THE PLANNING PROCESS OF THE PANAMA CANAL AUTHORITY AND ITS RESULTS FOR OIL SPILL PREPAREDNESS

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ABSTRACT

Ships from all parts of the world transit daily through the Panama Canal. Some 13,000 to 14,000 vessels with all types of cargo use it every year. In fact, commercial transportation activities through the Canal represent approximately 5% of the world trade. This waterway is managed by the Panama Canal Authority (ACP) and, consistent with sound emergency preparedness actions, the ACP has developed a comprehensive contingency plan to provide the organization with a response system to minimize the consequences of adverse scenarios. The plan includes operational, strategic, and information toolbox components. It also uses the Incident Command System (ICS) and the Planning “P” model as a methodology to conduct a proactive response. The ICS allows responders to be organized with a common terminology, with clear hierarchy and functions, and with a modular and flexible structure. In this way, it adjusts to the needs of an incident, instead of trying to adjust the incident or responders to the normal structures of their agencies. The Planning “P” aids the process for the ICS to manage the incident by objectives and to elaborate concrete actions to mitigate all aspects of an incident, not just tactical matters. During the planning process, the need to increase oil spill response capabilities was recognized. Consequently, the ACP presented to its customers a program known as the Panama Canal Shipboard Oil Pollution Emergency Plan (PCSOPEP) that went into effect on January 1, 2005, after ample consultation and modifications with the international maritime community. The successful implementation of the PCSOPEP involved several stages. The Regulation on Navigation in Panama Canal Waters was updated, establishing the responsibility of vessels during spills, the presentation of an oil spill plan specific for the Canal as a transit requirement, the application of tariffs to cover the costs of maintaining equipment and training, and the designation of the ACP as the sole oil spill removal organization in Canal waters. The implementation of these policies also involved the development of strategies, outlining investment projects, and increasing the baseline number of employees with training in oil spill response. Initially, response strategies focused on mechanical recovery, but the program considered the evaluation and incorporation of alternative countermeasures as response protocols at the level of a national contingency plan.

BACKGROUND

Since the year 2000, the government of the Republic of Panama appointed the Panama Canal Authority (ACP) to manage the Panama Canal. Recognizing the possibility of oil spills and other adverse incidents, the ACP devised an integrated contingency plan to face all types of events requiring emergency response. Under a risk management approach, this plan covers cases when prevention measures or other risk mitigation alternatives may not prevent a negative occurrence. Therefore, the contingency plan establishes an emergency preparedness system in the organization.

Following international good practices, the plan is divided into the following three components:

- Operational – which becomes active in a response to an emergency.
- Strategic – which administrators and planners use to maintain the plan and improve preparedness.
- Information toolbox – which gathers information to support the decision making process in a response and stores all relevant tools and job aids.

To ease access to the plan and enhance its strengths, its content has been designed into a Web environment and available through the organization’s Intranet with alternative use in laptops and printed formats.
DESCRIPTION

Figure 2 presents the general structure of the ACP Contingency Plan. Its operational component uses an adapted and modified version of the Planning “P” process (USCG, 2006) as a planning methodology for the Incident Command System (ICS) in a response. It contains linked information for all the necessary steps in the creation of an incident action plan and integrates its corresponding ICS forms or job aids. The strategic component includes system information, programs, and administrative aids to improve emergency preparedness. Improvements devised through this process provide feedback to the operational component. With this structure, the contingency plan serves as the common response and preparedness framework for the different units with emergency response functions, like fire units, security guards, pollution control and others. These units operate under their own procedures in minor incidents that, because of their magnitude, only require partial activation of the contingency plan, but in incidents of greater magnitude would require an integration under this common framework.

The operational component applying the ICS and Planning “P”

Cultural and institutional issues also play an important role in contingency planning. They are especially relevant in the adaptation of the work methods contained in the operational component of the plan that is intended for the overall response organization, not just the planners. For the plan to be effective, ACP planners recognized the need to introduce the Incident Command System and Planning “P” concepts in a gradual manner into the existing emergency response organization. This has been done by adapting and simplifying work aids and ICS tools into the decision-making process of emergency response and incorporating already existing systems in the Emergency Operations Center. For example, the ACP utilizes computerized charts with vessel tracking systems and visually monitors most areas of the Canal via day and night cameras and other automatic systems. This expedites situation assessment, communications, and resource accountability, thus containing inherent information for the ICS. With such considerations, the application of ICS in the organization is a continuous improvement process. In this sense, the Planning “P” model, shown in Figure 3 has been adapted to fit the needs of the ACP. Also, some ICS forms have been integrated and simplified, as in Figure 4, while keeping the spirit of the ICS work method consistent with international best practices.

