2016 Emergency Preparedness Addendum Working Paper:

Observations on DOE's 2016 Clear Path IV Exercise and Implementation of the 2014 NPC Emergency Preparedness Report Recommendations

National Petroleum Council

Prepared in Follow-Up to the 2014 NPC Report:
Enhancing Emergency Preparedness for Natural Disasters

July 29, 2016

On December 17, 2014, the National Petroleum Council (NPC) approved the report *Enhancing Emergency Preparedness for Natural Disasters.* As a part of approving the report, the NPC agreed to work with the Department of Energy on implementing the report recommendations. On July 29, 2016, the NPC approved the transmittal of this working paper and related documents to the Secretary and the posting on www.npc.org. The National Petroleum Council has not endorsed or approved this document, but approved the publication of these materials.

The NPC offers these suggestions in the spirit of continuing improvement as industry and government work jointly to improve preparedness and response programs.

INTRODUCTION

This working paper is prepared for the use of the Department of Energy (DOE) and others implementing the recommendations of the 2014 National Petroleum Council (NPC) emergency preparedness report *Enhancing Emergency Preparedness for Natural Disasters*. The intent is to provide an independent and constructive review of ongoing progress with implementation of those recommendations, and this review provides observations on the Department's 2016 Clear Path IV exercise. The NPC participants acknowledge that only anecdotal evidence is available on several of the recommendations and that observations of a single exercise are limited in fully evaluating the implementation of the other recommendations.

In a letter dated October 25, 2013, Secretary of Energy Ernest Moniz requested the National Petroleum Council's advice about natural gas and oil infrastructure resilience (emergency preparedness for natural disasters). The NPC assembled a diverse team of industry and government experts on emergency response that reviewed past incidents, collected analyses, and developed a consensus on recommendations for industry and government to improve response to supply chain disruptions. In December 2014, the NPC approved and presented the report to the Secretary (www.npc.org, Reports: Emergency Planning and Preparedness: *Enhancing Emergency Preparedness for Natural Disasters*).

The 2014 report highlighted seven key recommendations. These recommendations fall into two broad categories: (1) leveraging operational frameworks that are appropriately staffed and (2) maintaining readiness through sustaining mechanisms to address interdependencies, enhance capabilities, and continuously improve.

2014 Report Recommendations:

Operational Framework

- Harmonize DOE's energy response team structure with the National Incident Management System (NIMS) Incident Command System (ICS).
- Leverage the Energy Information Administration's (EIA) subject matter expertise within DOE's energy response team to improve supply chain situation assessments.
- Establish company liaisons and direct communication with DOE's energy response team to improve situation assessments.
- Streamline and enhance processes for obtaining temporary regulatory relief to speed up recovery.

Sustaining the Process

- States should increase engagement with the oil and natural gas industry in their energy assurance plans, and industry members should assist the states in such efforts.
- Both DOE and states should establish routine education and training programs for key government emergency response positions.
- Both DOE and states should improve their comprehensive drill and exercise programs and include industry participation. Reciprocal invitations extended by companies to DOE and states are recommended.

At the December 2014 Council meeting, NPC Chair Charles D. Davidson noted that the real challenge was implementing the recommendations, not writing the report. The NPC members, through approving the report, made a commitment to follow through with DOE and support implementation of the key recommendations. In a March 23, 2015 letter to the Council, Secretary Moniz thanked the Council for the report and noted several areas where implementation of the report's recommendations was underway. The Secretary also restated the Department's interest in working with industry partners to enhance energy system resilience. The Secretary's March 2015 letter is available for reference in Appendix A.

One of the seven key recommendations addresses an effective drill and exercise program. In late 2015, DOE announced that the fourth annual "Clear Path" energy sector preparedness exercise would be revamped and move away from an academic session format of earlier Clear Path exercises and more toward a functional exercise in support of the Quadrennial Energy Review (QER), the NPC's report recommendations, and the Deputy Secretary's desire for cross-sector coordination. Consistent with the commitment made in approving the report, the NPC and industry assisted DOE with the Clear Path IV exercise that took place in April 2016. This effort built upon previous work completed by DOE and industry in working toward implementing the 2014 NPC report recommendations.

The April exercise scenario simulated a 9.0 Cascadia Subduction Zone earthquake and tsunami in the Pacific Northwest. The NPC role was two-fold:

1. Support DOE by providing a link to key companies in the exercise region and providing assistance in designing and planning the oil and gas components of the exercise
2. Provide independent observations regarding the demonstration of report recommendations during the exercise.

Many members of the NPC team participated in the 2014 Emergency Preparedness study individually, or colleagues from their companies participated. In addition, some members were added to ensure that key facilities in the Pacific Northwest were represented. A full roster of 2016 Emergency Preparedness Addendum participants can be found in Appendix B.

This working paper contains a summary of NPC support for DOE's Clear Path IV exercise and observations of DOE's exercise and implementation of the 2014 NPC report recommendations. In addition to DOE's implementation of recommendations, the NPC team attempted to identify industry and state progress in implementing the recommendations. Appendix C provides a list of references used in this review, Appendix D includes the output from the State Fuel Planning workshop, and Appendix E provides a detailed set of comments on the planning and execution of the 2016 Clear Path IV exercise.

NPC SUPPORT FOR CLEAR PATH IV

The NPC offered to assist in exercise development with a focus on incorporating the 2014 study recommendations into exercise play. DOE welcomed this assistance and three NPC workgroups were established to lead these efforts. Workgroup 1 was established to assist with planning Day 1 activities in Portland. Workgroup 2 was established to assist with planning Day 2 activities and supporting the functional exercise simulation cell. Workgroup 3 was established to conduct a review of the Clear Path IV activities and document actions that demonstrate the adoption of the 2014 NPC report recommendations.

Clear Path IV was developed to provide an opportunity for government and industry to examine the challenges of responding to a catastrophic Cascadia Subduction Zone earthquake and tsunami and to identify gaps within respective response plans and policies. Day 1 activities consisted of a tabletop exercise in the morning followed by sector-specific workshops in the afternoon. Day 2 activities were planned as a functional exercise, engaging members from industry and local municipalities in Oregon and Washington states as Controllers in a Simulation Cell to test members of DOE's Emergency & Incident Management Council (EIMC) and Energy Response Organization (ERO) in Washington, DC.

For further details on the exercise scenario and related materials on emergency response, please refer to Appendix C for a list of references.

Workgroup 1 – Day 1 Exercise - Tabletop and Workshop

Workgroup 1 focused on supporting the tabletop exercise and fuels workshop. A Work Plan was developed to guide Workgroup 1 efforts in assisting DOE with the Day 1 exercise and the facilitation of the afternoon Fuels Breakout Session for oil and natural gas sector participants. The Workgroup 1 team focused on the following deliverables:

- Contacting oil and natural gas operating companies (refineries, terminals, pipelines, etc.) in the Pacific Northwest to participate in the exercise and breakout session.
- Providing support for Day 1 exercise participation by detailing response issues that oil and natural gas companies would be dealing with after the earthquake.
- Facilitating the Fuels Breakout Session to discuss state fuel plans and areas for improvement.

In addition, the workgroup provided expertise and education on the oil and natural gas supply chains as part of the workshop discussion.

Detailed information and output from the workshop regarding state fuel plans can be found in Appendix D.

Workgroup 2 – Exercise Development

A Work Plan was developed to guide Workgroup 2 efforts in assisting DOE with development of the functional exercise. Workgroup 2 was charged with two key focus points for assisting in the development of the exercise: 1) establishing a way to test DOE initial activation procedures and 2) demonstrating coordination between government (federal, state, and local) and industry partners. While providing significant input to DOE's exercise contractor, DOE led the overall planning and development effort for the exercise.

Using the key NPC Emergency Preparedness study recommendations and following Homeland Security Exercise and Evaluation Program (HSEEP) guidance, Workgroup 2 developed an Exercise Evaluation Guide (EEG) focusing on key priorities and providing a foundation for exercise development. The EEG outlined what the NPC observers desired to see demonstrated during the exercise play. Workgroup participants used these expected player actions to develop exercise injects that would create an environment for expected player actions to occur. These injects were incorporated into the exercise script, the Master Scenario Event List (MSEL), developed by DOE exercise planners.

The basic process was as follows:

Detailed observations and suggestions for improving future DOE functional exercises can be found in Appendix E.

Workgroup 3 – Observation Team

Workgroup 3 was formed to coordinate a team of observers for the functional exercise on Day 2 of the DOE Clear Path IV exercise. This team was composed of emergency preparedness and response professionals with years of experience both leading exercises and participating in exercises, as well as significant experience leading response teams during actual response events. The role for Workgroup 3 was to observe the DOE Clear Path IV exercise and offer insights on DOE's progress in implementing the 2014 NPC report recommendations and thoughts on areas for continuing improvement in DOE's emergency response system. In addition to observing the exercise, Workgroup 3 had the opportunity to interview some DOE employees and industry representatives on the progress of the NPC study recommendations that were not exercised in the scenario. The details from Workgroup 3's observations form the basis for the detailed comments that follow.

