



# First Responder Training and Geographic Response Strategy (GRS) Testing Exercise Series – Danvers/Salem

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After-Action Report/Improvement Plan

May 8, 2023

The After-Action Report/Improvement Plan (AAR/IP) aligns exercise objectives with preparedness doctrine and related frameworks and guidance. Exercise information required for preparedness reporting and trend analysis is included; users are encouraged to add additional sections as needed to support their own organizational needs.

## EXERCISE OVERVIEW

<b>Exercise Name</b>	2023 Danvers/Salem GRS Exercise
<b>Exercise Date</b>	May 8, 2023
<b>Scope</b>	This was a full-scale exercise planned for approximately six hours at Popes Landing in Danvers and upon the waters of Porter River in Danvers Harbor. Exercise play was limited to Danvers Harbor and the adjacent shorelines.
<b>Mission Area(s)</b>	Prevention, Protection, Response
<b>Capabilities</b>	Environmental Response/Health and Safety, Operational Coordination, Operational Communications
<b>Objectives</b>	<p><b>Objective 1:</b> Demonstrate the ability of local first responders to conduct initial response activities within the first 4-6 hours of an oil spill incident by deploying MassDEP oil spill response equipment and implementing common Geographic Response Strategy (GRS) tactics in alignment with the MassDEP GRS Tactics Guide.</p> <p><b>Objective 2:</b> Demonstrate the ability of local first responders to establish and maintain command and control in the first 4-6 hours of an oil spill incident response by identifying relative health and safety hazards, developing an initial response organization, and communicating response objectives, strategies, and tactics through the completion of an Incident Briefing form (ICS 201) and the facilitation of an Operations and Safety Briefing.</p> <p><b>Objective 3:</b> Demonstrate the ability of local first responders to effectively communicate information and actions between multiple local, state, and federal agencies within the first 4-6 hours of an oil spill incident by identifying a common UHF or VHF radio channel that can be utilized by all participants.</p>
<b>Threat or Hazard</b>	Discharge of oil into a navigable waterway
<b>Scenario</b>	An oil spill has occurred that threatens Porter River and the adjacent shorelines. The Danvers and Salem Fire Departments and Police Department/Harbormasters will utilize various Geographic Response Strategy (GRS) tactics to protect sensitive resources in Porter River and the surrounding area.
<b>Sponsor</b>	Massachusetts Department of Environmental Protection (MassDEP)
<b>Participating Organizations</b>	<p>Participating organizations included:</p> <ul style="list-style-type: none"> <li>• Danvers Fire Department</li> <li>• Danvers Harbormaster</li> <li>• Salem Fire Department</li> <li>• Salem Police/Harbormaster</li> <li>• MassDEP</li> <li>• U.S. Coast Guard Sector Boston</li> <li>• Moran Environmental Recovery (MER)</li> <li>• Nuka Research</li> </ul> <p><b>Note: See Appendix B for participant count</b></p>
<b>Point of Contact</b>	<p>Julie Hutcheson, Marine Oil Spill Prevention &amp; Response Program Coordinator                  Massachusetts Department of Environmental Protection                  Oil Spill Prevention and Response Program                  100 Cambridge St., Suite 900                  Boston, MA 02114                  (617) 366-7424                  julie.hutcheson@mass.gov</p>

Participants undergo instruction in setting up a shoreside anchor system



Participants practice connecting boom sections



Photos courtesy of Nuka Research & Planning Group

Participants learn about the different sorbent materials and culvert plugs



Participants review booming tactics prior to on-water deployment



Photos courtesy of Nuka Research & Planning Group

## EXECUTIVE SUMMARY

### Exercise Planning

In preparation for the Danvers/Salem exercise, both an Initial and Final Planning Meeting (IPM/FPM) were held with members of the Exercise Planning Team (EPT), which was comprised of personnel from each of the participating organizations listed in the Exercise Overview section.

