Economic and Policy Issues in Sustaining an Adequate Oil Spill Contingency Fund in the Aftermath of a Catastrophic Incident

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Abstract

On April 20, 2010, the offshore drilling unit *Deepwater Horizon*, experienced a significant explosion, fire, and subsequent sinking that led to the discharge of oil and other substances into the Gulf of Mexico. The spill, the largest recorded marine accident in history, led to a monumental effort requiring considerable financial resources from various state and local government coffers. While Louisiana had an established Oil Spill Contingency Fund (the "Fund") dating back to the early 1990s, the Fund's financial reserves alone proved to be inadequate to cover the costs for many governmental activities. The suspected sources of this shortfall are varied and include: (1) a dated Fund design and structure; (2) narrow fee collection coverage; (3) a low fee structure that was not tied directly to spill activity or total crude oil volumes moving through and within the state; and (4) an unaccounted for increase in spill volumes that started around 2004, prior to the *Deepwater Horizon* incident, that was not accompanied by any change in policy.

In the aftermath of the *Deepwater Horizon* incident, the Fund is being assessed, with two specific tasks in mind. The first task is to review various potential structural deficiencies through a re-assessment conditioned upon the changing nature of what could be loosely defined as a "normal spill activity level" (i.e., levels less than a catastrophic incident). The second task is determining whether, and/or how, the Fund should be modified to better prepare the State for similar catastrophic spill events. This paper explores the economic and policy ramifications of both tasks, along with offering potential financial and policy solutions. The analysis potentially provides useful information to other coastal states grappling with, or concerned about, their financial exposure to crude oil spills in this new era of American oil and natural gas production.

1.0 Historic Trends in Oil Spill Agency Funding and Costs

1.1 Overview

Like many coastal states, the Louisiana Legislature developed comprehensive oil spill legislation in the early 1990s in the aftermath of the *Exxon Valdez* disaster in Prince William Sound, Alaska. Included within this legislation was the creation of Louisiana Oil Spill Coordinator's Office ("LOSCO"), as well as the Louisiana Oil Spill Contingency Fund (hereafter "Fund"), in 1991. LOSCO's mission is to exercise the powers and duties set forth in this Louisiana-specific statute referred to as the Oil Spill Prevention and Response Act ("OSPRA," La. R.S. 30:2451 *et seq*.), that includes: providing a coordinated response effort for all appropriate state agencies in the event of an unauthorized or threatened discharge of oil; providing clear delineation for state coordinated response efforts in relation to jurisdictional authorities and use of state and federal funds for removal costs under various federal laws; and administering the Fund to provide for funding these activities. As such, LOSCO works very closely with other natural resource and environmental regulatory agencies in such matters as:

ensuring effective oil spill response and cleanup; restoring public resources; oil spill prevention; research and innovation; and state agency coordination

The costs associated with LOSCO's operations, as well as some of the state's other oil spill response efforts, are covered through legislatively-approved dispersals from the Fund. Originally, the Fund was financed through a two cent per barrel fee assessed on all crude oil transferred to or from vessels at a Louisiana-based marine terminal (defined in La. R.S. 30:2486 and effective until June 30, 2014). Until recently, this financing mechanism has not changed outside of adjustments to the fund ceiling and floor that determine when the fee is collected. In 2013, the Louisiana Legislature approved Act 394 which changed the Fund fee structure to one that assesses one-quarter cent per barrel on all crude oil received by a Louisiana refinery for storage or processing. This new fee is to become effective on July 1, 2014 per the terms defined in La. R.S. 30:2485.A., effective July 1, 2014.

Every year, LOSCO submits an operating budget, through the Department of Public Safety ("DPS"), to perform its responsibilities toward fulfilling its mission and to fund a limited number of support activities performed by other agencies that work closely with LOSCO on a regular basis. The Legislature, in turn, either approves or modifies LOSCO's budget request, and appropriates monies to support the approved annual budget, which is paid from the Fund, not from the state's general revenues.

From the Fund's inception in 1991, minimum and maximum limits have been imposed on the balance in the Fund. Once the Fund reached one of these limits, fee collection was triggered, and turned on or off (depending on which was reached). In 1991, the initial maximum balance was $15 million (i.e., the cap) and the initial minimum balance was $8 million (i.e., the floor). The floor and cap, and ultimately the balance of the Fund, have changed over the years with legislative modifications.

In 2010, the legislature modified the Fund balance again, removing the maximum balance and cap of the Fund, but only during emergencies or declared disasters. Act 394 of the 2013 legislative session removed the Fund balance cap, as well as the minimum and maximum balances associated with the fee triggers. The only trigger that now remains is a trigger to increase the fee from one-quarter of a cent to one-half of a cent if certain parameters (as outlined in La. R.S. 30:2485) are met.