OBSERVATIONS OF DOE'S EXERCISE AND IMPLEMENTATION OF 2014 RECOMMENDATIONS

The Clear Path IV exercise allowed the NPC to observe progress toward the seven recommendations in the 2014 NPC report, since the exercise touched on many of the areas discussed in the NPC study. This section covers the NPC observations relative to each recommendation. The review was not intended to be a complete assessment of the progress to date, since it was based mainly on the exercise observations. The exercise had several limiting factors for observations, such as exercise controls, technology, and physical constraints within DOE, and some recommendations were not exercised during Clear Path IV.

The most challenging building blocks of a successful response program are leadership commitment and a program owner who is given the resources to sustain the program. The long-term commitment to these two components will be fundamental to DOE's successful emergency preparedness and response effort. Many of the 2014 NPC recommendations, such as the Incident Command System (ICS), are institutional frameworks to manage incidents, and it is the leadership commitment and the program owner that ensures their effective implementation and use. DOE has clearly begun the process of setting an emergency preparedness foundation.

An effective preparedness and response program is a long-term endeavor. The organizations with mature programs have been implementing and continuously improving their programs for many years, even decades. In order to sustain and build on past progress over time, the NPC cannot adequately emphasize the importance of a formal management-of-change process. A management-of-change process is an essential component in any program, but the added complexity of the election-driven change of the Administration and the large turnover of senior staff over a very short time heightens the criticality of change management. The NPC encourages DOE to make management of change a key priority in planning for a new Administration and an ongoing priority of the emergency preparedness and response program.

Following is a brief overview of high-level observations on preparedness and response program progress and areas for continuing improvement. This overview is followed by more detailed observations. The NPC offers these suggestions in the spirit of continuing improvement and looks forward to continuing to work with the Department over the next years and decades as industry and government work jointly to improve preparedness and response programs.

Overview – Operational Framework

The exercise demonstrated the DOE leadership's commitment to establishing a preparedness and response program, which is the first step in further program development. One of the clear improvement areas was the inclusion of EIA in the ERO response team, and it appeared that EIA participants understood their roles. To develop into a seamless team in the Situation Unit, EIA will require documentation of clearly defined roles and responsibilities and additional practice. EIA's inclusion seemed to help others outside the industry to understand

the antitrust issues that require EIA's confidential information handling. Based on interactions with industry through the Oil and Natural Gas Sector Coordinating Council (ONG SCC), EIA has also compiled a foundational list of company liaison contacts to use during such incidents.

A key effort in improving and maintaining a preparedness and response program is the process of continuous improvement. DOE should continue to build their capability and understanding of the ICS to ensure its consistent use across the entire preparedness and response team. The observation team has noted that a review of DOE response plans, staffing, and facility space may offer areas to advance effectiveness. In the staff category, there may be opportunities to increase the leverage of EIA staff as part of the response team. In addition, the ONG SCC and the EIA should work together to ensure that the liaison contact list maintenance process is institutionalized and sustainable, and work with DOE's Energy Response Organization to synchronize planning.

Overview – Sustaining the Process

The Clear Path IV exercise was a significant step forward in improving industry and DOE energy emergency preparedness cooperation. Through the ONG SCC and its member trade associations and companies, the industry has also been reaching out to DOE for government attendance or participation in individual company exercises. As DOE personnel continue to participate in industry exercises, moving from observation to actual participant roles will advance the value of that input. The fuels workshop on Day 1 of the exercise was an important opportunity for states to improve understanding of industry supply chains and use that knowledge in the development of their state fuel preparedness plans. It also was an opportunity for industry participants to improve understanding of state and federal roles during emergencies. The move to a functional exercise created the opportunity for industry and government to work together not just during the exercise, but during the planning and review processes. This created an ongoing dialogue and facilitated the development of working relationships that are likely to continue for years.

This DOE and industry collaboration highlighted opportunities for continuing improvement. The fuels workshop and the discussions on fundamental supply chain issues emphasize the need for ongoing training and education between government and industry at all levels so that the fuel production and distribution network is more clearly understood in advance of an emergency by those that will be working toward restoration. Such collaboration will also help to inform more industry personnel on government roles, including situation assessments and areas in which government assists in restoration. Future exercises can build upon Clear Path IV and provide even greater value in supporting the industry and government emergency preparedness and response systems.

Following is a detailed review organized around the original 2014 NPC emergency preparedness recommendations that includes many suggestions for improvement directed at industry, states, and the Department of Energy. A few key issues have been identified as the

most critical to advance the DOE emergency preparedness and response program, as well as industry and state programs.

Key Action Items for DOE

- Conform to ICS organizational structure, roles, nomenclature, and processes (avoid customization). The ICS approach provides standardization through consistent terminology and established organizational structure.[1]
- Develop a continuity and management-of-change strategy. This should include a staffing plan for key emergency preparedness and response positions, which addresses employee turnover and retains subject matter expertise, historical knowledge, and an understanding of work processes to ensure a long-term organizational core team. In addition, a process owner for emergency preparedness and response leadership, who has a long-term commitment to the program, is a key component of continuity.
- Engage experienced, operational responders and practitioners as coaches to assist with emergency preparedness and response design, documentation, knowledge, tools, and training (e.g., U.S. Coast Guard, subject matter experts from industry operators, etc.).
- Expand training and exercises. Continue collaboration with industry, states, and others.

Key Action Items for Industry

- Collaborate with EIA on the design of a sustainment process for the company liaison contact system with the ONG SCC.
- Formalize a process to share industry exercise schedules and engage both DOE and state governments' participation through the Energy Government Coordinating Council (GCC).

Key Action Items for States

- Establish routine review and update of state energy assurance plans.
- Expand understanding of energy system interdependencies.
- Improve understanding of oil and natural gas supply chains, including regional and national implications of disruptions.

DETAILED REVIEW OF 2014 NPC REPORT RECOMMENDATIONS

The following section incorporates observation details to review progress toward meeting the original 2014 NPC recommendations. Each recommendation begins with the 2014 report language and descriptive bullets in blue text. The comments are organized into two subsections noted as "Progress Observed" and "Opportunities for Improvement."

[1] National Incident Management System, Homeland Security, December 2008.

Recommendation 1

Harmonize DOE's energy response team structure with the National Incident Management System (NIMS) Incident Command System (ICS).

- Adopt scalable model from local to regional to national – Stafford Act enacted or not
  - Use common nomenclature, structure, tools, training
  - Ensure connectivity at local level and higher levels
  - Maintain clear contact points between government and industry ICS structures
- Develop DOE culture and knowledge of ICS
  - Ensure staffing and training to sustain both capabilities and competencies between incidents
  - Identify mechanism (e.g., U.S. Coast Guard) for training DOE staff on ICS.

Progress Observed

Observers had a sense of DOE leadership commitment, which is critical to developing and maintaining a preparedness and response program for DOE to use in performing its role under ESF-12. DOE leadership has expressed on various occasions their desire to implement the NPC study recommendations, including adoption of ICS as the response organization and communication tool.

- The Deputy Secretary's participation in the exercise debrief and in the Emergency & Incident Management Council (EIMC) meetings indicated her interest and commitment to improving the DOE preparedness program. She was focused on lessons learned from the exercise and understood the importance of participating in exercises with the industry.
- The Deputy Assistant Secretary's leadership was responsible for supporting and providing resources for the exercise, including participating in the NPC activity associated with this event and allowing NPC observers to attend.

The DOE Office of Electricity Delivery and Energy Reliability has progressed in harmonizing its response structure under NIMS ICS.

- Since the 2014 NPC study, DOE has developed an Energy Response Plan document, which contains the basic concepts of the ICS.
- The functions (legal, safety, public affairs) were organized under what appears to be the Command Staff.
- The Energy Response Organization (ERO) was organized under the basic structure of ICS and contained the following sections: Operations, Planning, Finance, and Logistics.

Opportunities for Improvement

DOE's response organization design needs to be fully consistent with NIMS ICS and avoid terminology that creates confusion, particularly with staff group designations. Strict conformity to ICS structure, nomenclature, and documentation of DOE Energy Response Plan organization structure will improve the effectiveness of DOE response and interaction with other public and private response stakeholders.

