Ten Years of Advances in Oil Spill Preparedness and Response: A Summary of Key International Industry Programs

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ABSTRACT

In light of the Deepwater Horizon accident, the oil and gas industry has undertaken various national and global initiatives to advance our knowledge, understanding and approach to oil spill preparedness and response. Notable amongst these, are the IPIECA-IOGP (International Association of Oil and Gas Producers) Oil Spill Response Joint Industry Project (OSR-JIP) and the American Petroleum Institute's Joint Industry Task Force (API-JITF). These alone represent million dollars of investment and the collective contribution of hundreds of subject matter experts from around the world.

The above two initiatives have produced numerous technical reports, good practice guides and recommended practices that have offered significant advances in industry's oil spill preparedness and response capabilities. Additionally, the various research projects conducted primarily by API have greatly enhanced the understanding of the efficacy and fate and effects of selected response options with a focus on subsea dispersant injection.

This paper provides an overview and assessment of the key outcomes of these programs as well as highlighting some of the key breakthrough projects including spill impact mitigation assessment (SIMA), incident management, tiered provision of response capability, wildlife response and dispersants. The authors also describe briefly how the industry has continued this legacy through ongoing API and IPIECA/IOGP programs,

together with a brief exploration of the full extent of value which may be derived from these kinds of initiatives.

INTRODUCTION

Oil spills and their potential impacts are an enduring risk for the oil and gas industry, regulators, stakeholders and the community at large. This drives an ongoing need to understand how best to plan for and respond to these events - notwithstanding the efforts to make as safe as possible, all activities encompassing exploration and production, refining and transportation, storage, retail and associated consumption.

Regulators, stakeholders, the wider response community and in particular the oil industry, have all contributed to developments in our knowledge and understanding of different aspects of oil spill preparedness and response. There is no single solution to being well prepared and able to respond well to minimize the impacts - each activity and operational setting presents their own unique challenges and requirements. However, taken as a whole, there are common approaches, recognized good practices and proven technical steps that can be applied to these different scenarios, all of which have been improved over time through defined research and advancement programs.

On occasion a notable event, new driver or a new perspective prompts a reappraisal of the status quo, from which impetus emerges to learn more, gain new insights and make further advances in how we can characterize our knowledge of, and move the dial on, better preparedness and response capability.

JOINT INDUSTRY ORGANIZATIONS AND PROJECTS

In light of the Deepwater Horizon accident, coupled with various earlier events such as the Montara well blowout, two notable formal industry projects were set up, namely:

- The IPIECA-IOGP (International Association of Oil and Gas Producers) Oil Spill Response Joint Industry Project (**OSR-JIP**)
- The American Petroleum Institute's Joint Industry Task Force (**API-JITF**).

The API-JITF was established in 2010 and ran for 5 years, delivering a very broad range of technical research papers, reports, recommended practices and communication/information materials.

In the international arena, IPIECA and IOGP formed a Global Industry Response Group (GIRG) in 2010, to identify issues or gaps in overall prevention, preparedness and response. The OSR-JIP was then established to address specifically the oil spill preparedness and response issues which had initially been identified by the GIRG. Other international JIPs were also established, such as the Sub-Sea Wells Response Project (SRWP) to address the prevention issues identified by the GIRG

The OSR-JIP was set up in 2012 and initially ran for 3 years (Phase 1), before being extended for a further 3 years (Phase 2) to continue some aspects of the original work and to address specific additional issues of prime significance. The API-JITF's primary focus was on spill preparedness and response issues germane to the US Oil and Gas operations whereas the OSR-JIP focus was on global issues, although projects were applicable to both the US and international settings. Like the API-JITF, a variety of technical materials were developed and published, notably, a series of benchmark good practice guides, focused technical reports, detailed technical research reports and further communication/information materials.

Both Projects worked under the auspices of internationally recognized practices for Industry Institutes and Associations including accountable leadership by senior figures from within the industry, clear technical workstreams and targeted deliverables, and a strong commitment and huge collective contribution from hundreds of technical subject matter experts from around the world – drawn from industry, the response community, academic/research institutions and other expert/specialist organizations. The project management staff at the heart of each program worked hard to coordinate the scope of the Project workstreams, minimize the potential for overlap, and wherever possible leverage the very best outcomes from these collective efforts and funding which ran to millions of dollars.

