Readiness Evaluation Tool for Oil Spills (RETOS™): Closing the Gaps in Spill Planning and Preparedness

Authors:

Elliott Taylor, Polaris Applied Sciences, Inc., Bainbridge Island, WA 98110, USA

Miguel Moyano, ARPEL, Javier de Viana 1018, 11200 Montevideo, Uruguay

Abstract

In 2011, the Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean (ARPEL) developed the "Oil Spill Response Planning and Readiness Assessment Manual" and its assessment tool, the "Readiness Evaluation Tool for Oil Spills (RETOS™)" with the support of regional and international experts from industry and government, including associations such as Clean Caribbean and Americas (CCA), the Regional Activity Centre / Regional Marine Pollution, Emergency, Information and Training Centre – Caribe (RAC-REMPEITC-Caribe), and the International Maritime Organisation (IMO). The ARPEL Manual and RETOS™ provide a general guide for industry and governments to assess their level of oil spill response (OSR) planning and readiness management in relation to pre-established criteria. These criteria are commonly agreed upon by the institutions involved in the project and consider international best management practices. The foundation for the ARPEL Manual's concepts and criteria is the "Assessment of Oil Spill Response Capabilities: A Proposed International Guide for Oil Spill Response Planning and Readiness Assessment", developed for the 2008 International Oil Spill Conference.

RETOS™ adapts evaluation criteria according to the type of OSR program to be assessed.

- Seven different scopes from two perspectives (government and industry) are considered, including facilities, companies' business lines, and government national programs.
- For each scope there are three possible assessment levels for which OSR planning and readiness assessment criteria become increasingly more demanding.
- Each level contains criteria in 10 different categories (topic areas).

Feedback from workshops, reviewers such as OSRL, Caspian and Black Sea's OSPRI(Oil Spill Preparedness Regional Initiative), GI WACAF (Global Initiative – West and Central Africa), and IPIECA, and the practical application of RETOS™ provided feedback that led to an upgraded version of RETOS™ in 2014. The multi-institutional review and increased use of these readiness assessment tools is expected to further expand worldwide awareness of the ARPEL Manual and RETOS™. Highlights of the upgraded tools and overviews of its implementation worldwide are the focus of this paper.

INTRODUCTION

In 2007, organizers of the 2008 International Oil Spill Conference (IOSC) agreed to support development of general guidance to assess oil spill response (OSR) readiness programs. As part of that development, the 2008 IOSC Workshop Subcommittee prepared a broad suite of planning and readiness assessment elements to encourage improved response capacity. That initial work set a framework to aid development and maintenance of response management systems to improve OSR readiness, documented in the 2008 IOSC Guideline (Taylor et al., 2008a and 2008b).

Subsequent feedback received from the international community recommended transforming the 2008 IOSC Guideline into a more user-friendly management tool, hence leading to the "ARPEL Oil Spill Response Planning and Readiness Assessment Manual" (the "Manual") and its accompanying assessment tool, the Readiness Evaluation Tool for Oil Spills - RETOS™ (ARPEL, 2014a). RETOS™ has seven scopes or general OSR program areas:

Industry or Government

1. Facility: Refineries, Well or Production Sites, Storage facilities, Tank farms, Floating Storage and Offloading/Floating Production Storage and Offloading, Transfer facilities, Privately-owned port
2. Multi-Facility / Asset Operations: Pipeline operations, Vessel fleets (tankers, barges), Rail transport, Subsea pipelines and gathering systems

Government

3. Port/City/Local: Port facilities, Municipalities
4. Area (Region, Province, State): State, Province, Multi-state/provincial
5. National (& Multi-National): Country-wide, National, Joint National, Multi-National

Industry

6. Country or Business Line: Nation-wide Industry program , Pipelines (comprehensive for multiple operations), Fleets, Production, Drilling & Exploration
7. Corporate: Company OSR Program, OSR portion of Corporate HSE Programs, OSR programs defined in ISO and adopted international practices

For each scope a user first selects an assessment Level (Figure 1). Assessment Levels (A, B or C) do not correspond to spill tiers (1, 2 or 3) in the OSR planning sense. Rather, an assessment Level indicates the maturity of a program. For instance, a facility may be well prepared to mount a quick and very effective response to a Tier 1 spill. In such a case, the assessment Level C would reflect its maturity for a Tier 1 spill response. Alternatively, a national Tier 3 program may be in the early stages of development and implementation, in which case a Level A assessment would be performed.