1.2 Oil Spill Contingency Fund Resources

Figure 1 provides a chart examining financial resources available from the Fund from 1992 to 2012 and represents the combined total of all fees and other revenues collected in any given year along with any carry-over prior year financial balances, which themselves are calculated as the difference between prior year revenues and agency expenses. The Fund's total annual resources available are an important measure since they represent the financial resources upon which the state can draw upon to respond immediately to the environmental threats posed by oil spills in any given year. Historically, annual fee revenues (i.e., revenues collected from the annual two cent per barrel fee) are comprised of the revenues collected from marine transport entities moving oil to a Louisiana port or terminal.

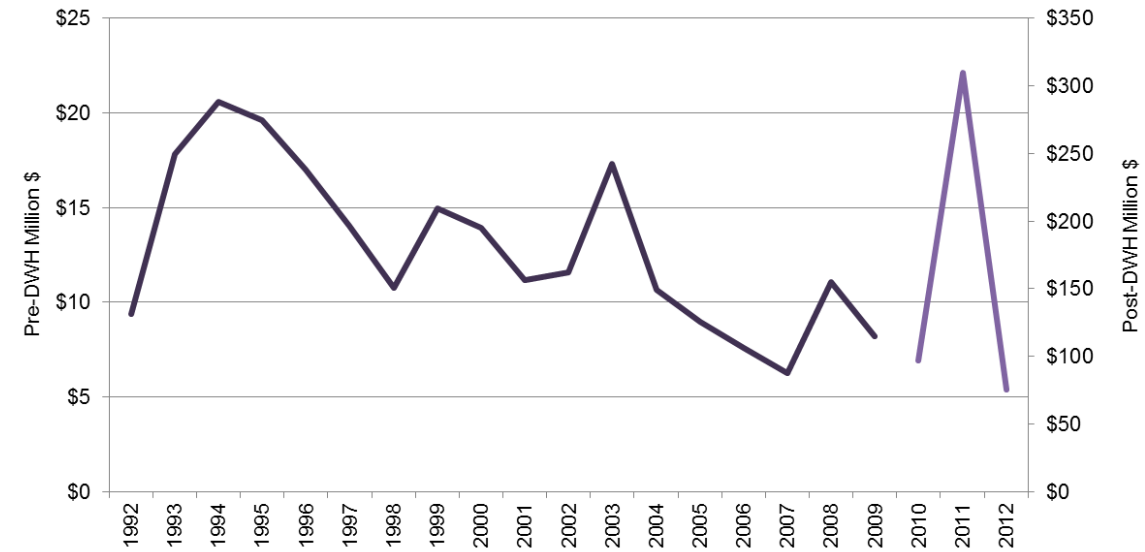

Figure 1. Oil Spill Contingency Fund Available Financial Resources (1992-2012)
Source: Treasury and Authors' Calculations

However, in addition to this fee, the Fund can receive reimbursements from the National Pollution Funds Center ("NPFC") for reimbursable expenses associated with specific incidents as well as monies from responsible parties to reimburse for response, assessment, restoration or monitoring costs associated with an incident. These additional sources of revenue are usually paid after expenses have been incurred on a particular incident. These monies reimburse the state and its respective agencies for agency-specific costs associated with oil spills.

While the state, in theory, has access to reimbursement from the NPFC or the responsible party(ies), there are several important reasons why those sources cannot be relied on too heavily for the state's spill-related activities. First, because spills continue to occur, the state must maintain a sufficient balance in the Fund to be prepared to respond to multiple spills at any given time. Second, even though the state may receive reimbursements or other associated revenue, there is a lag associated with the costs incurred and the reimbursements or other revenues such that the state must have sufficient resources available to promptly respond to an incident, which includes funding response and assessment activities up front. Third, reimbursements and other revenues are often uncertain because activities deemed necessary by the state may not always be approved for reimbursement and the amount of any settlement- or litigation-related revenues from responsible parties typically cannot be determined in advance at times when the state must undertake response and assessment activities.

Throughout the 1990s, the Fund's available resources varied by as much as 100 percent. In 1992, the first full year of the Fund, total resources available amounted to $9.4 million. The Fund peaked in 1994 at $20.6 million, and then decreased each year thereafter until hitting a low of $10.7 million at the end of the decade. The Fund hovered between $10 million and $17 million during the better part of the past decade before falling to a historic low of $6.2 million in 2007, three years before the DWH spill. The Fund resources fluctuated prior to 2010, and in 2009, there was a total of only $8.2 million in financial resources available to respond to the DWH spill. In fact, the 2009 Fund resources, totaling $8.2 million, represents one of the three lowest balances on record during the Fund's history.

By contrast, financial resources available during the BP oil spill period (2010-2012) averaged over $160 million compared to a pre-DWH average of $12.8 million. The overwhelming bulk of these resources, however, came from funds provided directly by the NPFC or BP, the responsible party, to the DWH spill, and will be discussed in greater detail later in this section of the report. This is also true for the most recent year (2012) where the Fund balance appears to be relatively large (over $50 million). The majority of the Fund balance in all three post-DWH years, however, are already encumbered to DWH-specific (not general spill-related) activities. Available resources for non-DWH (non-encumbered) spill-related activities are estimated to only be around $2.5 million annually in this period.

