Balancing Response Operations with Safety, the Environment & Commerce

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ABSTRACT:

On January 23, 2010, a double hull tank vessel spilled nearly 9,500 barrels of high sulfur crude oil into the Sabine-Neches River in Port Arthur, Texas. The ensuing evacuation of surrounding areas, coupled with the potential environmental impact and closure of the Intracoastal Waterway, elevated public, political and environmental concerns. The spill occurred in one of the highest volume shipping thoroughfares in the United States, resulting in a response that required a balance between the economic need to open the waterway quickly and the environmental responsibility to do so conscientiously. Through an effective multi-agency Incident Command, rapid call up of abundant response resources to properly implement pre-identified response protocols, and the development of innovative response tactics, response managers successfully balanced environmental, commercial and safety concerns to execute a highly effective spill response. Operations personnel developed and executed solutions to problems such as unusually high water levels and currents, an H_2S environment that posed a threat to responders, and protection of highly environmentally sensitive areas within this industrial corridor. The multi-agency Unified Command directed sound response goals and objectives while supporting response strategies and tactics developed by Planning and Operations personnel, the implementation of which resulted in minimal damage to environmentally sensitive areas, reopening of the waterway in just four days, and the reestablishment of local trust that the waterway and environment were safe. Collectively, the support of a cohesive Incident Command to execute operational strategies, and the RP's diligence in ensuring all needed responses resource were quickly made available, enabled the command post to be stood down and the majority of the cleanup to be complete within just 21 days of the spill. Additionally, response tactics implemented in this response resulted in potential improvements to response strategies in this geographical region.

INTRODUCTION:

The Sabine-Neches River extends north from the Gulf of Mexico through Port Arthur, Beaumont and Orange, Texas (Attachment 1 – Map Overview). This waterway is a conduit for deep draft vessels, fishing vessels, and a multitude of barge traffic on the Intracoastal Waterway (ICW) which intersects and, for a short distance, joins the Sabine-Neches River. Together, these two waterways provide a vital lifeline of resources to Southeast Texas and the rest of the United States (U.S.) ranging from chemical, petroleum and petroleum-related cargoes being transported on the Sabine-Neches River to a plethora of other assorted cargoes being transported on the ICW. This includes providing critical crude oil supplies to feed four major petroleum refineries that account for 6.5% of the U.S. total refining capacity. Additionally, the Sabine-Neches River is used by vessels supporting two Liquid Natural Gas facilities, the largest commercial military outload port in the U.S., commercial fishing vessels and recreational boating.

Although the Sabine-Neches River and ICW act as maritime-industrial throughways, they are situated along pristine and highly environmentally sensitive areas spread throughout the region. There are more than 20 designated Environmentally Sensitive Areas noted in Marine Safety Unit (MSU) Port Arthur's section of the Southeast Texas and Southwest Louisiana Geographic Response Plan that located are in close proximity to the initial spill site. The most notable sensitive areas along the Sabine-Neches River from the Gulf of Mexico to the intersecting Neches River are the Sabine-Neches Canal, Keith Lake, Sabine Lake, Taylor Bayou, and JD Murphee Wildlife Refuge. These areas are rich in fish, oysters, crabs and shrimp. Additionally, the surrounding environment serves as a robust habitat for wading birds and rookeries and provides locals with an abundance of fish for both recreational and commercial purposes.

On January 23rd, 2010, these high volume waterways and environmentally sensitive areas were unexpectedly impacted due to a serious maritime casualty that occurred in Port Arthur, approximately 24-miles north of the Gulf of Mexico in a location where the ICW joins the Sabine-Neches River. At this point (Attachment 2 – Map Collision Point), a collision occurred between the northbound, double-hulled tanker, M/T *Eagle Otome,* and the southbound Tug *Dixie Vengeance* tow, pushing two fully laden tank barges (Kirby 30406 and Kirby 28112)**.** The collision resulted in a spill of an initially estimated 11,000 barrels of Olmeca crude oil which contained high concentrations of Hydrogen Sulfide (H_2S) and posed significant toxicity and potential fire hazards. Consequent affects of H_2S range from eye, nose and throat irritation when a person is exposed to low concentrations of H_2S, to headaches, dizziness, nausea and vomiting, severe respiratory tract irritation, shock, coma and death in moderate and high level exposure situations. Due to the potentially high concentrations of H_2S, the initial response action involved evacuation of the adjacent community as ordered by local responders and law enforcement agencies. Further, the H_2S vapors and fire hazard increased response concerns due to potential exposure to crewmembers and emergency response personnel in both mitigating the release of cargo and minimizing the effects of the released oil to the environment.

While the cause of the accident is beyond the purview of this paper, the effect to both the local economy and environment was potentially catastrophic if response operations were not properly and methodically managed. Collectively, the collision, the resulting spill & evacuation and elevated response concerns presented a dilemma in prioritizing response efforts and balancing safety, the environment and commerce.