**Based on general direction provided by the EPT, and the overarching exercise scope and objectives mentioned above, the following deployment plans were developed:**

- Deploy 375 ft of boom to test the Exclusion (EX01) strategy detailed in the North Shore (NS32A) GRS (see **Figure 1** below)

### Exercise Conduct

Upon arrival at the deployment site on the day of the exercise, exercise controllers and senior participant personnel conducted a pre-deployment site survey to identify any limitations or obstructions that may impact the deployment plan outlined above. The following factors are typically observed and evaluated during this process:

- Wind speed and direction
- Tidal conditions, water depth, current speed and direction, and other water flow patterns
- Vessel traffic, mooring field density, and other deployment area limitations or obstructions

**Based on the results of this site survey, the following limiting conditions were noted, leading to modifications to the initial deployment plan:**

- After deploying an oil surrogate (peat moss) near the Liberty St bridge, exercise participants observed that strong northerly winds pushed the oil surrogate toward the east/southeast and against the flood tide, making it impossible to effectively test the EX01 strategy.

**As a modification to the initial deployment, the following deployment activities were completed:**

- Deploy 200 ft of a cascading diversion (DV) boom configuration from the Pope's Landing boat ramp
- Deploy 100 ft of containment boom around a docked vessel

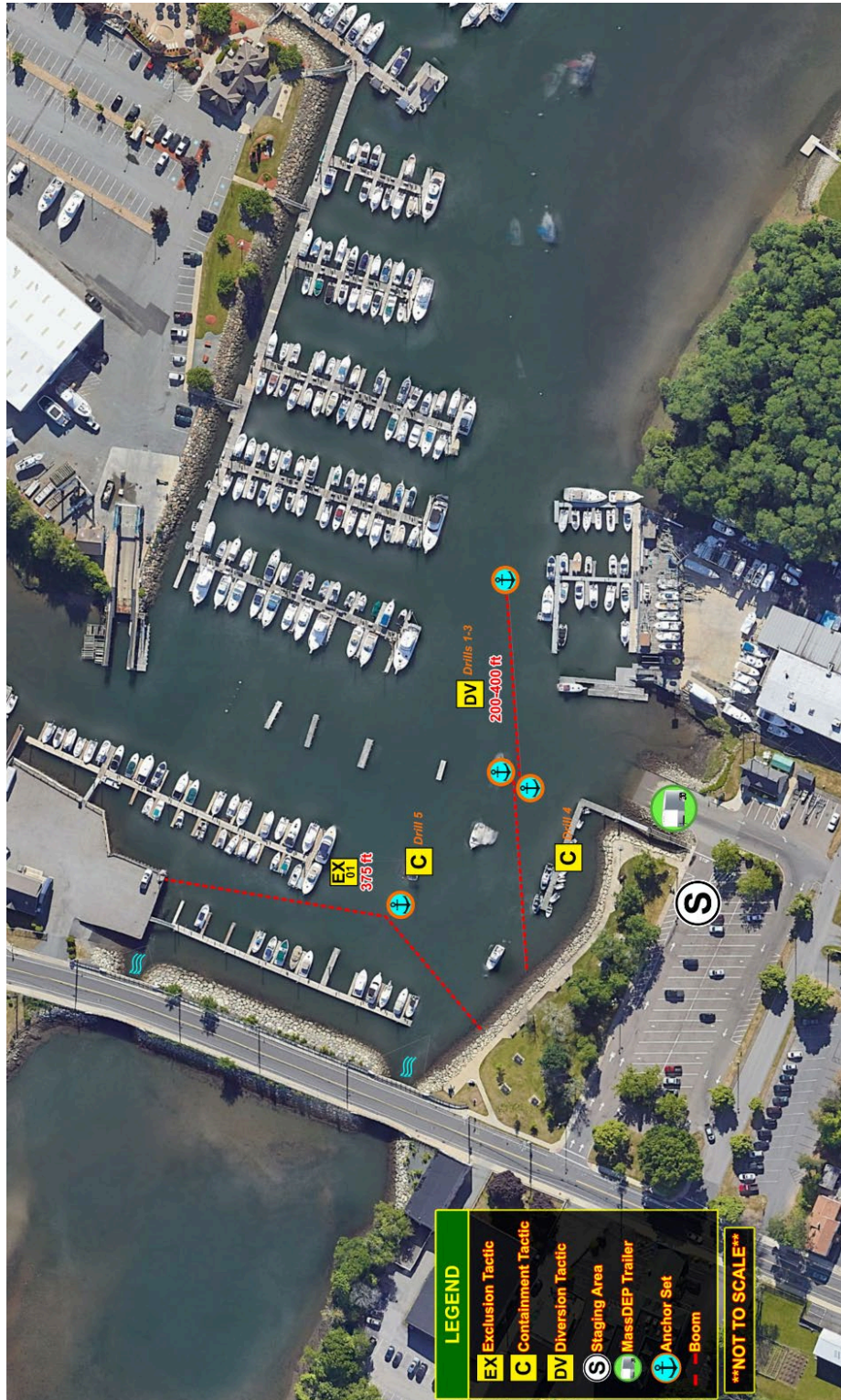


Figure 1. Exercise Tactics Map

## ANALYSIS OF CAPABILITIES

Aligning exercise objectives and capabilities provides a consistent taxonomy for evaluation that transcends individual exercises to support preparedness reporting and trend analysis. Table 1 includes the exercise objectives, aligned capabilities, and performance ratings for each capability as observed during the exercise and determined by the evaluation team.

Objective	Capability	Rating
Demonstrate the ability of local first responders to conduct initial response activities within the first 4-6 hours of an oil spill incident by deploying MassDEP oil spill response equipment and implementing common Geographic Response Strategy (GRS) tactics in alignment with the MassDEP GRS Tactics Guide.	Environmental Response Health and Safety	S