1.3 Oil Spill Contingency Fund Fee Revenue

Another important consideration in reviewing the funding mechanism for supporting the state's activities associated with oil spills is the timing of deposits to the Fund. As discussed previously, for most years of the Fund's existence, there has been a cap and floor that determined when the fee should be collected. When the Fund balance went above the cap, collection was suspended. Collection resumed when the Fund balance fell below the floor. This fee structure led to sporadic collections that had little to no association with spill response activity. The historic patterns of fee revenue show large collections until the Fund balance reached the statutory cap; followed by periods of very little or no fees collected until the Fund balance fell to the relevant floor. In fact, in 2004 the Louisiana legislature implemented a total fee revenue cap that actually required a one-time fee revenue-reimbursement, resulting in a "negative" Fund balance for that year.

1.4 Revenues, Costs, and Oil Spills

Because of the limited ability to exactly match spill notifications and their associated costs, the relationship between spill notifications and financial information should be considered over a period of multiple years to identify more stable patterns that will be less subject to bias created by this misalignment.

Figure 2 provides an evaluation of annual agency costs per barrel of oil spilled on a "lagged basis." Here, current year costs are divided by prior year spills (hence the use of the term "lagged") in order to get a better "average" measure of costs and spills (i.e., the cost per bbl-spilled). Agency costs are lagged to reflect the fact that the do not arise on an instantaneous basis with spills incidents, but are likely to arise and carry over for a number of months, if not years. The use of a simple one-year lag (on spills, or the denominator of the average cost calculation) attempts to correct for these potential cost carry-overs and will likely offer a more realistic measure of the "average cost" (cost per bbl-spilled) of responding to a spill.

This chart provided in Figure 2 shows a slightly less variable trend although the low still hovers around $5.76/bbl-spilled on a lagged basis (2007) with a high of $479.62/bbl-spilled on a lagged basis (1996). The average pre-DWH lagged agency cost per spill is estimated to be $111.47/bbl-spilled, slightly lower than the $130.35/bbl-spilled estimated for the non-lagged values of the pre-DWH sample. However, excluding the extreme outlier years (1995 and 1996), the average pre-DWH agency cost per barrel of oil reported spilled is $83.13. The chart also reveals a pattern of considerably lower agency costs per barrel spilled in the years leading up to the DWH spill than was true for the period 1992-2004. For the five years leading up to the DWH spill, agency costs averaged only $44.61 per barrel reported spilled.

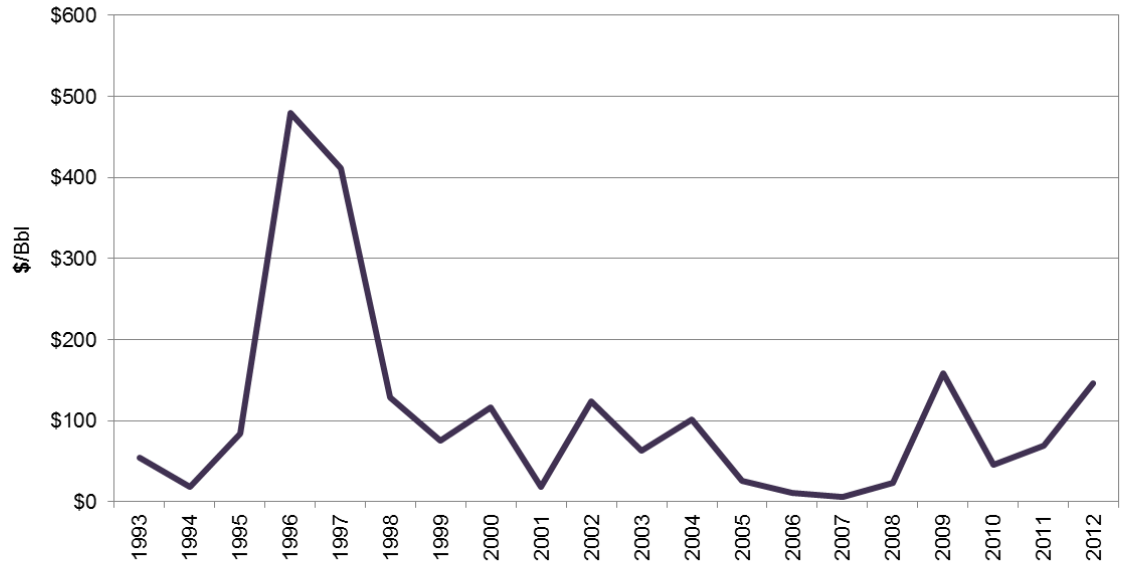

Figure 2: Lagged Pre-DWH Agency Costs Per Reported Barrel Spilled (1993-2012)
Source: Louisiana Department of Revenue; NRC

The lagged post-DWH agency cost per barrel-spilled range from around $46/bbl-spilled to a high of $146/bbl-spilled; averaging $86.54/bbl-spilled. However, because these post-DWH figures are not easily separated into DWH-only expenditures and those related to other spills, these amounts are not used in projecting the future non-DWH related agency expenditures. There are expected to be significant costs beyond 2012 associated with the DWH spill implying that the use of pre-DWH cost figures provides a very conservative measure of expense requirements.