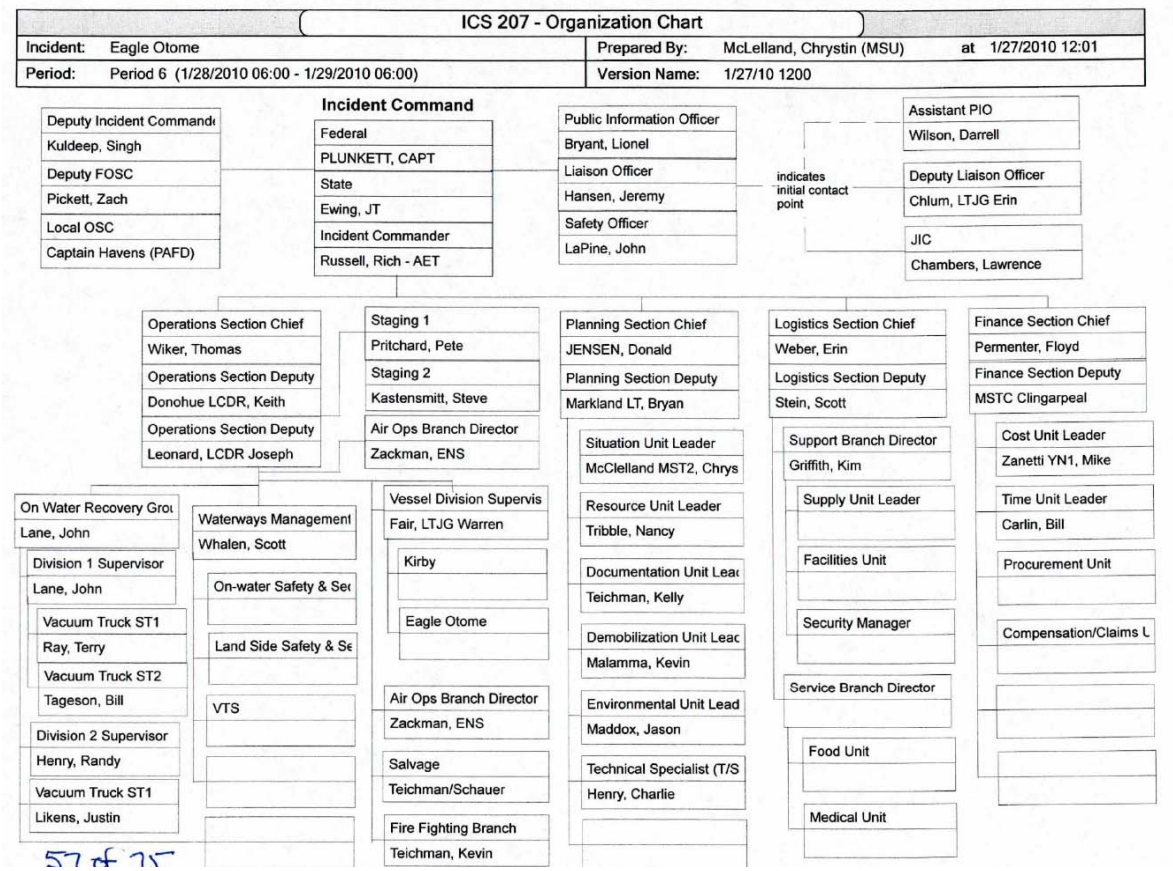
METHODS:

Balancing contributing factors of the crisis with sound ICS management practices

Many critical issues arose from the outset of the spill and throughout the response. As with similar incidents, the major challenge in responding to these issues is prioritizing them without compromising other relatively important concerns. This is further complicated as the issues are voiced from a variety of concerned parties such as local media, environmentalists, the general public, regulatory agencies and others. Considering the magnitude of this incident, a full Incident Command System (ICS), inclusive of a Unified Command (UC), was implemented soon after the collision.

The ICS serves as a multi-agency collaboration of Federal and State regulatory personnel working in unison with the *Responsible Party (RP)*, in this case the shipowner, in the overall management of an incident. Collectively, personnel staffing the ICS worked together to coordinate the incident response following the ICS protocol of *management by objectives*. As is most often the case in large spill responses such as this, the ICS is spearheaded by representatives of the lead Federal Agency, lead State agency or agencies and the RP to form the UC. Within the ICS organization, goals and objectives are established by the UC first identifying and prioritizing key issues and then outlining general plan(s) of action by establishing objectives. Planning and Operations personnel then develop strategies and appropriate tactics for dealing with each of the issues in the most efficient manner.

In this response, the ICS was fully staffed within 24-hours by members of the U.S. Coast Guard (USCG), Texas General Land Office (TGLO), the RP and their Spill Management Team (SMT), the National Oceanic & Atmospheric Administration (NOAA), local police and fire departments, the Oil Spill Removal Organization (OSRO), the Salvage & Marine Firefighting (SMFF) provider and several other key agencies and organizations. Collectively, these ICS members contributed to the successful preparation of an Incident Action Plan (IAP) on the first day of the incident. An example of the initial ICS structure during this response is provided in the below Organizational Chart:



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Initial response personnel from the USCG, TGLO, NOAA, Texas Parks & Wildlife Services and the RP mobilized at USCG MSU Port Arthur to begin planning a response. Initial primary issues identified by this group were:

1. Safety to responders and the general public;
2. Stabilization of the vessel, tug and tank barges while also securing the source;
3. Containing the released oil.

Considering the above primary issues, the USCG, TGLO, RP and other trustees identified preliminary objectives for the first 12 hours and prioritized them as follows:

1. Safety of Responders/ Public	7. Develop Unified Command
2. Obtain/Mobilize Marine Firefighting resources	8. Begin Salvage Planning
3. Source Control	9. Evaluate & report MTS Impact
4. Contain Spilled Material	10. Incident Investigation
5. Protect Sensitive Resources	11. Keep Stakeholders and Public Informed of Response Activities
6. Secure Waterway	

Safety to the responders and surrounding population was paramount. Prior to establishing a fully functioning UC and ICS, regulatory personnel had to make a decision regarding the hazards involved with this spill. They considered the potential health effects of the H_2S -laden cargo to the public with the safety, economic and social impacts of ordering a local evacuation. After careful evaluation, it was apparent that H_2S levels were high enough to merit this evacuation which began first with adjacent facilities and the Port of Port Arthur (POPA) and then commercial and residential areas north of POPA. Given that personnel felt that an additional release of crude oil was unlikely and the presence of H_2S vapors would dissipate within a reasonable amount of time, it was anticipated that the evacuation would be short-lived and of minimal inconvenience when compared to the safety benefits of imposing the evacuation. This evacuation, initiated via the Southeast Texas Alerting Network, displaced approximately 120 people for a short period of time. A temporary shelter was immediately stood up and made available to the evacuees. Air monitoring was quickly established to monitor the H_2S levels which soon deteriorated to a safe level allowing residents to return to their homes and businesses early on January 24th. The decision to evacuate based on the considered variables proved to be correct.

The H_2S also proved to be a hurdle in initially containing the oil. It was obvious that oil containment boom needed to be deployed around the Eagle Otome, Tug Dixie Vengeance and the tank barges but there were exposure dangers involved in undertaking such a response. The H_2S exclusion zone was enacted around the vessel, POPA and inland for approximately six city blocks. The USCG, TGLO and RP required response personnel to wear the proper personal protective equipment in deploying boom in this area. Upon completion, it was determined that

no further response actions would be undertaken in the immediate vicinity of the collision site until air monitoring proved that H_2S levels were below unsafe concentrations.

Understandably, UC members did not want to expose response personnel to unsafe conditions; however, recognized that the oil still remained in the water and a response was necessary. Therefore, air monitoring continued which allowed responders to identify locations where personnel could safely work. Safe work areas were then matched with environmentally sensitive sites where personnel could be safely deployed. This enabled productive work activity in deploying boom to protect sensitive areas, collect migrating oil for recovery and minimize further impact.

