

# **Black Sea Oil and Gas Summit**

## ***Considerations in the Preparedness and Response to Pipeline Oil Spills in Remote Environments***

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As more and more oil is moved by major pipelines, there is an increasing awareness of the need for effective and timely response in what are often extremely challenging conditions.

Pipelines are major feats of engineering often traveling enormous distances through a range of culturally, politically, geographically and environmentally diverse environments. Whilst simple in concept they are in reality a combination of complicated and specialized engineering components that are sensitive to a variety of threats such as natural disasters, mechanical failure and terrorist/criminal activities any of which could lead to a small release rapidly dealt with to a full blown rupture that may require extensive resources and time to resolve.

The response team will need to be prepared and capable of responding to a variety of scenarios. Preparedness requires an understanding of the product to be transported, the terrain profile, the catchment areas, the sensitivities and potential release volumes. This has a direct relation to the type and variety of equipment required the number and location of response bases and ultimately where to respond – containment at source and or containment downstream.

- How do you develop a team of qualified response personnel from the local population to understand these requirements and instill concepts that maybe technically and culturally new to them?
- What are the considerations that need to be addressed when mobilising and responding to pipeline incidents, specifically if the pipeline runs through remote areas with terrain that changes from semi arid desert to mountains and experiences extreme temperature variations.
- How do you mobilize and support equipment and personnel when there are no or few roads or supporting infrastructure more especially if the incident is in a remote location, at elevation with a heavy snow falling.
- What logistical difficulties does this create for equipment and people, how can they be overcome and what are the appropriate response techniques required to deal effectively with an incident, in such conditions.

This paper will review these questions and report on lessons learned from first-hand experience both from drills and exercises plus real spill situations in overcoming them.

The growing demands on the energy sector have meant an increase in the volumes of oil and gas delivered and the distances that they're required to be transported. As oil and gas is most times produced in areas often remote from the end user plus a means of exporting it to them, then it has to be transported from these areas to a point where it maybe stored and then forwarded to the markets. Hence pipelines are generally required to collect and transport the crude to shore and or onwards to the tank farm then the loading or export terminal. It is the remoteness of the oil producing fields in respect to the majority of end users which presents challenges both in the construction of the pipelines and how to mitigate the impacts of their construction and operation on the environment and of which I will talk today in respect to oil spill response operations.

There is an old but accurate adage, 'prevention is better than the cure' and this is certainly the case when developing OSR coverage for pipelines carrying oil and gas through geographically and environmentally diverse environments. Preventative measures often start at the planning and design stage where this can be partially achieved by engineering safety measures into the pipeline along with putting in place a comprehensive security/leak detection system, developing robust safety and operating procedures. However it is often a combination of all of these factors which provides for a success.

Ultimately because of corporate responsibility, local and or regional government and on many occasions NGO pressure groups there is a requirement to plan for any contingency including the potential release of oil from the pipeline. Therefore, having a competent, well equipped team of trained people capable of responding as effectively and efficiently as maybe possible for any incident to any location on the pipeline, is critical to conducting an effective response and clean-up. This is fine in theory and sounds relatively simple but creating a cohesive team of responders, training them in HSE and OSR techniques, equipping them and at the same time developing operating bases sufficient to meet any and all response needs is difficult in a main population center let alone at an elevation of 2000+ metres, or hundreds of kilometers from a major city or township. As mentioned previously the very nature of pipelines and the products they carry often means that the best place to lay them is in remote and inhospitable areas where the topography, climate and available resources make providing competent response coverage that much more challenging.

One of the key areas in being able to meet this challenge is in the planning and preparation of both the route of the pipeline and how to mount a response to an incident, should one occur.

Pipelines are constructed only after an enormous amount of research and consultation has taken place concerning the terrain profile, the catchment areas, the sensitivities and numerous other criteria are taken into consideration. Not only does this process supply vital information allowing for selection of the most acceptable route, for all interested parties, it also provides essential information required for the development of an effective Response Plan, potential recovery sites, likely spill volumes and accessibility. The last is a most important factor for any response activities, including OSR and will be directly linked to response times. All of this information will help to determine where the most suitable locations are for response centers, satellite bases, or pre-staged equipment stockpiles, what type and quantity of equipment, vehicles and boats, is required at each location, how many responders are required to operate these items effectively for both a short or sustained effort, plus what other resources maybe required due to the variances of terrain, weather and location.

Thankfully oil spill incidents are very rare from well built and maintained pipelines but that in itself is another challenge, because how do you develop, test and evaluate a competent team of responders without the likelihood of them attending a real or major incident. Although a competent OSRO will conduct ongoing training, drills and exercises, as part of maintaining their response preparedness, it is only with an actual or real incident that you can be fully assured of readiness, a test none us want to face or fail.