WHAT THE API-JITF AND OSR-JIP DELIVERED

The API-JITF delivered a very broad range of different materials, totaling some 70-80 individual documents and reports. They broadly fit in seven categories:

- Spill Response Planning
- Oil Sensing and Tracking
- Dispersant
- In-Situ Burning
- Mechanical Recovery
- Shoreline Protection
- Alternative Response Technologies
- Inland

They are so numerous, that details of the individual products are listed separately in Appendix 1 and are available directly from the API website [http://www.oilspillprevention.org/oil-spill-research-and-development-cente].

The OSR-JIP also delivered a broad variety of materials, comprising:

- **IPIECA-IOGP Good Practice Guide (GPG) series** – 24 documents, replacing the previous internationally-recognized IPIECA Oil Spill Response Report series
  - Presents the current views on good practice for a comprehensive range of oil spill preparedness and response topics.
  - Supports alignment of industry approaches and individual activities, informs stakeholders, and serves as a communication tool to promote awareness and education.
  - These are listed in Appendix 2 and are available directly from the IPIECA website [http://www.ipieca.org/our-work/oil-spill/].

- **Short Technical Reports -** developed to communicate a specific aspect of technical good practice or to make it accessible to external parties:
  - Regulatory approval of dispersant products and authorization for their use
  - Dispersant supply and logistics
  - At-sea monitoring for surface dispersant effectiveness
  - Guidelines for the selection of in-situ burning equipment
  - Oil spill risk assessment and response planning for offshore operations
  - The global distribution and response effectiveness of major oil spill response resources

- **Pure Research and Longer Technical Documents** - detailed research and data:
  - Subsea dispersant effectiveness bench-scale testing protocols

- Capabilities and uses of sensor-equipped ocean vehicles for subsea and surface detection and tracking of oil spills
- Capabilities and uses of sensor and video-equipped waterborne surveillance-ROVs for subsea detection and tracking of oil spills
- Assessment of surface surveillance capabilities for oil spill response using satellite remote sensing
- Assessment of surface surveillance capabilities for oil spill response using airborne remote sensing
- Surface surveillance capabilities for oil spill response using remote sensing
- A review of models and metocean databases and validation techniques
- Recommended practice for common operating picture architecture for oil spill response

- **Outreach, Communications and "Glance/Scan" materials, videos and animations** - to describe various key aspects of oil spill response for a less technical audience. Some of these were developed jointly with the API-JITF.
  - Oil Spill Preparedness and Response - A Good Practice Framework
  - Tiered Preparedness and Response
  - Introduction to Net Environmental Benefit Analysis (NEBA)
  - Introduction to the Role of Dispersants in Oil Spill Response

BREAK-THROUGH ADVANCES EMERGING FROM THE API-JITF AND OSR-JIP

Taken together, the body of work from these two initiatives represents a huge undertaking and has provided a wealth of new insights, learnings and opportunities for industry and stakeholders to advance many aspects of oil spill preparedness and response. It

is simply not possible to capture these in one paper, especially since each stakeholder will draw different relevance and importance from the various research, guidance, practices etc. and apply them in ways that offer the greatest significance to their own situation. There are however, some technical themes and issues that have significance to many, and in some cases, they represent something more akin to a break-through change in thinking or approach, with the potential to offer major advances for a particular aspect of oil spill prevention and response. Some representative examples of these are highlighted below.

Spill Impact Mitigation Assessment - SIMA

There is an enduring challenge when planning for or responding to an oil spill event; of predicting the potential impacts on different sensitive ecological, social and commercial resources; determining their relative importance and priority to different stakeholders; and developing a response strategy comprising a set of response actions which serves to achieve a commonly accepted preferred or optimal outcome in the circumstances. This has been a focus of planners and responders for decades, and various approaches have been sought. One approach which has endured, is the set of conceptual principles of NEBA – Net Environmental Benefit Analysis. http://www.ipieca.org/our-work/oil-spill/oil-spill-response-resources/strategy/. However, while the over-arching principles of NEBA were generally understood, the means to the end varied considerably and Practitioners have often struggled in reality to harness them tangibly in their response decisions, that suitably balance the interests and concerns of so many varied resources and stakeholders.