Workshops, training, and use conducted after the rollout of RETOS™ between 2011 and 2013 provided multiple channels of feedback and suggestions for upgrades to the application. In 2012, experts from OSRL (Oil Spill Response Limited), ITOPF (International Tanker Owners Pollution Federation), IMO/IPIECA GI WACAF (Global Initiative's West and Central Africa), IPIECA, and OSPRI (Oil Spill Preparedness

Regional Initiative for Caspian, Black Sea and Central Eurasia) evaluated the Manual and RETOS™. These experts made suggestions to help its use within the Global Initiative context. Nine major areas were built in an upgrade leading to RETOS™ V 2.0 and its accompanying Manual (Taylor et al., 2014). The 2014 upgrades were:

1. Identified "critical" criteria (for Level A only) that, if missing or incomplete, would not allow a program to qualify as complete, regardless of scores to individual criteria. Missing or incomplete critical criteria were then included as top priority steps in the Global Improvement Program (GIP) assessment report.

2. Added an institution-specific category with blank criteria rows to allow for up to ten institution-specific criteria to be inserted at any given level.

3. Added RETOS™ V 2.0 functionality for critical and institution-specific criteria such that a N/A, missing, or incomplete/partial score requires an assessor to add Comments and Recommendations.

4. Developed a more robust assessment report, the Global Performance Analysis (GPA), including sub-scores per assessment category, highlighting any categories with missing or incomplete critical criteria, and enabling simple display of results by category in a radar chart or spider-web diagram (Figure 2).

5. Enabled auto-generation of a GIP -Global Implementation Plan in which critical criteria (rated as either missing or partial) are highlighted and listed as top priorities for improvement, followed by other criteria rated as either partial or missing (Table 3).

6. Added linkages to the GIP Report so that criteria 'requiring action' have an added notation to relevant information in the 2008 IOSC Guideline (see right-hand column in Figure 3).

7. Updated available literature and guidelines on best practices, including links to web sites, to supporting information (i.e., the Toolbox) in the Manual, now with over 150 citations.

8. Upgraded the ARPEL Manual to reflect changes and improvements made to RETOS™.

Global Implementation

Since its initial rollout in 2011, the ARPEL RETOS™ tool and Manual have been used within industry groups and governments worldwide. Highlights of its use are:

Latin America

- ARPEL coordinated workshops on use and implementation of RETOS™ in at least nine venues between 2011 and 2014: Brazil, Ecuador (2), Trinidad & Tobago, Peru (2), Colombia, and Venezuela (2), with more than 200 total participants having worked with the tool on actual or fictitious OSR programs.
- ARPEL member companies have agreed to use RETOS™ as a benchmarking tool in pipelines systems (1st option) and the approximately 100 maritime terminals (2nd choice) in Latin American countries. In 2015, ARPEL is preparing the Manual for benchmarking of these two

major operational targets. Pipeline spills are the most frequent and largest volumes spilled in Latin American countries (see Table 1). Using RETOS for gap assessment and improvement is meant to lead to improved spill prevention and mitigation. Results are expected to be received by the end of this year.

- COCATRAM (Central American Maritime Transport Commission) and RAC/REMPEITC-Carib (Regional Marine Pollution Emergency Information and Training Center for the Wider Caribbean) are presently using the Manual and RETOS™ V 2.0 as tools to assist over 30 countries in the Caribbean and Central America to develop/improve their preparedness. The Manual and RETOS™ V 2.0 help these organizations to harmonize and evaluate improvements and to identify priorities within the challenges that need to be addressed so that their member countries can achieve higher levels of OSR preparedness.
- The RETOS™ V 2.0 readiness analysis tool was introduced at the Sub-regional OPRC ratification and implementation Workshop in Paramaribo, Suriname in November/2014. The workshop, coordinated by RAC-REMPEITC, brought together government officials from Suriname, Belize and Guyana. Workshop participants from each country used the RETOS™ tool to perform a preliminary assessment (Level A) of each of their respective national oil spill programs.