Demonstrate the ability of local first responders to establish and maintain command and control in the first 4-6 hours of an oil spill incident response by identifying relative health and safety hazards, developing an initial response organization, and communicating response objectives, strategies, and tactics through the completion of an Incident Briefing form (ICS 201) and the facilitation of an Operations and Safety Briefing.	Operational Coordination	S
Demonstrate the ability of local first responders to effectively communicate information and actions between multiple local, state, and federal agencies within the first 4-6 hours of an oil spill incident by identifying a common UHF or VHF radio channel that can be utilized by all participants.	Operational Communications	P
<p>Ratings Definitions:</p> <p><b>Performed without Challenges (P):</b> The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws.</p> <p><b>Performed with Some Challenges (S):</b> The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws. However, opportunities to enhance effectiveness and/or efficiency were identified.</p> <p><b>Performed with Major Challenges (M):</b> The targets and critical tasks associated with the core capability were completed in a manner that achieved the objective(s), but some or all of the following were observed: demonstrated performance had a negative impact on the performance of other activities; contributed to additional health and/or safety risks for the public or for emergency workers; and/or was not conducted in accordance with applicable plans, policies, procedures, regulations, and laws.</p> <p><b>Unable to be Performed (U):</b> The targets and critical tasks associated with the core capability were not performed in a manner that achieved the objective(s).</p>		

**Table 1. Summary of Core Capability Performance**

The following sections provide an overview of the performance related to each exercise objective and associated capability, highlighting strengths and areas for improvement.

## **Objective 1: Demonstrate the ability of local first responders to conduct initial response activities within the first 4-6 hours of an oil spill incident by deploying MassDEP oil spill response equipment and implementing common Geographic Response Strategy (GRS) tactics in alignment with the MassDEP GRS Tactics Guide.**

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

### **Capability 1: Environmental Response/Health and Safety**

#### **Strengths**

The Partial capability level can be attributed to the following strengths:

**Strength 1:** Shoreside anchor crews identified an anchor location that was above the high-water mark and at an angle enabling vessel crews to avoid nearby piers while engaging in boom towing operations.