- Implementation of the ICS, under NIMS, is not consistent across organizations and first responders at all levels of government. Although many agencies at local, state, and federal levels use ICS, the variability in application undermines the efficiencies sought through standardization. A consistent, disciplined process for communication between federal agencies and with industry can lead to more timely and quality information to support situational awareness and decision-making during natural disasters.
- The use of staffing position terminology and some documents provided during the exercise created confusion as to who was performing certain roles. It was particularly unclear to the observers who was performing the role of Incident Commander during the Clear Path IV exercise. DOE needs to clearly define the terminology for positions and the associated roles with them**.**
  - At various time the ERO Director seemed to be performing the function of Incident Commander and at other times it appeared that this function was housed in the Senior Energy Response Official (SERO) position.
  - Various versions of the organization charts indicated three different reporting structures for the SERO, Command Staff, and ERO Director.
    - The Energy Response Plan indicates that the Public Affairs Officer would report to the SERO and the Legal Officer would report to the ERO Director. In a NIMS compliant ICS, the Command Staff would report to the Incident Commander.
    - During the exercise, the Command Staff (legal and public affairs) reported to the SERO. In NIMS ICS that would indicate that the SERO was the Incident Commander.
    - The Exercise Player Layout document, provided to the observers, used the term Chief of Staff in place of the ERO Director and did not indicate any position termed the SERO.
    - Another document provided to the observers indicated that both the Command Staff functions (legal and public affairs) reported to the ERO Director.
  - All the organizational charts provided to the observers, and in the Energy Response Plan, indicated Finance, Logistics, and Administrative functions are being supplied by the same person. In a NIMS ICS compliant structure, rather than combining functions under one Section, if any functions identified in ICS as beneath the level of Incident Commander are not being performed by that ICS Section, they are the responsibility of the Incident Commander.

- EIMC is not a standard ICS element, roles and responsibilities are not clear, and chain of command was not consistent nor clear relative to the ICS structure. The ERO (on Day 2) waited for the EIMC to establish priorities, which were communicated to the Unified Command Group (UCG) and then the ERO. Within a typical ICS, the ERO would be recommending objectives to the UCG as input to EIMC.

Roles and responsibilities of response team positions need to be clearly understood by all; documentation of roles and responsibilities must be described sufficiently in the Energy Response Plan. (Note: The Energy Response Plan references other supporting documentation – e.g., The "Energy Response Organization Tactical Procedures Manual" and the "ESF #12 Program Plan" – that may have more detail and description, but were not available to the assessment team for review.)

- There was confusion between UCG roles of command and coordination. There is a significant difference between "command" and "coordination" and the correct terminology should be decided upon based on the role of that group. Typically, a UCG is created when leadership is joint with members from different organizations. The exercise UCG was made up of players from the DOE (i.e., an Office of Electricity Delivery and Energy Reliability and National Nuclear Security Administration [NNSA] Leadership Team). The significantly different missions between these DOE response teams should be considered in the use of any "unified command/ coordination" group. It may be appropriate for some responses, but that should be clearly articulated in DOE's energy response plan and terminology changed to avoid confusion with ICS definitions.
- The Energy Response Plan had very short role and responsibility descriptions for each position, which lacked sufficient clarity. Clarity of role for each response section must be clearly understood by all response team members to ensure a cohesive response team and avoid duplication of effort.
- The functions of the EIMC, UCG, and ERO did not appear to be completely understood by all the members of each group. This added confusion between roles for each group and in turn clear direction on goals, objectives, and situational status were not followed with the rigor that we would normally expect under an ICS organizational structure.

Standard ICS work processes and tools should be fully used to improve the effectiveness of DOE's response team; adherence to these processes and tools, throughout the event, will enable DOE to quickly align with and work effectively in a real response with other public and private organizations.

- There was no evidence of the development of a DOE Incident Action Plan (IAP) for the response. Without the initial development of an IAP and a repeatable process to update the IAP with the changing scenario, there is no way for the response team to keep up with all the changing situation. DOE used what they referred to as "Battle Rhythm" as their planning tool. Battle Rhythm is not a term routinely used or understood by other organizations and agencies operating under ICS.

  - The Battle Rhythm was observed to be a list of pre-defined meetings or conference calls and times. The use of this Battle Rhythm alone could not produce an ICS quality IAP. The IAP is a document that contains the response objectives, communication of the objectives, strategic direction, tactical plans to accomplish the objectives, identification and allocation of resources, the development of a situational status board (display), and the operational period for activity. The IAP is reviewed and signed off on by the Incident Commander. It is used to ensure cohesion of mission by the response team and is the plan for accomplishing the objectives.

- The ICS standard Planning "P" process was not leveraged to develop the IAP**.**
  - The use of the ICS standard Planning "P" process was absent from the response planning process. DOE indicated in later interviews that the Battle Rhythm was intended to be the process to develop their primary product – the Situation Report. The Battle Rhythm, as observed, could not replace the Planning "P" process and lacks the ability to adequately develop the IAP. Without the use of an IAP, developed by the use of the Planning "P", a coordinated and efficient response effort will be extremely difficult to maintain. Trained responders, operating under ICS and the Planning "P" process can progressively handle and accomplish complex scenarios. Our observation is that the Battle Rhythm, as currently used, cannot be relied upon the use in a long-term or complex scenario.
- There was no situational status board available in the DOE Emergency Operations Center (EOC) to inform the entire response team of the status of the response. This would include resources identified and allocated; response objectives; a situational display (map) of the operations area; response organization chart with specific names assigned to each section; etc. It was the observers opinion that WebEOC was intended to be used, but it did not work and there was no attempt to display wall charts.

DOE's Energy Response Plan should include sufficiently trained staff to cover Incident Command roles and EOC operations for a scenario that extends 24/7 operations over an extended period (weeks or months). The EOC staffing during the exercise appeared to be inadequate to handle this specific exercise scenario.

- The observers saw or heard no recognition concerning this issue.
- DOE indicated that it is investigating training other DOE employees outside of the Infrastructure Security and Energy Restoration Division to fill those roles.
- DOE indicated that its rationale for "doubling up" on the ICS Section Chief positions was to provide an opportunity for cross-training.

Guidelines should be developed for managing response to simultaneous events. Establishing a Unified Command approach across the events would be valuable when the events impact the same region and/or sector and response requires coordination and allocation of similar resources. When there are few or no interdependencies between response resources, it

may be more effective to manage each event under a discreet response structure (ERO) with communications integrated at the EIMC level. The complexities, diversities, and dynamics of managing a response to simultaneous events, across sectors, regions, and agencies is difficult. The decision for an integrated response team under Unified Command is situation and event dependent. However, once decided, fully utilizing the ICS process and tools to clearly communicate response scope, responsibilities, and action plans is a critical enabler to ensure response teams are aligned and effective.

- Responding as a "unified response organization" between the Cascadia scenario and the nuclear threat scenario was confusing. Even though these scenarios were introduced as having one response team, the parties addressing these scenarios routinely worked in separate spaces.
- It appeared that the integrated functions had limited benefit and added to the role confusion.
- Integration at the higher levels, perhaps the EIMC, is more appropriate.

Emergency Operations Center (EOC) logistics should accommodate a wide variety of internal and external participants supporting unified command, including reliable communications, sufficient space, redundant systems, and other EOC design best practices. The EOC used for this exercise appeared have significant limitations and perhaps hindered a more cohesive response.

- Using restricted (classified) space for non-classified emergency response operations adds unnecessary constraints to communications and interactions. For the exercise, DOE provided escorts who were helpful, informative, and professional; they accommodated requests quickly and pleasantly, but in a real event, if there are un-cleared participants, these limitations may be difficult to coordinate effectively.
- The DOE Emergency Operations Center had limited space to handle a large exercise; the Unified Command Group was isolated from the rest of the team.
- Communication system issues required the EIA situation unit representative in the EOC to leave the exercise room for extended periods during the afternoon to communicate with the EIA team.

Summary – Recommendation 1 Input

The discipline of ICS, using the systematic, standardized approach, provides an effective mechanism for DOE to act as the coordinating, primary agency for energy infrastructure assessment, repair, and restoration within the federal government as part of the National Response Framework and the National Incident Management System. The benefits of implementing ICS as designed includes: standardized organization structure with clearly defined roles and responsibilities, integrated communications that facilitate escalation of issues, situation assessment, common operating picture, and coordination of response across agendas and sectors.

Recommendation 2

Leverage the Energy Information Administration's (EIA) subject matter expertise within DOE's energy response team to improve supply chain situation assessments.

- Staff situation unit leader and support personnel from EIA (most knowledgeable on industry supplies)
- Develop situation assessment via two communication paths
  - Bottom up through government ICS structure (ESF-12 contact, PSAs, JFO, etc.)
  - Direct one-on-one communications and coordination with Industry Supply Chain Liaisons
- Summarize overall fuel supply situation and cascading events and timelines
- Aggregate industry support requirements
- Support DOE continuing to assess and implement social media information gathering.