Through the OSR-JIP Phase 2 and working together across all three key industry associations – IOGP, IPIECA and API, the principles of NEBA were harnessed into a simple qualitative process, now known as SIMA. This enables resources to be selected and assessed

for potential impacts from an oil spill, different response measures to be considered for their potential positive or detrimental effects on each resource, and stakeholders to better understand and explore the complex issues within a clear framework and to align more closely on the optimal actions to take in the circumstances. A remarkable feature of this SIMA process, is that it readily facilitates bringing together stakeholders with very disparate backgrounds and views. And supports them to reach a more common and shared perspective of the genuinely critical concerns, the realities of the response and what can be achieved in practice, and ultimately the hard choices that need to be made. SIMA therefore represents a break-through in both planning for, and responding to, oil spill events.

Incident Management System for Response – IMS

The principles of systematic incident management have been recognized for many years, and particularly in the US where they were formulated into the incident command system (ICS) as a regulatory expectation. While the functionality of ICS was generally accepted in principle in the international response community, features of how it worked in practice had motivated a reluctance to adopt this approach globally. This was reinforced in many countries by adherence to response structures preferred or indeed regulated by government agencies who retained overall control of any oil spill response in different ways.

It became clear during the response to the Deepwater Horizon accident in 2010, that in reality, only one response system could have coped with the multitude of technical issues and challenges, and the extraordinary scale of incident management needed for such an event – namely ICS. During the OSR-JIP Phase 1, the generic principles of ICS were embraced and captured in an Incident Management System (IMS) Good Practice Guide. This IMS GPG can be applied by any designated 'Responsible Party' responding within any regulatory

regime, across a worldwide setting that encompasses 170+ countries with a sea border and countless more landlocked countries – all with a variety of prevailing oil spill risks. The use of a common system across the industry also facilitates the seamless integration of incident management personnel from external organizations anywhere in the world. While many of the principles existed before, the adaptation of this by industry for an international setting, marks a break-through in how response will be planned, organized and managed going forwards.

Tiered Preparedness and Response (TPR)

Regulators, industry and the response community have for decades recognized the need to provision response capability and position it in suitable locations, in readiness for responding quickly to any oil spill event. Over the years however, various difficulties have been encountered in defining what that capability was, how much was needed and where to station and maintain it most effectively and cost-efficiently. Since the 1980's, IPIECA has promoted the concept of holding resources in three 'tiers', by connecting together the need for some to be maintained close by certain operations and locations, ready for rapid deployment by local organizations, especially for smaller incidents that were potentially more likely to occur more frequently – Tier 1. Building on this, Tier 2 resources were seen broadly as being maintained in fewer locations in an effective and cost-efficient way, serving the needs of a variety of organizations and needs, often targeted at a particular geographical region. These resources would supplement Tier 1 resources for larger and/or higher consequence incidents deemed less likely to occur. Beyond this, the industry Tier 3 capability was seen as an international resource with specific centers of expertise, and resources held in readiness to supplement the other 'tiers' of capability, on a global setting.

Similar to the NEBA situation described above, while these over-arching principles of TPR were generally understood, Practitioners often struggled in reality to harness them into tangible and robustly defendable decisions on what resources to provision, how much and where. Over the years this has manifested in flaws to the planning process. In particular, there was little guidance or agreement as to the types and quantities of resources that should be available locally (Tier 1) or regionally (Tier 2) and that many perceived the resource capabilities of each Tier to be equivalent but just maintained in different locations. There were also many aspects of oil spill risks not being coherently addressed as a whole and provisioned accordingly.