Central and West Africa

- GI WACAF presented the tool to a number of countries in 2014 (Cote d'Ivoire, Congo, Democratic Republic of Congo, Togo, Gabon, Ghana, Gambia, Nigeria and Namibia). The purpose of those RETOS™ sessions was to explain the tool, its purpose, how it works, and whether this is something that the Governments would be interested in using within their countries. The feedback received was extremely positive and GI-WACAF now plans to introduce the tool into the 2015 work program.
- GI WACAF plans to use the tool to undertake a full assessment of Gambian national oil spill response capability in May 2015 and, if successful, plan to undertake assessments of all 22 of the GI WACAF countries at the regional conference in November 2015. These will be Level A assessments and will be national in scope. The primary goal of these assessments is to help GI WACAF, and more importantly the countries themselves, identify where gaps exist in their national contingency plans

Southeast Asia

- GI-SEA plans to roll-out RETOS™ V 2.0 in ASEAN (Association of Southeast Asian Nations) this year (2015), although definite dates and countries where this will start are not yet finalized.

Key Findings

By early 2015, RETOS™ had been presented and/or used in more than 20 countries. The tool had been used to evaluate more than 50 OSR programs (Table 2). The ARPEL project team took advantage of each opportunity to learn what improvements were recommended for improved RETOS™ functionality. Most programs evaluated consisted of industry fixed facilities (installations) or wider operations (i.e., pipelines). Results of most of the assessments conducted (nearly all Level A) showed that OSR programs

typically achieved a 60-70% completion. Priority areas for closing gaps are provided in the Global Improvement Program report generated by the RETOS™ tool (Figure 3). Gaps are listed by priority, in which any missing critical criteria (Level A only) are listed first, followed by partial critical criteria, and then followed by missing and/or partial criteria not highlighted as critical. The same report lists where additional information on the subject can be found in the IOSC 2008 Guideline and the more than 150 hyper-linked citations in the Manual provide personnel tasked to address the gaps with guidelines and references for further information.

One recommendation from more recent applications was to add the numbering to criteria in the Manual so that it would be easier for users to find corresponding criteria listed in RETOS™ V 2.0 and to match similar criteria between levels. Another recommendation made and being explored is to transition the RETOS tool from an Excel™-based application to a web- or tablet-based application.

CONCLUSIONS

The ARPEL Manual and RETOS™ are intended to help assess OSR planning and readiness and to identify challenges, information needs, and areas for improvement. OSR assessment criteria are the foundation for a consistent approach to gauge the level of OSR planning and readiness and to assist in identifying areas for improvement. The criteria in RETOS™ are not mandatory and are not intended to reflect or add any legal or regulatory requirements. The Manual and RETOS™ are oriented more towards the management of OSR readiness and less towards detailed operational aspects, such as specific amounts or types of equipment.

An important feature of RETOS™ is the fact that criteria are specific to the scope of the OSR program being evaluated, providing assessments tailored to the needs of the user. The RETOS™ tool and Manual have been well received and provide a common basis available to the broad international spill response community to engaging in gap assessment and continual improvement. Since the criteria utilised relate to best international practices, RETOS™ represents a powerful tool for international benchmarking purposes.

RETOS™ V 2.0 is very easy to use. The Manual and RETOS™ V 2.0 are currently available in English and Spanish and can be downloaded free of charge from the ARPEL web site (www.arpel.org). Translation into other languages may be undertaken with due consideration to copyrights.

