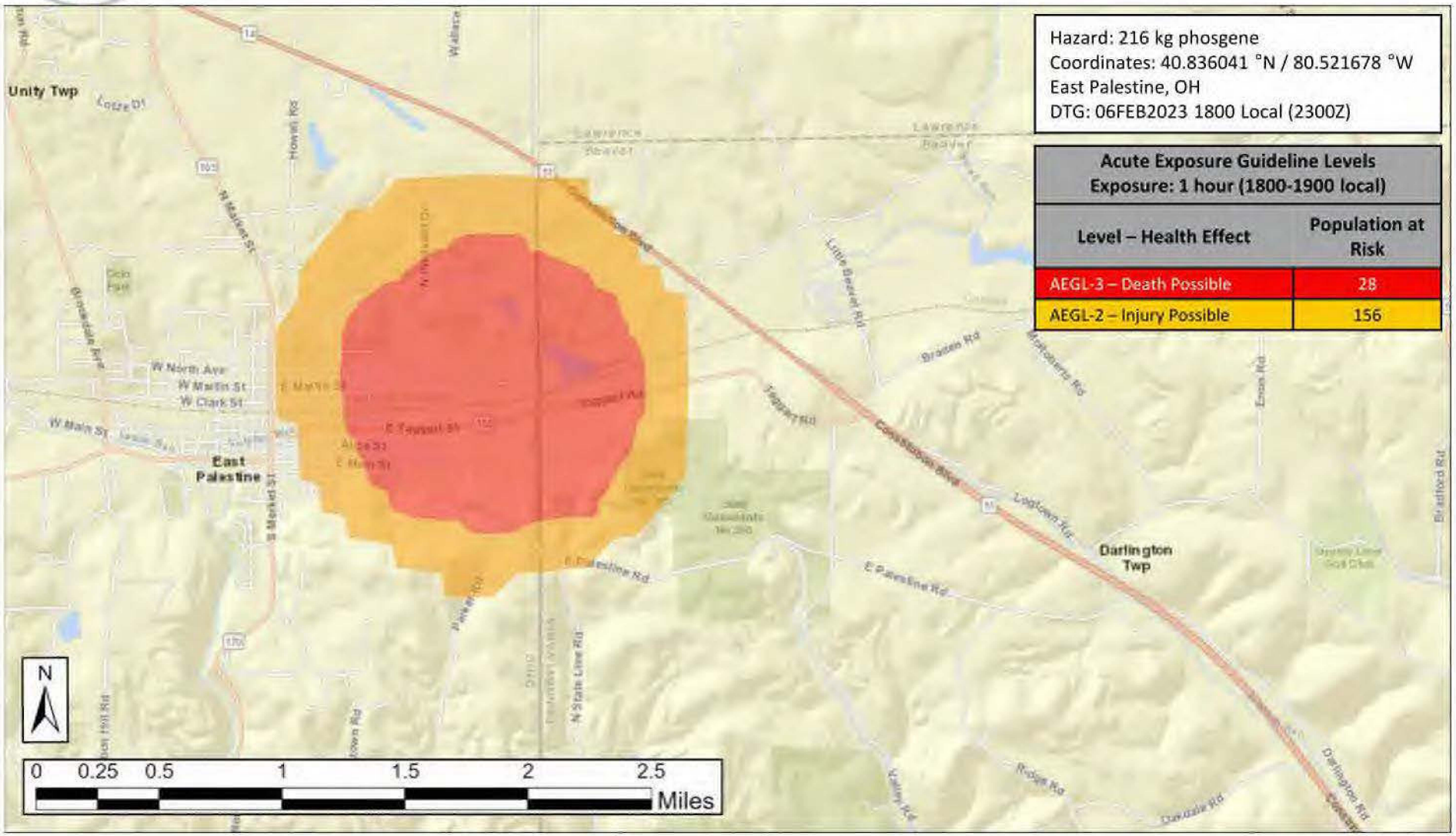


6:00PM Breach (2300Z)
06 FEB 2023

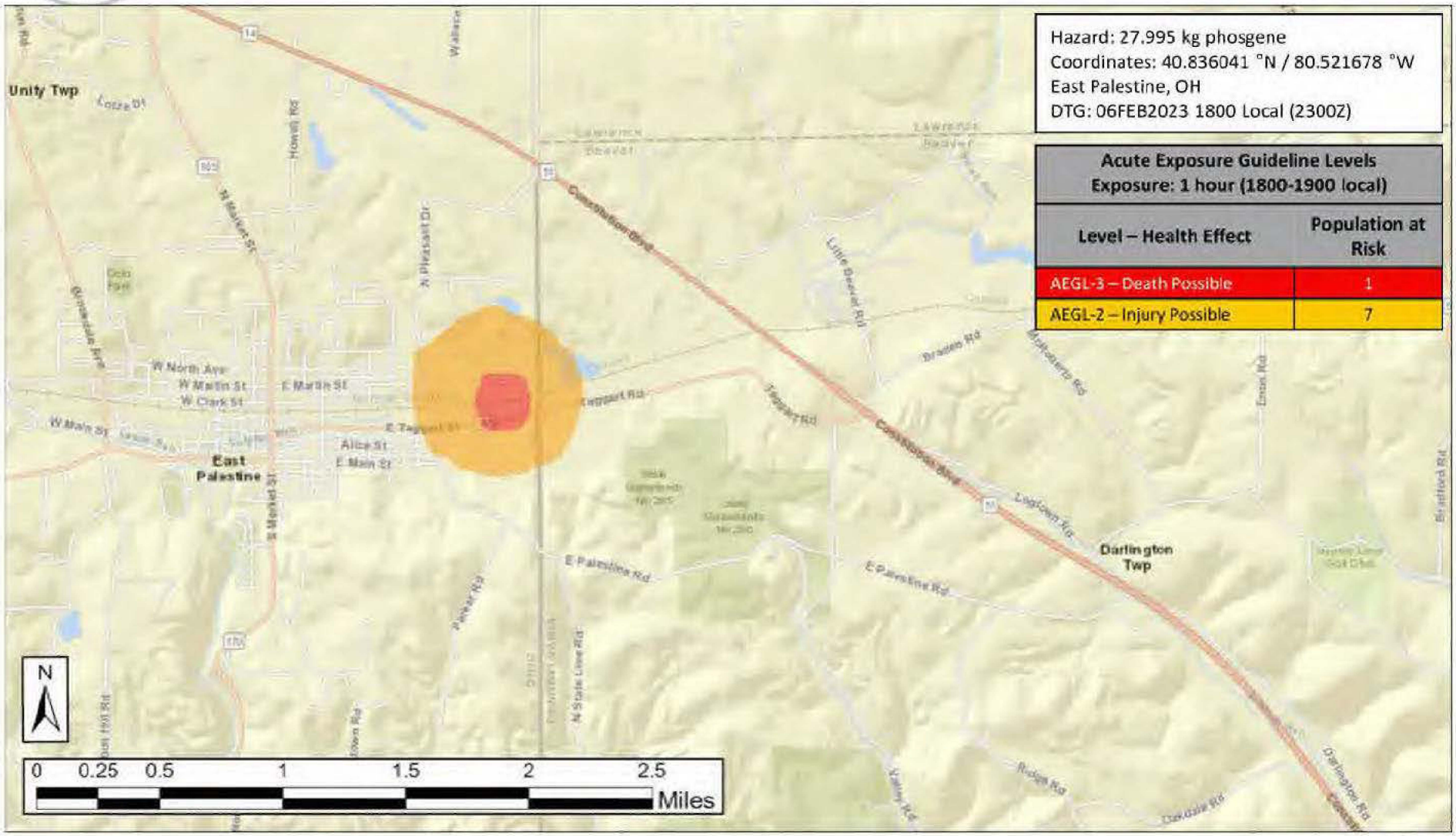
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

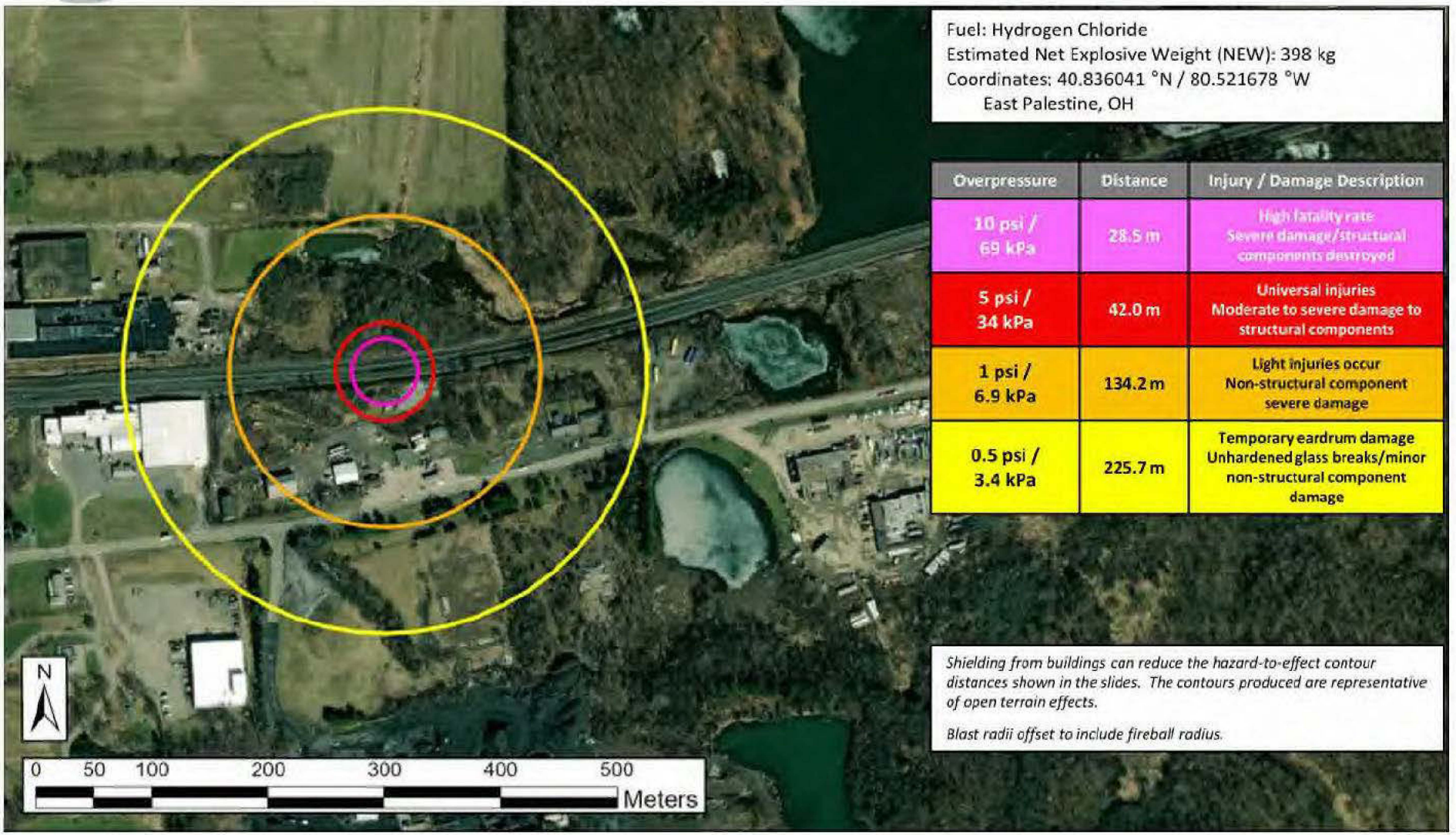
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

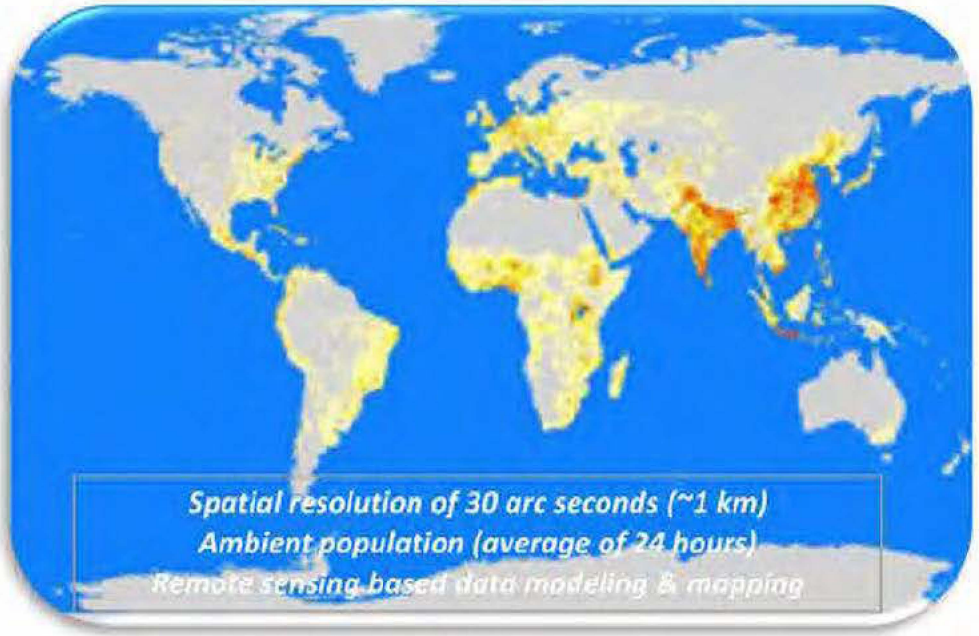
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 07FEB2023 1100Z

Version: Revision I

Changes: Adjusted buoyancy, Updated Wx

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081iU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 07FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 07FEB2023 Local (2030Z) 2. 1200 07FEB2023 Local (2030Z)
Executive Summary	• The largest AEGL-2 (serious injury possible) hazard area (HCl) extends about 150 feet away from the fire. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown**

Modeling Overview

- A breach of five mostly-full (70%) vinyl chloride containers is considered. This results in some level of combustion/explosion. Based on reports from the shipper, the estimated total load is approximately 3.5 cars' worth.
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

Caveats

- The partitioning of the various chemicals is not fully known. We have made the best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accounted for accurately.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling cannot account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

6:00 AM Breach (1100Z)
07 FEB 2023

Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Vinyl Chloride – 0600 Local

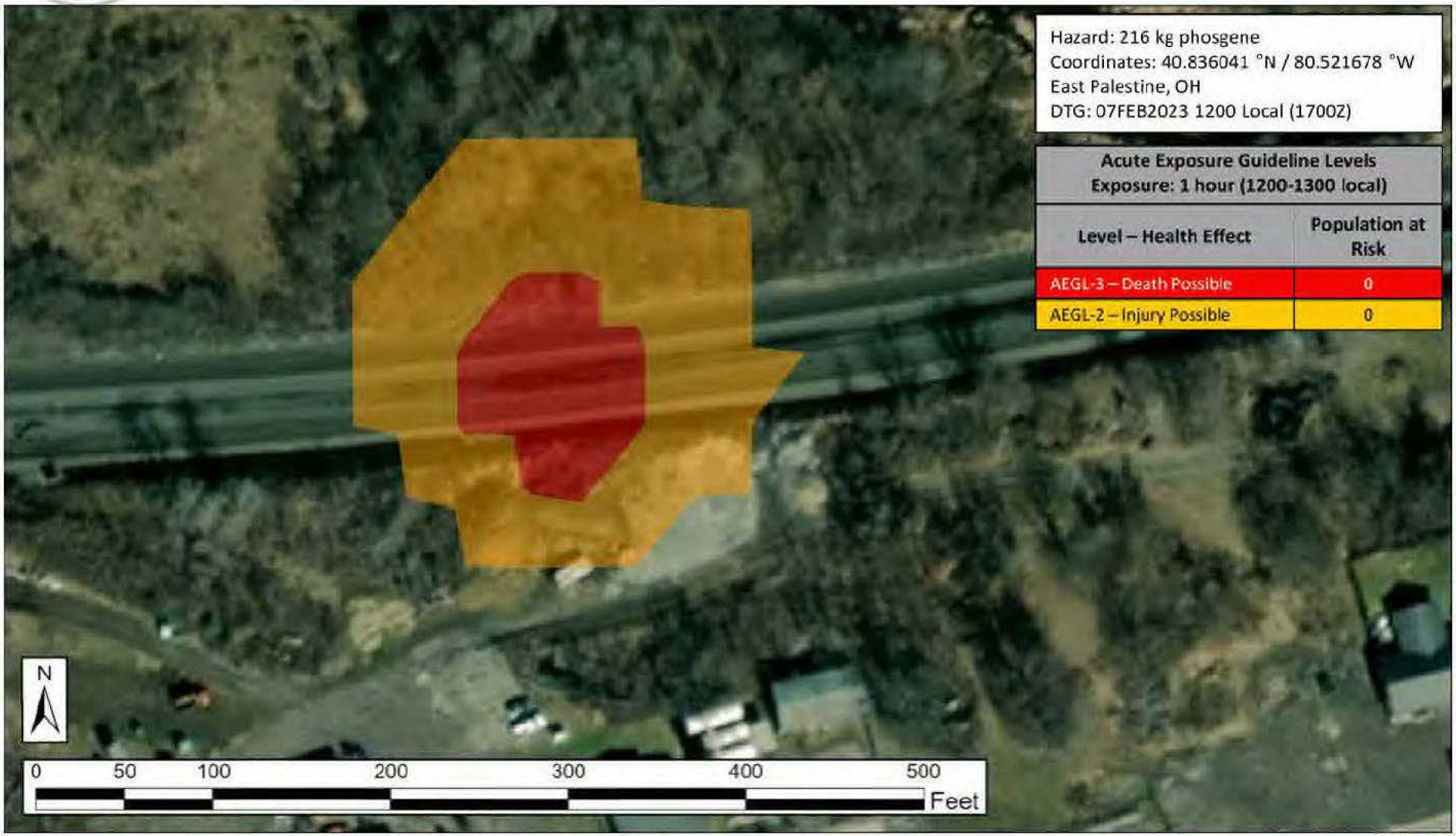


12:00 PM Breach (1700Z)
07 FEB 2023

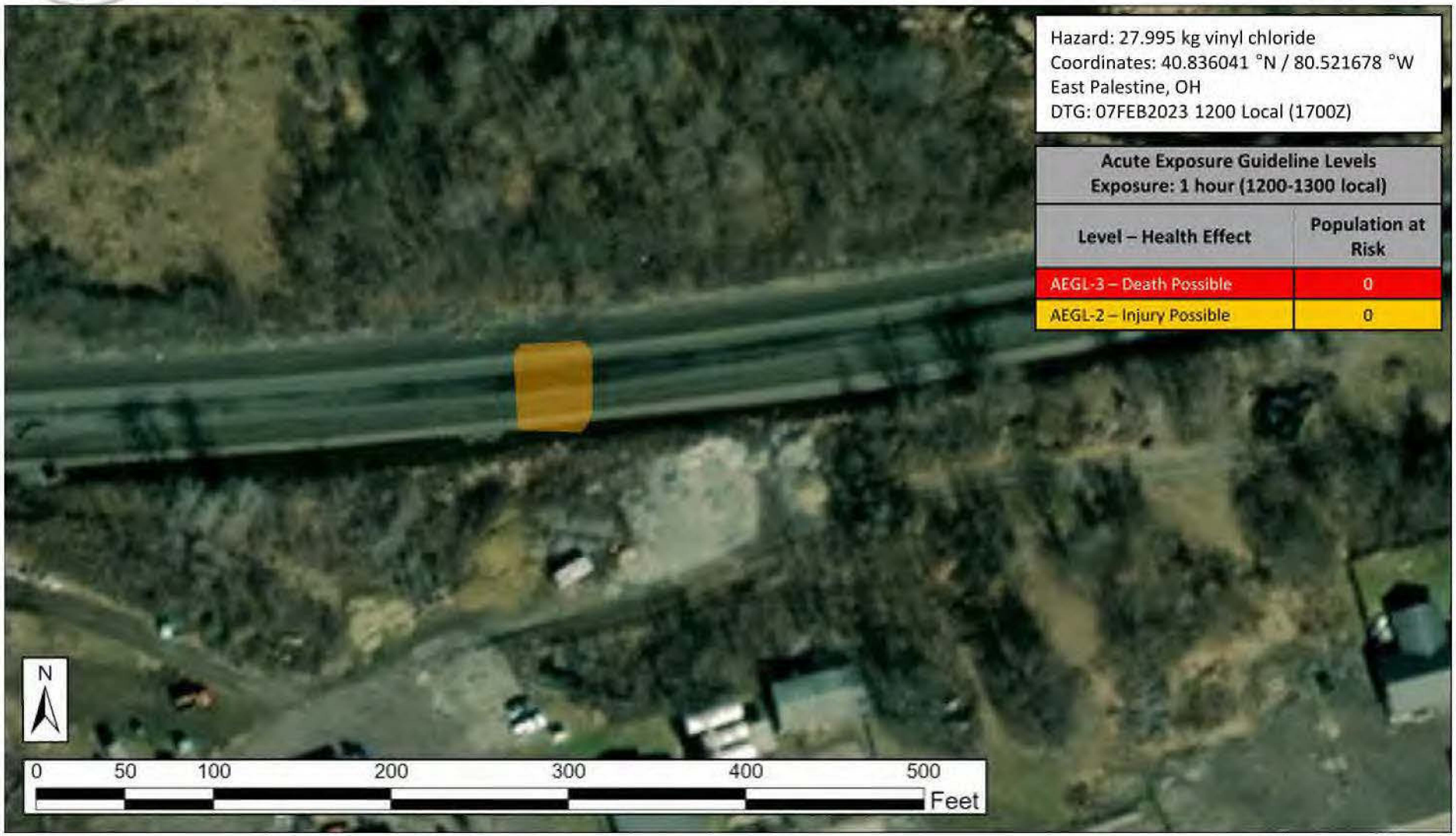
Hydrogen Chloride – 1200 Local



Phosgene – 1200 Local



Vinyl Chloride – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

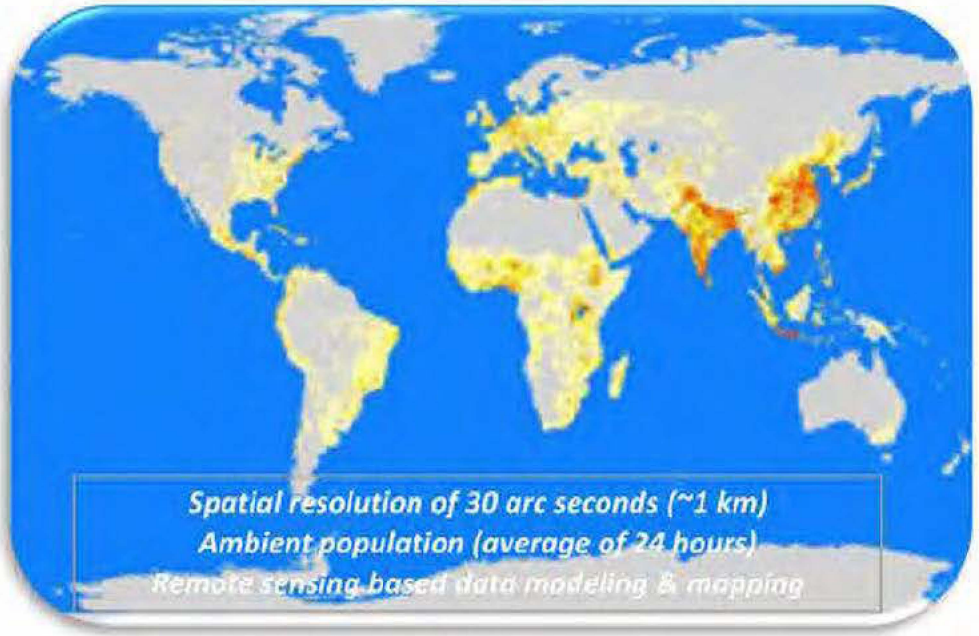
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 07FEB2023 1100Z

Version: Revision I

Changes: Adjusted buoyancy, Updated Wx

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081iU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 07FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 07FEB2023 Local (2030Z) 2. 1200 07FEB2023 Local (2030Z)
Executive Summary	• The largest AEGL-2 (serious injury possible) hazard area (HCl) extends about 150 feet away from the fire. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown**

Modeling Overview

- A breach of five mostly-full (70%) vinyl chloride containers is considered. This results in some level of combustion/explosion. Based on reports from the shipper, the estimated total load is approximately 3.5 cars' worth.
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

Caveats

- The partitioning of the various chemicals is not fully known. We have made the best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accounted for accurately.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling cannot account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

6:00 AM Breach (1100Z)
07 FEB 2023

Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Vinyl Chloride – 0600 Local

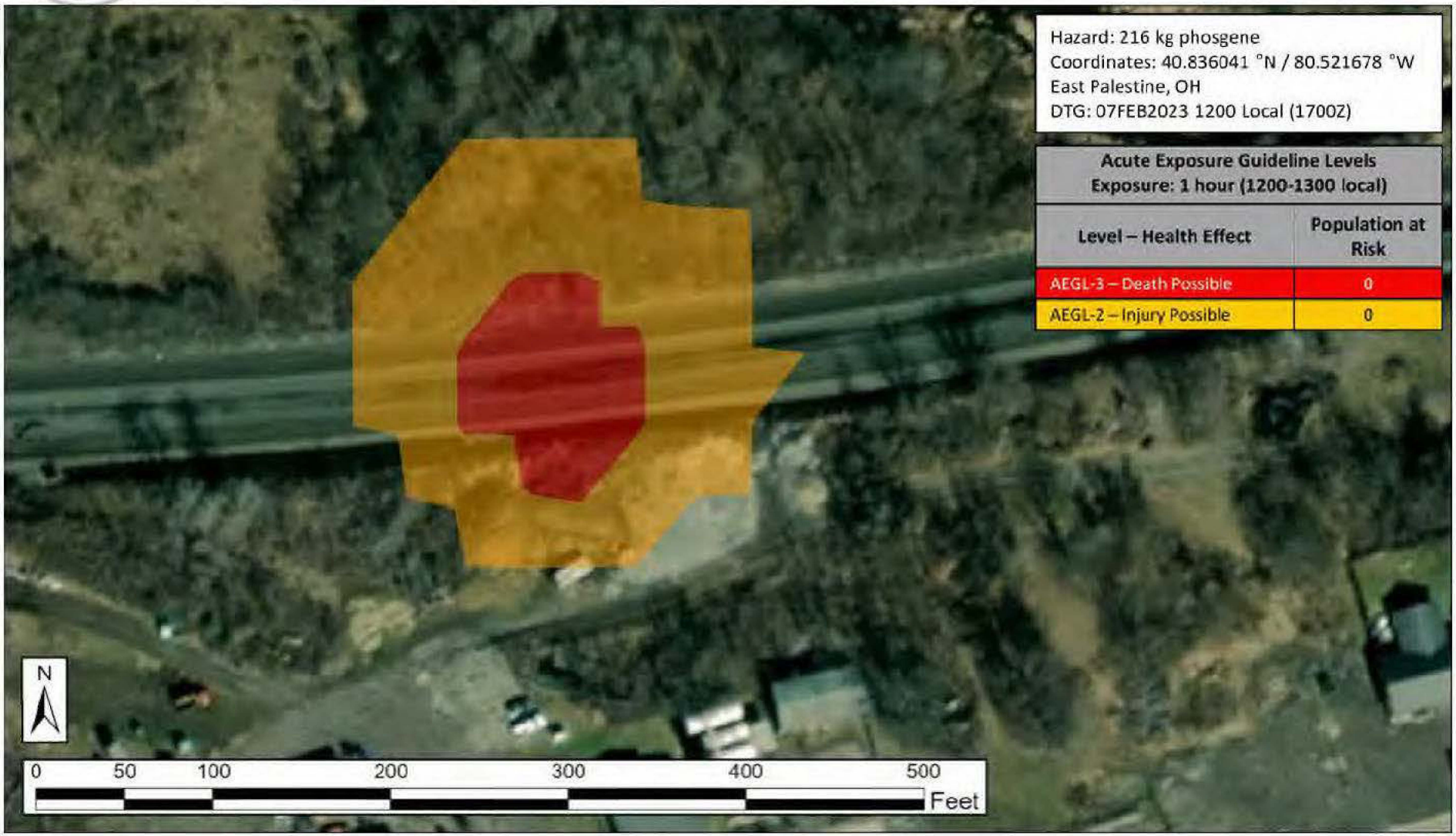


12:00 PM Breach (1700Z)
07 FEB 2023

Hydrogen Chloride – 1200 Local



Phosgene – 1200 Local



Vinyl Chloride – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

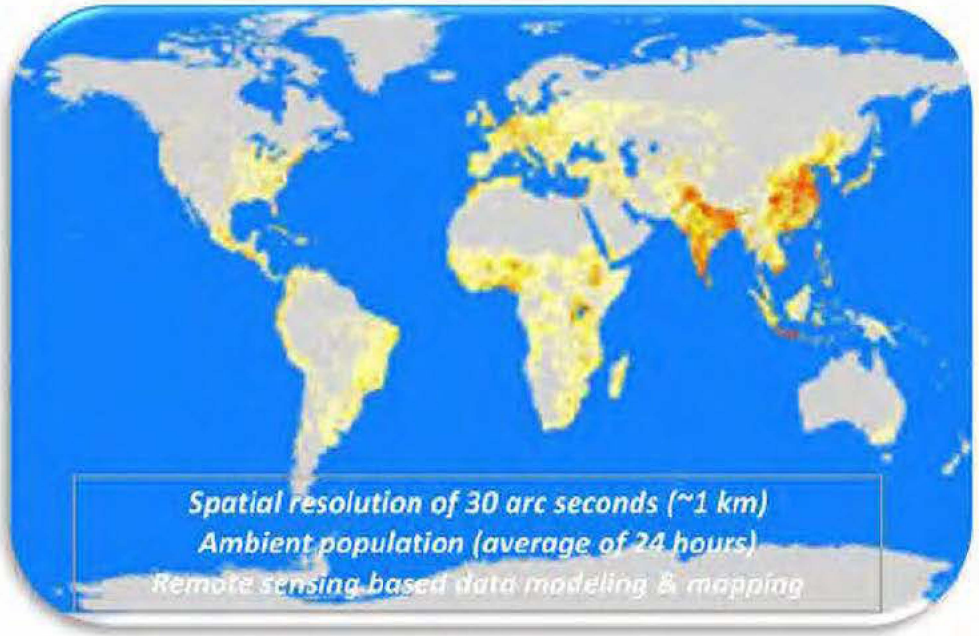
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center; (b) (6)
Cc: DTRA Ft Belvoir RD Mailbox Reachback; (b) (6)
Subject: (Real World) IMAAC Product Available
Date: Saturday, February 4, 2023 1:56:51 AM

IMAAC has completed an initial modeling product for activation requested by the EPA for a train derailment and fire in E. Palestine, OH at 11:30PM EST. The product is available on the IMAAC Portal page (https://www.radresponder.net/app/index#imaac/modelrequest).

IMAAC Technical Operations will conduct a coordination teleconference at 0210 EST (0710Z) to discuss source term and weather information, the initial modeling product, and other agency modeling products (if available). (b) (6) (b) (6) it would be helpful if you called in to this phone conference.

Teleconference information:
Phone number: 1-800-320-4330
PIN: 692400#

(b) (6)
IMAAC TECHNICAL OPERATIONS HUB
(b) (6)
IMAAC@FEMA.DHS.GOV

From: (b) (6)
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: [Non-DoD Source] East Palestine
Date: Saturday, February 4, 2023 1:07:09 AM
Attachments: East Palestine Train Derailment_Rail Car List.xlsx

---

(b) (6)
On-Scene Coordinator
US EPA
2565 Plymouth Road
Ann Arbor, MI 48105
(b) (6)

#	Postion	Car #	UN/NA	Product	Haz Class #	Load/Empty
1	2nd	GATX9166	1075	Residue LPG	2	Empty
2	26th	TILX402025	1086	Vinyl Chloride Stabilized	2.1	Load
3	27th	OCPX080235	1086	Vinyl Chloride Stabilized	2.1	Load
4	28h	OCPX080179	1086	Vinyl Chloride Stabilized	2.1	Load
5	29th	GATX95098	1086	Vinyl Chloride Stabilized	2.1	Load
6	34th	SHPX211226	1993	Combustible Liquid, Ethelyene Glycol	3	Load
7	36th	DOWX73168	1993	Ethyl-Hexayl Acrylate	3	Load
8	47th	NATX35844	1055	Iso-butylene	2.1	Load
9	48th	UTLX205907	2348	Butyl-Acrylates, Stabilized	3	Load
10	53rd	OCPX80370	1086	Vinyl Chloride Stabilized	2.1	Load
11	57th	DPRX259013	1114	Residue, Last contained Benzene	3	Empty
12	58th	DPRX258671	1114	Residue, Last contained Benzene	3	Empty
13	91st	UTLX667639	1993	Ethylene Glycol	3	Load
14	97th	GATX54892	1993	Combustible Liquid, nos	3	Load
15	100th	GATX54899	2348	Butyl-Acrylates, Stabilized	3	Load
16	116th	TILX101984	1832	Sulfuric Acid, Spent	8	Load
17	117th	GATX37935	1832	Sulfuric Acid, Spent	8	Load
18	118th	TILX101958	1832	Sulfuric Acid, Spent	8	Load
19	119th	GATX35941	1832	Sulfuric Acid, Spent	8	Load
20	120th	GATX35930	1832	Sulfuric Acid, Spent	8	Load

NS POC

(b) (6) [redacted]

From: (b) (6)
To: (b) (6) Ft Belvoir RD Mailbox Reachback; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: [Non-DoD Source] Fwd: Train manifest
Date: Saturday, February 4, 2023 1:52:49 AM
Attachments: SHPX211226_Train_Export.csv

:

From: (b) (6)
Date: February 4, 2023 at 01:49:50 EST
To: '(b) (6)
Subject: Train manifest

SEQ #	EQUIPMENT ID	CAR TYPE	CONTAINER ID	CONTAINER TYPE	L/E STATUS
1	NS 4178	LOCOMOTIVE			UNKNOWN
2	NS 4224	LOCOMOTIVE			UNKNOWN
3	OCPX 70524	HOPPER CAR			LOADED
4	GATX 9166	TANK CAR			EMPTY
5	TTPX 81589	BULKHEAD FLAT			LOADED
6	TTPX 805391	BULKHEAD FLAT			LOADED
7	TTPX 80902	BULKHEAD FLAT			LOADED
8	TTPX 806356	BULKHEAD FLAT			LOADED
9	TTZX 864660	BULKHEAD FLAT			LOADED
10	GACX 15324	HOPPER CAR			LOADED
11	NS 245167	HOPPER CAR			EMPTY
12	TBOX 641071	BOX CAR			LOADED
13	CSOX 23642	TANK CAR			EMPTY
14	UTCX 46842	HOPPER CAR			EMPTY
15	TILX 623413	HOPPER CAR			LOADED
16	BRKX 62205	HOPPER CAR			LOADED
17	GPLX 76170	HOPPER CAR			LOADED
18	GPLX 76158	HOPPER CAR			LOADED
19	GPLX 75450	HOPPER CAR			LOADED
20	MULX 53887	HOPPER CAR			LOADED
21	TILX 624042	HOPPER CAR			LOADED
22	BRKX 68611	HOPPER CAR			LOADED
23	ARSX 4145	HOPPER CAR			LOADED
24	BRKX 66738	HOPPER CAR			LOADED
25	GPLX 75465	HOPPER CAR			LOADED
26	ECUX 860375	HOPPER CAR			LOADED
27	UTLX 684543	TANK CAR			EMPTY
28	TILX 402025	TANK CAR			LOADED
29	OCPX 80235	TANK CAR			LOADED
30	OCPX 80179	TANK CAR			LOADED
31	GATX 95098	TANK CAR			LOADED
32	RACX 51629	TANK CAR			LOADED
33	LYBX 5191	TANK CAR			LOADED
34	RACX 51435	TANK CAR			LOADED
35	UTLX 671772	TANK CAR			LOADED
36	SHPX 211226	TANK CAR			LOADED
37	TILX 331319	HOPPER CAR			LOADED
38	DOWX 73168	TANK CAR			LOADED
39	ROIX 57036	HOPPER CAR			LOADED
40	NCUX 40057	HOPPER CAR			LOADED
41	UTLX 100055	TANK CAR			LOADED
42	XOMX 110664	TANK CAR			LOADED
43	UTLX 684798	TANK CAR			LOADED
44	UTLX 671310	TANK CAR			LOADED
45	CERX 30072	TANK CAR			LOADED
46	SHPX 211106	TANK CAR			LOADED
47	NATX 231335	TANK CAR			LOADED
48	UTLX 671913	TANK CAR			LOADED
49	NATX 35844	TANK CAR			LOADED
50	UTLX 205907	TANK CAR			LOADED
51	UTLX 661296	TANK CAR			LOADED

52	COCX 287059	TANK CAR	LOADED
53	ROIX 59396	HOPPER CAR	LOADED
54	ROIX 57782	HOPPER CAR	LOADED
55	OCPX 80370	TANK CAR	LOADED
56	TBOX 640019	BOX CAR	LOADED
57	BKTY 152621	BOX CAR	LOADED
58	LINX 7278	BOX CAR	LOADED
59	DPRX 259013	TANK CAR	EMPTY
60	DPRX 258671	TANK CAR	EMPTY
61	XOMX 110236	TANK CAR	LOADED
62	ELTX 7458	HOPPER CAR	LOADED
63	ELTX 3421	HOPPER CAR	LOADED
64	NDYX 892049	HOPPER CAR	LOADED
65	TTGX 953815	AUTORACK	LOADED
66	TBOX 889334	BOX CAR	LOADED
67	NOKL 603412	BOX CAR	LOADED
68	NS 472751	BOX CAR	LOADED
69	TBOX 676291	BOX CAR	LOADED
70	TBOX 670331	BOX CAR	LOADED
71	TBOX 662599	BOX CAR	LOADED
72	KCS 112405	BOX CAR	LOADED
73	TBOX 666771	BOX CAR	LOADED
74	TBOX 664264	BOX CAR	LOADED
75	TBOX 642155	BOX CAR	LOADED
76	TBOX 643155	BOX CAR	LOADED
77	TBOX 630049	BOX CAR	LOADED
78	BKTY 151113	BOX CAR	LOADED
79	TBOX 672287	BOX CAR	LOADED
80	TBOX 643036	BOX CAR	LOADED
81	TTZX 862546	BULKHEAD FLAT	LOADED
82	NAHX 320459	HOPPER CAR	LOADED
83	TTGX 696500	AUTORACK	LOADED
84	TTGX 851756	AUTORACK	LOADED
85	TTGX 981950	AUTORACK	LOADED
86	LRS 137205	BOX CAR	LOADED
87	NS 469567	BOX CAR	LOADED
88	TBOX 641883	BOX CAR	LOADED
89	TBOX 675515	BOX CAR	LOADED
90	LRS 2512	BOX CAR	LOADED
91	TBOX 672773	BOX CAR	LOADED
92	BKTY 152854	BOX CAR	LOADED
93	UTLX 667639	TANK CAR	LOADED
94	GATX 225435	TANK CAR	LOADED
95	UTLX 669739	TANK CAR	LOADED
96	NAHX 620163	HOPPER CAR	LOADED
97	TTPX 81575	BULKHEAD FLAT	LOADED
98	SHQX 4267	HOPPER CAR	LOADED
99	GATX 54892	TANK CAR	LOADED
100	TBOX 639745	BOX CAR	LOADED
101	TBOX 640016	BOX CAR	LOADED
102	GATX 54899	TANK CAR	LOADED
103	ROIX 58372	HOPPER CAR	LOADED

104	MULX 200058	HOPPER CAR	LOADED
105	SHPX 463835	HOPPER CAR	LOADED
106	ELTX 7538	HOPPER CAR	LOADED
107	CCBX 58366	HOPPER CAR	LOADED
108	BRKX 66231	HOPPER CAR	LOADED
109	CITX 200199	HOPPER CAR	LOADED
110	CITX 200288	HOPPER CAR	LOADED
111	GISX 1386	HOPPER CAR	LOADED
112	NS 4412	LOCOMOTIVE	UNKNOWN
113	GONX 320417	GONDOLA	LOADED
114	GONX 310070	GONDOLA	LOADED
115	NW 189995	GONDOLA	LOADED
116	NW 169645	GONDOLA	LOADED
117	NS 163615	GONDOLA	LOADED
118	NS 168788	GONDOLA	LOADED
119	TILX 101984	TANK CAR	LOADED
120	GATX 35935	TANK CAR	LOADED
121	TILX 101958	TANK CAR	LOADED
122	GATX 35941	TANK CAR	LOADED
123	GATX 35930	TANK CAR	LOADED
124	STSX 51519	TANK CAR	LOADED
125	STSX 3110	TANK CAR	LOADED
126	STSX 51308	TANK CAR	LOADED
127	STSX 61226	TANK CAR	LOADED
128	STSX 4000	TANK CAR	LOADED
129	STSX 4201	TANK CAR	LOADED
130	STSX 3082	TANK CAR	LOADED
131	TILX 170527	TANK CAR	LOADED
132	ADMX 16442	TANK CAR	LOADED
133	DMIX 191118	TANK CAR	LOADED
134	ADMX 16192	TANK CAR	LOADED
135	DMIX 191011	TANK CAR	LOADED
136	VTGX 190085	TANK CAR	LOADED
137	GATX 73411	TANK CAR	LOADED
138	DMIX 190425	TANK CAR	LOADED
139	ADMX 15742	TANK CAR	LOADED
140	DMIX 190327	TANK CAR	LOADED
141	TILX 170647	TANK CAR	LOADED
142	ITFX 129067	HOPPER CAR	LOADED
143	SHPX 454520	HOPPER CAR	LOADED
144	CR 53534		EMPTY
145	CR 53318		EMPTY
146	CITX 701780	HOPPER CAR	LOADED
147	NS 168703	GONDOLA	LOADED
148	TILX 291356	TANK CAR	LOADED
149	TILX 650290	HOPPER CAR	LOADED
150	CEFX 360330	HOPPER CAR	LOADED
151	ADMX 64225	HOPPER CAR	LOADED
152	ADMX 63057	HOPPER CAR	LOADED
153	NS 76754	END OF TRAIN DEVICE	EMPTY

QUANTITY	UN/NA #	CONTENTS SHIPPING NAME	HAZARD CLASS	
Net Weight: 184700 Pounds		POLYVINYL		
0 Pounds	UN1075	PETROLEUM GASES, LIQUEFIED		2.1
Net Weight: 139029 Pounds		PIPE TUBG IORS		
Net Weight: 136981 Pounds		PIPE TUBG IORS		
Net Weight: 141588 Pounds		PIPE TUBG IORS		
Net Weight: 141906 Pounds		PIPE TUBG IORS		
Net Weight: 191400 Pounds		LBR TIMBER,DRID		
Net Weight: 214336 Pounds		FLOUR,WHEAT		
Net Weight: 148991 Pounds		MALT LIQUORS		
Net Weight: 193800 Pounds		POLYPROPYLENE		
Net Weight: 194350 Pounds		POLYPROPYLENE		
Net Weight: 149450 Pounds		POLYETHYLENE		
Net Weight: 153750 Pounds		POLYETHYLENE		
Net Weight: 156400 Pounds		POLYETHYLENE		
Net Weight: 195100 Pounds		POLYPROPYLENE		
Net Weight: 193450 Pounds		POLYPROPYLENE		
Net Weight: 195300 Pounds		POLYPROPYLENE		
Net Weight: 195100 Pounds		POLYPROPYLENE		
Net Weight: 193400 Pounds		POLYPROPYLENE		
Net Weight: 142900 Pounds		POLYETHYLENE		
Net Weight: 163200 Pounds		POLYETHYLENE		
178300 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
177250 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
177600 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
178150 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
Net Weight: 187400 Pounds		DIPROPYLENE		
Net Weight: 168030 Pounds		PROPYLENE		
Net Weight: 188934 Pounds		PROPYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
185750 Pound-1 Carload	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 208800 Pounds		SEMOLINA		
Net Weight: 205900 Pounds	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 186550 Pounds		POLYVINYL		
Net Weight: 191200 Pounds		POLYVINYL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 200000 Pounds		POLYPROPYL GLYC		
Net Weight: 180890 Pounds		PROPYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
155642 Pound-1 Carload	UN1055	ISOBUTYLENE		2.1
Net Weight: 180000 Pounds	UN2348	BUTYL ACRYLATES, STABILIZED		3
Net Weight: 172265 Pounds		PETRO OIL,NEC		

Net Weight: 176122 Pounds		ADDITIVES,FUEL		
Net Weight: 184450 Pounds		POLYVINYL		
Net Weight: 197150 Pounds		POLYVINYL		
176100 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 111057 Pounds		SHEET STEEL		
Gross Weight: 117005 Pounds		VEGTBLE FRZN		
0 Pounds	UN1114	BENZENE		3
0 Pounds	UN1114	BENZENE		3
Net Weight: 163662 Pounds		PARAFFIN WAX		
Net Weight: 203550 Pounds		FLAKES,POWDER		
Net Weight: 193100 Pounds		FLAKES,POWDER		
Net Weight: 222065 Pounds		HYDRAULIC CMT		
Net Weight: 24998 Pounds		AUTOS PASSENGER		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 122689 Pounds		MALT LIQUORS		
Net Weight: 122747 Pounds		MALT LIQUORS		
Net Weight: 150338 Pounds		MALT LIQUORS		
Net Weight: 162741 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 122689 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 123867 Pounds		MALT LIQUORS		
Net Weight: 116404 Pounds		BEVERAGES,ALCC		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 157054 Pounds		LBR TIMBER,DRID		
Net Weight: 181120 Pounds		SEMOLINA		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 121816 Pounds		PLPBDFBD N CORR		
Net Weight: 194675 Pounds		PLPBDFBD N CORR		
Net Weight: 113842 Pounds		PLPBDFBD N CORR		
181250 Pound-1 Carload	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 167900 Pounds		SOLVENTS,PLORV		
Net Weight: 179000 Pounds		PETRO OIL,NEC		
Net Weight: 168450 Pounds		POLYPROPYLENE		
Net Weight: 179615 Pounds		SHT STEEL BLACK		
Net Weight: 207025 Pounds		RICE,CLND BRKN		
Net Weight: 187600 Pounds	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 187300 Pounds	UN2348	BUTYL ACRYLATES, STABILIZED		3
Net Weight: 178900 Pounds		POLYVINYL		

Net Weight: 205310 Pounds		RICE,CLND BRKN	
Net Weight: 203150 Pounds		FLAKES,POWDER	
Net Weight: 203850 Pounds		FLAKES,POWDER	
Net Weight: 188800 Pounds		POLYETHYLENE	
Net Weight: 188000 Pounds		POLYPROPYLENE	
Net Weight: 202550 Pounds		POLYETHYLENE	
Net Weight: 188600 Pounds		POLYETHYLENE	
Net Weight: 205400 Pounds		FLAKES,POWDER	
Net Weight: 189910 Pounds		SCRAP I OR S	
Net Weight: 188110 Pounds		SCRAP I OR S	
Net Weight: 188750 Pounds		SCRAP I OR S	
Net Weight: 168990 Pounds		SHEET,IORS,NEC	
Net Weight: 172450 Pounds		SHEET,IORS,NEC	
Net Weight: 161130 Pounds		SHEET,IORS,NEC	
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
Net Weight: 213688 Pounds		CRN SYR UNMXD	
Net Weight: 213188 Pounds		CRN SYR UNMXD	
Net Weight: 191150 Pounds		CRN SYR UNMXD	
Net Weight: 193350 Pounds		CRN SYR UNMXD	
Net Weight: 196850 Pounds		CRN SYR UNMXD	
Net Weight: 195900 Pounds		CRN SYR UNMXD	
Net Weight: 213500 Pounds		CRN SYR UNMXD	
Net Weight: 222000 Pounds		CRN SYR UNMXD	
Net Weight: 199750 Pounds		CRN SYR UNMXD	
Net Weight: 220700 Pounds		CRN SYR UNMXD	
Net Weight: 199300 Pounds		CRN SYR UNMXD	
Net Weight: 220350 Pounds		CRN SYR UNMXD	
Net Weight: 221800 Pounds		CRN SYR UNMXD	
Net Weight: 221350 Pounds		CRN SYR UNMXD	
Net Weight: 220600 Pounds		CRN SYR UNMXD	
Net Weight: 199850 Pounds		CRN SYR UNMXD	
Net Weight: 220200 Pounds		CRN SYR UNMXD	
Net Weight: 222200 Pounds		CRN SYR UNMXD	
Net Weight: 197000 Pounds		UREA OT LIQOLQD	
Net Weight: 194850 Pounds		UREA OT LIQOLQD	
Net Weight: 106000 Pounds		BEET PULP, DRY	
Net Weight: 146270 Pounds		SHEET,IORS,NEC	
Net Weight: 202530 Pounds		SOYBEAN OIL	
Net Weight: 214550 Pounds		SOYBN CK,ML,SCR	
Net Weight: 214550 Pounds		SOYBN CK,ML,SCR	
Net Weight: 215350 Pounds		SOYBN CK,ML,SCR	
Net Weight: 190750 Pounds		CORN CAKE OR ML	

PACKING GROUP

III

III

III

II
II

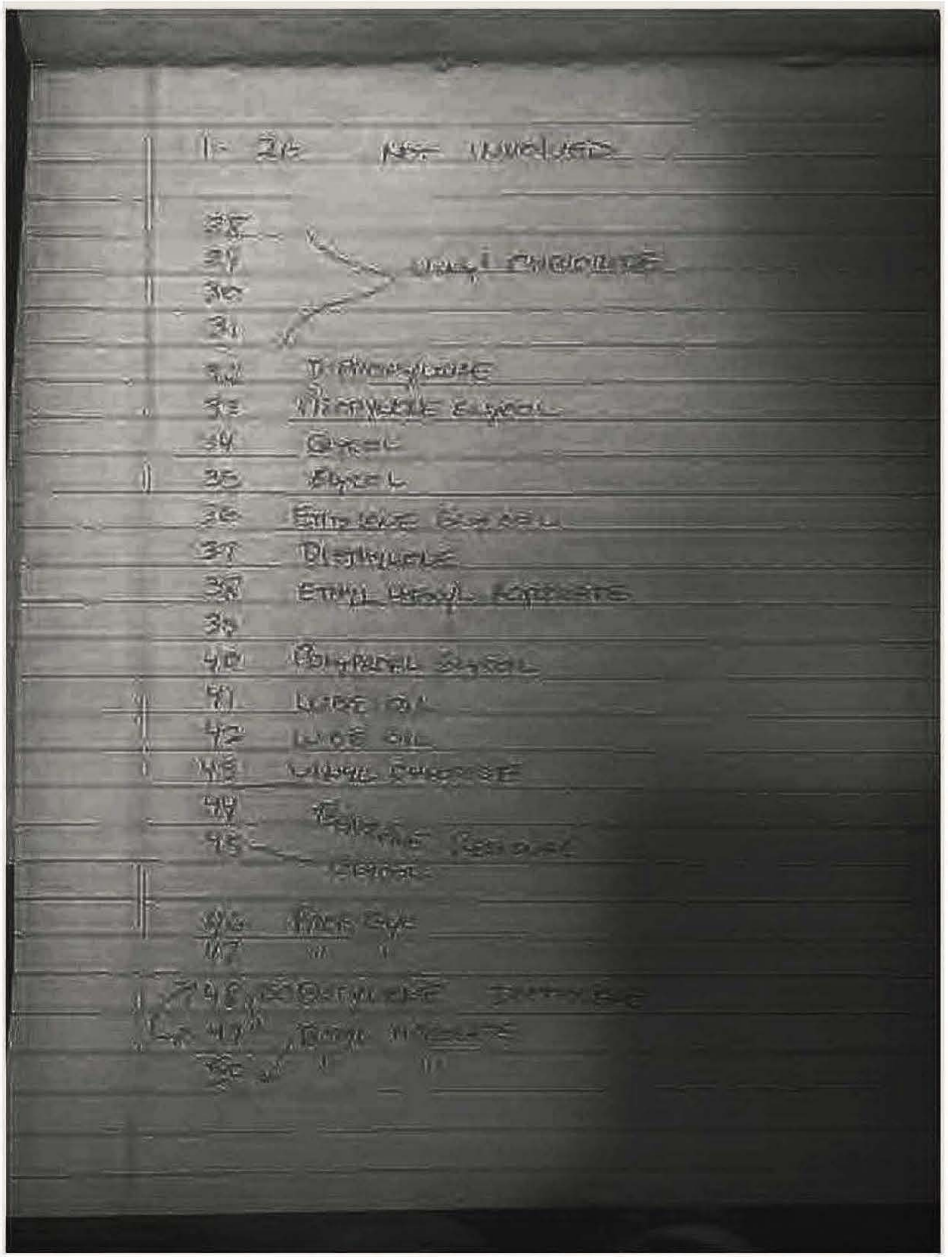
III

III

III

From: (b) (6)
To:
Subject:
Date: Monday, February 6, 2023 12:58:49 PM

Mail ops 28-76 are fully resolved.



From: (b) (6)
To: DTRA Ft Belvoir RD Mailbox Reachback; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 8:33:10 AM

Yep 1psi was there, how about .1 psi?

Thanks,
Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:27 AM
To: (b) (6) DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

I think the 1 psi was on the product (at least the last version I saw) --
radius of approx. 134 meters.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Monday, February 6, 2023 8:21 AM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Thanks BZ,

Do you know the distance for .1psi? 450m?

Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:08 AM
To: [redacted] DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

Ed,

Don't have a precise answer for you. Glasstone states that "Aircraft are damaged by blast effect at levels of peak overpressure as low as 1 to 2 pounds per square inch. Complete destruction or damage beyond economical repair may be expected at peak overpressures of 4 to 10 pounds per square inch."

Of course, there's some caveats:
- Presumably, military aircraft are more robust than a Cessna.
- These experiments were done on 1950's era aircraft, modern aircraft may use better materials in some case
- An aircraft in flight is presumably more vulnerable, but it's not clear to me how much more

So with all those caveats, 0.5 psi is probably not great, but I'm not sure it would bring down the aircraft. Wouldn't be really fun for the guy flying it though, and I can't promise my supposition is correct.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: (b) (6)
Sent: Monday, February 6, 2023 7:11 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Received thank you.

RB - any thoughts on the BLEVE overpressure on an airborne Cesena 208B, .5 seems like it might bad for an aircraft to experience. If there's an overpressure of concern, can you let me know the distance for it.

Thanks,
Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 6:25 AM
To: (b) (6)
Subject: FW: RFI_23_0081fU_IMAAC

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
< >
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

From: (b) (6)
To: DTRA Ft Belvoir RD Mailbox Reachback; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 8:41:03 AM

Good copy, thanks for the support!

Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:39 AM
To: (b) (6) DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

Did you type 0.1 and I missed the dot? Sorry, probably need to get my eyes checked.

Anyhow, probably on the order of a factor of 5 from the 1 psi, so about 650 - 700 meters or so.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Monday, February 6, 2023 8:32 AM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Yep 1psi was there, how about .1 psi?

Thanks,
Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:27 AM
To: [redacted] (b) (6) [redacted]; DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

I think the 1 psi was on the product (at least the last version I saw) --
radius of approx. 134 meters.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: (b) (6)
Sent: Monday, February 6, 2023 8:21 AM
To: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint
Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Thanks BZ,

Do you know the distance for .1psi? 450m?

Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:08 AM
To: (b) (6) DTRA Ft Belvoir OI Mailbox
Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

Ed,

Don't have a precise answer for you. Glasstone states that "Aircraft are damaged by blast effect at levels of peak overpressure as low as 1 to 2 pounds per square inch. Complete destruction or damage beyond economical repair may be expected at peak overpressures of 4 to 10 pounds per square inch."

Of course, there's some caveats:
- Presumably, military aircraft are more robust than a Cessna.
- These experiments were done on 1950's era aircraft, modern aircraft may use better materials in some case
- An aircraft in flight is presumably more vulnerable, but it's not clear to me how much more

So with all those caveats, 0.5 psi is probably not great, but I'm not sure it would bring down the aircraft. Wouldn't be really fun for the guy flying

it though, and I can't promise my supposition is correct.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Monday, February 6, 2023 7:11 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Received thank you,

RB - any thoughts on the BLEVE overpressure on an airborne Cesena 208B, .5 seems like it might bad for an aircraft to experience. If there's an overpressure of concern, can you let me know the distance for it.

Thanks,
Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 6:25 AM
To: [redacted] (b) (6) [redacted]
Subject: FW: RFI_23_0081fU_IMAAC

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
< >
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

#	Postion	Car #	UN/NA	Product	Haz Class #	Load/Empty
1	2nd	GATX9166	1075	Residue LPG	2	Empty
2	26th	TILX402025	1086	Vinyl Chloride Stabilized	2.1	Load
3	27th	OCPX080235	1086	Vinyl Chloride Stabilized	2.1	Load
4	28h	OCPX080179	1086	Vinyl Chloride Stabilized	2.1	Load
5	29th	GATX95098	1086	Vinyl Chloride Stabilized	2.1	Load
6	34th	SHPX211226	1993	Combustible Liquid, Ethelyene Glycol	3	Load
7	36th	DOWX73168	1993	Ethyl-Hexayl Acrylate	3	Load
8	47th	NATX35844	1055	Iso-butylene	2.1	Load
9	48th	UTLX205907	2348	Butyl-Acrylates, Stabilized	3	Load
10	53rd	OCPX80370	1086	Vinyl Chloride Stabilized	2.1	Load
11	57th	DPRX259013	1114	Residue, Last contained Benzene	3	Empty
12	58th	DPRX258671	1114	Residue, Last contained Benzene	3	Empty
13	91st	UTLX667639	1993	Ethylene Glycol	3	Load
14	97th	GATX54892	1993	Combustible Liquid, nos	3	Load
15	100th	GATX54899	2348	Butyl-Acrylates, Stabilized	3	Load
16	116th	TILX101984	1832	Sulfuric Acid, Spent	8	Load
17	117th	GATX37935	1832	Sulfuric Acid, Spent	8	Load
18	118th	TILX101958	1832	Sulfuric Acid, Spent	8	Load
19	119th	GATX35941	1832	Sulfuric Acid, Spent	8	Load
20	120th	GATX35930	1832	Sulfuric Acid, Spent	8	Load

NS POC

(b) (6) [redacted]

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6) [redacted]
Subject: FW: IMAAC Update
Date: Monday, February 6, 2023 1:14:00 PM
Attachments: RFI_23-0081qU_IMAAC.pdf
HCL_AEGL_1h.kmz
phosgene_AEGL_1h.kmz
vinyl_chloride_AEGL_1h.kmz

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 1:10 PM
To: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: IMAAC Update

CUI

JOC,

Have attached an update of the IMAAC product. Please send to the distro list, and please also add (from the CST):
(b) (6) [redacted]

Thank you.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

Date: 06FEB2023 1745Z

Version: Revision G

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081gU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 1 single railcar, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1400 06FEB2023 Local (1900Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

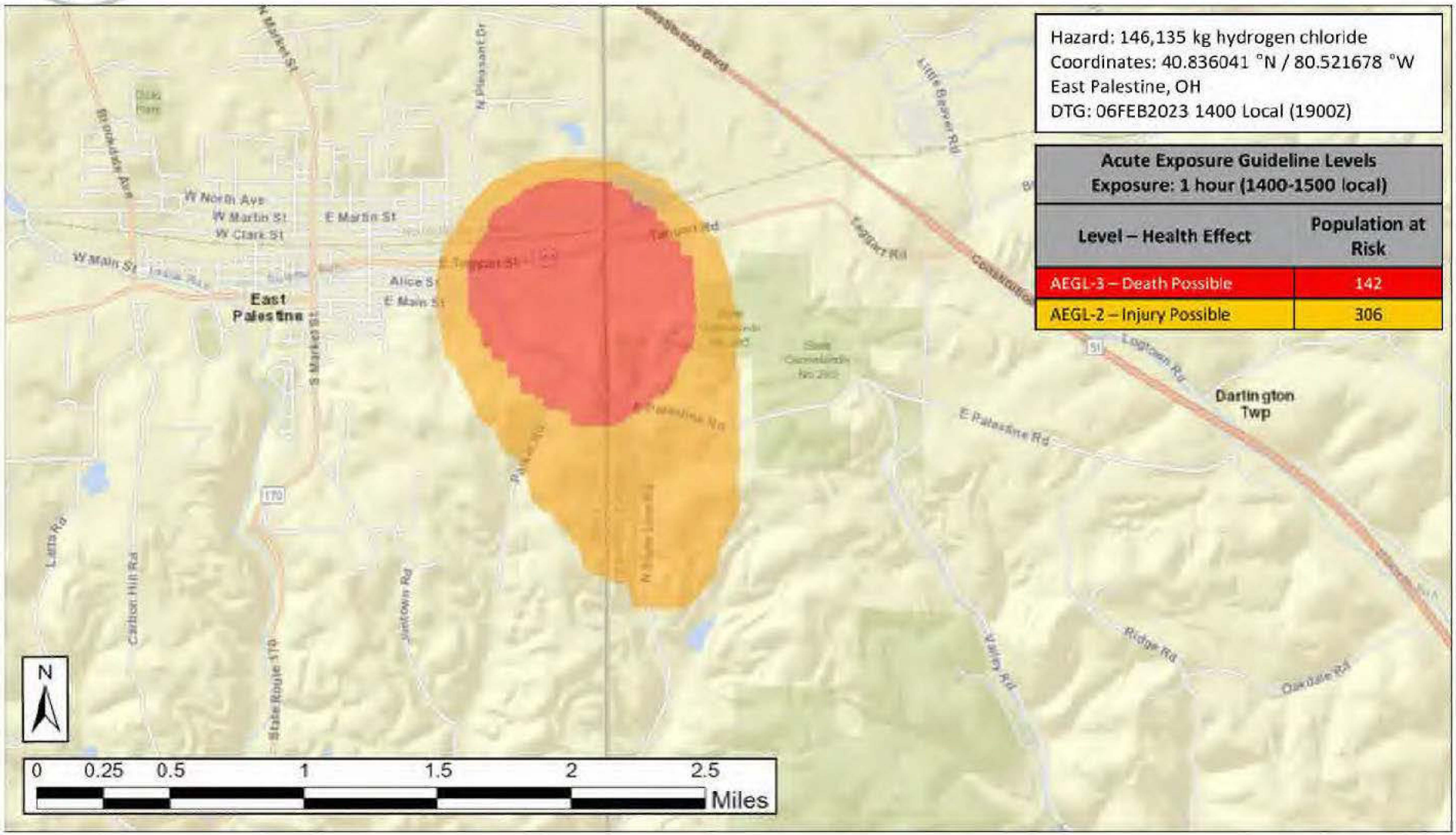
(b)(3)10USC130

- Blast effects from a BLEVE is provided.

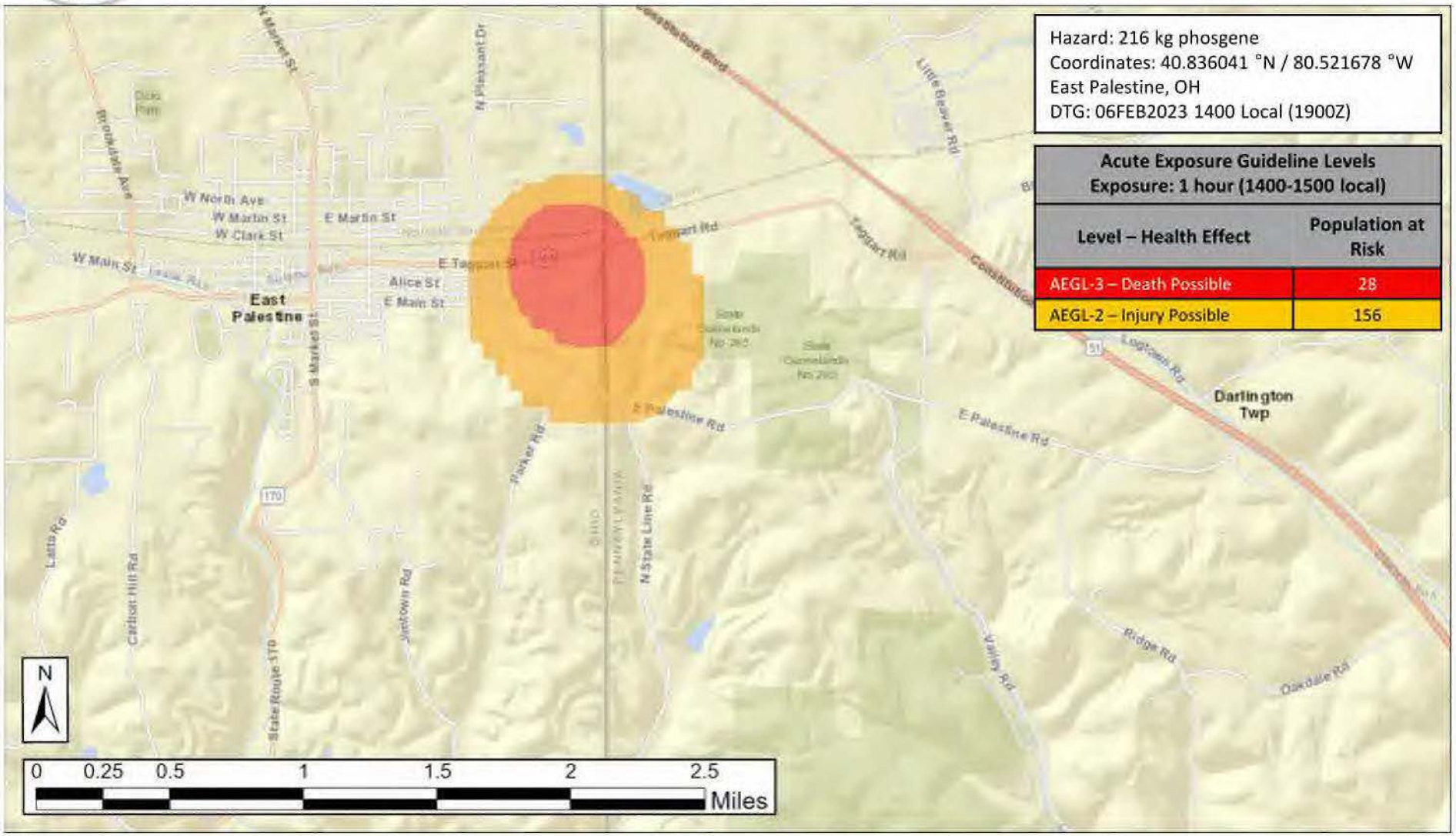
Caveats

- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

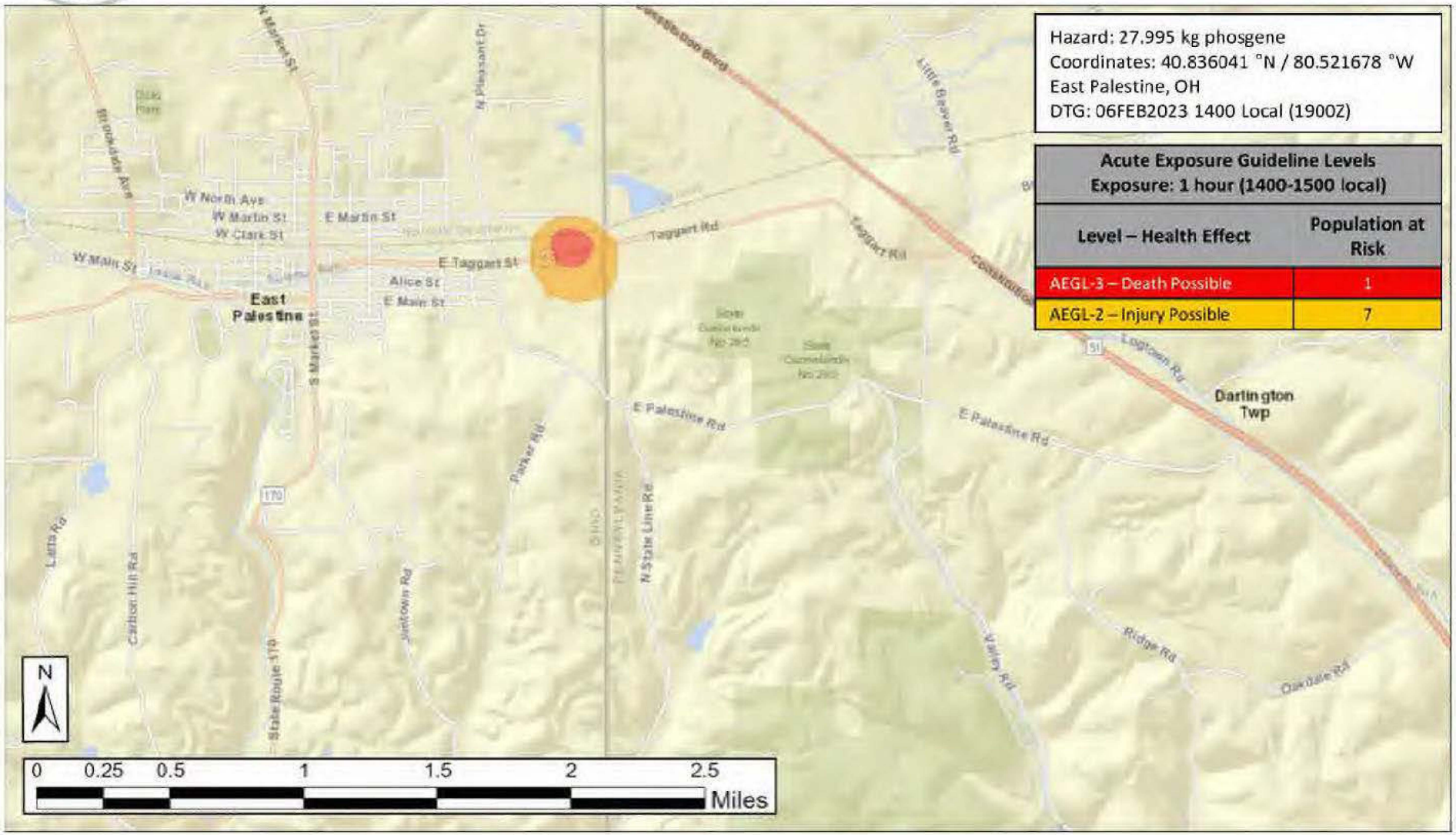
Hydrogen Chloride – 1400 Local



Phosgene – 1400 Local



Vinyl Chloride – 1400 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

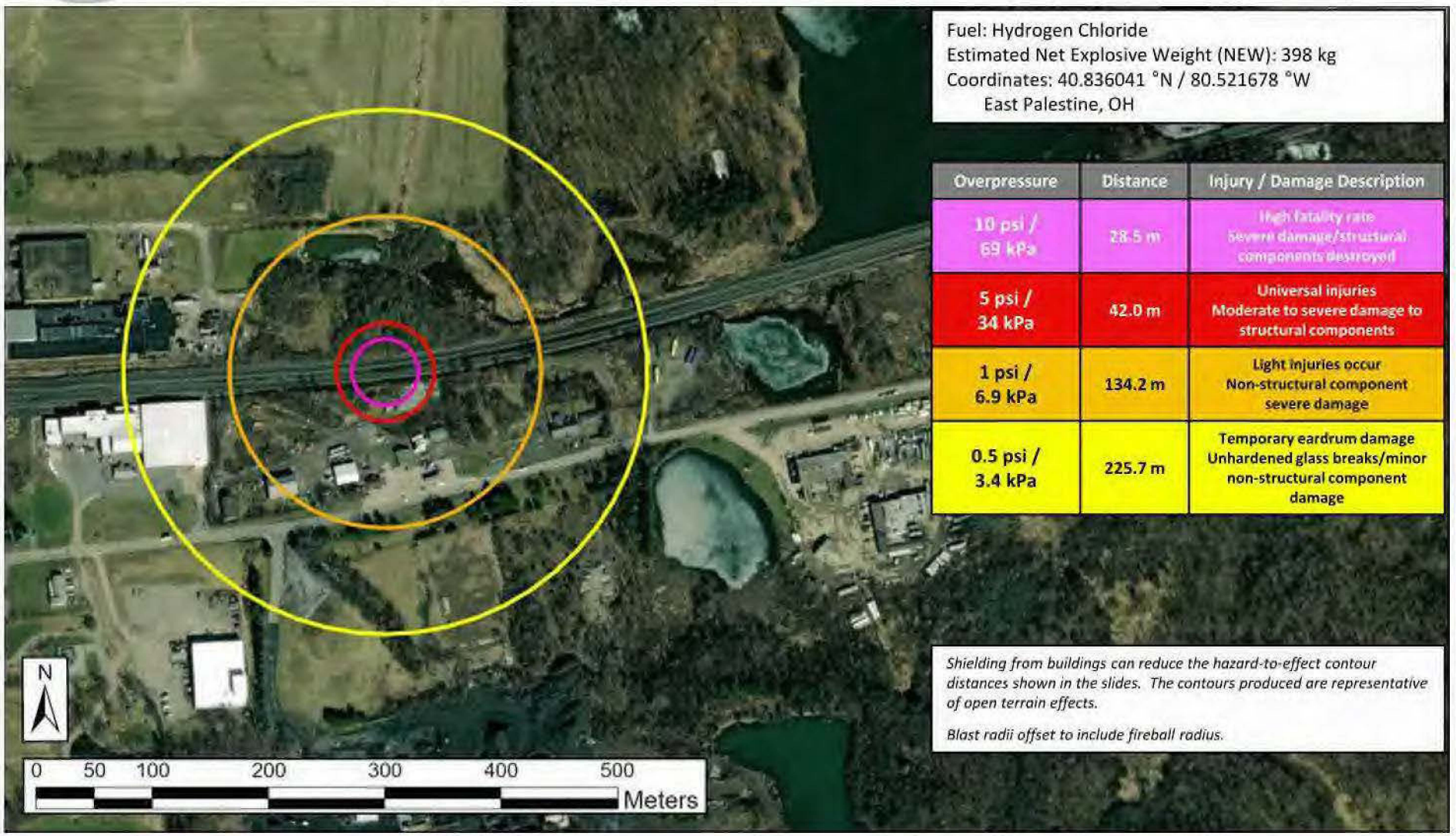
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

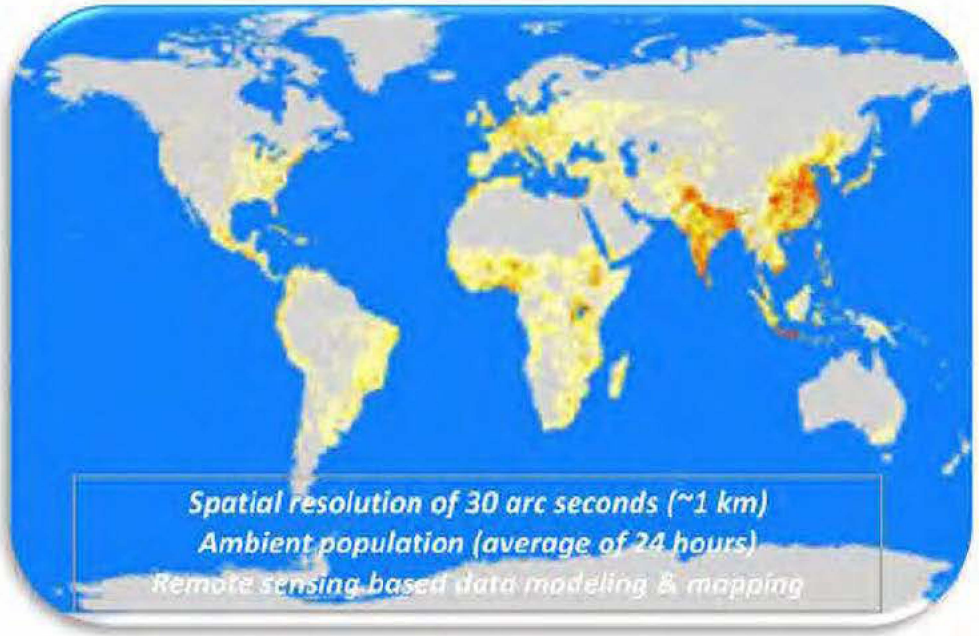
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: DTRA Ft Belvoir RD Mailbox Reachback
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: FW: RFI - Ground Deposition
Date: Monday, February 6, 2023 4:38:51 PM

RB,

Are you tracking and able to support the request below, thanks!

Very Respectfully,

(b) (6)
Watch Officer
Joint Operations Center
Current Operations Division (OI-OPAO)
Defense Threat Reduction Agency
DSN: 703-767-2000
NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil

-----Original Message-----
From: (b) (6)
Sent: Monday, February 6, 2023 4:20 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: (b) (6)
Subject: RFI - Ground Deposition

DTRA,

First, let me thank you all for the profound help you've given in a unusually chaotic undertaking!

Secondly, if I may ask yet more of you: Could we get surface deposition modeling for 1 day, and potentially upwards of 1 week from now?

Respectfully,

(b) (6)

Operations NCOIC

8202 S. Access Rd. Bldg. 946

Columbus, Oh 43217

(b) (6) [redacted]

[redacted]

[redacted]

[redacted]

Emergency: 1-866-4-WMD-CST (1-866-496-3278)

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6)
Subject: FW: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 6:24:00 AM
Attachments: RFI_23-0081fU_IMAAC.pdf
RFI_23_0081fU_IMAAC_KMLs.jpg

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

Date: 06FEB2023 1045Z
Version: Revision F
Changes: Added BLEVE Scenario

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081fU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model railcars filled with vinyl chloride in fire.
Employment	Real World
Hazards	Combustion products of 5 railcars on fire, filled with vinyl chloride resulting in releases of: • 23,389 kg hydrogen chloride (HCl) • 31,719 kg phosgene (CCl_2O) • HCl BLEVE
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 06FEB2023 Local (1100Z) 2. 1200 06FEB2023 Local (1700Z)
Executive Summary	• For phosgene at 0600 and 1200 Local, 163 and 119 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 29 and 24 people respectively may be exposed to hazard levels that could possibly result in death. (0600 local model shows fewer at risk). • For HCl at 0600 and 1200 Local, 4 and 5 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 2 and 1 people respectively may be exposed to hazard levels that could possibly result in death. • BLEVE from vaporized HCl can produce minor injuries out to 226 meters in a worst case scenario.

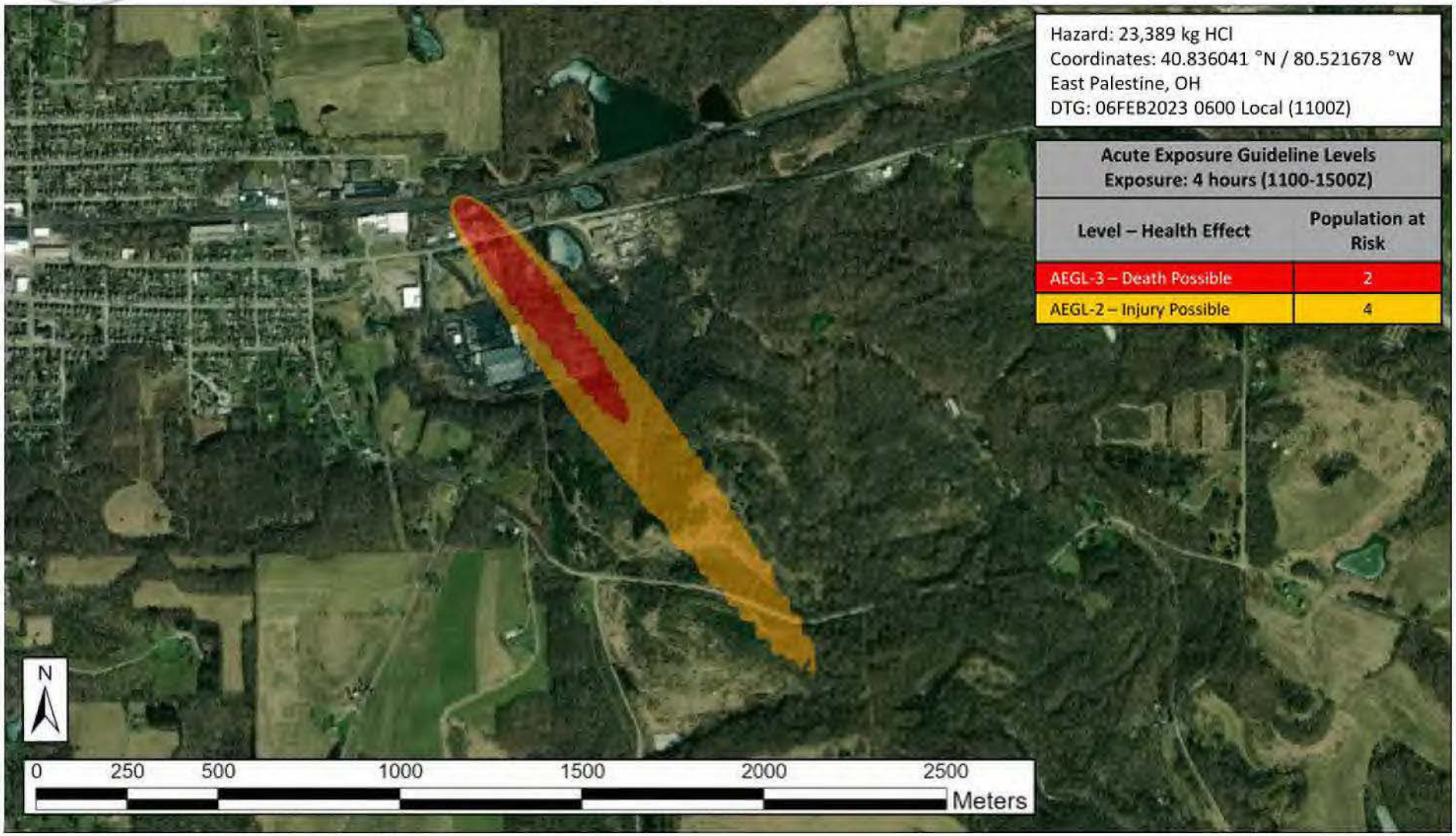
Assumptions & Comments

- No additional information was provided on the fire that continues to burn, and no changes were made to the modeled amounts and fire intensity. As a result, populations at risk in this update may be overstated.
- Model assumes 5 railcars of vinyl chloride burning.
- Quantity per railcar from requestor: (178,000 lb ~ 81,000 kg).
- Worst-case situations are modeled, in which the vinyl chloride is wholly consumed in the fire and converts completely to either hydrogen chloride or phosgene.
- Hydrogen chloride is a combustion byproduct of vinyl chloride.
- Reports exist of vinyl chloride decomposing to phosgene. Amounts modeled likely overstate the expected hazard and be considered an absolute worst-case hazard (upper bound).
- A worse case BLEVE outcome is provided, where all available HCl is vaporized into a pressure wave. HCl is non-flammable and does not pose a thermal hazard.

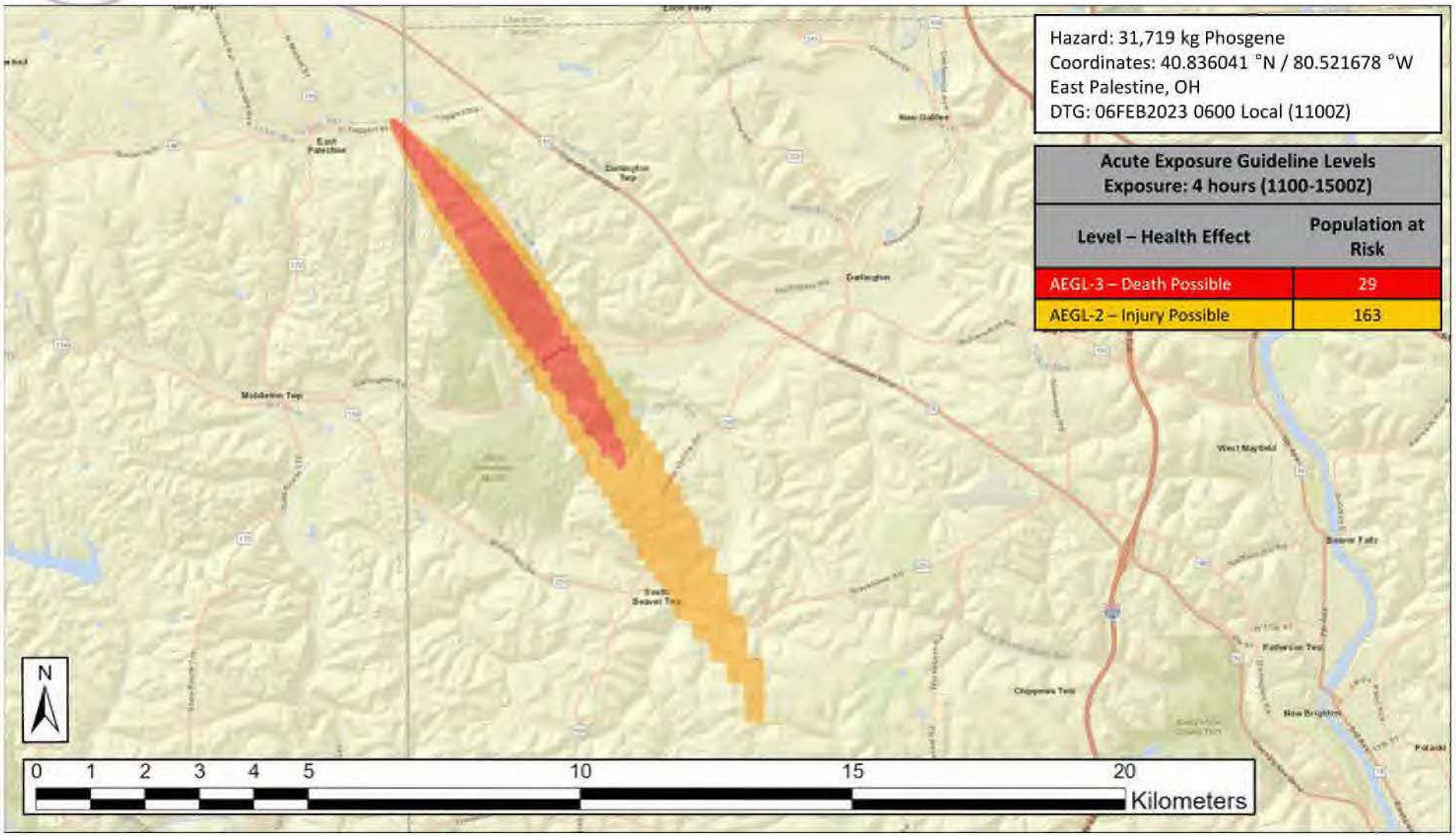
0600 Local (1100Z)

06FEB2023

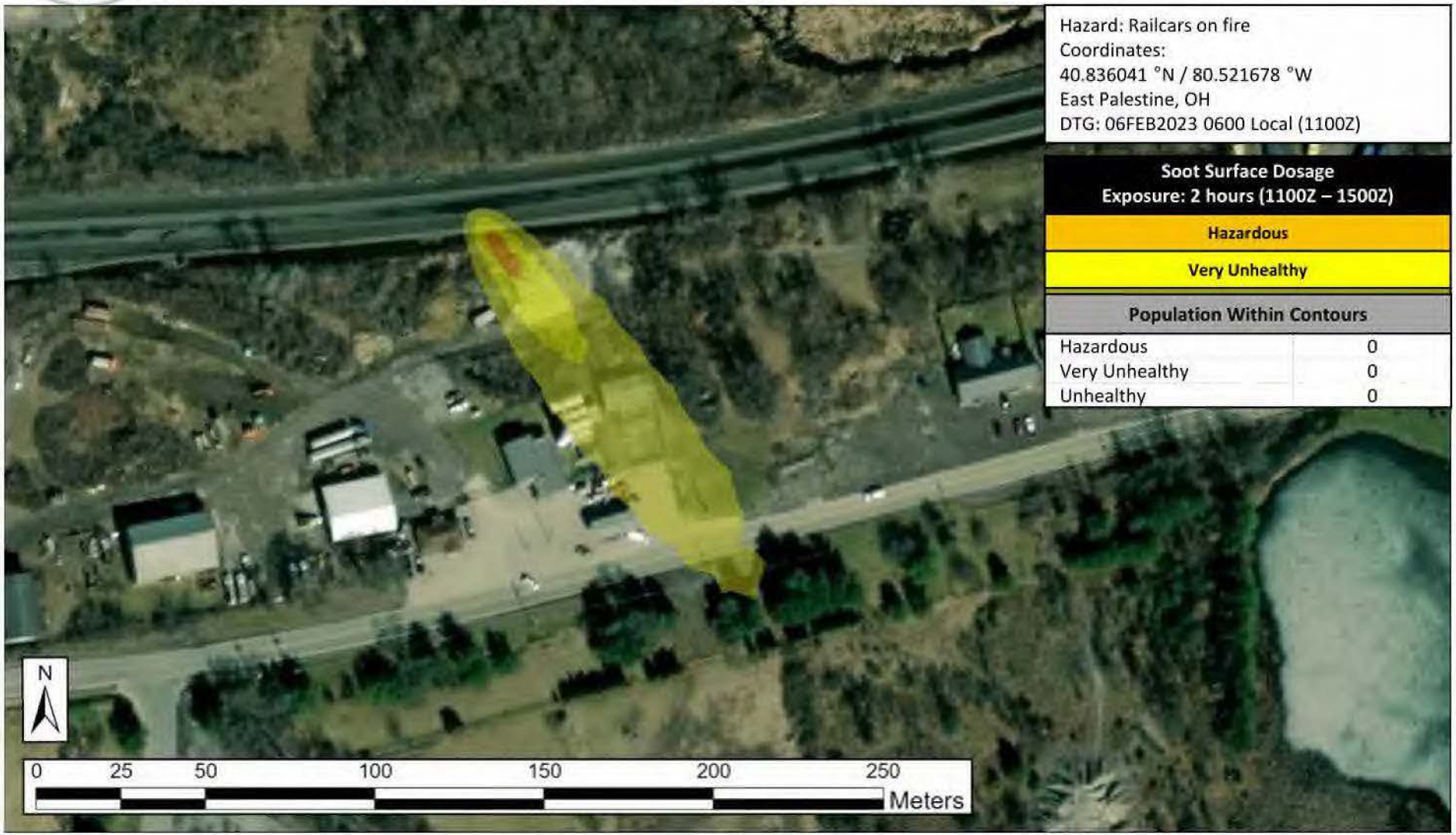
Hydrogen Chloride – 0600 Local



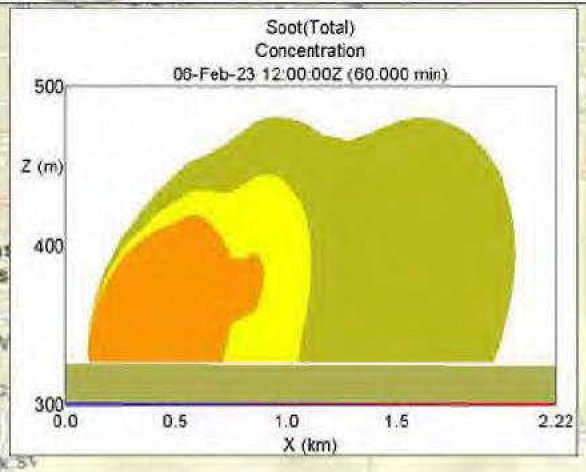
Phosgene – 0600 Local



Soot– Surface Dosage – 0600 Local



Soot – Vertical Profile – 0600 Local



Hazard: Railcars on fire
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 0600 Local (1100Z)

Soot Concentration @ 0600 Local
Hazardous
Very Unhealthy
Unhealthy

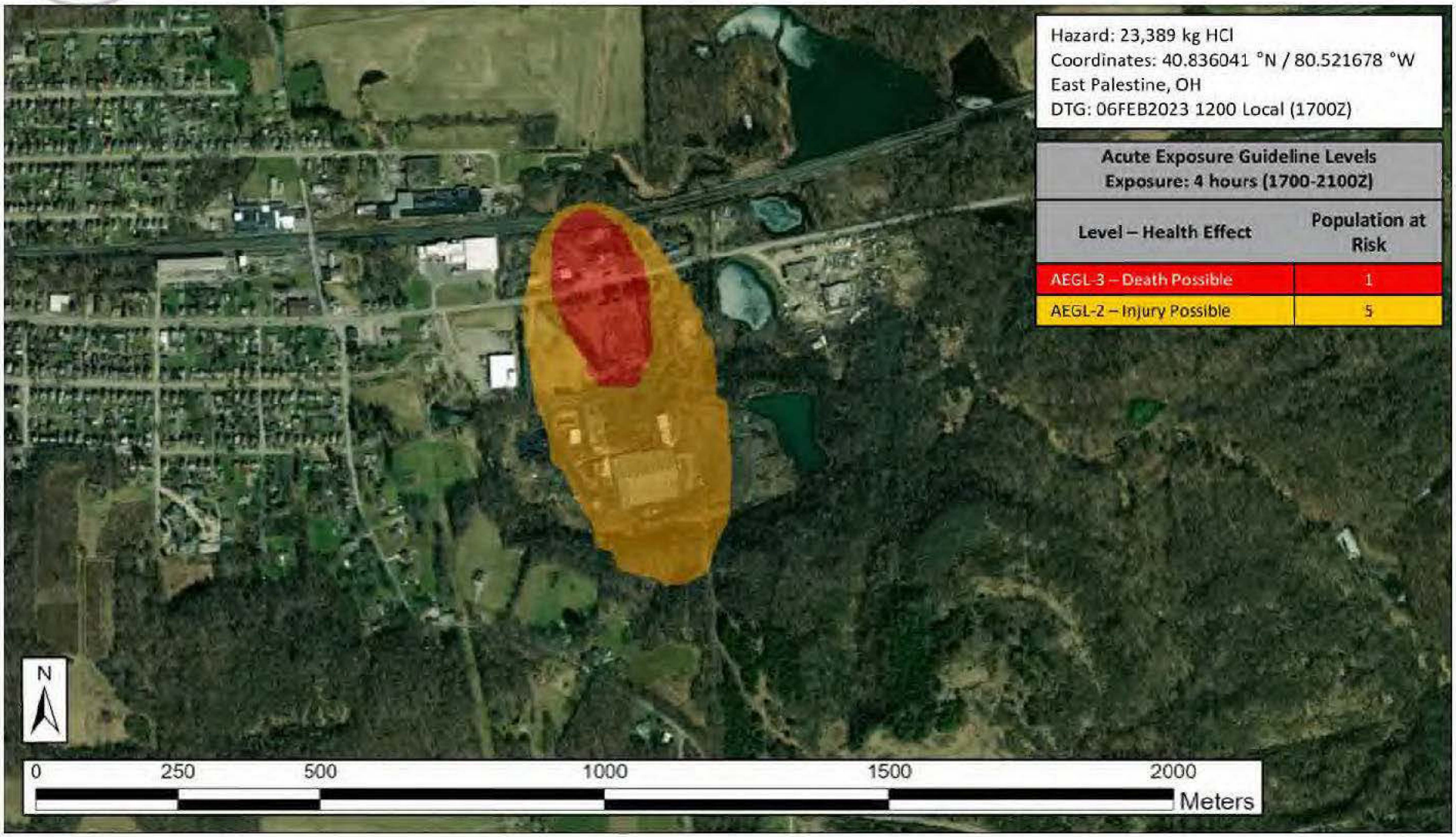
Light Transmittance
10%
50%
90%

Gray plume represents a bird's eye view of the smoke cloud.

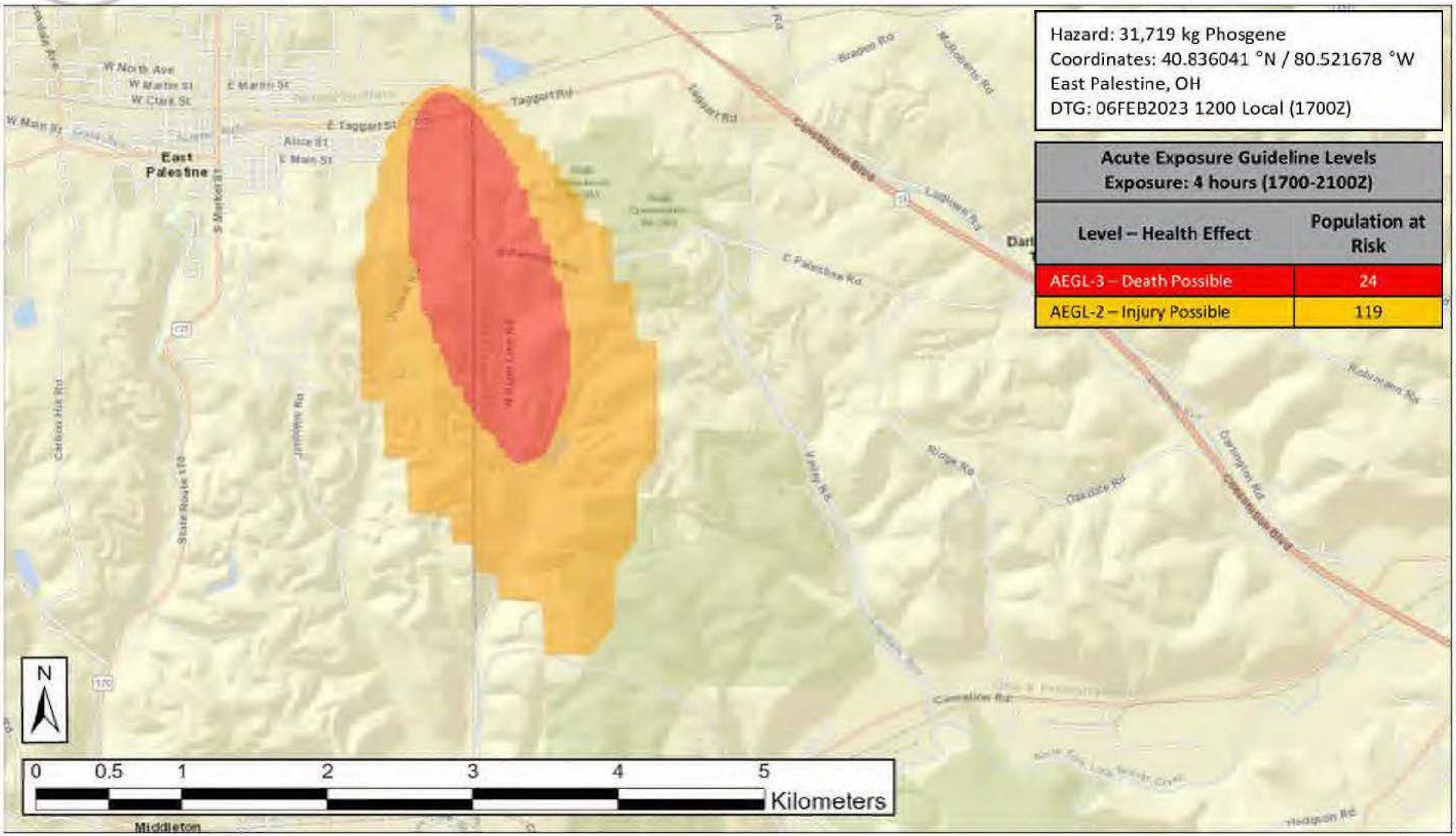
1200 Local (1700Z)

06FEB2023

Hydrogen Chloride – 1200 Local



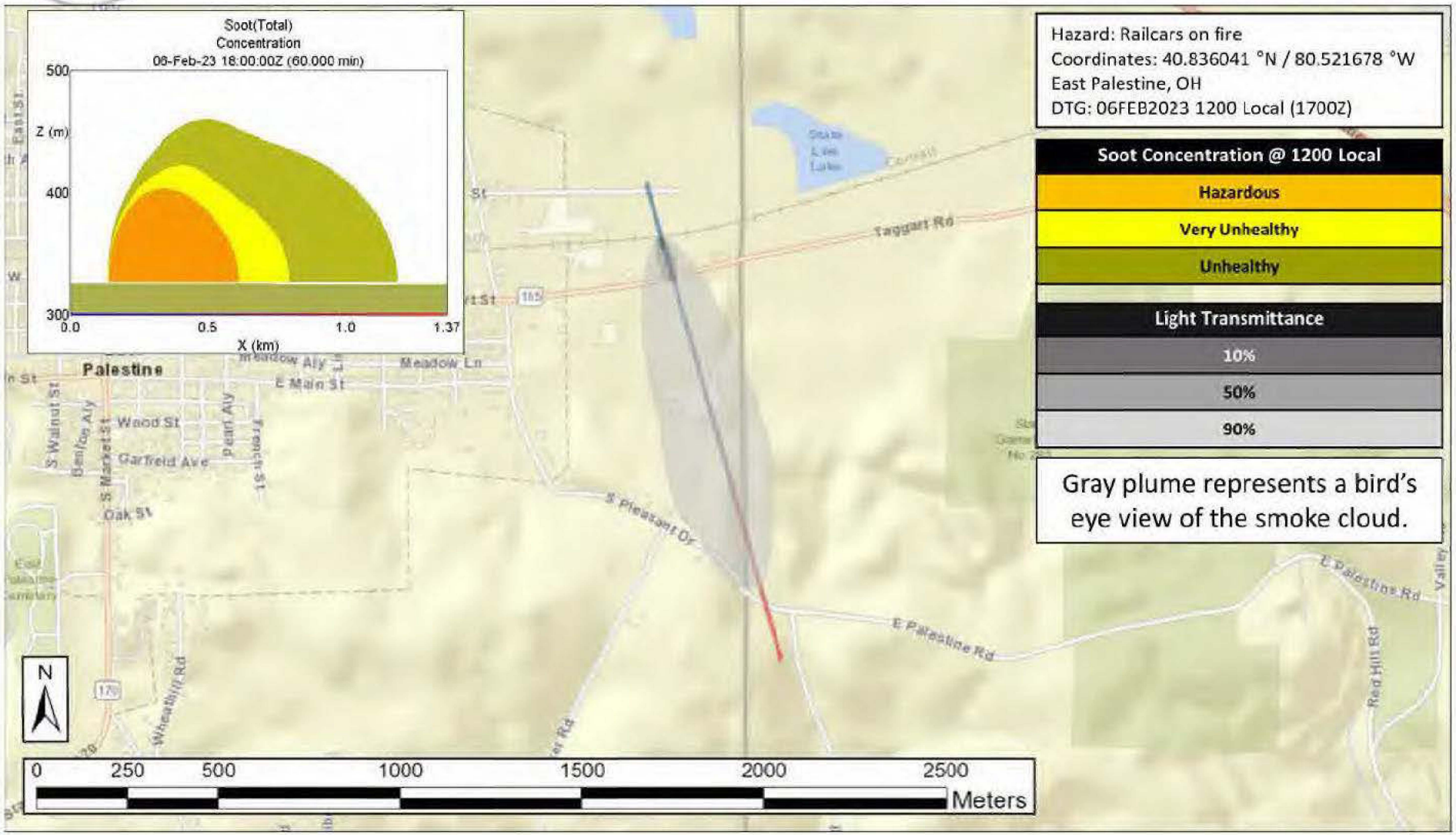
Phosgene – 1200 Local



Soot– Surface Dosage – 1200 Local



Soot – Vertical Profile – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

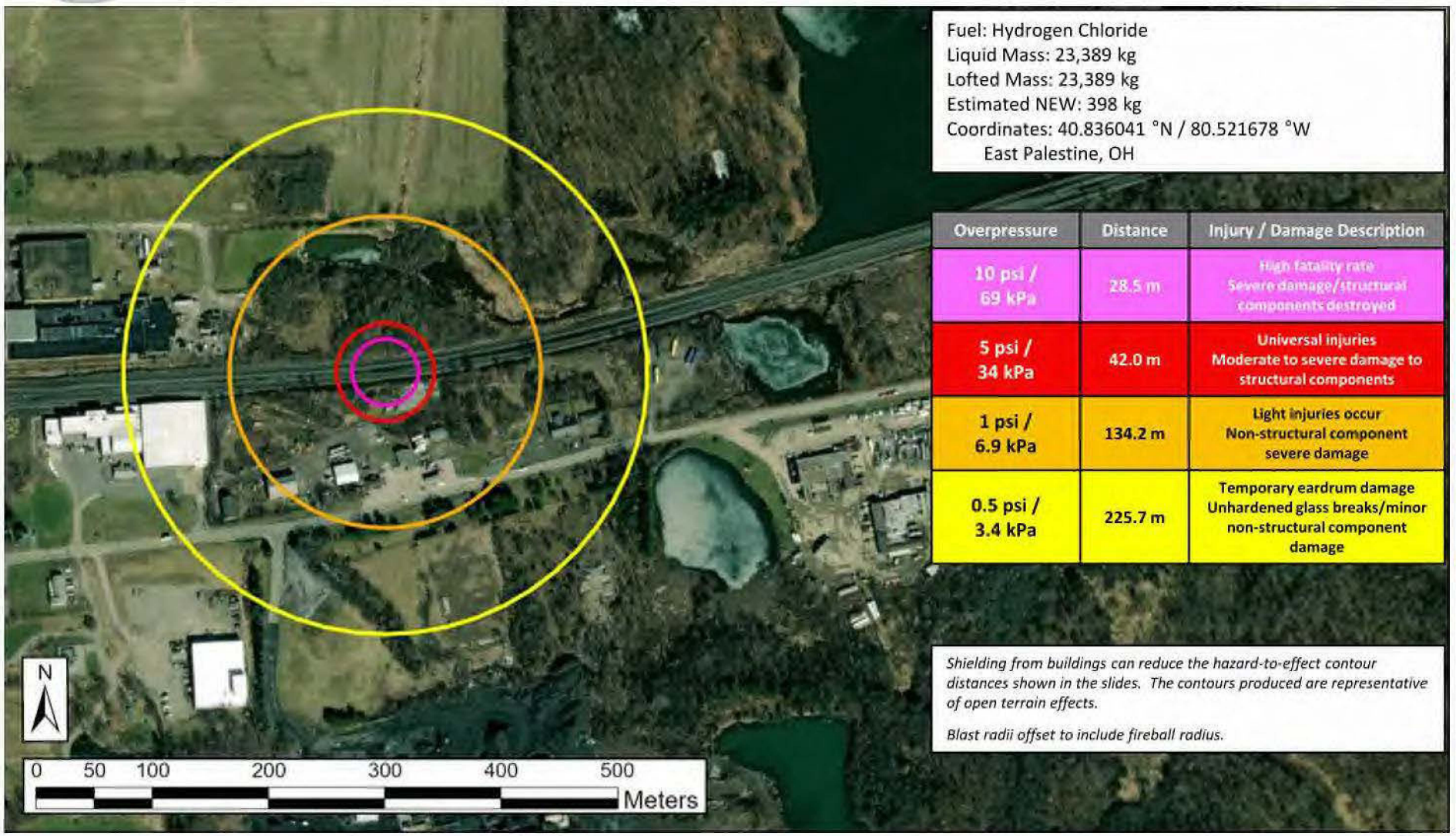
AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE Scenario

06FEB2023

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Liquid Mass: 23,389 kg
Lofted Mass: 23,389 kg
Estimated NEW: 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

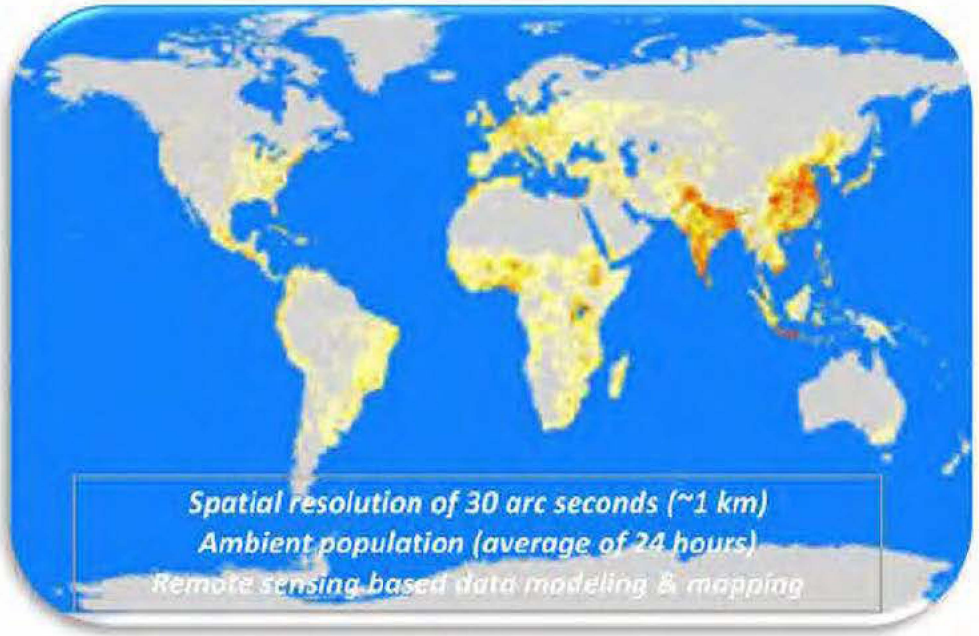
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6) [redacted]
Subject: FW: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 6:21:00 AM
Attachments: RFI_23-0081fU_IMAAC.pdf
RFI_23_0081fU_IMAAC_KMLs.ipz

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6) [redacted]
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6) [redacted]

Date: 06FEB2023 1045Z
Version: Revision F
Changes: Added BLEVE Scenario

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081fU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model railcars filled with vinyl chloride in fire.
Employment	Real World
Hazards	Combustion products of 5 railcars on fire, filled with vinyl chloride resulting in releases of: • 23,389 kg hydrogen chloride (HCl) • 31,719 kg phosgene (CCl_2O) • HCl BLEVE
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 06FEB2023 Local (1100Z) 2. 1200 06FEB2023 Local (1700Z)
Executive Summary	• For phosgene at 0600 and 1200 Local, 163 and 119 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 29 and 24 people respectively may be exposed to hazard levels that could possibly result in death. (0600 local model shows fewer at risk). • For HCl at 0600 and 1200 Local, 4 and 5 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 2 and 1 people respectively may be exposed to hazard levels that could possibly result in death. • BLEVE from vaporized HCl can produce minor injuries out to 226 meters in a worst case scenario.