2.0 Louisiana's Potential Oil Spill Outlook

2.1 Assumptions and Scenarios

Historic patterns oil spill volumes (as measured by spill notifications) show a correlation with the annual crude oil supply disposition (or movement of crude in the state). Unfortunately the use of spill volumes as reported by spill notifications can be limited since the National Response Center (NRC) does not collect actual spill-specific information nor does it verify or do any post-spill measurement. Nevertheless, the historical patterns of spill notifications serve as the best proxy for spills for the purpose of projecting future demands on the state's spill response and restoration efforts. The relationship between crude oil supply and spill notifications, which will be referenced here simply as "spills," is based upon the fact that certain crude oil supply sources have unique spill probabilities.

The future outlook for Louisiana oil spills will be determined in large part by the size and disposition of the crude oil that moves into, within, and out of the state. One of the primary determinants of the state's crude oil movement rests with the anticipated needs of state's refineries. The greater the demand for crude oil by these refineries, the larger the amount of crude oil likely to be moving into and through the state, which in turn, will likely influence the nature, frequency, and size of potential oil spills. Thus, the first step in forecasting future potential oil spills is estimating the total level, and source, of crude oil that will be utilized by Louisiana's refining industry.

Most forecasts are based upon some level of historic information to condition future outlooks. The use of past experience to forecast future Louisiana refinery capacity additions seems well-placed given the stability of the past relationships in historic capacity growth. The base level capacity forecast developed here is based upon a long-run average annual capacity creep growth rate of 0.96 percent to forecast future Louisiana refinery capacity. This estimate was chosen as a conservative level since it (a) is much lower than a five-year trend that includes more recent refinery capacity additions not likely to occur again in the near future and (b) is one actually lower than both the 10- and 15-year averages. A lower growth level is also consistent with most independent forecasts that anticipate that refined product growth will be limited in the future given changes in automobile efficiency standards as well as increases in the use of hybrids and alternative fuel vehicles.

The next step in the process of ultimately projecting Louisiana oil spills is to determine where the crude oil supply is going to come from in order to meet these projected refinery requirements. A scenario-based approach for future Louisiana oil spill sources has been utilized instead of a large multi-equation system approach. Louisiana's crude oil supply disposition is comprised of (a) imports into the state, (b) in-state and offshore production, and (c) exports of crude oil out of the state. Imports are comprised of foreign as well as domestic sources of crude oil. Production includes in-state, onshore production and state and federal offshore production. Exports are the movements of crude oil to other states. Three different and credible oil supply disposition scenarios have been utilized in this analysis to project movement of crude into, within, and out of the state.

Scenario 1 (Business as usual scenario) assumes Louisiana in-state oil production to remain constant over time. Offshore (OCS) production, however, is assumed to increase to offset on-shore production. Imports are assumed to grow to (a) gradually increasing annual refinery requirements and (b) to offset flat Louisiana crude oil production growth. Exports are assumed to be constant on percent (at 2012 levels) of total supply disposition basis, but growing in absolute terms likely impacting pipeline and railway-related spills.

Scenario 2 also assumes constant Louisiana-based crude oil production with offshore production growing relative to on-shore production. Domestic imports are assumed to increase while international imports are assumed to fall and ultimately bottom-out at around five percent of the state's total supply disposition. Scenario 2 assumes that domestic imports, from unconventional production across the country, will offset international imports and actually increase to meet in-state refinery requirements. Exports are assumed to be constant on percent of total supply disposition basis.

Scenario 3 expands the prior two scenario-based forecasts. Scenario 3, while similar in many respects to the other two scenarios, has an important difference in export assumptions. Scenario 3 assumes that Louisiana will become an increasingly important hub for the movement of domestic crude oil production to other states and refineries in the U.S. as well as international export to other countries, which is currently not allowed by U.S. law, but is being debated as a potential policy change in the near future. The purpose of Scenario 3 is to ascertain how total increases in supply, and increases in domestic and international exports, impact Louisiana spill probabilities.

2.2 Historic Oil Spill Sample Probabilities

The average probability of historic spills was calculated for three different historical periods to assist in providing a picture of how risks are allocated across types of activities. The three different historic period include the time period prior to the DWH incident (the "pre-DWH period," 1990-2009), the time period during and immediately following the DWH incident (the "post-DWH period," 2010-2012), and the total sample period (1990-2012).