Figure 3 shows the Planning “P” process for an operational cycle or work period in 12 steps, from the activation of the response to termination activities. Each step links corresponding ICS forms, meetings, and other tools aimed at the production of an incident action plan for the next work period, while providing room for monitoring and control of current response operations. Figure 4 shows several ICS forms combined in a matrix form, which all together, like a set, can be viewed as a decision-making tool and not just a “document”. These work tools contribute to the conduction of a response beyond the tactical issues, i.e. more strategically focused. The matrix provides columns for objectives, strategies to implement the objectives, and tactics with the resources identified to accomplish them. Also, columns of key success factors are included as a mnemonic in the selection of objectives, in an attempt to make the tool more user-friendly. Although it seems like a simple process, training and exercises are of the utmost importance for the promotion and internalization of the contingency plan. And, this aspect becomes one of the key issues managed and programmed through the strategic component.

The strategic component and continuous improvement

Through the development of the contingency plan of the ACP, its planners have gathered leading edge tools in emergency preparedness, and have adapted them to local needs and the organizational structure of the ACP. The strategic component of the plan organizes all programs in a structured format to maintain desired preparedness levels and a continuous improvement system. Therefore, subcomponents like training and exercise calendars and incident specific plans are incorporated smoothly. With this approach the oil spill program of the ACP contingency plan was integrated into the overall preparedness blueprint. During the first years of the implementation of the plan, through an analysis of status and an identification of needs and gaps in planning workshops and other activities, the ACP recognized the need to improve its capability for oil spill response. This need gave rise to a program under the contingency plan known as the Panama Canal Shipboard Oil Pollution Emergency Plan (PCSOPEP) that was announced in 2003 and implemented January 1, 2005.

The oil spill program and the PCSOPEP

At its initial steps, the creation of the PCSOPEP program underwent a series of consultations with the maritime industry to consider different approaches to meet the overall objective of minimizing consequences of spills by safeguarding life, reducing impact on the environment, and ensuring the continuous operation of the Canal. As a result, its implementation required changes in the Regulation on Navigation in Panama Canal Waters (ACP, 2007), the development of new strategies, the formulation of investment projects, and the increase of the number of employees with training in oil spill response. The regulation that promulgated the PCSOPEP established specific oil spill preparedness measures for vessels that transit the Panama Canal. Vessels with a capacity, including cargo and fuel, of 400 metric tons or more are required to prepare and submit a plan, for oil spills in Canal waters, to the ACP, valid for four years, as a stand alone plan or an appendix to an existing Shipboard Oil Pollution Emergency Plan required by MARPOL 73/78. A vessel must also identify an Authorized Person to act as a liaison with the ACP. In agreement with the international maritime community, the ACP assumed the role of being the sole oil spill removal organization in Panama Canal waters. In this relationship, the costs of resources and training are funded with PCSOPEP transit fees that vary from US$200 to US$750.00, depending on the vessel classification.

For mechanical removal strategies, the PCSOPEP program set planning standards, in Table 1 (ACP, 2007), regarding minimum requirements in stock inventories of equipment, which are based on response time and resource needs for the different risk areas. In this table, the tiers in the first row correspond to cargo and fuel capacities of vessels as possible oil spill sources, and not to spill volumes. The focus of the spill volume versus impact depends on the quantity of resources and response time, which is contained in the other rows of the table. Thus, these tiers are specific to the ACP for the purpose of planning, and they mean the following:

- Tier 5: capacity of cargo and fuel between 400 and 1,000 metric tons
- Tier 4: capacity of cargo and fuel of more than 1,000 up to 7,000 metric tons
- Tier 3: capacity of cargo and fuel of more than 7,000 up to 15,000 metric tons
- Tier 2: capacity of cargo and fuel of more than 15,000 metric tons
- Tier 1: capacity of cargo and fuel of more than 1,000 up to 7,000 metric tons
- Tier 0: capacity of cargo and fuel of less than 1,000 metric tons

Through planning workshops and field inspections, the ACP produced an atlas of predefined strategies based on resource capability, risk areas and environmental sensitivity index (ESI) maps. These maps constitute an important information source to apply risk analysis methodologies and plan response strategies. For example, Figure 5 shows a subset of the ESI for the Barro Colorado National Monument in Gatun Lake, a fresh water lake of the Panama Canal, which encompasses unique environmental...
resources of national and international significance. In planning workshops, ESIs, personnel experience, historical data, risk sources, hydrological and meteorological information, and other elements were utilized to plan strategies as shown in Figure 6 that contains a subset of a map with predefines response decisions for a sector of the map in Figure 5. The map shows symbols for different configurations of boom deployment, places for skimmer operations, sacrificial areas and other response techniques. Following this development, the capacity for mechanical removal with equipment in Table 1 has been distributed along the Canal, with emphasis in higher risk areas, to achieve an optimum response time with sufficient resources readily available. A significant part of this equipment has been prearranged on tow trailers to improve logistics and reaction time, even exceeding planning standards.