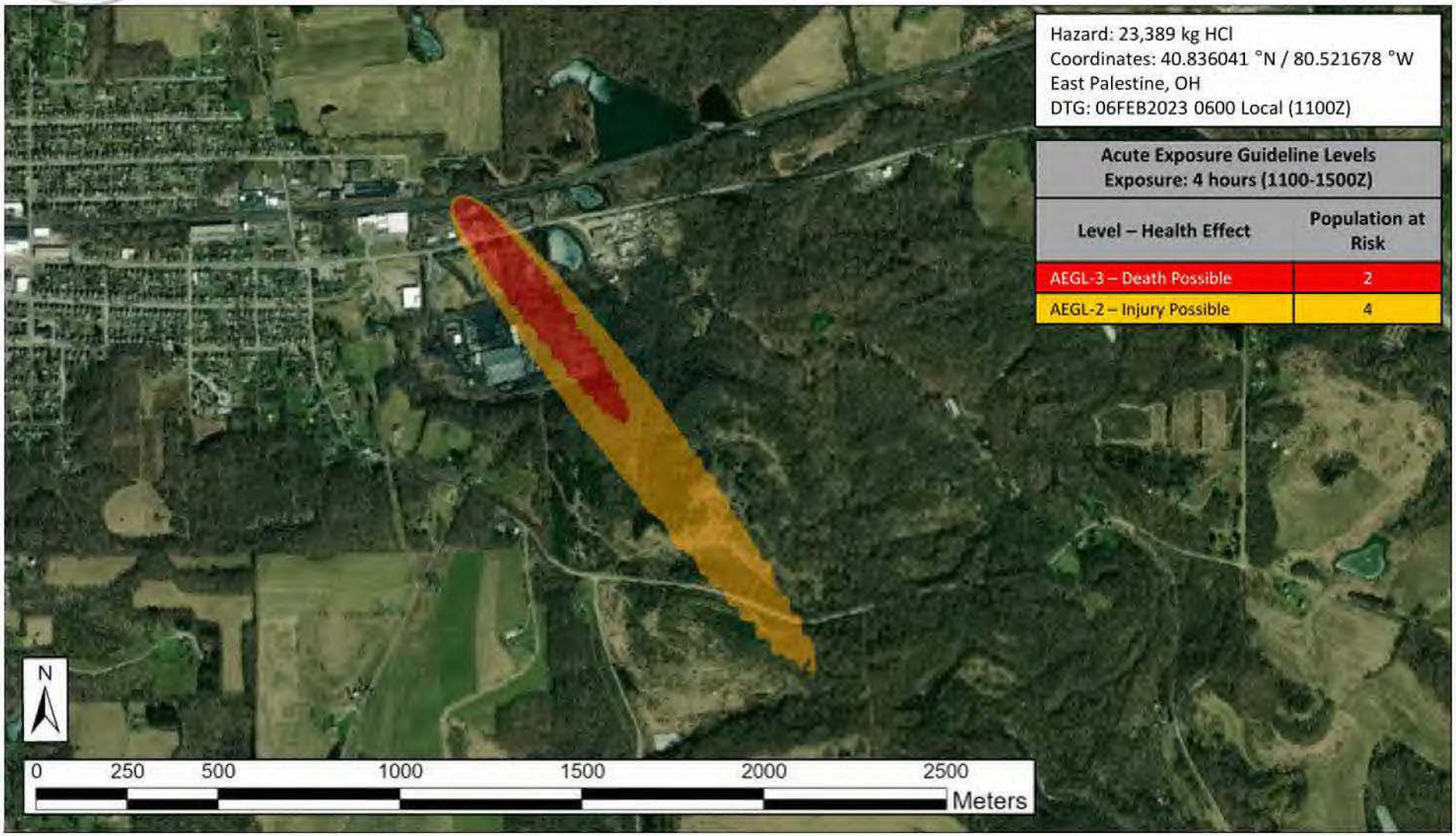
Assumptions & Comments

- No additional information was provided on the fire that continues to burn, and no changes were made to the modeled amounts and fire intensity. As a result, populations at risk in this update may be overstated.
- Model assumes 5 railcars of vinyl chloride burning.
- Quantity per railcar from requestor: (178,000 lb ~ 81,000 kg).
- Worst-case situations are modeled, in which the vinyl chloride is wholly consumed in the fire and converts completely to either hydrogen chloride or phosgene.
- Hydrogen chloride is a combustion byproduct of vinyl chloride.
- Reports exist of vinyl chloride decomposing to phosgene. Amounts modeled likely overstate the expected hazard and be considered an absolute worst-case hazard (upper bound).
- A worse case BLEVE outcome is provided, where all available HCl is vaporized into a pressure wave. HCl is non-flammable and does not pose a thermal hazard.

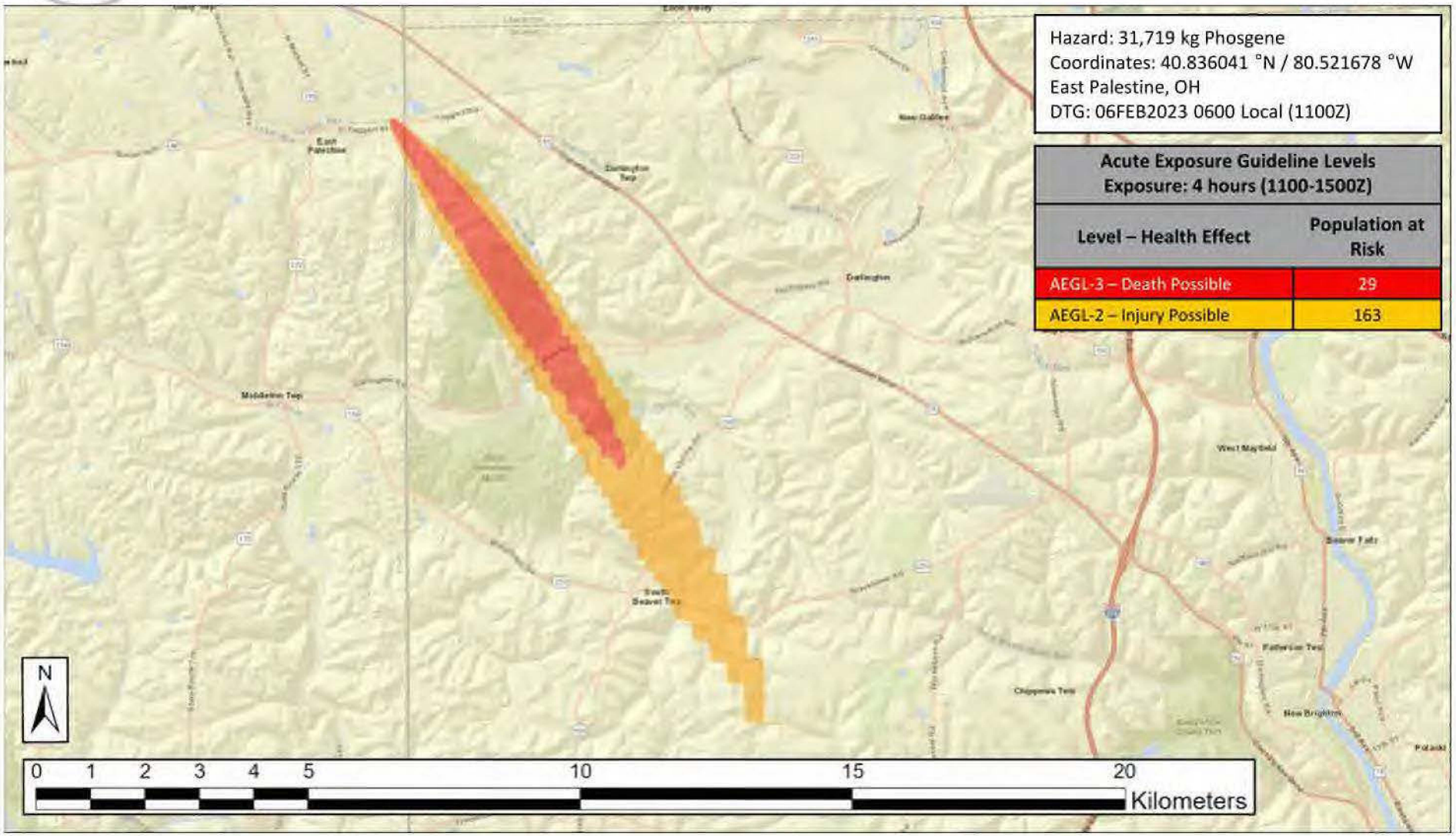
0600 Local (1100Z)

06FEB2023

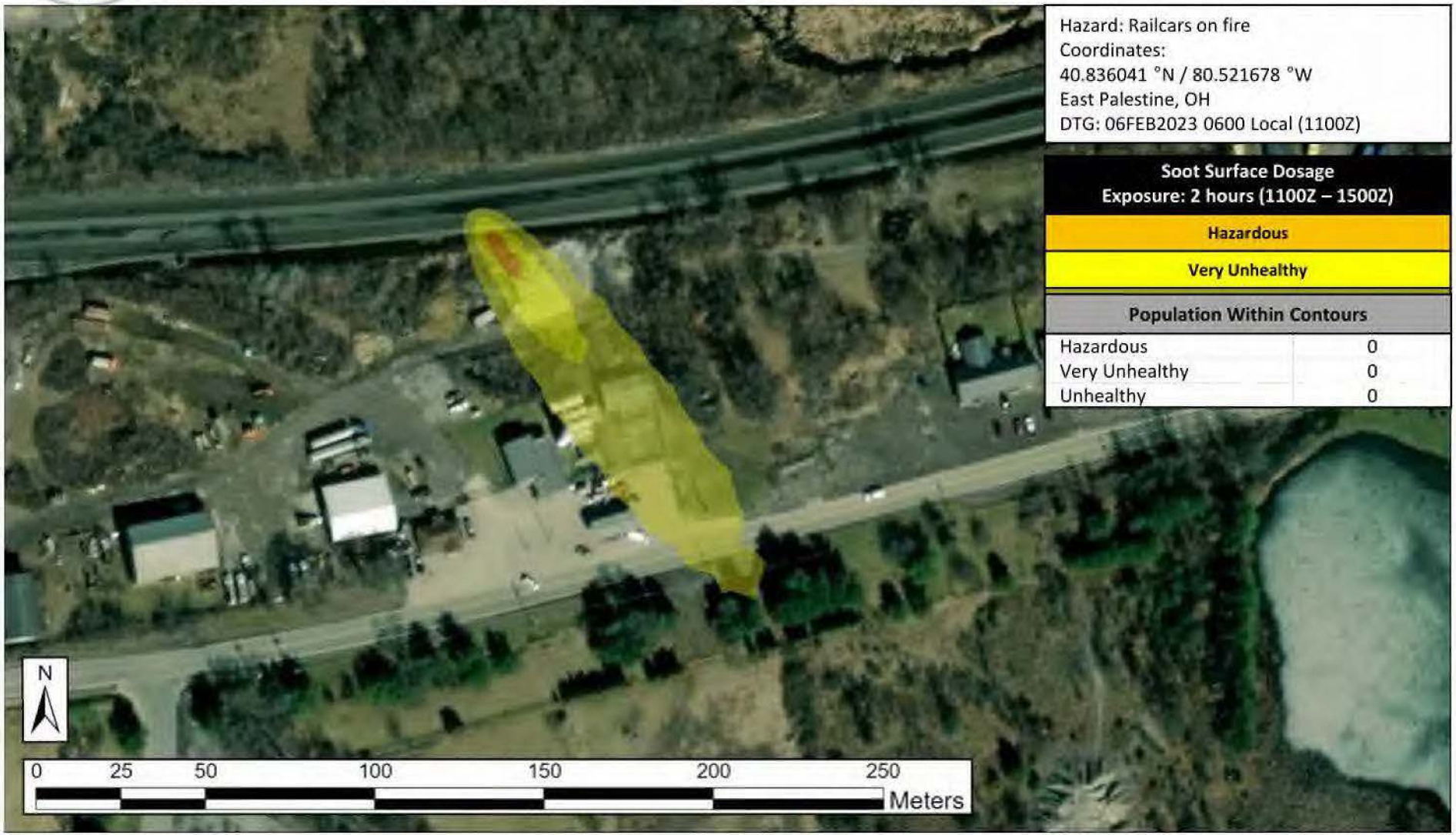
Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Soot– Surface Dosage – 0600 Local

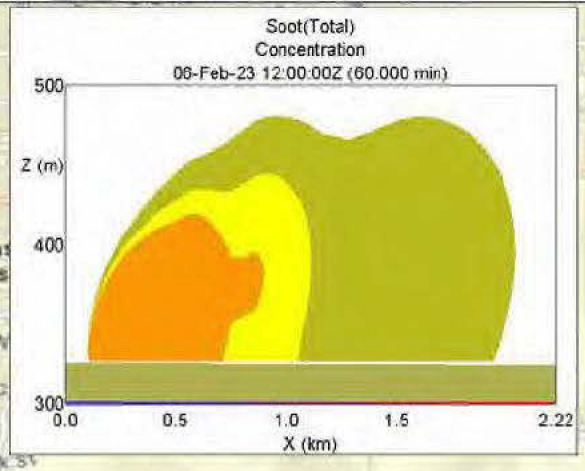


Hazard: Railcars on fire
Coordinates:
40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 0600 Local (1100Z)

Soot Surface Dosage Exposure: 2 hours (1100Z – 1500Z)	
Hazardous	
Very Unhealthy	

Population Within Contours	
Hazardous	0
Very Unhealthy	0
Unhealthy	0

Soot – Vertical Profile – 0600 Local



Hazard: Railcars on fire
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 0600 Local (1100Z)

Soot Concentration @ 0600 Local
Hazardous
Very Unhealthy
Unhealthy

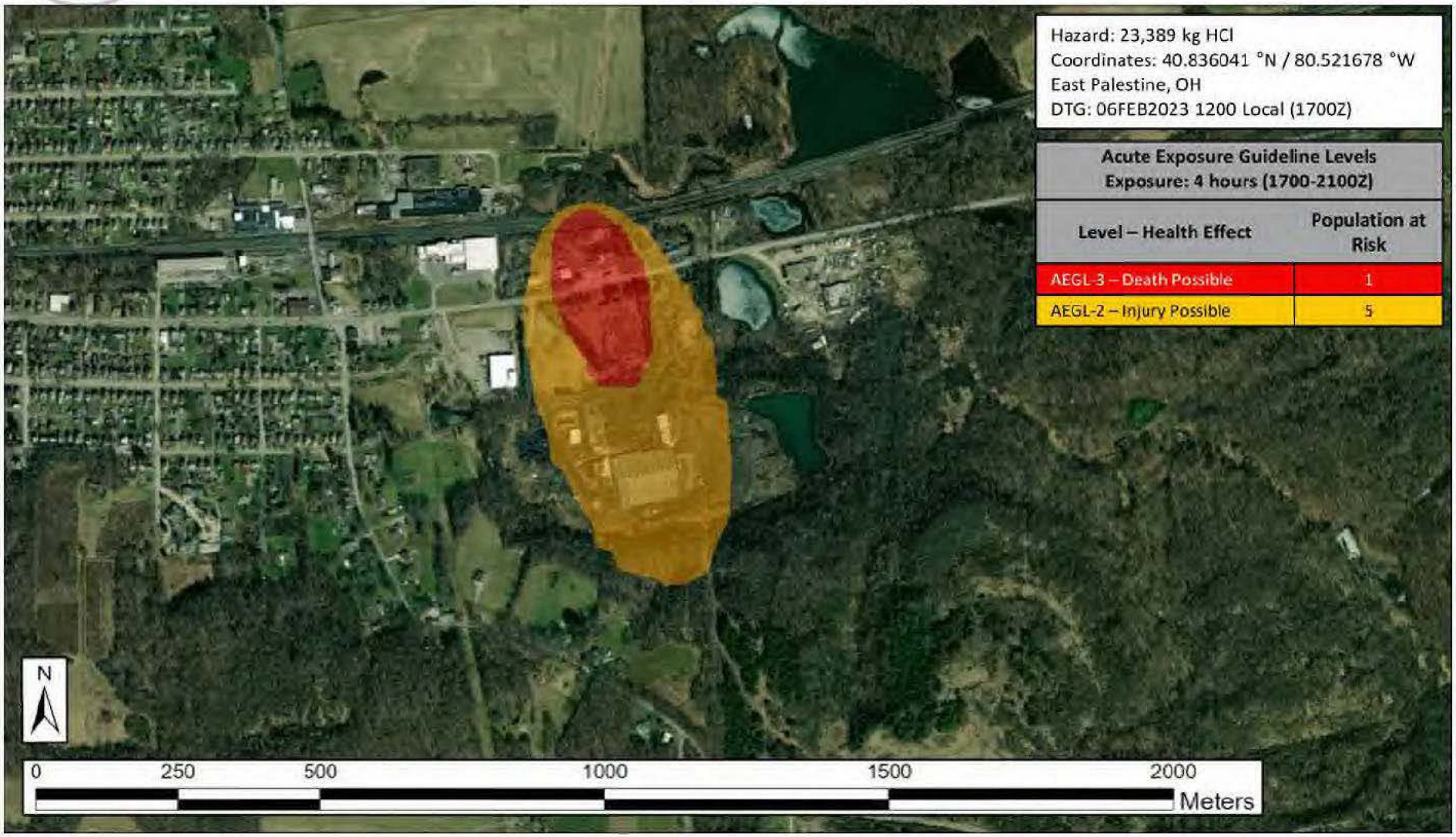
Light Transmittance
10%
50%
90%

Gray plume represents a bird's eye view of the smoke cloud.

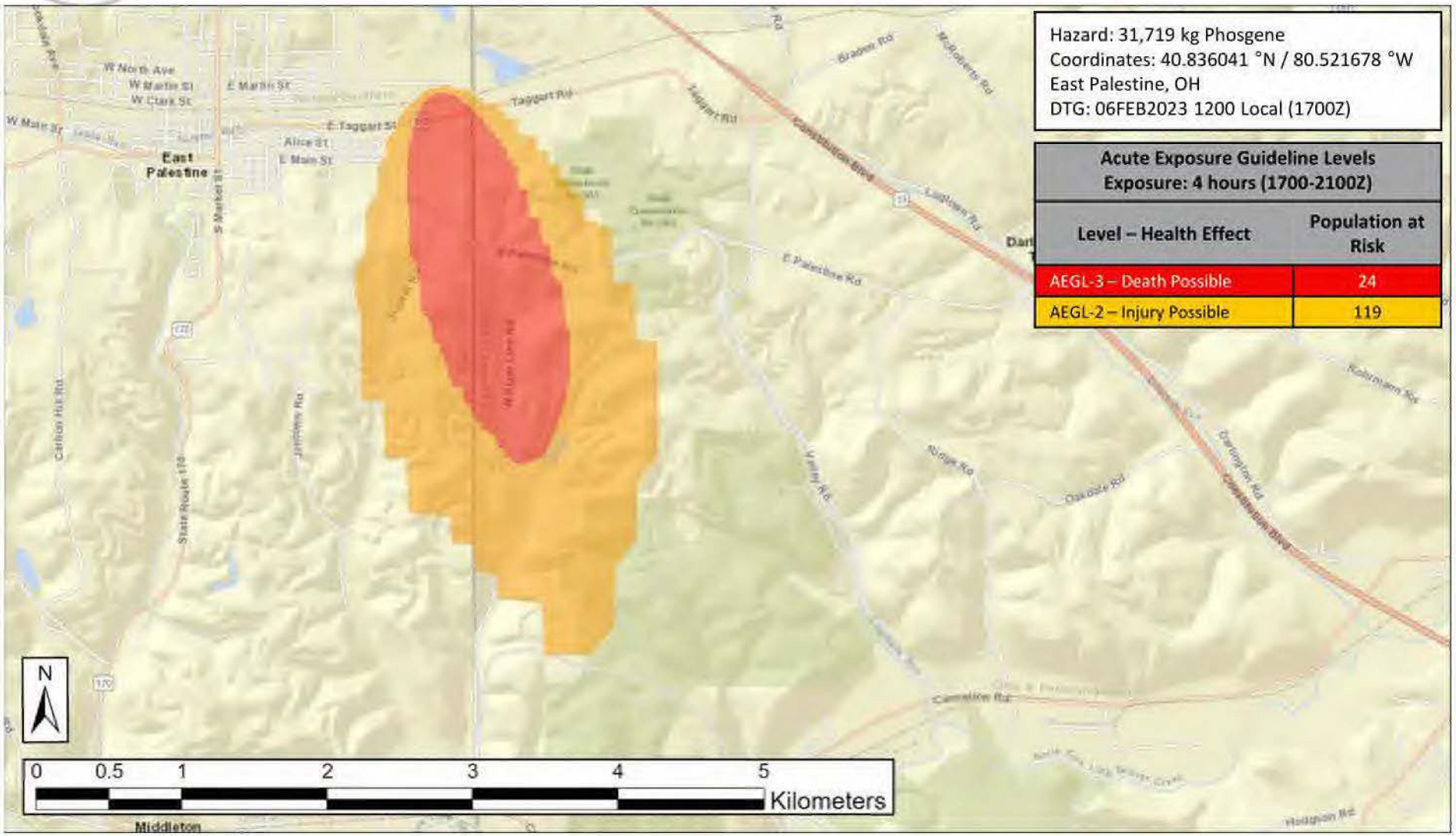
1200 Local (1700Z)

06FEB2023

Hydrogen Chloride – 1200 Local



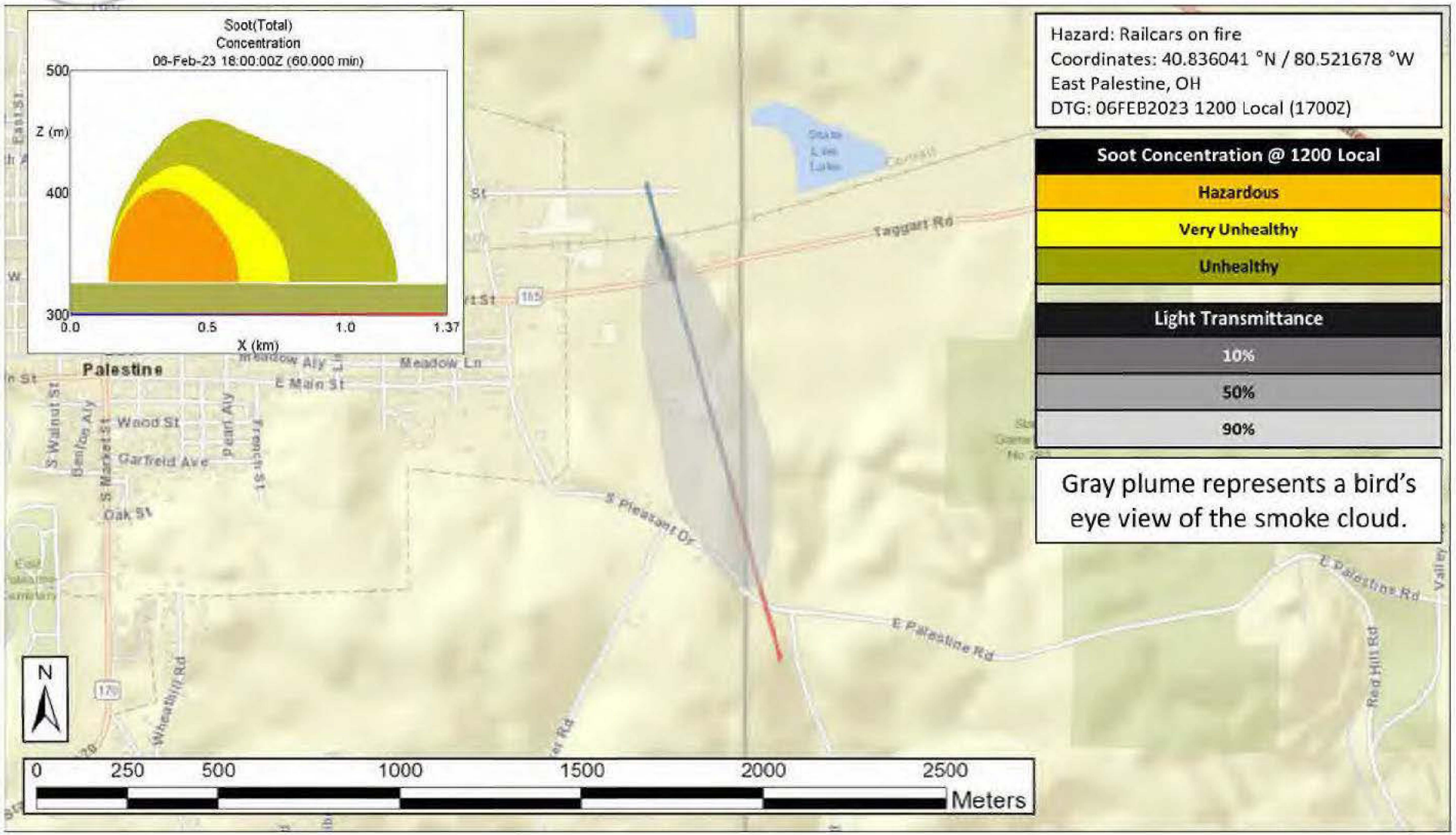
Phosgene – 1200 Local



Soot– Surface Dosage – 1200 Local



Soot – Vertical Profile – 1200 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

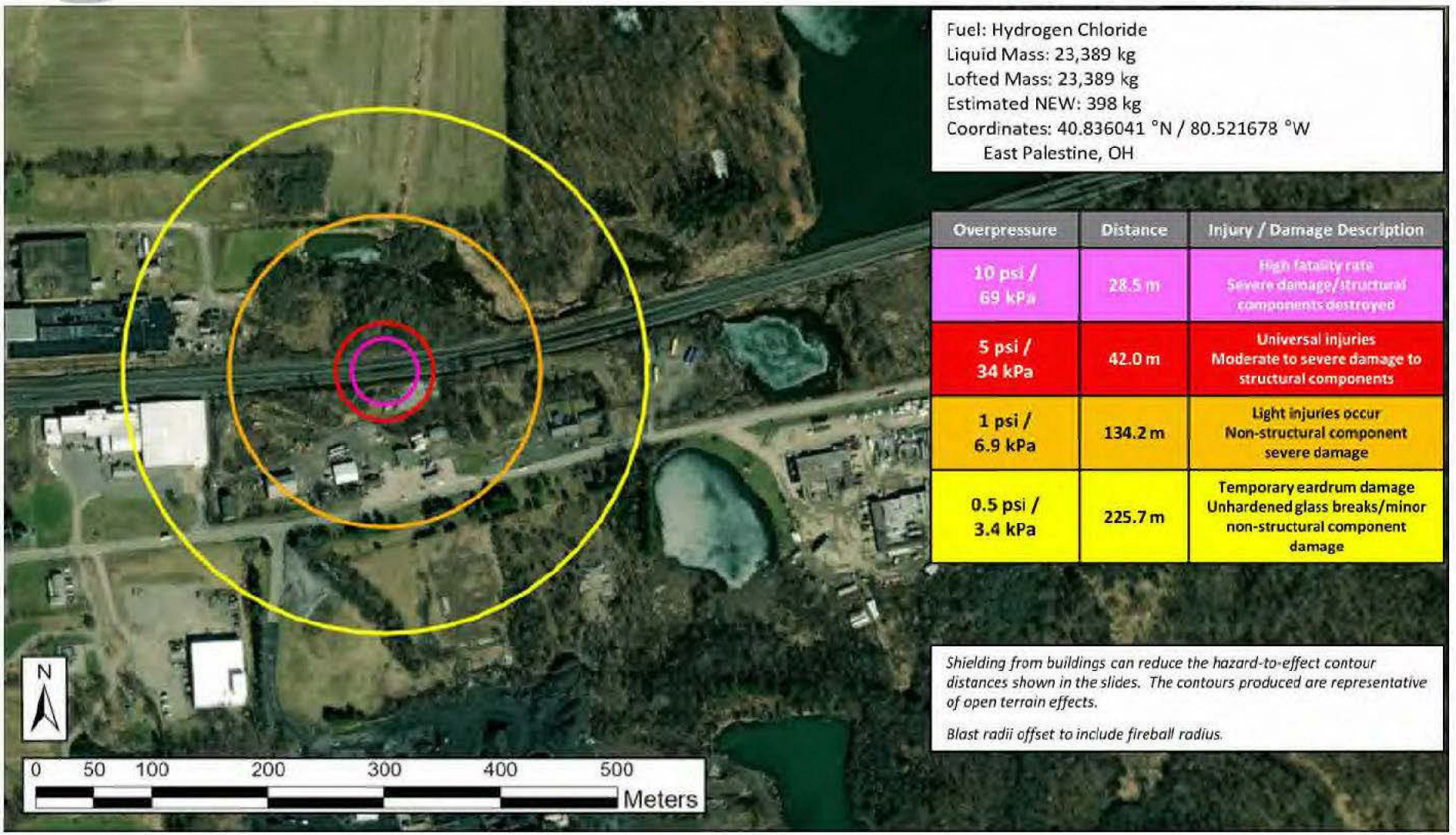
AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE Scenario

06FEB2023

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Liquid Mass: 23,389 kg
Lofted Mass: 23,389 kg
Estimated NEW: 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

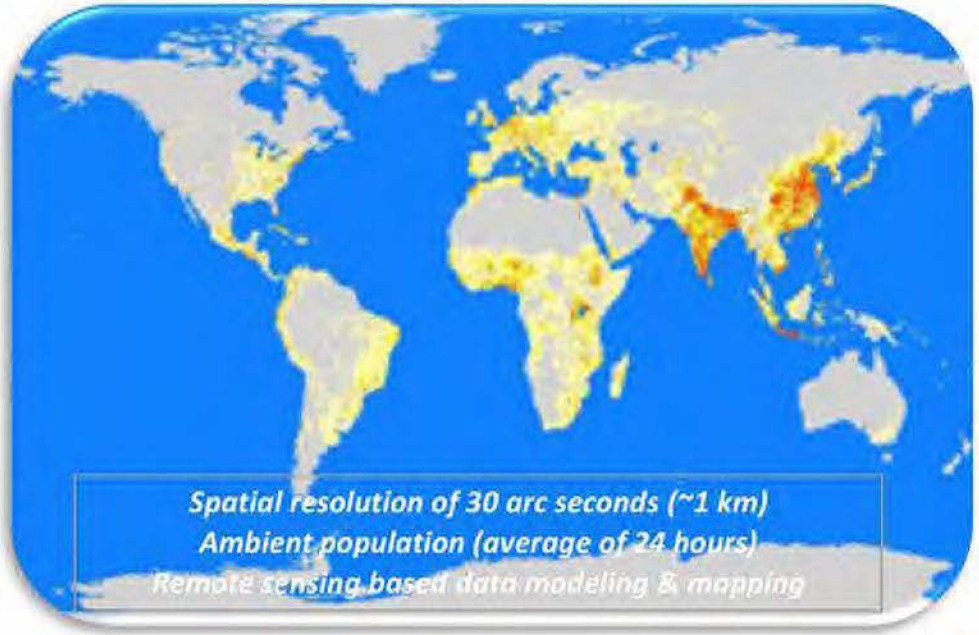
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6) [redacted]
Subject: FW: Updated Product
Date: Monday, February 6, 2023 3:34:00 PM
Attachments: RFI 23-0081hU IMAAC.pdf
1800 HCL AEGL 1h0.kml
1800 phosgene AEGL 1h0.kml
1800 VCL AEGL 1h0.kml
1530 HCL AEGL 1h0.kml
1530 phosgene AEGL 1h0.kml
1530 VCL AEGL 1h0.kml

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 3:20 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: FW: Updated Product

CUI

JOC,

Attached is a short-suspense update to the IMAAC product. Thank you.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
Sent: Monday, February 6, 2023 3:08 PM
To: (b) (6) [redacted]

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b) (6)

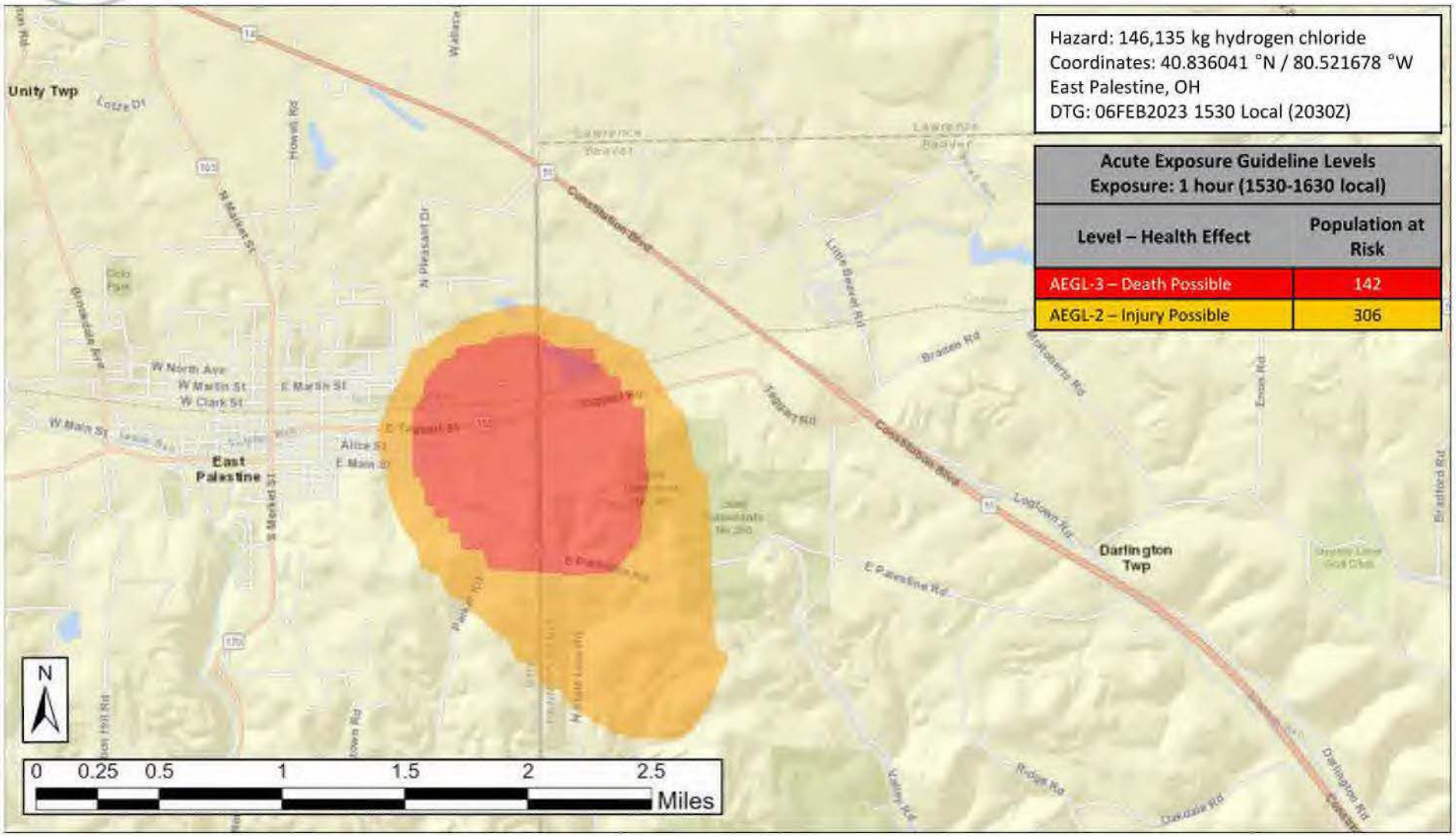
- Blast effects from a BLEVE is provided.

Caveats

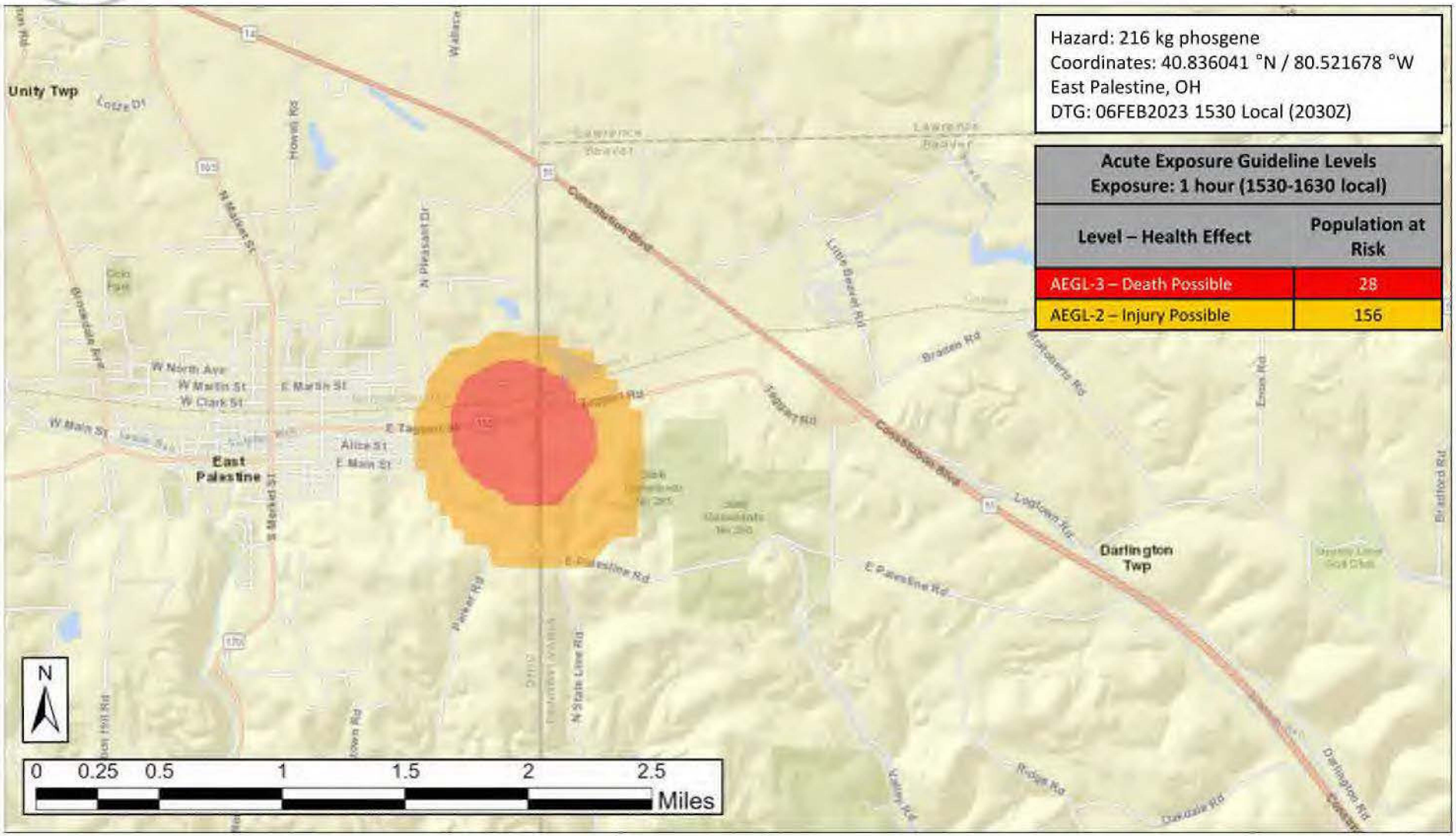
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

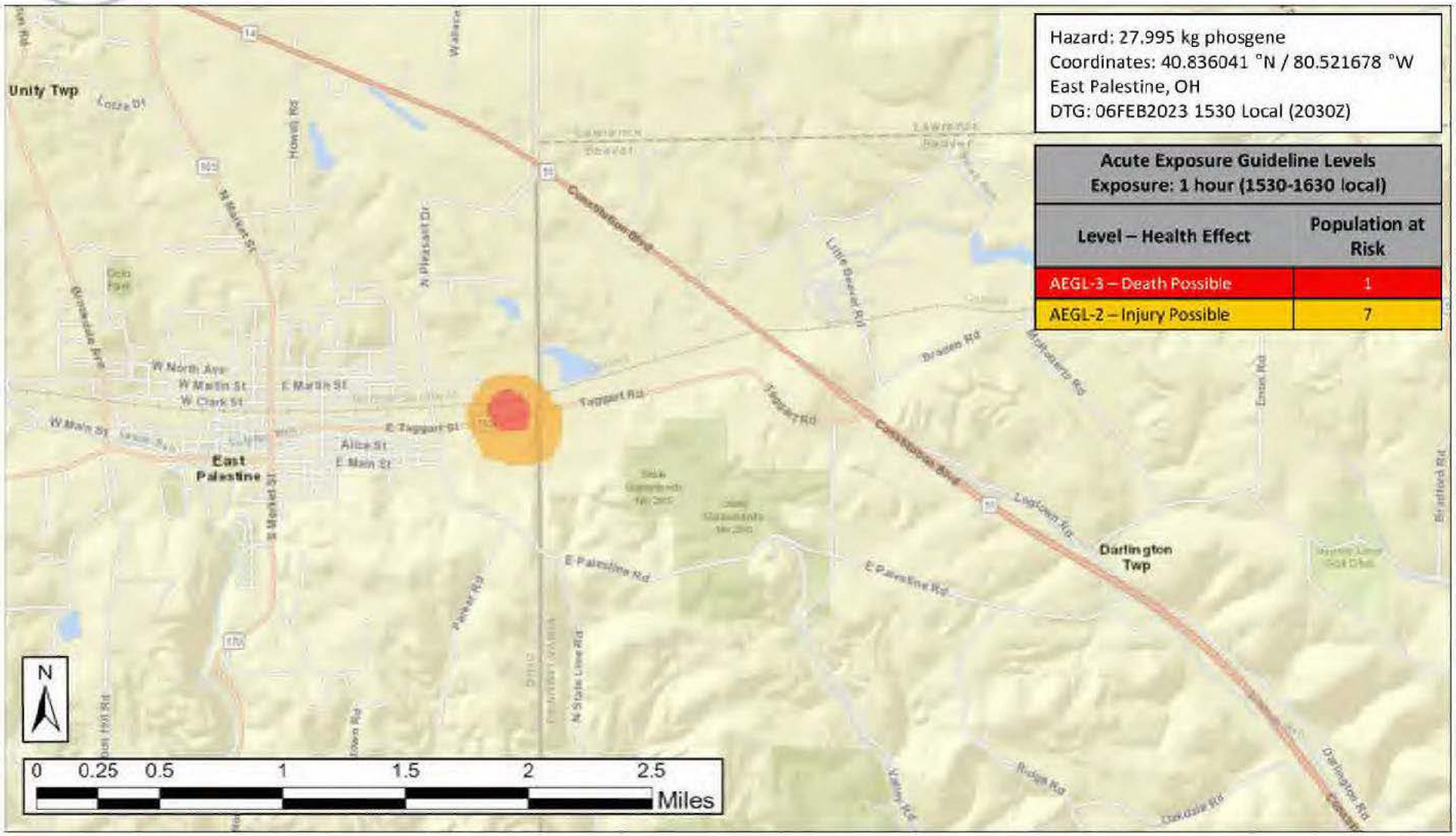
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

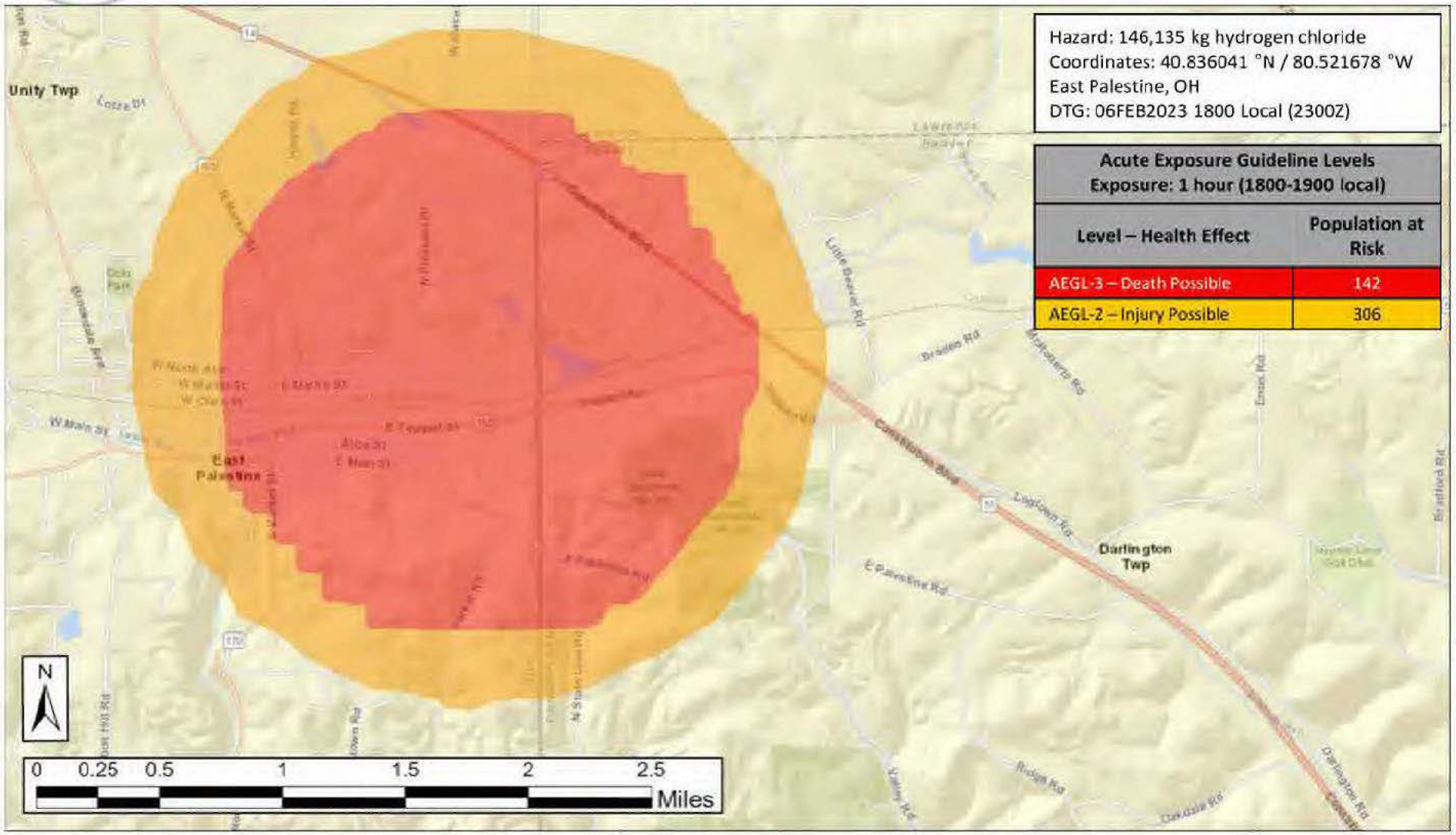


Vinyl Chloride – 1530 Local

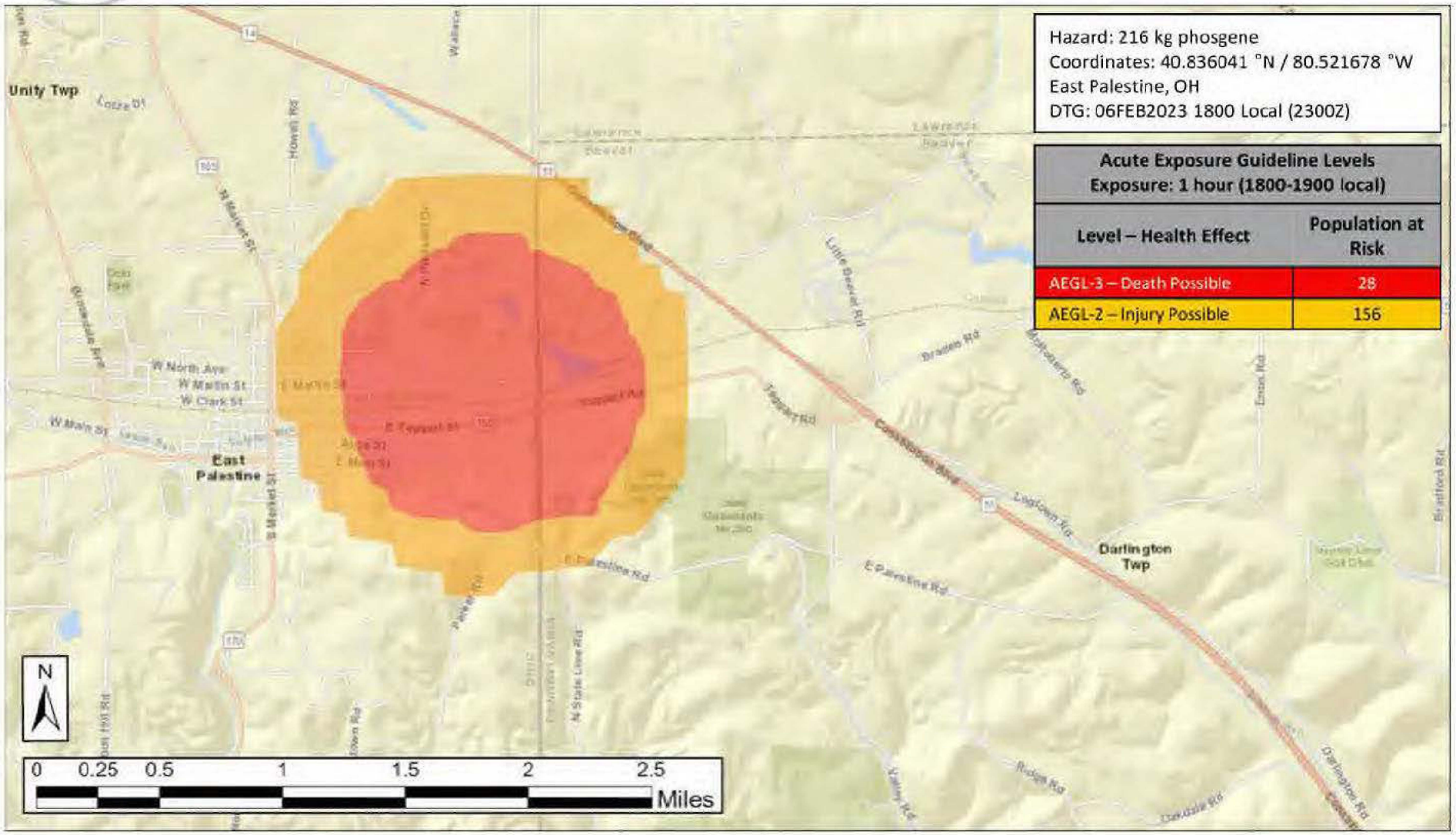


6:00PM Breach (2300Z)
06 FEB 2023

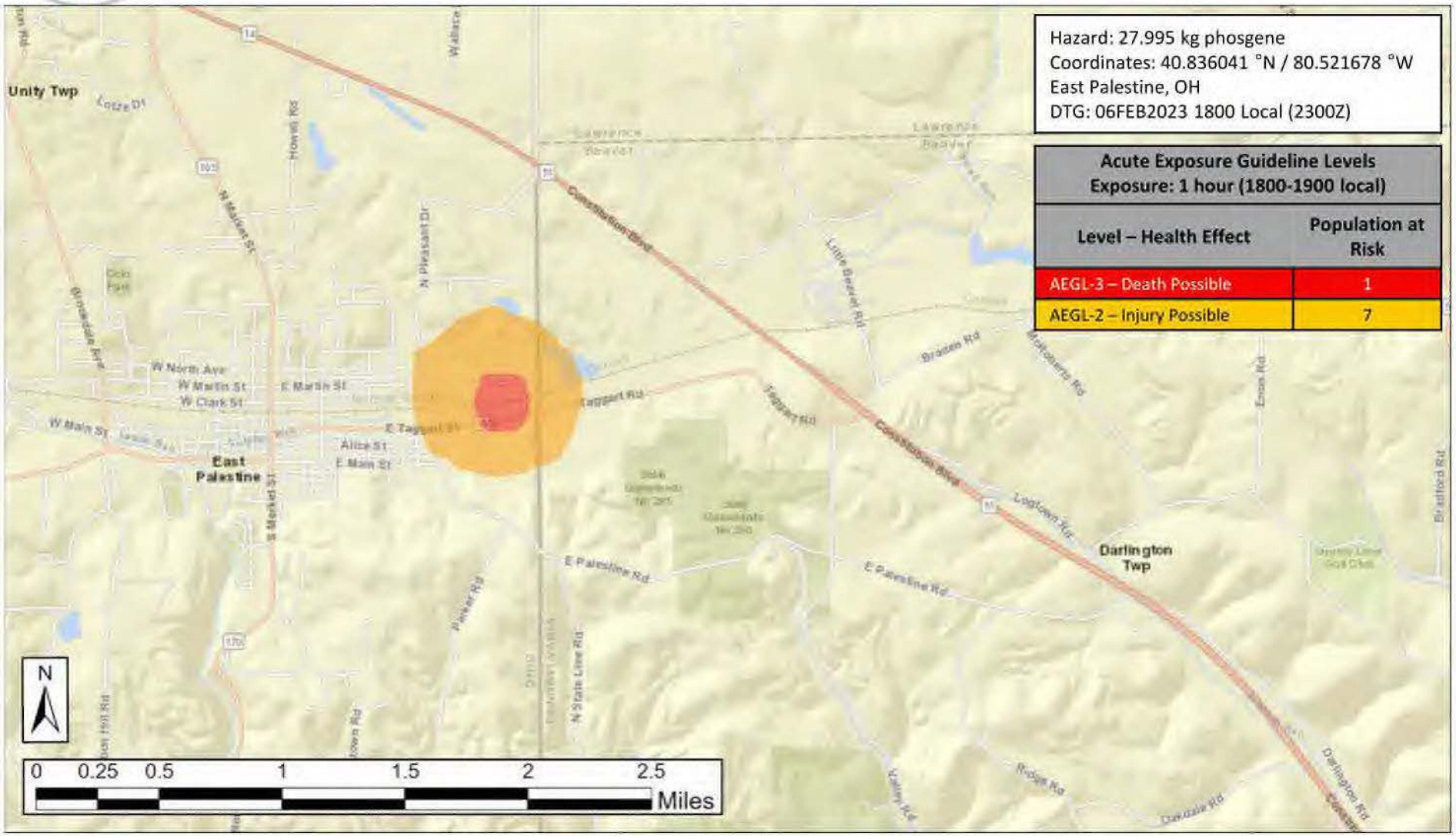
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

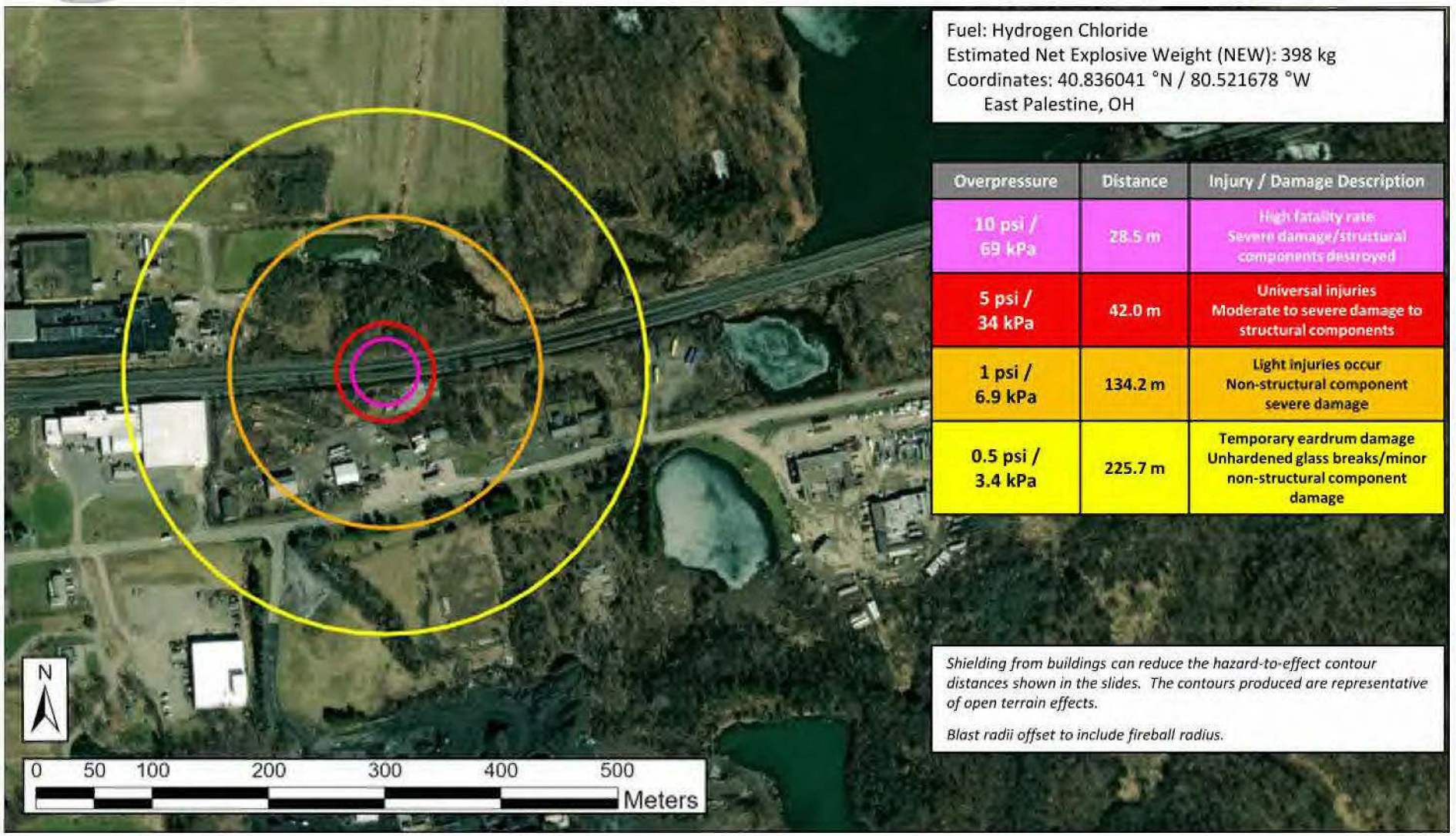
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

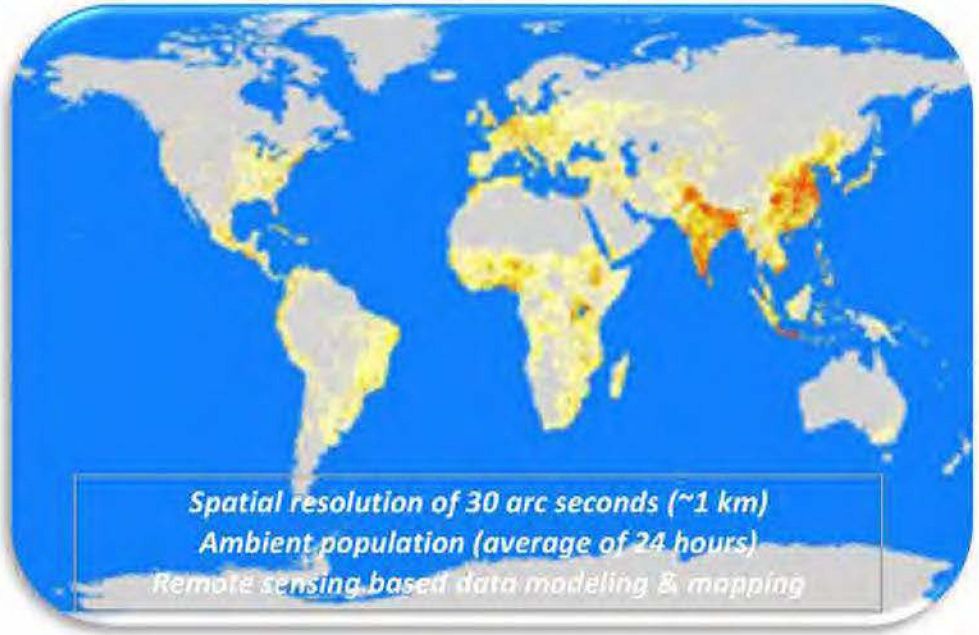
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

[redacted] (b) (6)

Subject: RE: Updated Product

Suspect it would burn faster than that. But the math seems okay.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

-----Original Message-----
From: [redacted] (b) (6)
Sent: Monday, February 6, 2023 2:57 PM
To: [redacted] (b) (6)

Subject: Re: Updated Product

Yes please.