Because of the uniqueness of the DWH spill, those volumes have been omitted from the primary analysis. Then, a weighted average of the spill probabilities occurring over the pre- and post-DWH time periods is used to arrive at the expected future spill scenarios using a weight of 60 percent on the post-DWH period and 40 percent on the pre-DWH period. These weights are consistent with those used in calculating costs and the patterns determined based on the review of small and large spills discussed above. Table 1 shows the probability of one barrel of oil being spilled for each barrel of total supply by spill type to provide a general picture of the prevalence of each type of spill and outline the methodology selected for projecting total oil spill volumes under each scenario.

Table 1. Average Oil Spill Probabilities by Type (Bbls spilled per Bbls Total Crude Oil Supply)

	Type of Spill						
	Platform	Fixed	Pipeline	Vessel	Storage	Other	Total
	(Percent)						
1990-2009	0.0012%	0.0020%	0.0007%	0.0006%	0.0002%	0.0010%	0.0056%
2010-2012	0.0068%	0.0019%	0.0008%	0.0001%	0.0003%	0.0000%	0.0100%
Weighted Average	0.0046%	0.0019%	0.0008%	0.0003%	0.0003%	0.0004%	0.0082%

In general, platform spills are most likely to occur followed by fixed and pipeline spills. Most spill types show a relatively stable probability of spill in the early and later time periods with the exception of platform spills, which have become increasingly more likely over the last several years. Collectively, the other spill types show an average decline in probability of spill from the earlier period to the later period, though some spill types increased slightly.

These patterns are consistent with the trends presented previously. Long-run trends in the number of smaller spills have been relatively flat in recent years, but the future outlook in all three supply disposition scenarios suggests that number of spills should rise. In addition, the reported volume per spill for smaller platform-based spills has steadily risen and should continue to do so under all three scenarios without any other structural or technological change shifting the trend downwards. Conversely, the average reported volume per spill for smaller spill types has increased slightly, although recent years have been below that trend.

Finally, across all types of large spills, the number of spills and, in particular, the volume per spill has grown in recent years. Collectively, these results support more reliance on recent data. However, over such a short time frame, the data do not provide a reliable trend when using the last three years alone. Therefore, a weighted average of the two results (before and after DWH) is used to assess the future likelihood of spills under each scenario. For the final analysis, the general probabilities presented in Table 6.2 are further refined so that each spill type is based on the specific types of oil disposition that are most closely associated with the type of spill (e.g. platform spill probabilities are calculated based on Louisiana production of oil and gas for purposes of carrying out scenario calculations).

2.3 Projected Louisiana Oil Spills

Table 2 provides a summary of projected oil spill volumes under differing supply scenarios and oil spill occurrence probabilities per volume of oil produced or moving into or through the state. Each supply outlook is then subjected to three differing sets of spill probabilities to estimate the range of potential spills that may arise from the increasing in-state crude oil volumes. The three sets of probabilities are based upon those observed prior to the DWH incident (pre-DWH), those observed after the DWH incident (post-DWH), and a weighted average between the two time periods where a 60 percent weight has been placed on the post-DWH spill probabilities and a 40 percent weight placed on the pre-DWH spill experience.

Table 2. Projected Louisiana Oil Spills by Scenario

	--------------- Scenario 1 ---------------			--------------- Scenario 2 ---------------			--------------- Scenario 3 ---------------		
Year	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)
2013	73.29	131.20	108.03	73.39	131.73	108.39	74.00	132.28	108.97
2014	73.00	130.94	107.76	73.21	132.02	108.50	74.58	133.28	109.80
2015	72.74	130.70	107.52	73.07	132.34	108.63	75.20	134.32	110.67
2020	71.83	129.79	106.61	72.75	134.49	109.80	78.73	140.23	115.63
2025	71.49	129.30	106.18	73.10	137.49	111.73	82.94	147.19	121.49
2030	71.66	129.18	106.17	74.04	141.32	114.41	87.74	155.12	128.17
2035	72.27	129.38	106.54	75.52	145.98	117.79	93.10	163.97	135.62
Cumulative Total:	1,655.39	2,983.13	2,452.03	1,690.81	3,163.89	2,574.66	1,899.53	3,371.56	2,782.75
Annual Average:	71.97	129.70	106.61	73.51	137.56	111.94	82.59	146.59	120.99
Cumulative Percent Increase:	-1.39%	-1.38%	-1.38%	2.90%	10.82%	8.67%	25.80%	23.96%	24.46%
Annual Avg Percent Increase:	-0.06%	-0.06%	-0.06%	0.13%	0.49%	0.39%	1.17%	1.09%	1.11%

While some of the changes in sources of crude oil will influence where those spills occur, the relative similarity in the overall size of projected spill volumes is driven by the large number of platform spills that are expected and the continued growth of offshore development, which is a key component of each scenario. It is important to note that while the post-DWH time period is examined, due to the recent changes in spill probabilities, those spill probabilities exclude the DWH incident itself. So each forecast should be interpreted as the outlook for what can be loosely referred to as “typical spills” not extraordinarily large spill events like DWH.