**Strength 2:** Participants deployed an oil surrogate (peat moss) prior to attempting to test the existing EX-01 tactic on the Danvers River (NS23A) GRS and determined that effective testing would not be feasible as a northeasterly breeze pushed surrogate away from the intended deployment location.

**Strength 3:** Participants adequately connected boom sections, towing bridle to boom, and all components of anchor systems.

#### **Areas for Improvement**

The following areas require improvement to achieve the full capability level:

**Area for Improvement 1:** Participating vessels and vessel crews initially struggled towing the first section of boom due to a twist in the end closest to the shoreside anchor, forcing a brief pause in towing operations while shoreside crews repositioned the boom.

**Reference:** MassDEP GRS Tactics Guide

**Analysis:** While participants from the shoreside crew quickly tended to the twisted section of boom, this additional effort may have been avoided if extra care was taken to properly lay the boom out alongside the shoreside anchor system prior to engaging in towing operations. Even a partially twisted section of boom can negatively impact the overall effectiveness of a GRS tactic, as it presents an opportunity for oil to flow underneath the boom array.

**Area for Improvement 2:** Participants initially prepared too much anchor line while deploying the southern marine anchor of the second section of boom, resulting in unnecessary slack impacting the overall tension, placement, and angle of the section of boom.

**Reference:** MassDEP GRS Tactics Guide

**Analysis:** While vessel crews quickly recognized that the additional slack in anchor line impacted the placement and effectiveness of the boom section and were able to coordinate adjustments to the length of the line by tying off any excess slack, it is important to acknowledge that water depth should be considered while preparing

anchor lines, with a general recommendation that anchor line lengths remain between 3 and 5 times the depth of the water.

**Area for Improvement 3:** Participating vessel maneuverability was limited near the boat ramp due to shallow water depths.

**Analysis:** For future oil spill response towing operations, participating towns should consider the use of smaller vessels to increase maneuverability in shallow waters near the boat ramp and shorelines.

**Objective 2: Demonstrate the ability of local first responders to establish and maintain command and control in the first 4-6 hours of an oil spill incident response by identifying relative health and safety hazards, developing an initial response organization, and communicating response objectives, strategies, and tactics through the completion of an Incident Briefing form (ICS 201) and the facilitation of an Operations and Safety Briefing.**

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

## Capability 2: Operational Coordination

### Strengths

The Partial capability level can be attributed to the following strengths:

**Strength 1:** The Incident Commander and Safety Officer effectively identified safety hazards and coordinated roles and responsibilities prior to engaging in exercise activities.

**Strength 2:** Participants worked well to identify booming tactic and strategy modifications in real time and coordinate those adjustments to maximize the effectiveness of the modified cascading diversion array.

### Areas for Improvement

The following areas require improvement to achieve the full capability level:

**Area for Improvement 1:** Vessel crews initially prepared to tow the first leg of boom with the heaving line instead of towing line.

**Reference:** Exercise Specific ICS-201

**Analysis:** Command staff briefly observed vessel crews towing the first section of boom with a heaving line instead of towing line, and directed vessels and vessel crews to pause towing operations while the heaving line was removed and replaced with a proper towing line. Although this slight misstep did not negatively impact the overall effectiveness of boom deployment, it could have resulted in personnel injury and/or a damaged heaving line.

**Objective 3: Demonstrate the ability to effectively communicate between multiple local, state, and federal agencies including fire, police and harbormaster departments using VHF and UHF communications**

The strengths and areas for improvement for each capability aligned to this objective are described in this section.



## Capability 3: Operational Communications

### Strengths

The Partial capability level can be attributed to the following strengths:

**Strength 1:** Participants from all agencies coordinated prior to on-water deployment to determine the appropriate radio frequencies, then utilized radios appropriately to communicate deployment tactics and adjustments.