Overall, members of the UC balanced the need to respond without compromising the safety of the responders in the early stages of this incident. These early decisions and a commitment by the RP to react quickly and proactively resulted in the majority of the cleanup being complete within three weeks. Considered ahead of schedule, this expedient cleanup was the result of hard work, commitment and sound communications led by members of the UC and supported by the ICS compliment.

RESULTS/DISCUSSION:

Safety of responders & the public

Air monitoring efforts were quickly implemented and confirmed the presence of flammable vapors above the Lower Explosive Levels (LEL) and high H_2S levels in the immediate vicinity of the vessel. This required the evacuation of local residents as a precautionary method. Further, this required the UC to establish a safety zone which necessitated appropriate protective gear for responders and limited access in responding to the highest concentrations of the oil. However, safety personnel ensured proper precautions were taken while responders did their best to recover oil in unusually challenging circumstances. Overall, the presence of H_2S where large concentrations of oil within the safety zone existed, did hinder the response in the early stages particularly given that unusually fast currents moved some of the oil from within its original containment near the collision point.

Additional air monitoring revealed that elevated H_2S levels dropped dramatically as the testing distance increased proximate to the collision site. Given the characteristics of the spilled oil, air monitoring efforts continued and workers, located relatively close to the collision site, were required to wear appropriate protective equipment. A section within the IAP, the Site Safety Plan (SSP), addressed the safety risk factors associated with the H_2S and the spilled Olmeca Crude Oil in ensuring that all responders were aware of the proper protective measures that were required to be undertaken throughout the response.

Challenges in Containing and Recovering free-floating oil

Vessel personnel immediately began taking measures to control the release of the cargo from the damaged tank onboard the vessel. Although immediate actions were taken, a substantial release of what was later determined to be slightly less than 9,500 barrels of Olmeca Crude oil, occurred before the source was secured. When the incident initially occurred, the vessel engaged its USCG-approved Vessel Response Plan (VRP) and activated their pre-contracted network of response personnel. This resulted in notifications to all Federal & State agencies and activation of the Qualified Individual (QI), SMT, OSRO and SMFF providers. The OSRO was directed to respond with oil containment boom and oil recovery equipment while the SMFF provider focused on vessel stabilization, elimination of fire hazard, minimization of H_2S levels and eventually moving the vessel to a safe location where temporary repairs could be started.

Initial response efforts were concentrated in the vicinity of the vessel, tug and barges which were quickly surrounded with oil containment boom. Oil recovery equipment was also mobilized to this area but was placed on standby as there was a UC enacted safety zone at the collision site that was established for the first 24-hours due to the elevated H_2S environment. Additionally, boom and recovery equipment was placed in locations near the spill site but away from the safety zone with the objective of containing the free-floating oil, preventing and minimizing it from impacting sensitive areas.

Members of the SMT immediately referenced the Texas State Contingency or *One Gulf* plan to identify pre-designated environmentally and economically sensitive areas near the collision point. The *One Gulf* plan combines portions of multiple Area Contingency Plans (ACPs) throughout the U.S. Gulf the result of which constitutes the “Base Plan”. Geographic Area

Specific information is included for each of the locations in the form of *Geographic Response Plans* that are encompassed within the *One Gulf* plan.

In the case of the *Eagle Otome*, key response information was located in the MSU Port Arthur Geographic Response Plan section of the *One Gulf* Plan. SMT members used *Environmental Sensitivity Index Maps (ESIM)* and *Site Specific Sheets* (SSS) to prioritize sensitive areas and implement pre-designated strategies in protecting these environmentally and economically sensitive resources. The ESIM (Attachment 3 – ESIM Map) provides information such as sensitive biological sites, shoreline topography, location of water intakes and boat ramps, and environmentally sensitive areas with accompanying protection priorities (High, Medium and Low). The SSS (Attachment 4 – SSS Map) provides interactive mapping that shows the pre-designated environmentally sensitive sites. Each site has its own site description, directions, Trustee points of contact, environmental and economical resources at risk and protection strategies. The predominant consideration in protecting sensitive areas lies with the decision between the priority of the area per the ESIM against the timing and likelihood of these areas being impacted by oil. Sites in the immediate path of the oil were protected first in order of ESIM priority followed by lower ESIM prioritized areas with consideration to the oil's anticipated shoreline impact.

Eagle Otome's VRP-listed OSRO was wholly engaged and had either on-site or enroute to the scene, their Oil Spill Recovery Vessels (OSRV) and a large quantity of on-water and shoreside oil recovery assets and personnel. These assets were placed in strategic locations dictated by the SMT via their ESIM/SSS priorities and the use of data collected by members of the UC during twice daily helicopter overflights. Further, the VRP-listed SMFF provider was fully engaged to

concentrate on vessel stabilization, source control and minimization & elimination of additional LEL and H_2S conditions.

With respect to the containment and recovery of the free-floating oil, it is worthy to note that unusually fast currents, high-shifting winds and high & low tides were present for the duration of this response which presented abnormal challenges. According to MSU Port Arthur Marine Safety Information Bulletin (MSIB) 04-10 dated 30 January 2010, the ebb tide was running at 4.0 knots on that day alone. It was informally reported that the current exceeded that speed in other locations in the river. These uncontrollable environmental variables resulted in oil entraining, or travelling under oil containment boom, oil splashing over the boom due to the wind, boom becoming entangled or broken due to severed securing lines, broken anchors, etc. Although planning and operational efforts were undertaken to proactively prevent these problems, battling weather continues to be a challenging response hurdle. These weather conditions also resulted in the failure or lack of completely reliable data associated with some of the previously proven strategies in the *One Gulf* Plan. However, SMT members worked with local responders, the NOAA Scientific Support Coordinator (SSC) and regulatory agencies in developing suitable protection and recovery strategies to combat the uncharacteristically fast currents, high winds and high/low tides. Specifically, successfully tested strategies for Environmentally Sensitive Areas such as Keith Lake were implemented immediately but had to be adjusted to prevent oil from impacting this breeding ground for both water fowl and aquatic life. There was a significant amount of public and political pressure to prevent oil from entering this area. Further, the introduction of oil to this area would be catastrophic given the abundance of fish, shrimp, crab and waterfowl in addition to its inaccessibility due to shallow marshlands.