3.0 Contingency Fund Adequacy

3.1 Overview

One of the primary purposes of this research is to determine whether or not the recently-modified Oil Spill Contingency Fund fee mechanism, which assesses a quarter-cent per barrel fee on all crude oil received by a refinery for storage or processing, is adequate given anticipated spill volumes under normal industry operating conditions, as well as those that could arise under an extreme event such as the DWH spill. For purposes of this analysis, “adequacy” is defined as the ability of Fund revenues to cover anticipated annual agency costs, excluding any other sources of funding or reimbursement including specific direct agency assessments or NPFC reimbursements. This is a conservative definition and was chosen to assess the state’s potential annual liability if no other funding sources are available. Thus, the adequacy analysis included in this report can be thought of as a form of “worst-case” scenario where Louisiana has no immediate financial recourse to fund its agency costs, except through the Fund and the annual fee revenues that are contributed to this Fund.

The projected Fund adequacy analysis is based upon three sets of information: (1) the crude oil supply disposition scenarios; (2) the oil spill historic probabilities per fixed time period; and (3) the agency costs analysis (i.e., state agency cost per bbl-spilled).

3.2 Revenue Projections Summary

Annual revenues under the new fee structure of a quarter cent per barrel delivered to refinery are estimated to grow from $2.7 million in 2013 to $3.3 million by 2035, or by an annual average rate of some 1.1 percent in 2013-dollar terms (excluding any impacts for inflation). This fee revenue growth will be constant across all three potential oil spill outcomes, and across all three crude oil supply scenarios, since (1) the fee is fixed, and (2) the refinery volumetric requirements forecast, while growing over time, is the same for each crude oil supply disposition scenario. Further, annual fee revenues under the new fee structure are estimated to be lower than they would have been if the prior fee structure were in place.

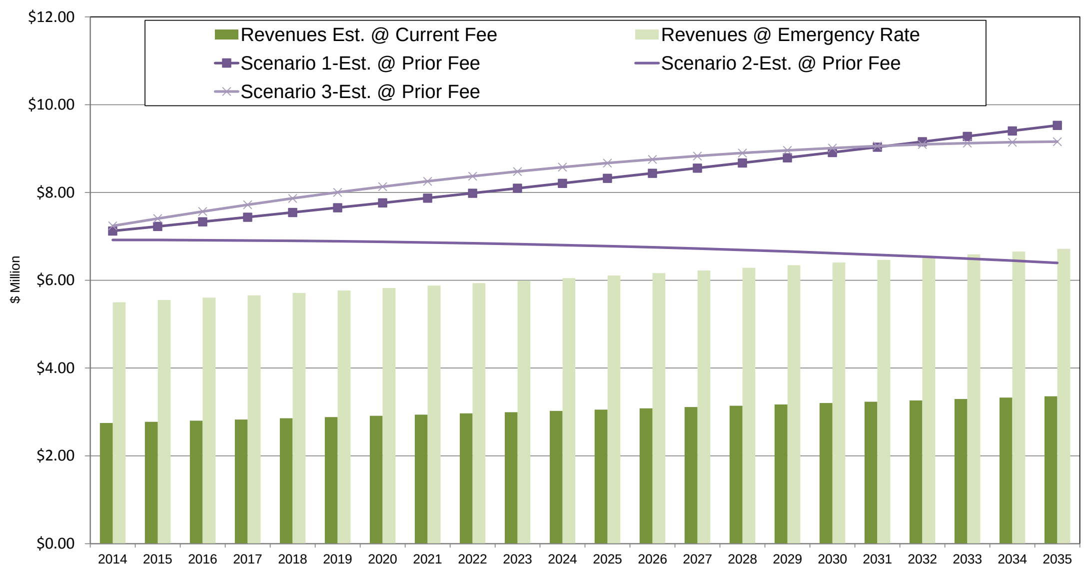

Figure 3. Revenue Comparison Under Prior and Current Fee Structure (Constant Dollar, 2012=100)

Figure 3 compares projected fee revenues under the new versus prior fee structure. The current/new fee structure is a function of refinery requirements and is, thus, insensitive to the various supply scenarios examined in this report. The prior fee structure, however, is a function of supply source; primarily changes in marine-based crude oil supplies, which vary across the three scenarios. Thus, there is one series provided in Figure 3 for the new/current fee structure at the regular rate as well as one at the emergency rate which allows fees to increase to one-half cent during a state-declared oil spill emergency. Three series (one for each supply scenario) for the estimated revenues that may have been collected under the older fee structure are also provided.