The IPIECA-IOGP GPG Series now sets out a coherent 'golden thread' approach to planning for potential oil spill events. First, in the Contingency Planning GPG, by characterizing oil spill risks through planning scenarios – i.e. tangible depictions of what could happen, what might be affected and what significance this could have. Then, the SIMA GPG lays out a powerfully simple approach to making sense of the variety of issues that need to be addressed, in order to define clearly an overall response strategy – i.e. what combination of response actions is needed to achieve an outcome deemed preferred/optimal for each planning scenario.

The TPR GPG then starts from this point, informed directly by a defined response strategy – and supports decisions being made on what resources are needed, how much, and by when. It also offers a much better focus on the variety of resources needed, by categorizing them in terms of e.g. surveillance, offshore dispersants, mechanical recovery, shoreline clean-up, wildlife response, waste management etc. Addressing the issue of 'what, how much, and by when' allows planners to clearly define what needs to be provisioned

close by (Tier 1), what can tolerably be provisioned regionally in a more collaborative, effective and cost-efficient way (Tier 2), and what will be needed from national or international 'Tier 3' resources. It also drives discussion and greater clarity on what is a tolerable timeframe for resources to be mobilized, set against what is perceived as needed and feasible in practice. Additionally, it recognizes that in some cases any kind of local incident may call for wider tiers of resources to be mobilized, thereby challenging the myth of there being a pre-defined 'Tier 1 spill'.

All of this clarity and sharper focus is fundamental to robustly managing oil spill risks and response solutions. Taken together, and with the TPR approach now defined in this way, the resources that need to be provisioned in 'tiers' becomes much clearer, more technically justified, and much more closely linked to the oil spill risks that a regulator, oil company operator and response service provider may need to deal with in their area of interest. This TPR approach provides the last piece of that 'golden thread' that links oil spill risks (using planning scenarios) to response strategy to tiered capability needed for the job of response, and as such, is another break-through development.

Oiled Wildlife Preparedness and Response

For many years, the approach taken towards oiled wildlife preparedness and response by regulators, stakeholders, the oil industry and the response community, can best be described as very variable. A range of perspectives prevailed amongst stakeholders, holding often strongly different philosophies and perceptions, divergent views on the organizational approach and expertise needed, and often varied opinions on preferred and feasible outcomes. It is no surprise that preparedness levels and the availability of suitable expertise to respond and care for oiled wildlife has varied considerably across different parts of the world.

Recognizing the need to move past those differently held positions and for this to be approached in collaboration across a range of industry, veterinary science, non-governmental organizations (NGOs) and other stakeholders; the IPIECA-IOGP JIP sought to bring these different groups together to achieve alignment on some specific issues. Through a funded collaboration between 10 of the world's wildlife NGOs respected for their expertise in this field, some of the key outcomes and work products included:

- Planning Good Practice Guide – key principles on planning for and responding to oiled wildlife. For the first time, this provides a common basis for the oil industry and other stakeholders on how to address oiled wildlife in their response capability planning.
- Wildlife Care Technical Support Document – an aligned position on veterinary practice for animal care. Irrespective of which stakeholder may be involved in a response, this provides a common basis for the specialized care that is needed to feature at the core of any wildlife response activities.
- Global Oiled Wildlife System (GOWRS) – a network of internationally recognized wildlife response organizations, that have established protocols for working together in a collaborative and systematic way; to support the needs for wildlife response during an incident. While this is currently established on a best-endeavors basis, rather than as a formal legal entity with a formal service level agreement for specific clients; it marks a major step forwards, offering the platform for further advances.

As with several other key technical products from this JIP work, there are also a wealth of positives of a more intangible nature, helping to bring stakeholders together and address prior-held perceptions which presented difficulties before the project began. As such, this

oiled wildlife work overall represents a break-through in better aligning perceptions as well as technical good practices, and it provides a clear platform for this important aspect of oil spill preparedness and response to be further advanced by a variety of stakeholders.

