ABSTRACT
This Fuels Sub-Sector Black Sky Guidebook reflects collective input from numerous partners, as well as operational industry technical personnel. This Guidebook is a recommended framework for planning resilience investments, disaster response, restoration and recovery activities. It represents the planning and cross-sector coordination needed for long duration, multi-region power outages that may result in cascading, severe adverse impact to the fuels sub-sector and other critical infrastructures. This peer-reviewed document is designed as a resource for lifeline infrastructure owners and operators when addressing critical Black Sky resilience needs.

David L. Miller
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This Fuels Sub-Sector Black Sky Guidebook is published in significant part using the work of the American Petroleum Institute and its partnering organizations in the development of the “Oil and Natural Gas, Industry Preparedness Handbook ¹

American Gas Association

NATSO

American Fuel and Petrochemical Manufacturers

Petroleum Marketers Association of America

International Liquid Terminals Association

SIGMA - Aldrich

Interstate Natural Gas Association Of America

¹ Oil and Natural Gas Industry Preparedness Handbook Ver. 2.0, Sept. 30, 2013, American Petroleum Institute
Role of the EPRO Fuels Sub-Sector Black Sky Guidebook

This Guidebook is designed to provide an evolving framework for recommended guidelines to manage risks of long duration, over multiple regions associated with emerging “Black Sky” hazards.

This Guidebook will be consistently updated and reviewed using the EPRO Fuels Subsector Steering Committee process through consultation with critical infrastructure professionals and managers. This guidebook contains the latest consolidated school of thought on the unique challenges posed by wide area, long duration, severe adverse impacts to critical and supporting infrastructures. It provides guidelines to help individual entities strengthen their resilience measures, develop focused operational plans and assess external support needed to address these severe hazard scenarios.

Background


For purposes of this Guidebook, the terms “Fuels Sub-Sector” and “Fuels Infrastructure” will be used to describe a sub-element of the Energy Sector as defined in PPD-21. While presently focused primarily on the Oil and Natural Gas infrastructures, in future iterations of this Guidebook the Fuels Sub-Sector will be inclusive of other fuels infrastructures including but not limited to renewable and nuclear fuels.

In September 2013 the American Petroleum Institute produced a guide entitled the *Oil and Natural Gas Industry Preparedness Handbook*. In the *Introduction to the Oil and Natural Gas Strategy*, the authors stated:

“The oil and natural gas industry has created the following strategy document to ensure that roles, responsibilities and needs are clearly identified prior to any events that may affect the integrity of oil and natural gas systems. The oil and natural gas industry has long maintained and been acknowledged for its serious commitment to the safety of infrastructure, workers and processes. Disruptive events, whether manmade or natural, should be approached with the commitment to the safety, resilience and the needs of the community. Therefore, the following strategy approaches preparedness and response from the local level, acknowledging that events impact workers, businesses and communities first and foremost. While resources and information are often held at the regional or national level, it is the facility operators and those on the ground who will have the best ability to assess their systems, identify needs, and execute the work needed to restore services. This strategy lays out how local responses can be aided by State and regional associations, established relationships with governments and communities, and how corporate and federal relationships and capabilities can facilitate efficient response and recovery at the local level.”
This EIS Council Fuels Sub-Sector Black Sky Guidebook is designed to expand upon the significant and meaningful work already completed by the Oil and Natural Gas (ONG) Industry as reflected in their handbook. The information provided by the industry and authors of the handbook will be placed within the context of a catastrophic Black Sky event, expanding the strategies for resilience and mitigation investments, describing the notable differences between a relatively normal disaster response and response to a catastrophic event or an event that threatens national security, and expanding the strategies for short term restoration of services and longer term recovery. This playbook will also discuss the interdependencies between the Oil and Natural Gas Industry and other lifeline infrastructures, sectors and sub-sectors, such as Electric, Water and Wastewater, Transportation, and Communications.

In 2017 the EIS Council recognized the need to broaden the discussion of the role of critical fuels beyond the ONG industry to be inclusive of the roles that may be played by the renewable fuels (i.e., biofuels, solar energy) and the nuclear fuels industries.

**Fuels Sub-Sector Black Sky Environment**

*A Catastrophic Incident*, as defined by the National Response Framework (NRF) is any natural or manmade incident, including terrorism that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale and/or government functions. A catastrophic incident could result in sustained nationwide impacts over a prolonged period of time; almost immediately exceeds resources normally available to state, tribal, local, and private-sector authorities in the impacted area; and significantly interrupts governmental operations and emergency services to such an extent that national security could be threatened.

**Black Sky Hazards**, as defined by the EPRO Handbook are natural or manmade events capable of causing multi-FEMA region outages [electric grid] lasting a month or more, including acts of war by nation-states, terrorist attacks, or earthquakes and other natural catastrophes. Black Sky Events are characterized in terms of four characteristics:

- **Severe outage metrics**: Outage duration, percentage of customers losing power, and geographic scope, and other outage metrics.
- **Unprecedented physical grid damage**: Large-scale physical damage to the grid, and to the infrastructure essential for power restoration.
- **Demand for emergency power**: The extraordinary stress that Black Sky events would put on emergency power generators and fuel supplies, which, in shorter duration outages, provide essential support for hospitals, emergency operations centers, and other crucial facilities and functions.
- **Unprecedented need for mass care**: The unprecedented requirements for life-saving and life-sustaining operations created by the event, and the degree to which power outages will disrupt the delivery of those efforts.
Taken together, these event characteristics highlight the enormous challenges that Black Sky events entail and exemplify the need for cross-sector collaboration.

**Fuels Sub-Sector Model Overview**

The following graphics prove an overview of the oil and natural gas supply chains. Oil and natural gas are key resources to the nation, providing the energy needed to not only heat homes in the winter and cool them in the summer but also the fuel that powers private and commercial activities such as domestic truck fleets and emergency response vehicles. The diversity and complexity of these systems is often difficult to explain and understand, particularly when incidents occur, and context is critical to effective decision making. These oil and natural gas system models provide simple but relatable visual descriptions of these critical systems, their major components and the critical customers and services which are dependent on this energy. Recognizing the critical components and their placement in the system provides the context to understand the consequences to both upstream and downstream of an impacted component of the fuel supply system.

**Oil and Natural Gas Sector Model Graphics**
Fuels Sub-Sector Black Sky Strategic Mission Statement

The Mission of the Fuels Sub-sector is to: Develop and implement a focused resilience framework for investment and metrics, providing for capacities and capabilities to mitigate against, prepare for, and provide timely and effective catastrophic disaster response, stabilization, restoration, and recovery operations.

Following a Black Sky event with its wide area of impact, long duration power outages, and disrupted environments associated with Black Sky hazards, the most critical goals for societal health and continuity will be systematic, timely and well-prioritized critical infrastructure restoration, while simultaneously enabling the largest numbers of people to “shelter in place” during the multi-week or longer restoration and recovery period.

While many tasks must go forward to enable these two goals, among the most critical will be properly focused resilience investment and planning and preparedness by the Fuels Sub-sector, along with the corresponding, coordinated investment and plans by partner sectors and sub-sectors, required to support the Fuel Sub-sector’s measures.
Fuels Sub-Sector Black Sky Strategic Mission Priorities Matrix

Define the minimal, sustainable level of service (s)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Priority</th>
<th>Mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Establish Production, Processing, Transmission and Distribution</td>
<td>High</td>
<td>Stabilize catastrophic impacts to the capability and capacity of production, processing, refinement and blending, storage, transmission and distribution facilities to service critical, dependent infrastructures and customers.</td>
</tr>
<tr>
<td>2 Expand Production, Processing, Transmission and Distribution</td>
<td>High</td>
<td>Expand services to include priority, critical supply chain and lifeline services. Reliability and services may be less than pre-event reliability.</td>
</tr>
<tr>
<td>3. Continued Restoration and Recovery</td>
<td>High</td>
<td>Continue restoration and recovery of services to establish normal or near normal operations, serving as many customers as possible.</td>
</tr>
</tbody>
</table>

Black Sky Assumptions

The U.S. Department of Energy (DoE) and the National Petroleum Council (NPC) have stated that the physical vulnerabilities of the ONG infrastructures vary between components. For example, the production side is more diverse with hundreds of thousands of wells that produce oil and natural gas. As a result, the loss of a specific well would be considered low vulnerability.

High vulnerability ranking components include oil and natural gas pipelines, oil pumping stations, and natural gas compressor stations (used to flow commodity through pipelines), storage and distribution. Disruption of these components could result in infrastructure outages.

- **Damage to Underground Pipelines.** Underground pipelines are vulnerable to physical damages caused by a variety of human-caused or natural occurring disasters. Additionally, open rights-of-way and pipeline markers make targeting these critical assets relatively easy to entities with hostile intentions.
- **Refinery or Transportation Failures.** The blockage of a shipping channel or delays in the transportation of product, or extensive damages to refineries may lead to a withdrawal of oil from the Strategic Petroleum Reserve. This occurred in 2017 in response to Hurricane Harvey in order to satisfy demand and minimize economic impacts to citizens.
- **Delayed Restoration.** Due to just-in-time logistics, some companies are reducing their inventory of spare parts, which could increase outage duration times.