Referencing the SSS Strategies (Attachment 5 – SSI Site 115) of the MSU Port Arthur Geographic Response Plan, the existing strategy recommends 1,100 feet of 18" containment boom, two boats and adequate support equipment. Having already implemented Site Strategy 115, SMT personnel quickly noted that this was ineffective in the current and expected weather conditions and had to be improvised. In addition to Site Strategy 115, boom was triple layered within Keith Lake Cut. Additionally, a double apex formation was created at the mouth of Keith Lake Cut, which is fed by the Sabine-Neches River **(**Attachment 6 – Implemented Revised SSI Strategy at Keith Lake Cut**)**. The additional protection measures increased response costs for this area by a multiple of three; however, resulted in little oil impact to the sensitive area. Consequently, the overall benefit far outweighed the costs for implementation of the strategy.

Another challenge was the need to reopen the waterway without compromising the cleanup. An open shipping channel meant the introduction of deep draft vessels, tugs, barges, etc. in areas which were now populated with OSRVs, response boats, and other resources supporting the cleanup. This coupled with the fast currents required a change from a conventional concentration of waterborne recovery assets to an increase in shoreside recovery via vacuum trucks. It also meant a commitment to increase resources and expenditures with the objective of finishing the response and opening the channel as soon as possible.

Operations personnel decided that the most effective means to open the channel while continuing the cleanup was to deploy diversion boom at key locations along the approximately 25 miles of impacted or potentially impacted shorelines of the Sabine-Neches River. Tactics were developed for corralling the oil to the shoreline in natural and/or strategic collection points. The objective was to isolate free-floating oil to locations on the river's edge where it was easily recoverable thus making a safe, oil free throughway on the shipping channel while having

minimal impact on the response. This *diversion booming* technique was highly successful in containing a large portion of the spilled oil out of the main shipping channel within a relatively brief amount of time. Although there are an abundance of resources in the Port Arthur area, recovery of nearly 9,500 barrels of oil exceeds the immediate local response capabilities. Consequently, a large quantity of vacuum trucks equipped with appropriate skimming equipment had to be procured and cascaded in from outlying areas to support this response tactic. SMT logistics personnel sourced and mobilized the vacuum trucks and skimming equipment in a short amount of time. Upon arrival, trucks were positioned adjacent to large concentrations of oil where they skimmed oil until all recoverable amounts were removed. This strategy resulted in a more effective and timely recovery of oil and enabled the reopening of the shipping channel without any injuries or delay in the response.

Implementation of the Transit Plan.

The U.S. Coast Guard issued MSIB 01-10 by 17.30 hours on January 23rd, 2010 informing mariners that portions of the Sabine-Neches Canal had been closed due to the collision and subsequent oil spill. Vessels were not permitted to enter or depart the zone without the consent of the Captain of the Port (COTP). Prolonged closure of this waterway would, no doubt, have a substantial economic impact on the local area as it meant that deep draft and all other vessels inclusive of barges were either stranded in port or in the ICW or had to wait offshore until permitted to transit by the COTP.

The USCG's Vessel Traffic Service (VTS) resides in the waterways management department of USCG MSU Port Arthur. VTS works for the COTP and is tasked with monitoring and enhancing safe movement of vessels in the VTS Port Arthur area. According to VTS Port Arthur, an estimated 35 to 50 tows - each of which average 2.5 barges - transit the ICW every 24

hours. This averages out to approximately 40 tows involving 100 barges on a daily basis. Furthermore, an average of 12 deep draft vessels, six inbound and six outbound, transit the Sabine-Neches River on a daily basis. According to MSU Port Arthur, the closure of the Sabine-Neches waterway, inclusive of the ICW, could potentially cost up to $200 million per day. MSU Port Arthur calculated this figure by comparing all incidents which closed this waterway between 2002 and 2007, and then arrived at a dollar figure based on information provided by agents, facilities, and several impact reports written by contractors. Removal of free-floating oil from the main shipping channel was paramount in beginning the process of reopening these waterways. This was accomplished by diversion booming oil to the riverbanks where it was recovered by a fleet of strategically positioned vacuum trucks.

When this collision occurred on January 23, 2010, there were more than 115 tugs and barges and several deep draft vessels in the queue to transit of the Sabine-Neches River or the ICW. However, oil sheen and free-floating oil occupied vital sections of the river from the intersection of the Neches River with the Sabine-Neches River, also known as the "North Forty" leading south to "Texas Point" where the river enters the Gulf of Mexico. This stretch of more than 25 miles of river was closed to traffic and required vessels and barges to wait until the USCG approved their transit on a priority basis. The number of waiting tugs, barges and deep draft vessels increased each day placing significant pressure on the UC to open the waterway to recommence commerce.

SMT Operations personnel worked closely with VTS Port Arthur and the TGLO in developing a *Transit Plan* which would enable barges and vessels to move without compromising the response or incurring further environmental damage. The primary issue was relocating the damaged *Eagle Otome* as well as the *Dixie Vengeance* and her two tank barges all of which were acting as obstructions in the channel. Once it was deemed safe and an efficient

plan of action was developed and approved, *Eagle Otome* was relocated out of the channel on January 27. Although less of an obstruction, the Tug *Dixie Vengeance* and her two tank barges were also anchored in the vicinity of the original collision point and were relocated on January 28. Once these vessels were moved, responders could then focus on implementing a systematic plan to reopen the channel. Collectively, the SMT, VTS Port Arthur and the TGLO, developed a *Transit Plan* focusing on the ICW and Sabine-Neches River with the basis of moving vessels during an ebb tide when it was advantageous to both collect oil and allow tows and deep draft vessels to traverse the area.

The Transit Plan was divided into four sections:

1. Objectives
2. Requirements
3. Plan Implementation
4. Coordination and Oversight

The *Objectives* clearly spelled out the types, originating location & destination, and number of vessels, inclusive of barge traffic, that were to be moved during the plan's operational period. The *Objectives* further stipulated the order in which these vessel movements were permitted to occur and locations where they would be cleaned before transiting out of the spill area. Two vessel cleaning stations were established at the northern and southern most points of the spill area. Upon transit, vessels would be inspected, cleaned and re-inspected prior to exiting the spill area. These "car wash" vessel cleaning stations allowed quick but thorough cleaning of vessels prior to departure thus eliminating the chance of contamination outside of the area but minimizing the delay in the respective vessel transits.