Progress Observed

EIA participated in the Planning Section of the Energy Response Organization (ERO), with a staff person in the Emergency Operations Center (EOC). EIA staff supporting the ERO were located outside of the EOC in an EIA data-secure area in order to collect and process individual company data for the Situation Report. EIA has prepared a list of questions to pre-identify the types of information that will be required during a real disruption event. EIA used simulated contacts for industry representatives to get an initial assessment of the supply chain procedures for purposes of the exercise.

A Situation Report was produced that covered major energy facilities status and information on recovery. The Energy Response Plan indicates that the Situation Report is the primary product of the ERO during a major event. While the exercise began Day 2 with a prepared Situation Report, the Planning group produced a second report toward the end of the day, using input from EIA.

Opportunities for Improvement

Use of EIA's subject matter expertise within DOE's energy response team did not appear to be fully exercised. Incorporating this role as a learning objective into future exercise design may assist in increasing EIA's effectiveness to the process. This is another example of where the Energy Response Plan needs to be updated to clarify and codify EIA's roles and responsibilities.

EIA's role in the ERO as observed during the exercise should enhance its ability to interact more effectively with situation assessment. EIA's support to the Situation Unit, under the ICS structure, should be formalized, and training on emergency response protocols and tools should be provided to EIA personnel. EIA has many statistical analytical skills and abilities that can aid DOE's assessment of impacts to the energy sector during a supply disruption. EIA individuals assigned to the ERO Situation Unit roles should have a broad knowledge of the oil

and gas supply chains, sensitivity to business proprietary and company confidential data, and understanding of the supply markets. More fully leveraging EIA's subject matter expertise on the ERO team will improve the quality of analytical and situation assessments produced by DOE and used for decision-making more broadly.

Recommendation 3

Establish company liaisons and direct communication with DOE's energy response team to improve situation assessments.

- DOE ICS Liaison to gather one-on-one information prior to or during supply chain disruptions
  - Develop best and fastest source for information and clarity on supply, delivery issues, and support needs
  - Advise DOE on situation assessment (status, potential cascading events, response activity)
  - Highlight antitrust and confidentiality limitations that preclude joint industry/trade association support
- Oil and Natural Gas Sector Coordinating Council (ONG SCC) to support DOE in maintaining two-way contact roster (regional/national)
- DOE and industry to establish contacts in advance of emergency event.

Progress Observed

In 2015, the NPC, ONG SCC, and EIA compiled company liaison contact information. As recommended, the information represents the single point of contact for DOE to contact companies in support of situation assessment, and an avenue to contact senior company officials, as intended in the NPC study recommendations.

- An NPC request for contact information was distributed to all NPC member companies and trade associations. The letter, supported with FAQ, outlined the key information requested and protocol to be followed by EIA to maintain confidentiality of the information.
- The ONG SCC supported the compilation of the current company catalogue. Since company participation is voluntary, the ONG SCC and trade groups worked on a prioritized list of companies to ensure effective industry coverage in different segments of the industry. The list includes:
  - Refining companies – approx. 96% of all the refining companies that operate an individual refinery capacity of >150,000 bpd; this represents approx. 86% of all U.S.-based refining capacity
  - Midstream companies (liquid pipelines & terminals) – approx. 65% of all midstream companies that were listed in the top tier by capacity or throughput. This includes for liquid pipelines – top 25 by bbl. delivered or miles of pipe; for terminals – top 10

by bbl. of capacity or number of terminals; and for FERC-regulated companies – 28 companies.

- Natural gas and oil production companies – 14 companies.

EIA has stated its intention to validate and update the list annually through an exercise call-out procedure, but this was not practiced during the exercise.

The ONG SCC has updated the sector plan appendix on emergency management during supply chain disruptions. This includes: ONG SCC Roles and Limitations, key reference material (API *Oil and Natural Gas Industry Preparedness Handbook*, 2014 NPC report), description of how the oil and natural gas sector companies prepare and respond to incidents, and company organizational structure and operations under the National Response Framework. The appendix was approved and the API handbook adopted by the ONG SCC.

EIA validated key oil and gas companies in PADD 5 in preparation for the Clear Path IV exercise.

Opportunities for Improvement

EIA may need to assess the completeness of the contact list for all PADDs and coordinate with the ONG SCC to fill any identified gaps.

EIA has not tested the Liaison Contact System. During Clear Path IV, a simulation contact list was used, so the actual liaison call-out protocol was not used.

The ONG SCC and EIA need to work together to institutionalize a sustainment process for the liaison contact list. Within DOE, a formal protocol between the Energy Information Administration and the Office of Electricity Delivery and Energy Reliability should be established to clarify the information sharing and staff roles.

Recommendation 4

Streamline and enhance processes for obtaining temporary regulatory relief to speed up recovery.

- Develop best practice language and standardized templates for key temporary regulatory relief
- Key improvements:
  - Improve existing Environmental Protection Agency (EPA) process for federal fuel waivers to reduce delays and decrease uncertainty
  - Identify Clean Air Act provisions/restrictions on EPA waiver authority that may create uncertainties that hinder response activities
  - Improve state fuel waiver processes
  - Improve Jones Act waiver process.

Progress Observed

The DOE Energy Response Organization (ERO) processed a request for regulatory relief as part of the Clear Path IV exercise.

Opportunities for Improvement

The exercise response to an inject for a Jones Act waiver request indicates additional work may be needed in this area.

- The Unified Command Group (UCG) spent time working a Jones Act waiver (transportation of goods and fuel on non-U.S. flagged vessels between U.S. ports), which should be a clearly defined and documented process. Regulatory relief involving other agencies was not part of the exercise.
- Any regulatory relief communication with the simulated federal interagency National Response Coordination Center was not observed.

In order to respond effectively to the many different waivers and associated authorities, DOE may want to document the specific roles of DOE and specifically the Office of Electricity Delivery and Energy Reliability in the various waiver processes. This documentation could be included in the energy response plan to identify the appropriate DOE department and ICS people to oversee waiver process requests and to provide interagency support. The API *Oil and Natural Gas Industry Preparedness Handbook* provides an overview of the many possible waivers that have occurred during emergency events.

Recommendation 5

States should increase engagement with the oil and natural gas industry in their energy assurance plans, and industry members should assist the states in such efforts.

- DOE and states to assess comprehensiveness of state energy assurance plans
  - States to increase industry involvement with plan development (role for ONG SCC, trades)
  - Include assessment of vulnerabilities and risk assessments of supply chains
  - Ensure resiliency considered in permitting process (i.e., gas vs. electric for natural gas compression)
  - Address interdependencies (cross-regional and cross-industry)
  - Verify plans for ensured fuel supply and distribution points for first responders
- Industry to ensure that interdependencies are addressed in Business Continuity Plans.

Progress Observed

Clear Path IV Day 1 agenda provided an opportunity for states to engage with the oil and gas industry to share understanding and enhance state (Washington, Oregon) energy assurance plans. Oregon identified additional areas for improving its plan and Washington used the exercise to inform the drafting of a plan under development.

- State-industry discussion topics included industry assessment processes; overflights or damage assessment; and alternative sources of products, supplies, and personnel.
- Authority to allocate fuel was discussed, recognizing the complexity of different authorities and how this issue is a regional issue that would need detailed analysis in each state plan.

The ONG SCC and National Association of State Energy Officials (NASEO) hosted a joint meeting of state energy officials and industry in October 2015 to discuss further implementation of the NPC recommendations.

DOE and NASEO are working together on a process with the states to improve and update state energy assurance plans, training, and exercises, pending available resources.

- This is a follow-up to a major joint program that concluded in 2014 and was funded by DOE to establish energy assurance plans in the states.
- In February 2016, the Secretary of Energy entered into a Memorandum of Understanding to strengthen and expand communications and information sharing through the Energy Emergency Assurance Coordinator program with NASEO, the National Association of Regulatory Utility Commissioners, the National Governors Association, and the National Emergency Management Association.

DOE's Office of Electricity Delivery and Energy Reliability has supported a State Energy Risk Assessment Initiative to help state energy agencies better understand risks to their energy infrastructure so they can be better prepared to make informed decisions about their investments, resilience, response, and hardening strategies.[2,3]

Clear Path IV demonstrated an effective way for states not only to test their plans, but explore more opportunities for industry involvement.

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[2] U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability. "State Energy Risk Assessment Initiative." http://energy.gov/oe/mission/energy-infrastructure-modeling-analysis/state-and-regional-energy-risk-assessment-initiative.

[3] U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, Energy Modeling and Analysis Division. "Energy Risk Resource Library." December 31, 2015. http://energyoe.maps.arcgis.com/apps/MapSeries/index.html?appid=ece7b1c390b24177b4361784104cab7d.