I'd also love someone to check my math. I expect approximately 516,000 lbs would have been burned off (assuming 3 hour conservative burn time) and that there would be approximately 103,000 lbs left to burn by 1800.

180 min total burn (conservative
150 allotted burn time at 1800.

619,000 lbs remaining in tanks.
516,000 lbs burned at 150 minutes
103,000 lbs remaining.

(not an expert in this - just fulfilling an odd request).

Respectfully,

(b) (6)

Operations NCOIC

8202 S. Access Rd. Bldg. 946

Columbus, Oh 43217

(b) (6)

Emergency: 1-866-4-WMD-CST (1-866-496-3278)

From: (b) (6)
Sent: Monday, February 6, 2023 2:47 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; (b) (6)
Subject: [Non-DoD Source] RE: Updated Product

Great! Thank you very much.

(b) (6)
On-Scene Coordinator
US EPA
2565 Plymouth Road
Ann Arbor, MI 48105
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 2:43 PM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; (b) (6)
Subject: RE: Updated Product

ALCON,

Just saw on the governor's news conference that the plan is to conduct the operation at 1530 EST. So we are doing an update for that time.

We can also do an update for 1800 if that's still necessary.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 1:22 PM
To: (b) (6) [redacted]
Subject: Updated Product

ALCON,

We sent out an updated product to our Ops Center. They should be forwarding it to you shortly.

This analysis was based on a few changes:

- Based on discussion with the CST (via information from Norfolk Southern), they estimate that only 3.5 railcars worth of material is present. Note that this assumption doesn't dramatically reduce the extent of the plume, so if it's still a full five railcars, it probably increases the plume extent by about 10 - 20 percent.
- We did some additional research and calculations on the potential combustion products. Based on what we were able to find, we believe we were overestimating the phosgene amount and underestimating the HCl amount. We're still making some assumptions (for example, how much vinyl chloride combusts) but we think this is closer to reality. But again, I wouldn't call that a rock-solid prediction.
- Incident time was set at 1400 based on discussion with CST (I guess the incident command was considering that time) for blowing the tanks.

Please let us know if there's any questions or if the product doesn't show up within the next few minutes.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil

JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center; DTRA Ft Belvoir RD Mailbox Reachback; (b) (6)
[redacted]
(b) (6)
[redacted]
hhs
Gll
[redacted]
Subject: IMAAC ACTIVATION: Train Derailment East Palestine Ohio
Date: Saturday, February 4, 2023 12:43:00 AM

ALCON,

At 04 0522Z FEB 2023, with the approval of the Requestor, Environmental Protection Agency Region 5, the Interagency Modeling and Atmospheric Assessment Center (IMAAC) is standing up a IMAAC for the Train Derailment/Fire at East Palestine , Ohio.

Source: (b) (6) [redacted], EPA Region 5

IMAAC TECHNICAL OPERATIONS HUB
Phone: 703-767-2003
FEMA-NWC@FEMA.DHS.GOV

Respectfully,

(b) (6) [redacted]
Watch Officer
DTRA Joint Operations Center
(703) 767-2000 (DSN 427)
NSTS: 717-7208

NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil
JWICS: DTRA.OpsCenter@dtra.ic.gov

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: RE: East Palestine Chem train derailment
Date: Thursday, February 16, 2023 12:18:10 PM
Attachments: RFI_23-0081hU_IMAAC.pdf

(b) (6),

The last update for the DTRA Hazard plot for the East Palestine Train derailment incident is attached.

Very Respectfully,
(b) (6)
The MASY Group support to DTRA IT-KT
DTRA Joint Operations Center
Phone: 703.767.2116
DTRA-JOC@mail.mil

-----Original Message-----
From: (b) (6)
Sent: Thursday, February 16, 2023 12:04 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: East Palestine Chem train derailment

Sir/Ma'am

This is (b) (6). I am requesting the unclassified DTRA Hazard plot for the 03FEB23 East Palestine Train derailment incident. Please let me know if there are any issues/concerns

Respectfully,

(b) (6)

Brigade CBRN Officer

75th Field Artillery Brigade

(b) (6)

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

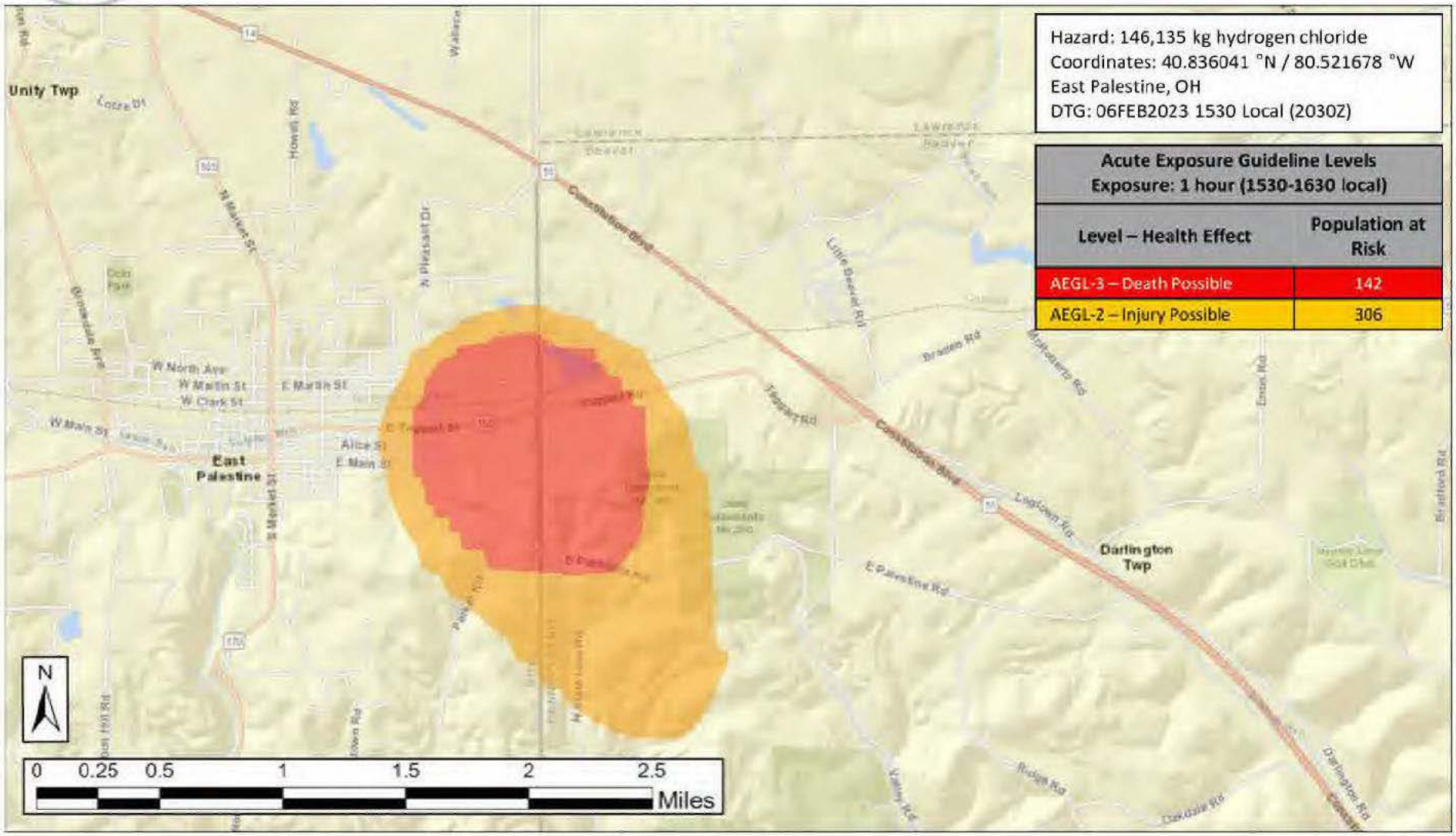
- Blast effects from a BLEVE is provided.

Caveats

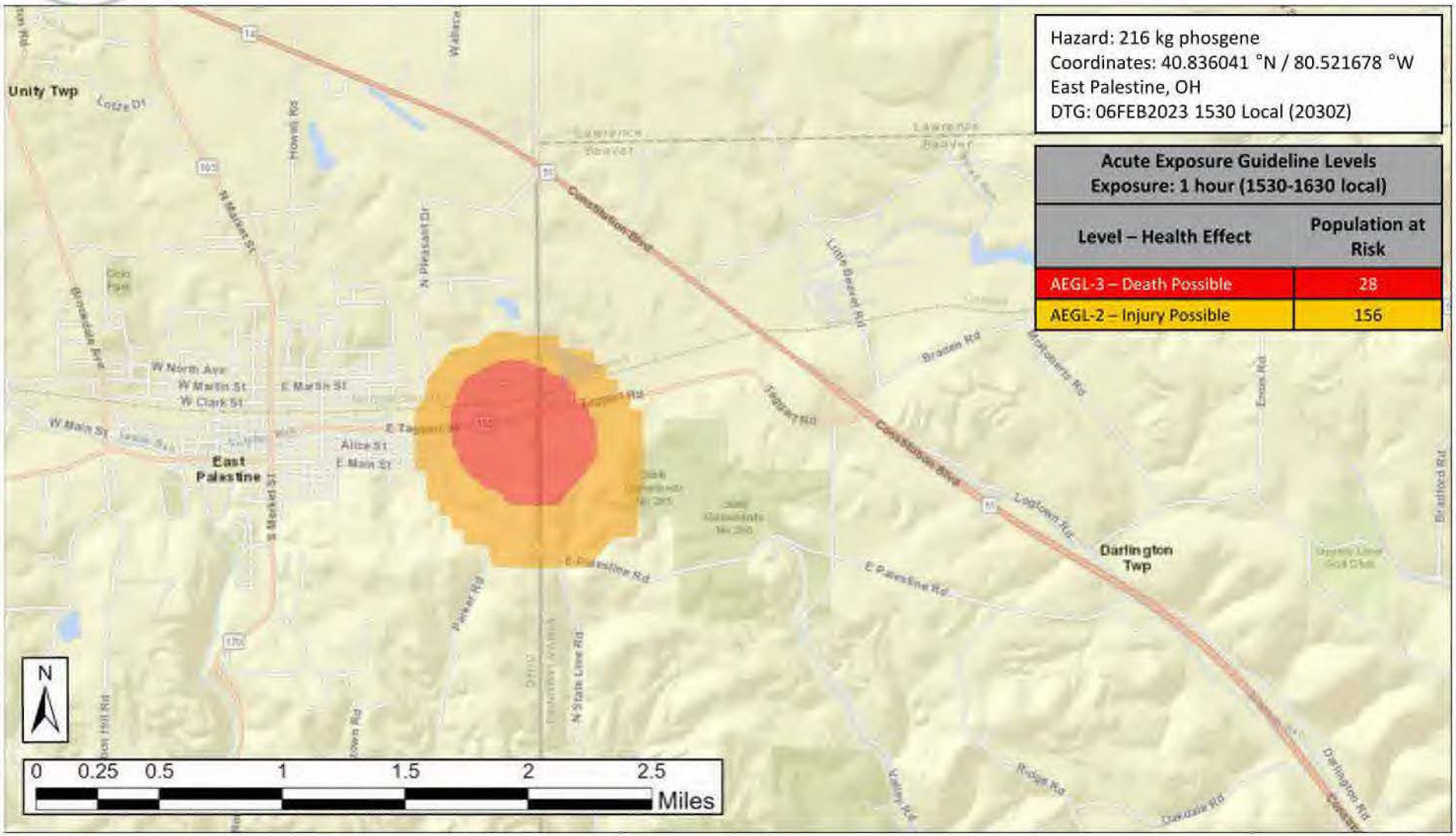
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

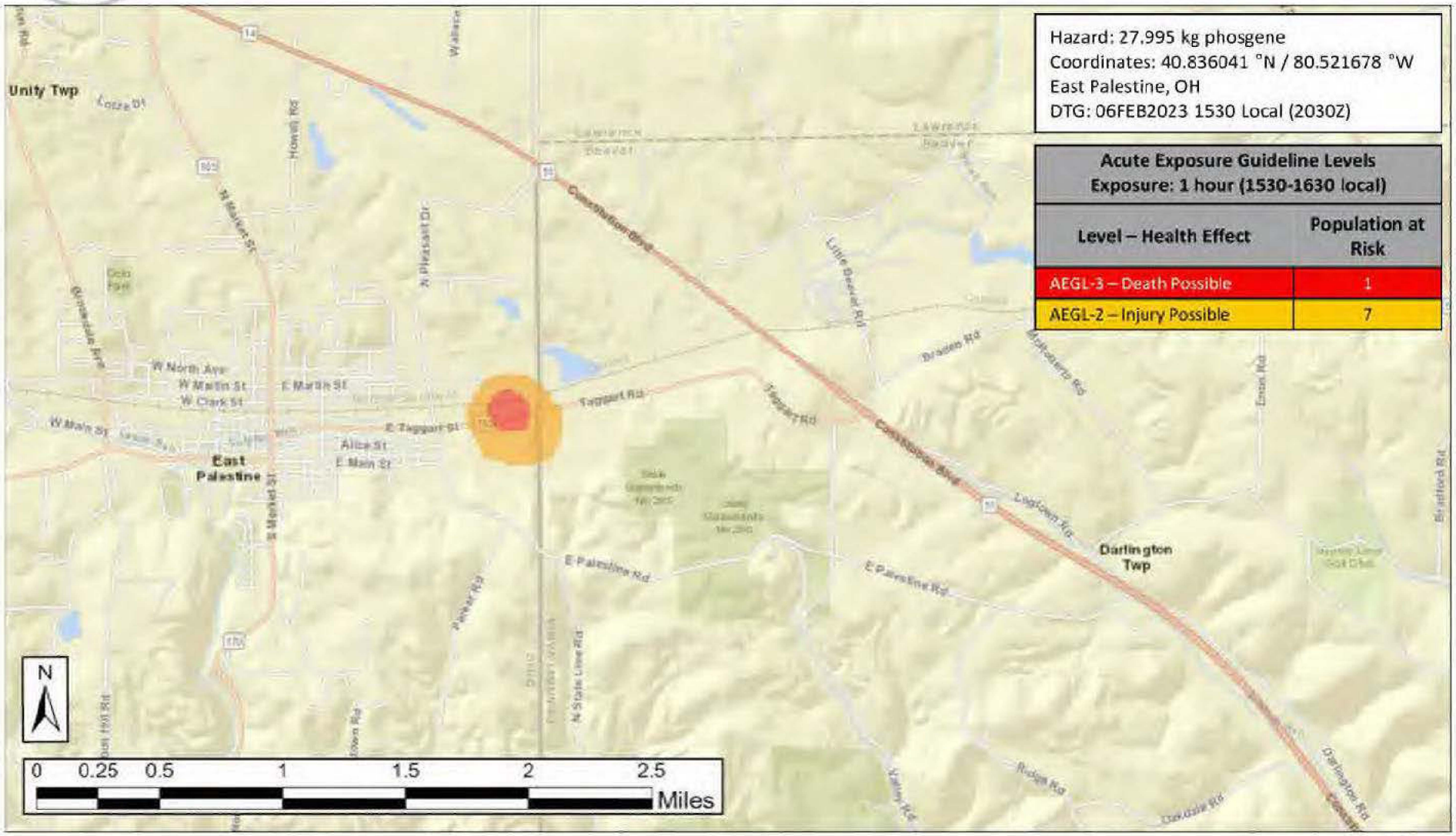
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

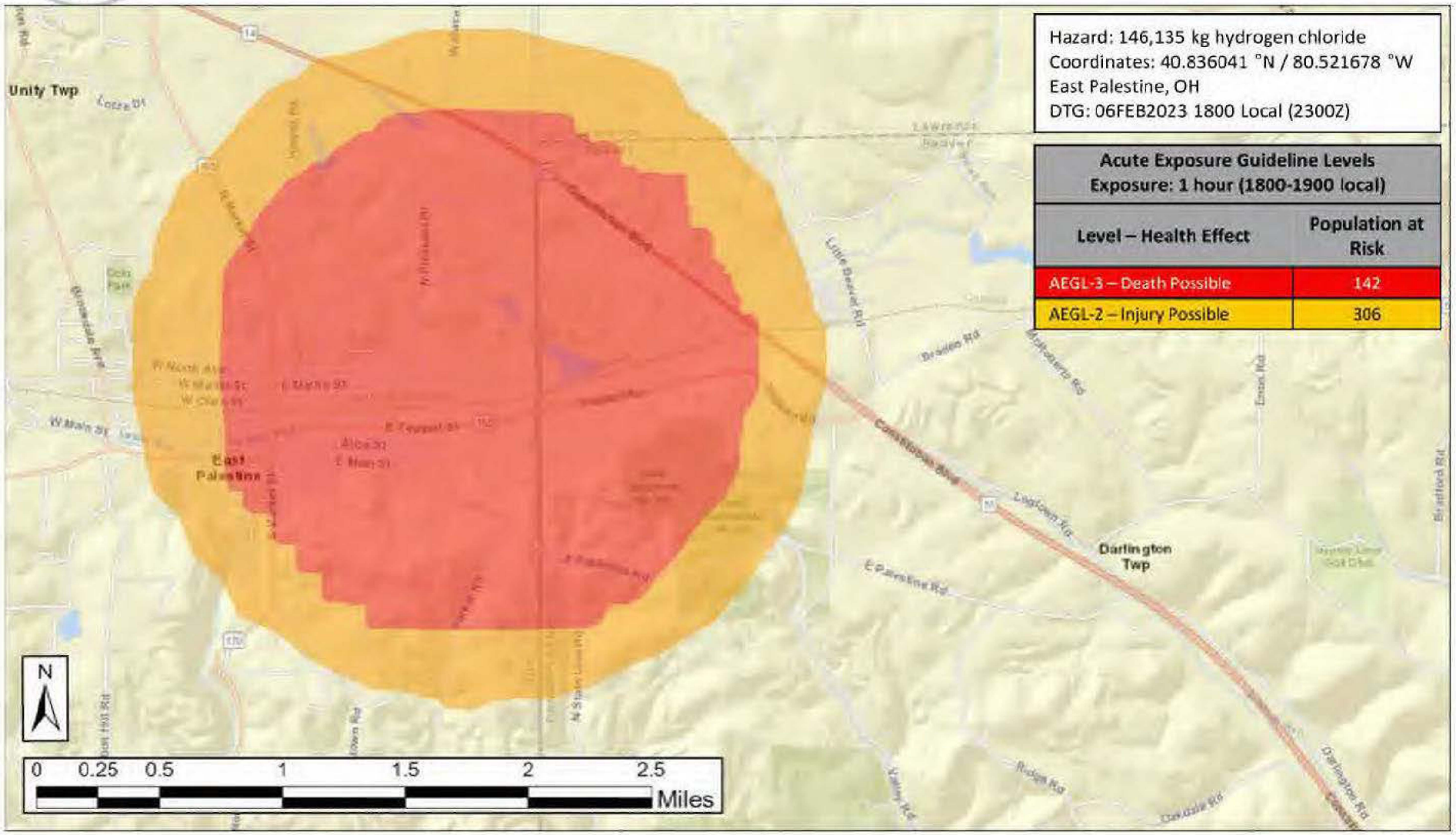


Vinyl Chloride – 1530 Local

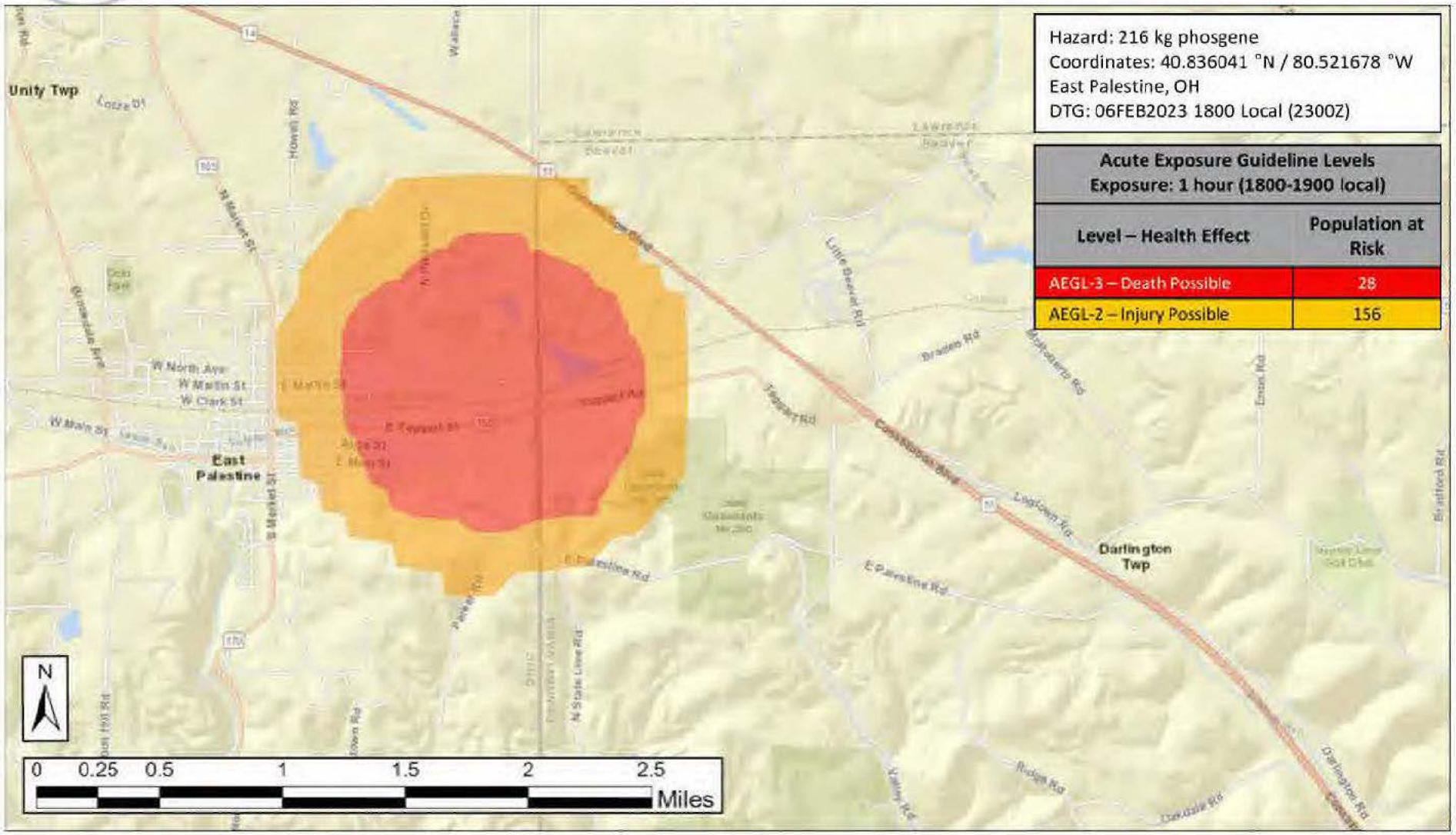


6:00PM Breach (2300Z)
06 FEB 2023

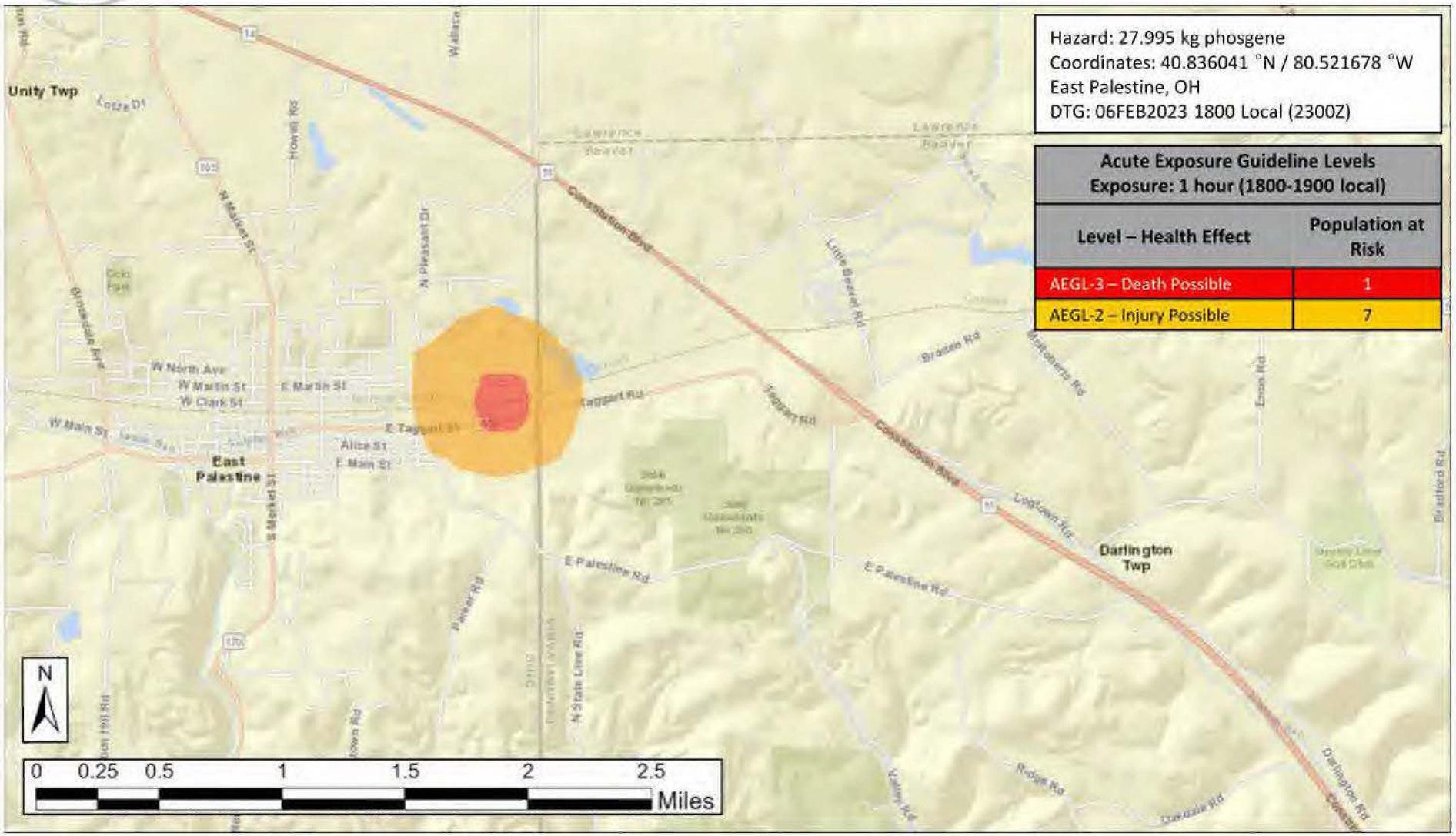
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

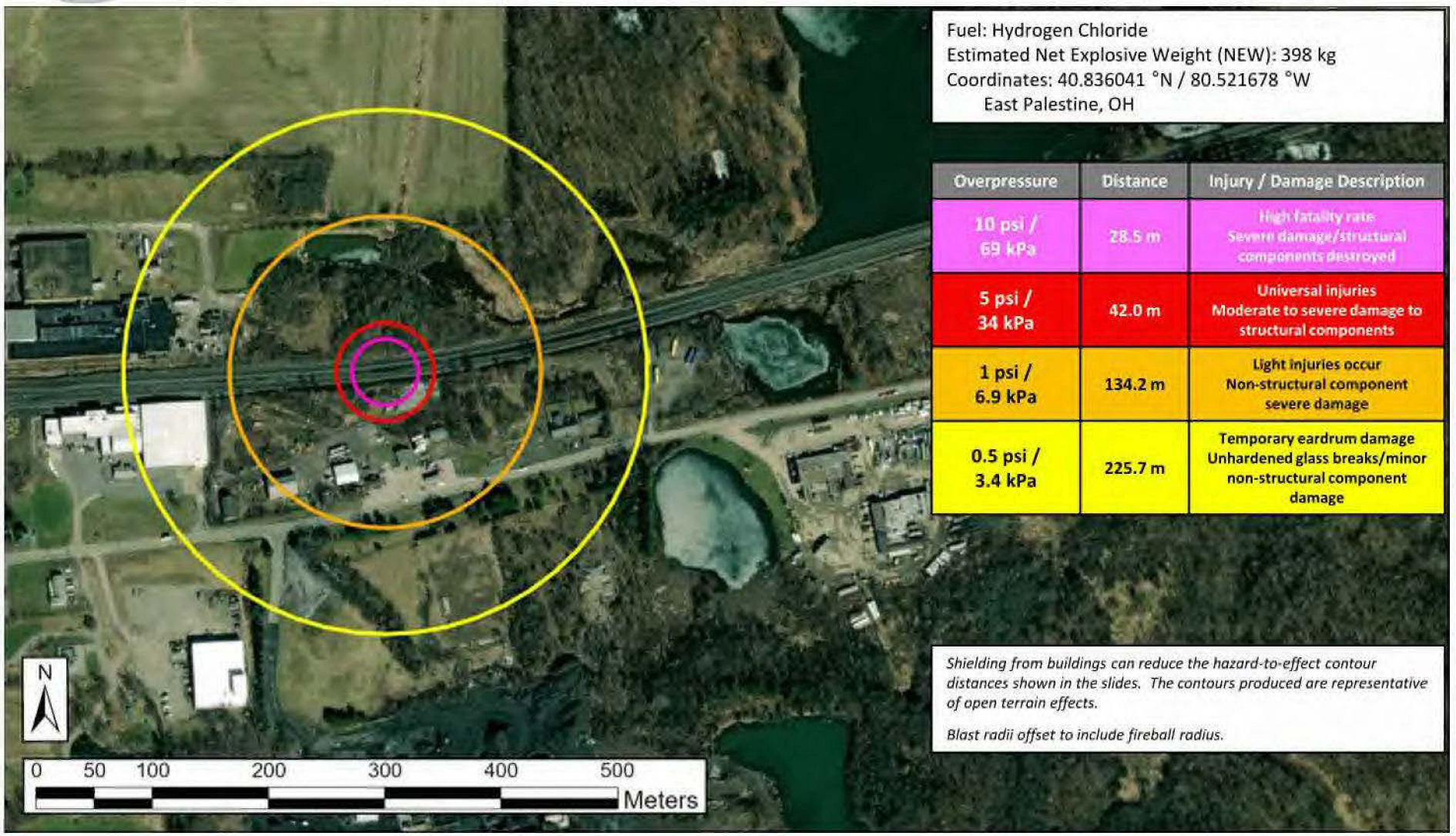
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

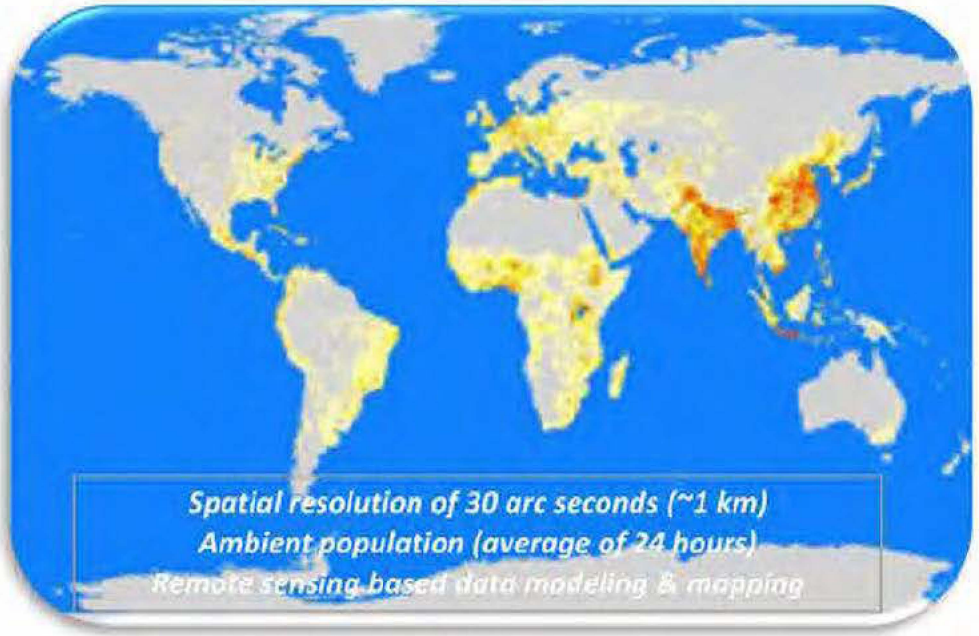
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

From: DTRA Ft Belvoir RD Mailbox Reachback
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center; DTRA Ft Belvoir RD Mailbox Reachback
Subject: RE: RFI - Ground Deposition
Date: Monday, February 6, 2023 5:21:38 PM

Yes. We are tracking. We're beginning to look at this.

Respectfully,

(b) (6)

[redacted]
CBRNE Analyst / Chemistry SME
(b) (6)

DTRA Technical Reachback (RD-OPR)
703-767-3445
Dtra-reachback@mail.mil

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 16:39
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: FW: RFI - Ground Deposition

RB,

Are you tracking and able to support the request below, thanks!

Very Respectfully,

(b) (6)
Watch Officer
Joint Operations Center
Current Operations Division (OI-OPAO)
Defense Threat Reduction Agency
DSN: 703-767-2000
NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil

-----Original Message-----
From: (b) (6)
Sent: Monday, February 6, 2023 4:20 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: (b) (6)
Subject: RFI - Ground Deposition

DTRA,

First, let me thank you all for the profound help you've given in a unusually chaotic undertaking!

Secondly, if I may ask yet more of you: Could we get surface deposition modeling for 1 day, and potentially upwards of 1 week from now?

Respectfully,

(b) (6) [redacted]

[redacted]

Operations NCOIC

8202 S. Access Rd. Bldg. 946

Columbus, Oh 43217

(b) (6) [redacted]

[redacted]

[redacted]

[redacted]>

Emergency: 1-866-4-WMD-CST (1-866-496-3278)

From: (b) (6)
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: Re: RFI 23-0956U
Date: Wednesday, December 6, 2023 11:06:00 AM

Thank you so much! The product more than meets my needs. I appreciate the quick turnaround on this.

From: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Date: Tue, Dec 5, 2023, 11:38 PM
To: (b) (6)
Subject: FW: RFI 23-0956U

SFC Stacey,

Attached is the product for your RFI 956 . Please contact the Ops Center
via email reply or at 703-767-2116 when you are in receipt and satisfied with completed product so that we may close out your request.

V/R

(b) (6)
Operations Center Support
Analytics & Integration Division (IT-KTA)
Contractor, General Dynamics Information Technology
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Wednesday, December 6, 2023 2:24 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI 23-0956U

The requested analysis is attached. Please review and forward to the requestor. Please contact Reachback with questions and/or constructive comments.

RLu

Reachback analyst

From: DTRA Ft Belvoir RD Mailbox Reachback
To: (b) (6) [redacted]; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: RE: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 8:26:43 AM

CUI

I think the 1 psi was on the product (at least the last version I saw) --
radius of approx. 134 meters.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: (b)(6) [redacted]
Sent: Monday, February 6, 2023 8:21 AM
To: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint
Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Thanks BZ,

Do you know the distance for .1psi? 450m?

Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:08 AM
To: (b) (6) DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

Ed,

Don't have a precise answer for you. Glasstone states that "Aircraft are damaged by blast effect at levels of peak overpressure as low as 1 to 2 pounds per square inch. Complete destruction or damage beyond economical repair may be expected at peak overpressures of 4 to 10 pounds per square inch."

Of course, there's some caveats:
- Presumably, military aircraft are more robust than a Cessna.
- These experiments were done on 1950's era aircraft, modern aircraft may use better materials in some case
- An aircraft in flight is presumably more vulnerable, but it's not clear to me how much more

So with all those caveats, 0.5 psi is probably not great, but I'm not sure it would bring down the aircraft. Wouldn't be really fun for the guy flying it though, and I can't promise my supposition is correct.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: (b) (6)
Sent: Monday, February 6, 2023 7:11 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center

<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Received thank you,

RB - any thoughts on the BLEVE overpressure on an airborne Cesena 208B, .5 seems like it might bad for an aircraft to experience. If there's an overpressure of concern, can you let me know the distance for it.

Thanks,
Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 6:25 AM
To: (b) (6)
Subject: FW: RFI_23_0081fU_IMAAC

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
< >
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov

R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

From: DTRA Ft Belvoir RD Mailbox Reachback
To: (b) (6); DTRA Ft Belvoir RD Mailbox Reachback; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Subject: RE: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 8:39:09 AM

CUI

Did you type 0.1 and I missed the dot? Sorry, probably need to get my eyes checked.

Anyhow, probably on the order of a factor of 5 from the 1 psi, so about 650 - 700 meters or so.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Monday, February 6, 2023 8:32 AM
To: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Yep 1psi was there, how about .1 psi?

Thanks,
Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6) [redacted]

(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:27 AM
To: [redacted]; DTRA Ft Belvoir RD Mailbox
Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI
Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

I think the 1 psi was on the product (at least the last version I saw) --
radius of approx. 134 meters.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Monday, February 6, 2023 8:21 AM
To: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint
Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Thanks BZ,

Do you know the distance for .1psi? 450m?

Ed

(b) (6) [redacted]
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management

(b) (6) [redacted]

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Sent: Monday, February 6, 2023 8:08 AM
To: [redacted]; DTRA Ft Belvoir OI Mailbox
Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RE: RFI_23_0081fU_IMAAC

CUI

Ed,

Don't have a precise answer for you. Glasstone states that "Aircraft are damaged by blast effect at levels of peak overpressure as low as 1 to 2 pounds per square inch. Complete destruction or damage beyond economical repair may be expected at peak overpressures of 4 to 10 pounds per square inch."

Of course, there's some caveats:
- Presumably, military aircraft are more robust than a Cessna.
- These experiments were done on 1950's era aircraft, modern aircraft may use better materials in some case
- An aircraft in flight is presumably more vulnerable, but it's not clear to me how much more

So with all those caveats, 0.5 psi is probably not great, but I'm not sure it would bring down the aircraft. Wouldn't be really fun for the guy flying it though, and I can't promise my supposition is correct.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: (b) (6) >
Sent: Monday, February 6, 2023 7:11 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Received thank you,

RB - any thoughts on the BLEVE overpressure on an airborne Cesena 208B, .5 seems like it might bad for an aircraft to experience. If there's an overpressure of concern, can you let me know the distance for it.

Thanks,
Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 6:25 AM
To: (b) (6)
Subject: FW: RFI_23_0081fU_IMAAC

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
< >
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)

STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

From: DTRA Ft Belvoir RD Mailbox Reachback
To: (b) (6) [redacted]; DTRA Ft Belvoir OI Mailbox Joint Ops Center
Cc: DTRA Ft Belvoir RD Mailbox Reachback
Subject: RE: RFI_23_0081fU_IMAAC
Date: Monday, February 6, 2023 8:08:27 AM

CUI

Ed,

Don't have a precise answer for you. Glasstone states that "Aircraft are damaged by blast effect at levels of peak overpressure as low as 1 to 2 pounds per square inch. Complete destruction or damage beyond economical repair may be expected at peak overpressures of 4 to 10 pounds per square inch."

Of course, there's some caveats:
- Presumably, military aircraft are more robust than a Cessna.
- These experiments were done on 1950's era aircraft, modern aircraft may use better materials in some case
- An aircraft in flight is presumably more vulnerable, but it's not clear to me how much more

So with all those caveats, 0.5 psi is probably not great, but I'm not sure it would bring down the aircraft. Wouldn't be really fun for the guy flying it though, and I can't promise my supposition is correct.

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

-----Original Message-----
From: [redacted]
Sent: Monday, February 6, 2023 7:11 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback <dtra.belvoir.rd.mbx.reachback@mail.mil>

Subject: [Non-DoD Source] RE: RFI_23_0081fU_IMAAC

Received thank you,

RB - any thoughts on the BLEVE overpressure on an airborne Cesena 208B, .5 seems like it might bad for an aircraft to experience. If there's an overpressure of concern, can you let me know the distance for it.

Thanks,
Ed

(b) (6)
Branch Chief
Field Operations Branch
CBRN Consequence Management Advisory Division
Office of Emergency Management
(b) (6)

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Monday, February 6, 2023 6:25 AM
To: (b) (6)
Subject: FW: RFI_23_0081fU_IMAAC

-----Original Message-----
From: DTRA Ft Belvoir RD Mailbox Reachback
< >
Sent: Monday, February 6, 2023 6:08 AM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Cc: DTRA Ft Belvoir RD Mailbox Reachback
<dtra.belvoir.rd.mbx.reachback@mail.mil>
Subject: RFI_23_0081fU_IMAAC

Ops,

Please review and release the latest update for RFI_23_0081U.

Respectfully,

JB

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Respectfully,

(b) (6)
DTRA Reachback Shift Lead - ARA Meteorologist
703-767-3445
(b) (6)

From: (b) (6)
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center
Cc: (b) (6)
Subject: RFI - Ground Deposition
Date: Monday, February 6, 2023 4:20:03 PM

DTRA,

First, let me thank you all for the profound help you've given in a unusually chaotic undertaking!

Secondly, if I may ask yet more of you: Could we get surface deposition modeling for 1 day, and potentially upwards of 1 week from now?

Respectfully,

(b) (6)
Operations NCOIC
8202 S. Access Rd. Bldg. 946
Columbus, Oh 43217
(b) (6)

Emergency: 1-866-4-WMD-CST (1-866-496-3278)

Date: 08MAR2023 1430Z
Version: Initial Product
Changes: Analysis after controlled breach

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081kU; analysis of controlled burn)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 08MAR2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], Chemist, Tech. Advisor/ QAC, US EPA-R5-LSASD-SQAB
Contact information	(b) (6) [redacted]
Request	After-action analysis of the afterburn of the train derailment in East Palestine, OH.
Employment	Real World
Hazards	• Soot from the combustion of several chemicals including: • Vinyl Chloride (887,400 lb) • Ethylene Glycol (185,150 lb) • Ethyl Hexyl Acrylate (205,900 lb) • Butyl Acrylate (180,000 lb)
Location	East Palestine, OH 40.8360921°N 80.5215888°W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	06FEB2023 1500 Local
Executive Summary	• A reanalysis of the train derailment and fire was performed with emphasis on tracing downwind locations where chemical deposits may exist. Contours of 10% of the AEGL-1 hazard level are provided for hydrogen chloride. 10% and 1% of the "unhealthy" dose of soot contour are provided as well.

Analysis Caveats

- This analysis is based on best estimates of the situation at the time of and during the controlled burn at East Palestine, OH. However, there are numerous unknowns and inherent uncertainty in models and model results that must be recognized.

- **This model does not claim to be the "ground truth" of what happened at the site.**

- Please see the following slides for caveats.

Modeling Results Summary

- Modeling did not show widespread areas affected at a level that would suggest serious health consequences, but possibly local effects due to:
  - Atmospheric variability
  - Synergistic effects from multiple chemicals
  - Individual sensitivity to certain chemicals
- The plume likely moved to the SE from the site over the first two - three hours. After this, a wind shift drove the plume back in the opposite direction (to the NNW), over the East Palestine area. A sinking nighttime atmospheric boundary layer kept material closer to the ground.
- As a result of this shift, deposition occurred first to the SE and in the vicinity of the burn location, then to N and NW of the burn location after about 4 – 5 hours.

Caveats (1): Vinyl Chloride Burn

- [redacted]
  - [redacted]
  - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
- Products of combustion assumed to be burning at near stoichiometric conditions (i.e. close to the optimal amount of air for ideal combustion). Analysis assumes a constant mass burn rate based on a hydrocarbon-like pool fire.
- No downwind hazard at the AEGL-1 level was estimated for unburned vinyl chloride or phosgene

Caveats (2): Other Chemicals

(b)(3)10USC130

- [redacted]
  - [redacted]
  - [redacted]
    - [redacted]
  - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
- Products of combustion assumed to be burning at near stoichiometric conditions (i.e. close to the optimal amount of air for ideal combustion). Analysis assumes a constant mass burn rate based on a hydrocarbon-like pool fire.

- Chemicals can have synergistic human effects (i.e., harmless doses of multiple chemicals can result in harm). **This model does not have any ability to model synergistic effects from what was certainly a multi-chemical mixture. We are not currently aware of any synergistic effects from this particular mix of chemicals.**

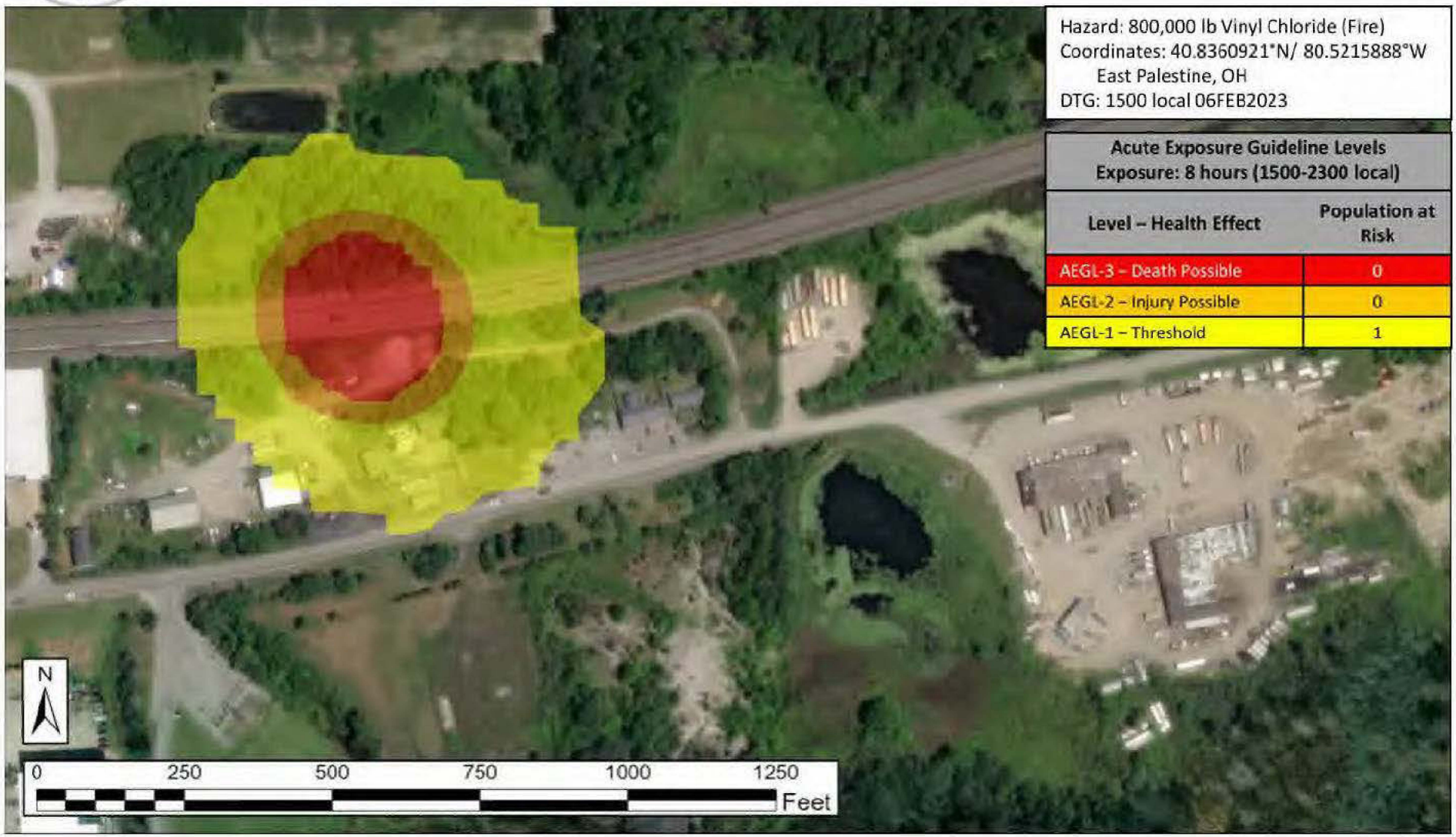
Caveats (3): General Caveats

- (b)(3)10USC130 [redacted]
  - [redacted]
  - [redacted]
- [redacted]
- Model results are inherently uncertain (even assuming perfect knowledge of the initial conditions, which we do not have) due to atmospheric variability, e.g., meander, intermittency, turbulence, etc. **This means that certain areas will have either higher or lower concentrations than indicated by the modeling.**
- Because of the nonlinear dynamics of fire plume spread, assumptions about the nature of the fire can have a huge effect on the results, including the size, intensity (the rate at which material is burning), and temperature. These factors introduce significant uncertainty into the analysis.
- Weather used the NOAA (National Oceanic and Atmospheric Administration) High Resolution Numerical North American Model (12 km NAM). These are broadly consistent with observations at the Pittsburgh International Airport, though that location is relatively far away (approx. 40 miles).
  - Forecast weather covers multiple locations and times across the modeling area rather than observations at one or a few locations. This should allow for greater accuracy across large regions.