Figure 3 shows that revenue collections under the prior fee structure (assuming no Fund or annual revenue caps) are higher than the current fee structure for each year in the forecast period as well as the likely annual revenues that would be collected under the half-cent per barrel emergency rate currently allowed by statute. Annual revenues estimated under the current fee structure are anticipated to range between $2.7 million to $3.3 million per year and only increase as refinery demand increases (since current fees are assessed on refinery deliveries). Annual revenues are estimated to double (ranging from $5.4 million to $6.6 million) if the emergency rate were to be put into place, and maintained, throughout the forecast period.

Annual fee revenues under the prior fee structure are estimated to range from an annual low of $6.2 million to a high of over $9.5 million depending upon the supply scenario. The annual differences in revenue projections (under the prior fee structure and current fee structure) range from between $2.4 million per year to as high as $5.3 million depending upon the supply scenario examined. The relatively smaller difference between Scenario 2 annual revenue projections under the prior method, and current projected revenues, is based upon the assumption that marine-based imports will decrease on relative basis as international imports of oil decrease.

3.3 Adequacy of Fund Revenue

While revenues associated with the current fee structure are relatively consistent, estimated annual agency costs do vary and are a function of both (a) the assumed spill scenario and (b) the assumed spill unit costs. Changes in these costs will directly impact the projected Fund adequacy since annual revenues are the same across all three scenarios and strictly a function of estimated crude oil deliveries to refineries. The balance between estimated Fund revenues and agency costs are provided in the following two tables for spill outlooks. Each table shows the effect of the three oil supply scenarios and differing spill probabilities for the relevant cost per barrel spilled assumption.

Table 3 shows annual net revenue (revenues minus expenses) at several benchmark time periods based on the current fee of a quarter cent and an agency cost per barrel spilled of $44.61 calculated from the five year period right before the DWH spill. In general, the quarter cent fee falls short of covering expected agency costs. Using the more conservative spill probability assumption based on pre-DWH trends, the annual imbalance is more modest. However, even in scenario 1, which provides the most conservative outlook for the number of spills, fee revenue does not cover projected expenses.

Table 3. Annual Net Fund Revenue: Quarter Cent Fee and 2005-2009 Costs

	Scenario 1			Scenario 2			Scenario 3		
Year	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)
2015	$ (592,537)	$ (3,242,594)	$ (2,182,571)	$ (607,244)	$ (3,317,651)	$ (2,233,488)	$ (704,849)	$ (3,408,098)	$ (2,326,799)
2020	$ (848,895)	$ (3,847,351)	$ (2,647,969)	$ (896,554)	$ (4,090,569)	$ (2,812,963)	$ (1,205,731)	$ (4,387,269)	$ (3,114,654)
2025	$ (1,177,319)	$ (4,561,034)	$ (3,207,548)	$ (1,271,276)	$ (5,040,532)	$ (3,532,829)	$ (1,847,183)	$ (5,608,188)	$ (4,103,786)
2030	$ (1,591,256)	$ (5,400,685)	$ (3,876,914)	$ (1,748,855)	$ (6,204,971)	$ (4,422,525)	$ (2,656,731)	$ (7,118,911)	$ (5,334,039)
2035	$ (2,106,670)	$ (6,386,075)	$ (4,674,313)	$ (2,350,292)	$ (7,629,369)	$ (5,517,738)	$ (3,667,231)	$ (8,977,824)	$ (6,853,586)

A second agency cost per barrel spilled is calculated using data covering all years leading up to the DWH spill, except the extreme outlier years, 1995 and 1996. This average cost per barrel of $83.13 results in an even greater annual imbalance between fund revenues and agency costs across all scenarios and spill probability assumptions. Table 4 shows fairly significant revenue shortfalls in 2015 that only grow over time as projected agency costs grow more rapidly than fee revenues.

Table 4. Annual Net Fund Revenue: Quarter Cent Fee and 1993-2009 Costs

	-------------- Scenario 1 --------------			-------------- Scenario 2 --------------			-------------- Scenario 3 --------------		
Year	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)
2015	$ (3,464,682)	$ (8,403,020)	$ (6,427,685)	$ (3,492,089)	$ (8,542,886)	$ (6,522,567)	$ (3,673,973)	$ (8,711,433)	$ (6,696,449)
2020	$ (4,057,665)	$ (9,645,237)	$ (7,410,208)	$ (4,146,475)	$ (10,098,471)	$ (7,717,672)	$ (4,722,622)	$ (10,651,366)	$ (8,279,868)
2025	$ (4,790,568)	$ (11,096,066)	$ (8,573,867)	$ (4,965,655)	$ (11,989,602)	$ (9,180,023)	$ (6,038,849)	$ (13,047,421)	$ (10,243,992)
2030	$ (5,688,729)	$ (12,787,537)	$ (9,948,014)	$ (5,982,412)	$ (14,286,311)	$ (10,964,751)	$ (7,674,223)	$ (15,989,421)	$ (12,663,342)
2035	$ (6,782,180)	$ (14,756,780)	$ (11,566,940)	$ (7,236,165)	$ (17,073,639)	$ (13,138,649)	$ (9,690,259)	$ (19,586,462)	$ (15,627,981)