Opportunities for Improvement

All stakeholders need to make a greater effort to communicate during steady state operations, and not just immediately before or during an event. The pathways for communication between states and industry are identified in the API *Oil and Natural Gas Industry Preparedness Handbook* and the 2014 NPC report.

Discussions during Clear Path IV Day 1 of the exercise highlighted that federal, state, local, and industry stakeholders have not sufficiently discussed the cause and effect of interdependent energy systems as they relate to planning, allocation of resources, and potential supply and demand concerns during an energy disruption event.

Federal, state, local, and industry preparedness plans should be enhanced to address allocation of resources and cascading supply and demand implications during a disruption event.

State energy plans require routine review and updating.

Recommendation 6

Both DOE and states should establish routine education and training programs for key government emergency response positions.

- Use and maintain the API *Oil and Natural Gas Industry Preparedness Handbook* as a key reference
  - Overviews: supply chains, pre-event preparations, operational models, regulatory relief inventory
  - Enhance API handbook and appendices
- DOE and states to hold regular education sessions
  - Conduct annual refresher education on supply chains in advance of hurricane season
  - Leverage existing federal, state, local, and industry forums for education
  - Engage the correct level of decision-makers and stakeholders (e.g., local decision-makers)
- DOE and states to establish management-of-change processes for key positions.

Progress Observed

The API *Oil and Natural Gas Industry Handbook* has been updated (consistent with the NPC study recommendations). The updated version, published April 2016, is available on the API website; hard copies can be obtained by contacting the API office. API has offered outreach education to various government agencies; there has been select interest and inquiries but no

sessions have been scheduled. The API handbook has been adopted by the ONG SCC as a key reference.[4]

Energy Information Administration (EIA) petroleum supply reports are available for PADD 5 (Clear Path IV region), as well as PADDs 1 and 3.[5,6] These reports enhance DOE Energy Response Organization (ERO) and state government supply chain awareness for regions most likely impacted by natural disasters. Access to these reports enables more effective analysis and improved situation assessment.

ONG SCC members have continued to reach out through the NPC report process, the Energy Government Coordinating Council (Energy GCC), and participation in events such as Clear Path IV to provide industry expertise and experience.

Opportunities for Improvement

Government personnel turnover and management-of-change process remain a continuing concern. Loss of personnel means loss of knowledge. A management-of-change process is an essential component of any emergency preparedness and response program. The NPC encourages DOE to make management of change a key priority in planning for a new Administration and an ongoing priority of the emergency preparedness and response program.

Discussions on Day 1 of the exercise indicated that, as DOE more clearly adheres to its role and response structure under ESF-12, it should work with states to educate them on DOE's role and how they interact with the states. This is especially important for the situation assessment activity. The exercise did not have a visible path for state situation assessment needs to flow to the federal level and for a feedback loop of federal situation reports back to the states. Under the National Response Framework, this would be through the interagency joint field office (JFO).

Continuing education and training of DOE and state staff should be an ongoing priority in the face of expected staff turnover. The educational program objectives need to include both emergency response capabilities, such as ICS, and energy-specific expertise, such as oil and natural gas supply chain basics.

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[4] American Petroleum Institute, *Oil and Natural Gas Industry Preparedness Handbook,* April 2016. http://www.api.org/news-policy-and-issues/hurricane-information/oil-and-natural-gas-industry-preparednes.

[5] U.S. Energy Information Administration. "PADD 5 Transportation Fuels Markets." September 30, 2015. http://www.eia.gov/analysis/transportationfuels/padd5/.

[6] U.S. Energy Information Administration. "PADD 1 and PADD 3 Transportation Fuels Markets." February 3, 2016. https://www.eia.gov/analysis/transportationfuels/padd1n3/.

Recommendation 7

Both DOE and states should improve their comprehensive drill and exercise programs and include industry participation. Reciprocal invitations extended by companies to DOE and states are recommended.

- DOE emergency preparedness program needs an assigned process owner
- DOE with states to establish frequency and scope (local, state, and federal)
- DOE to develop and implement a comprehensive drill and exercise program that fully tests their response plan to supply chain disruptions
  - Engage with other federal agencies and interdependent private sectors
  - Ensure right level participation (senior decision-makers, first responders, etc.)
  - Test understanding of roles, communications, priorities, interdependent infrastructure
- Industry to invite DOE participation in their drills and exercises
- DOE and states to adjust plans based on lessons learned from past drills/exercises and incidents.

Progress Observed

DOE advanced its exercise program by implementing a functional exercise (Clear Path IV) with both the oil & natural gas and the electric industries.

DOE has an assigned process owner in the Deputy Assistant Secretary. This was noted as a critical element in the beginning of the review section of this paper. Continuing to properly resource the preparedness and response effort is equally important.

At each Energy GCC meeting, both DOE and the industry share available information on upcoming exercises or drills for awareness and to encourage participation between industry and government.

DOE has attended exercises or drills hosted by several oil and natural gas companies, including ExxonMobil, Marathon Petroleum Co., and Shell.

Many companies participated in the design and role play at Clear Path IV in 2016. For a list of NPC participants, please refer to Appendix B.

DOE advanced their exercise program by implementing a functional exercise (Clear Path IV) with both the oil & natural gas and the electric industries participating. The Clear Path IV exercise served as an important opportunity for government (federal and state) and industry to work together and advance emergency preparedness capability.

Opportunities for Improvement

Using Homeland Security Exercise and Evaluation Program (HSEEP) guidance, DOE should include industry partners in the multi-year training and exercise planning process.

Continued collaboration between DOE and industry will enable even greater benefit for future exercises. Improved exercise preparation and added training of exercise controllers for the functional exercise component will enhance the exercise benefits.

DOE should consider using ICS coaches (such as Coast Guard strike teams or industry subject matter experts) with the response team during exercises in order to provide more direction in their roles and responsibilities. More advanced techniques will align training and exercise programs with the capabilities and planning as the maturity of the incident management organization grows.

ONG SCC (industry) should formalize a process within the ONG SCC and the Energy GCC for gathering and sharing information on upcoming industry exercises to facilitate DOE and other government agency participation.

Government representatives should expand participation and consider serving as participants in industry exercises, rather than observers, to gain the most benefit from the experience.

Appendices

Appendix A – Secretary Moniz Letter to the Council, March 23, 2015

The Secretary of Energy
Washington, DC 20585

March 23, 2015

Mr. Charles D. Davidson
Chairman, National Petroleum Council
1625 K Street, NW
Washington, DC 20006

Dear Mr. Davidson:

Thank you for the National Petroleum Council's (NPC) exceptional study and report, *Enhancing Emergency Preparedness for Natural Disasters: Government and Oil and Natural Gas Industry Actions to Prepare, Respond, and Recover*.

The Council's study is notable for its comprehensive stakeholder engagements, including many experts and emergency response professionals from Federal, state and local governments; trade associations; and nongovernmental organizations. The NPC emergency preparedness study provides useful advice on how the oil and natural gas industry and government at all levels can better prepare for, and respond to, defined emergencies.

The recommendations on emergency preparedness are simple and straightforward. Our job is to build, maintain, and exercise the connections, communications, and processes necessary for effective emergency management and response. I am committed to action, and the Council's report is valuable in this regard.

The Department has already begun the necessary planning to better harmonize our emergency response team structure with the National Incident Management System. We look forward to working with industry partners to enhance energy system resilience and mitigation strategies to complement our improved emergency response protocols.

This study clearly shows that the Nation will benefit from a more resilient energy system, particularly given the potential threats of climate change, that can either continue to function during incidents or that can recover quickly following an incident. The Council's best management system approach for industry and government to work together will aid this important effort. We look forward to collaborative efforts to support critical oil and gas infrastructure.

I greatly appreciate the time and effort your team dedicated to this study. The President placed a high priority on this subject, and I am pleased that tangible actions were recommended and an implementation plan by government and industry was developed.