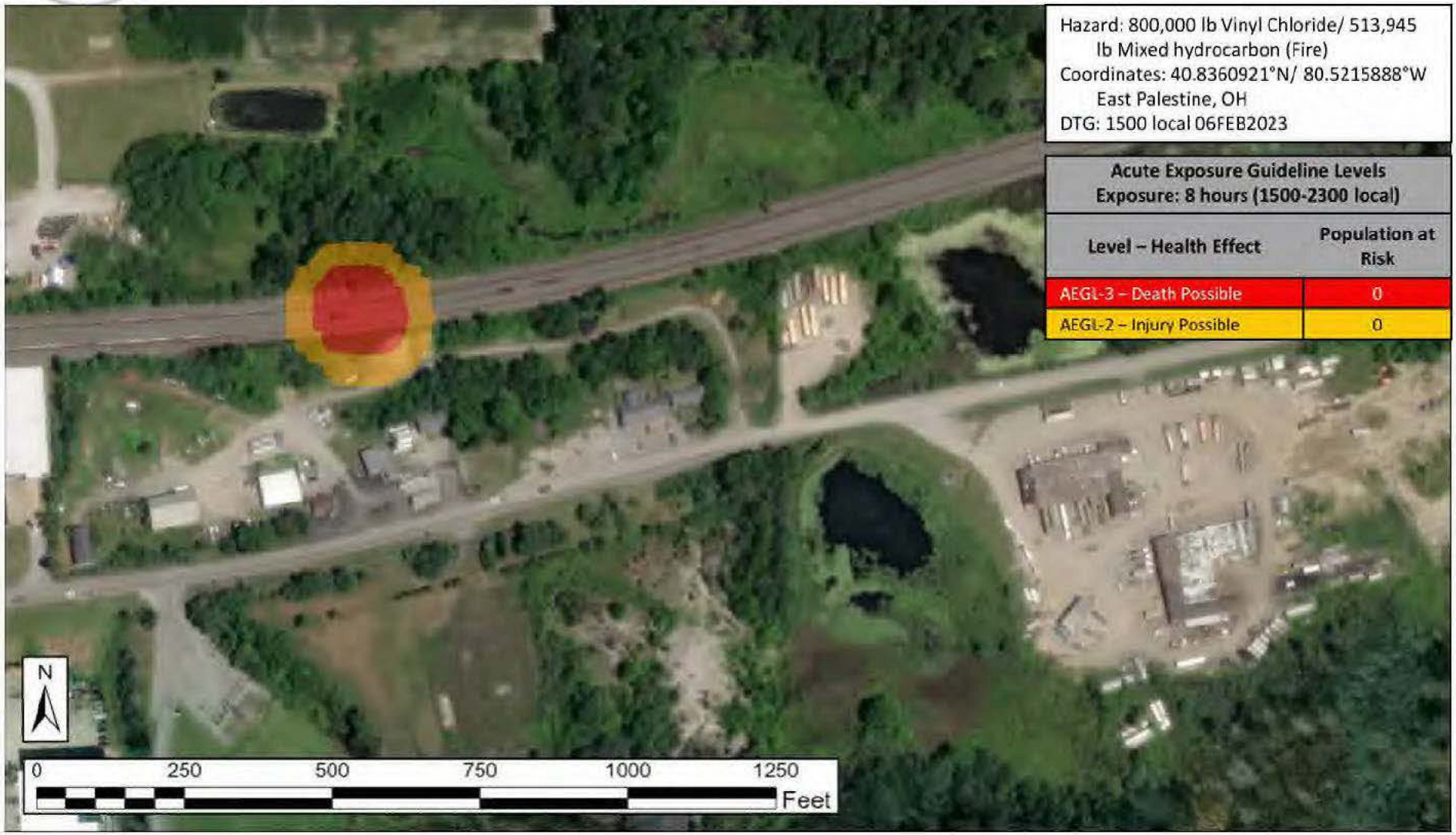
Notes

- AEGL hazards and hazardous soot dosage are displayed over an 8 hr duration
- Soot deposition over the course of the ten hours of the model run (6 hours of burning plus four hours of transport after burning).
- The soot transmittance and vertical plume are displayed at 6 hrs to match the duration of the fire
  - Soot dissipates rapidly after the end of the combustion duration

Hydrogen Chloride – East Palestine – 2300 local



Carbon Monoxide– East Palestine – 2300 local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

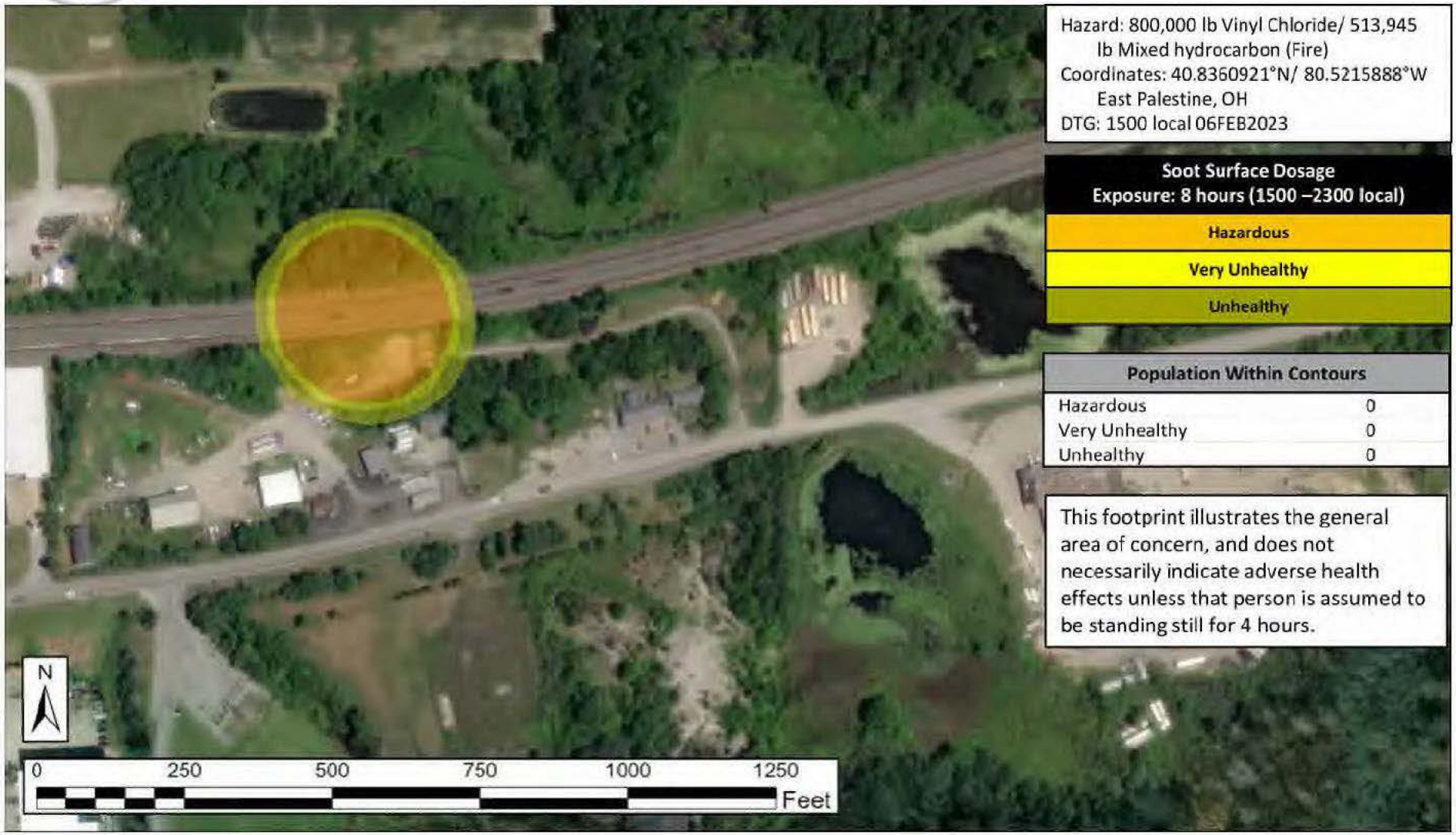
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

Soot – Surface Dosage – 2300 local



Hazard: 800,000 lb Vinyl Chloride/ 513,945 lb Mixed hydrocarbon (Fire)
Coordinates: 40.8360921°N/ 80.5215888°W
East Palestine, OH
DTG: 1500 local 06FEB2023

Soot Surface Dosage
Exposure: 8 hours (1500 –2300 local)

- Hazardous
- Very Unhealthy
- Unhealthy

Population Within Contours	
Hazardous	0
Very Unhealthy	0
Unhealthy	0

This footprint illustrates the general area of concern, and does not necessarily indicate adverse health effects unless that person is assumed to be standing still for 4 hours.

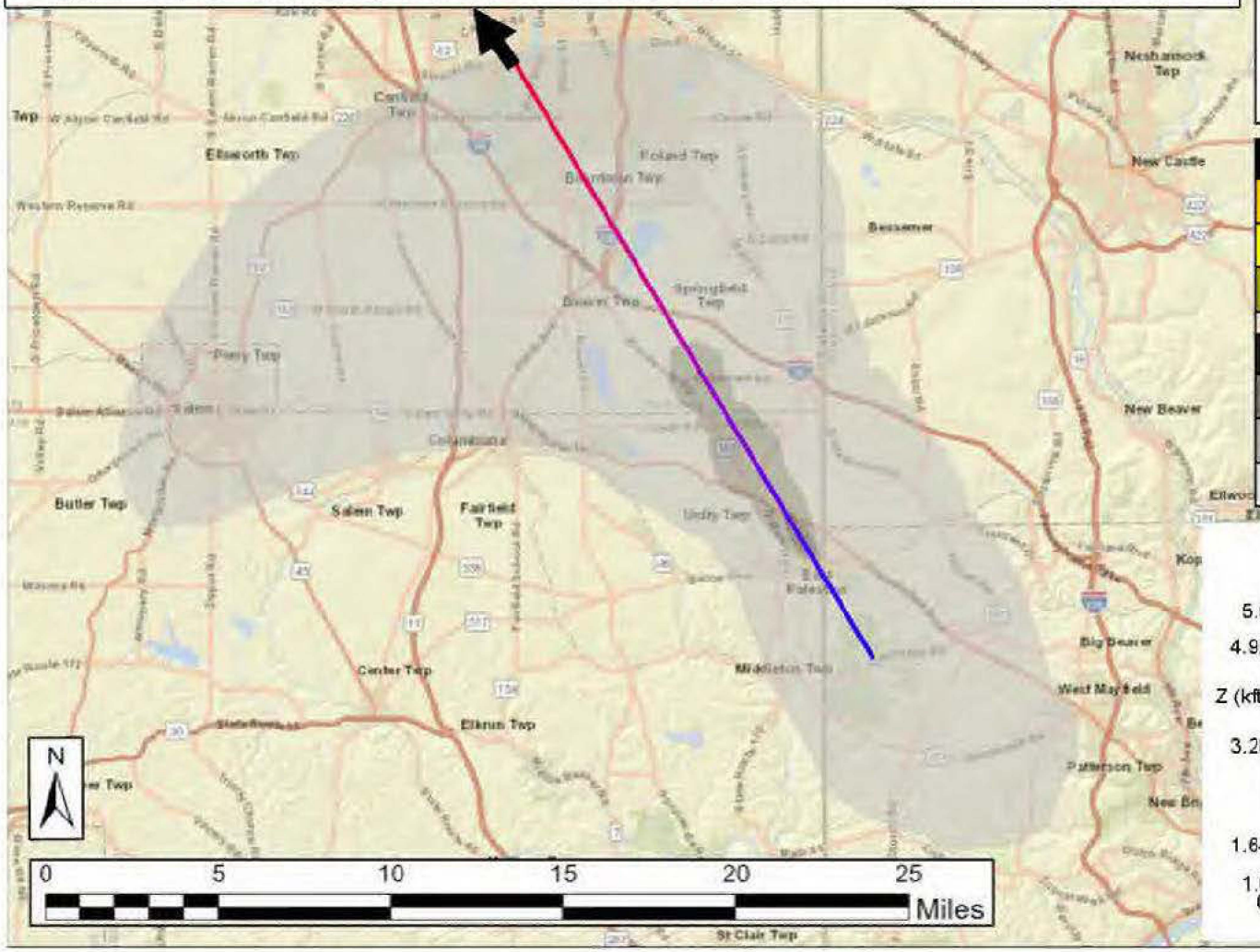
Soot – Surface Dosage

Value	Description
Hazardous	Serious aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; serious risk of respiratory effects in general population. Everyone should avoid all physical activity
Very Unhealthy	Significant aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; significant increase in respiratory effects in general population. People with heart or lung disease, older adults, and children should avoid all physical activity outdoors; everyone else should avoid prolonged or heavy exertion.
Unhealthy	Increased aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; increased respiratory effects in general population. People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion; everyone else should reduce prolonged or heavy exertion.

Cumulative dosage values based on exposure to 2.5um particulate matter. Concentration values and descriptions taken from Pollutant-Specific Sub-indices and Health Effects Statements and Cautionary Statements for Guidance on the Air Quality Index tables, in Guidelines for Reporting of Daily Air Quality – Air Quality Index (AQI), USEPA, EPA-454/B-06-001, May 2006.

Soot – Vertical Profile – 2100 local

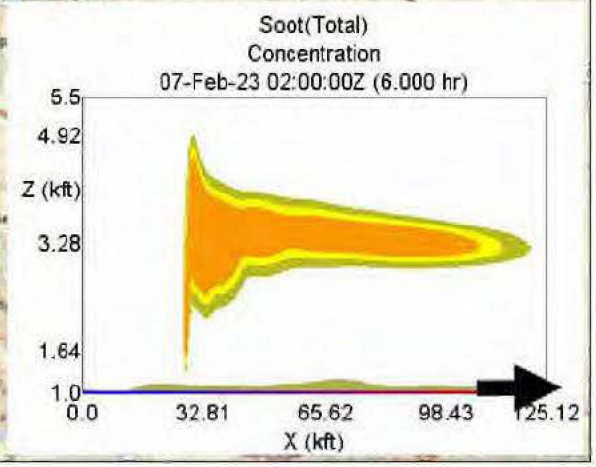
Gray plume represents a bird's eye view of the smoke cloud. Note: image is an snapshot, not a cumulative effect.



Hazard: 800,000 lb Vinyl Chloride/ 513,945 lb Mixed hydrocarbon (Fire)
Coordinates: 40.8360921°N/ 80.5215888°W East Palestine, OH
DTG: 1500 local 06FEB2023

Soot Concentration @ 2100Z
Hazardous
Very Unhealthy
Unhealthy

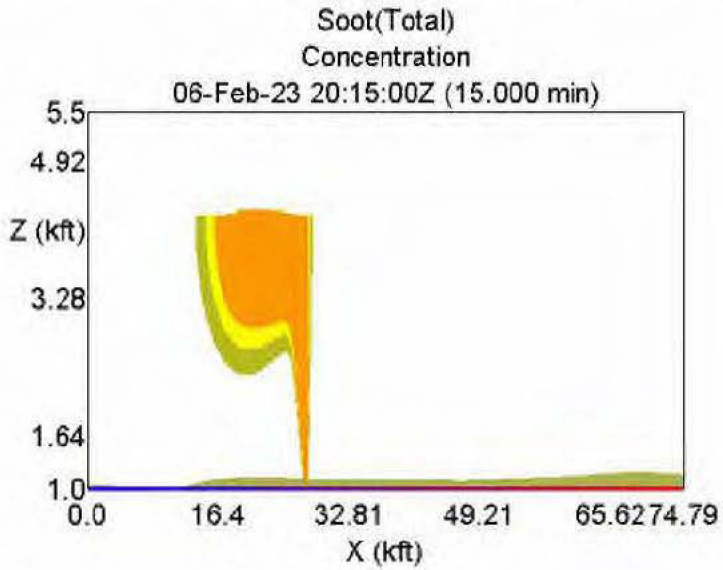
Light Transmittance
10%
50%
90%



Plume Height

- Reports[1] suggested the initial plume rose to a height of about 3,000 ft, and was the focus of multiple pictures both from the air and ground. Modeling results shown here depict a vertical cross-section of the soot plume at 15 min after the start of the burn, shown in feet above sea level.
- Modeled plume height is approximately 2500 - 4300 ft above ground level and therefore seems broadly consistent with reported plume heights. This provides some confidence that we are capturing the overall dynamics of the fire, with the caveat that neither the observed nor modeled heights are highly precise.

Soot concentration looking approx. SE from the burn location at 15 min after fire start

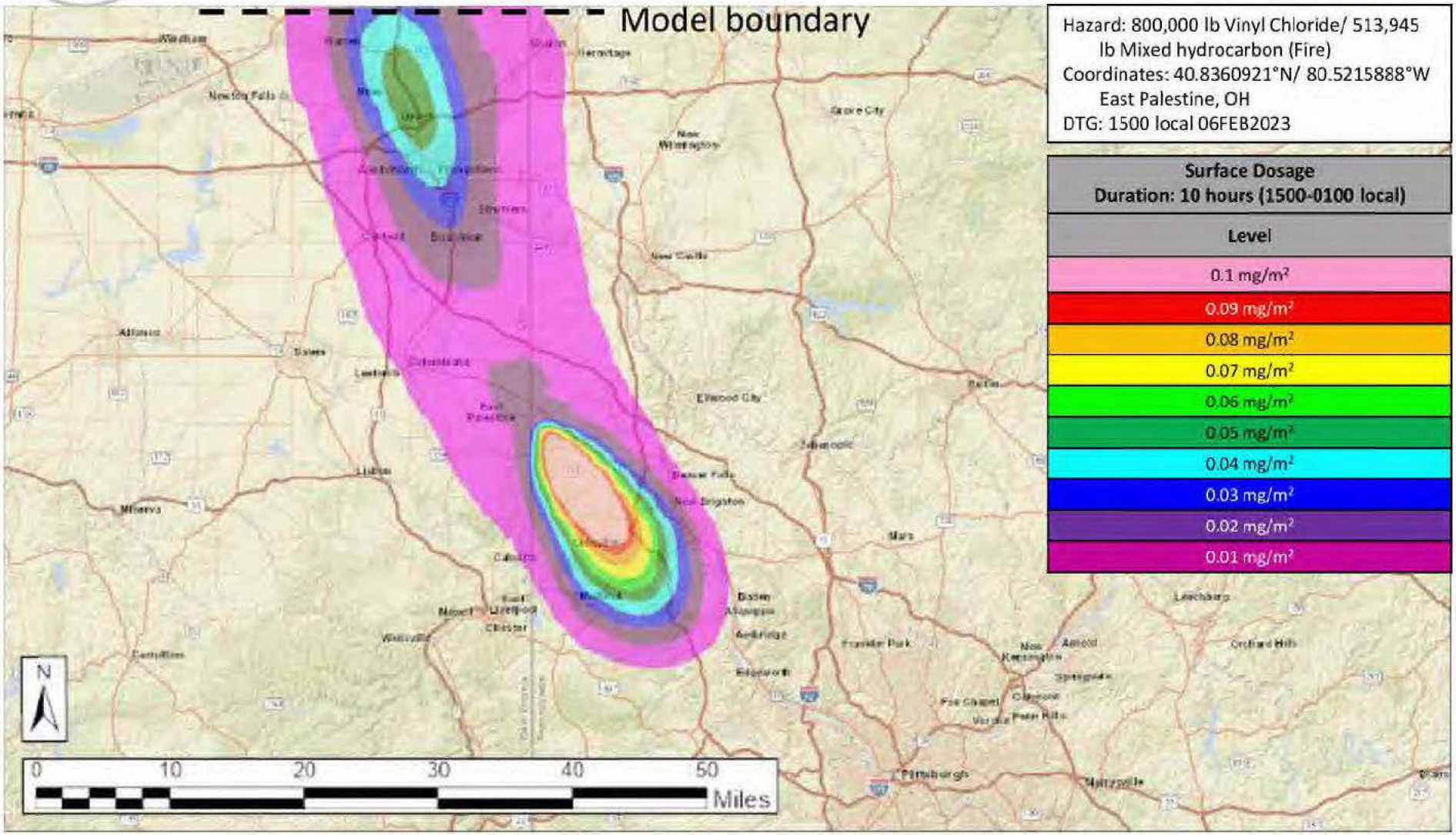


1. https://myfox8.com/weather/blog/how-an-inversion-layer-trapped-a-plume-of-toxic-chemicals-near-surface-in-ohio/

Soot Deposition

- Total soot deposition is plotted to demonstrate areas where soot is most likely to have settled. It does not imply any specific health effects, it should only be used as a guide for where soot is likely to have settled on the ground.
- Caveat: The settling rate of soot is highly dependent on its particle size. We do not have good information on the particle size distribution of this particular fire. Smaller or larger particles could settle in different patterns than indicated by this analysis.

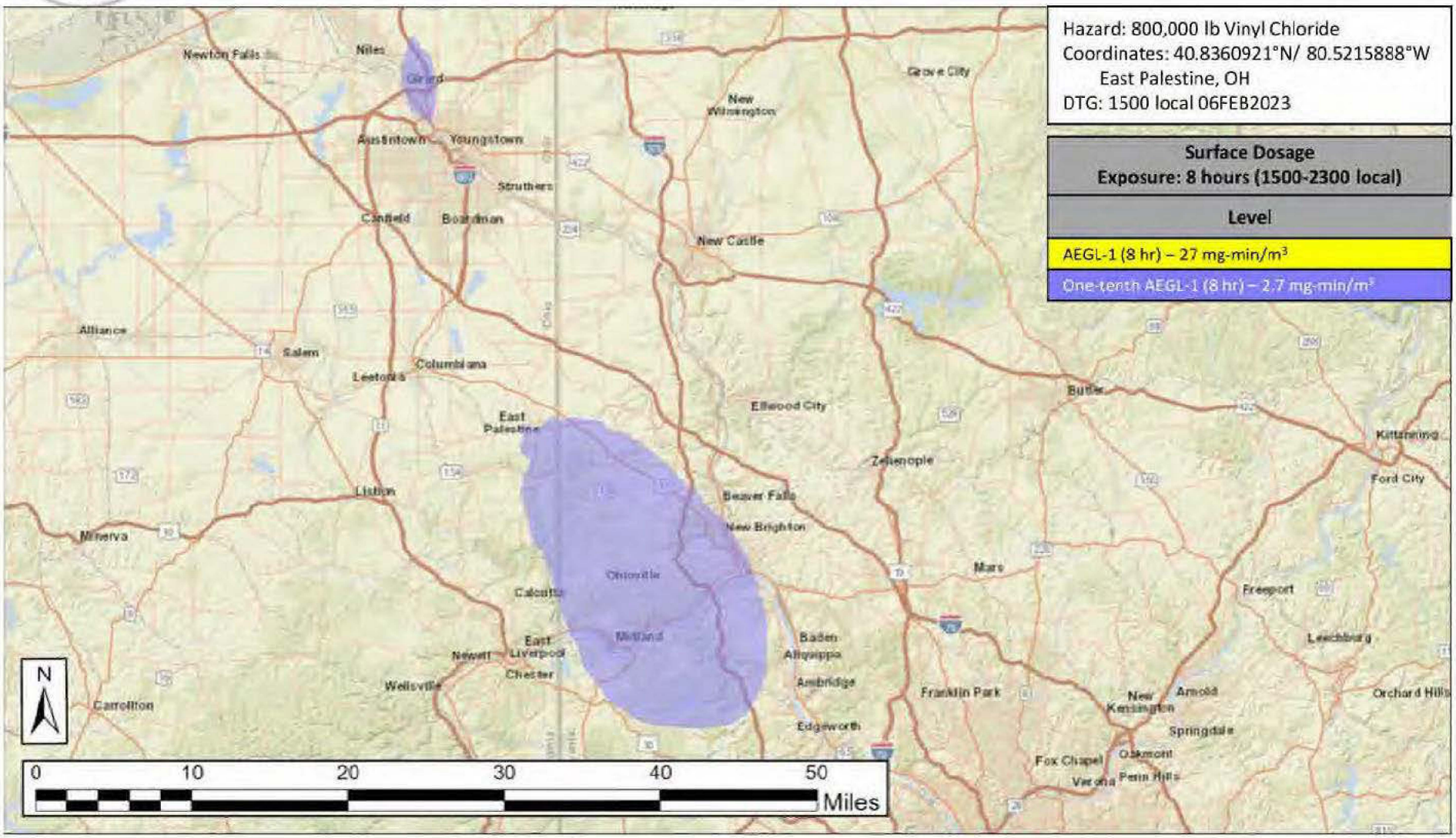
Soot Surface Deposition over 10 hours (1500 – 0100)



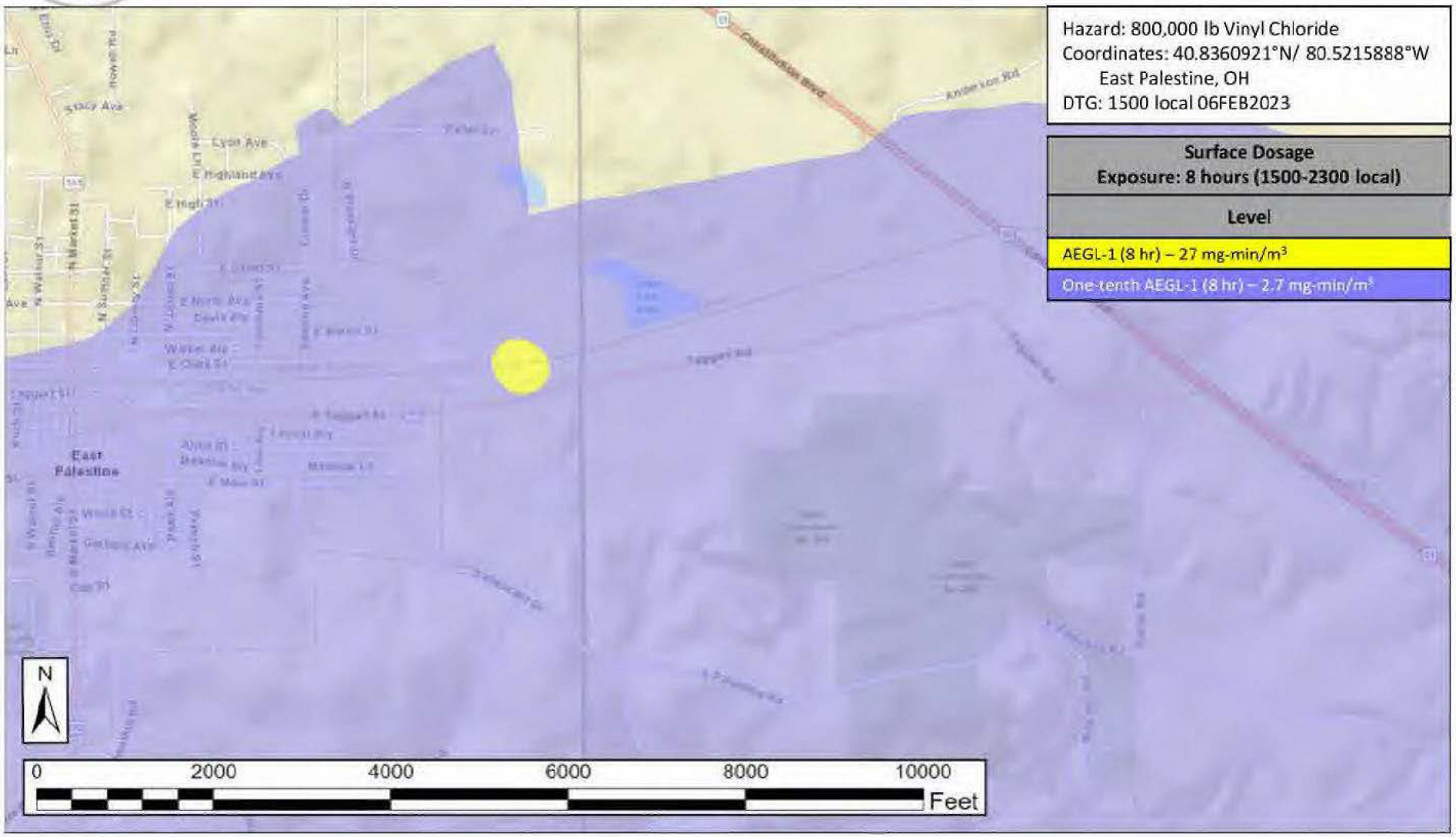
HCl Surface Dosage Plots

- Of the human effects, the HCl effects were by far the highest (again, see the caveats about synergistic effects and assumptions about chemical amounts).
- HCl has acute exposure guideline levels (AEGLs) prescribed, based on an airborne concentration level integrated over time (i.e., a dosage). The lowest level, AEGL-1, indicates threshold effects, which could be discomfort or irritation, but not life-threatening effects. The lowest AEGL-1 threshold is the 8 hour exposure, a dosage of about 27 mg*min/m^3.
  - The above dosage at ground level is plotted for multiple time points after the initiation of the controlled burn. This dosage level was only exceeded in the immediate proximity of the fire.
- **A level one-tenth of the lowest AEGL-1 is also plotted. People in this contour have an extremely low probability of effect**, but may be affected due to:
  - Particular sensitivity to the chemical(s)
  - Atmospheric or plume variability resulting in a much higher than average dose at that location
  - The synergistic effects of multiple chemicals may mean that a lower dosage threshold can result in effects.

Hydrogen Chloride – Surface Deposition– 2300 local (Far View)



Hydrogen Chloride – Surface Deposition– 2300 local (Near View)



Date: 06FEB2023 1045Z
Version: Revision F
Changes: Added BLEVE Scenario

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081fU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model railcars filled with vinyl chloride in fire.
Employment	Real World
Hazards	Combustion products of 5 railcars on fire, filled with vinyl chloride resulting in releases of: • 23,389 kg hydrogen chloride (HCl) • 31,719 kg phosgene (CCl_2O) • HCl BLEVE
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 0600 06FEB2023 Local (1100Z) 2. 1200 06FEB2023 Local (1700Z)
Executive Summary	• For phosgene at 0600 and 1200 Local, 163 and 119 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 29 and 24 people respectively may be exposed to hazard levels that could possibly result in death. (0600 local model shows fewer at risk). • For HCl at 0600 and 1200 Local, 4 and 5 people respectively are estimated to be exposed to hazard levels that could possibly result in at least severe injury. Of this group, 2 and 1 people respectively may be exposed to hazard levels that could possibly result in death. • BLEVE from vaporized HCl can produce minor injuries out to 226 meters in a worst case scenario.

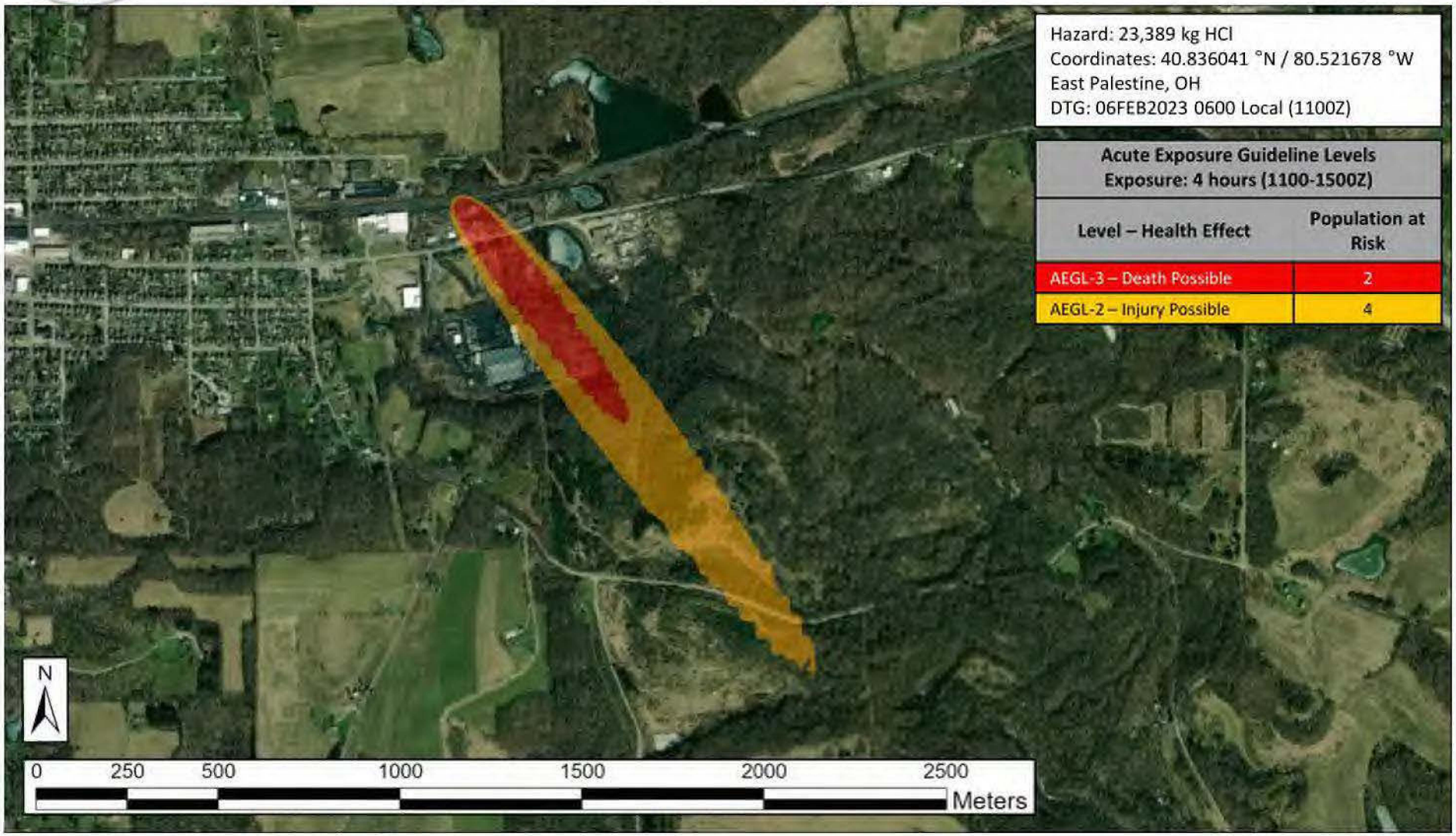
Assumptions & Comments

- No additional information was provided on the fire that continues to burn, and no changes were made to the modeled amounts and fire intensity. As a result, populations at risk in this update may be overstated.
- Model assumes 5 railcars of vinyl chloride burning.
- Quantity per railcar from requestor: (178,000 lb ~ 81,000 kg).
- Worst-case situations are modeled, in which the vinyl chloride is wholly consumed in the fire and converts completely to either hydrogen chloride or phosgene.
- Hydrogen chloride is a combustion byproduct of vinyl chloride.
- Reports exist of vinyl chloride decomposing to phosgene. Amounts modeled likely overstate the expected hazard and be considered an absolute worst-case hazard (upper bound).
- A worse case BLEVE outcome is provided, where all available HCl is vaporized into a pressure wave. HCl is non-flammable and does not pose a thermal hazard.

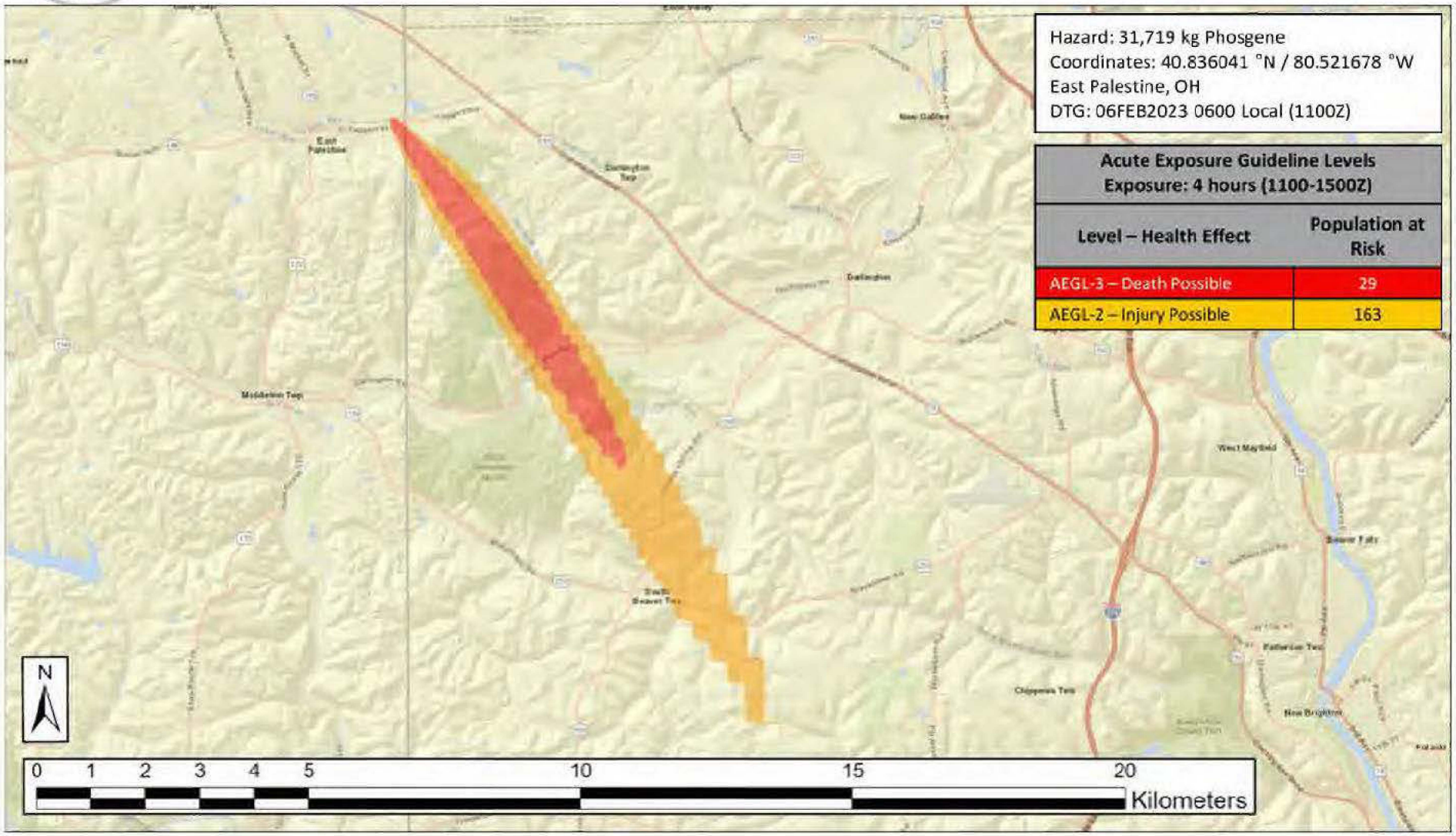
0600 Local (1100Z)

06FEB2023

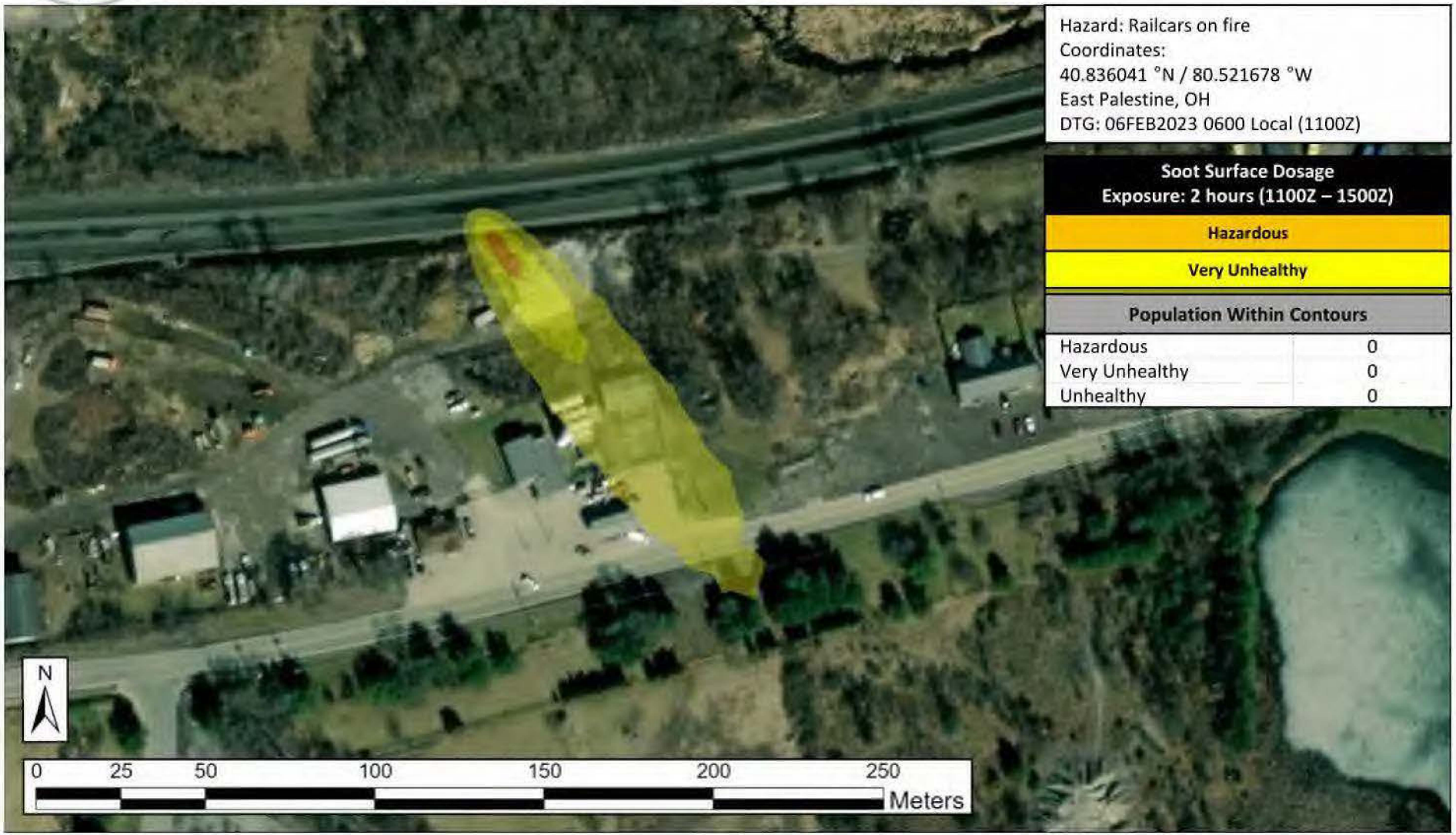
Hydrogen Chloride – 0600 Local



Phosgene – 0600 Local



Soot– Surface Dosage – 0600 Local



Hazard: Railcars on fire
Coordinates:
40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 0600 Local (1100Z)

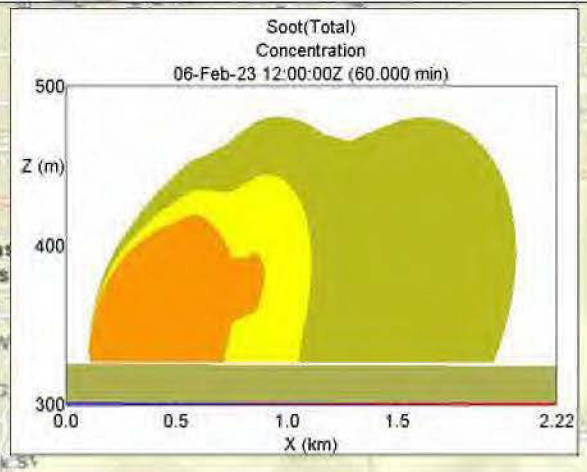
Soot Surface Dosage
Exposure: 2 hours (1100Z – 1500Z)

Hazardous

Very Unhealthy

Population Within Contours	
Hazardous	0
Very Unhealthy	0
Unhealthy	0

Soot – Vertical Profile – 0600 Local



Hazard: Railcars on fire
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 0600 Local (1100Z)

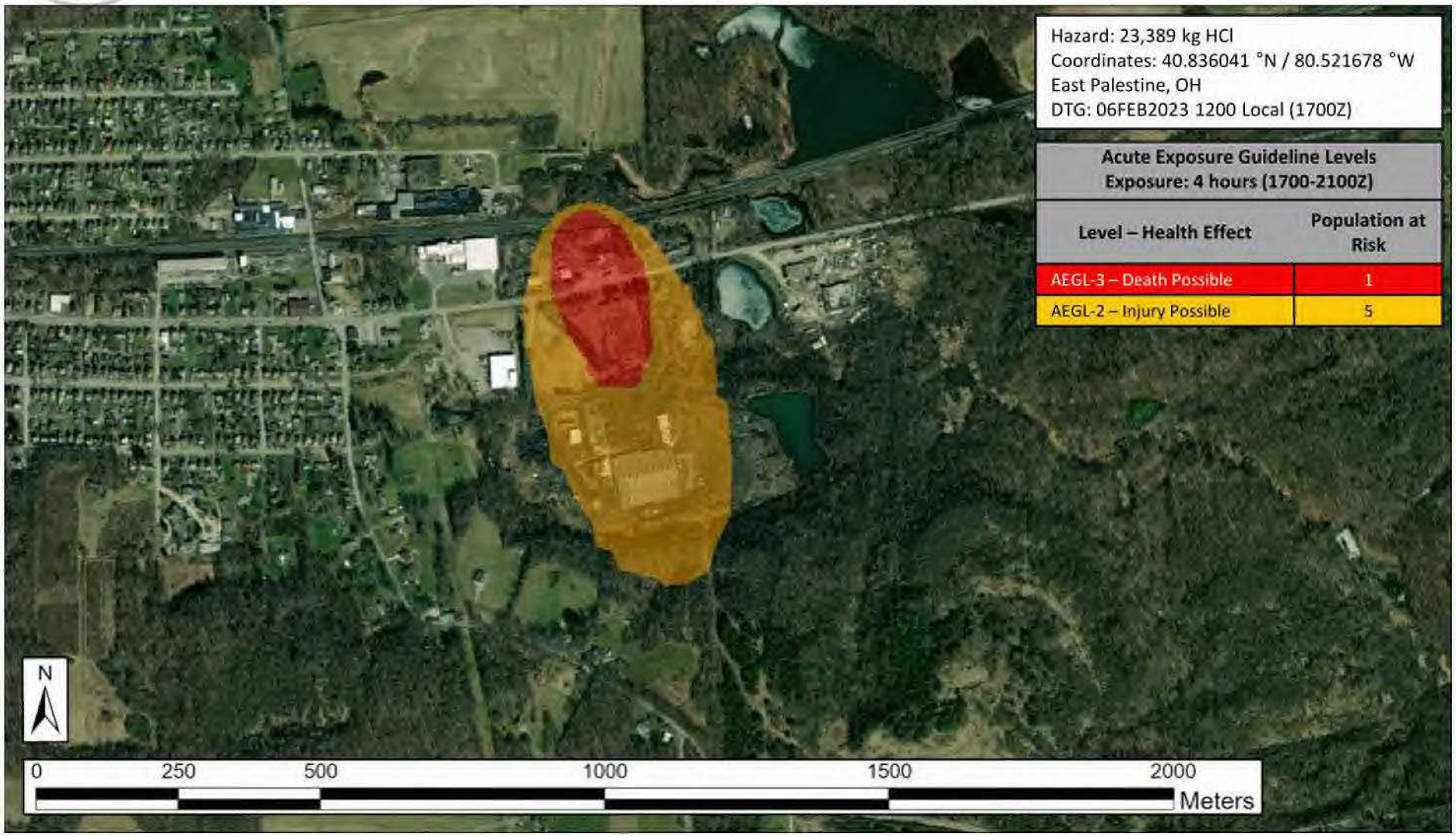
Soot Concentration @ 0600 Local
Hazardous
Very Unhealthy
Unhealthy
Light Transmittance
10%
50%
90%

Gray plume represents a bird's eye view of the smoke cloud.

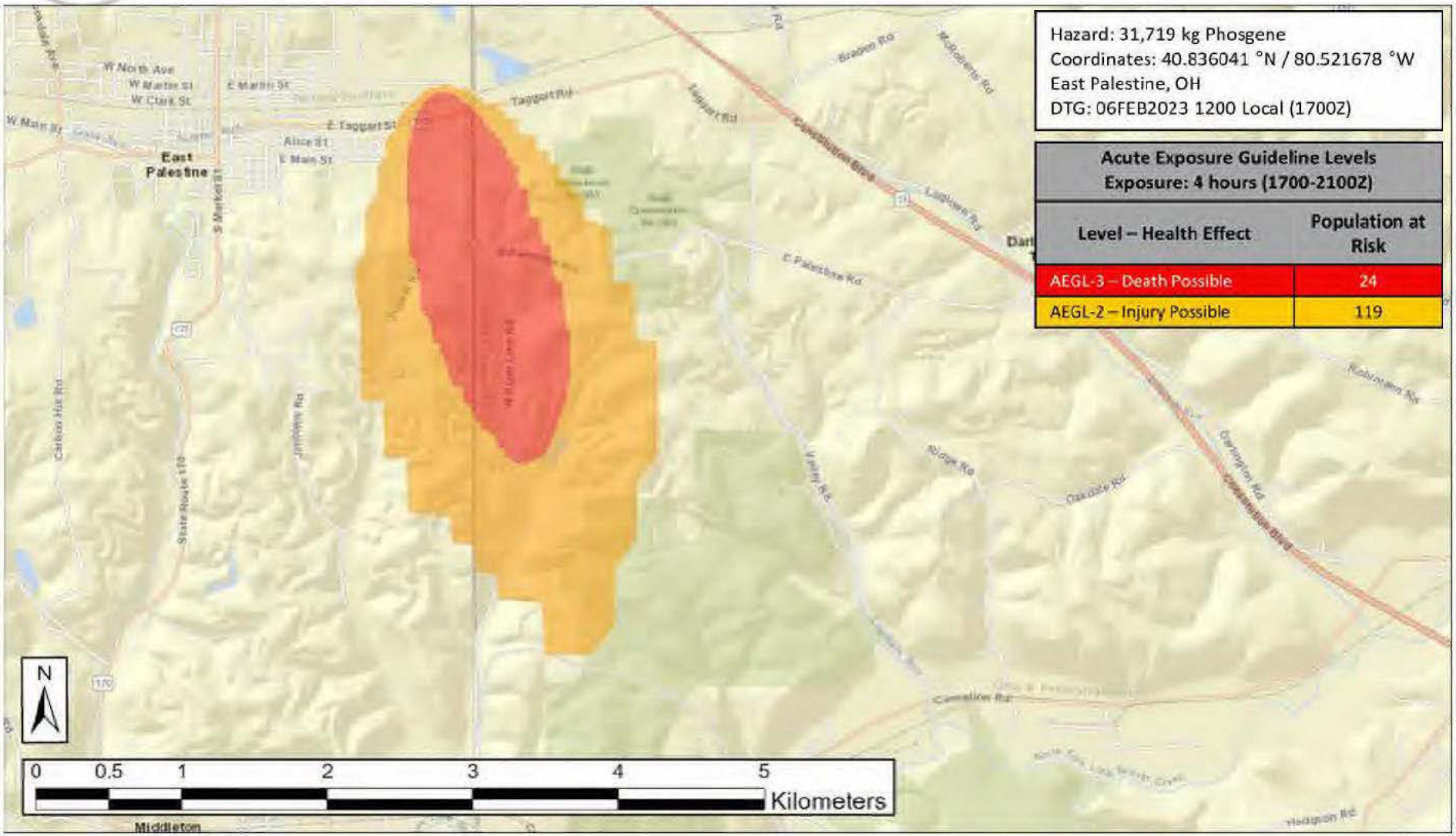
1200 Local (1700Z)

06FEB2023

Hydrogen Chloride – 1200 Local



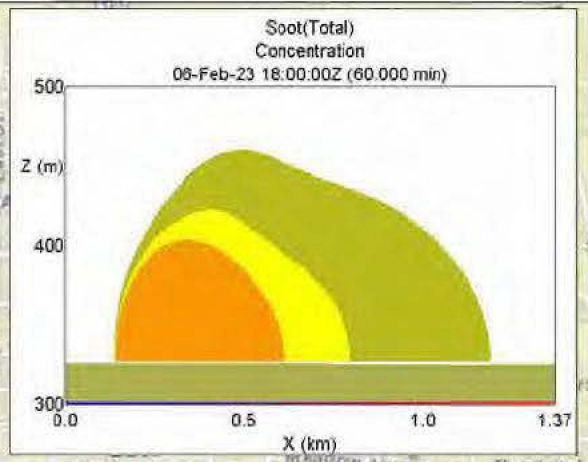
Phosgene – 1200 Local



Soot– Surface Dosage – 1200 Local



Soot – Vertical Profile – 1200 Local



Hazard: Railcars on fire
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH
DTG: 06FEB2023 1200 Local (1700Z)

Soot Concentration @ 1200 Local
Hazardous
Very Unhealthy
Unhealthy

Light Transmittance
10%
50%
90%

Gray plume represents a bird's eye view of the smoke cloud.

Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

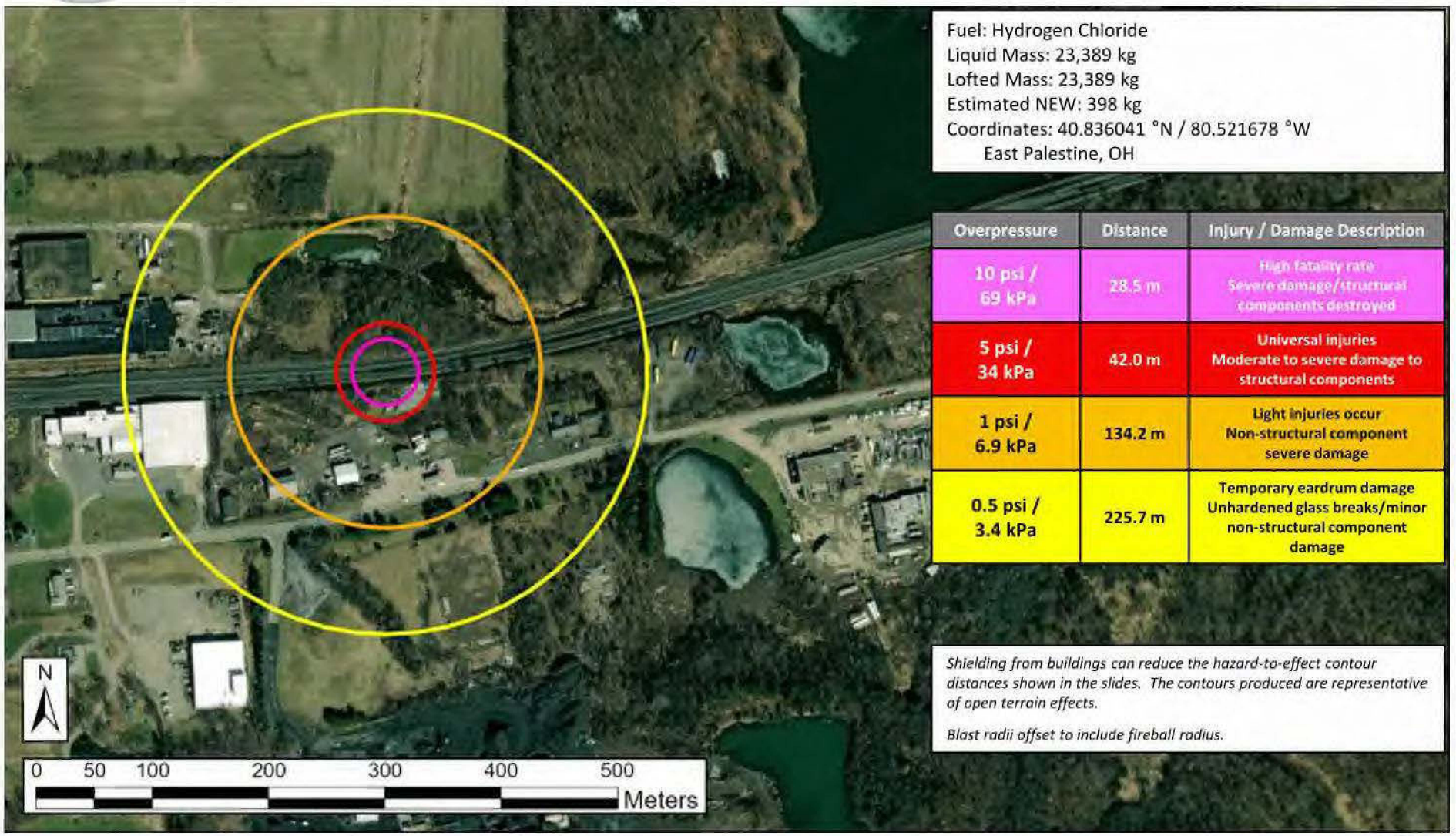
AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE Scenario

06FEB2023

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Liquid Mass: 23,389 kg
Lofted Mass: 23,389 kg
Estimated NEW: 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

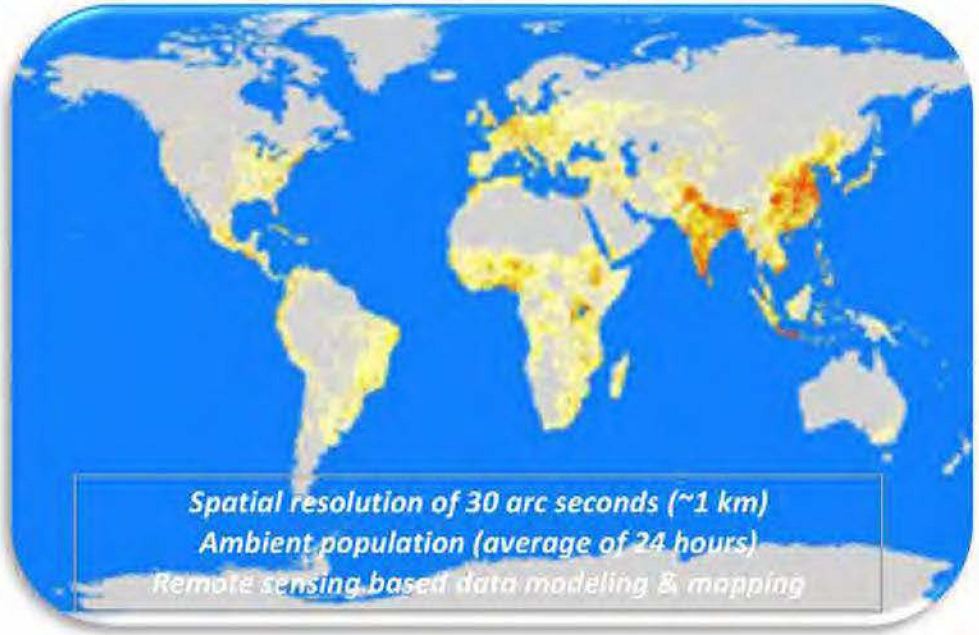
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 06FEB2023 1745Z

Version: Revision G

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081gU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], EPA Region 5, Emergency Response Branch
Contact information	(b) (6) [redacted]
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 1 single railcar, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1400 06FEB2023 Local (1900Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

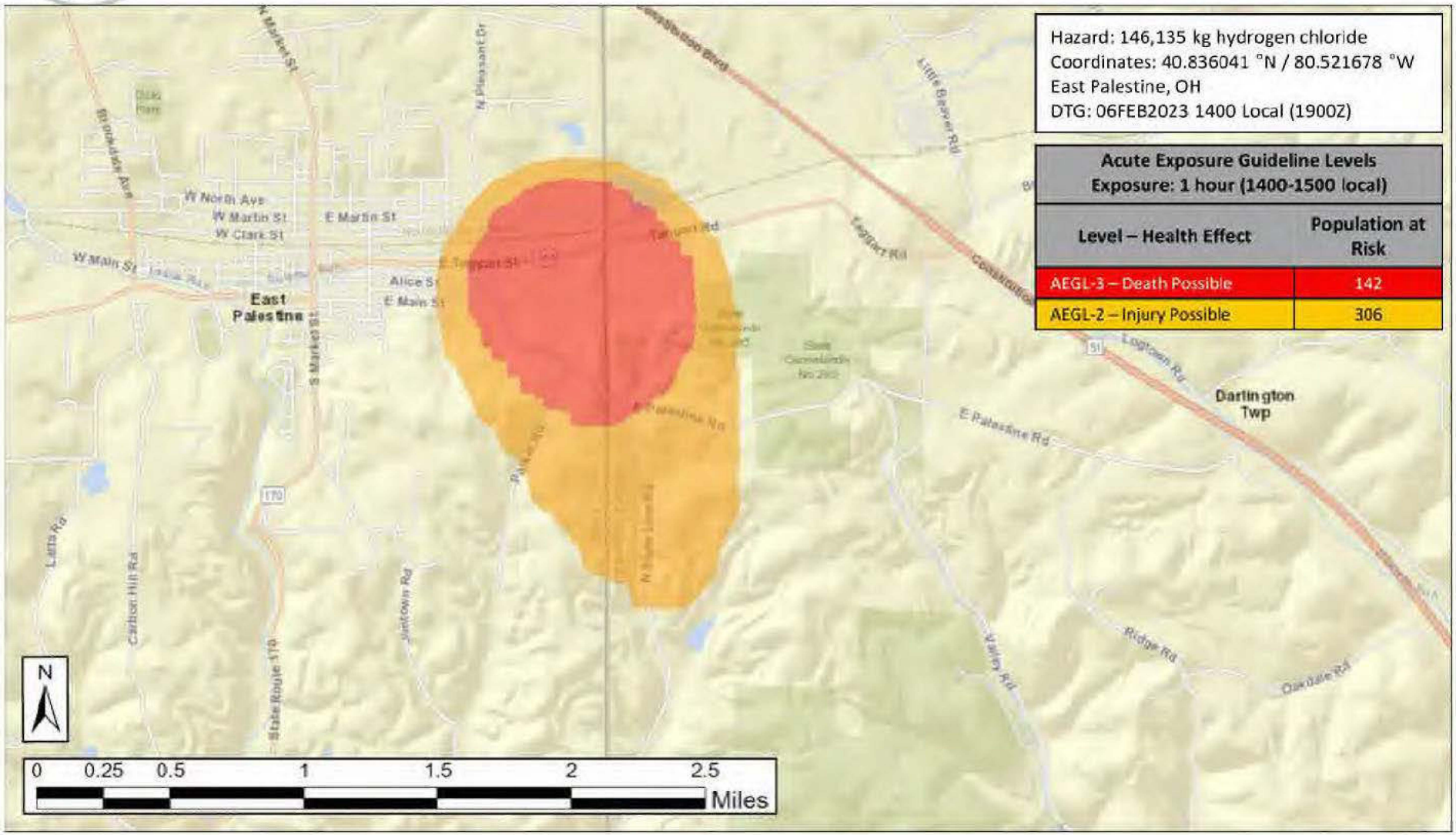
(b)(3)10USC130

- Blast effects from a BLEVE is provided.

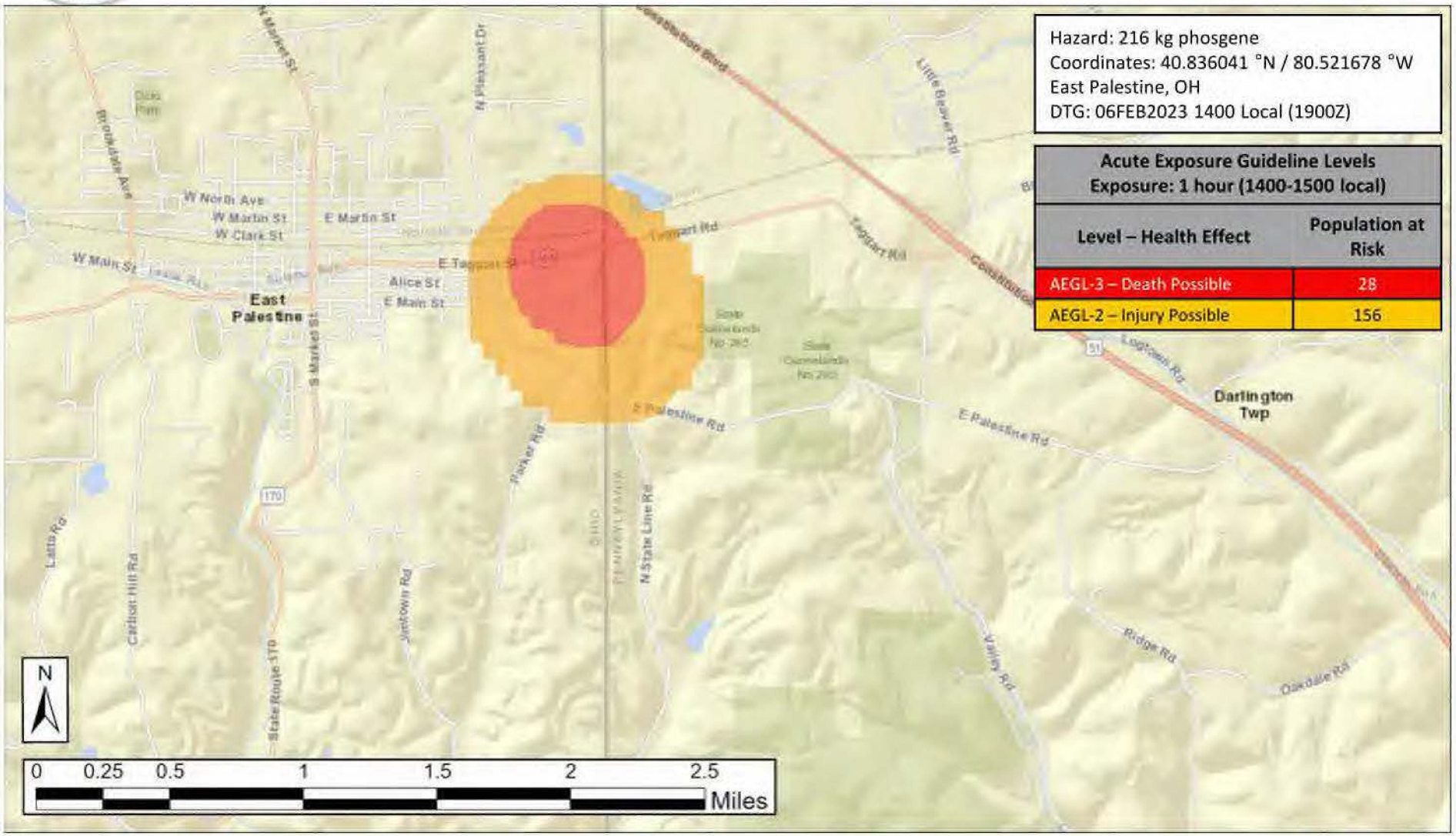
Caveats

- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

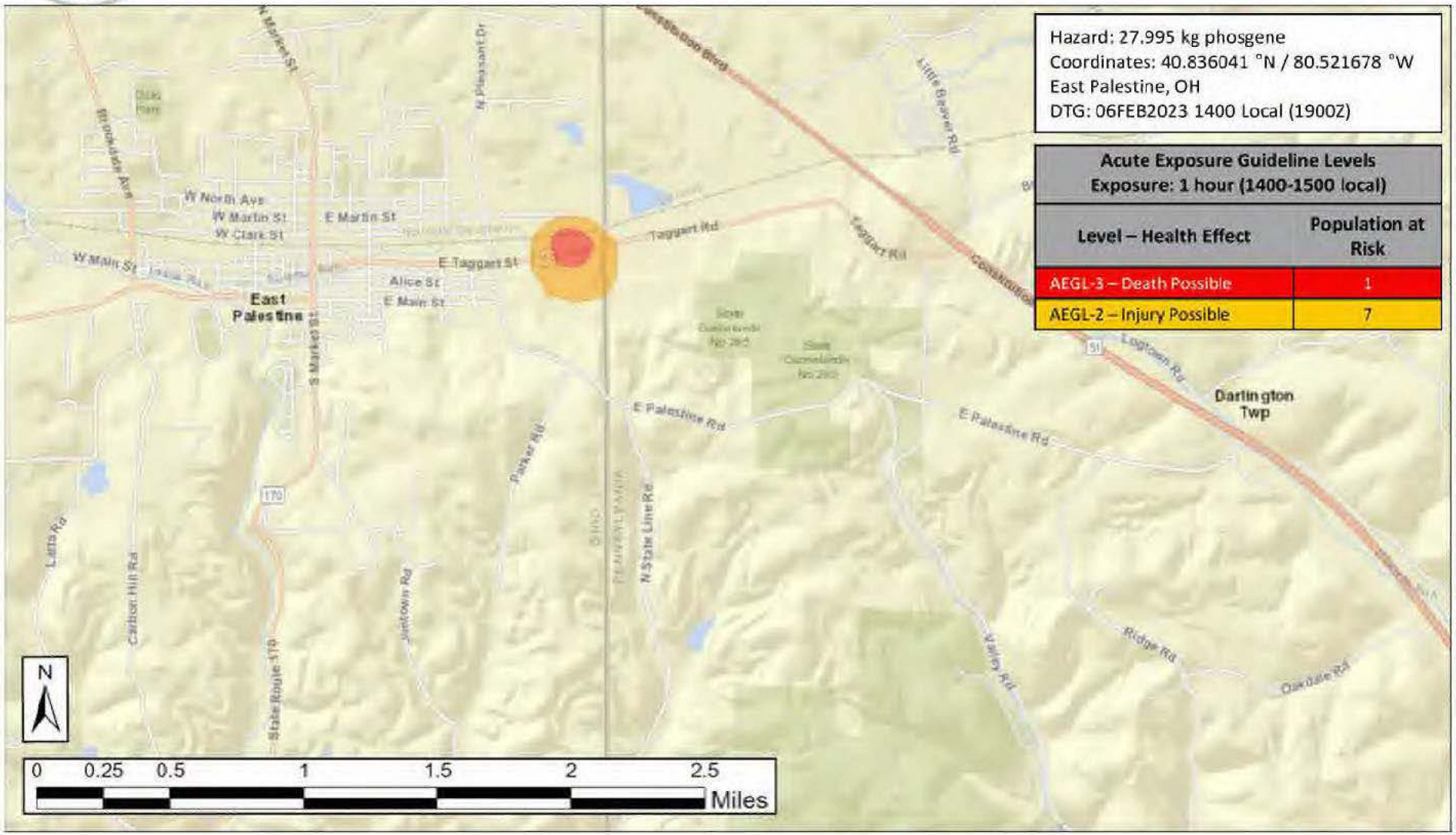
Hydrogen Chloride – 1400 Local



Phosgene – 1400 Local



Vinyl Chloride – 1400 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

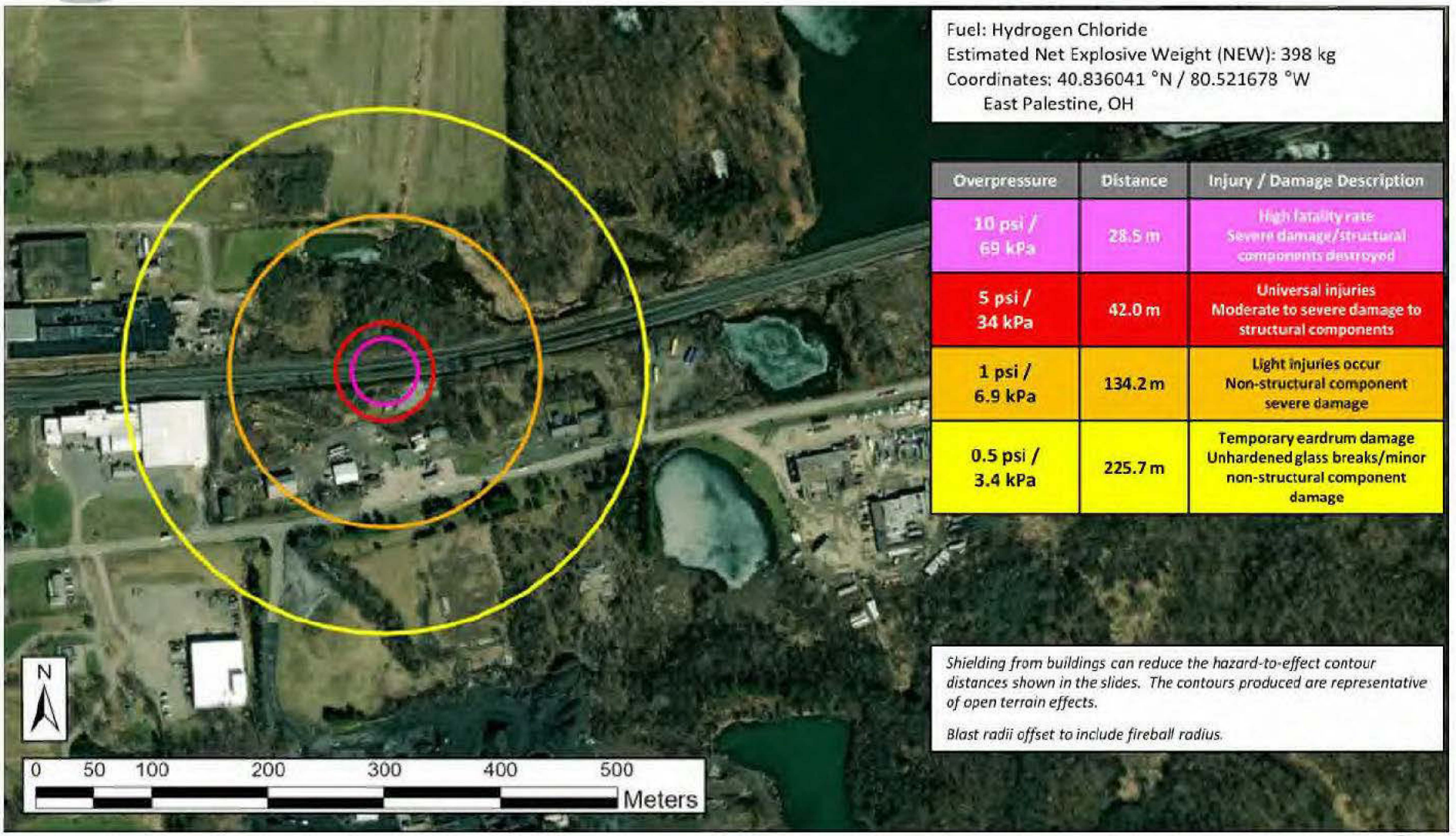
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

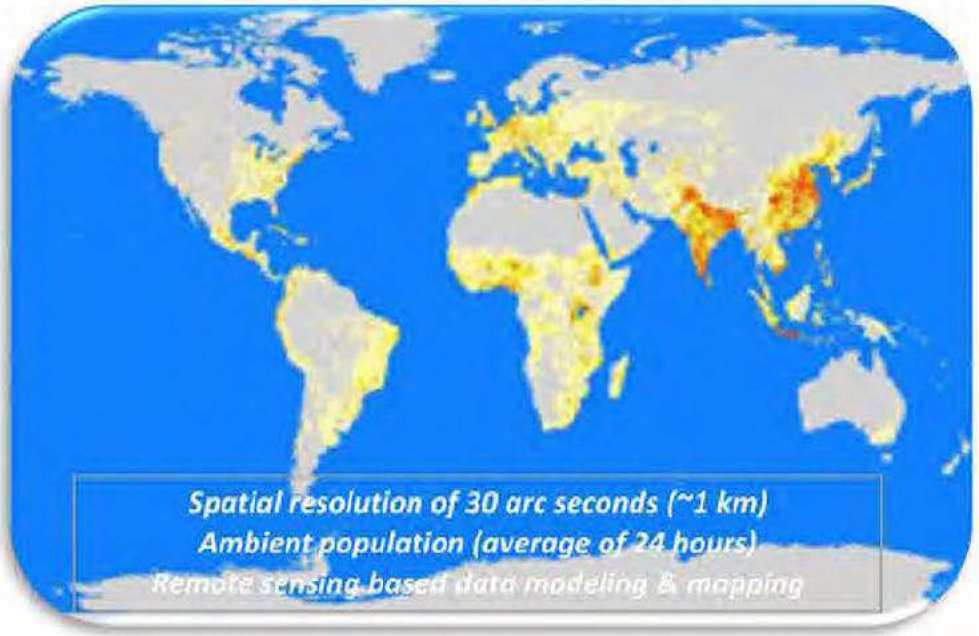
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

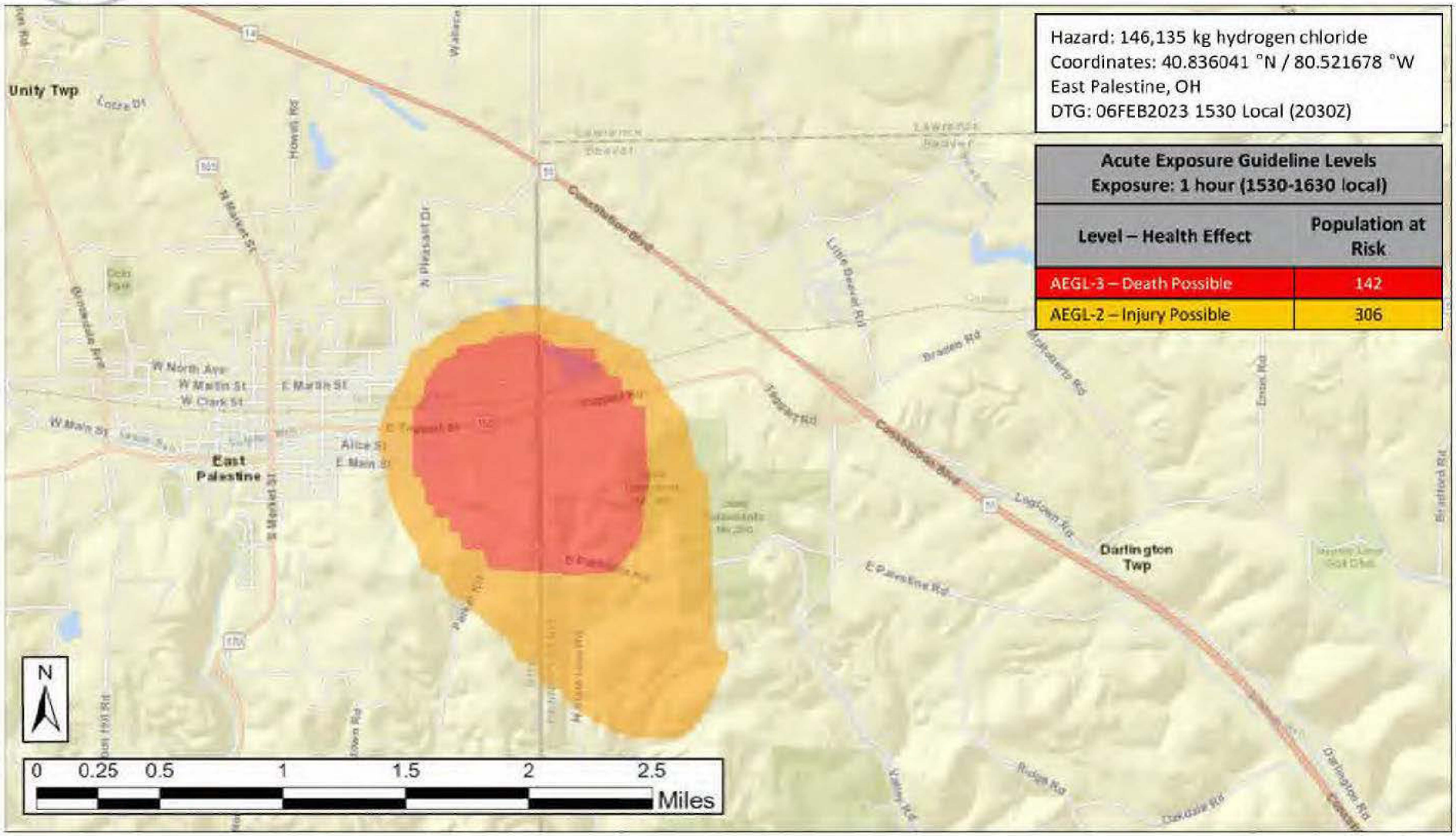
- Blast effects from a BLEVE is provided.

Caveats

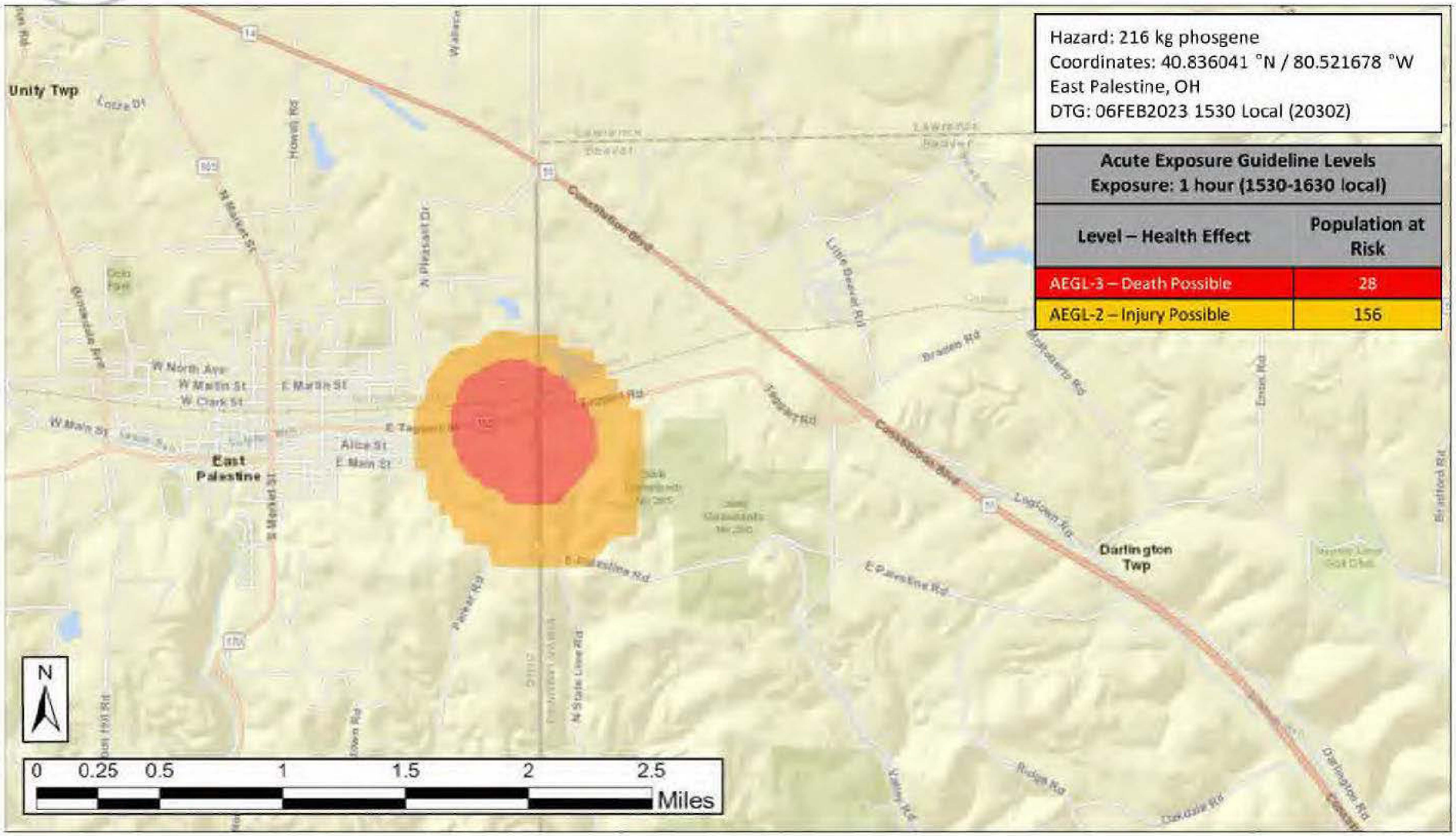
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

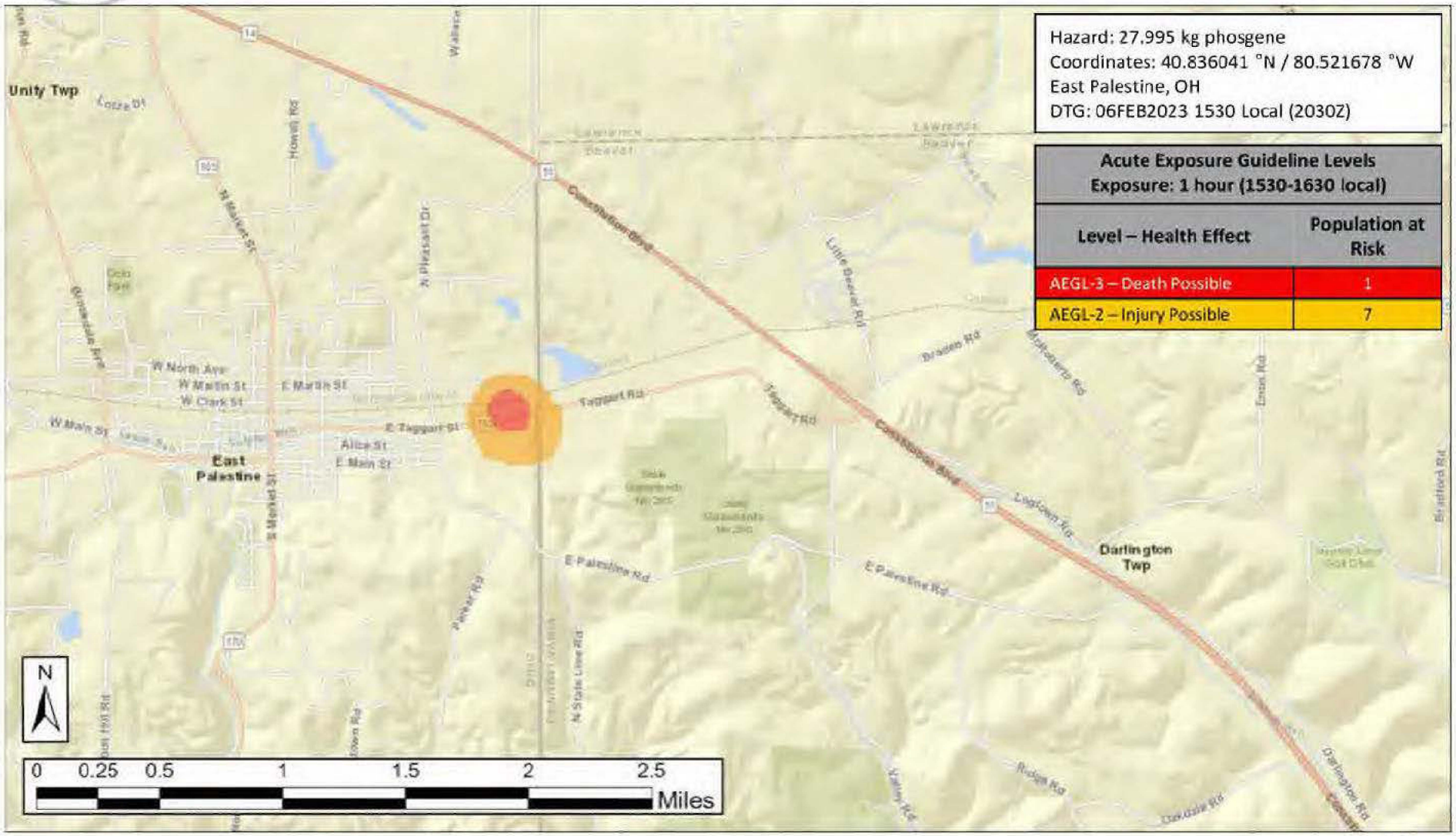
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

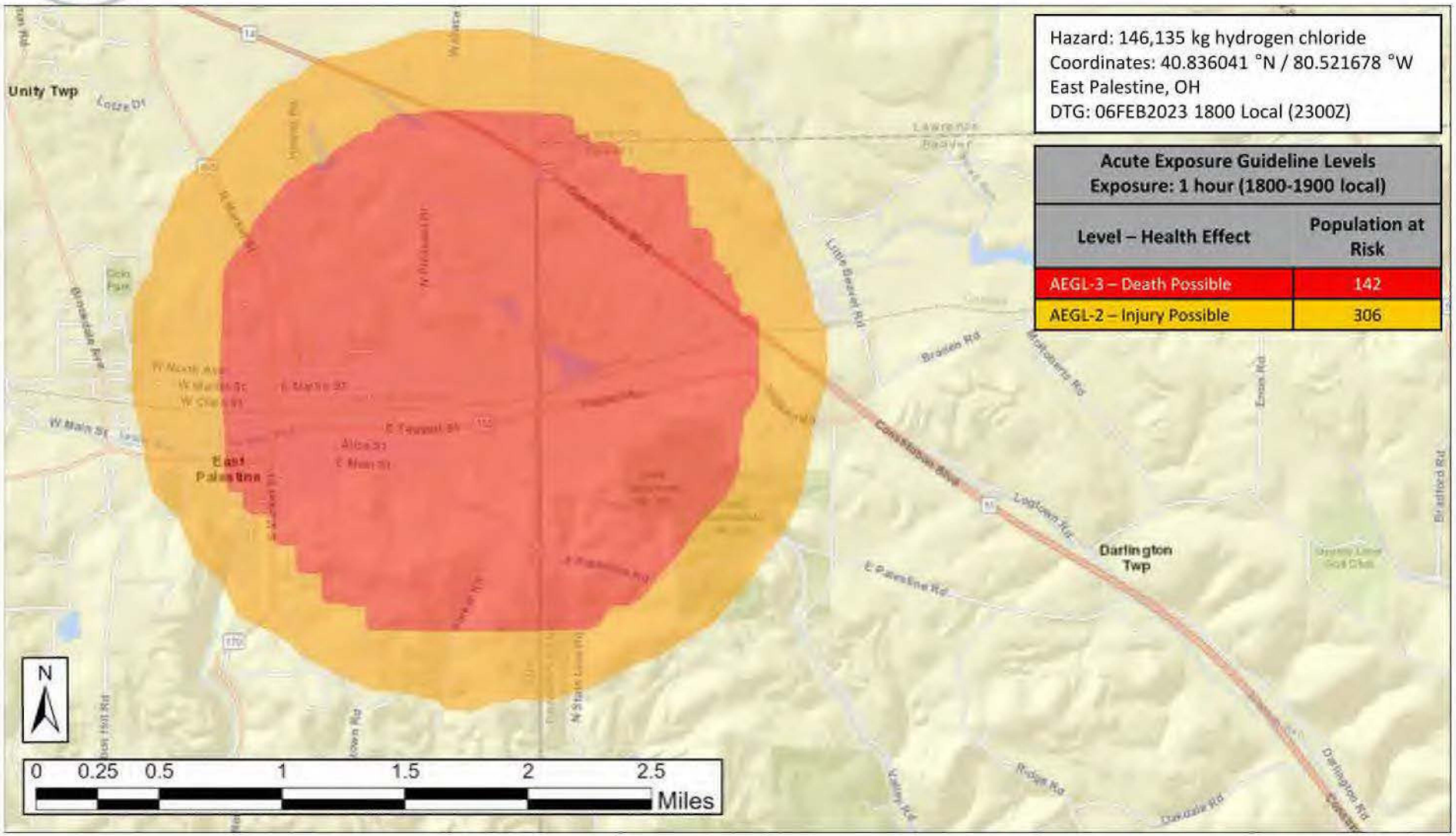


Vinyl Chloride – 1530 Local

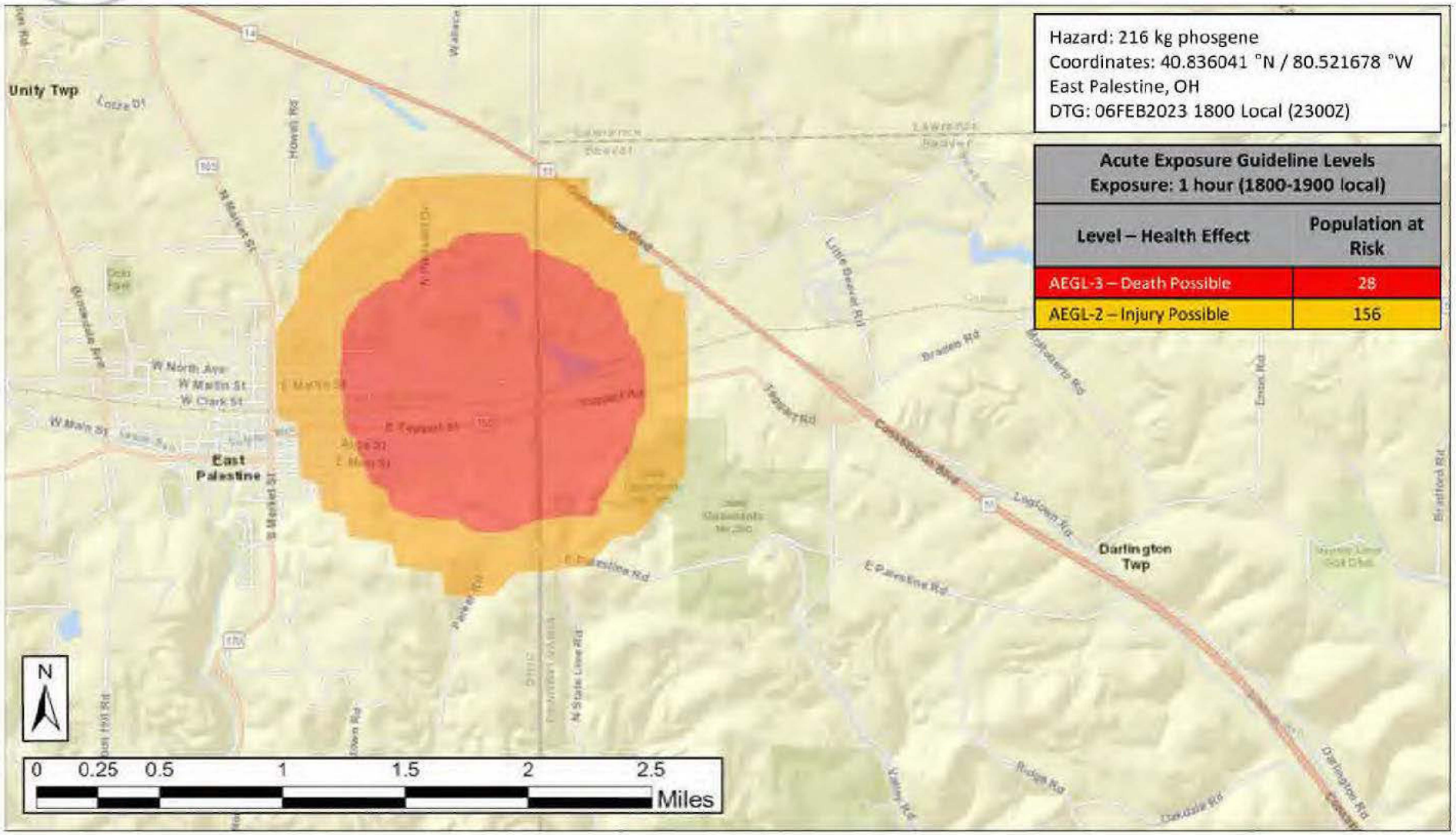


6:00PM Breach (2300Z)
06 FEB 2023

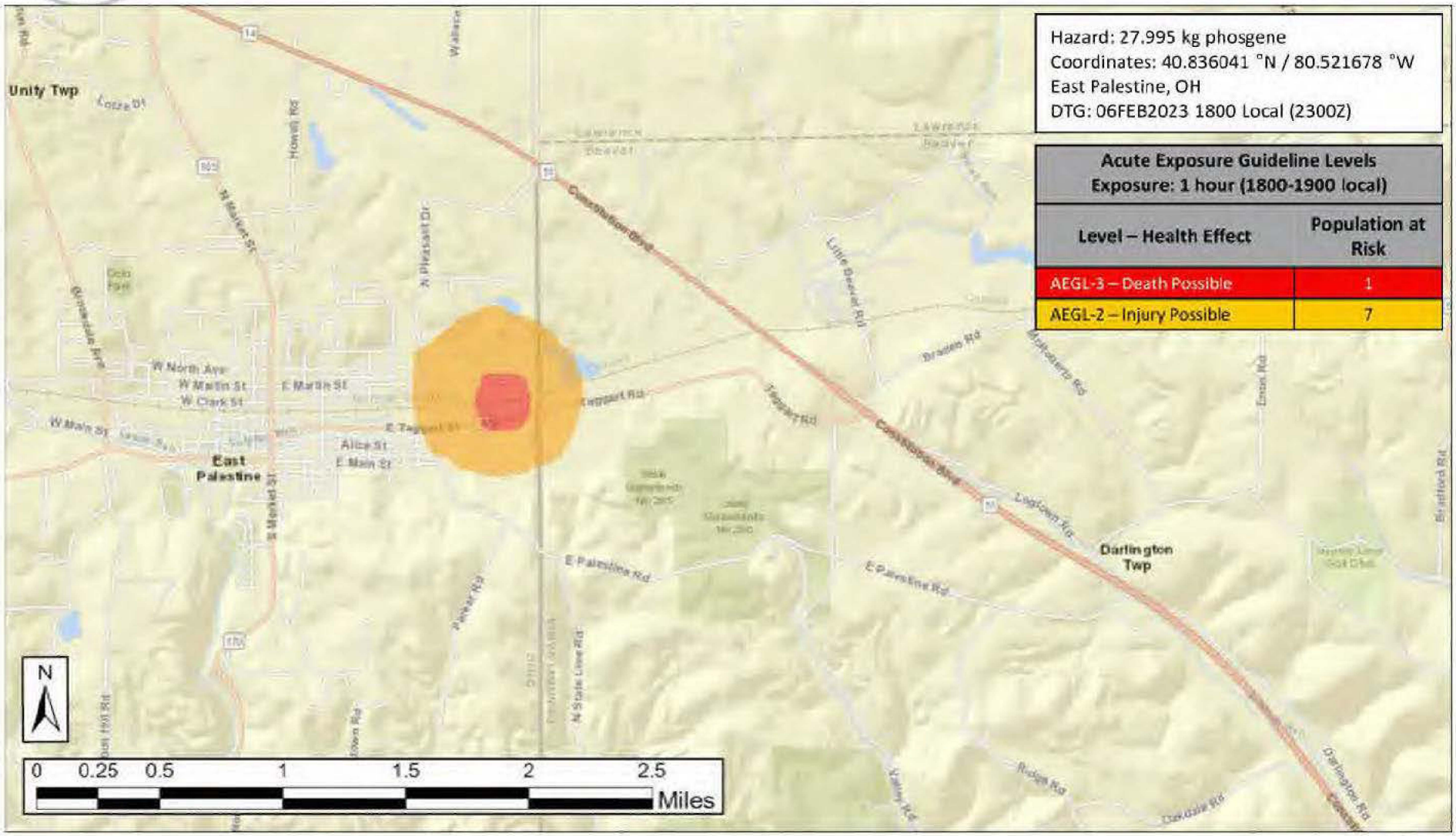
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

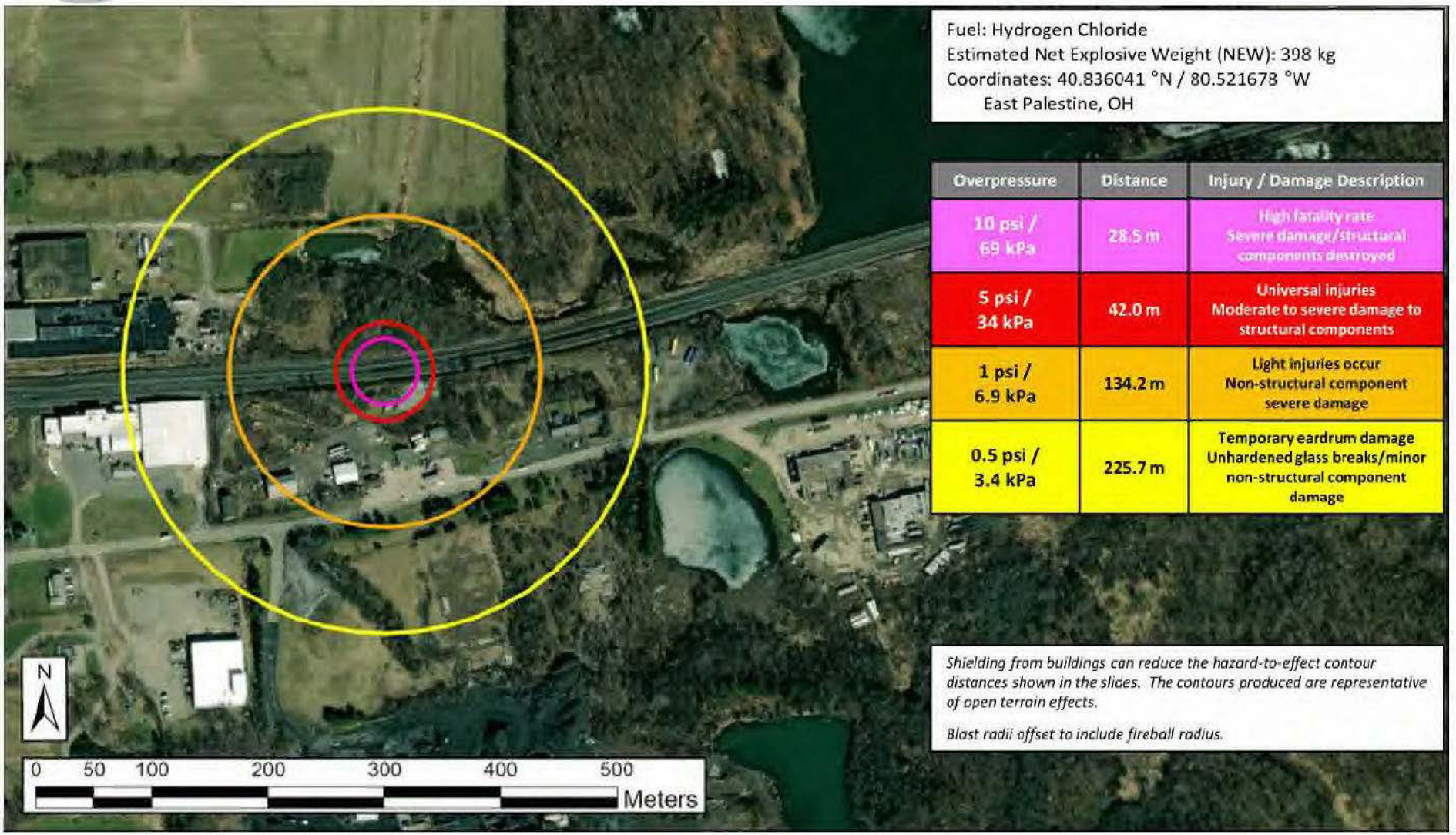
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

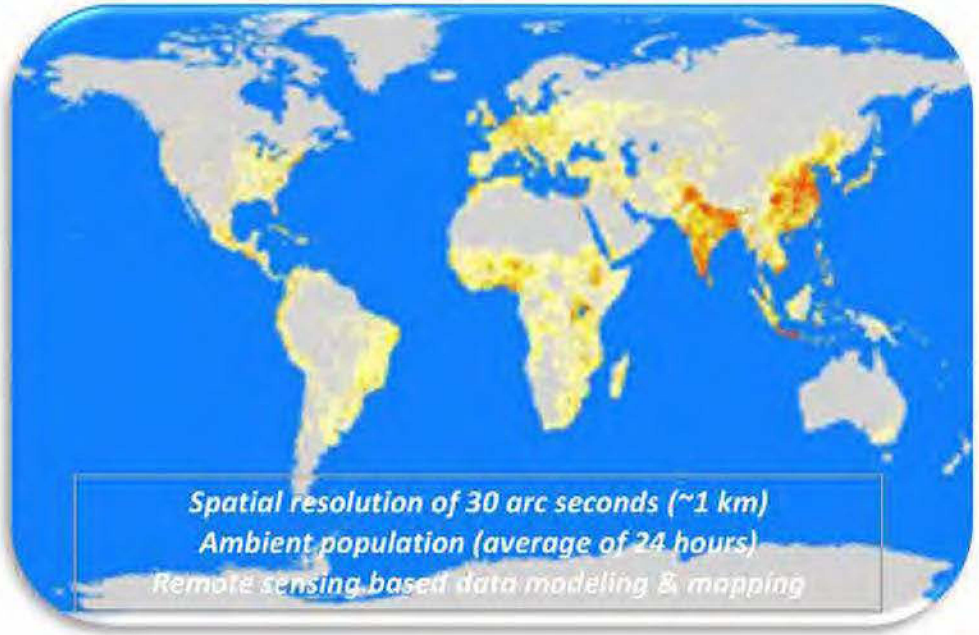
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

Date: 06FEB2023 1745Z

Version: Revision H

Changes: Planned breach model; adjusted amounts (see Slide #3)

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081hU)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 06FEB2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6), EPA Region 5, Emergency Response Branch
Contact information	(b) (6)
Request	Model planned breach of railcar filled with vinyl chloride.
Employment	Real World
Hazards	Release from 5 railcars, filled with vinyl chloride resulting in releases of: • 146,135 kg hydrogen chloride (HCl) • 216 kg phosgene (CCl_2O) • 27,995 kg of vinyl chloride • *Amounts based on information from Ohio CST via Norfolk Southern*
Location	East Palestine, OH 40.836041 °N / 80.521678 °W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	1. 1530 06FEB2023 Local (2030Z) 2. 1800 06FEB2023 Local (2030Z)
Executive Summary	• For the largest plume (HCl) the plume extends over one mile downrange for AEGL-2 (serious injury possible) effects. • **Please note that plume predictions have inherent uncertainty – effects may occur outside the contours shown** • BLEVE scenario can produce minor injuries out to 226 meters.

Modeling Overview

- A breach of five containers of vinyl chloride is considered. This results in some level of combustion/explosion. Based on reports from shipper, the estimated total load is approximately 3.5 cars' worth.
- Modeling is provided in the event of a planned breach of the container.
- A BLEVE, as a result of or during the breach, is possible. **This analysis does not make recommendations on how to conduct this breach.**
- Quantity per railcar: 178,000 lb ~ 81,000 kg

(b)(3)10USC130

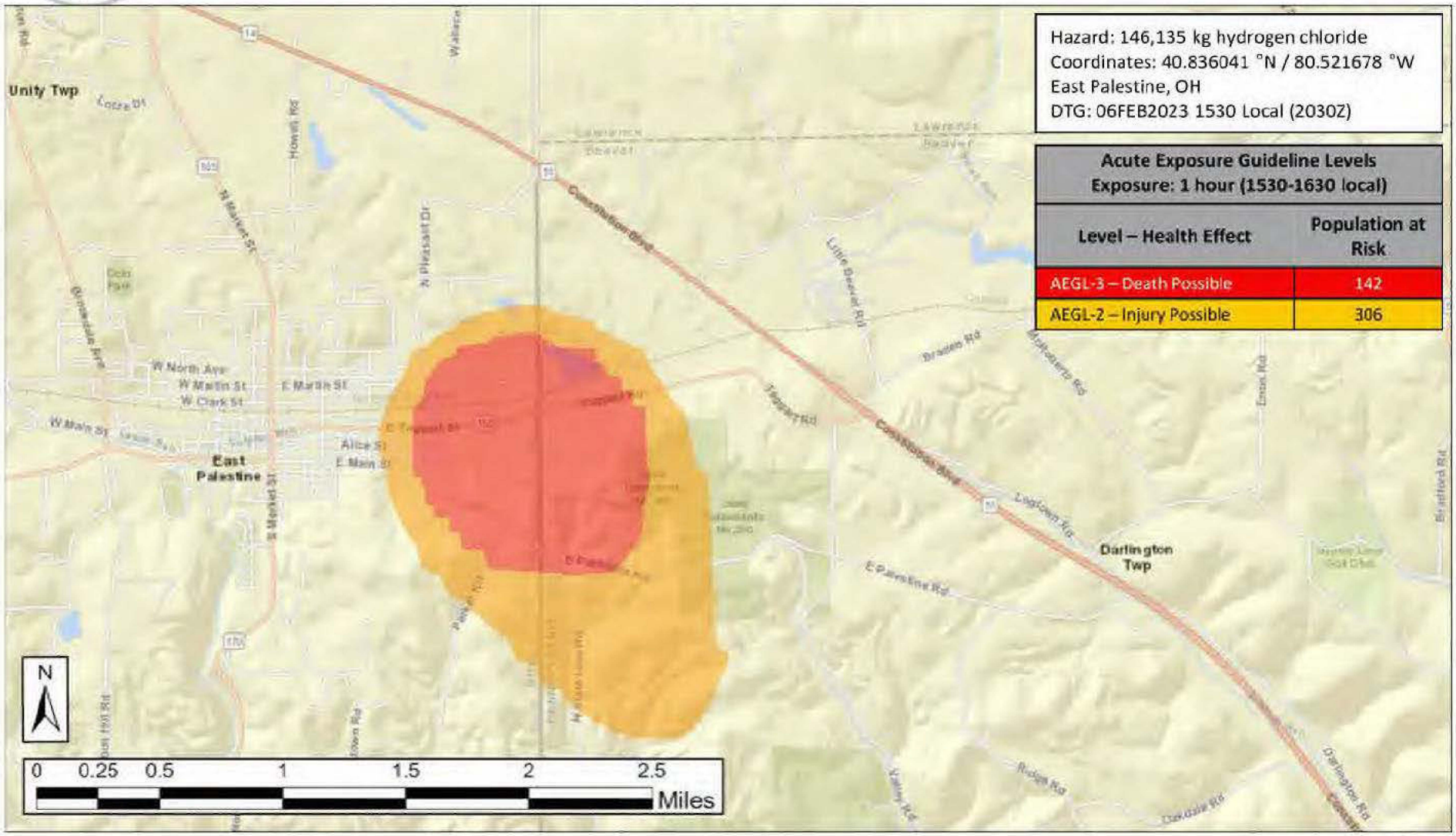
- Blast effects from a BLEVE is provided.