The *Requirements* portion of the plan dictated the time to both commence and cease the implementation of the *Transit Plan* based on the window of opportunity which was driven by slack water and the ebb tide. It also specified the parameters for opening and closing the boom to ensure that no previously contained oil was released due to manipulation of the boom or as a result of a passing vessel's wake. Further, it outlined the need for direct coordination between the vessels, VTS Port Arthur and the response personnel and placed vessel speed and movement restrictions on the transiting vessels.

The *Plan Implementation* section provided concise instructions for moving the vessels in a safe yet efficient manner. This included details for opening and closing the boom at the beginning and end of the plans operational period, which consisted of an ebb tidal cycle, to prevent the loss of contained oil which would occur if the booms were not properly re-attached prior to and during a flood tide. A safety measure, in the form of additional allocated time for personnel to disconnect and reconnect the boom, was installed to prevent the unlikely loss of oil if problems arose for response personnel in completing these tasks. Further, additional personnel and equipment were allocated and placed on standby at the boom connection points to be available if any unforeseen problems arose.

With respect to prioritizing vessel-traffic, this proved to be a challenge given that most of the traffic was delayed and needed to move their respective cargoes. VTS Port Arthur, the Sabine Pilots and members of the SMT worked closely each day in surveying the queue of vessels, their cargoes, and other factors. Priorities were given based on ETAs, time in queue (delay) and other variables. This information was used each day in formulating a plan of priority to expedite the flow of commerce in the most efficient means possible.

Coordination and Oversight of the implementation of the *Transit Plan* resided with the USCG, TGLO, SMT and NOAA. The NOAA SSC was required to verify the accuracy of tidal data while the USCG, TGLO and SMT provided personnel for oversight of the cleaning and final inspection of the "clean" vessels.

Diversion booming tactics and efficient recovery of oil, now contained along the river's edge, were the basis of implementing the *Transit Plan*. Successful implementation of the Diversion booming strategy enabled the successful implementation of the *Transit Plan* early on the morning of January 27th, following the relocation of the *Eagle Otome*. On that date, delayed tugs, barges and deep draft vessel traffic that were critical to the economy, were permitted to recommence movement. Pursuant to the initial implementation of the plan on January 27th, it was constantly amended over the following four days to allow for time, environmental and commercial adjustments until the waterways were reopened to unrestricted traffic on January 29th. The fact that there were no injuries or accidents during this highly complex plan where multiple vessels and supporting resources were methodically repositioned without compromising the environment is testament to the thoroughness of the plan and the high level of professionalism of personnel in carrying it out.

CONCLUSIONS:

As with most serious casualties, the Eagle Otome-Tug Dixie Vengeance collision presented many intricate and complex challenges for responders. This incident involved a large spill of a persistent oil on a major shipping thoroughfare which, when closed to traffic, accounted for a significant amount in local economic losses. Further, there exists a wealth of fish, oyster, crab, shrimp and other aquatic life which supports local commercial and recreational fishing. In

addition to these fisheries, there are other environmentally sensitive areas in the form of bird rookeries, a wildlife refuge and bird wading areas.

Overall, it was widely determined that the response to this incident was successful in overcoming environmental challenges, minimizing impact to the environment, recommencing commerce expeditiously and completing the majority of the cleanup within 21 days. All of this was undertaken with no serious injuries during the project. Efficient implementation of the ICS, a rapid mobilization of large quantities of response equipment, use of local area knowledge, response plans & resources, creative solutions to challenging issues and sound balance of all of these issues were critical in balancing multiple issues during this successful response.

An Efficiently Run Incident Command System

The most cogent reason for the success of this response was due to the effective and immediate implementation of the ICS in managing the overall response. Members of the UC worked cohesively in overseeing this response, considering field recommendations, and ensuring safe yet productive measures were taken to address the various issues. Key members from the USCG, TGLO and SMT were fluent in ICS nomenclature and understood how to efficiently implement the ICS in managing this incident from the beginning.

At the height of this response, more than 1,200 personnel were responding in a geographic area covering, for the most part, both sides of the river for approximately 25 miles. Considering this, it was paramount that directions were clear and concise and were safely executed in the field. This was accomplished via the daily IAP which identified clear objectives, efficient communications, accurate execution of established objectives, attention to detail and avoiding duplication of efforts, among other things.

Adapting Response Strategies to Acclimate to Incident Specific Challenges

Although the use of vacuum trucks and diversion booming methods are not new to this industry, the results of using these booming tactics and committing to unusually large numbers of vacuum trucks demonstrated the value and efficiency of this strategy. At the peak of the response, nearly 100 vacuum trucks were fully committed and used 24-hours a day in the recovery effort. The Port Arthur area does have a reasonable quantity of vacuum trucks; however, a significant amount needed to be procured and cascaded in to meet the high demand established by the SMT. Coupled with the use of waterborne recovery equipment such as weir disc, Marco belt and drum skimmers, the oil recovery effort associated with this nearly 9,500 barrel spill was efficient enough to partially reopen this busy waterway in less than four days and fully open it to unrestricted vessel traffic within six days.

Environmental vs. Commercial interests

The Sabine-Neches River and ICW are unique waterways in that each act as a conduit for commercial shipping and largely impact and support the economy of Southeast Texas. Additionally, these same maritime thoroughfares serve as environmental habits for wildlife ranging from waterfowl to oysters. Immediately following the collision, there were competing interests in protecting and minimizing damage to the environment with reopening the shipping lanes to recommence commerce.

The UC, supported by members of the ICS, had to meticulously coordinate balance between these two sensitive issues while also considering public and political demands and safety of response personnel. This was achieved through the aforementioned containment and recovery

strategy and via a carefully thought out *Transit Plan* designed to move vessel traffic without compromising the environment.

The implemented *Transit Plan* was successful in clearing the queue of vessel and barge traffic which climbed to a single day peak of 150 units on January 27th down to a zero backlog by January 31st. During this four day period, nearly 350 of a combination of tugs and barges and 35 deep draft vessels transited these waters under the *Transit Plan* which enabled an effective balance in allowing vessel movement without compromising the environment to additional contamination.

Weather as a Response Hurdle

Tides, currents and wind all played a significant role in posing challenging issues during this response. Excessive currents resulted in failing boom, oil entrainment, broken boom connections, torn boom tie-down lines and disconnected anchors. Additionally, previously tested booming strategies at Keith Lake and other environmentally sensitive areas were ineffective in these unusually fast currents. However, SMT personnel, with the support of field supervisors, revised strategies to shore up the previously deployed protection strategies which minimized the spread of oil. Using NOAA weather forecasts, SMT members took proactive steps to prevent these weather-related problems; however, battling weather continues to be a challenging response hurdle. TGLO and SMT field personnel local knowledge and response expertise proved to be the best tools for combating these problems and minimizing collateral damage. Response strategies in the MSU Port Arthur Geographic Response Plan are now being reconsidered based on the successful strategies developed and successfully implemented during this response.