Participants connect a towing bridle to one end of boom prior to using a heaving line to transfer boom to an awaiting vessel



Participants toss the heaving line to the awaiting vessel



Vessel crews begin towing the first leg of boom to the deployment site



Participants position the northern marine anchor system on the second leg of boom to complete a cascading diversion array



Photos courtesy of Nuka Research & Planning Group

## APPENDIX A: IMPROVEMENT PLAN

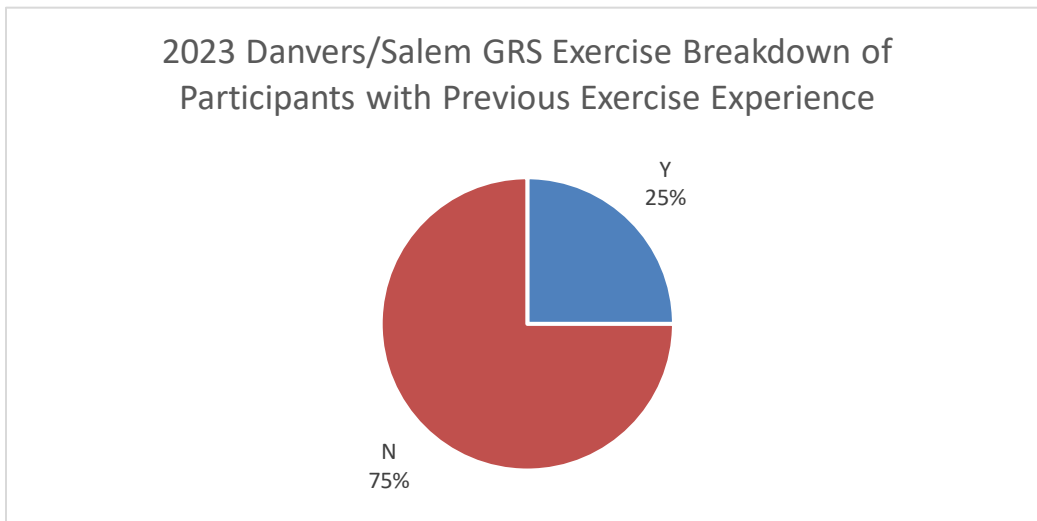
This IP is developed specifically for MassDEP, MER, Nuka Research and the Towns of Danvers and Salem as a result of the MassDEP GRS Testing and First Responder Training Exercise conducted on 08-May-23.

Capability	Issue/Area for Improvement	Corrective Action	Capability Element <sup>1</sup>	Primary Responsible Organization
Capability 1: Environmental Response	Participating vessels and vessel crews struggled towing the first section of boom due to a twist in the end closest to the shoreside anchor, forcing a brief pause in towing operations while shoreside crews repositioned the boom.	During the Safety and Operations brief, command staff emphasize best practices for deploying boom, to include suggestions for methods to prepare boom for towing operations.	Organization/Leadership	Fire Departments and Harbormasters
Capability 1: Environmental Response	Participants initially prepared too much anchor line while deploying the southern marine anchor of the second section of boom, resulting in unnecessary slack impacting the overall tension, placement, and angle of the section of boom.	During the Safety and Operations brief, command staff emphasize best practices for deploying boom, to include suggestions for using water depth and other factor to inform the proper anchor line length.	Organization/Leadership	Fire Departments and Harbormasters
Capability 1: Environmental Response	Participating vessel maneuverability was limited near the boat ramp due to shallow water depths.	During the Exercise Final Planning Meeting (FPM), facilitators review the limitations of certain vessel types and provide suggestions to departments for mobilizing the proper resources.	Planning	Fire Departments and Harbormasters
Capability 2: Operational Coordination	Vessel crews initially prepared to tow the first leg of boom with the heaving line instead of towing line.	Exercise facilitators incorporate a more detailed towing best practices section within the classroom portion of the training.	Training	Nuka Research

<sup>1</sup> Capability Elements are: Planning, Organization and Leadership, Personnel, Equipment and Systems, Training, or Exercise