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• **Automated Remote Facilities.** The industry has become dependent on remote automated production or transportation facilities. Reaction time to reach and repair these remote facilities could be extensive.

**Threats:** Black Sky hazards and threats include naturally occurring and human caused disasters having widespread, catastrophic effects. That stated, the DoE and NPC have concluded that a number of other compounding factors may impair the ability to stabilize, restore, and recover from catastrophic disaster:

- Information technology and telecommunications are the areas where catastrophic event or failure could cripple any or all critical infrastructures.
- A failure in telecommunications infrastructure will create significant impacts to the oil and natural gas industries because of local and wide-area networks interconnecting new economy systems.
- The ability to go back to old methods can be lost, as oil and natural gas companies become reliant on these information technology and telecommunications systems. Because of change in organization, the workforce is no longer as experienced or as skilled as before, and it often lacks the ability to operate systems without cyber tools, thereby limiting the capability to return to older, manual methods.
- Information technology and telecommunications systems are vulnerable to externally initiated events because it is no longer necessary to be on premises to launch an attack, or to create an interruption. Rogue nations, terrorists, or other enemies are developing capabilities to attack cyber infrastructures.
- Companies are continually focused on increased efficiencies and cost reductions. This leads to business re-engineering, outsourcing, and downsizing. The result is a blend of employees, contractors, consultants, vendors, and suppliers, some located in foreign countries.
- Interdependency of infrastructures is an evolving component of critical infrastructure protection and one of the most difficult to understand, creating threats to the industry.

**Black Sky Decisions and Strategies Overview**

**Oil and Natural Gas Industry Preparedness and Response Strategy**:

Disruptive events affecting U.S. oil and natural gas infrastructure and operations, including 2012’s Superstorm Sandy, prompted the industry to revisit and clearly define the strategy used to prepare for an all-hazards response. In their publication, *Oil and Natural Gas Industry Preparedness Handbook*, published in September 2013, the industry set forth its strategy as follows:

As a preface to this discussion of the industry’s strategy, it is the industry’s position that incidents, whether anthropogenic or natural should be managed by local and State

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governments, under the construct of the National Response Framework (NRF). While the Federal government can have a role in a response, its involvement should take place only when local and state governments request it, and then their efforts should be in support of the State and local response activities. It is also industry’s position that, as indicated in Presidential Policy Directive 8, the Department of Energy (DOE), is the lead coordinator and primary agency for Emergency Support Function (ESF) 12 – Energy during events; and activities, and requests for information that involve the oil and natural gas industry should happen in coordination with DOE.

During any incident, there are many requests for information from owners and operators who are simultaneously attempting to restore services and infrastructure. Requests originate from all levels of government that are attempting to serve the needs of their constituencies by prioritizing resources, services and access to critical supplies. Crude oil, the products derived from crude (e.g. gasoline, lubricants, etc.) and natural gas, enable many of the critical services which support response and restoration. As such, having effective communication and informed stakeholders can facilitate more effective restoration of industry services and result in a more efficient recovery. However, there are challenges to effective communication across the complex oil and natural gas sector. These can include understanding the variety and volume of information requests from stakeholders during the course of recovery and competing interests and priorities of governments, owners and operators and other stakeholders. Industry believes that effective communication and education across all stakeholder groups, beginning with our government partners, is the most efficient use of resources and will provide the greatest return for our nation.

Specifically, the industry believes that, with regard to incidents involving the oil and natural gas infrastructure and systems, a two-phased approach implemented prior to, during, and after an event will ensure an efficient response and recovery of affected systems.

**Educating Stakeholder Groups:**
Ensuring that stakeholders through the response community and across Federal, State and Local governments are knowledgeable about the oil and natural gas system is critical to the effective and efficient flow of information between the private and public sectors. Education must occur on a consistent basis to ensure decision makers have an informed understanding of the policy and operational differences amongst the diversity of fuels and how they are transported, the primary challenges and limitations industry faces during an event, and the processes and means in place to respond and restore critical services. The means to accomplish this include:

- Utilizing and disseminating materials, such as oil and natural gas delivery supply chains, to educate stakeholders.
- Holding regular educational sessions with decision makers and critical stakeholder groups on a consistent basis (regardless of events) to explain the oil and natural gas systems, markets and critical functions.
• Utilizing existing relationships and mechanisms to ensure that channels of communication are open and effective.
• Identifying key staffing changes within stakeholder groups that warrant an education in the complexities of oil and natural gas systems.

Formalizing Processes of Communication and Information Sharing:
The dynamic nature of incidents often leads to communication and information sharing based on relationships rather than processes. This is particularly evident when robust processes and procedures have not been codified and exercised. A dependency on personal relationships can be beneficial as established relationships generally yield better communication, but this dependency can also contain significant risk. The assumption that the two individuals in the relationship are always available is one that often cannot be guaranteed. Therefore, formalizing a process based on position or role with government partners and partners in the field who will be participating in a response will support effective and appropriate information sharing during an event. Most importantly, formalizing processes will give both industry and government agreed upon mechanisms to avoid multiple requests for information/assistance from multiple parties. Thus, the oil and natural gas industry and its associations will:

• Work with local and State-based industry organizations to identify industry roles and responsibilities before, during, and after an event.
• Facilitate effective communication between key government representatives and company/facility representatives. Again, local organizations will play a pivotal role in this effort.
• Develop processes to facilitate information sharing between impacted facilities and governments at the local level.
• Utilize existing exercises and drills, which occur regularly throughout the sector, to understand and institutionalize the processes and procedures that have been recognized and accepted by response partners.

Industry has provided guidance (see section: Preparing at the State and Local Levels) to its local partners to prepare them and their constituents for the impacts of events before they occur. This guidance reaffirms how the partners can form the essential processes and relationships, understand the varied needs and wants of members and governments, and exercise both to understand the complexities of response before an event impacts a state’s or region’s critical energy infrastructure. A concerted effort by the local organizations and their constituents can help establish a baseline of education for stakeholders regarding the structure of the oil and gas industry, the requirements for basic operations, and the functions of markets. The end result if a disruptive, future event occurs, will be a stronger and more effective partnership between industry and stakeholders at the local and state levels to improve resilience, and ultimately enable a more efficient restoration.
Preparing at the State & Local Levels
The oil and natural gas preparedness and response strategy focuses the majority of its efforts, resources and information on efforts at the local level. The below guidance includes recommendations that will allow associations to form the necessary relationships with members and governments before an event occurs, to understand what critical operations their members operate and depend on, and to recognize how exercising can support these activities and the actions that may be required if an event were to occur.

Know who does what:
There are many roles and responsibilities assigned during a disruptive event that may be out of the scope of normal business operations, which means that contacts should be established, and responsibilities understood in preparation for, rather than in response to an event. In an event, having established relationships facilitates effective information sharing, the communication of needs and priorities, and the acquisition of resources. During an event it is extremely difficult to determine who the appropriate contacts are within companies, at facilities, and in government.

Although each event is different, depending on its nature, scope, duration, and impact, general responsibilities should be outlined, and contacts documented to help shorten response time, develop accurate situational awareness, and advance restoration. Initially, contacts should be identified by position, rather than individual, as turnover takes place, people are absent or unavailable, and functions change. When considering positions and responsibilities, it is also critical to identify who the decision makers are within organizations, both public and private. Developing relationships with the appropriate individuals during normal operations will make communication easier during the tumult of a disruptive event. Creating an annual process to update and verify suitable emergency contacts is good practice to reaffirm existing relationships and to create new ones, when needed. Including mobile phone numbers and alternate email addresses is an important detail to consider when gathering and documenting information. During periods of disruption, primary methods of communication are often unreliable or unavailable due to infrastructure damage, loss of power, etc. Cell phones, text messages, and other means of communication should be considered and utilized to ensure communication is effective.

Lastly, it is important to predetermine, to the extent possible, the stakeholders and organizations that might request information during an event, their need and/or authority, and the purpose of the information requested. While requests may differ with each type of event, government entities at the State, local and Federal levels will require specific information to manage critical services and public order. These needs should be identified through the process of established channels of communication with the appropriate parties involved in response. Industry and association representatives can use this information and the relationships they have developed to help members work through the process of reporting information and requesting assistance and/or resources during an event.
Know what not to do:
Federal and State antitrust laws limit what kinds of information associations and companies are permitted to share, even during an emergency. It must be recognized that members have faced antitrust actions stemming from response activities in the past, despite representations of promises made by government agencies. Just as association staff and member company representatives do in the normal course of business, there should be no sharing or discussing among company representatives, or soliciting by associations, of a company’s confidential or proprietary information during an event. Such information relevant in an event may include, but is not limited to, locations of supplies, delivery schedules, pricing, or refining operations. This prohibition applies even where a government official may request it from an association or from a group of members. If you receive such a request, decline it and explain that an official may obtain this information directly from an individual company on an individual basis (without trade associations or other companies involved). If you are unsure about the implications of information received from a member company or requested by a government official, please consult with legal counsel.