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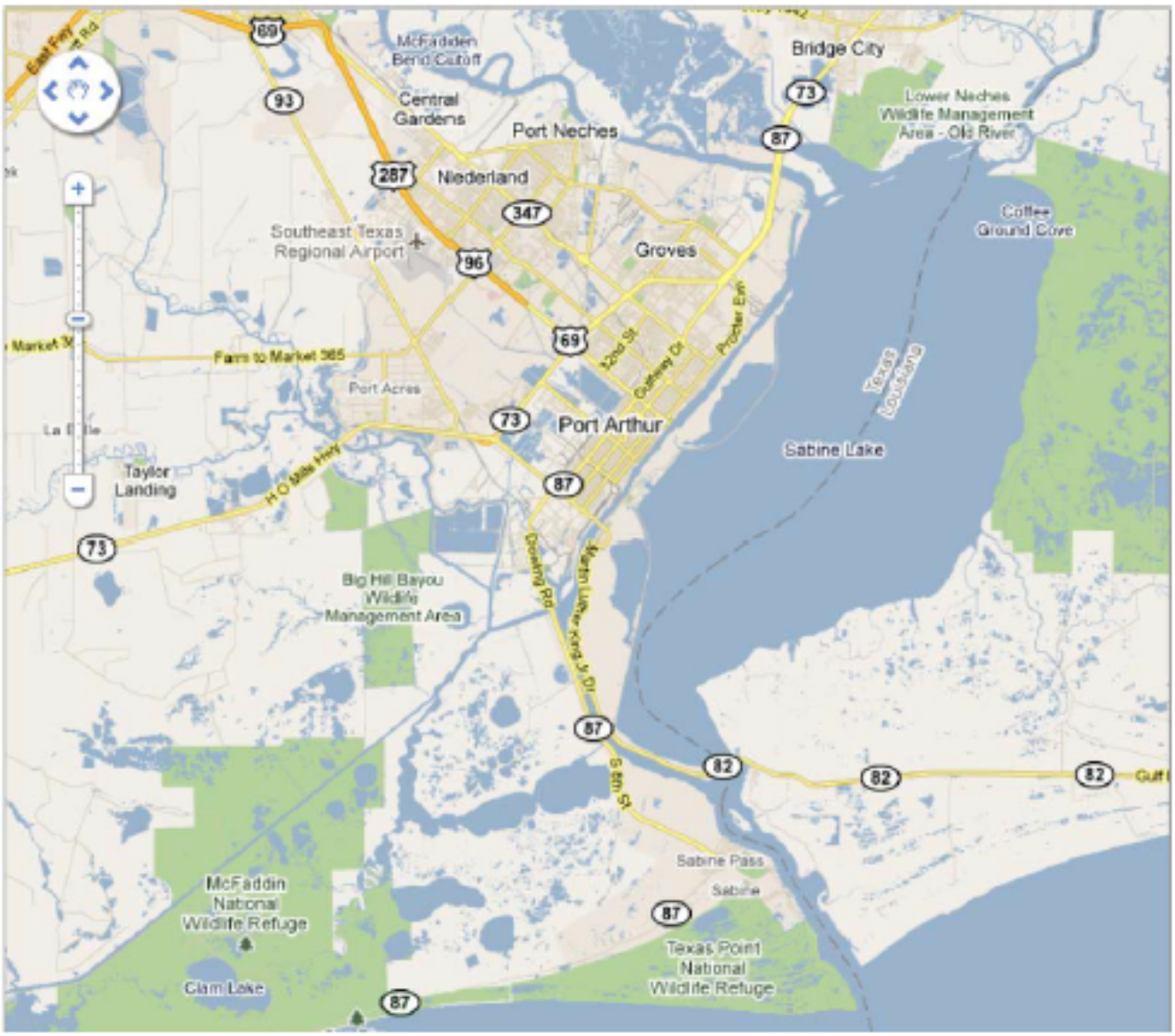
ATTACHMENTS: On The following pages…

Balancing Response Operations with Safety, the Environment & Commerce

Attachment 1 – Map Overview



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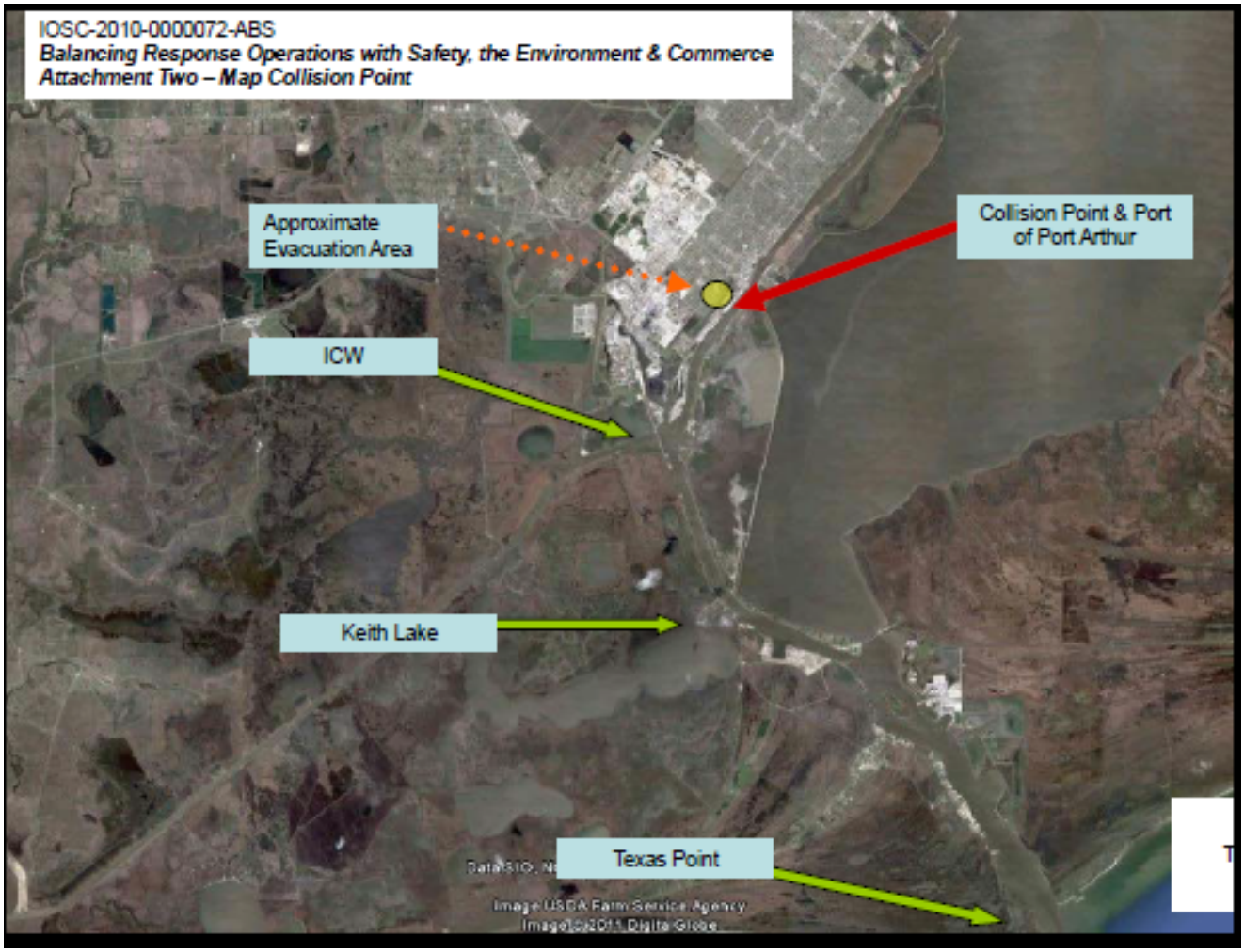