REFERENCES

ARPEL, 2014a. Oil Spill Response Planning and Readiness Assessment Manual and RETOS™. [online]. Regional Association of Oil and Gas Companies - Latin America and the Caribbean. Available from: www.arpel.org [Accessed 10 February 2015]

ARPEL, 2014b. [Homepage of the Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean] [online]. 13 February 2015. Available from: www.arpel.org [Accessed 13 February 2015]

Taylor, E., Moyano, M., and Steen, A.E., 2014. Upgraded RETOS™: An International Tool to Assess Oil Spill Response Planning and Readiness. Proc. of the International Oil Spill Conference, 2014. American Petroleum Institute, Washington, DC. http://ioscproceedings.org/doi/pdf/10.7901/2169-3358-2014.1.1353 [Accessed 14 November 2014]

Taylor, E., Steen, A., Meza, M., Couzigou, B., Hodges, M., Miranda, D., Ramos, J., and Moyano, M., 2008a. IOSC Workshop Report: A Proposed International Guide for Oil Spill Response Planning and Readiness Assessment. Proc. 2008 International Oil Spill Conference, API Publ. I47190, Washington, DC. p. 1-18. [online] Available from: http://www.ioscproceedings.com/doi/pdf/10.7901/2169-3358-2008-1-1 [Accessed 10 February 2015]

Taylor, E., Steen, A., Meza, M., Couzigou, B., Hodges, M., Miranda, D., Ramos, J., and Moyano, M., 2008b. Assessment of Oil Spill Response Capabilities: A Proposed International Guide for Oil Spill Response Planning and Readiness Assessment. Technical Report IOSC 009. International Oil Spill Conference, API. Washington, DC. 70pp. [online] Available from: https://www.arpel.org/library/publications/search/?thematic=&focus_area_1=ParentFocusAreas.p_1&focus_area_2=ParentFocusAreas.p_2&focus_area_3=ParentFocusAreas.p_3&types=&year=&title=RETOS [Accessed 10 February 2015]

Acknowledgements: We thank Camila Morales (ARPEL) for processing the information from ARPEL environmental benchmarking annual reports that led to the data displayed in Table 1.

Figure 1 Overview on use of the ARPEL Manual and RETOS™ for OSR Program Assessment