Know what matters:
During normal business operations, associations can communicate with oil and gas companies in their regions to ensure there is an understanding of assets and resources, and their importance to the reliable operations of the system. This knowledge is critical to maintain at least minimal system operations, assets which have been designated for priority restoration by State and local governments, and assets that are critical to public needs when an event occurs. Owners and operators, as well as public officials, need to be aware of the critical services in their regions, the products needed to maintain those services, and the impacts of not receiving those products and services. For example, interruptions to product deliveries can affect the ability of first responders to fuel vehicles, the ability of citizens to heat their homes, and the ability of hospitals to keep generators running. In a crisis, impacts to the fuels system can have impacts throughout the area and potentially hinder the restoration process.

 Governments, particularly at the state and local levels, should be provided information and education about purchasing fuels and fuel contracts. Stake holders are often unaware of what is needed to purchase fuel, which may already have contracts in place for available supplies, and what laws and regulations apply to purchases in their States. For example, the National Association of State Energy Officials (NASEO) has identified one of the critical issues that must be considered in advance of an emergency.

“Experience from several states indicates that supply may be sustained during shortages through careful attention to how fuel is purchased in fuel purchasing contracts. Some large consumers, including some public entities with critical petroleum fuel using agencies such as police, fire, and public transit, may have opted to reduce the cost of fuel through spot market-based contracts or by contracting for fuel from spot-market dependent vendors. However, spot-market fuel availability diminishes rapidly during a shortage. This is because fuels supplies that are available in excess of that needed to meet contractual obligations are treated as a surplus and sold at a discount. In a
shortage, contractual needs are served first and there is little or no surplus. Hence, vendors who rely solely on the spot market may be unable to supply critical needs customers during a shortage.”

It is important to highlight that these practices and regulations can vary greatly from State to State and by municipality and it is critical that decision makers have the information in advance of an event. While it is acknowledged that the Federal government may have the authority under certain circumstances to acquire and redistribute certain resources, it is critically important that all parties understand contracting processes and that Federal intervention is used only as a last resort in emergency situations. It is also important for governments at all levels to understand that 95% of retail gas stations are independently owned and operated; that is, they are not owned by refiners. Further, nearly 60% of all stations are owned by a single store owner. This means that during an event, identifying power status, supply availability and operational capability across such a broad and diverse ownership pool will be extremely challenging. Therefore, governments should focus on system-level restoration to ensure power and supplies are available to those who can receive them.

Understanding of the availability or resources and the needs of stakeholders, combined with on-the-ground situational awareness, will facilitate member companies’ abilities to respond to requests for information across governments and receive assistance should they need it. Preparing effective processes which facilitate the delivery of critical information during an event, whether through official working groups or informal networks, could be a valuable service provided by industry associations. Clear communication by members of damages, restoration activities, and potential needs can facilitate restoration when it is received and understood by affected stakeholders. Industry associations can promote an understanding between partners which supports response operations during an event, enabling the appropriate allocation of resources, movement of personnel, and public messaging. As priorities are addressed, associations should facilitate communication between members and governments to promote appropriate consumer behaviors and to inhibit those behaviors that can impede timely, efficient restoration.

Drill and exercise:
The best way to ensure that the correct relationships have been established, the correct information has been collected, and the correct mechanisms are in place is to test the process through drills and exercises. Exercises should be taking place routinely at the organizational, local, State and regional levels and participants should be incorporating lessons learned into their operations and business continuity and response plans. As members of a critical stakeholder community, associations can engage those public sector participants who have roles in preparedness, response, and recovery. Exercises and drills should be part of a consistent feedback loop that informs current operations, response plans and future infrastructure planning.

Stakeholders need to be aware of the various natural and manmade events that could affect them and should therefore build realistic scenarios to test their response and resilience to
those events. Associations can inform that process, bringing industry-specific expertise during the design phase, as well as during the exercise. This can ensure when a crisis happens, government partners in particular have an understanding of how systems function, how response is carried out, and what their expectations of restoration should be. Exercises will also educate industry as to the capabilities of their government partners, the validity of their own plans, and critical interdependencies they need to be aware of. If exercises are not occurring at the State and local level, industry associations and their members should suggest exercises to their public sector partners. Preparedness on both sides is essential to the recovery process; governments can just as easily impede as they can support if they are not prepared or informed.

Exercises, whether table tops, functional, or full-scale, allow participants to understand the various needs and issues that could emerge during a real-world event. Typically, many questions will arise that most would not have thought of without the stimulus of an exercise. For example, some important questions include:

- Who, at the State level, is responsible for requesting waivers?
  - From EPA?
  - From Agriculture?
  - From Transportation?
- Who is the relevant contact at the State Emergency Management Agency?
  - Do they have a role in energy restoration?
  - Do they have fuel needs that industry can assist with?
- Who is the Emergency Support Function -12 (ESF-12) liaison?

There is much that stakeholders would not know or not ask themselves during normal operations that can become critical during an event. Exercises help tease out this information, create the relationships that lead to the answers, and define the responsibilities of all stakeholders. Preparing for an event takes dedicated, persistent work at the State and local levels, with both public and private partners. Industry associations should ensure that they are sharing the information they gather and the lessons they learn throughout these processes back with their members. A concerted effort by industry associations and members can help establish a baseline of education for stakeholders regarding the structure of the oil and natural gas industry, the requirements for basic operations, and the functions of markets. The end result, if an event occurs, should be a stronger partnership between industry and stakeholders, improved resilience, and more efficient recovery.
Catastrophic Incident Response

The National Response Framework – Critical Incident Annex (NRF-CIA) establishes the context and overarching strategy for implementing and coordinating an accelerated, proactive national response to a catastrophic incident. A more detailed and operationally specific National Response Framework Catastrophic Incident Supplement (NRF-CIS) is published independently of the NRF and annexes. The NRF-CIA provides in part:

A catastrophic incident, as defined by the NRF, is any natural or manmade incident, including terrorism that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions. A catastrophic incident could result in sustained nationwide impacts over a prolonged period of time; almost immediately it would exceed resources normally available to State, tribal, local, and private-sector authorities in the impacted area. Moreover, it would significantly interrupt governmental operations and emergency services to such an extent that national security could be threatened. These factors drive the urgency for coordinated national planning to ensure accelerated Federal and/or national assistance.

Recognizing that Federal and/or nation resources would be required to augment overwhelmed State, tribal, and local agency response efforts, the NRF-CIA established the protocols to pre-identify and rapidly deploy key essential resources that are expected to be urgently needed or required to save lives and contain incidents.

Upon the occurrence of a catastrophic incident, or in advance if determined by the Secretary of Homeland Security, the Government will deploy Federal resources, organized into incident specific “packages,” in accordance with the NRF-CIS and in coordination with the affected State and incident command structure.

Where State, tribal, or local governments are unable to establish or maintain an effective incident command structure due to catastrophic conditions, the Federal Government, at the direction of the Secretary of Homeland Security, may establish a unified command structure, led by the Unified Coordination Group (UCG), the save lives, protect property, and protect national security. The Federal Government shall transition to its role of coordinating and supporting the State, tribal, or local government when they are capable of reestablishing their incident command.

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Concept of Operations:

- **State, Tribal, Local, Non-Governmental Organization (NGO), and the Private Sector Response**
  State, tribal, local, NGO, and private sector response operations and responsibilities are covered in the NRF and the NRF-CIS. This annex addresses the proactive Federal response to be taken in anticipation of, or following, a catastrophic incident to rapidly provide critical resources to assist and augment State, tribal, local, NGO, and private-sector efforts.

- **Federal Response**
  In accordance with the NRF provisions for a proactive Federal response to catastrophic incidents, the NRF-CIA employs an expedited approach to the provision of Federal resources to save lives and contain the incident.

Guiding principles for a proactive Federal catastrophic incident response include the following:

- The primary mission is to save lives, protect property and critical infrastructure, contain the event, and protect national security.
- Standard procedures outlined in the NRF regarding requests for assistance may be expedited or, under extreme circumstances, temporarily suspended in the immediate aftermath of an incident of catastrophic magnitude, pursuant to existing law.
- Pre-identified Federal response resources are mobilized and deployed, and if required, begin emergency operations to commence life-safety activities.
- Notification and full coordination with States occur, but the coordination process should not delay or impede the rapid mobilization and deployment of critical Federal resources.
- Upon recognition that a catastrophic incident condition (e.g., involving mass casualties and/or mass evacuation) exists, the Secretary of Homeland Security immediately begins implementation of the NRF-CIA. Upon notification from the National Operations Center (NOC) that the NRF-CIA has been implemented, Federal departments and agencies immediately:
  - Take actions to activate, mobilize, and deploy incident-specific resources in accordance with the NRF-CIS.
  - Take actions to protect life, property, and critical infrastructure under their jurisdiction, and provide assistance within the affected area.
  - Commence those hazard-specific activities established under the appropriate and applicable NRF Incident Annex(es), including the NRF-CIA.
Commence functional activities and responsibilities established under the NRF Emergency Support Function (ESF) Annexes.

