Black Sky Preparedness &
"Operation Blue Flame" Exercise Series
2025 Pipeline Safety Seminar

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Introduction

Derek Ruhl
Lead Emergency Agency Representative (AREP)
PA Public Utility Commission (PUC)
717-787-7904
druhl@pa.gov

Disclaimer

- This presentation and the opinions expressed do not necessarily represent those of the Commission, or any of the Commissioners.

Black Sky Event (BSE) Definition

- Black Sky Events (BSE) are defined as extraordinary and hazardous events that produce large-scale power outages, sometimes on a regional (multi-state) level, that last significantly longer than typical weather or operational outages and may have cascading impacts on other critical infrastructure sectors

- BSEs can be caused by electromagnetic pulse events (EMP)s, severe cyberattacks, severe weather events, severe solar flares, or physical attacks

- Hurricane Maria in Puerto Rico is an example of a very damaging, long-duration BSE

Black Sky Events

- During a BSE, it will be most urgent to reconstitute the backbone infrastructures for the lifeline utilities such as communications, energy systems, transportation, water and wastewater systems
- Functional utility restoration is necessary for the eventual restoration of customers
- These are not electric restoration plans – these are backbone functional restoration plans

Black Sky Steering Committee (BSSC)

- Through the Black Sky Steering Committee (BSSC), the Commonwealth has been having semi-annual meetings since 2017 to discuss the anticipated concerns, challenges, and priorities that would need to be addressed during a BSE event
- The BSSC is comprised of representatives from the various utility sectors and state and federal agencies
- The BSSC has (4) lifeline sector workgroups: Water/Wastewater; Energy; Communications; and Transportation
- The workgroups are mostly led by senior private sector subject matter experts and the transportation WG is led by PennDOT

Black Sky Event (Assumptions)

The main purpose of the BSSC is to plan for the following two assumptions:

- (1) Conventional communications systems such as email, landline, cellular, and satellite phones are disrupted or severely degraded for several days or weeks

- (2) Electrical generation, transmission, and distribution capacity is extremely limited in a region of the Commonwealth

Black Sky Event (Objectives)

Based off assumption #1, the BSSC and its workgroups are planning for the following objectives:

- (1) What responsible independent actions are taken and by whom? Where do they report and within what timeframe? Who are they communicating with and how?
- (2) Identify facilities or components of critical infrastructure in the affected lifeline sectors that need to be communicated to or that need to have situational awareness of so that a common operating picture of the backbone systems can be established

Black Sky Event (Objectives)

Based off assumption #2, the BSSC and its workgroups are planning for the following objectives:

- Given the limited electricity capacity, identify the critical backbone infrastructure in your sector that could provide a baseline of service and determine whether those sites have backup power or could support a backup generator

Black Sky Event (Objectives)

Based off assumption #2, the BSSC and its workgroups are planning for the following objectives:

- Identify critical infrastructure in your sector that supports the backbone infrastructure of other lifeline sectors
- Develop tiered lists and crosswalk all critical customers with all planning stakeholders
- Identify and leverage existing interdependency lists, research, tools, and technology being developed that relates to all workgroups

Black Sky Event (Common Priorities)

- Based off the BSSC meetings, the two primary concerns identified for initial response were communications and access to fuel (for backup generation and transportation)
- The BSSC is beginning to develop Primary, Alternate, Contingency, and Emergency (PACE) communication plans
- In partnership with PEMA, we hope to have a draft ***integrated*** PACE concept by the end of 2026

PACE Communications (Examples)

- P – Primary (cell phone)
- A – Alternate (land line or Teams call)
- C – Contingency (radio)
- E – Emergency (responsible independent action)

Summary of BSSC Goals

- Participate in exercises
- Develop interdependency lists
- Develop fuel priorities
- Emergency communication methods (PACE)
- Coordinate restoration priorities
- Maintain a secure document repository

Summary of Goals

- Potentially develop policy recommendations
- Maintain a Black Sky Event Conference Call Procedure

Operation Blue Flame Exercise Series

Background

- The prevalence of natural gas in our society has caused the PUC to conduct an annual Operation Blue Flame tabletop exercise (TTX)
- The PUC's Bureau of Technical Utility Services (TUS) plans and facilitates the annual exercises
- There have been six exercises to date (2018 was the first)
- The exercise target audience rotates between state agencies and the Natural Gas Distribution Companies (NGDC)s