Sub-sea Dispersant Injection (SSDI)

The sub-sea application of dispersants was first practiced during the response to the Deepwater Horizon accident and there is an extensive range of research available from numerous sources. During the AIP JITF and the OSR-JIP, specific technical areas were targeted to reduce uncertainty and deepen aspects of knowledge, technical understanding and response practices. There was also a high degree of coordination across the two initiatives, to ensure efforts were complementary and the maximum value could be drawn from expert contributions. The topic of SSDI is covered extensively elsewhere in conferences, research papers and proceedings. Note is given here briefly to some critical insights revealed from the JITF and JIP work, including:

- SSDI efficacy - studies identified optimal dispersant injection points and methods; confirmed readily available dispersants (Corexit, Dasic, Finasol) are all effective on a wide range of oils and reduced droplet size by at least an order of magnitude; and documented that increased pressure at depth and 'live' oil (with and without natural gas bubbles) have insignificant efficacy effects
- VOC concentrations - flux modeling validated that SSDI substantially reduces concentrations in the air at the sea surface
- SSDI Toxicity - testing of deep-sea organisms (selected fish, shrimp and corals) established that they are not more sensitive to oil toxicity than surface organisms
- Biodegradation - refuted a popular but flawed Kleindienst study which promulgated a notion that dispersants impair the natural biodegradation of oil droplets

- SSDI Monitoring – a Guideline was developed for conducting subsea monitoring for SSDI
- Droplet size field measurement – research led to the development of the Silhouette Camera (Sil Cam) which significantly enhances the capability for droplet size measurement
- Droplet size prediction modelling – research has greatly increased the accuracy of modelling algorithms for prediction of droplet size in the field
- Comparative Risk Assessment – a risk assessment model was developed collaboratively to quantitatively evaluate response options (aligns with the SIMA qualitative approach)

CONTINUING THE LEGACY OF THE API-JITF AND OSR-JIP

API OSEPR

Following the sunsetting of the API JITF in 2016, the ongoing JITF projects as well as subsequent projects were taken up by the API Oil Spill and Emergency Preparedness and Response subcommittee (OSEPR). The OSEPR was organized into three work groups including Scientific/Technical, Emergency Response and Policy/Outreach wherein the JITF related projects were transitioned to the Scientific/Technical Work Group or STWG.

In addition to the notable projects mentioned above, the OSEPR STWG is working on, or has recently completed, the following projects:

- Comparison of emissions from In Situ Burning and other sources
- Evaluation of DWH toxicity data on sediments, algae and aquatic organisms
- Update of SSDI monitoring guidelines
- Canine subsurface oil detection calibration study

- Summary papers on SSDI fate and effects and efficacy studies

IPIECA OSG

With the work of JIP Phase 2 nearing completion late in 2016, steps were taken early in 2017 by the international industry to consolidate efforts going forwards in a sustained manner through IPIECA's Oil Spill Working Group. In essence, this followed a similar approach taken by the API when it transitioned efforts from the former JITF to a reconstituted technical working committee which became the OSEPR. Representing a large majority of international oil companies and industry associations, the IPIECA Oil Spill Group (OSG) as it is now known, has subject matter expert contributors attending from across the full IPIECA and IOGP membership.

Under a conventional Chair/Vice Chair leadership construct, three workstreams focus on:

- Advancing technical issues of priority to members and the wider response community
- Supporting implementation of good practice within member companies and through various regional government-industry partnership programs
- Communications and sharing perspectives on good practice via recognized forums

Examples of technical work either delivered or currently being worked on, include:

- technical guidance on the storage, transport, maintenance and testing of dispersants,
- scientific monitoring and sampling guidelines,
- developing a surveillance strategy to inform situational awareness,
- forwards planning in IMS, and
- guidelines and standard training on Shoreline Response Programs/SCAT.

Through a vital partnership approach with the UN International Maritime Organization (IMO), members of IPIECA support various geographic regional programs in the coordinated and consistent improvement to national plans, response policy, training, exercises and response capability – which together cover around 90 countries, which has reached several thousand individual attendees and stakeholders worldwide. These regional Global Initiative programs are covered by other papers at this IOSC 2020 conference. Members of IPIECA also engage regularly with many stakeholders through recognized forums, conferences and meetings worldwide.

SUMMARY OBSERVATIONS AND REMARKS

An extraordinary amount of vital work has been delivered by the API-JITF and OSR-JIP, summarized above, and the huge range and depth of material has different significance and applicability to various stakeholders. Taken overall, this has greatly increased global oil spill risk management, preparedness and response capabilities.