NRF-CIA actions that the Federal Government takes in response to a catastrophic incident include:

- For no-notice or short-notice catastrophic events resulting in little or no time to assess the requirements of the State, tribal, and local governments, all Federal departments and agencies initiate actions to mobilize and deploy resources by scenario type as planned for in the NRF-CIS.
- For those potential catastrophic incidents where there is time to coordinate with State, tribal, and local governments, as well as private-sector and NGO authorities, Federal departments and agencies will pre-deploy appropriately tailored elements specified in the NRF-CIS, as well as other Federal resources as required to meet the anticipated demands of the specific incident scenario.
- For no-notice/short-notice catastrophic events when there is little or no time to assess the requirements of the State, tribal, and local governments, Federal departments and agencies initiate actions to mobilize and deploy resources by scenario type as planned for in the NRF-CIS. To that end, the Department of Defense (DOD) is prepared to provide capabilities in the following support categories: aviation, communication, defense coordinating officer/defense coordinating element, medical treatment, patient evacuation, decontamination, and logistics.

All Federal departments and agencies and organizations assigned primary or supporting ESF responsibilities immediately begin implementation of those responsibilities, as appropriate or when directed by the President.

Incident-specific resources and capabilities are activated and prepared for deployment to a National Logistics Staging Area (NLSA) near the incident site. The development of site-specific catastrophic incident response strategies (as detailed in the NRF-CIS) that include pre-identification of incident-specific critical resource requirements and corresponding deployment/employment strategies accelerate the timely provision of critical capabilities.

Regional Federal facilities are activated and prepared to receive and treat casualties from the incident area. Federal facilities are directed to reprioritize services (in some cases possibly reducing or postponing certain customary services) until life-saving activities are concluded. The development of site-specific catastrophic incident response plans that include the pre-identification of projected casualty and mass care support requirements and potentially available facilities expands the response architecture and accelerates the availability of such resources.
Supplementary support agreements with NGOs and the private sector are activated.

Given the projected high demand for Federal support, as well as the potential national security implications of a catastrophic incident, Federal departments and agencies may be asked to redirect efforts from their day-to-day responsibilities to support the response effort.

**Black Sky Decisions Matrix**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Priority</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>Does the utility have a Black Sky response plan? What are the adjustments to the plan necessitated by the nature and scope of the disaster?</td>
</tr>
<tr>
<td>1</td>
<td>High</td>
<td>How will impacts to other critical infrastructures such as electricity and communications impact ONG operations?</td>
</tr>
<tr>
<td>1</td>
<td>High</td>
<td>What communications systems or methods are available to ensure ONG internal operations? Is SCADA or EMS available?</td>
</tr>
<tr>
<td>1</td>
<td>High</td>
<td>Are there properly trained and adequate numbers of staff to provide inspections, disaster assessment s and emergency repairs to stabilize and restore operations?</td>
</tr>
</tbody>
</table>

**Sector Black Sky Situational Awareness Overview**

Situational awareness is key to the successful operation of ONG systems. Systems operators cannot guess about the status of production, refinement, transmission, storage, and distribution of oil and natural gas.

Operators must know the status of systems prior to a Black Sky event, understand and anticipate the extent possible, adverse impacts to their systems. During and after the disaster event they must be able to quickly assess damages and impacts not only to their systems but also have awareness of impacts to those other infrastructures and services that impact ONG operations. The exchange of situational awareness information between critical sectors will be an imperative if proper response, stabilization, restoration and recovery are to be achievable.

Communications between and among facilities and field operations personnel are necessary for assuring the functioning or recovery of critical operations. In addition, both vertical and horizontal communications between service providers, government officials and other critical infrastructures is vital.

**Priority Information Requirements Matrix**

<table>
<thead>
<tr>
<th>Information</th>
<th>Source</th>
<th>Priority</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial status of production, processing, transmission, storage and distribution systems</td>
<td>SCADA, EMS, or other automated systems or verbal communications</td>
<td>High</td>
<td>Must have confidence in situational awareness information to determine operational, response and recovery strategies</td>
</tr>
<tr>
<td>Status of other critical infrastructures and services needed to ensure the production, transmission and distribution of ONG</td>
<td>Verbal and/or electronic</td>
<td>High</td>
<td>Must have confidence in the reliability of electric, communications, transportation and other critical infrastructures that will impact ONG operations</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Knowledge and information on critical system manual operations</td>
<td>Verbal or electronic</td>
<td>High</td>
<td>Need to ensure that operators and field personnel are knowledgeable, capable and equipped to institute manual operations when necessary</td>
</tr>
<tr>
<td>Time to repair and return service to non-functional equipment and services</td>
<td>Verbal communications with operations and field personnel</td>
<td>High</td>
<td>Information is required for critical sectors to work in coordination to optimize disaster stabilization, restoration and recovery efforts</td>
</tr>
</tbody>
</table>
Sector Initial Actions, Information Flow and Assessment

ESF 12 Oil and Gas Information Flow: Industry Perspective

Private

Corporate / Industry

Sector Coordinating Council / Trades (oil & gas only)

Public

POTUS (NSS)

Secretary of Energy

DOE OPS Center*

NRCC*

JFO* / STATE EOC*

LOCAL EOC*

Corporate / Industry

State-based Industry associations

Facility

State / Region / Territory

Federal / National

Local / Field

Communication Mechanisms

- Face to face
- Phone
- Email (exchange, Listserv)
- Two-way radio
- Interpersonal relationships
- Public/private databases
- Social media
- Radio & TV

*Indicates ESF 12 presence at location
### Sub-Sector Initial Actions Matrix

<table>
<thead>
<tr>
<th>Priority</th>
<th>Initial Action</th>
<th>Desired/Required Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Situational Awareness – After a Black Sky event it will be vitally important to understand the scope and impacts of the disaster on ONG functionality. Operators will need to know the status of their systems and those systems on which they are dependent. They will also need to know the status critical employees, supplies and equipment and begin to estimate the time for stabilization, restoration and longer term recovery</td>
<td>Establish Black Start response, stabilization, restoration and recovery priorities</td>
</tr>
<tr>
<td>2</td>
<td>Communications – After a Black Sky event, internal and external communications may be severely interrupted or inoperable. Communications are critical to providing situational awareness and ONG operators should have redundant, reliable communications methods for critical operations</td>
<td>At a minimum verbal communication protocols must be established with clear instruction on the information that must be obtained and reported. Critical electronic communications should receive the highest priority and systems should be redundant and hardened to the extent possible</td>
</tr>
<tr>
<td>3</td>
<td>Energize prioritized, critical operations and systems in coordination with other critical infrastructures</td>
<td>Work in coordination with other lifeline, critical infrastructures to ensure to the extent possible, the coordinated delivery of critical services.</td>
</tr>
</tbody>
</table>

### Internal Sub-Sector Requirements: To Be Determined

Describe the Internal sector requirements. Focus initial efforts only on the requirements to meet initial Black Sky resilience standards.

### Internal Sub-Sector Requirements Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Priority</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
External and Cross Sector Dependencies Overview: To Be Determined
Describe the cross sector external dependencies within the Black Sky environment that impact resilience.

External and Cross Sector Requirements Matrix

<table>
<thead>
<tr>
<th>Requirement Area</th>
<th>Priority</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manpower</td>
<td></td>
<td></td>
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<tr>
<td>Transportation</td>
<td></td>
<td></td>
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<tr>
<td>Backup Power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Physical)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add additional lines as needed within each area as needed. In future versions there will likely be an Annex to further define these requirements.

Sub-Sector Specialized Resource Requirements Overview: To Be Determined
Describe those specialized resources requirements that are unique to this sector by phase.

Sector Commodity Specific List Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Commodity</th>
<th>Estimated Quantity</th>
<th>Potential Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Sub-Sector Black Sky Communications Overview: To Be Determined
Describe the communications requirements for the Sector in a Black Sky environment required to achieve resilience.

Sector Communications Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Communications Requirement</th>
<th>Coordinated Cross Sector Element</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Sector Black Sky Assessment Tool (s) Overview To Be Determined
List and discuss the various areas where assessments would add value. Use a simple approach. For each assessment listed there will be an associated Assessment Tool in Annex A.
Sector Overall Resilience Assessment – Annex A-1


Sector Black Sky Planning Requirements (On-going)
Describe the Sector Best Practices environment. This should include the rational for improving the resilience posture in general terms.

Sector Best Practices Matrix (On-going)

<table>
<thead>
<tr>
<th>Area of Operations</th>
<th>Recommendation</th>
<th>Expected Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Integrated and Shared Planning Actions
Describe and list areas where joint or integrated planning actions should be addressed. These will include: Real time coordination checkpoints defined as those “real time” coordination frameworks, processes and tools that will be essential to enable corporate, utility, government and NGO leaders to mutually navigate a successful path back to national continuity, using the advance-prepared tooling and capabilities.

Planning and Coordination Actions Matrix

<table>
<thead>
<tr>
<th>Response Area</th>
<th>Shared Planning Requirement/Real Time Interface Check Points</th>
<th>Cross-Sector(s) ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Sector Black Sky Resilience Considerations Overview
Over the past year EIS has worked to satisfy a request by the Federal Energy Regulatory Commission (FERC) and the National Association of Regulatory Utilities Commissioners (NARUC) to establish a
Resilience framework, metrics and matrix tool for use by regulators and critical infrastructure owners and operators in making decisions regarding resilience investment. The basis for this tool can be found in the following key documents:

1. Presidential Police Directives 21 (PPD-21), February 2013
2. Presidential Executive Order 13636, February 12, 2013

Through the application of this tool, regulators will be able to work with utilities under their purview to institute and measure resilience investment and effectiveness.