Sincerely,

Ernest J. Moniz

Enclosure

Appendix B – NPC Emergency Preparedness Addendum Participants

Emergency Preparedness Addendum Workgroup

Lead		
Philip B. Smith	Manager, Emergency Management and Regulatory Policy & Advocacy	Shell Energy Resources Company
Secretary		
James A. Slutz	Senior Study Coordinator	National Petroleum Council
Members		
David K. Barrett	Senior Corporate Strategic Advisor Corporate Strategic Planning	Exxon Mobil Corporation
Matthew D. Duncan	Program Manager for State, Local, Tribal, Territorial Energy Assurance Infrastructure Security & Energy Restoration Office of Electricity Delivery & Energy Reliability	U.S. Department of Energy
Sean M. Griffin	Program Manager for Exercises Infrastructure Security & Energy Restoration Office of Electricity Delivery & Energy Reliability	U.S. Department of Energy
Jeffrey T. Gunnulfsen	Director Security and Risk Management	American Fuel & Petrochemical Manufacturers
Eric A. Haugstad	Director, Contingency Planning & Emergency Response Environmental, Health, Safety & Sustainability–Contingency Planning	Tesoro Companies, Inc.
Nancy L. Johnson	Senior Advisor, Environmental Science & Policy Analysis Office of Oil and Natural Gas Office of Fossil Energy	U.S. Department of Energy
Suzanne M. Lemieux	Manager, Midstream & Industry Operations Marine and Security	American Petroleum Institute
Jay S. Montgomery	Vice President and Chief Security Officer	Kinder Morgan Energy Partners, L.P.
Fabio A. Naranjo	Operational Excellence/Health, Environment & Safety Process/ Technical Team Lead	Chevron

Jillian Robles	Emergency Management Supervisor	Devon Energy Corporation
Keith C. Robson	Manager Corporate Safety, Security and Emergency Preparedness	Marathon Petroleum Company LP
Robin R. Rorick	Director Marine and Security Issues	American Petroleum Institute
Joanne M. Shore	Chief Industry Analyst Government Relations/Outreach	American Fuel and Petrochemical Manufacturers
Gerard Taylor	Emergency Management Specialist	Chevron

Workgroup 1–Tabletop and Workshop (Day 1)

Lead

Billy J. Powell	Manager, Americas Emergency Response	Shell Exploration & Production Company

Members

Paul D. Andersen	Operations Manager	Williams Northwest Pipeline
Mark L. Anderson	Senior Energy Policy Specialist State Energy Office	Washington State Department of Commerce
Stephanie Arnold	Safety & Security Manager	U.S. Oil & Refining Co
Hannah P. Breul	Team Lead, Petroleum Market Analysis Energy Information Administration	U.S. Department of Energy
Tracy L. Cowan	Manager, Business Continuity	Tesoro Companies, Inc.
Rick Duncan	Director, Borders West Region	TransCanada Pipelines Limited
Todd Felix	Emergency Manager	NW Natural
Jeffrey T. Gunnulfsen	Director Security and Risk Management	American Fuel & Petrochemical Manufacturers
Kelli Gustaf	Crisis & Continuity Management Advisor	BP US Pipelines & Logistics
Eric A. Haugstad	Director, Contingency Planning & Emergency Response Environmental, Health, Safety & Sustainability–Contingency Planning	Tesoro Companies, Inc.
Terry W. Hardman	Manager, Pipeline Control	Williams Northwest Pipeline
Jim Hart	Senior Manager–Gas Operations	NW Natural
Deanna Henry	Emergency Preparedness Manager Nuclear Safety & Energy Emergency Preparedness Division	Oregon Department of Energy
Andrew Holbrook	Manager–Operations, Pacific Northwest	Kinder Morgan Inc.

Suzanne M. Lemieux	Manager, Midstream & Industry Operations Marine and Security	American Petroleum Institute
Scott L. McCreery	Crisis & Continuity Manager	BP Fuels North America
Dean A. Meier	Head Terminal Operator/ Operations Planner	Chevron Willbridge Light Products
Xavier Miller	Supply Logistics Coordinator–Rockies/Pacific Northwest	ExxonMobil
Laura K. Ritter	Lead Analyst–Security Governance and Risk Corporate Information Security Services	Exelon
Jillian Robles	Emergency Management Supervisor	Devon Energy Corporation
Lori Russell	Vice President–Utility Services	NW Natural
Yvonne Sisler	Contractor to Office of Energy/ Infrastructure Security and Energy Restoration	U.S. Department of Energy
Rick Slaugh	Director–Environmental, Health & Safety	Kinder Morgan Energy Partners, L.P.
James A. Slutz	Senior Study Coordinator	National Petroleum Council
Philip B. Smith	Manager, Emergency Management and Regulatory Policy & Advocacy	Shell Energy Resources Company
Gerard Taylor	Emergency Management Specialist	Chevron
Larry West	Coordinator of Maintenance	Williams

Workgroup 2–Exercise Development (Day 2)

Lead		
Jillian Robles	Emergency Management Supervisor	Devon Energy Corporation
Members		
Robert J. Fick	Global Emergency Preparedness and Response Advisor	Exxon Mobil Corporation
Sean M. Griffin	Program Manager for Exercises Infrastructure Security & Energy Restoration Office of Electricity Delivery & Energy Reliability	U.S. Department of Energy
Eric A. Haugstad	Director, Contingency Planning & Emergency Response Environmental, Health, Safety & Sustainability–Contingency Planning	Tesoro Companies, Inc.

Suzanne M. Lemieux	Manager, Midstream & Industry Operations Marine and Security	American Petroleum Institute
Kevin P. O'Prey	Senior Vice President/ Contractor to Infrastructure Security and Energy Restoration	Obsidian, A Cadmus Company/ U.S. Department of Energy
Barbara T. Parker	Oil Spill Response and Advocacy Manager	Shell Exploration & Production Company
Billy J. Powell	Manager, Americas Emergency Response	Shell Exploration & Production Company
Rick Slaugh	Director–Environmental, Health & Safety	Kinder Morgan Energy Partners, L.P.
Gerard Taylor	Emergency Management Specialist	Chevron

Workgroup 3–Observation Team

Lead

Jay S. Montgomery	Vice President and Chief Security Officer	Kinder Morgan Energy Partners, L.P.

Members

David K. Barrett	Senior Corporate Strategic Advisor Corporate Strategic Planning	Exxon Mobil Corporation
Robert J. Fick	Global Emergency Preparedness and Response Advisor	Exxon Mobil Corporation
Marshall W. Nichols	Executive Director	National Petroleum Council
Barbara T. Parker	Oil Spill Response and Advocacy Manager	Shell Exploration & Production Company
Keith C. Robson	Manager Corporate Safety, Security and Emergency Preparedness	Marathon Petroleum Company LP
Robin R. Rorick	Director Marine and Security Issues	American Petroleum Institute
Joanne M. Shore	Chief Industry Analyst Government Relations/Outreach	American Fuel and Petrochemical Manufacturers
Michael Smith	Senior Advisor Office of Electricity Delivery & Energy Reliability	U.S. Department of Energy

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Appendix D – Clear Path IV Exercise Workshop (Day 1) – State Fuel Plans

The Fuels Breakout Session reviewed the plenary and discussed how incident management applies to the oil and natural gas sector: response in the initial phase of a disaster and then followed by a shift in approach during the long-term response that requires activities beyond emergency response.

The session clarified the following:

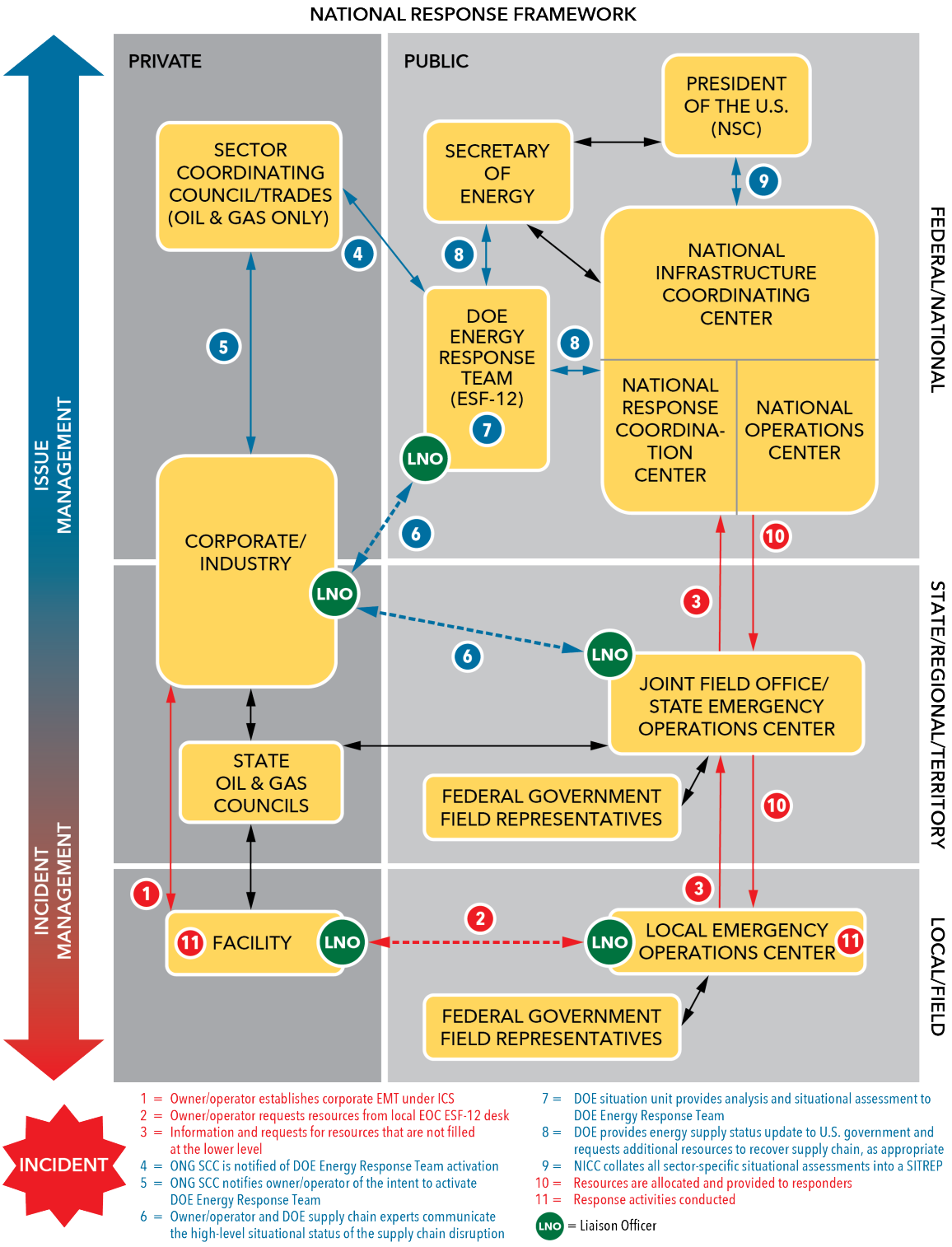
- The states of Washington and Oregon both have fuel plans with some areas still in development. Oregon's plan was fairly well defined (staging areas, storage requirements, some predesignated, etc.)
- There are two types of fuel issues (refer to National Response Framework flow chart at the end of this appendix):
    - Incident Management (Emergency Response Phase – Life Safety)
        - State and county Emergency Operations Centers (EOCs)
        - Fuel needed to support ESF-10 and early ESF-12 activities
        - EOCs have direct communications to terminals and refineries for ESF-10 fuel needs
            - Strictly needs for emergency response – not forecasting supply for recovery or condition of facility
        - Communications are conducted privately with terminal/facility and not provided in group setting with other industry members. Discussions must be confidential to ensure compliance with antitrust regulations. This should be acknowledged in State Fuel Plans.
        - Lack of electric power may require management-of-change reviews for other methods of fueling such as gravity-fed options.
        - Immediate need will be for generators for emergency response fuel only, not recovery
    - Issue Management (Recovery Phase – Long-Term Fuel Supply)
        - DOE Emergency Response Team ESF-12
        - Antitrust prevents discussion of fuel providers in a group setting, as noted above; this issue should be clearly acknowledged in state plans (early identification of process for long-term fuel discussions)
            - Industry to have direct contact with Energy Information Administration (EIA) – Individual companies discuss supply and recovery needs based on assessment, timing, etc. (EIA provides the point of contact for DOE.)

        - EIA to aggregate information and coordinate with DOE emergency response team (incident commander) to share totals with states impacted, etc.
        - Include condition of facility and needs for recovering facility
        - Electric needs – generators, heavy lift helicopters, etc.
    - Other fuel supply topics
        - How to manage regional supply?
        - How to consult with oil companies for additional supply from out of region to meet recovery needs?
        - Prioritizing recovery of assets in region based on impact
        - Who can recover the quickest – which refinery, terminal, etc.?
    - National Response Framework flowchart (see graphic) needs to be included in state plans
        - Communication process to/from state and federal
    - Need for early identification of waivers in state plans
        - Fuel Waivers
        - Jones Act Waivers
        - U.S. Army Corps of Engineers Waivers
        - EPA Air Quality Waivers
        - State Environmental Waivers
        - Federal Environmental Waivers (Oil Pollution Act of 1990 and the Clean Water Act) – Estimated Daily Recovery Capacity
        - U.S. Navy Single-Point Mooring Systems
- State plans need to address engagement and coordination with EIA in regard to information about fuel supplies in a region.
- Discussions focused on response coordination 14 days after the incident. While some power will be restored in less impacted areas, it will be a major effort to restore areas in the Pacific Northwest that received severe infrastructure damage.
- For a major earthquake, the region's fuel supply would be difficult to access and distribute due to damaged pipelines, roads, and ports. State plans should address the following:
    - Fuel supplies would have to come from outside the region either by truck, rail, or ship.

    - With the highway, bridges, rail, and waterway infrastructure destroyed, there would be a reliance on trucking fuel into affected areas. Trucking fuel would have limited distribution to affected areas in which there are no accessible roads or bridges due to damage from tsunami waters and earthquake.
    - Delivering fuel by ship would require mooring areas identified for tank ships that could transfer product to barges, etc. In addition, a temporary dock and storage facility would need to be constructed for receiving the fuel.
- There was discussion of adding information to the State Fuel Plans to address streamlining the process and early request of obtaining key waivers (Jones Act, Single-Point Mooring Systems, etc.) for affected areas. Each plan would need to have a clause or statement about antitrust rules as they relate to EIA information. By addressing these and other key issues will assist in response in the region.
- For industry and federal government, early response efforts will be focused on search and rescue (safety and human life) following by environmental emergency response efforts.

In summary, both Washington and Oregon have fuel plans but additional detail is required to address the issues identified above. The workshop participants suggested that an expanded workshop with all stakeholders and industry would be a useful process to ensure the plans cover key issues and lines of communications. The levels of engagement and coordination need to be clearly defined at local, state, and federal levels.

National Response Framework Organizational Model



Source: National Petroleum Council. "Figure 4-3." In *Enhancing Emergency Preparedness for Natural Disasters*. Washington DC: 2014.

Appendix E – Clear Path IV Exercise Critique Details

The NPC offered to assist in exercise development to support DOE in the incorporation of the 2014 NPC study recommendations into exercise play. DOE welcomed this assistance, and NPC workgroups were established to lead these efforts. Workgroup 1 was established to assist with Day 1 activities in Portland. Workgroup 2 was established to assist with Day 2 activities. And Workgroup 3 was established to observe the Clear Path IV activities and serve in the "exercise evaluators" role in terms of the Homeland Security Exercise and Evaluation Program (HSEEP) guidance.

Clear Path IV was developed to provide an opportunity for government and industry to examine the challenges of responding to a catastrophic Cascadia Subduction Zone (CSZ) earthquake and tsunami and to identify gaps within respective response plans and policies.

Objectives for the Clear Path IV event were developed to cover both Day 1 and Day 2 activities:

1. Examine energy sector roles and responsibilities within response plans utilized for a CSZ 9.0 earthquake and tsunami, such as the DOE Energy Response Plan, Federal Emergency Management Agency (FEMA) Regional Plans, State Emergency Management Plans, State Energy Assurance Plans, and industry response plans.
2. Highlight strategies to address fuel disruptions and shortages during a multi-state regional disaster with impacts to oil and natural gas supply chains and methods of transportation.
3. Identify essential elements of information and determine methods and processes of information sharing between state, federal, and industry partners to best provide situational awareness and to develop a common operating picture to support executive and operational decision-making and resource requirements, adjudication, allocation, and disposition.
4. Determine effective identification of critical resources and capabilities, eliminate duplication of requests or delivery, and determine logistical requirements with commercial and governmental methods within multiple mutual assistance networks and systems.
5. Prioritize the restoration of energy systems with state, federal, and industry partners with consideration to cascading impacts to interdependent sectors.
6. Evaluate the DOE Unified Command Structure Concept of Operations with federal, state, and industry partners in responding to the CSZ disaster.

Day 1 activities consisted of a tabletop exercise in the morning followed by sector-specific workshops in the afternoon.

Day 2 activities were planned as a functional exercise engaging members from industry and local municipalities in Oregon and Washington states as controllers in a Simulation Cell to test

members of DOE's Emergency & Incident Management Council (EIMC) and Energy Response Organization.

The purpose of this appendix is to provide feedback about the functional exercise design, development, and execution rather than observations on response effectiveness.

Workgroup 2 Exercise Development

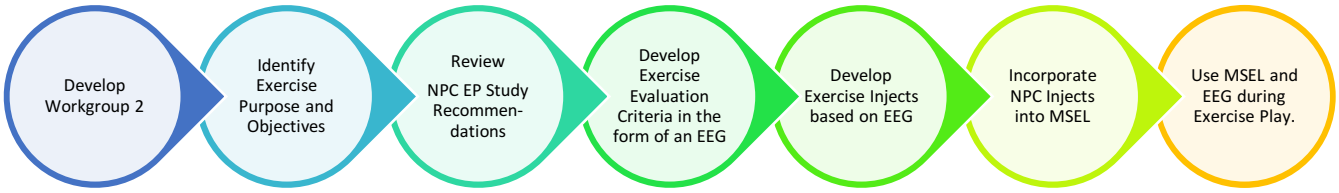
A Work Plan was developed to guide Workgroup 2 efforts in assisting DOE with development of the functional exercise. Workgroup 2 was charged with two key focus points for assisting in the development of the exercise: 1) establishing a way to test DOE initial activation procedures and 2) demonstrating coordination with federal, state, and industry partners.