It is also worth noting, that this program of work has predominantly been driven by technical experts for consumption by fellow technical experts, stakeholders and the wider oil spill response community. Therefore, it is worth standing back briefly, to reflect more broadly on the full range of outcomes and intrinsic value of these initiatives, which may be summarized as:

1. Advanced technical knowledge, understanding and insights on technical issues
2. A reference of internationally recognized technical documents, materials and tools
3. A common approach and suitable technical details to underpin good practice
4. A consistent position and common voice with which to engage a range of stakeholders on matters of technical importance

5. Deeper expertise and an expanded network/cadre of subject matter experts available to sustain and further advance our understanding and good practice in the future

Intuitively, when we make an advance in an aspect of oil spill preparedness and response, we gain a different vantage point from which we can see new opportunities emerge for what the next step forwards could be. And on occasion, as noted earlier, a notable event or new driver prompts a reappraisal of the status quo. Inevitably, there will always be new perspectives to reach for and new advances to be made. It is important that we remain attentive to the need to maintain progress, implement advances and while doing so, seek to maximize all of the value that can be derived from industry initiatives such as the JITF and OSR-JIP projects.

If there were to be another industry collaborative initiative in the future, it would be advantageous to consider all of these valuable outcomes at the outset, to ensure we squeeze the very most from these efforts – offering as many as possible new insights, new tools, new ways to implement good practice, and to communicate and share perspectives in ways that have relevance and can reach as many organizations, people and minds as possible.

Appendix 1 – API-JITF - Details of Technical Products Developed

Spill Response Planning

Sensitivity Analysis for Oil Fate and Exposure Modeling of a Subsea Blowout – Data Report
Guidelines on Implementing Spill Impact Mitigation Assessment (SIMA)
Guidelines for Oil Spill Response Training and Exercise Programs, API Technical Report 1159
Preparation of Response Plans for Oil Spills from Offshore Facilities, API Recommended Practice 1145
Personal Protective Equipment Selection for Oil Spill Responders, API Recommended Practice 98
Introduction to Net Environmental Benefit Analysis (NEBA)

Oil Sensing and Tracking

Remote Sensing in Support of Oil Spill Response, API Technical Report 1144

Dispersants

Dispersants Fact Sheet 1 - Introduction to Dispersants
Dispersants Fact Sheet 2 - Dispersants and Human Health and Safety
Dispersants Fact Sheet 3 - Fate of Oil and Weathering
Dispersants Fact Sheet 4 - Toxicity and Dispersants
Dispersants Fact Sheet 5 - Dispersant Use Approvals in the United States
Dispersants Fact Sheet 6 - Trade Offs
Dispersants Fact Sheet 7 - Aerial Vessel
Dispersants Fact Sheet 8 – Subsea and Point Source Dispersant Operations
Dispersant Fact Sheet 9 – Dispersant Use & Regulation Timeline
Dispersant Fact Sheet 10 – Dispersant Use in the Arctic Environment
Industry Recommended Subsea Dispersant Monitoring Plan, API Technical Report 1152
Introduction to the Role of Dispersants in Oil Spill Response
SINTEF Dispersants Effectiveness Report – Phase I
SINTEF Dispersants Effectiveness Report - Phase II
SINTEF Dispersants Effectiveness Report – Phase III
SINTEF Dispersants Effectiveness Report – Phase V
SINTEF Dispersants Effectiveness Report – Phase VI
Aerial and Vessel Dispersant Preparedness and Operations Guide, API Technical Report 1148
Report: Evaluation of Models for Subsurface Dispersant Injection
Industry Guidelines on Requesting Regulatory Concurrence for Subsea Dispersant Use, API Bulletin 4719
Sensitivity Analysis for Oil Fate and Exposure Modeling