This methodology has validity as we design investment strategies and metrics for all critical infrastructure satisfying agreed upon goals and objectives for sustaining the Nation. This methodology is applicable when looking across and in coordination with all critical infrastructures within a specified geographic area.

While this current resilient strategy is primarily focused on the resilience of electric systems and operations, we believe it has broad applicability to other critical infrastructures. The information supplied here is for consideration by the Fuels Subsector as a methodology for making and tracking resilience investments and their effectiveness. The information and examples contained here is not intended to be prescriptive but is intended for consideration by Fuels Sub-sector partners.

In the end, a coordinated, cross-sector analysis provides for a resilience strategy that is holistic in approach and is more than a sum of its various parts.

Those priorities, goals, and objectives, are based on knowledge and understanding using assumptions borne of the values of the organization and its leadership. As stated in the Sandia Labs report, “This framework allows for metrics that:

- **Are useful**: Metrics developed under this framework must be useful for decision making (by humans, computational analysis, or both). Decisions of interest include system planning decisions, real-time operations decisions, and policy decisions.
- **Provide a mechanism for comparison**: Applying the same metric to different systems should result in valuable information. Furthermore, the same metric must be able to differentiate between the resilience of a system that has not been enhanced and one that has (either through infrastructure or operations) enhancements.
- **Are useable in operations and planning contexts**: The same metric should be able to assist decisions for both planning and operations.
- **Exhibit extensibility**: The metrics selected must be scalable in time and geography. The metrics should remain valid as technology progresses and more complex analytic methods become feasible.
• **Are quantitative:** The framework must allow the development of metrics that can be used both qualitatively and quantitatively.

• **Reflect uncertainty:** It’s critical that metrics are populated using methods that will quantify the uncertainty of the result. Specifically, decisions being made based on a resilience metric value must be well informed by the certainty of that value.

• **Support a risk-based approach:** The metrics should reflect a specific threat or set of threats, the system vulnerability, and potential consequences to **PEOPLE** (beyond the immediate system effects). *(Emphasis added).*

• **Consider recovery time:** Resilience metrics should reflect the consequences over time, and therefore must consider the recovery period either directly or indirectly.

Two fundamental concepts of this risk-based framework are:

• **Resilience** is defined with respect to disturbance(s) or threat(s), and

• **Consequences** relate to the social effects of system performance in addition to system performance alone.”

We would offer a third concept:

• **Dependence & Interdependence** between systems and critical infrastructure sectors is necessary if we are to achieve true national resilience. The resilience of one system does not directly translate to community, regional, or national resilience.

*Metrics Can Serve Both Operational & Strategic Decision Making:*

The RAND Corporation, in its report, “Measuring the Resilience of Energy Distribution Systems – Henry H. Willies & Kathleen Loa, 2015” provided complementary data, insight and specificity to the SANDIA Labs report. Perhaps, the most relevant of their conclusions was:

>“There is no single set of metrics that supports all decision making needs; rather, each purpose may need a unique set of metrics. But across levels of decision making, the metrics ought to be organized within a consistent measurement framework.”

>“From an operational perspective, a logic model explains how activities, budgets, and people (i.e., inputs) ultimately contribute to desired outcomes. From a strategic perspective, a logic model explains which inputs are needed to support strategy. From either perspective a hierarchy of metrics exists to connect inputs to outcomes and improve understanding about how to achieve outcomes more effectively and efficiently.”
Metrics Can Serve Both Operational & Strategic Decision Making

Operational Perspective

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Capacities</th>
<th>Capabilities</th>
<th>Performance</th>
<th>Outcomes</th>
</tr>
</thead>
</table>

Strategic Perspective

What is available?

Examples:
- Budgets
- Equipment
- Number of spare parts
- Number of generators
- Number of workers

How are inputs organized?

Examples:
- Response teams
- Plans
- Aid agreements
  - Smart-grid technology

What tasks can be performed?

Examples:
- Outage detection
- Line repair
- Backup delivery
- Outage restoration

What is produced?

Examples:
- Energy delivery
- Efficiency
- Reliability
- Hardness
- Robustness
- Sustainability

What is achieved?

Examples:
- Increased economic activity
- Reduced costs and damage
- Improved human welfare

“In the end, the performance of [energy] systems depends on how the systems generate the outcomes that society is seeking to achieve. Resilience of [energy] systems can be measured by many outcomes, such as reduced damage from disasters, increased economic activity, or reduced deaths and injuries from disasters.”

Source: Rand Corporation: *Measuring the Resilience of Energy Distribution Systems*

Resilience Metrics & Investment Examples:

The Rand Corporation report offers pages of examples of energy resilience metrics for electricity systems at the facility / system level, at the system / regional level, and at the region / national level. Their research also cites metrics for oil and natural gas systems at the system / regional level and at the region / national level.

Below are examples of resilience metrics and investments captured by the EIS Council and include those investments needed in the:

- EPRO Resource Family
- EarthEx Exercise Program
- Black Sky/Black Start Protection Initiative (BSPI),
- Black Sky Emergency Communications and Coordination System (BSX),
- Certified Power Recovery (CPR) Engineering Team Project
Conclusions & Recommendations:

We concur with the recommendations outlined in the Sandia Labs report:

1. **A framework for energy resilience metrics has been created such that:**
   a. Energy resilience metrics quantify the expected consequence due to events that have low probability but potentially high consequence. Consequences focus on social welfare, extending beyond systems impacts.
   b. The resilience metrics rely on the performance of the system, as opposed to attributes of that system.
   c. The resilience metrics incorporate the uncertainty associated with limited information about the system and threat.
   d. Resilience metrics quantify performance given uncertainty, providing insights into risk management and cost/benefit processes for planning, operations, and policy building.

2. **A resilience analysis process has been created that explains how to use resilience metrics.**

3. **The process is flexible enough for use by different stakeholders and infrastructures.**

4. **Stakeholder goals should drive the selection of metrics used for an analysis within the framework provided.**

5. **Continued research is essential:**
   a. More research is needed to improve quantification of human/societal consequences based on reduced system performance in a disruption. Key areas for R&D investment include multi-category uncertainty quantification, modeling and simulation of disruption, recovery and repair, and adaptive system operation algorithms.
   b. Developing a library of suggested performance indicators and recommended methods for translating those system outputs to common consequence measures is a necessary national research and development pursuit.
   c. Data availability will be a challenge in the early stages of adopting these methods, so some effort is likely needed to with respect to data collections and establishing associated best practices.

6. **Outreach and collaboration is necessary to define the types of decisions that will use resilience metrics, as well as the metrics’ units of consequence, selection of threats, and quantification of uncertainty.**

7. **A stakeholder group should be created for the refinement and standardization of metrics for electricity, petroleum, and natural gas sectors for the validation of this resilience metric framework. Specific areas that should be addressed include:**
   a. Differentiate reliability metrics from resilience metrics with input from state, federal, and regional regulatory authorities and other stakeholders.
   b. Determine federal, state, and local government roles.
   c. Work toward stakeholder buy-in and coordination: federal and state regulators, utilities, asset owners, and other key stakeholders.
   d. Conduct an expanded case study using data from one or more major utilities (in coordination with that utility).

**It is expected that this resilience tool will be ready for publication and broad release early spring of 2018.**
The notes below may be removed in the final playbook. Feel free to add clarification as needed to maximize use and understanding.

[For each requirement, there should be an associated crude metric showing impact on its ability to meet its sector Black Sky mission, depending on the level of successful implementation of that requirement – e.g., if this requirement is satisfied (a) not at all, (b) partially, (c) fully, it will have no/minor/major/catastrophic effect on our sector’s ability to meet its mission].

Examples of resilience requirements, to be defined at least functionally for each of the above phases (a) through (d), and for both (A) Generic hazards and (B) Specific Black Sky hazards:

1. **Emergency Communication** (e.g., BSX Communications system)
2. **Cross-sector situational awareness, coordination and decision support requirements**: What will each sector need from an overall, multi sector, national / state / corporate coordination body in terms of status of their own and other sectors’ critical support asset availability and critical needs? (e.g., BSX Coordination support, and GINOM)
3. **Emergency Fuel**: Diesel refueling requirements
4. **Operational Fuel (e.g., natural gas) Requirements**
5. **Emergency Generators (Black Sky hazard-hardened, designed for long duration continuous operation)**: Categorized by power output, fuel tank size.
   a. Pre-deployed requirement
   b. Anticipated replacement requirements
   
   Note: *This requirement includes provision for adequate supply of emergency generators, either pre-integrated in users’ facilities or regionally staged for scenario-based deployment, as well as provision for adequate technical maintenance labor support.*
6. **Protective measures**: Hardware, software, operational procedures
7. **Health / damage assessment diagnostics**: Hazard-hardened, in three categories:
   a. Pre-deployed, automated self-powered remote reporting to central assessment controllers
   b. On-site diagnostics providing easy 1st order damage assessment for an onsite, deployed restoration team
   c. Diagnostic tooling designed for manual use by a deployed restoration team
8. **Restoration / emergency tooling**: Must include advance field deployment requirements
9. **Material**: Essential supply chain assets, and associated key corporations in the supply chains, that are not practical candidates for field pre-deployment and storage adequate for two months of operation.
10. **Spares, with advance field deployment requirements**: In three categories
   a. **Inexpensive, common use** hardware that will be hard to find in Black Sky conditions unless pre-deployed (i.e., “For want of a nail ...”)
   b. **Inexpensive to moderately expensive hazard-vulnerable hardware elements** for different Black Sky hazard scenarios
c. **Expensive, long lead hazard-vulnerable hardware and associated installation tooling** for different Black Sky hazard scenarios

11. **Personnel support requirements**: What teams, and how many teams, will be required by each stakeholder organization, with what team makeup and what deployment, for each hazard type and for each phase?