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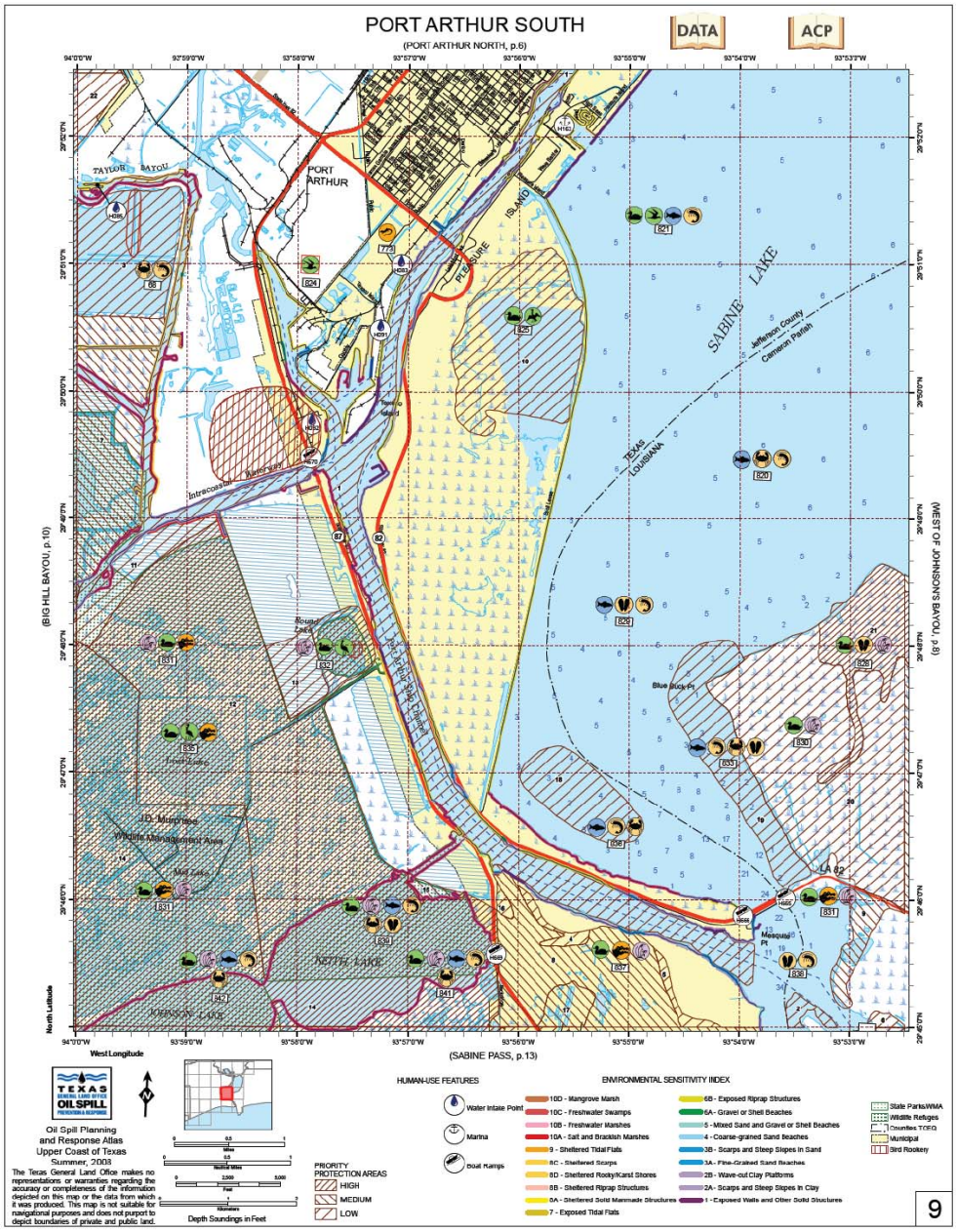
Attachment 3 – ESIM Map