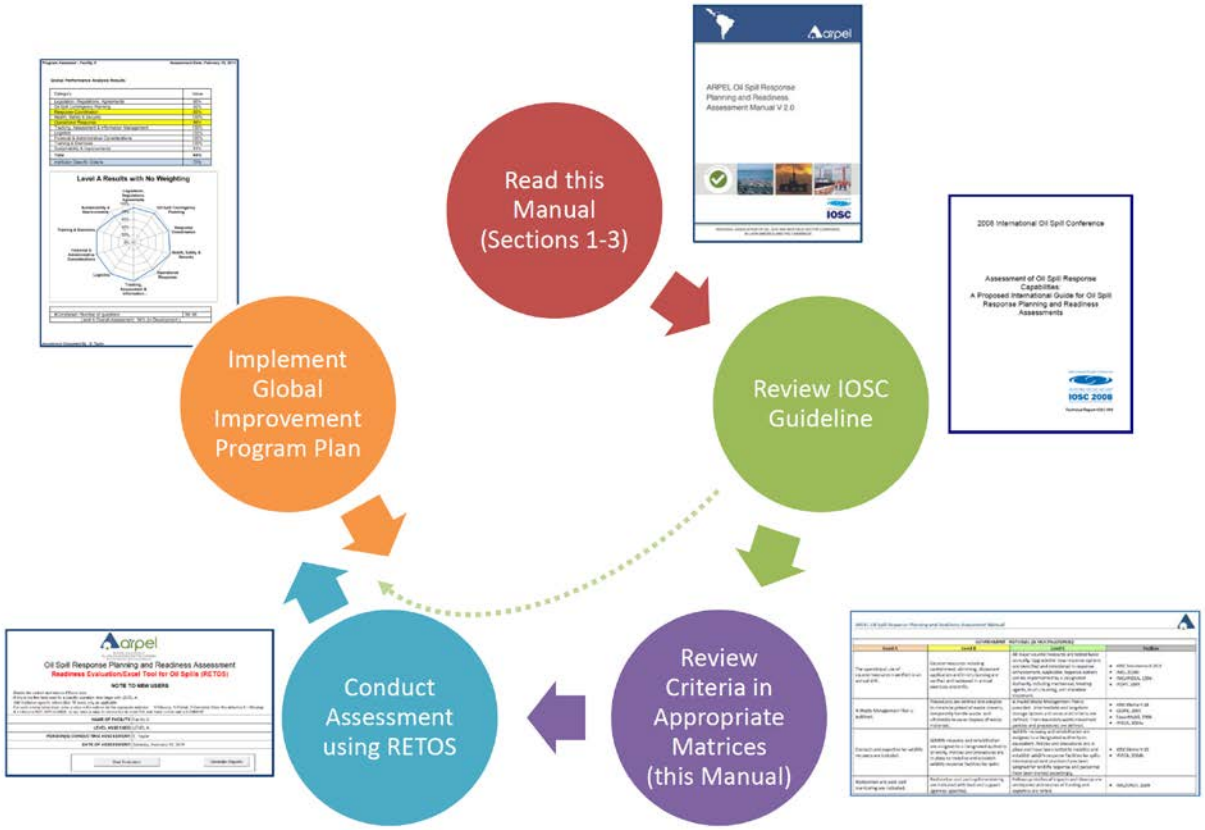


Table 1- Statistics on average number of spills and barrels spilled per million tonnes of liquid hydrocarbons transported through pipelines and per million tonnes handled at maritime terminals in Latin America and the Caribbean (Source: ARPEL, 2014b)

	Pipelines		Terminals	
Year	# spills / million tonnes HC transported	Barrels spilled / million tonnes HC transported	# spills / million tonnes HC handled	Barrels spilled / million tonnes HC handled
2008	0,002	450	0,73	64,4
2009	0,005	6800	0,02	4,5
2010	0,01	480	0,03	26,7
2011	0,02	76,2	0,27	20,5
2012	0,29	181,75	0,09	115,5
2013	0,004	243,12	0,07	1866,5

Table 2- Locations of RETOS™ use and feedback (2011-2014)

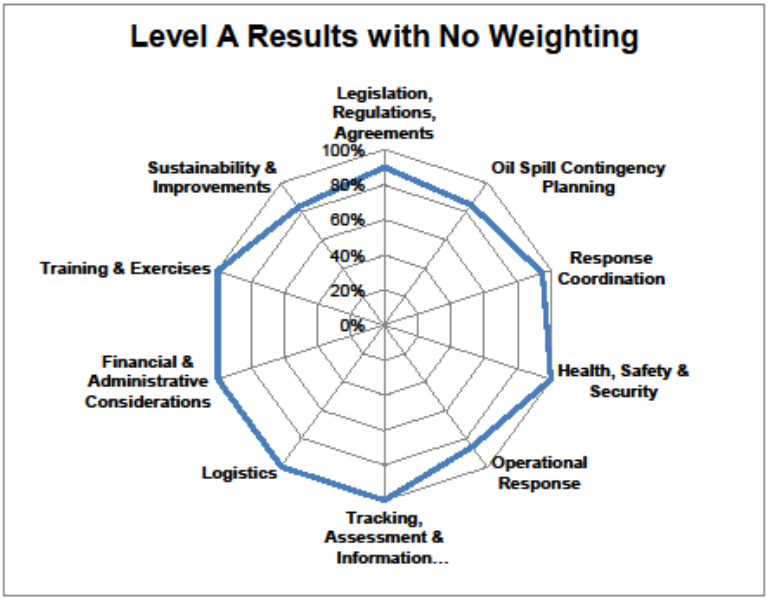
Countries	Belize, Brazil, Colombia, Costa Rica, Ecuador, Guyana, Kuwait, Peru, Suriname, Trinidad & Tobago, Turkey, USA, Venezuela	
Organizations	Caribbean Environment Program (UNEP)	Kuwait Petroleum Corp.
	Clean Caribbean-OSRL	Maersk Oil
	COCATRAM	OCENSA
	Ecopetrol	Petroamazonas
	ENI	Petrobras
	EP Petroecuador	Petroperu
	ExxonMobil	RAC/REMPEITC-Caribe
	Instituto Brasileiro do Petroleo	Recope
	IMO – IPIECA	Repsol
		Staatsolie
		Trinidad y Tobago Ministry of Energy