   *Note 1.* This assessment will drive, for example, the requirements for prearranged, pre-certified, external Certified Power Recovery (CPR) Engineering Teams to add substantially to the core organizational teams for that sector.

   *Note 2.* A supplemental requirement: given the number, makeup and deployment of the requisite teams, what will be required for associated family support?

   *Note 3:* These personnel / team requirements should be provided as a function, at least crudely, of the level of availability of diagnostics (in (g) i. - iii. Above). E.g., if there are remotely pre-deployed, Black Sky hardened, self-powered, embedded and remotely reporting diagnostics in all important power grid substations and generating substations and water system and gas pipeline key facilities, vastly fewer restoration teams would need to be deployed, those that are deployed would be far more effective, and the entire damage assessment phase would be far quicker.

12. **Black Sky Operational Plans and Procedures**: Supplementing existing hazard plans and procedures for conventional hazards

13. **Black Sky Exercise and Training Requirements and Plans**: Supplementing existing hazard exercise and training requirements

---

**Resilience Initiatives Matrix**

**Tooling and capabilities prepared in advance**: Define those categories of advance planning, investment and effort required to make infrastructure restoration and population sustainment possible, when the nation finds itself thrust into a highly disrupted, Black Sky scenario.

<table>
<thead>
<tr>
<th>Initiative Title</th>
<th>Initiative Description/Cost</th>
<th>Expect Outcome</th>
</tr>
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<tbody>
<tr>
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</table>

34
Potential Regulatory and Statutory Waivers

The oil and natural gas industries operate under a myriad of regulations to ensure safe operations, environmental quality and fair market competition. The industry has a deep commitment to complying with all regulations all of the time regardless of external conditions. However, during the response to an incident affecting system integrity, some regulations could impede the quick restoration of services when access to specific resources is limited or workers and equipment are needed from other areas. Governments understand this paradox and the value of quickly restoring critical services when events affect their communities. Waivers, where government temporarily suspends regulations so that companies can continue operations that will help alleviate the emergency and restore normal operating conditions, are the solution to this problem. The following identifies many of the statutes and regulations, related issues and waivers that can be requested during an incident to speed recovery and a return to compliance.

Environmental Protection Agency (EPA)

- **RFG Requirements**
  - **Issue:** Reformulated Gasoline (RFG) is a cleaner burning gasoline blend required in areas that are not meeting certain air quality standards. During times of emergency, it is imperative that distributors have the flexibility to get any available fuel into the affected area in any way possible regardless of whether or not it is RFG.
  - **Waiver Needed:** 40 CFR 80.78(a)(7), prohibits persons from combining any reformulated gasoline blendstock or oxygenate blending with any other gasoline, blendstock, or oxygenate.

- **ULSD Requirements**
  - **Issue:** Ultra Low Sulfur Diesel (ULSD) is a cleaner fuel, with a 15 parts per million (ppm) sulfur specification, required by EPA for vehicles and equipment. During times of emergency, it is imperative that distributors have the flexibility to get any available fuel into the affected area in any way possible, regardless of sulfur content.
  - **Waiver Needed:** 40 CFR 80.510 and 80.520, which set ULSD standards. This waiver would allow the use of high sulfur heating oil in model 2006 and older vehicles, generators and as home heating oil during the emergency.

- **Vapor Recovery Regulations**
  - **Issue:** Fuel terminal loading and unloading systems and tank trucks that transport fuels are required to use specified vapor recovery equipment which can differ from state to state. In the case of an emergency, it is imperative that fuel can get from jurisdiction to jurisdiction by any transport means available. The states include these regulations in their state implementation plans (SIPs) which are approved and enforced by the EPA.
  - **Waiver Needed:** 40 CFR Part 60, Subpart XX and Part 63 Subparts R, Y, and BBBBBB, which set the standards for loading applicable to Bulk Gasoline Terminals, Pipeline Breakout Stations and Marine Tank Vessel Loading Operations, respectively.
✓ Tank Roof Landing Emissions
  o Issue: During an emergency when more fuel may be needed to pass through a facility’s tanks faster than normal operations, the emptying and filling of tanks may result in higher air emissions due to the tank roof landing emissions in floating roof tanks.
  o Waiver Required: Air emission regulations are enforceable by EPA and air emissions for specific facilities are limited by their air permits. If EPA provides a waiver (or no-action assurance) during an emergency, each state may also waive the permit limits for an appropriate time during and following an emergency.

U.S. Department of Transportation (USDOT)
✓ General Administrative Requirements
  o Issue: The DOT Federal Motor Carrier Safety Administration (FMCSA) sets general standards and requirements that apply to vehicle labeling, record keeping, etc. They also require transporters to follow all applicable state and federal requirements. Waiving this section could expedite shipments of fuel to recover areas and allow for other federal and state waivers to be effective.
  o Waiver Needed: 49 CFR 390, which provides the general basis for federal motor carrier safety regulations.
  o Issue: The DOT Pipeline & Hazardous Materials Safety Administration sets requirements on operator qualification training for certain hazardous liquid and gas pipelines transportation functions or “covered tasks” that meet the components of the “four-part test”. This set of regulations is commonly referred to as Operator Qualification, and an example of a covered task is manual closure of valves. Due to the diversity of hazardous liquid and gas pipeline infrastructure across the Nation, operators train to satisfy the requirements as they apply specifically to their company’s equipment and infrastructure. These requirements, which may be appropriate under regular operating circumstances, hinder the effort for mutual aid from other hazardous liquid and gas pipeline companies in time-sensitive circumstances.
  o Waiver needed: 49 CFR Part 192 and 195, subpart N lists the requirements of Operator Qualification, including “covered tasks” and “four-part test” in § 192.80 and § 195.505.

✓ Driver Qualification Regulations
  o Issue: The FMCSA has certain rules regarding a driver’s physical fitness, fluency in English language, level of fatigue, the thorough inspection of cargo, and ensuring that lighting and cargo standards are met. However, maintenance requirements, which may be appropriate under regular operating circumstances, hinder the effort to get as many loads into the disaster area as possible in a short amount of time.
  o Waiver Needed: 49 CFR Parts 391-3, and 396, which set driver standards, load standards, inspection standards, etc.

✓ Hours of Service Regulations
  o Issue: The FMCSA sets requirements on how many hours a truck driver can drive or be on duty in a given day and week. There are also certain rest time requirements between on duty periods. These requirements, which may be appropriate under regular operating circumstances, hinder the effort to get as many loads into the disaster area as possible in a short amount of time.
  o Waiver Needed: 49 CFR Part 395, which sets hours of service regulations.
✓ Vehicles Not Meeting HazMat Specifications
  o **Issue:** USDOT’s Pipeline and Hazardous Materials Safety Administration (PHMSA) sets strict specifications on which vehicles can carry gasoline and other hazardous materials, and how they need to do it (i.e. shipping papers, markings, placarding, etc.). To get the needed quantities of fuel into the disaster area as quickly as possible, more vehicles are needed as long as they are fit to carry gasoline and diesel fuel, even if they do not meet the strict specifications.
  o **Waivers Needed:** 49 CFR Parts 173.242 and 172 Subparts C,D,F, and I, which govern vehicle specifications and other shipping standards for tank trucks. These waivers will also affect 49 CFR Parts 106, 107 and 171-180.

✓ Jones Act
  o **Issue:** The Merchant Marine Act, also called the Jones Act, requires that only U.S. built and flagged vessels carry goods from U.S. ports to other U.S. ports. During times of emergency it is imperative that disaster relief items, including fuel, get to the disaster area as quickly as possible regardless of country of origin. More vessels mean that more disaster relief supplies arrive in a more timely fashion. Coastwise waivers can be granted in two ways: (1) waivers shall be granted automatically on request of the Secretary of Defense to the extent considered necessary in the interest of national defense; and (2) when the “head of an agency responsible for the administration of the navigation or vessel inspection laws (in this case the Secretary of DHS) considers it necessary in the interest of national defense, if the Administrator of the Maritime Administration (MARAD) determines that no U.S. –flagged vessels are available for the proposed transportation. US. Customs and Border Protection (CBP) has direct responsibility for enforcing the Jones Act and processes requests for waivers for the Secretary of DHS. Prior to granting the waiver, CBP must seek MARAD’s advice regarding U.S.-flagged vessel availability before the Secretary of DHS makes a decision by law (see U.S.C. § 501).
  o **Waiver Needed:** 46 USC 551, which codifies the restriction on non-U.S. flagged vessels delivering from U.S. ports to U.S. ports.