Alternative response technologies

The PCSOPEP first considered preparedness improvements in mechanical removal strategies. However, it acknowledged the need to incorporate alternative countermeasures such as the use of dispersants, in-situ burning, and bioremediation. As these issues need to be considered at the national level jointly with other governmental entities, the ACP has supported and coordinated with other authorities the development of the National Contingency Plan, which is led and organized by the Maritime Authority of Panama. Since 2005, the ACP has hosted planning meetings and workshops with governmental entities and the industry and has participated in a National Contingency Plan Technical Committee that has produced a draft plan containing the national response framework and planning system for oil spill issues.

In Panama, the Law gives jurisdiction to the ACP over its operational waters, which is contiguous to the jurisdiction of the Maritime Authority over the waters of the rest of the country. However, it is probable that some incidents of great magnitude would impact both jurisdictions. Also, there are other agencies responsible for safety, environmental and economic issues. With this into account, in the national contingency plan draft, the adoption of the ICS with the Unified Command System (ICS/UC) and the Planning “P” model has been noteworthy. The ICS/UC operates with the participation of the incident commanders of all the agencies with responsibilities or authority, in order to set common response objectives and to conduct a consolidated process with the Planning “P” methodology. This approach aims to achieve desired results with objective-based solutions to the problems. The importance of establishing an ICS/UC lays in conducting the required response tailored to the incident and not to the organizational structures of the different agencies, thus building a common organization with a standardized process and terminology.

CLOSING REMARKS

There are opportunities to continue improving emergency preparedness for oil spills and others risks, and the ACP is playing an important role in this process within Panama and the region. In aligning social responsibility interests with the plan, the ACP is committed to follow the best practices in this field and to foster national coordination to minimize the consequences of such events as. Through this effort, the contingency plan contributes an excellent and valuable service in the ACP, while guaranteeing prompt, dependable, safe and uninterrupted interoceanic transit, and managing Canal resources in harmony with its precious environmental assets.

BIOGRAPHY

Urho Gonzal P. has a Chemical Engineering (B.Sc.) and Environmental Engineering (M.Sc.) background with experience as a Process Engineer in the petroleum refining industry and as a contingency planner and hazardous materials specialist in the ACP. Email: ugonzal@pancanal.com.

REFERENCES

Work guide and ICS Forms (combined) to be filled by: Planning Section and Operations Section

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<th>Public communication</th>
<th>Support</th>
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<th>FORM ICS-204M</th>
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<td>Tactics / Work assignments</td>
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<td>Aimed RESULTS</td>
<td>HOW to achieve</td>
<td>WHAT, WHERE, WHEN</td>
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- 1
  - 1-A
  - 1-B

- 2
  - 2-A
  - 2-B

- 3
  - 3-A
  - 3-B

FIGURE 4. COMBINED ICS FORM IN THE EMERGENCY OPERATIONS CENTER AS A LAMINATED 42”X42” POSTER THAT CAN BE USED AS A WHITEBOARD (A MODIFIED VERSION IS SHOWN TO FIT THIS PAPER.)

FIGURE 5. A SUBSET OF A MAP OF PREDEFINED STRATEGIES FOR OIL SPILL RESPONSE FOR THE BARRO COLORADO NATIONAL MONUMENT IN GATUN LAKE.

FIGURE 5. A SUBSET OF THE ENVIRONMENTAL SENSITIVITY INDEX MAP FOR THE BARRO COLORADO NATIONAL MONUMENT IN GATUN LAKE.
TABLE 1: PLANNING STANDARDS FOR MINIMUM REQUIREMENTS OF EQUIPMENT FOR MECHANICAL REMOVAL.

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<tr>
<th>Criteria</th>
<th>Tier S (smallest tier)</th>
<th>Tier 1 (small)</th>
<th>Tier 2 (medium)</th>
<th>Tier 3 (big)</th>
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<td>a. Resource Location</td>
<td>All resources placed on-site</td>
<td>All resources placed on-site</td>
<td>All resources located in ACP</td>
<td>May be located internationally</td>
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<td>b. Response Time</td>
<td>Not to exceed 6 hours</td>
<td>Not to exceed 6 hours</td>
<td>Not to exceed 12 hours</td>
<td>Not to exceed 72 hours</td>
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<td>c. Protection Boom</td>
<td>3,000 feet</td>
<td>10,000 feet</td>
<td>25,000 feet</td>
<td>30,000 feet</td>
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<td>d. Containment Boom</td>
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<td>1,000 feet plus 300 feet per skimming system</td>
<td>1,000 feet plus 300 feet per skimming system</td>
<td>1,000 feet plus 300 feet per skimming system</td>
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<td>e. Removal or Skimming</td>
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<td>5,000 (Bbls/day)</td>
<td>20,000 (Bbls/day)</td>
<td>50,000 (Bbls/day)</td>
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<td>f. Storage</td>
<td>4,000 (Bbls)</td>
<td>10,000 (Bbls)</td>
<td>40,000 (Bbls)</td>
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