Operation Blue Flame Exercise Series

Background

- TUS realizes there's a gap in natural gas emergency "awareness" in many state agencies and local and county emergency management agencies (EMAs)
- The NGDC-focused exercises have gas company operationally-focused discussions
- The state agency-focused exercises focus on gas shutoff and safety relight processes and large gas emergency response aspects and human needs impacts
- Each annual TTX solicits the assistance of a 'partner NGDC' to assist with scenario development and to provide 'vignettes' during the exercise (senior company execs usually attend as well)

Operation Blue Flame Exercise Series

Background

- Select county EMAs, as well as select federal and state agencies are invited to each TTX
- To date, the exercise scenarios have varied from over-pressurizations; safety-related shutdowns; explosions caused by defective equipment; and intentional sabotage
- To maximize the cascading impacts, each hypothetical scenario has occurred during a cold weather snap
- Scenarios have varied from customer areas as large as multiple counties of the state to a single county

Operation Blue Flame Exercise Series

Background

- To date, the NGDCs who have partnered in this effort are Columbia, Peoples, UGI, PECO, and PGW
- The discussions are “non-regulatory” and intended to be for learning purposes only
- At the conclusion of the exercises, TUS develops an After-Action Report (AAR) with general recommendations
- The AARs are used to inform the development of future exercises

Operation Blue Flame Exercise Series

Exercise Attendees

- The attendees have varied, and the scenario each year will dictate the invitees
- Past attendees: NGDCs; PJM; Transmission Pipelines; US DOE; FBI; American Red Cross; PA Dept. of Aging; PA Dept. of Labor & Industry; Dept. of Community & Economic Develop; PA Dept. of Agriculture; PA. Dept. of Corrections; PA Office of Administration; PennDOT; DEP; PSP; Gov's Office of Homeland Security; PA Dept. of Education; PA Army National Guard; PA Dept. of Health; PA Dept. of Human Services; county emergency management agencies; Philadelphia Police Dept.; Delaware Valley Intelligence Center

Operation Blue Flame Exercise Series

Summary of Exercises

- 2018 – UGI - Compressor Station Explosion (PEMA – Harrisburg)
- 2019 – Columbia & UGI (Training for State Agencies at PEMA)
- 2021 – Peoples'- Overpressurization Affecting Southside (Pittsburgh)
- 2022 – PECO – Outage Affecting SE PA (PEMA – Harrisburg)
- 2023 – PGW – Sabotage Incident in Phila. (Philadelphia)
- 2024 – UGI – Transmission Line Outage (Shippensburg University)
- 2025 – Columbia (State College)

Operation Blue Flame Exercise Series

Outcomes & After Action Lessons Learned

- Each TTX documents participant feedback and recommendations for improvement
- Enhance understanding of impacts to other industries
- Expand pre-exercise gas company trainings
- For a very large gas outage, sheltering ops could be even more critical
- Large gas outages can negatively impact the sheltering system, since many shelters have gas service too

Operation Blue Flame Exercise Series

Outcomes & After Action Lessons Learned

- State agency COOP plans have been improved
- State and local emergency management organizations have been educated on gas emergency response
- Many counties still need to be included in future trainings
- There is a greater state and local agency awareness of the cascading impacts and importance of gas to critical infrastructure
- Hospitals, nursing homes, and correctional institutes will shelter-in-place if they can avoid transporting patients to different facilities

Operation Blue Flame Exercise Series

Outcomes & After Action Lessons Learned

- There is no effective way to prioritize every critical customer restoration for a large-scale, long-duration gas outage
- NGDCs should work closely with EMAs for planning and emergencies (coordinate critical customer lists and emergency response plans)
- Commonwealth agencies and PEMA would be available to assist the impacted populations with resources

Operation Blue Flame Exercise Series

Outcomes & After Action Lessons Learned

- A large-scale, long-duration gas outage could impact workplaces and the ability for many public and private sector employees to telework
- A large-scale gas transmission line disruption would adversely impact the supply of natural gas for electrical generation and could consequently impact the reliability of the grid
- Public messaging is vitally important during a large gas outage/emergency

Questions

Derek Ruhl
Lead Emergency Agency Representative (AREP)
PA Public Utility Commission (PUC)
(Electric, Water, Telco Reportable Emergencies)
717-787-7904
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