✓ Foreign Oil Spill Response Vessels
  o **Issue:** The Maritime Administration entered into a Memorandum of Agreement with the U.S. Coast Guard, the Environmental Protection Agency and the State Department to expedite requests for exemptions for foreign oil spill response vessels (oil skimmers, etc.).
  o **Waiver Needed:** 46 U.S.C. § 55113. This MOU essentially memorializes the process so that these agencies will continue to expedite allowances to foreign oil spill response vessels in the future.

✓ Anchor Handling Waiver Program
  o **Issue:** Similar to the Launch Barge Program, MARAD is authorized to make determinations under 46 U.S.C § 501 allowing the use of foreign anchor handling vessels (used to position mobile offshore drilling units) if no U.S.-flag vessel s are available, and
if the companies that want to use foreign vessels have contracts in place to bring in replacement U.S.-flag vessels.

- **Waiver Needed:** 46 U.S.C. § 501 allowing the use of foreign anchor handling vessels (used to position mobile offshore drilling units) if no U.S.-flag vessels are available.

**Internal Revenue Service (IRS)**

- ✓ **Diesel Fuel Penalty**
  - **Issue:** The IRS imposes 24.4 cents per gallon tax on diesel fuel sold for on road use, while dyed diesel fuel used for farming purposes, home heating use, and etc. is not ordinarily subject to the tax. Typically, if a diesel fuel that was not subject to this excise tax was converted to use for on road purposes, the IRS would require that use to be reported and the tax paid accordingly. In case of emergency, the goal is to get as much transportation fuel into the market as possible to make up for supply shortages, and as such, this reporting and tax requirement becomes an impediment to bringing that fuel into the transportation mix.
  - **Waiver Needed:** Requirements under Publication 510, which governs excise taxes, of the Internal Revenue Code.

**Other Federal Government Assistance Options**

- ✓ **Vessel Movement Control**
  - **Issue:** The Coast Guard has authority to control vessel traffic in areas subject to the jurisdiction of the United States which are determined to be hazardous or under other hazardous circumstances through enactment of safety and security zones. Coordination efforts with the U.S. Coast Guard and Department of Homeland Security (DHS) should provide exclusive access to ports in the disaster area to those bringing in fuel and other necessary supplies in an effort to expedite barge movement.
  - **Waiver Needed:** Captain of the Port order waiver under Ports and Waterways Safety Act (33 U.S.C. 1221 et. seq.).

- ✓ Fuel loans and distribution assistance from the Department of Defense’s (DOD’s) Defense Logistics Agency (DLA) and DHS’s Federal Emergency Management Administration (FEMA).

- ✓ Fuel loans from the Department of Energy (DOE).

**State Specific Waivers Needed to Transport Fuel Interstate**

- ✓ **Reid Vapor Pressure (RVP) Requirements**
  - **Issue:** Many states allow a variance, up to 1 lb. RVP, from the most recent version of ASTM D4814 for gasoline blended with ethanol. NIST Handbook 130 also provides for this variance.
Waiver Needed: States that do not allow for an RVP variance may waive the applicable state law of regulation to allow fuel from states that do allow the variance to be used interchangeably across state lines during an emergency.

**Biofuel Blending Requirements**
- **Issue:** Some states require a minimum amount of biofuels to be blended into all gasoline and/or diesel sold within the state.
- **Waiver Needed:** States with minimum biofuel blending requirements may waive the applicable law or regulation to allow fuel that does not contain the specified volume of biofuels to be carried across state lines and sold in the state during an emergency.

**Stage I Vapor Recovery Requirements**
- **Issue:** Fuel terminal loading and unloading systems and tank trucks that transport fuels are required to use specified vapor recovery equipment, which can differ from state to state. In the case of emergency, it is imperative that fuel can get from jurisdiction to jurisdiction by any transport means available. The states include these regulations in their state implementation plans (SIPs) which are approved and enforced by EPA.
- **Waiver Required:** SIPs are enforceable by the EPA and during the case of an emergency, if EPA provides a waiver (or no action assurance) during the emergency, each state requiring Stage I Vapor Recovery may waive the applicable law or regulation to allow trucks and terminals without vapor recovery equipment to operate and move fuel from the terminal to intrastate or interstate destinations.

**Weight Limits**
- **Issue:** All states set weight restrictions (maximum weight allowable) for trucks that travel on their roadways. Because federal law allows each state to set their own weight requirements, not all states set the limits at the same weight. Additionally, these state-specific weight limits typically require fuel tankers to be filled at levels below their capacity in most, if not all states.
- **Waiver Needed:** States may waive their typical weight limits and set temporary limits for trucks carrying emergency relief supplies (including fuel) to allow rapid movement of the largest amount of fuel that can be moved safely intrastate and across state lines. A typical waiver may allow trucks from 92,000 to 100,000 lbs.

**Distributor License**
- **Issue:** Many states require a carrier to pay a fee and obtain a Distributor’s License to transport fuel within the state.
- **Waiver Needed:** States may waive the applicable fees and license requirements to ensure that all drivers, trucks and resources within the state, or brought across state lines to provide support are available to contribute to the disaster relief effort.

**Hours of Service**
- **Issue:** Some states have driver Hours of Service requirements that are more restrictive than the USDOT.
Waiver Needed: States with hours of service regulations that are more restrictive than the federal government may waive those requirements in kind with the USDOT effort to get as many loads into the disaster area as possible in a short amount of time.

✓ Retail Gasoline Label Requirements
  o Issue: States that have specific biofuel blending requirements may require labels that say things like “contains 10% ethanol,” while some fuel transported interstate may not have exactly 10%, but rather, “up to 10% ethanol.”
  o Waiver Needed: States with content specific labeling requirements may waive those requirements to allow fuels that may not be blended with the exact volume depicted on the dispenser to be sold in the state during the emergency.

✓ Importer/Exporter Licenses
  o Issue: State revenue departments require fuel importers and exporters to pay a fee and obtain a license from the state to move fuel across state lines. Without these licenses the fuel merchant cannot legally buy gasoline from one state and move it to another.
  o Waiver Needed: Each individual state within the disaster region may allow fuel to be bought and sold within or outside their state by any merchant, whether or not they have paid the proper fee and obtained an importer/exporter license, regardless of where the fuel is purchased and where it will be delivered. States who have allowed this in the past have taken different approaches, with some expediting licenses during the emergency and others waiving the requirement entirely or required the merchant to remit taxes to the state despite not being properly licensed and registered.

✓ IRP/IFTA
  o Issue: The International Registration Plan (IRP) is an agreement among states of the U.S., the District of Columbia and provinces of Canada providing for payment of commercial motor carrier registration fees. To operate in multiple states or provinces, motor carriers must register in their base jurisdiction (state or province). The International Fuel Tax Agreement (IFTA) is an agreement among states to report fuel taxes by interstate motor carriers.
  o Waiver Needed: The tax structures, which act as interstate fuel taxes, may be waived in agreement with all states that are affected by the emergency or that are participating in the emergency relief effort to ensure that fuel can move freely from one state to another without being bogged down with tax bureaucracy.
This is not a comprehensive list of waivers but an example of the many types that can be requested.
Sector Black Sky Essential Critical Infrastructure (MC) Overview To Be Determined

Describe the most essential elements of the sectors infrastructure to achieve resilience. This section should address only those items that unique or mission essential to the sector. You will likely have a handful of items for each element of the sector model. These are areas for priority hardening.

Sector Critical Infrastructure Matrix

<table>
<thead>
<tr>
<th>Element</th>
<th>Function</th>
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Sector Black Sky Specialized Skill Training Requirements Overview To Be Determined.

Describe the mission critical sector identified skills/positions that must be filled to accomplish resilience. Start with Assessment and move through, Response, Restoration and Recovery. This should not be a laundry list of all positions. These are the agreed upon most critical positions and the associated training or certification requirement.

Sector Specialized Skill Training Requirements Matrix

<table>
<thead>
<tr>
<th>Phase</th>
<th>Position/Skill</th>
<th>Training/Certification Requirement</th>
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Annex A – Assessments (On-going)
Sector Overall Resilience Assessment

Everyone will have at least 1 Assessment List

Simple table of resilience activities/actions that should be prepared.
Annex B – Regulatory Issues Detail Statements (On-Going)

Issue Statement 1 (See Regulatory Section Above).

- Statement
- Decision Authority
- Required Documentation – To justify/document decision
- Resiliency Investment statement
- Plan Requirements
- Training Requirements
- Liability Statement/3rd Party Protection Issue
- Explicit requested legislative changes/Insurance/Assurance/3rd Party Indemnification
Annex C – Communications Requirements

Communications Requirement 1

- Internal/Planned Format/Path
- External/Planned Format/Path
- Explicit Model
  - Who
  - What
  - When
  - Strategies (back up)
  - Bandwidth requirement (actual and notional)
  - Format
  - Priority
Annex D: Resilience Requirements by Layer

Identify requirements for each phase, including both (A) Generic required elements for all Black Sky hazards, and (B) Hazard-specific required requirements. Note, however, that many requirements will exhibit heavy overlap among sectors, with many infrastructure sectors, and their partners, requiring the same resilience measures.