## APPENDIX B: PARTICIPANTS & RESOURCES

Participating Organizations	
<b>Town of Danvers, MA</b>	<b>Participant Count</b>
Danvers Fire Department	4
Danvers Harbormaster	4
<b>City of Salem, MA</b>	
Salem Fire Department	2
Salem Police/Harbormaster	2
<b>TOTAL TOWN/CITY PARTICIPANTS</b>	<b>12</b>
<b>Federal</b>	
United States Coast Guard Sector Boston	2
<b>State</b>	
Massachusetts Department of Environmental Protection (MassDEP)	2
Nuka Research and Planning Group, LLC (contractor for MassDEP)	3
Moran Environmental Recovery (contractor for MassDEP)	3
<b>TOTAL</b>	<b>22</b>

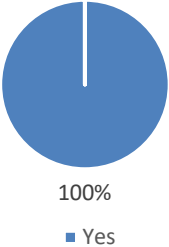
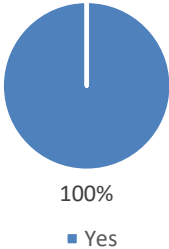
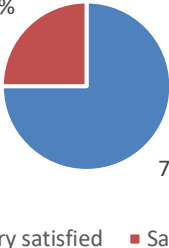


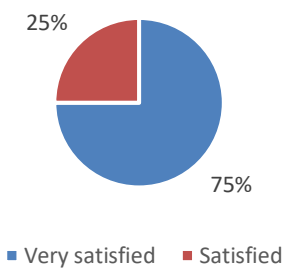
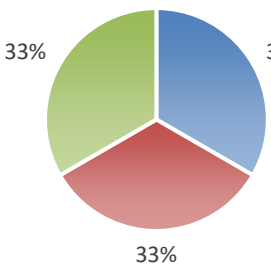
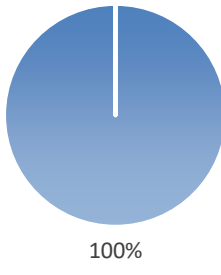
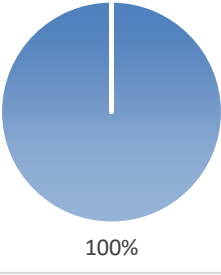
List of Resources			
Agency	Resource	Kind	Exercise Function
Danvers FD	12' Inflatable	Vessel	Support
Salem HM	23' Utility boat	Vessel	Boom Deployment
Danvers HM	Whaler	Vessel	Boom Deployment
Danvers FD	Oil spill response trailer	Trailer	Demo
Salem FD	Oil spill response trailer	Trailer	Deployment

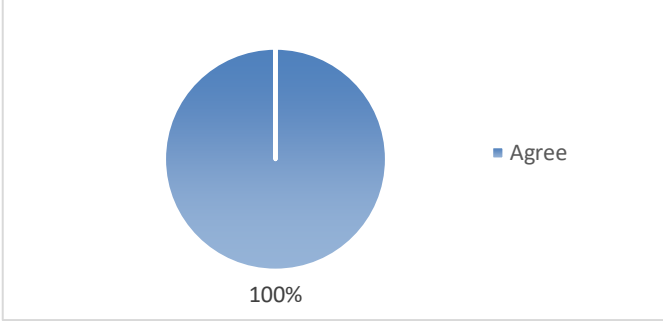
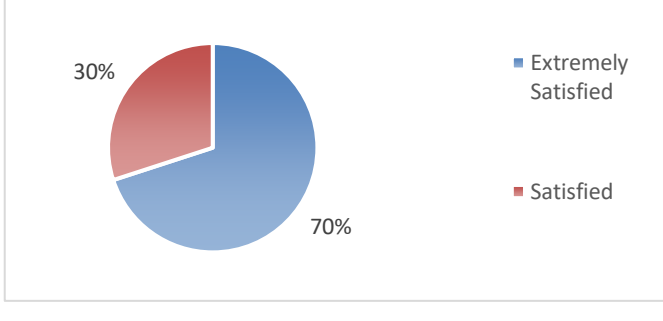
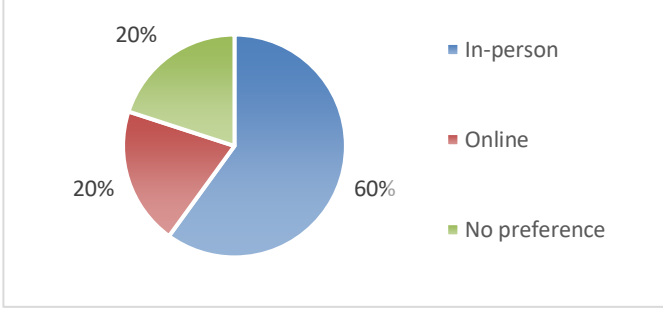
## APPENDIX C: PARTICIPANT FEEDBACK