In-Situ Burning

Fact Sheet 1: Introduction to In-Situ Burning
Fact Sheet 2: Fate of Burned Oil
Fact Sheet 3: Human Health and Environmental Effects
Fact Sheet 4: Assessing ISB Benefits and Risks
Fact Sheet 5: ISB Approval in the U.S.
Fact Sheet 6: ISB Operations
Field Operations Guide for In-situ Burning of Inland Oil Spills, API Technical Report 1251
Field Operations Guide for In-situ Burning of On-Water Oil Spills, API Technical Report 1252
API Selection and Training Guidelines for In Situ Burning Personnel, API Technical Report 1253
In-Situ Burning – The Fate of Burned Oil, API Publication 4735
In Situ Burning Guidance for Safety Officers and Safety and Health Professionals, API Technical Report 1254
In Situ Burning: A Decision Maker's Guide, API Technical Report 1256

Mechanical Recovery

Deepwater Horizon Mechanical Recovery System Evaluation, API Technical Report 1143

Shoreline Protection

Oil Spills in Marshes – Planning and Response Considerations, API Technical Report 1146
Subsurface Oil Detection and Delineation in Shoreline Sediments – Phase 1 Report, API Technical Report 1149-1
Subsurface Oil Detection and Delineation in Shoreline Sediments – Phase 2 Field Guide, API Technical Report 1149-2
Subsurface Oil Detection and Delineation in Shoreline Sediments – Phase 2 Report, API Technical Report 1149-2A
Shoreline Protection on Sand Beaches – Phase 1 Report, API Technical Report 1150-1
Shoreline Protection on Sand Beaches – Phase 2 Field Guide, API Technical Report 1150-2
Improvements for the Mechanized Cleanup of Oiled Sand Beaches – Phase 1 Report, API Technical Report 1151-1
Tidal Inlet Protection Strategies (TIPS) – Phase 1 Report, API Technical Report 1153-1
Tidal Inlet Protection Strategies (TIPS) – Phase 2 Field Guide, API Technical Report 1153-2
Biodegradation and Bioremediation of Oiled Beaches, API Technical Report 1147
Canine Oil Detection: Field Trials Report, API Technical Report 1149-3
Canine Oil Detection: (K9 – SCAT) Guidelines, API Technical Report 1149-4
Mechanical Treatment of Sand Beaches Historical Library Report, API Technical Report 1151-4
Shoreline In Situ Treatment (Sediment Mixing and Relocation) Fact Sheet, API Technical Report 1155-2
Shoreline In Situ Treatment (Sediment Mixing and Relocation) Job Aid, API Technical Report 1155-3
Shoreline In Situ Treatment (Sediment Mixing and Relocation) Library Report, API Technical Report 1155-1

Alternative Response Technologies

An Evaluation of the Alternative Response Technology Evaluation System (ARTES), API Technical Report 1142

Inland

Inland Oil Spill Preparedness and Response Overview
Sunken Oil Detection and Recovery, API Technical Report 1154-1
Sunken Oil Detection and Recovery Operational Guide, API Technical Report 1154-2
Options for Minimizing Environmental Impacts of Inland Spill Response, API Technical Report 425
Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response, API Recommended Practice 1174

Appendix 2 – IPIECA-IOGP JIP – Good Practice Guides

A broad range of technical reports, videos and other reference materials which were developed during the JIP can be found on the IPIECA website.
Listed below, are the Good Practice Guides which capture the mainstream industry good practice

Strategy
Oil Spill Preparedness and Response – An Introduction
Tiered Preparedness and Response
Response Strategy Development using NEBA
Guidelines on Implementing Spill Impact Mitigation Assessment (SIMA)

Planning
Contingency Planning for Oil Spills on Water
Sensitivity Mapping for Oil Spill Response

Response
Aerial Surveillance of Oil Spills at Sea
In-water Surveillance of Oil Spills at Sea
Satellite Remote Sensing of Oil Spills at Sea
Dispersants: Surface Application
Dispersants: Sub-Sea Application
In-Situ Burning of Oil Spills
At-Sea Containment and Recovery
A Guide to Shoreline Cleanup Techniques
A Guide to Oiled Shoreline Assessment (SCAT Surveys
Oil Spill Waste Minimization and Management
Wildlife Response Preparedness

People
Oil Spill Training
Oil Spill Exercises
Oil Spill Responder Health and Safety