<table>
<thead>
<tr>
<th>Area</th>
<th>Phase</th>
<th>Black Sky Generic</th>
<th>Black Sky Hazard Specific</th>
<th>Notes/ Status</th>
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<tbody>
<tr>
<td>Emergency Communication</td>
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<td>Cross-sector situational awareness,</td>
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<td>coordination and decision support</td>
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<tr>
<td>requirements</td>
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<td>Emergency Fuel</td>
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<td>Operational Fuel (e.g., natural gas)</td>
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<td>Requirements</td>
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<tr>
<td>Emergency Generators (Black Sky hazard-</td>
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<tr>
<td>hardened, designed for long duration</td>
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<td>continuous operation)</td>
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<tr>
<td>Protective measures: Hardware, software,</td>
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<tr>
<td>operational procedures</td>
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<tr>
<td>Health / damage assessment diagnostics:</td>
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<td>Pre-deployed,</td>
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automated self-powered remote reporting to central assessment controllers

On-site diagnostics providing easy 1st order damage assessment for an onsite, deployed restoration team

Diagnostic tooling designed for manual use by a deployed restoration team

<table>
<thead>
<tr>
<th>Restoration / emergency tooling</th>
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</thead>
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<table>
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<tr>
<th>Black Sky Exercise and Training Requirements and Plans</th>
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The notes below will be REMOVED in the final playbook. Feel free to add clarification as needed to maximize use and understanding.

[For each requirement, there should be an associated crude metric showing impact on its ability to meet its sector Black Sky mission, depending on the level of successful implementation of that requirement – e.g., if this requirement is satisfied (a) not at all, (b) partially, (c) fully, it will have no/minor/major/catastrophic effect on our sector’s ability to meet its mission].

Examples of resilience requirements, to be defined at least functionally for each of the above phases (a) through (d), and for both (A) Generic hazards and (B) Specific Black Sky hazards:
14. Emergency Communication (e.g., BSX Communications system)

15. Cross-sector situational awareness, coordination and decision support requirements: What will each sector need from an overall, multi sector, national / state / corporate coordination body in terms of status of their own and other sectors’ critical support asset availability and critical needs? (e.g., BSX Coordination support, and GINOM)

16. Emergency Fuel: Diesel refueling requirements

17. Operational Fuel (e.g., natural gas) Requirements

18. Emergency Generators (Black Sky hazard-hardened, designed for long duration continuous operation): Categorized by power output, fuel tank size.
   c. Pre-deployed requirement
   d. Anticipated replacement requirements

   Note: This requirement includes provision for adequate supply of emergency generators, either pre-integrated in users’ facilities or regionally staged for scenario-based deployment, as well as provision for adequate technical maintenance labor support.

19. Protective measures: Hardware, software, operational procedures

20. Health / damage assessment diagnostics: Hazard-hardened, in three categories:
   a. Pre-deployed, automated self-powered remote reporting to central assessment controllers
   b. On-site diagnostics providing easy 1st order damage assessment for an onsite, deployed restoration team
   c. Diagnostic tooling designed for manual use by a deployed restoration team

21. Restoration / emergency tooling: Must include advance field deployment requirements

22. Material: Essential supply chain assets, and associated key corporations in the supply chains, that are not practical candidates for field pre-deployment and storage adequate for two months of operation.

23. Spares, with advance field deployment requirements: In three categories
   a. Inexpensive, common use hardware that will be hard to find in Black Sky conditions unless pre-deployed (i.e., “For want of a nail ...”)
   b. Inexpensive to moderately expensive hazard-vulnerable hardware elements for different Black Sky hazard scenarios
   c. Expensive, long lead hazard-vulnerable hardware and associated installation tooling for different Black Sky hazard scenarios

24. Personnel support requirements: What teams, and how many teams, will be required by each stakeholder organization, with what team makeup and what deployment, for each hazard type and for each phase?

   Note 1. This assessment will drive, for example, the requirements for prearranged, pre-certified, external Certified Power Recovery (CPR) Engineering Teams to add substantially to the core organizational teams for that sector.
Note 2. A supplemental requirement: given the number, makeup and deployment of the requisite teams, what will be required for associated family support?

Note 3: These personnel / team requirements should be provided as a function, at least crudely, of the level of availability of diagnostics (in (g) i. -> iii. Above). E.g., if there are remotely pre-deployed, Black Sky hardened, self-powered, embedded and remotely reporting diagnostics in all important power grid substations and generating substations and water system and gas pipeline key facilities, vastly fewer restoration teams would need to be deployed, those that are deployed would be far more effective, and the entire damage assessment phase would be far quicker.

25. Black Sky Operational Plans and Procedures: Supplementing existing hazard plans and procedures for conventional hazards

26. Black Sky Exercise and Training Requirements and Plans: Supplementing existing hazard exercise and training requirements
Acronyms

**ESF**  Emergency Support Function
ESFs provide the structure for coordinating the Federal Interagency support to an incident. They are mechanisms for grouping functions most frequently used to provide Federal support to States, both for declared disasters and emergencies under Stafford Act and non-Stafford Act incidents.

**EOC**  Emergency Operations Center
The physical location at which the coordination of information and resources to support incident management (on-scene operations) activities normally takes place. An EOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction. EOCs may be organized by major functional disciplines (e.g., fire, law enforcement, medical services), by jurisdiction (e.g., Federal, State, regional, tribal, city, county), or by some combination thereof.

**ICS**  Incident Command System
A standardized on-scene emergency management construct specifically designed to provide an integrated organizational structure that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. ICS is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organize field-level incident management operations.

**JFO**  Joint Field Office
The primary Federal incident management field structure. The JFO is a temporary Federal facility that provides a central location for the coordination of Federal, State, tribal, and local governments and private-sector and nongovernmental organizations with primary responsibility for response and recovery. The JFO structure is organized, staffed, and managed in a manner consistent with National Incident Management System principles. Although the JFO uses an Incident Command System structure, the JFO does not manage on-scene operations. Instead, the JFO focuses on providing support to on-scene efforts and conducting broader support operations that may extend beyond the incident site.

**NGO**  Non-Governmental Organization
An entity with an association that is based on interests of its members, individuals, or institutions. It is not created by a government, but it may work cooperatively with government. Such organizations serve a public purpose, not a private benefit. Examples of NGOs include faith-based charity organizations and the American Red Cross. NGOs, including voluntary and faith-based groups, provide relief services to sustain life, reduce physical and emotional distress, and promote the recovery of disaster victims. Often these groups provide specialized services that help individuals with disabilities. NGOs and voluntary organizations play a major role in assisting emergency managers before, during, and after an emergency.
NICC  National Infrastructure Coordinating Center
A component of the NOC. The NICC is an information and coordination hub that maintains situational awareness of the nation’s essential Critical Infrastructure (CI). The NICC shares threat information in order to reduce risk, prevent damage, and enable rapid recovery of CI assets from incidents caused by natural disasters, attacks, or other emergencies.

NLSA  National Logistics Staging Area
Area at or near a disaster affected area used by the Federal Government of the staging and deployment of resources used in support of State, tribal, and local governments during an disaster incident.

NOC  National Operations Center
The NOC coordinates information sharing to help deter, detect, and prevent terrorist attacks and to manage domestic incidents. Information on a domestic incident is shared with Emergency Operations Centers at all levels through the Homeland Security Information Network (HSIN).

NRF  National Response Framework
NRF-CIA  National Response Framework – Catastrophic Incident Annex
NRF-CIS  National Response Framework – Catastrophic Incident Supplement
The National Response Framework (NRF), a component of the National Strategy for Homeland Security, guides the Nation in how all-hazards responses are coordinated and conducted by providing the structure and mechanisms for incident response in a national level incident. The NRF builds upon the scalable, flexible, and adaptable Incident Command System (ICS) structure to align key roles and responsibilities across the Nation, linking all levels of government, non-governmental organizations, and the private sector.

The Catastrophic Incident Annex to the National Response Framework (NRF-CIA) establishes the context and overarching strategy for implementing and coordinating an accelerated, proactive national response to a catastrophic incident. A more detailed and operationally specific National Response Framework Catastrophic Incident Supplement (NRF-CIS) is published independently of the NRF and annexes.

PSA  Protective Security Advisor
PSAs are in place in communities throughout the Nation to assist with local efforts to protect critical assets, providing a Federal resource to communities and businesses. During natural disasters and contingency events, PSAs work in State and local Emergency Operations Centers. PSAs also provide real-time information on facility significance and protective measures to facility owners and operators, as well as State and local representatives.

SCC  Sector Coordinating Council
SCCs are self-organized and self-governed bodies that serve as principal sector policy coordination and planning entities. Membership composition varies from sector to sector; however, membership is representative of a broad base of owners, operators, associations, and other entities. The SCCs enable owners and operators of critical infrastructure to interact with the government on a wide range of sector specific strategies, policies, activities, and issues.