The expertise and time needed to train and develop a team of local personnel is costly and unfortunately the same commitment and focus does not always remain in place or the same numbers of experienced personnel as present during the initial startup. This issue is usually compounded by the fact that the National personnel often don't have the required technical experience or even the same language background as the instructors. So how do we ensure that they are capable of managing an incident either with direct supervision and independently which should be the ultimate goal.

Planning and preparation are once more key elements in the process of ensuring preparedness as well having an experienced response organisation capable of implementing the various plans safely and effectively once startup begins. An understanding of not only response operations but also the relevant third party contracts and agreements is essential for measuring performance and to determine the priorities of establishing an effective OSR organisation.

A detailed training matrix and exercise plan with goals and objectives plus attainable timelines for completion again offer a plan to work towards and a tool to measure organisational and personnel performance both collectively and individually. Documentation and recording of the training and exercises also offers a means to measure performance and provide assurance of the effectiveness of the training program, something that must not be overlooked, especially by those conducting the training. Having all the national staff, of the OSRO, understand the process and requirements of conducting an effective response operation allows the personnel to not only buy into the plan early on but for them on ownership, so management roles sooner than later. Even although foreign 'experts' may provide the initial technical training, we are all able to learn from each other and the local staff are often the best suited in understanding the difficulties of logistics hence able with guidance to develop the needed support organization.

The specific and many equipment requirements for mounting a response operation in a remote area can be identified early in the planning and preparation process but ultimately experience and a detailed understanding of the area of operations will fine tune this selection. It is equally most important to build in flexibility into equipment purchasing plans, to allow for potential additional requirements which may only be identified once operations is up and running. Ideally a gap analysis should be conducted at some point soon after operations have stabilized. Experience has shown that vehicles and equipment wear more readily than forecasted by the manufacturers or suppliers, due to extreme terrain profile, local road conditions, large variations in temperatures, or even inconsistent fuel and oil quality. Therefore the equipment and vehicles require additional maintenance with considerable thought and planning needed for availability of spares and other more basic issues such as alternative means of transport should the first line response equipment and or vehicles fail or be overcome by the prevailing conditions. Alternatives could include helicopters, snow cats, tracked vehicles, low ground pressure high clearance vehicles, air boats, hovercraft are just some of the options that may require to be considered. As a minimum multi wheeled, all wheel drive, trucks with cranes and 4WD pickups with winch, satellite phones and first Aid kits should be available to transport equipment and personnel to site, heavy plant and transporters should be identified if not readily available in-house.

Not only does the staff and equipment need to be able to function in these remote and arduous conditions they may need to sustain operations for extended periods with minimal support, so ensuring they've received the correct training, appropriate equipment and PPE could mean the difference between a healthy and capable responder and a critically ill person unable to function and possible liability. Such a person not only may be a threat to him or her self, but as a result of their reduced capability maybe a threat to others who are working with or near them and so affect the response operations.

Having insulated tents with generators, heaters, lighting and hot sustenance are essential in winter conditions. Conversely being prepared for a response in the height of summer is just as critical with simple things such as having adequate summer weight coveralls on hand, shade and bottled water available going a long way towards maintaining an effective responder and team. It is surprising how often such basic essentials maybe forgotten, more especially by those who are too close to the clean-up activities but equally by those who are

remote from the site, perhaps sitting in an air conditioned IMT, with tea, coffee and food all readily available.

The response techniques and strategies for responding to incidents in these types of conditions are well documented and many publications and training courses are available to help develop the response team and management of the overall response efforts. The real test though is responding to real or actual incidents and as mentioned earlier, thankfully they are few and far between.

Therefore the only realistic option is drills and exercising at potential containment sites which have been identified as potential recovery sites, due to access, proximity to the pipeline and or topography. These drills and exercises not only tests the team's equipment deployment skills, at the actual sites at which they could be responding, it also identifies seasonal variations that could affect equipment and vehicle selection plus accessibility and many logistical issues. More importantly it identifies if it is a viable recovery site or do alternative sites need to be investigated. A detailed site exercising program with matching scenarios should be developed to ensure that all recovery sites are visited during all of the seasonal variations.

Land based pipeline response presents many different challenges to that of the marine environment and require different techniques and strategies to overcome them. Added to this is the need to develop response capability in areas that present logistical and environmental challenges.

To achieve a successful outcome is a task that requires commitment and perseverance from both National and Expat staff and a real team effort. The rewards though on seeing a team respond successfully to its first incident is well worth the challenge.