Caveats

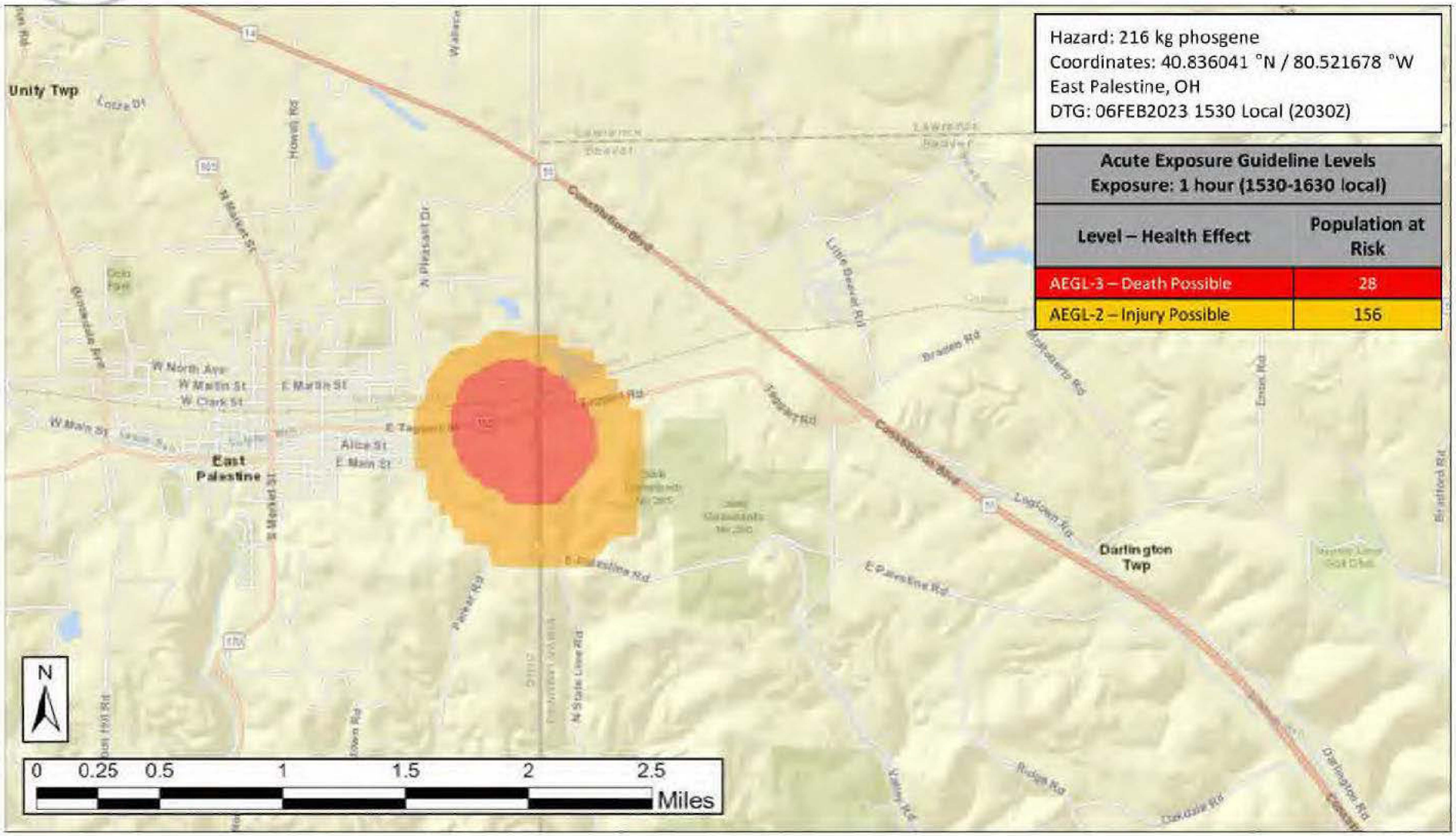
- The partitioning of the various chemicals is not fully known. We have made best estimates based on available literature and stoichiometry.
- As with the partitioning, estimates of the buoyancy induced by the fire and a possible explosion may not be accurately accounted for.
- There may be synergistic toxicological effects from exposure to multiple chemicals. Our modeling does not have the ability to account for this.
- Due to evacuations and responding personnel on the scene, population estimates may not reflect actual population distribution around the incident.

3:30PM Breach (2030Z)
06 FEB 2023

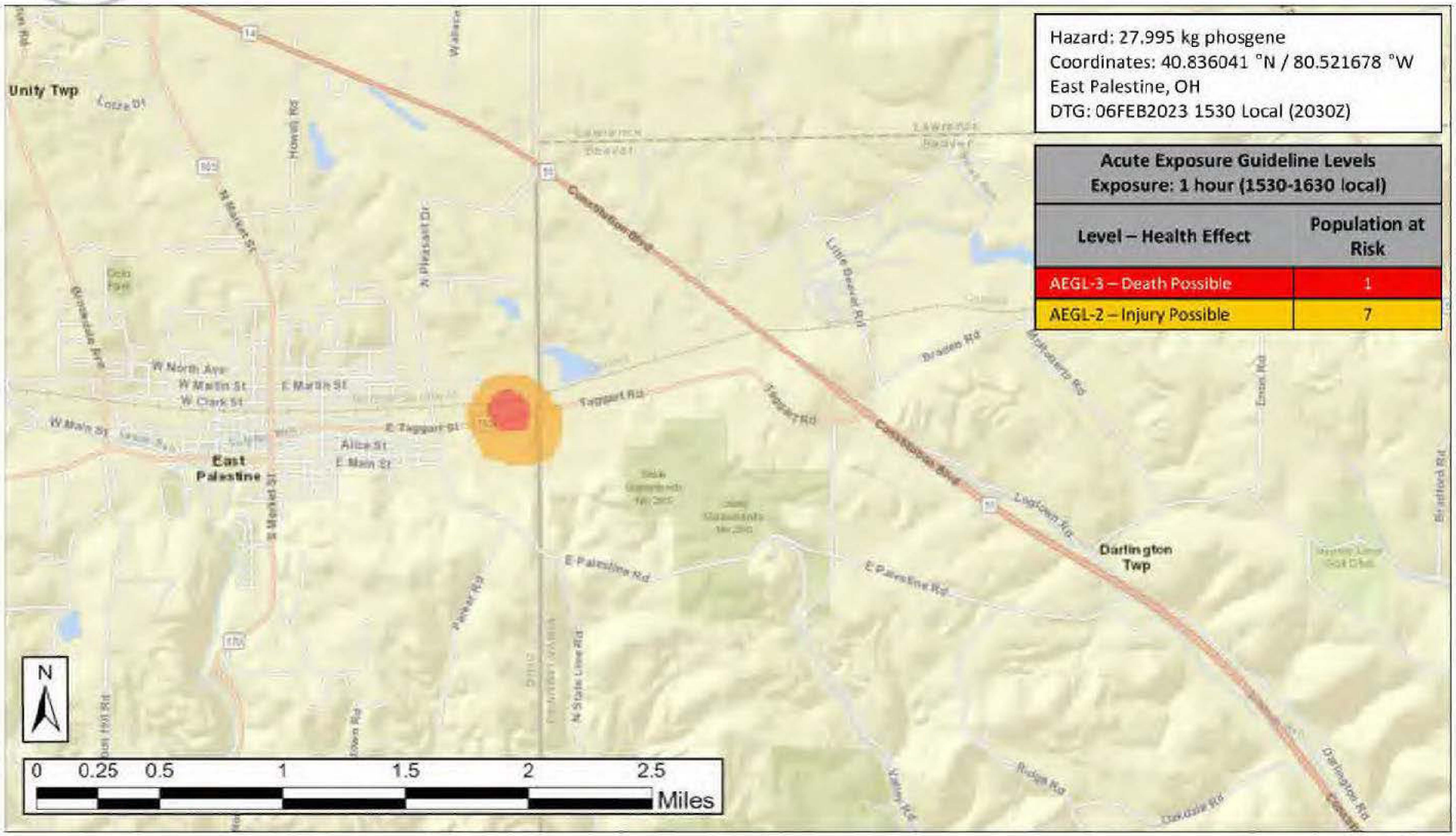
Hydrogen Chloride – 1530 Local



Phosgene – 1530 Local

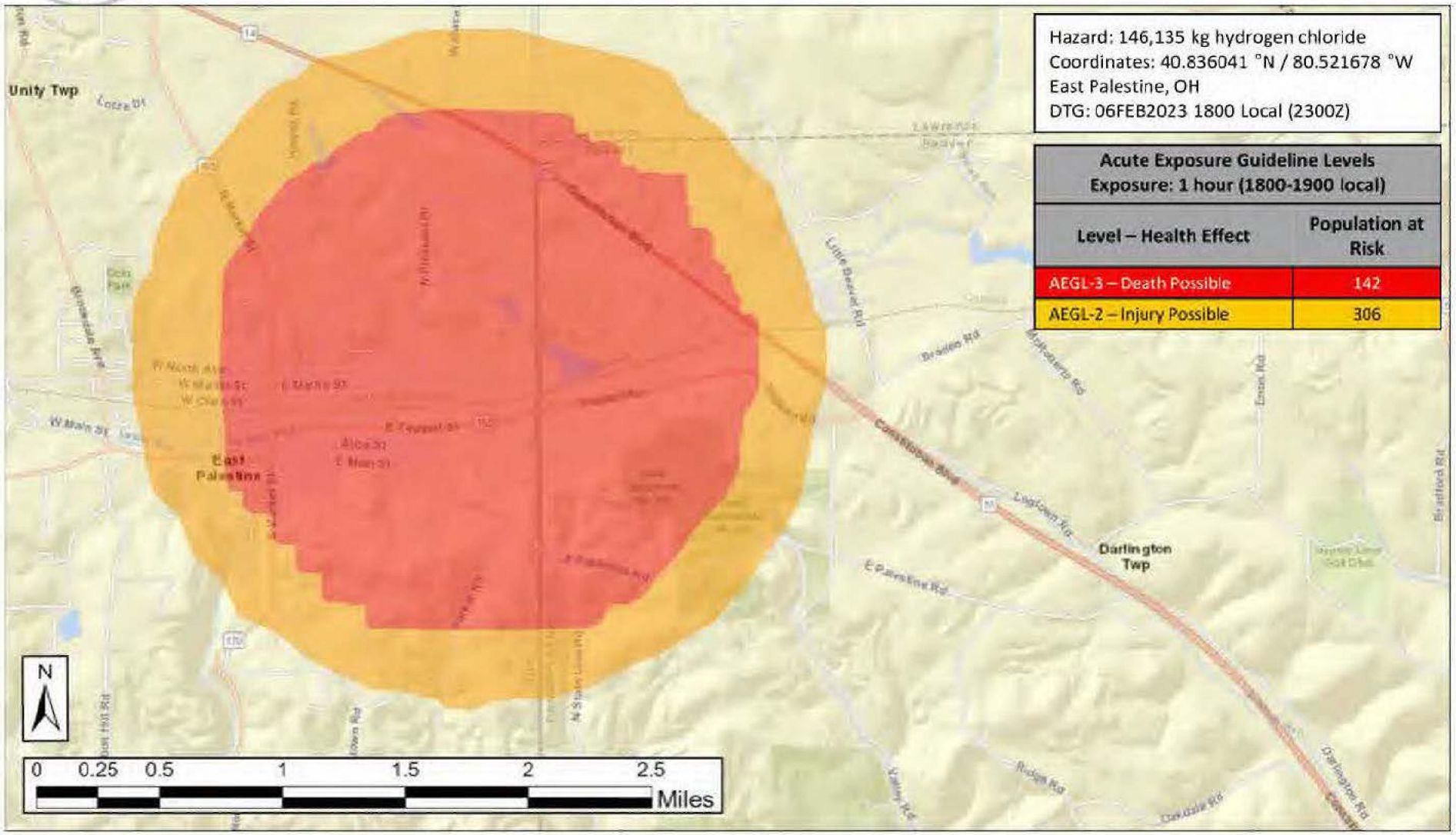


Vinyl Chloride – 1530 Local

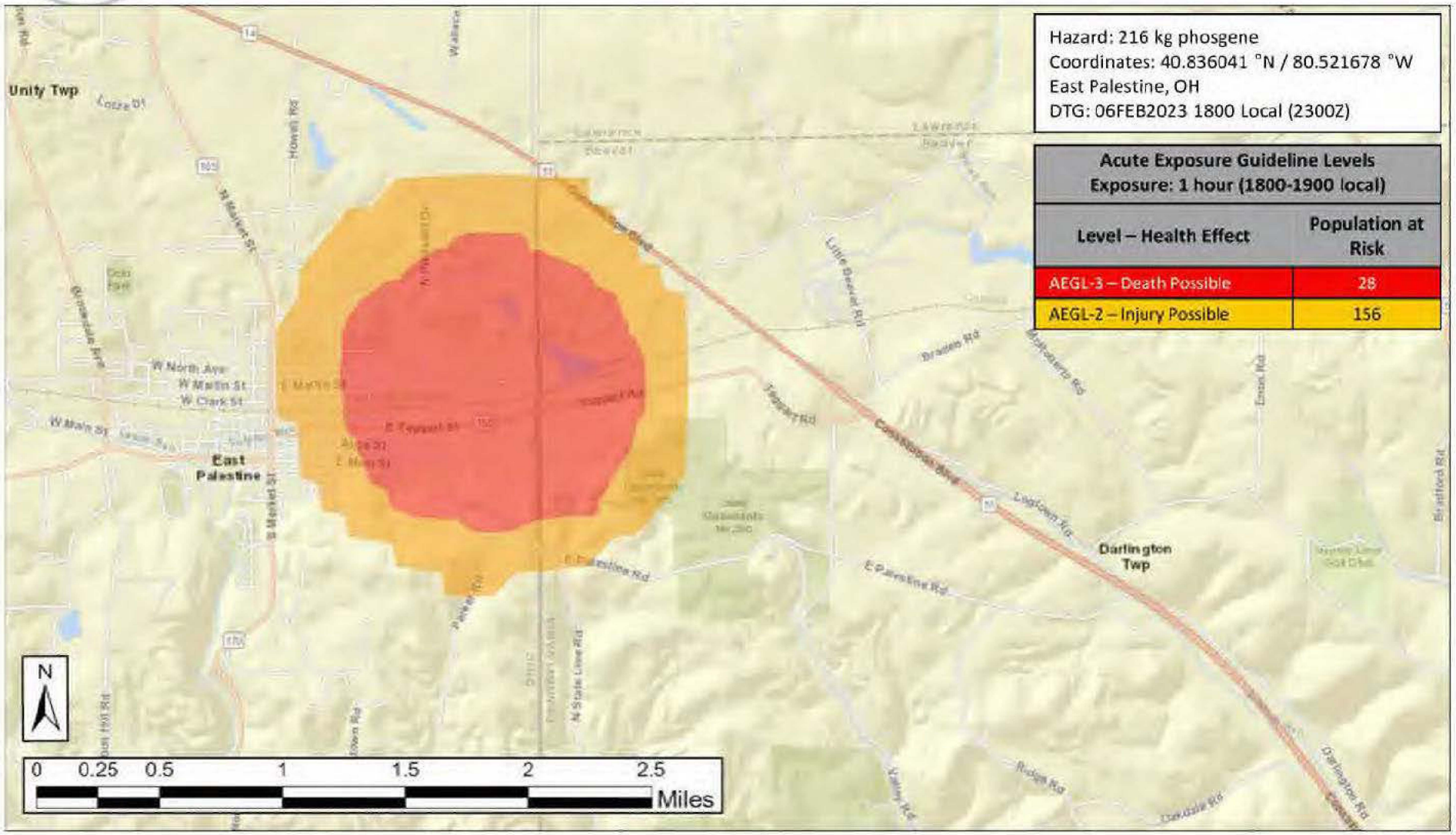


6:00PM Breach (2300Z)
06 FEB 2023

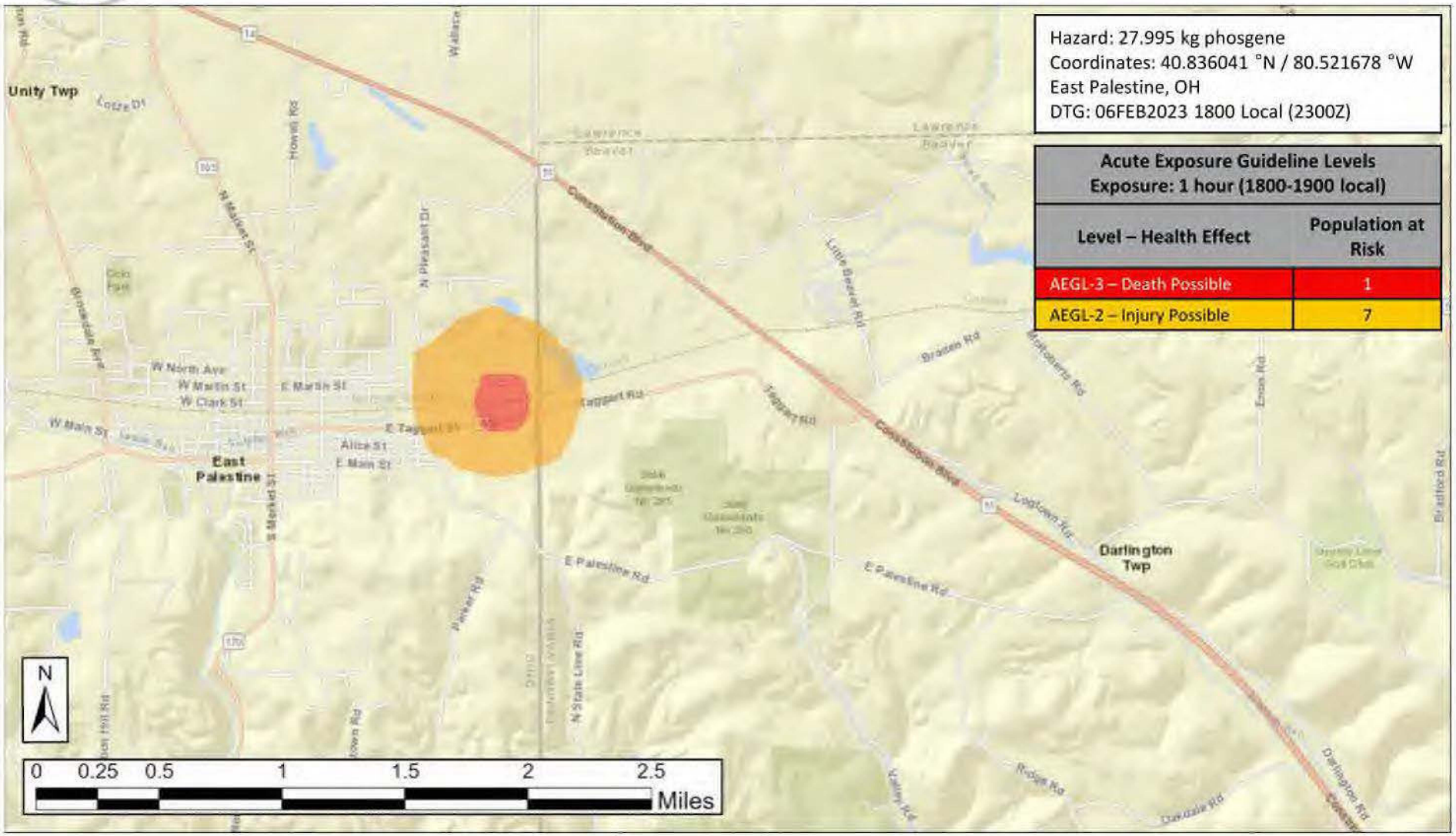
Hydrogen Chloride – 1800 Local



Phosgene – 1800 Local



Vinyl Chloride – 1800 Local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

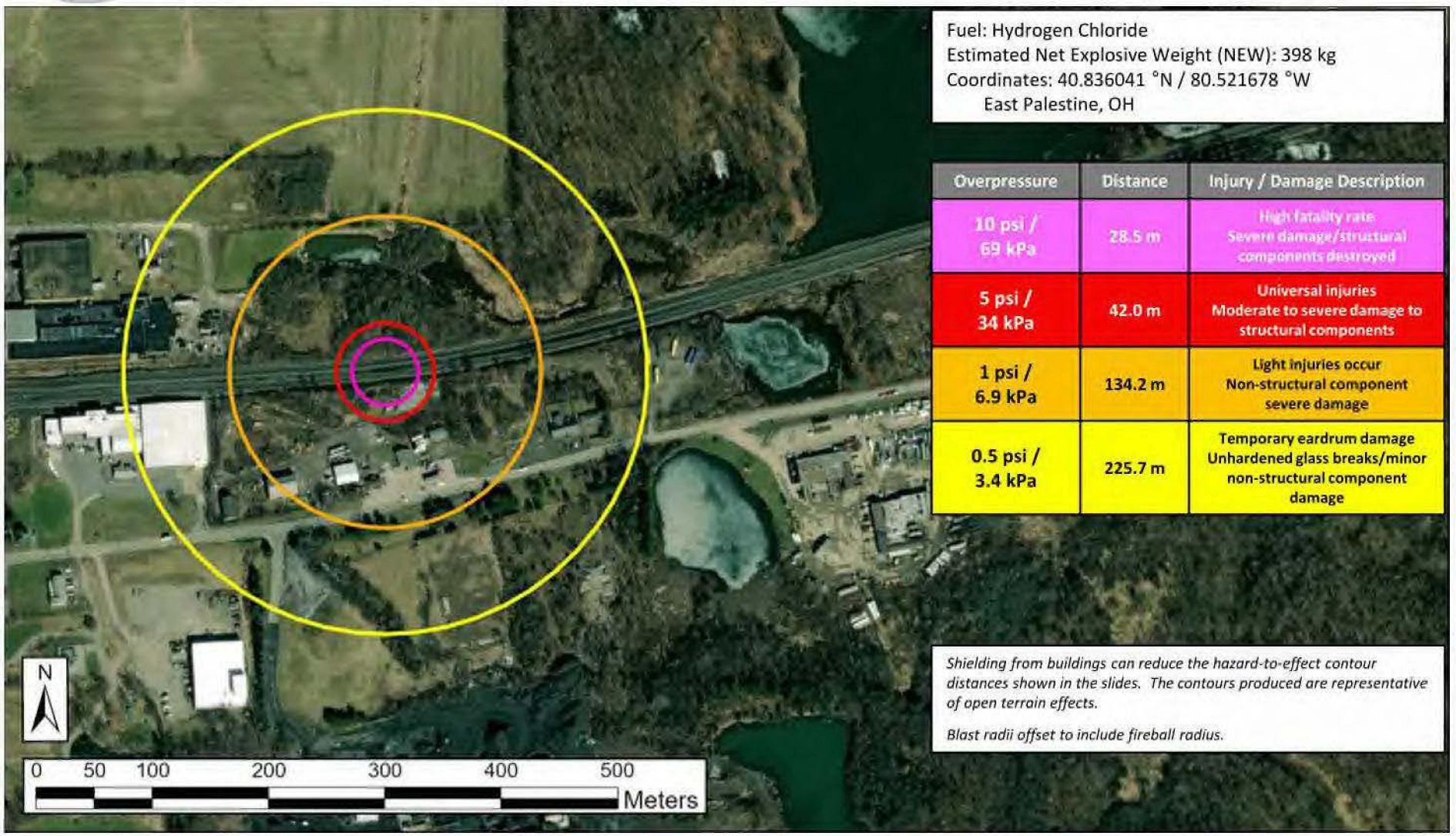
FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

BLEVE/VCE Blast Human Injury & Structural Damage Contours



Fuel: Hydrogen Chloride
Estimated Net Explosive Weight (NEW): 398 kg
Coordinates: 40.836041 °N / 80.521678 °W
East Palestine, OH

Overpressure	Distance	Injury / Damage Description
10 psi / 69 kPa	28.5 m	High fatality rate Severe damage/structural components destroyed
5 psi / 34 kPa	42.0 m	Universal injuries Moderate to severe damage to structural components
1 psi / 6.9 kPa	134.2 m	Light injuries occur Non-structural component severe damage
0.5 psi / 3.4 kPa	225.7 m	Temporary eardrum damage Unhardened glass breaks/minor non-structural component damage

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides. The contours produced are representative of open terrain effects.

Blast radii offset to include fireball radius.

BLEVE/VCE Blast Human Injury & Structural Damage Contours

	Personnel	Glass	Wood	Metal	Steel Frame	Concrete Block	Reinforced Concrete
10 psi / 69 kPa	>50% eardrum rupture, high fatality rate	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Collapse	Collapse	Severe damage / structural components destroyed
5 psi / 34 kPa	Chance eardrum rupture, injuries are universal	Shatters, severe frame failure	Collapse, complete destruction	Siding and interior destroyed	Severe damage	Severe damage	Moderate damage to structural components
1 psi / 6.9 kPa	Temporary eardrum damage, light injuries occur	Shatters	Studs, sheathing cracked	Severe buckling, some panels torn off	Minor damage	Severe damage	N/A
0.5 psi / 3.4 kPa	Temporary eardrum damage	Shatters	Rafters cracked	Moderate buckling, joints separated	N/A	N/A	N/A

BLEVE- Boiling Liquid Expanding Vapor Explosion

- Liquid is heated in a sealed vessel above its boiling point creating pressure. If the vessel fails the fluid vaporizes almost instantly and expands radially with a subsonic blast wave
- Need not be flammable

VCE- Vapor Cloud Explosion

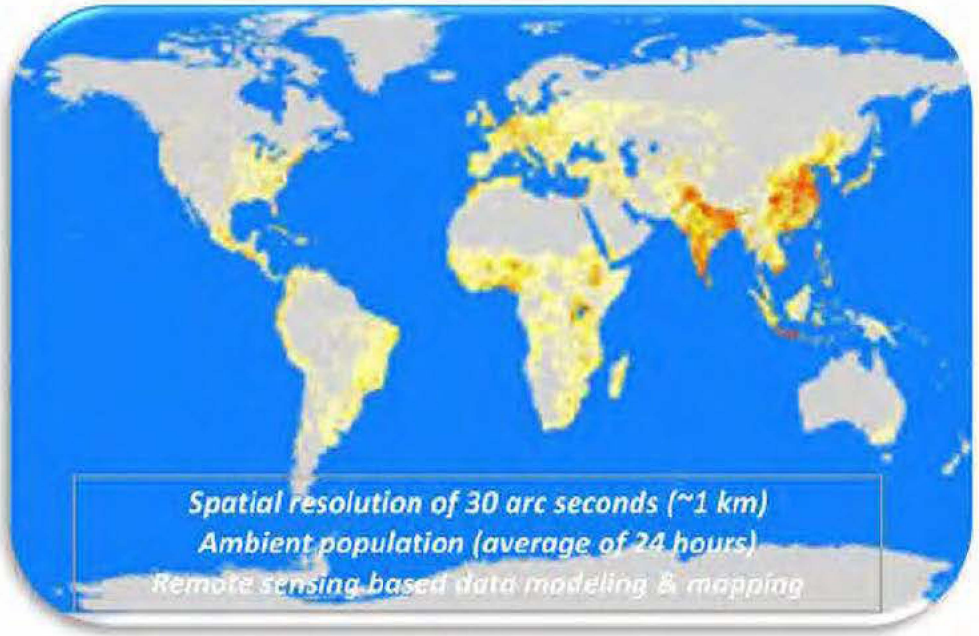
- A flammable material is dispersed through the air which ignites
- Prompt ignition is non-detonable, delayed ignition potentially (though unlikely) detonable
- Fireball and thermal radiation may ignite nearby combustible materials

Shielding from buildings can reduce the hazard-to-effect contour distances shown in the slides; contours are representative of open terrain effects.

Sources: "Explosive shock in air" Kinney & Grahm, **1985**; "*Facility damages and personnel injury from explosive blast*", Montgomery & Ward, 1993; "*The effects of nuclear weapons*", 3rd edition, Glasstone & Dolan, **1977**

Population Data

- Population figures are based on LandScan™, a database produced by Oak Ridge National Laboratory.
- LandScan™ is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data. It was updated in 2020 and refreshed annually.
- Reported population numbers are **based upon average day and night** time LandScan™ 2021 data.*



- This population data does not include major shifts in personnel such as relocations, special events, etc. In such cases the population database needs to be amended or population can be added or removed within HPAC.
- For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas.
- More information is available at https://landscan.ornl.gov.

*Individual day or individual night data is available upon request for US and specialized OCONUS locations.

SEQ #	EQUIPMENT ID	CAR TYPE	CONTAINER ID	CONTAINER TYPE	L/E STATUS
1	NS 4178	LOCOMOTIVE			UNKNOWN
2	NS 4224	LOCOMOTIVE			UNKNOWN
3	OCPX 70524	HOPPER CAR			LOADED
4	GATX 9166	TANK CAR			EMPTY
5	TTPX 81589	BULKHEAD FLAT			LOADED
6	TTPX 805391	BULKHEAD FLAT			LOADED
7	TTPX 80902	BULKHEAD FLAT			LOADED
8	TTPX 806356	BULKHEAD FLAT			LOADED
9	TTZX 864660	BULKHEAD FLAT			LOADED
10	GACX 15324	HOPPER CAR			LOADED
11	NS 245167	HOPPER CAR			EMPTY
12	TBOX 641071	BOX CAR			LOADED
13	CSOX 23642	TANK CAR			EMPTY
14	UTCX 46842	HOPPER CAR			EMPTY
15	TILX 623413	HOPPER CAR			LOADED
16	BRKX 62205	HOPPER CAR			LOADED
17	GPLX 76170	HOPPER CAR			LOADED
18	GPLX 76158	HOPPER CAR			LOADED
19	GPLX 75450	HOPPER CAR			LOADED
20	MULX 53887	HOPPER CAR			LOADED
21	TILX 624042	HOPPER CAR			LOADED
22	BRKX 68611	HOPPER CAR			LOADED
23	ARSX 4145	HOPPER CAR			LOADED
24	BRKX 66738	HOPPER CAR			LOADED
25	GPLX 75465	HOPPER CAR			LOADED
26	ECUX 860375	HOPPER CAR			LOADED
27	UTLX 684543	TANK CAR			EMPTY
28	TILX 402025	TANK CAR			LOADED
29	OCPX 80235	TANK CAR			LOADED
30	OCPX 80179	TANK CAR			LOADED
31	GATX 95098	TANK CAR			LOADED
32	RACX 51629	TANK CAR			LOADED
33	LYBX 5191	TANK CAR			LOADED
34	RACX 51435	TANK CAR			LOADED
35	UTLX 671772	TANK CAR			LOADED
36	SHPX 211226	TANK CAR			LOADED
37	TILX 331319	HOPPER CAR			LOADED
38	DOWX 73168	TANK CAR			LOADED
39	ROIX 57036	HOPPER CAR			LOADED
40	NCUX 40057	HOPPER CAR			LOADED
41	UTLX 100055	TANK CAR			LOADED
42	XOMX 110664	TANK CAR			LOADED
43	UTLX 684798	TANK CAR			LOADED
44	UTLX 671310	TANK CAR			LOADED
45	CERX 30072	TANK CAR			LOADED
46	SHPX 211106	TANK CAR			LOADED
47	NATX 231335	TANK CAR			LOADED
48	UTLX 671913	TANK CAR			LOADED
49	NATX 35844	TANK CAR			LOADED
50	UTLX 205907	TANK CAR			LOADED
51	UTLX 661296	TANK CAR			LOADED

52	COCX 287059	TANK CAR	LOADED
53	ROIX 59396	HOPPER CAR	LOADED
54	ROIX 57782	HOPPER CAR	LOADED
55	OCPX 80370	TANK CAR	LOADED
56	TBOX 640019	BOX CAR	LOADED
57	BKTY 152621	BOX CAR	LOADED
58	LINX 7278	BOX CAR	LOADED
59	DPRX 259013	TANK CAR	EMPTY
60	DPRX 258671	TANK CAR	EMPTY
61	XOMX 110236	TANK CAR	LOADED
62	ELTX 7458	HOPPER CAR	LOADED
63	ELTX 3421	HOPPER CAR	LOADED
64	NDYX 892049	HOPPER CAR	LOADED
65	TTGX 953815	AUTORACK	LOADED
66	TBOX 889334	BOX CAR	LOADED
67	NOKL 603412	BOX CAR	LOADED
68	NS 472751	BOX CAR	LOADED
69	TBOX 676291	BOX CAR	LOADED
70	TBOX 670331	BOX CAR	LOADED
71	TBOX 662599	BOX CAR	LOADED
72	KCS 112405	BOX CAR	LOADED
73	TBOX 666771	BOX CAR	LOADED
74	TBOX 664264	BOX CAR	LOADED
75	TBOX 642155	BOX CAR	LOADED
76	TBOX 643155	BOX CAR	LOADED
77	TBOX 630049	BOX CAR	LOADED
78	BKTY 151113	BOX CAR	LOADED
79	TBOX 672287	BOX CAR	LOADED
80	TBOX 643036	BOX CAR	LOADED
81	TTZX 862546	BULKHEAD FLAT	LOADED
82	NAHX 320459	HOPPER CAR	LOADED
83	TTGX 696500	AUTORACK	LOADED
84	TTGX 851756	AUTORACK	LOADED
85	TTGX 981950	AUTORACK	LOADED
86	LRS 137205	BOX CAR	LOADED
87	NS 469567	BOX CAR	LOADED
88	TBOX 641883	BOX CAR	LOADED
89	TBOX 675515	BOX CAR	LOADED
90	LRS 2512	BOX CAR	LOADED
91	TBOX 672773	BOX CAR	LOADED
92	BKTY 152854	BOX CAR	LOADED
93	UTLX 667639	TANK CAR	LOADED
94	GATX 225435	TANK CAR	LOADED
95	UTLX 669739	TANK CAR	LOADED
96	NAHX 620163	HOPPER CAR	LOADED
97	TTPX 81575	BULKHEAD FLAT	LOADED
98	SHQX 4267	HOPPER CAR	LOADED
99	GATX 54892	TANK CAR	LOADED
100	TBOX 639745	BOX CAR	LOADED
101	TBOX 640016	BOX CAR	LOADED
102	GATX 54899	TANK CAR	LOADED
103	ROIX 58372	HOPPER CAR	LOADED

104	MULX 200058	HOPPER CAR	LOADED
105	SHPX 463835	HOPPER CAR	LOADED
106	ELTX 7538	HOPPER CAR	LOADED
107	CCBX 58366	HOPPER CAR	LOADED
108	BRKX 66231	HOPPER CAR	LOADED
109	CITX 200199	HOPPER CAR	LOADED
110	CITX 200288	HOPPER CAR	LOADED
111	GISX 1386	HOPPER CAR	LOADED
112	NS 4412	LOCOMOTIVE	UNKNOWN
113	GONX 320417	GONDOLA	LOADED
114	GONX 310070	GONDOLA	LOADED
115	NW 189995	GONDOLA	LOADED
116	NW 169645	GONDOLA	LOADED
117	NS 163615	GONDOLA	LOADED
118	NS 168788	GONDOLA	LOADED
119	TILX 101984	TANK CAR	LOADED
120	GATX 35935	TANK CAR	LOADED
121	TILX 101958	TANK CAR	LOADED
122	GATX 35941	TANK CAR	LOADED
123	GATX 35930	TANK CAR	LOADED
124	STSX 51519	TANK CAR	LOADED
125	STSX 3110	TANK CAR	LOADED
126	STSX 51308	TANK CAR	LOADED
127	STSX 61226	TANK CAR	LOADED
128	STSX 4000	TANK CAR	LOADED
129	STSX 4201	TANK CAR	LOADED
130	STSX 3082	TANK CAR	LOADED
131	TILX 170527	TANK CAR	LOADED
132	ADMX 16442	TANK CAR	LOADED
133	DMIX 191118	TANK CAR	LOADED
134	ADMX 16192	TANK CAR	LOADED
135	DMIX 191011	TANK CAR	LOADED
136	VTGX 190085	TANK CAR	LOADED
137	GATX 73411	TANK CAR	LOADED
138	DMIX 190425	TANK CAR	LOADED
139	ADMX 15742	TANK CAR	LOADED
140	DMIX 190327	TANK CAR	LOADED
141	TILX 170647	TANK CAR	LOADED
142	ITFX 129067	HOPPER CAR	LOADED
143	SHPX 454520	HOPPER CAR	LOADED
144	CR 53534		EMPTY
145	CR 53318		EMPTY
146	CITX 701780	HOPPER CAR	LOADED
147	NS 168703	GONDOLA	LOADED
148	TILX 291356	TANK CAR	LOADED
149	TILX 650290	HOPPER CAR	LOADED
150	CEFX 360330	HOPPER CAR	LOADED
151	ADMX 64225	HOPPER CAR	LOADED
152	ADMX 63057	HOPPER CAR	LOADED
153	NS 76754	END OF TRAIN DEVICE	EMPTY

QUANTITY	UN/NA #	CONTENTS SHIPPING NAME	HAZARD CLASS	
Net Weight: 184700 Pounds		POLYVINYL		
0 Pounds	UN1075	PETROLEUM GASES, LIQUEFIED		2.1
Net Weight: 139029 Pounds		PIPE TUBG IORS		
Net Weight: 136981 Pounds		PIPE TUBG IORS		
Net Weight: 141588 Pounds		PIPE TUBG IORS		
Net Weight: 141906 Pounds		PIPE TUBG IORS		
Net Weight: 191400 Pounds		LBR TIMBER,DRID		
Net Weight: 214336 Pounds		FLOUR,WHEAT		
Net Weight: 148991 Pounds		MALT LIQUORS		
Net Weight: 193800 Pounds		POLYPROPYLENE		
Net Weight: 194350 Pounds		POLYPROPYLENE		
Net Weight: 149450 Pounds		POLYETHYLENE		
Net Weight: 153750 Pounds		POLYETHYLENE		
Net Weight: 156400 Pounds		POLYETHYLENE		
Net Weight: 195100 Pounds		POLYPROPYLENE		
Net Weight: 193450 Pounds		POLYPROPYLENE		
Net Weight: 195300 Pounds		POLYPROPYLENE		
Net Weight: 195100 Pounds		POLYPROPYLENE		
Net Weight: 193400 Pounds		POLYPROPYLENE		
Net Weight: 142900 Pounds		POLYETHYLENE		
Net Weight: 163200 Pounds		POLYETHYLENE		
178300 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
177250 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
177600 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
178150 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
Net Weight: 187400 Pounds		DIPROPYLENE		
Net Weight: 168030 Pounds		PROPYLENE		
Net Weight: 188934 Pounds		PROPYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
185750 Pound-1 Carload	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 208800 Pounds		SEMOLINA		
Net Weight: 205900 Pounds	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 186550 Pounds		POLYVINYL		
Net Weight: 191200 Pounds		POLYVINYL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 150000 Pounds		PET LUB OIL		
Net Weight: 200000 Pounds		POLYPROPYL GLYC		
Net Weight: 180890 Pounds		PROPYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
Net Weight: 180000 Pounds		DIETHYLENE		
155642 Pound-1 Carload	UN1055	ISOBUTYLENE		2.1
Net Weight: 180000 Pounds	UN2348	BUTYL ACRYLATES, STABILIZED		3
Net Weight: 172265 Pounds		PETRO OIL,NEC		

Net Weight: 176122 Pounds		ADDITIVES,FUEL		
Net Weight: 184450 Pounds		POLYVINYL		
Net Weight: 197150 Pounds		POLYVINYL		
176100 Pound-1 Carload	UN1086	VINYL CHLORIDE, STABILIZED		2.1
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 111057 Pounds		SHEET STEEL		
Gross Weight: 117005 Pounds		VEGTBLE FRZN		
0 Pounds	UN1114	BENZENE		3
0 Pounds	UN1114	BENZENE		3
Net Weight: 163662 Pounds		PARAFFIN WAX		
Net Weight: 203550 Pounds		FLAKES,POWDER		
Net Weight: 193100 Pounds		FLAKES,POWDER		
Net Weight: 222065 Pounds		HYDRAULIC CMT		
Net Weight: 24998 Pounds		AUTOS PASSENGER		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 122689 Pounds		MALT LIQUORS		
Net Weight: 122747 Pounds		MALT LIQUORS		
Net Weight: 150338 Pounds		MALT LIQUORS		
Net Weight: 162741 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 122689 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 158660 Pounds		MALT LIQUORS		
Net Weight: 123867 Pounds		MALT LIQUORS		
Net Weight: 116404 Pounds		BEVERAGES,ALCC		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 157054 Pounds		LBR TIMBER,DRID		
Net Weight: 181120 Pounds		SEMOLINA		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 40000 Pounds		AUTOS PASSENGER		
Net Weight: 172097 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 149154 Pounds		MALT LIQUORS		
Net Weight: 121816 Pounds		PLPBDFBD N CORR		
Net Weight: 194675 Pounds		PLPBDFBD N CORR		
Net Weight: 113842 Pounds		PLPBDFBD N CORR		
181250 Pound-1 Carload	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 167900 Pounds		SOLVENTS,PLORV		
Net Weight: 179000 Pounds		PETRO OIL,NEC		
Net Weight: 168450 Pounds		POLYPROPYLENE		
Net Weight: 179615 Pounds		SHT STEEL BLACK		
Net Weight: 207025 Pounds		RICE,CLND BRKN		
Net Weight: 187600 Pounds	NA1993	COMBUSTIBLE LIQUID,N.O.S.	CL	
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 197838 Pounds		BALLS,CTN,MEDCL		
Net Weight: 187300 Pounds	UN2348	BUTYL ACRYLATES, STABILIZED		3
Net Weight: 178900 Pounds		POLYVINYL		

Net Weight: 205310 Pounds		RICE,CLND BRKN	
Net Weight: 203150 Pounds		FLAKES,POWDER	
Net Weight: 203850 Pounds		FLAKES,POWDER	
Net Weight: 188800 Pounds		POLYETHYLENE	
Net Weight: 188000 Pounds		POLYPROPYLENE	
Net Weight: 202550 Pounds		POLYETHYLENE	
Net Weight: 188600 Pounds		POLYETHYLENE	
Net Weight: 205400 Pounds		FLAKES,POWDER	
Net Weight: 189910 Pounds		SCRAP I OR S	
Net Weight: 188110 Pounds		SCRAP I OR S	
Net Weight: 188750 Pounds		SCRAP I OR S	
Net Weight: 168990 Pounds		SHEET,IORS,NEC	
Net Weight: 172450 Pounds		SHEET,IORS,NEC	
Net Weight: 161130 Pounds		SHEET,IORS,NEC	
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
204923 Pound-1 Carload	UN1832	SULFURIC ACID, SPENT	8
Net Weight: 213688 Pounds		CRN SYR UNMXD	
Net Weight: 213188 Pounds		CRN SYR UNMXD	
Net Weight: 191150 Pounds		CRN SYR UNMXD	
Net Weight: 193350 Pounds		CRN SYR UNMXD	
Net Weight: 196850 Pounds		CRN SYR UNMXD	
Net Weight: 195900 Pounds		CRN SYR UNMXD	
Net Weight: 213500 Pounds		CRN SYR UNMXD	
Net Weight: 222000 Pounds		CRN SYR UNMXD	
Net Weight: 199750 Pounds		CRN SYR UNMXD	
Net Weight: 220700 Pounds		CRN SYR UNMXD	
Net Weight: 199300 Pounds		CRN SYR UNMXD	
Net Weight: 220350 Pounds		CRN SYR UNMXD	
Net Weight: 221800 Pounds		CRN SYR UNMXD	
Net Weight: 221350 Pounds		CRN SYR UNMXD	
Net Weight: 220600 Pounds		CRN SYR UNMXD	
Net Weight: 199850 Pounds		CRN SYR UNMXD	
Net Weight: 220200 Pounds		CRN SYR UNMXD	
Net Weight: 222200 Pounds		CRN SYR UNMXD	
Net Weight: 197000 Pounds		UREA OT LIQOLQD	
Net Weight: 194850 Pounds		UREA OT LIQOLQD	
Net Weight: 106000 Pounds		BEET PULP, DRY	
Net Weight: 146270 Pounds		SHEET,IORS,NEC	
Net Weight: 202530 Pounds		SOYBEAN OIL	
Net Weight: 214550 Pounds		SOYBN CK,ML,SCR	
Net Weight: 214550 Pounds		SOYBN CK,ML,SCR	
Net Weight: 215350 Pounds		SOYBN CK,ML,SCR	
Net Weight: 190750 Pounds		CORN CAKE OR ML	

PACKING GROUP

III

III

III

II
II

III

III

III

From: DTRA Ft Belvoir RD Mailbox Reachback
To: (b) (6); DTRA Ft Belvoir OI Mailbox Joint Ops Center
Cc: (b) (6)
Belvoir RD Mailbox Reachback
Subject: Soot Deposition Model for East Palestine Controlled Burn
Date: Wednesday, March 8, 2023 9:43:45 AM
Attachments: RFI_23_0081kU_IMAAC.pdf
AEGL_CO_8hr0.kml
AEGL_HCl_8hr0.kml
custom_soot_deposition.kml
HCl_SurfDose_8hr.kml
Soot_IntConc_6hr.kml
SootDose_8hr0.kml

CUI

(b) (6)

Here is the modeling based on our conversation yesterday. A few comments:

- I think Slide 17 is the main thing you are looking for.
- This analysis is just for the controlled burn, not for the estimated 10% that was released over two days. On the other hand, as mentioned on the phone call I wouldn't expect the the material from that fire to have traveled nearly as far, so sampling within a few km of the burn should find most it (though it's always possible for small amounts to travel farther). It seemed like getting this to you more quickly was the better approach.
- I compared the fire location to the drone footage at https://www.youtube.com/watch?v=3ur1f1sA-FU and this lines up pretty well with the buildings and roads.
- I included KMLs so you can put this on whatever mapping software you're using for the sampling

Respectfully,

BZ

Defense Threat Reduction Agency
COM: (703) 767-3448 (DSN 427-)
STE: (703) 767-2138
NIPR: dtra-reachback@mail.mil
SIPR: dtra-reachback@mail.smil.mil
JWICS: reachback@dtra.ic.gov
R&D Directorate
Technical Reachback Division

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Categories: CTI
Distribution/Dissemination Statement: C
POC: RD-OPR, dtra-reachback@mail.mil, 703-767-3445

CUI

Date: 08MAR2023 1430Z

Version: Initial Product

Changes: Analysis after controlled breach

IMAAC

Interagency Modeling and Atmospheric Assessment Center

REAL WORLD

Train Derailment and Fire in East Palestine, OH

(RFI 23-0081kU; analysis of controlled burn)

Warning - This document contains technical data whose export is restricted by the Arms Export Control Act (Section 2751 of Title 22, United States Code) or the Export Control Reform Act of 2018 (Chapter 58 Sections 4801-4852 of Title 50, United States Code). Violations of these export laws are subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25 and DoD Instruction 2040.02.

Controlled by: Defense Threat Reduction Agency
Controlled by: Research and Development
CUI Category: CTI, EXPT
Distribution/Dissemination Statement: C
POC: RD-OPR, 703-767-3445

Distribution Statement C: Distribution authorized to U.S. Government agencies and their contractors [Critical Technology; 08MAR2023]. Other requests for this document should be referred to the Defense Threat Reduction Agency/SCR, 8725 John J. Kingman Road, Mail Stop 6201, Fort Belvoir, VA 22060-6201.

RD Directorate
Technical Reachback Division
(703) 767-3445, DSN 427-

Request Summary

Requestor	(b) (6) [redacted], Chemist, Tech. Advisor/ QAC, US EPA-R5-LSASD-SQAB
Contact information	(b) (6) [redacted] [redacted]
Request	After-action analysis of the afterburn of the train derailment in East Palestine, OH.
Employment	Real World
Hazards	• Soot from the combustion of several chemicals including: • Vinyl Chloride (887,400 lb) • Ethylene Glycol (185,150 lb) • Ethyl Hexyl Acrylate (205,900 lb) • Butyl Acrylate (180,000 lb)
Location	East Palestine, OH 40.8360921°N 80.5215888°W
Weather	High Resolution Numerical Weather Prediction: 12 km NAM from NCEP (CONUS)
Incident Date & Time	06FEB2023 1500 Local
Executive Summary	• A reanalysis of the train derailment and fire was performed with emphasis on tracing downwind locations where chemical deposits may exist. Contours of 10% of the AEGL-1 hazard level are provided for hydrogen chloride. 10% and 1% of the "unhealthy" dose of soot contour are provided as well.

Analysis Caveats

- This analysis is based on best estimates of the situation at the time of and during the controlled burn at East Palestine, OH. However, there are numerous unknowns and inherent uncertainty in models and model results that must be recognized.

- **This model does not claim to be the "ground truth" of what happened at the site.**

- Please see the following slides for caveats.

Modeling Results Summary

- Modeling did not show widespread areas affected at a level that would suggest serious health consequences, but possibly local effects due to:
  - Atmospheric variability
  - Synergistic effects from multiple chemicals
  - Individual sensitivity to certain chemicals
- The plume likely moved to the SE from the site over the first two - three hours. After this, a wind shift drove the plume back in the opposite direction (to the NNW), over the East Palestine area. A sinking nighttime atmospheric boundary layer kept material closer to the ground.
- As a result of this shift, deposition occurred first to the SE and in the vicinity of the burn location, then to N and NW of the burn location after about 4 – 5 hours.

Caveats (1): Vinyl Chloride Burn

- (b)(3)10USC130 [redacted]
  - [redacted]
  - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
- Products of combustion assumed to be burning at near stoichiometric conditions (i.e. close to the optimal amount of air for ideal combustion). Analysis assumes a constant mass burn rate based on a hydrocarbon-like pool fire.
- No downwind hazard at the AEGL-1 level was estimated for unburned vinyl chloride or phosgene

Caveats (2): Other Chemicals

- (b)(3)10USC130 [redacted]
  - [redacted]
  - [redacted]
    - [redacted]
  - [redacted]
    - [redacted]
    - [redacted]
    - [redacted]
    - Products of combustion assumed to be burning at near stoichiometric conditions (i.e. close to the optimal amount of air for ideal combustion). Analysis assumes a constant mass burn rate based on a hydrocarbon-like pool fire.
- Chemicals can have synergistic human effects (i.e., harmless doses of multiple chemicals can result in harm). **This model does not have any ability to model synergistic effects from what was certainly a multi-chemical mixture. We are not currently aware of any synergistic effects from this particular mix of chemicals.**

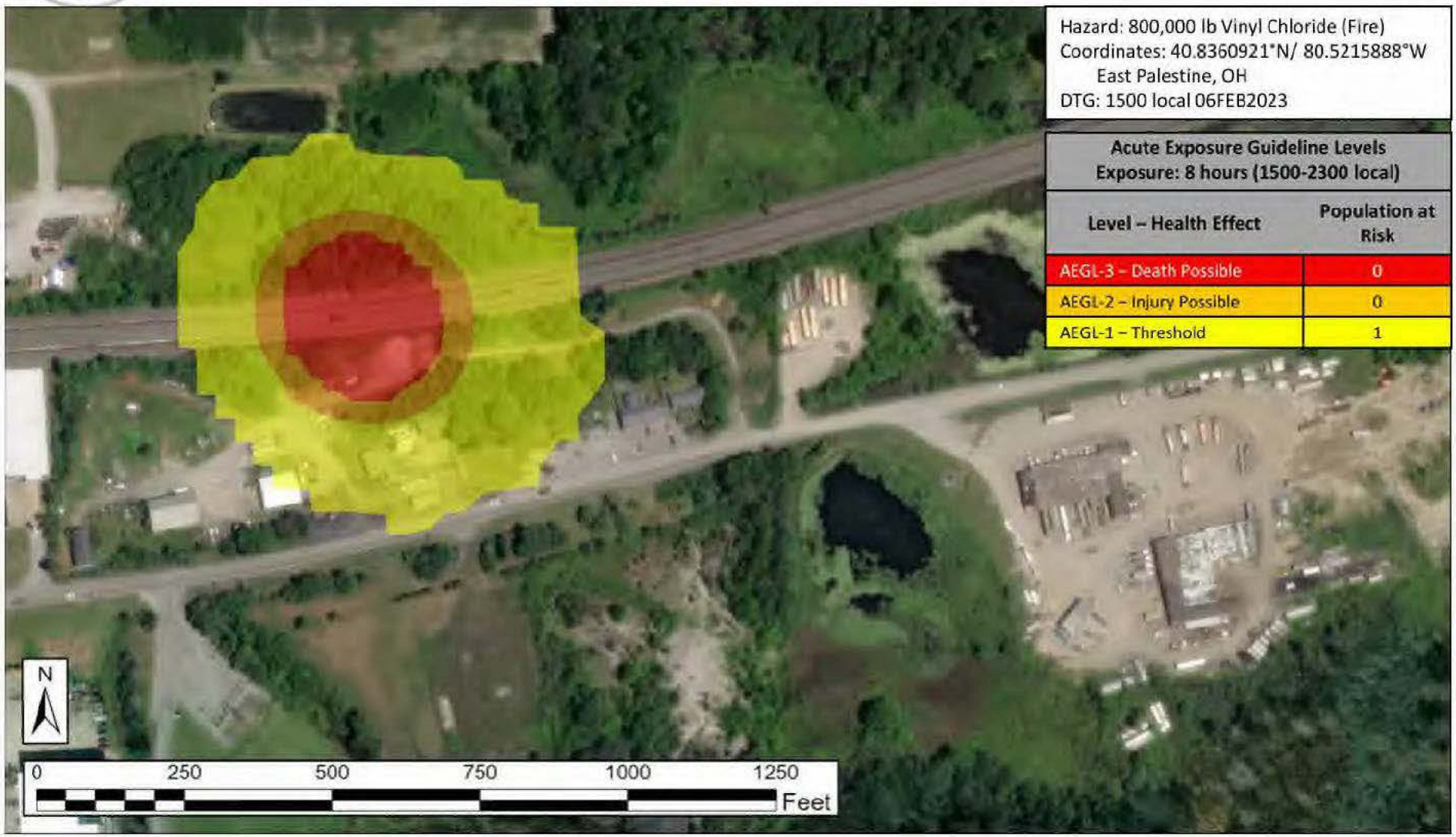
Caveats (3): General Caveats

- (b)(3)10USC130
- Model results are inherently uncertain (even assuming perfect knowledge of the initial conditions, which we do not have) due to atmospheric variability, e.g., meander, intermittency, turbulence, etc. **This means that certain areas will have either higher or lower concentrations than indicated by the modeling.**
- Because of the nonlinear dynamics of fire plume spread, assumptions about the nature of the fire can have a huge effect on the results, including the size, intensity (the rate at which material is burning), and temperature. These factors introduce significant uncertainty into the analysis.
- Weather used the NOAA (National Oceanic and Atmospheric Administration) High Resolution Numerical North American Model (12 km NAM). These are broadly consistent with observations at the Pittsburgh International Airport, though that location is relatively far away (approx. 40 miles).
  - Forecast weather covers multiple locations and times across the modeling area rather than observations at one or a few locations. This should allow for greater accuracy across large regions.