Utilizing the key NPC Emergency Preparedness report recommendations and following HSEEP guidance, Workgroup 2 developed an Exercise Evaluation Guide (EEG) to address the focus points and provide a foundation for exercise development. The EEG outlined the anticipated player actions based on the 2014 NPC report recommendations.

Workgroup participants used these expected player actions to develop exercise injects that would create an environment for expected player actions to occur. These injects were incorporated into the exercise script, the Master Scenario Event List (MSEL), developed by DOE's exercise leaders. NPC exercise evaluators used the EEG to determine whether or not player actions during the exercise occurred correctly as a result of issued injects.

Workgroup 2 met numerous times via conference call and then in person with DOE's exercise leaders to develop MSEL injects. The MSEL was used during the Clear Path IV exercise as the main script to guide exercise play and ensure that exercise activities tested NPC study recommendations appropriately and in a way that would allow for evaluator observation, as indicated in the EEG.

The basic process was as follows:



Inject development by NPC Workgroup 2 was successful and well received by exercise leaders responsible for MSEL development. All elements in the NPC-developed EEG were addressed and made observable through exercise injects. It is important to note that injects developed by Workgroup 2 were specific to NPC study recommendations and oil and natural gas activities only. These injects were incorporated into the larger MSEL used for exercise play.

As mentioned, a functional exercise was developed to test objectives on Day 2. According to the HSEEP, a functional exercise is best used for testing an operations center environment. A MSEL is initiated by controllers in a Simulation Cell (SimCell) and guides the player actions and behaviors. Injects are redirected to players until the objective is met and validated successfully.

A typical functional exercise has one SimCell and is focused toward a particular player group. In the case of Clear Path IV, the make-up of the controller versus player groups was not well defined and led to confusion leading up to the exercise, as well as on the day of the exercise. One true player group was identified – the DOE group in Washington, DC. However, multiple SimCells also serving as Exercise Players were created. This resulted in players testing players and SimCell controllers testing SimCell controllers rather than the SimCell controllers testing the players.

Success of a functional exercise relies on a well-scripted MSEL and a well-organized SimCell. Initially, it was understood by the NPC workgroups that the SimCell in Portland would be made up of industry partners from both energy sectors as well as key municipal partners and that the players would be the groups representing or working with DOE in Washington, DC. It was not until groups arrived in Portland that workgroup members became aware that controllers in Portland would also be expected to serve as players and that the MSEL was not fully scripted but would be developed ad hoc during exercise play.

In addition, during exercise play, facilitators were injected into sector-specific rooms to begin leading sector-specific discussions related to the scenario and sector priorities. This also caused confusion because it was not directly tied to exercise play. The facilitator placed in the oil and natural gas room was from the electric sector and did not understand the unique dynamics of the oil and natural gas sector. The discussion focused more on industry educating the facilitator about the sector, rather than on an exchange among sector participants.

Exercise Critique

The following exercise critique is based on the HSEEP guidance for exercise design and execution and the professional judgements of industry subject matter experts with decades of experience leading, designing, and evaluating emergency preparedness exercises. These individuals are also the key players in corporate emergency response programs, with years of practical experience in managing incident response operations. The purpose of this critique is to provide input to future DOE exercise leaders and planners for improving the effectiveness of future exercises.

Exercises are meant to be learning opportunities for participants. Exercise objectives and corresponding scenarios are developed to allow participants a safe environment to test their knowledge and skills while guiding key learning principles. Exercises may be organized in a way that allows participants to learn and successfully work through problems. Based on early

discussion with exercise leaders, there appeared to be confusion on whether the exercise goal was a learning environment or whether the aggressive design was intended to highlight deficiencies. This exercise forced players to engage with little guidance and did not appear to embed appropriate operational exercise planning process into the exercise design. An effectively designed exercise can provide both a learning environment and identify areas for improvement.

Functional exercises must be well planned, organized, and executed. These types of exercises are the most difficult to organize and must be controlled by a Lead with experience in developing, executing, and participating in such events. The MSEL must be very "tight" and heavily controlled. "Free Play" must be kept to a minimum and communications must be a tightly closed loop with a well-developed communications directory.

The exercise did engage a great number of players from various industries, disciplines, and levels of government. It is always beneficial having partners from various jurisdictions and companies come together in a common environment and talk through a common scenario. This was a positive element of the exercise.

Another positive element was the opportunity for DOE to interact with the various partners while working through their various plans. This provided an opportunity for partners to interact with DOE and for DOE to interact with partners pre-emergency in a safe environment.

The networking in the Portland venue was also a positive element of the exercise. Partners representing many different entities were able to discuss response activities and share best practices.

The exercise design process for Clear Path IV loosely followed HSEEP guidance. Some HSEEP terminology, documentation, and planning conferences were held; however, the exercise execution lacked command and control. Core elements that could have led to a more successful exercise were missing.

- Exercise objectives were written to cover both Day 1 and Day 2 activities. This created confusion about what the focus would be for Day 1 versus Day 2. The assumption was that the Day 2 activities were primarily meant to engage DOE HQ operation centers.

- A more cohesive functional exercise would have allowed for enhanced testing of the DOE HQ operation centers. However, SimCell operations were not well planned, required controllers to also participate as players, and in some cases, tested the players as much or more than DOE.

- Roles for exercise participants were assigned last minute and not explained. Players were left confused about their role and unsure of what their expectations were for participation. Exercise participants were not well briefed from early in the planning process on their roles during the exercise.

- The MSEL was written as a list of events without connecting logically with input from various partners. This did not lead to a cohesive script for exercise play. A well-developed MSEL will create a conversation between controllers and players. Upon reading through a MSEL, someone unfamiliar with the exercise will be able to understand the exercise scenario and see what is being asked of the players. This was not the case with the Clear Path IV MSEL.

- In addition, the process for executing the SimCell and injects was not clearly communicated or controlled. Players showed up at the exercise with their own MSEL and upon StartEx began implementing exercise injects per their own individual MSEL. These had not been coordinated in advance with the Lead Controller, were not incorporated into the exercise MSEL, and this activity was not recognized until a designated controller was approached with a question about who to send injects to.

- In addition, a MSEL typically simulates partners that are not actually represented as players and designates an appropriate controller for such. This also was not organized well and led to confusion during exercise play.

- The MSEL and exercise documentation to be utilized by controllers during the functional exercise were provided to controllers an hour prior to StartEx, not allowing for adequate review and preparation time. Ideally, this would be provided at the controllers and evaluators briefing.

- An invitation to the controllers and evaluators briefing was sent the day prior to the meeting being held. This should be planned as part of the initial exercise schedule.

- The player list was finalized the morning of the exercise and was also pieced together. Controllers should have been identified in advance to allow for successful exercise play. Any additional participants should have been assigned as Observers.

The exercise could have been even more successful with better planning and preparation for Day 2 events. Key items that should receive additional attention in the future:

- Designate a lead exercise controller with extensive knowledge of functional exercise and MSEL design to lead the functional exercise efforts.

- Identify true desired outcomes for the functional exercise and choose players and controllers for the SimCell that will allow that objectives to be accomplished.

- Create a single SimCell that is only serving as controller. The “hybrid” model was not successful and is not considered a best practice for exercise design.

- Ensure that exercise participants are identified early in the planning process and clearly understand their roles.

- Publish the MSEL and other pertinent controller documents in advance of the exercise and ensure all controllers and evaluators understand the script and items to be accomplished.

- All EEGs should be tied to MSEL injects.

Conclusion

The Clear Path IV exercise was valuable and advanced government and industry engagement on emergency preparedness and response. The exercise provided an excellent opportunity for state and industry partners from the Pacific Northwest to interact. The work planning the exercise and then working together during the exercise created a venue for DOE to interact with industry at local, regional, and national levels.

Disorganization, confusion, and lack of true functional exercise play inhibited some of the benefits that may have been achieved. Better preparation for exercise execution and development of exercise controllers and clarifying roles and responsibilities during exercise play will heighten the benefit of future functional exercises. For future exercises, DOE may want to expand its engagement of industry subject matter experts or others with experience working with industry on functional exercises significantly in advance of an exercise to improve the exercise outcome. Planning for major industry exercises may be a year or longer from initial scheduling through executing the exercise. A DOE exercise such as Clear Path IV has this same level of complexity and requires the same planning time frame.