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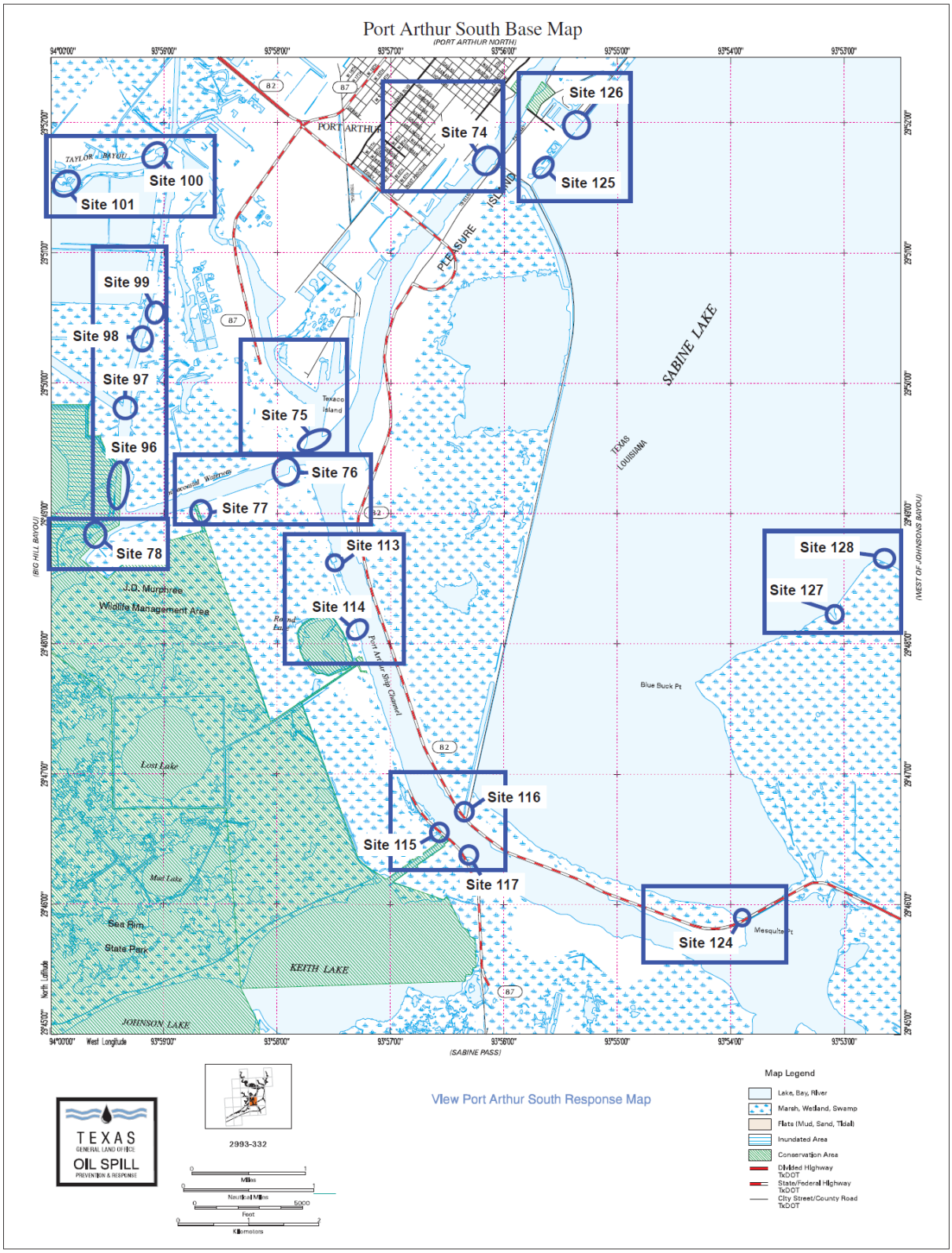
Attachment 4 – Baseline Map



Attachment 5

Site Specific Information
TGLO Response Atlas Map #9; Polygon #16;
Port Arthur Canal/Ship Channel-Site #115

Resources at Risk

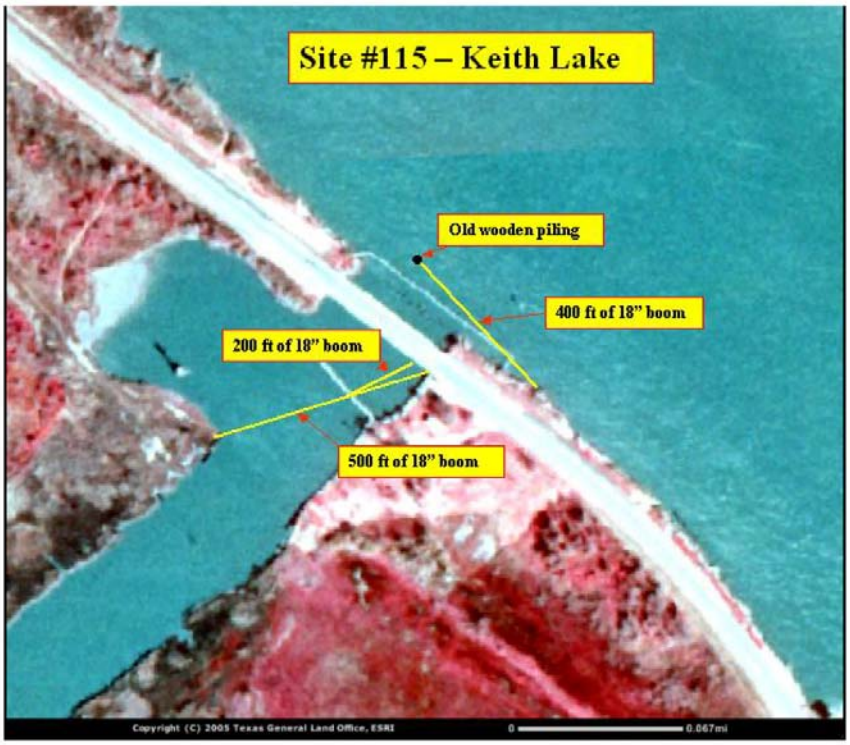
Atlas Priority:	**High**
Environmental:	This is a salt/brackish water marsh habitat for fish, shrimp, crab and oyster, waterfowl, wading birds.
Economic:	This area is a popular site among recreational fishermen.

Safety/ Cautionary Notes

Extreme currents are present during tidal changes. Vehicle traffic on Hwy 87 should be noted

Booming Strategy Recommendation

Recommendation:	Keith Lake Cut has extreme currents flowing during tidal changes. This site is high priority for protection, however it may be difficult due to the currents. Refer to the picture below for booming strategy.		
Number of personnel:	6-8	**Tidal Influence:**	Medium
Water depth at mouth:	20 ft.+	**Width of inlet:**	660 ft.
Equipment Recommended:	1100 ft of 18" boom 2 boats 6 stakes (with means of pounding stakes) Tow bridles as needed Anchor line as needed		



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Attachment 6 – Implemented Revised SSI Strategy at Keith Lake Cut

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