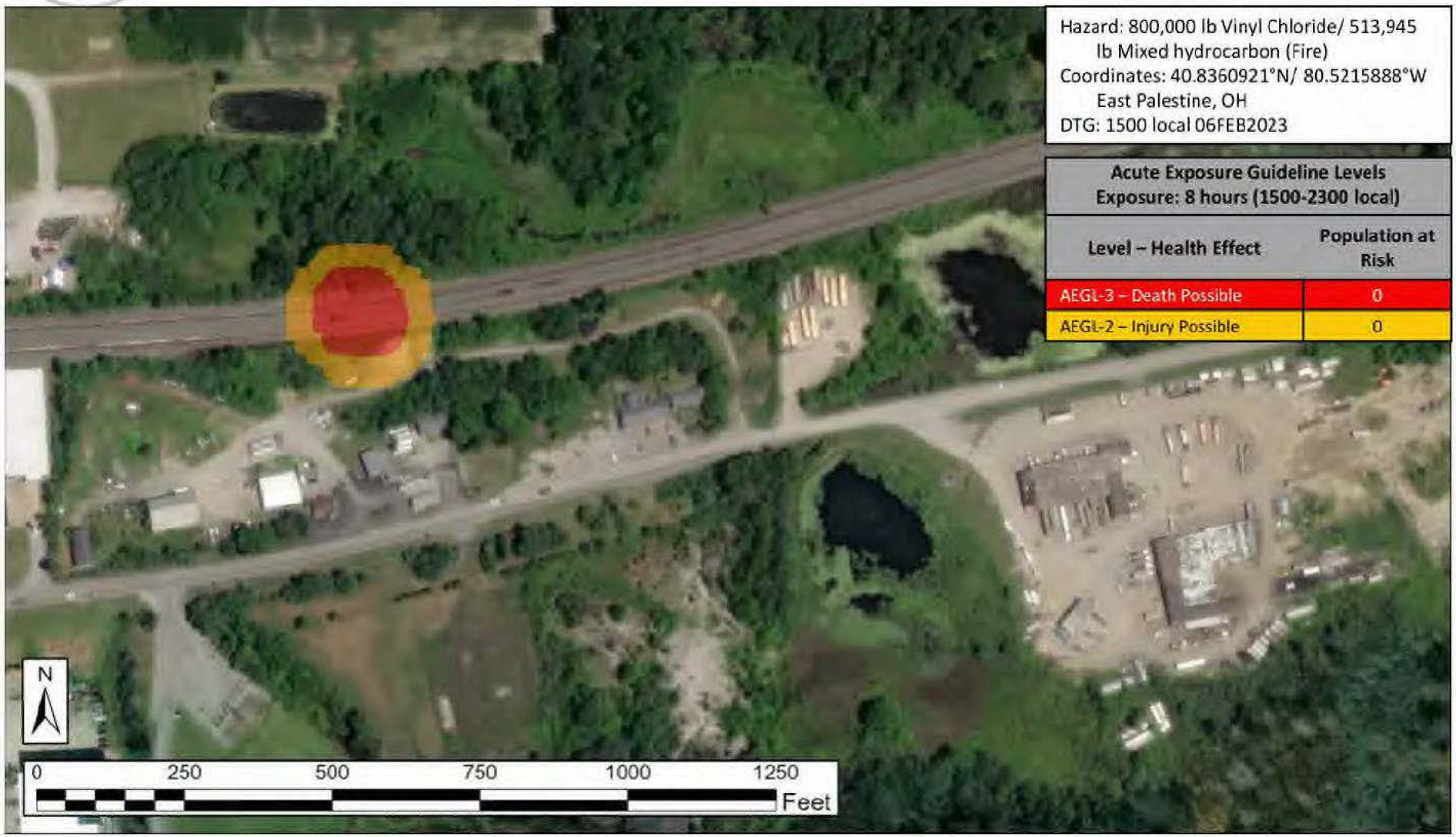
Notes

- AEGL hazards and hazardous soot dosage are displayed over an 8 hr duration
- Soot deposition over the course of the ten hours of the model run (6 hours of burning plus four hours of transport after burning).
- The soot transmittance and vertical plume are displayed at 6 hrs to match the duration of the fire
  - Soot dissipates rapidly after the end of the combustion duration

Hydrogen Chloride – East Palestine – 2300 local



Carbon Monoxide– East Palestine – 2300 local



Acute Exposure Guideline Levels (AEGL)

Value	Description
AEGL-3	**Death Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.
AEGL-2	**Injury Possible** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL-1 (May not be displayed or defined)	**Threshold** - the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

FINAL AEGLs – may be used on a permanent basis by all federal, state and local agencies, and private organizations.

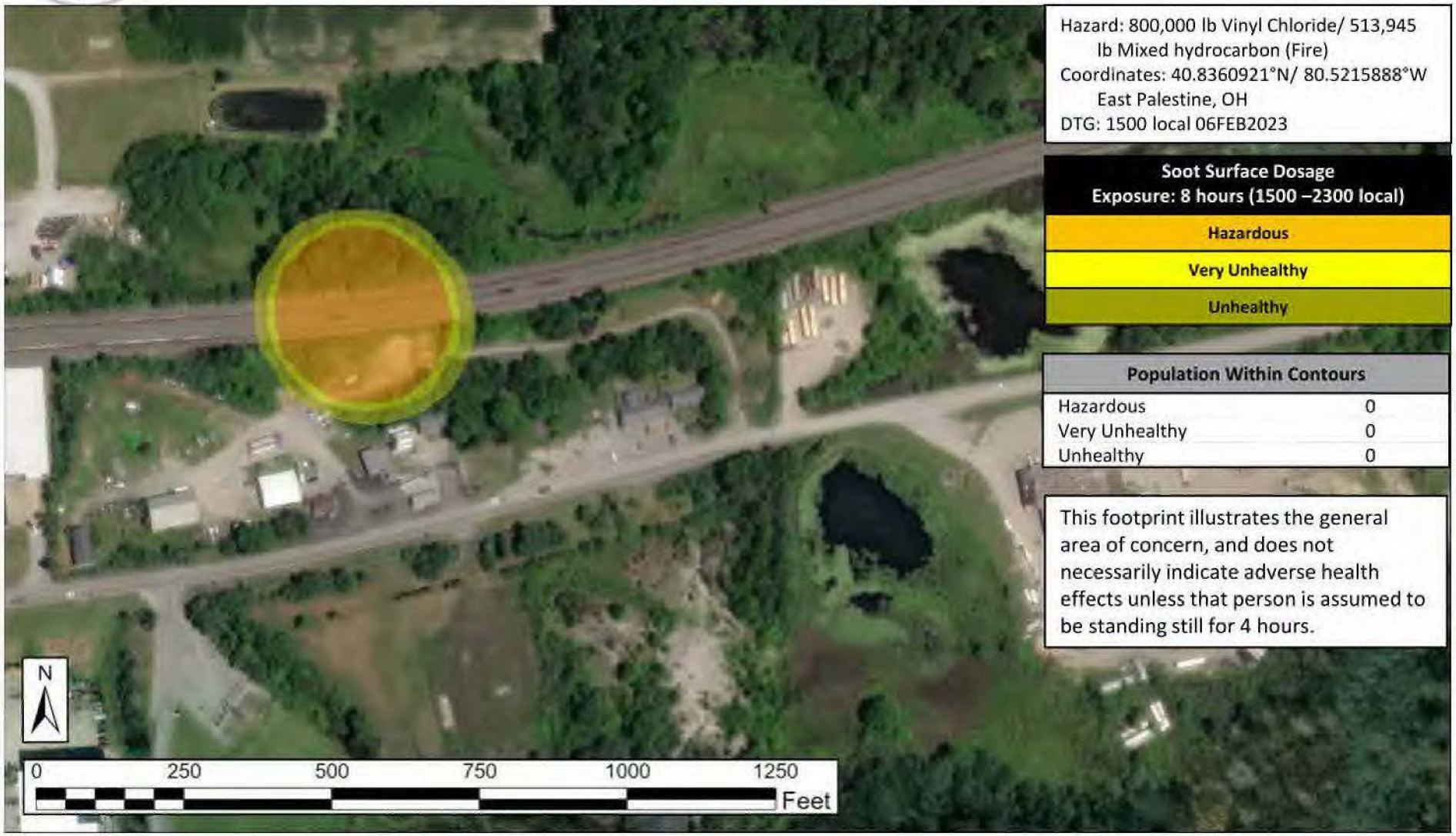
INTERIM AEGLs – represents the best efforts of the AEGL Committee to establish exposure limits, and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

AEGLs are developed by the EPA and represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. These levels are applicable to the general population including infants and children, and other susceptible individuals.

Published AEGL times are 10 min, 30 min, 1 hr, 4 hr and 8 hr. Using these published guidelines, DTRA developed HPAC to plot human effects in a time weighted manner that better estimates the AEGL effects. These effects use extrapolations for very short time exposures.

RFI 23-0081kU

Soot – Surface Dosage – 2300 local



Hazard: 800,000 lb Vinyl Chloride/ 513,945 lb Mixed hydrocarbon (Fire)
Coordinates: 40.8360921°N/ 80.5215888°W
East Palestine, OH
DTG: 1500 local 06FEB2023

Soot Surface Dosage
Exposure: 8 hours (1500 –2300 local)

- **Hazardous**
- **Very Unhealthy**
- **Unhealthy**

Population Within Contours	
Hazardous	0
Very Unhealthy	0
Unhealthy	0

This footprint illustrates the general area of concern, and does not necessarily indicate adverse health effects unless that person is assumed to be standing still for 4 hours.

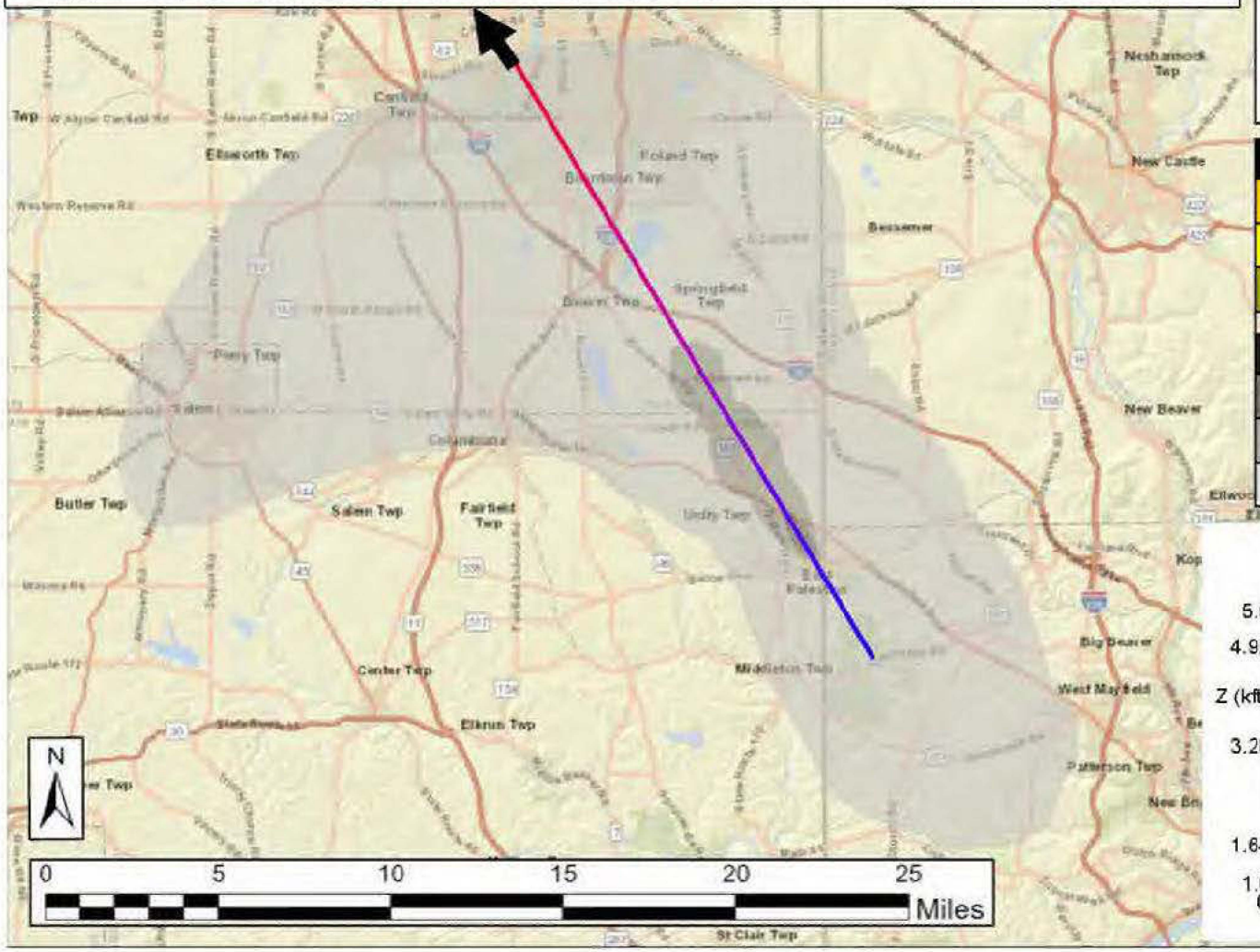
Soot – Surface Dosage

Value	Description
Hazardous	Serious aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; serious risk of respiratory effects in general population. Everyone should avoid all physical activity
Very Unhealthy	Significant aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; significant increase in respiratory effects in general population. People with heart or lung disease, older adults, and children should avoid all physical activity outdoors; everyone else should avoid prolonged or heavy exertion.
Unhealthy	Increased aggravation of heart or lung disease and premature mortality in people with cardiopulmonary disease and older adults; increased respiratory effects in general population. People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion; everyone else should reduce prolonged or heavy exertion.

Cumulative dosage values based on exposure to 2.5um particulate matter. Concentration values and descriptions taken from Pollutant-Specific Sub-indices and Health Effects Statements and Cautionary Statements for Guidance on the Air Quality Index tables, in Guidelines for Reporting of Daily Air Quality – Air Quality Index (AQI), USEPA, EPA-454/B-06-001, May 2006.

Soot – Vertical Profile – 2100 local

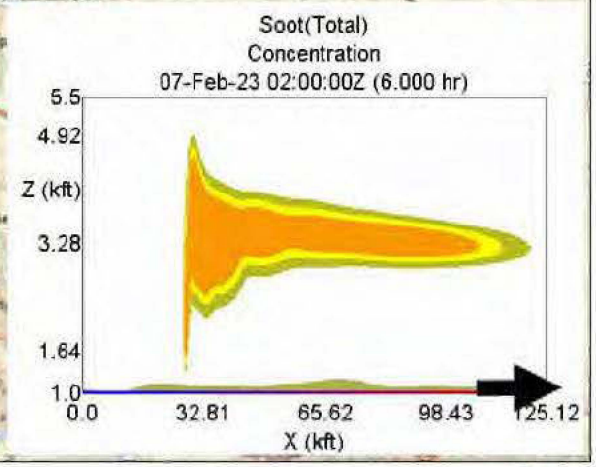
Gray plume represents a bird's eye view of the smoke cloud. Note: image is an snapshot, not a cumulative effect.



Hazard: 800,000 lb Vinyl Chloride/ 513,945 lb Mixed hydrocarbon (Fire)
Coordinates: 40.8360921°N/ 80.5215888°W
East Palestine, OH
DTG: 1500 local 06FEB2023

Soot Concentration @ 2100Z
Hazardous
Very Unhealthy
Unhealthy

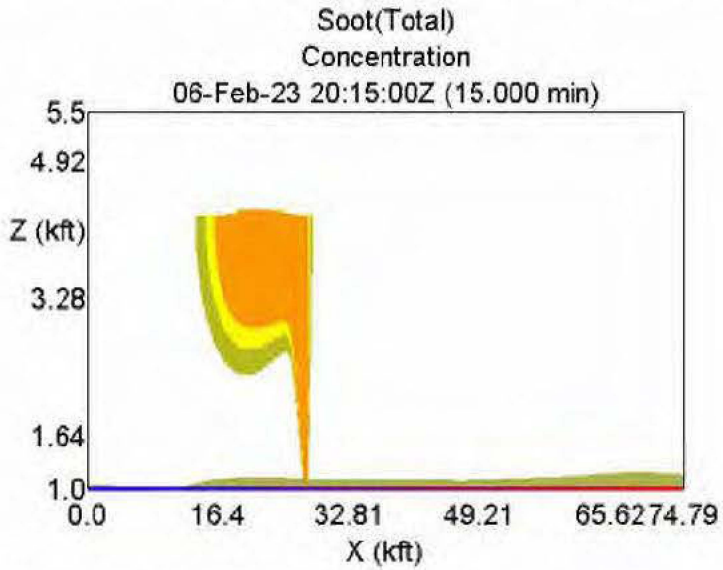
Light Transmittance
10%
50%
90%



Plume Height

- Reports[1] suggested the initial plume rose to a height of about 3,000 ft, and was the focus of multiple pictures both from the air and ground. Modeling results shown here depict a vertical cross-section of the soot plume at 15 min after the start of the burn, shown in feet above sea level.
- Modeled plume height is approximately 2500 - 4300 ft above ground level and therefore seems broadly consistent with reported plume heights. This provides some confidence that we are capturing the overall dynamics of the fire, with the caveat that neither the observed nor modeled heights are highly precise.

Soot concentration looking approx. SE from the burn location at 15 min after fire start

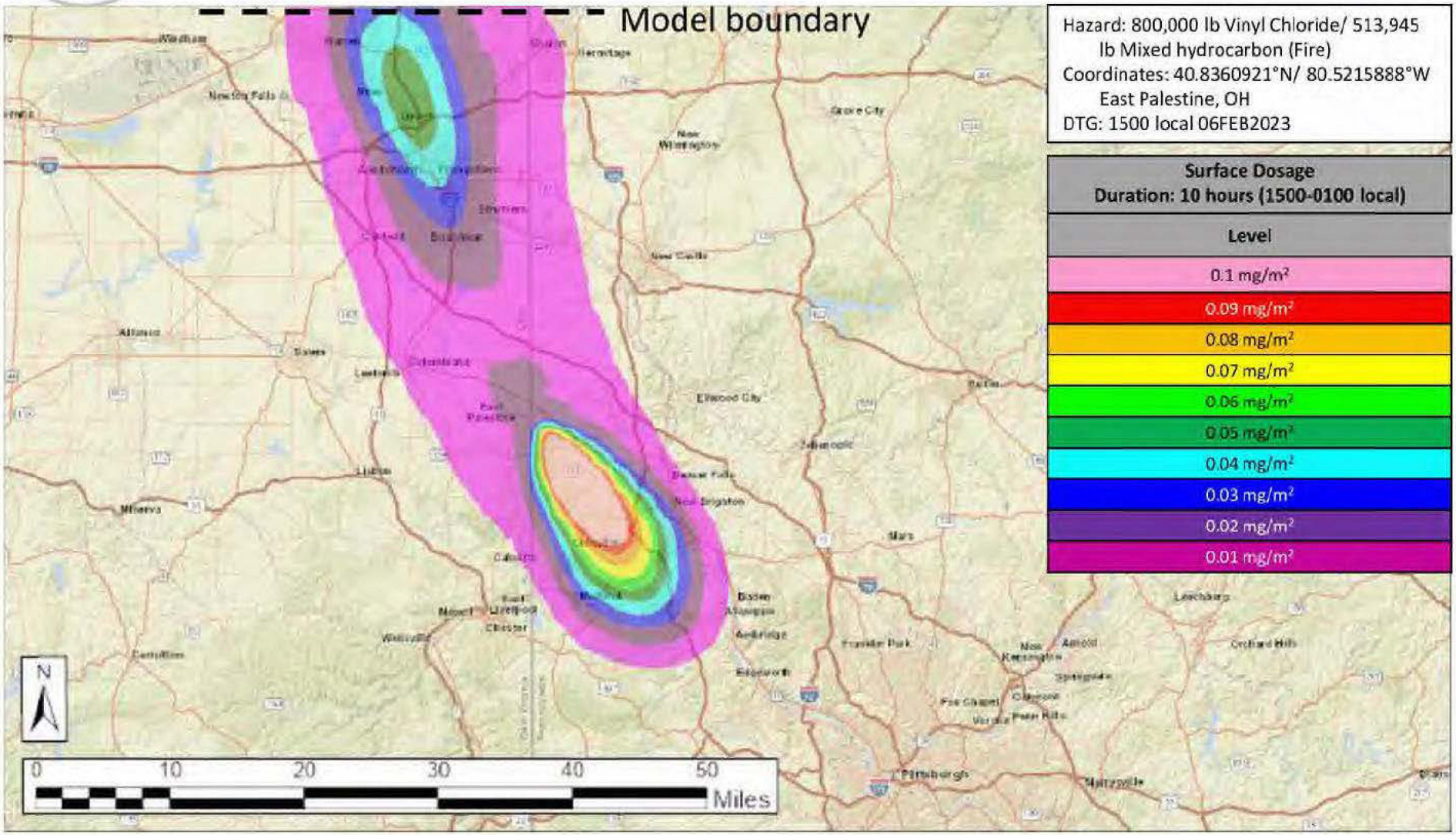


1. https://myfox8.com/weather/blog/how-an-inversion-layer-trapped-a-plume-of-toxic-chemicals-near-surface-in-ohio/

Soot Deposition

- Total soot deposition is plotted to demonstrate areas where soot is most likely to have settled. It does not imply any specific health effects, it should only be used as a guide for where soot is likely to have settled on the ground.
- Caveat: The settling rate of soot is highly dependent on its particle size. We do not have good information on the particle size distribution of this particular fire. Smaller or larger particles could settle in different patterns than indicated by this analysis.

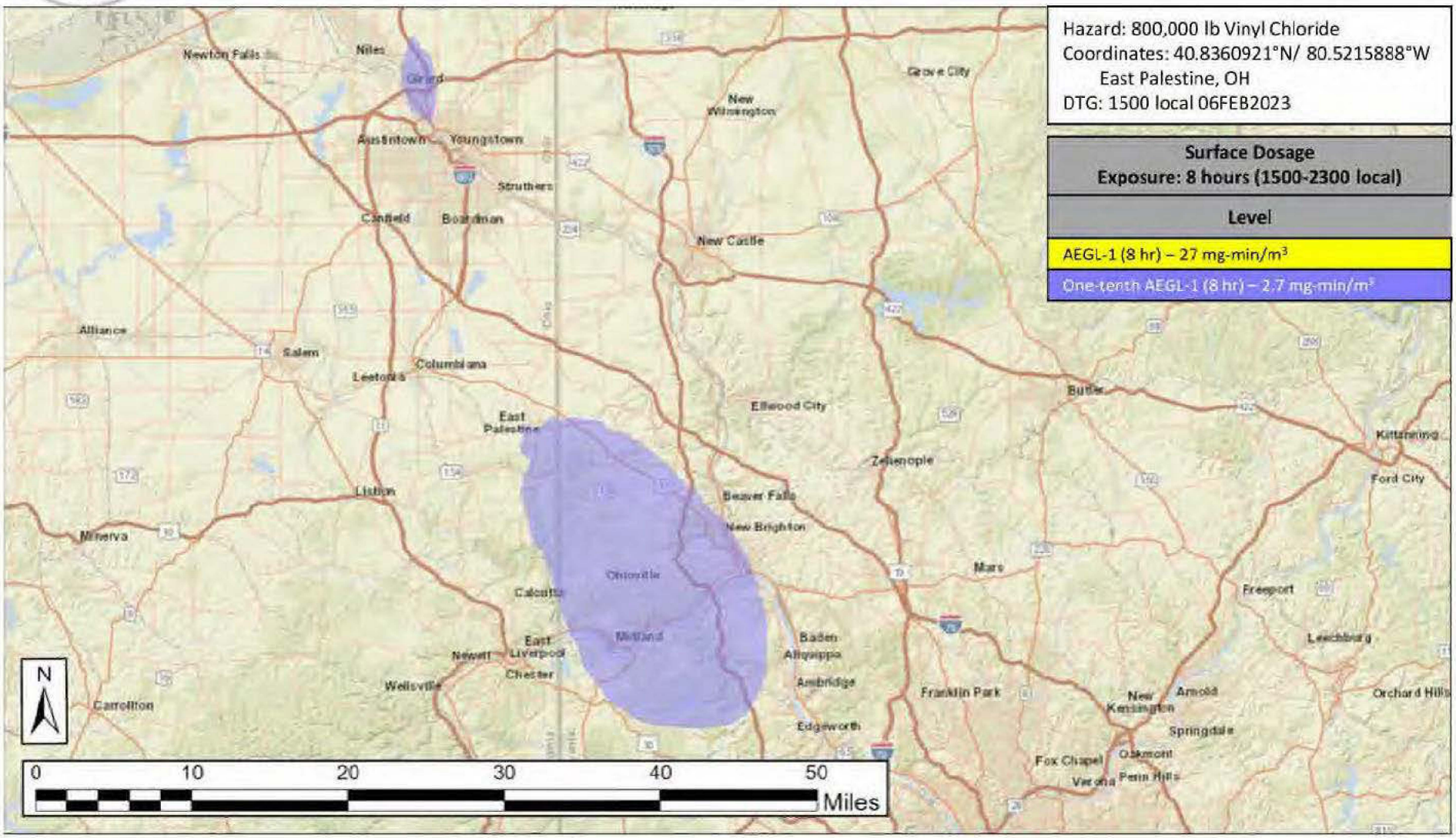
Soot Surface Deposition over 10 hours (1500 – 0100)



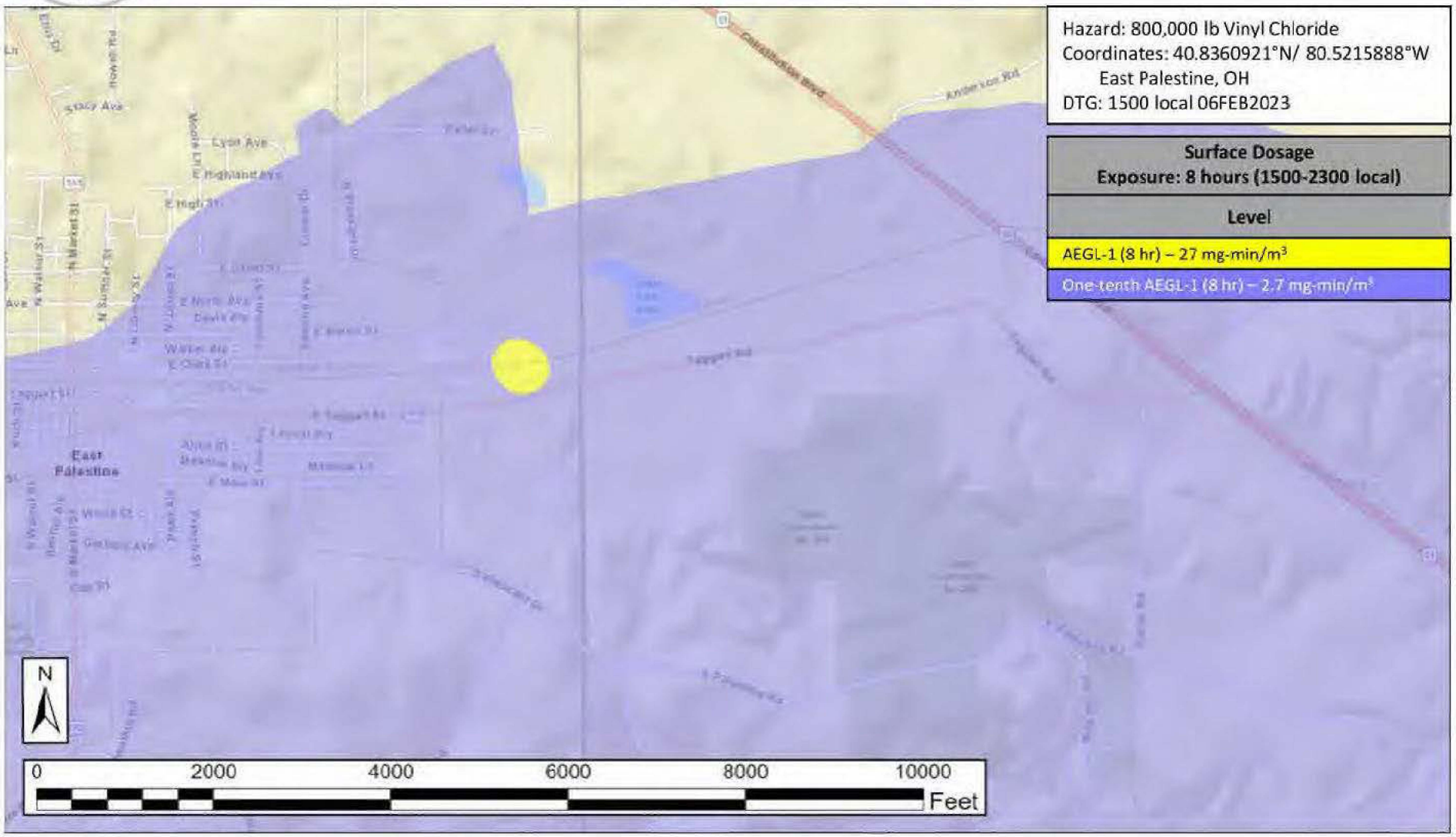
HCl Surface Dosage Plots

- Of the human effects, the HCl effects were by far the highest (again, see the caveats about synergistic effects and assumptions about chemical amounts).
- HCl has acute exposure guideline levels (AEGLs) prescribed, based on an airborne concentration level integrated over time (i.e., a dosage). The lowest level, AEGL-1, indicates threshold effects, which could be discomfort or irritation, but not life-threatening effects. The lowest AEGL-1 threshold is the 8 hour exposure, a dosage of about 27 mg*min/m^3.
  - The above dosage at ground level is plotted for multiple time points after the initiation of the controlled burn. This dosage level was only exceeded in the immediate proximity of the fire.
- **A level one-tenth of the lowest AEGL-1 is also plotted. People in this contour have an extremely low probability of effect**, but may be affected due to:
  - Particular sensitivity to the chemical(s)
  - Atmospheric or plume variability resulting in a much higher than average dose at that location
  - The synergistic effects of multiple chemicals may mean that a lower dosage threshold can result in effects.

Hydrogen Chloride – Surface Deposition– 2300 local (Far View)



Hydrogen Chloride – Surface Deposition– 2300 local (Near View)



DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details
* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure
* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

From: (b) (6)
Sent: Wed, 8 Mar 2023 08:16:03 -0500
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s

(b) (6)

I saw a previous email that FEMA LA may be taking care of this. Need to confirm. I've asked same question to IMAAC PM at FEMA.
We are pressing ahead just in case.
Todd

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt <dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

(b) (6)

I saw a previous email that FEMA LA may be taking care of this. Need to confirm. I've asked same question to IMAAC PM at FEMA.
We are pressing ahead just in case.
(b) (6)

-----Original Message-----

From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
<dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

From: (b) (6)
Sent: Wed, 8 Mar 2023 08:16:03 -0500
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s

(b) (6)
I saw a previous email that FEMA LA may be taking care of this. Need to confirm. I've asked same question to IMAAC PM at FEMA.
We are pressing ahead just in case.
Todd

-----Original Message-----

From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
<dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

From: (b) (6)
Sent: Wed, 8 Mar 2023 07:28:30 -0500
To: (b) (6)
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s
Importance: High

(b) (6)

Yes, we did all the modeling for the Ohio incident as part of the IMAAC.

(b) (6) - see below, need your approval. Also need to know if follow-on analyses for EPA should be considered.
(b) (6) once approved, collate appropriate products we did for IMAAC and send to (b) (6) and LA distro.

Thanks
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt <dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

(b) (6)

Yes, we did all the modeling for the Ohio incident as part of the IMAAC.

(b) (6) - see below, need your approval. Also need to know if follow-on analyses for EPA should be considered.
(b) (6) once approved, collate appropriate products we did for IMAAC and send to Steve and LA distro.

Thanks
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
<dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

From: (b) (6)
Sent: Wed, 8 Mar 2023 07:28:30 -0500
To: (b) (6)
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s
Importance: High

(b) (6)

Yes, we did all the modeling for the Ohio incident as part of the IMAAC.

(b) (6) - see below, need your approval. Also need to know if follow-on analyses for EPA should be considered.
(b) (6) - once approved, collate appropriate products we did for IMAAC and send to Steve and LA distro.

Thanks
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt <dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

(b) (6)

From: Lampela, Kyle M SES DTRA OI (USA)
Sent: Tue, 7 Mar 2023 14:24:54 -0500
To: Bonetti, Peter M Brig Gen USAF DTRA NE (USA); (b) (6) Kuliasha, Michael A SES DTRA RD (USA); (b) (6)
Cc: Cooper, Donald F SES DTRA OI (USA); (b) (6)
Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office
Attachments: smime.p7s

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From:
Sent: Tuesday, March 7, 2023 2:13 PM
To: Lampela, Kyle M SES DTRA OI (USA)
(b) (6)
Cc: Cooper, Donald F SES DTRA OI (USA) <(b) (6)
(b) (6)
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office

called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6)

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

[redacted]

[redacted]

DTRA JOC

703-767-2000/3

CUI

DDIR,

The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.

VR Kyle

-----Original Message-----
From: Doster, Travis W CIV DTRA OI (USA) <travis.w.doster.civ@mail.mil>
Sent: Tuesday, March 7, 2023 2:13 PM
To: [redacted] (b) (6)
[redacted] DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6)

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

DTRA JOC

703-767-2000/3

CUI

From: (b) (6)
Sent: Tue, 7 Mar 2023 14:24:54 -0500
To: (b) (6)

Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office

Attachments: smime.p7s

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 2:13 PM
To: (b) (6)
[redacted] DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously

provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6)

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

DTRA JOC

703-767-2000/3

CUI

From: (b) (6)
Sent: Tue, 7 Mar 2023 15:05:11 -0500
To: (b) (6)

Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office
Attachments: smime.p7s

Team,

This task, as all others coming from the Hill, should be managed by DTRA LA. As I understand it, we have not seen the actual task in writing and therefore cannot make a call where it should go. We need to ensure that Casey's office is properly managed through established process - which only LA is able to accomplish.

(b) (6) is prepped to manage this request. Please provide once received.

Thanks,

Amalie

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 2:25 PM
To: (b) (6)
; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>; (b) (6)

(b) (6) [redacted]

Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: (b) (6) [redacted]
Sent: Tuesday, March 7, 2023 2:13 PM
To: (b) (6) [redacted] DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to

them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6)

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

DTRA JOC

703-767-2000/3

CUI

Team,

This task, as all others coming from the Hill, should be managed by DTRA LA. As I understand it, we have not seen the actual task in writing and therefore cannot make a call where it should go. We need to ensure that Casey's office is properly managed through established process - which only LA is able to accomplish.

(b) (6) is prepped to manage this request. Please provide once received.

Thanks,

Amalie

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 2:25 PM

To: (b) (6) [redacted]

Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: (b) (6) [redacted]
Sent: Tuesday, March 7, 2023 2:13 PM
To: (b) (6) [redacted]

(b) (6) [redacted] DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6) [redacted]

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

[redacted]

[redacted]

DTRA JOC

703-767-2000/3

CUI

From: (b) (6)
Sent: Tue, 7 Mar 2023 15:05:11 -0500
To: (b) (6)
[redacted]
Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office
Attachments: smime.p7s

Team,

This task, as all others coming from the Hill, should be managed by DTRA LA. As I understand it, we have not seen the actual task in writing and therefore cannot make a call where it should go. We need to ensure that Casey's office is properly managed through established process - which only LA is able to accomplish.

(b) (6) is prepped to manage this request. Please provide once received.

Thanks,

(b) (6)

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Tuesday, March 7, 2023 2:25 PM
To: [redacted] (b) (6) [redacted]



Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: [redacted] (b) (6) [redacted]
Sent: Tuesday, March 7, 2023 2:13 PM
To: [redacted] (b) (6) [redacted]



DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6)

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6)

DTRA JOC

703-767-2000/3

CUI

From: (b) (6)
Sent: Tue, 7 Mar 2023 18:08:48 -0500
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: Sen Casey RFI / Modeling on Train Derailment
Attachments: DTRA_RFI_Form_FINAL.pdf, smime.p7s

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details
* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure
* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

From: (b) (6)
Sent: Tue, 7 Mar 2023 18:03:24 -0500
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: Sen Casey RFI / Modeling on Train Derailment
Attachments: DTRA_RFI_Form_FINAL.pdf, smime.p7s

(b) (6)

Senator Casey's office sent us the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." The Interagency Modeling and Atmospheric Assessment Center (IMAAC) falls under the auspices of FEMA, so I expect any product offered for release will need their concurrence. However, while DTRA did conduct modeling, I need to confirm whether it was actually done by IMAAC or by another DTRA element.

They are seeking a response by 1700 on 8 March. I expect this is to support a 9 March hearing on the matter before Senate Environment & Public Works where Senator Casey is a witness.
https://www.epw.senate.gov/public/index.cfm/hearings?ID=27D60C48-F310-4375-8616-B3CA87EBA01F

I will run the traps on our end, but am open to any guidance from you.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 5:15 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>; (b) (6)
Subject: RE: DTRA Request For Information (RFI) Form

(b) (6)

Thanks for reupping this.

Our form is attached. I limited the request to unclassified information that we could share in the hearing potentially, but if there is other information that would be helpful for our understanding but is CUI/FOUO, feel free to share and be clear that we should not use in the Senator's testimony.

Also, if you have questions - please reach out to (b) (6) whose contact info is in the form.

Thank you!

Sincerely,

(b) (6)

(b) (6)
National Security Legislative Aide
Senator Bob Casey (PA) | 202-224-5334

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Tuesday, March 7, 2023 4:50 PM
To: (b) (6)

DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: DTRA Request For Information (RFI) Form

Sir, just to verify that you have received the RFI request information for Senator Bob Casey (PA). We are standing by to ensure it goes through the proper channels for action.

-cc'd is our Legislative Affairs office.

Respectfully,

(b) (6)
Watch Officer
DTRA Joint Operations Center
(703) 767-2000 (DSN 427)
NSTS: 717-7208

NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil
JWICS: DTRA.OpsCenter@dtra.ic.gov

(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 1:55 PM
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>; (b) (6)
Subject: FW: DTRA Request For Information (RFI) Form

Thanks (b) (6)

Appreciate you getting back on this so quickly. Looping my colleague
(b) (6) here as well.

We will get back to you on this.

Sincerely,
(b) (6)

(b) (6)
National Security Legislative Aide
Senator Bob Casey (PA) | 202-224-5334

From: (b) (6)
Sent: Tuesday, March 7, 2023 1:49 PM
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: DTRA Request For Information (RFI) Form

Sir.

Please see attached RFI form.

Fill this out with as much information as possible and send back (reply all)
to this email address.

Thanks.

(b) (6)
Contractor support to DTRA IT-KT

Fort Belvoir (FBVA), VA
DTRA HQ (JOC)
Commercial: (703) 767-2116
dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
(b) (6)
[redacted]

DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details

* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure

* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details
* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure
* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

From: Zeitoun, Amalie E CIV DTRA DIR (USA)
Sent: Tue, 7 Mar 2023 20:05:11 +0000
To: Bonetti, Peter M Brig Gen USAF DTRA NE (USA); Hann, Todd A CIV DTRA R AND D (USA); Kuliasha, Michael A SES DTRA RD (USA); Urgese, Joseph J CIV DTRA DIR (USA); Shaw, Kimberly A CIV DTRA DIR (USA); Shyrigh, Brant C CSM USARMY DTRA DIR (USA); Williams, Rhys M SES DTRA DIR (USA)
Cc: Boyce, Georgina L CIV DTRA DIR (USA); Linton-Smith, Stephen A CIV DTRA DIR (USA); Mccann, Kevin J COL USARMY DTRA OI (USA); Hudnell, James A Col USAF DTRA OI (USA); Brady, Charles P CIV DTRA OI (USA); Nolan, Le E LtCol USMC DTRA OI (USA); Cannavo, Frank S Maj USMC DTRA OI (USA); Argo, Michael P CIV (USA); DTRA Ft Belvoir OI Mailbox Joint Ops Center; Phillips, Ford Christian Col USMC DTRA OI (USA); Jackson, Stephen J RDML USN DTRA OI (USA); Doster, Travis W CIV DTRA OI (USA)
Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office
Attachments: smime.p7s

Team,

This task, as all others coming from the Hill, should be managed by DTRA LA. As I understand it, we have not seen the actual task in writing and therefore cannot make a call where it should go. We need to ensure that Casey's office is properly managed through established process - which only LA is able to accomplish.

Steve Linton-Smith is prepped to manage this request. Please provide once received.

Thanks,

Amalie

-----Original Message-----
From: Lampela, Kyle M SES DTRA OI (USA) <kyle.m.lampela.civ@mail.mil>
Sent: Tuesday, March 7, 2023 2:25 PM
To: Bonetti, Peter M Brig Gen USAF DTRA NE (USA) <peter.m.bonetti.mil@mail.mil>; Linton-Smith, Stephen A CIV DTRA DIR (USA) <stephen.a.linton-smith.civ@mail.mil>; Kuliasha, Michael A SES DTRA RD (USA) <michael.a.kuliasha.civ@mail.mil>; Hann, Todd A CIV DTRA R AND D (USA) <todd.a.hann.civ@mail.mil>; Boyce, Georgina L CIV DTRA DIR (USA) <georgina.l.boyce.civ@mail.mil>; Urgese, Joseph J CIV DTRA DIR (USA) <joseph.j.urgese.civ@mail.mil>; Shyrigh, Brant C CSM USARMY DTRA DIR (USA) <brant.c.shyrigh4.mil@mail.mil>
Cc: Cooper, Donald F SES DTRA OI (USA) <donald.f.cooper3.civ@mail.mil>; Mccann, Kevin J COL USARMY DTRA OI (USA) <kevin.j.mccann2.mil@mail.mil>; Hudnell, James A Col USAF DTRA OI (USA) <james.a.hudnell.mil@mail.mil>; Brady, Charles P CIV DTRA OI (USA) <charles.p.brady.civ@mail.mil>; Nolan, Le E LtCol USMC DTRA OI (USA) <le.e.nolan.mil@mail.mil>; Cannavo, Frank S Maj USMC DTRA OI (USA) <frank.s.cannavo.mil@mail.mil>; Hann, Todd A CIV DTRA R AND D (USA) <todd.a.hann.civ@mail.mil>; Shaw, Kimberly A CIV DTRA DIR (USA) <kimberly.a.shaw.civ@mail.mil>; Argo, Michael P CIV (USA) <michael.p.argo.civ@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>; Phillips, Ford

Christian Col USMC DTRA OI (USA)
<ford.c.phillips.mil@mail.mil>; Jackson, Stephen J RDML USN DTRA OI (USA)
<stephen.j.jackson2.mil@mail.mil>; Doster, Travis W CIV
DTRA OI (USA) <travis.w.doster.civ@mail.mil>
Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: Doster, Travis W CIV DTRA OI (USA) <travis.w.doster.civ@mail.mil>
Sent: Tuesday, March 7, 2023 2:13 PM
To: Lampela, Kyle M SES DTRA OI (USA) <kyle.m.lampela.civ@mail.mil>; Jackson, Stephen J RDML USN DTRA OI (USA) <stephen.j.jackson2.mil@mail.mil>; Phillips, Ford Christian Col USMC DTRA OI (USA) <ford.c.phillips.mil@mail.mil>
Cc: Cooper, Donald F SES DTRA OI (USA) <donald.f.cooper3.civ@mail.mil>; Mccann, Kevin J COL USARMY DTRA OI (USA) <kevin.j.mccann2.mil@mail.mil>; Hudnell, James A Col USAF DTRA OI (USA) <james.a.hudnell.mil@mail.mil>; Brady, Charles P CIV DTRA OI (USA) <charles.p.brady.civ@mail.mil>; Nolan, Le E LtCol USMC DTRA OI (USA) <le.e.nolan.mil@mail.mil>; Cannavo, Frank S Maj USMC DTRA OI (USA) <frank.s.cannavo.mil@mail.mil>; Hann, Todd A CIV DTRA R AND D (USA) <todd.a.hann.civ@mail.mil>; Shaw, Kimberly A CIV DTRA DIR (USA) <kimberly.a.shaw.civ@mail.mil>; Argo, Michael P CIV (USA) <michael.p.argo.civ@mail.mil>; DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to

them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

(b) (6) [redacted]

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

(b) (6) [redacted]

[redacted]

[redacted]

DTRA JOC

703-767-2000/3

CUI

From: (b) (6)
Sent: Tue, 7 Mar 2023 23:08:48 +0000
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: Sen Casey RFI / Modeling on Train Derailment
Attachments: DTRA_RFI_Form_FINAL.pdf, smime.p7s

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,

(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details
* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure
* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

From: (b) (6)
Sent: Tue, 7 Mar 2023 23:03:24 +0000
To: (b) (6)
Cc: [redacted]; DTRA Ft Belvoir DIR List LA Govt
Subject: Sen Casey RFI / Modeling on Train Derailment
Attachments: DTRA_RFI_Form_FINAL.pdf, smime.p7s

(b) (6)

Senator Casey's office sent us the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." The Interagency Modeling and Atmospheric Assessment Center (IMAAC) falls under the auspices of FEMA, so I expect any product offered for release will need their concurrence. However, while DTRA did conduct modeling, I need to confirm whether it was actually done by IMAAC or by another DTRA element.

They are seeking a response by 1700 on 8 March. I expect this is to support a 9 March hearing on the matter before Senate Environment & Public Works where Senator Casey is a witness.
https://www.epw.senate.gov/public/index.cfm/hearings?ID=27D60C48-F310-4375-8616-B3CA87EBA01F

I will run the traps on our end, but am open to any guidance from you.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 5:15 PM
To: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>; (b) (6)
Subject: RE: DTRA Request For Information (RFI) Form

(b) (6)

Thanks for reupping this.

Our form is attached. I limited the request to unclassified information that we could share in the hearing potentially, but if there is other information that would be helpful for our understanding but is CUI/FOUO, feel free to share and be clear that we should not use in the Senator's testimony.

Also, if you have questions - please reach out to (b) (6) whose contact info is in the form.

Thank you!

Sincerely,

(b) (6)
(b) (6)
National Security Legislative Aide
Senator Bob Casey (PA) | 202-224-5334

-----Original Message-----
From: DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Sent: Tuesday, March 7, 2023 4:50 PM
To: (b) (6)
DTRA Ft Belvoir OI Mailbox Joint Ops Center
<dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: RE: DTRA Request For Information (RFI) Form

Sir, just to verify that you have received the RFI request information for Senator Bob Casey (PA). We are standing by to ensure it goes through the proper channels for action.

-cc'd is our Legislative Affairs office.

Respectfully,

(b) (6)
Watch Officer
DTRA Joint Operations Center
(703) 767-2000 (DSN 427)
NSTS: 717-7208

NIPR: dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
SIPR: dtra.belvoir.oi.mbx.joint-operations-center@mail.smil.mil
JWICS: DTRA.OpsCenter@dtra.ic.gov

(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 1:55 PM
To: (b) (6)
Subject: FW: DTRA Request For Information (RFI) Form

Thanks (b) (6)

Appreciate you getting back on this so quickly. Looping my colleague (b) (6) here as well.

We will get back to you on this.

Sincerely,
(b) (6)

(b) (6)
National Security Legislative Aide
Senator Bob Casey (PA) | 202-224-5334

From: (b) (6)
Sent: Tuesday, March 7, 2023 1:49 PM
To: (b) (6)
Cc: DTRA Ft Belvoir OI Mailbox Joint Ops Center <dtra.belvoir.oi.mbx.joint-ops-center@mail.mil>
Subject: DTRA Request For Information (RFI) Form

Sir.

Please see attached RFI form.

Fill this out with as much information as possible and send back (reply all) to this email address.

Thanks.

(b) (6)
Contractor support to DTRA IT-KT

Fort Belvoir (FBVA), VA
DTRA HQ (JOC)
Commercial: (703) 767-2116
dtra.belvoir.oi.mbx.joint-ops-center@mail.mil
(b) (6)
[redacted]

DTRA Joint Operations Center – Support Request

(877) 240-1187 or
(703) 767-2003; DSN 427

dtra-joc@mail.mil
dtra-joc@mail.smil.mil

Requestor Details
* *required field*

Type of Support:

Situational Awareness

Name of Operation or Exercise:

* Classification:

Unclassified

CUI Specified Categories // Limited Dissemination:

CUI References: DoD Registry (Category) | National Registry (Category) | National Registry (Marking) | National Registry (Marking) PDF | National Registry (Dissemination) | Country Trigraph Codes

* Command or Organization/Office Requesting

Senator Bob Casey's Office

If you are a DTRA Office submitting a request for another Organization, enter your DTRA Organization. (*Identify Office Symbol this is in support of or for coordination with, i.e. "J3BPC supporting ARNORTH"):*

* Requestor Rank/Name:

(b) (6)

Requestor Position:

Requestor Phone: What type of phone number? (SVOIP/DSN/COMMERCIAL(include area code)/TSVOIP)

(b) (6)

* Requestor E-mail:

(b) (6)

Foreign Disclosure
* *required field (If "Yes" is marked for the below question, please be sure to fill out the required section below* ***"FOREIGN DISCLOSURE"***

* Will product be disclosed to a foreign entity (Including visual presentation (ex. briefings):

Yes

* Request Date:

Mar 7, 2023

* Latest Date and Time to Receive a Response of Value:

Mar 8, 2023

* Zulu-24hr Clock:

1700

*Submit RFI to:

J9 CBRNE Reachback/CBRNE Modeling Request

* Incident Date:

Feb 3, 2023

* Incident Time (Zulu -24hr Clock):

2100

Coordinates Type:

Decimal Degrees

Input Coordinates:

40.8340, -80.5404

BE Number:

O-Suffix (required when BE Number is entered)

Chemical

Vinyl Chloride

Biological

Radiological

Explosive

Hazard Agent Description (When Hazard type or Agent is Not Listed):

Mass of Hazard Agent:

Units

Weapon Type/Delivery System:

Weather

User Defined Weather (*required if User Specified has been selected):*

* Specifics of Request:

Senator Casey's office is reaching out to request copies of plume models and/or maps related to the train derailment that occurred on February 3, 2023 in East Palestine, Ohio. Our office has been informed that I-MAAC under DTRA is leading modeling efforts for this incident. Our team is working to understand the full extent of the plum from the controlled burn and any or all impacted regions, particularly as it relates to Darlington Township, PA.

* Audience (Names or Level of Leadership):

Senator Bob Casey

Format of Response:

MS Office Product (PPT,XLXS,DOC)
Image/Graphic
Mapping/GIS Product (SHP (ESRI), KML (Google Earth)
MPTk Casualty File

Desired Length of Response:

Additional comments regarding format:

* Send Response via:

NIPRNET

FOREIGN DISCLOSURE

*** *Required Fields for Foreign Disclosure***

* PROPOSED DISCLOSURE IS FOR THE FOLLOWING COUNTRY(IES) / GOVERNMENT COMPONENT(S):

Public

* WHERE AND WHEN WILL THE DISCLOSURE TAKE PLACE?: (Event Date/Time, *Event type, Event name, Venue e.g. visit, conference, meeting/location)*

Public hearing

* IDENTIFY APPLICABLE INTERNATIONAL AGREEMENT(S) THAT SUPPORT THIS REQUEST:

NA

Master Information Exchange Agreement (MIEA), Information Exchange Annex (IEA), Data Exchange Agreement (DEA), Project Arrangement Agreement (PA), If using another DoD element's agreement, identify Title/Number/Date.

* IDENTIFY APPLICABLE DELEGATION OF DISCLOSURE AUTHORITY LETTER (DDL) THAT SUPPORTS THIS REQUEST:

NA

If using another agency's DDL, include:
DoD Element
Name/phone number of the Technical Project Officer (TPO) / Project Officer (PO)
Title/DDL Number/ DDL Date/ Expiration Date

* PROVIDE STATEMENT THAT PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. FOREIGN POLICY AND NATIONAL SECURITY OBJECTIVES CONCERNING THE PROPOSED RECIPIENT GOVERNMENT:

NA

Examples:
The recipient government cooperates with the U.S. in pursuing military and political objectives that are compatible with those of the U.S.
A specific U.S. national purpose, diplomatic or military, will be served.
The information will be used in support of mutual defense and security objectives

* PROVIDE STATEMENT THAT THE PROPOSED DISCLOSURE IS CONSISTENT WITH U.S. MILITARY AND SECURITY OBJECTIVES:

NA

Example:
Disclosure of advanced technology, if compromised, will not constitute an unreasonable risk to the U.S. position in military technology and operational capabilities, regardless of the intended recipient; the proposed disclosure reflects the need for striking a proper balance between pursuit of our mutual defense and foreign policy objectives on the one hand and the preservation of the security of our military secrets on the other.

* PROVIDE STATEMENT THAT THE INFORMATION, IF RELEASED, WILL BE TRANSFERRED THROUGH ESTABLISHED GOVERNMENT-TO-GOVERNMENT CHANNELS:

NA

(Identify channels to be used)

* PROVIDE JUSTIFICATION THAT THE PROPOSED DISCLOUSRE WILL RESULT IN A CLEARLY DEFINED BENEFIT TO THE U.S. AT LEAST EQUIVALENT TO THE VALUE OF THE INFORMATION DISCLOSED:

Helps inform the American people.

Submit by Email

From: (b) (6)
Sent: Wed, 8 Mar 2023 12:28:30 +0000
To: (b) (6)
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s
Importance: High

(b) (6)

Yes, we did all the modeling for the Ohio incident as part of the IMAAC.

(b) (6) see below, need your approval. Also need to know if follow-on analyses for EPA should be considered.
(b) (6) once approved, collate appropriate products we did for IMAAC and send to (b) (6) and LA distro.

Thanks
(b) (6)

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt <dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

From: (b) (6)
Sent: Wed, 8 Mar 2023 13:16:03 +0000
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt
Subject: RE: Sen Casey RFI / Modeling on Train Derailment
Attachments: smime.p7s

(b) (6)

I saw a previous email that FEMA LA may be taking care of this. Need to confirm. I've asked same question to IMAAC PM at FEMA.
We are pressing ahead just in case.
Todd

-----Original Message-----
From: (b) (6)
Sent: Tuesday, March 7, 2023 6:09 PM
To: (b) (6)
Cc: DTRA Ft Belvoir DIR List LA Govt <dtra.belvoir.dir.list.la-govt@mail.mil>
Subject: Sen Casey RFI / Modeling on Train Derailment

(b) (6)

Senator Casey's office sent DTRA the attached inquiry seeking modeling conducted on the train derailment in Ohio. The specific ask was for modeling conducted by "IMAAC under DTRA." As such, I had two questions:

(1) Was the modeling conducted by IMAAC or was it another DTRA element?
(2) If it was IMAAC, would you be able to clear it through FEMA?

They are seeking a response by 1700 on 8 March, so we will have to move rather quickly.

Thanks,
(b) (6)

(b) (6)
Legislative Liaison
Defense Threat Reduction Agency
(b) (6)

From: (b) (6) [redacted])
Sent: Tue, 7 Mar 2023 19:24:54 +0000
To: (b) (6) [redacted]
Subject: RE: Tier 1 RFI -- Senator Casey (PA) Office
Attachments: smime.p7s

DDIR,
The JOC received a request from Sen Casey's office (PA) for modelling of the recent East Palestine train derailment. DTRA is not the appropriate agency to answer this RFI and the JOC is in contact with FEMA who has agreed to work it. Given the visibility and implications of this request, I wanted to ensure you are tracking. No action required by Sr leadership at this time, just SA.
VR Kyle

-----Original Message-----
From: (b) (6) [redacted]
Sent: Tuesday, March 7, 2023 2:13 PM
To: (b) (6) [redacted]
Subject: Tier 1 RFI -- Senator Casey (PA) Office

CUI

Gentlemen,

(CUI) At ~1330 today (07 Mar), an aide form Senator Casey's (PA) office

called the JOC and requested analysis of potential toxicity/spread which may have resulted from the recent train derailment IVO the Ohio/Pennsylvania border. Desired suspense for the deliverable is tomorrow (08 Mar). I informed the requestor that for this particular request, DTRA would likely defer to DHS/FEMA/EPA for such analysis, but that we had conducted some analysis when the incident initially occurred which fed IMAAC. We provided them contact information and links to the DTRA Legislative Affairs team and the RFI form; currently standing by to receive the official RFI.

We have contacted FEMA and informed them of the incoming request. When the JOC receives the official request, FEMA has agreed for us to forward it to them and they will respond to the Senator's office via their Congressional liaison office, which will likely include the analysis DTRA previously provided, unless DTRA and/or OI leadership prefer otherwise.

I've cc'd RD Technical Reachback, Legislative Affairs, and the DHS LNO so everyone is on the same page.

Mr. Travis Doster

Chief, Current Operations Branch

Defense Threat Reduction Agency (DTRA)

Open: (b) (6)

NSTS: (b) (6)

(b) (6)

DTRA JOC

(b) (6)

CUI