Figure 2- Example of a Global Performance Analysis Report[1]

Program Assessed : Facility X ***Assessment Date: February 13, 2015***

Global Performance Analysis Results

Category	Value
Legislation, Regulations, Agreements	90%
Oil Spill Contingency Planning	85%
Response Coordination	95%
Health, Safety & Security	100%
Operational Response	86%
Tracking, Assessment & Information Management	100%
Logistics	100%
Financial & Administrative Considerations	100%
Training & Exercises	100%
Sustainability & Improvements	83%
Total	**92%**
Institution Specific Criteria	*75%*



#Completed / Number of questions:	58/ 66
Level A Overall Assessment: 92% (In Development)	

Assessment Completed By : E. Taylor

[1] Although the minimum percentage to pass from Level A to Level B is 90%, the fact that there are critical criteria partial or missing for Response Coordination and Operational Response categories–in yellow- results in the overall assessment to be shown as “In development”.

Figure 3- Example of a Global Improvement Program Report[2]

Global Improvement Program - Implementation Plan

Priority	Task (Listed by Element and Criteria)	Comment/Recommendations	Person Responsible	Resources (Human, Physical, Info Sources)	Schedule (indicate Target Completion Date)	IOSC 2008 Guidelines Reference*
Critical Criteria Missing						
1	B9: General area at risk is identified based on spill sources.	There has not been a proper risk assessment. Suggest this is made and see the need to adapt the OSR program	ET	Modeling; Sensitivity maps	3Q2015	IOSC Sub-element 4.3
Critical Criteria Partial						
2	C6: Incident command is assigned to one or two specific individuals (by name or position) with backups identified.	Need to identify backup personnel.	MM	Management	2Q2015	IOSC Element 10, Sub-element 10.3
	E3: Equipment is properly stored, in good working condition and being properly maintained and inspected.	Recommend boom be placed under shelter- will suffer UV damage if left as is.	OSR	Warehouse space	2Q2015	
A. LEGISLATION, REGULATIONS, AGREEMENTS						
	Signed agreements for local (within reasonable distance) OSR assistance are in place.	Agreements are verbal only. Recommend more formalized approach.	MM	Contracting	3Q2015	IOSC Sub-element 23.4
B. OIL SPILL CONTINGENCY PLANNING						
	Species at risk are listed.	Consider cross-reference to Area Plan.	ET	Documentation only	2Q2015	
E. OPERATIONAL RESPONSE						
	A Waste Management Plan is outlined.	Standard waste plan is used; suggest Plan be reviewed and revised for OSR emergencies.	HSE Mgr	Documentation; Contracting	4Q2015	IOSC Element 18
I. TRAINING & EXERCISES						
	Regular training courses are provided on OSCP to response team personnel.	An initial class was provided to persnnel at site at the time of plan rollout. New personnel have not received training on the Plan. Provide for newer personnel.	HSE Mgr	Classroom and field; Contracting	3Q2015	IOSC Element 9 and Element 27
J. SUSTAINABILITY & IMPROVEMENT						
	Audits of plans and facilities are conducted annually.	This audit was first; recommend audit or review be completed annually.	HSE Mgr	Management; Contracting	4Q2015	
INSTITUTION SPECIFIC CRITERIA						
	Management documented improvement and milestones for next year.	In progress. Need to finalize.	HSE Mgr	Management	3Q2015	
	Reviewed By:	Moyano & Taylor				
	Approved By:			**Date**		

[2] Table corresponds to GPA report in Figure 2.