Participants are encouraged to provide their feedback at the conclusion of each exercise by completing a participant feedback survey provided through Google Forms. The first two yes/no questions, as seen below, gather feedback from participants on the perceived success and effectiveness of the exercise. The following two questions use a satisfaction scale (Very Satisfied, Satisfied, Neutral, Unsatisfied, Very Unsatisfied) to gather feedback on each participant’s level of satisfaction with the course and the training experience.

In some instances, participating exercise towns/cities may opt for the online delivery of classroom training materials. In these instances, exercise participants will be provided with an online curriculum feedback survey. Online feedback survey questions and their associated feedback are also included in this section if applicable.

Question	Results		Comments
Do you have a better understanding of spill response techniques and tactics than you did before this training?	 <p>100%</p> <p>■ Yes</p>		
Do you feel more prepared to respond to an oil spill than you did before this exercise?	 <p>100%</p> <p>■ Yes</p>		
Please rank your overall satisfaction with the structure and length of this training.	 <p>25%</p> <p>75%</p> <p>■ Very satisfied ■ Satisfied</p>		

<p>How would you rate your overall learning experience?</p>	 <p>25%</p> <p>75%</p> <p>■ Very satisfied ■ Satisfied</p>	
<p>If you have previous experience participating in MassDEP GRS exercises, how would you compare your experience with classroom vs. online training?</p>	 <p>34%</p> <p>33%</p> <p>33%</p> <ul style="list-style-type: none"> <li>■ I learned more from the in-person experience</li> <li>■ I learned more from the online experience</li> <li>■ Both online and in-person methods were about the same</li> </ul>	
<p>Please rank whether you felt the length and pace of the online curriculum was effective for learning and knowledge retention.</p>	 <p>100%</p> <p>■ Agree</p>	
<p>Information provided verbally in the online curriculum was both clear and concise.</p>	 <p>100%</p> <p>■ Agree</p>	

<p>Information provided visually in the online curriculum appropriately supplemented verbalized content.</p>	 <p>A pie chart with a single blue slice representing 100%. The legend indicates 'Agree'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Agree</td> <td>100%</td> </tr> </tbody> </table>	Response	Percentage	Agree	100%					
Response	Percentage									
Agree	100%									
<p>Please rank your overall satisfaction with the online curriculum method and materials.</p>	 <p>A pie chart with two slices: a large blue slice for 'Extremely Satisfied' at 70% and a smaller red slice for 'Satisfied' at 30%. The legend includes 'Extremely Satisfied' and 'Satisfied'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Extremely Satisfied</td> <td>70%</td> </tr> <tr> <td>Satisfied</td> <td>30%</td> </tr> </tbody> </table>	Response	Percentage	Extremely Satisfied	70%	Satisfied	30%			
Response	Percentage									
Extremely Satisfied	70%									
Satisfied	30%									
<p>In general, do you prefer in-person or online training?</p>	 <p>A pie chart with three slices: a large blue slice for 'In-person' at 60%, and two smaller slices for 'Online' (red) and 'No preference' (green), both at 20%. The legend includes 'In-person', 'Online', and 'No preference'.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>In-person</td> <td>60%</td> </tr> <tr> <td>Online</td> <td>20%</td> </tr> <tr> <td>No preference</td> <td>20%</td> </tr> </tbody> </table>	Response	Percentage	In-person	60%	Online	20%	No preference	20%	
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