While the recent law revision established a new fee rate of one quarter cent per barrel under normal conditions, the fee will be levied at the rate of one half cent through December 31, 2015. In addition, the one half cent fee can be levied if certain conditions are met including a fund balance of less than five million dollars and either a large spill has recently occurred or the reduced balance is due to expenditures for certain activities as outlined by the law. Therefore, an alternative adequacy analysis is conducted assuming that the half-cent rate is in place. It is likely that future fee collections will oscillate between the two rates as future spill conditions and agency expenditures change. Therefore, this adequacy analysis provides a best possible outlook under the existing fee structure as well as providing guidance on the appropriate overall fee level under any conditions.

Table 5 shows the annual net revenue based on the higher fee of a half cent per barrel and the lower agency cost per barrel spilled of $44.61 calculated from the five years right before the DWH spill. With this higher level of fee revenue, the overall level of revenues and expenses is much more balanced across the oil supply scenarios and assumptions about probability of spill. Across all three oil supply scenarios, revenues are slightly above anticipated agency costs using the pre-DWH spill probabilities, agency costs exceed revenues using the post-DWH spill probabilities, and are fairly well balanced using the weighted average spill probability with revenues only slightly exceeding expected agency costs in early years, but agency costs growing more rapidly than revenues leading to modest deficits beyond five to ten years from now. Considering the continued need for additional revenues to support DWH-related activities, which are not formally addressed in this section, the modest revenue surplus in early years suggests that this higher fee is not likely to lead to the accumulation of significant excess revenues under the lower agency cost per barrel assumption of $44.61.

Table 5. Annual Net Fund Revenue: Half Cent Fee and 2005-2009 Costs

	-------------- Scenario 1 --------------			-------------- Scenario 2 --------------			-------------- Scenario 3 --------------		
Year	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)
2015	$ 2,141,156	$ (508,901)	$ 551,121	$ 2,126,448	$ (583,958)	$ 500,205	$ 2,028,844	$ (674,405)	$ 406,894
2020	$ 1,768,460	$ (980,171)	$ 219,211	$ 1,970,626	$ (1,223,390)	$ 54,216	$ 1,661,449	$ (1,520,090)	$ (247,474)
2025	$ 1,340,496	$ (1,553,850)	$ (200,364)	$ 1,735,909	$ (2,033,348)	$ (525,645)	$ 1,160,001	$ (2,601,004)	$ (1,096,602)
2030	$ 849,799	$ (2,246,660)	$ (722,888)	$ 1,405,170	$ (3,050,946)	$ (1,268,500)	$ 497,294	$ (3,964,885)	$ (2,180,013)
2035	$ 287,890	$ (3,078,038)	$ (1,366,276)	$ 957,745	$ (4,321,332)	$ (2,209,701)	$ (359,194)	$ (5,669,787)	$ (3,545,550)

A comparison of annual revenues and projected agency costs using the higher half cent fee and higher agency cost per barrel assumption of $83.13 calculated across the full range of pre-DWH data is shown in Table 6. Despite the higher fee collection, annual revenues are found to be inadequate using the higher agency cost per barrel assumption. Even with the most conservative oil supply scenario and lowest spill probability assumptions, agency costs are projected to exceed revenues in 2015 and that differential only grows over time as expenses grow more rapidly than revenues.

Table 6. Annual Net Fund Revenue: Half Cent Fee and 1993-2009 Costs

	-------------- Scenario 1 --------------			-------------- Scenario 2 --------------			-------------- Scenario 3 --------------		
Year	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)	Pre-DWH Probability-Based (MBbls)	Post-DWH Probability-Based (MBbls)	Weighted Average (MBbls)
2015	$ (730,989)	$ (5,669,327)	$ (3,693,992)	$ (758,396)	$ (5,809,193)	$ (3,788,874)	$ (940,281)	$ (5,977,741)	$ (3,962,757)
2020	$ (1,190,485)	$ (6,778,057)	$ (4,543,028)	$ (1,279,296)	$ (7,231,291)	$ (4,850,493)	$ (1,855,442)	$ (7,784,187)	$ (5,412,689)
2025	$ (1,783,384)	$ (8,088,882)	$ (5,566,683)	$ (1,958,471)	$ (8,982,418)	$ (6,172,839)	$ (3,031,665)	$ (10,040,237)	$ (7,236,808)
2030	$ (2,534,704)	$ (9,633,511)	$ (6,793,988)	$ (2,828,386)	$ (11,132,285)	$ (7,810,726)	$ (4,520,198)	$ (12,835,396)	$ (9,509,317)
2035	$ (3,474,143)	$ (11,448,743)	$ (8,258,903)	$ (3,928,128)	$ (13,765,602)	$ (9,830,613)	$ (6,382,223)	$ (16,278,425)	$ (12,319,944)

4.0 Summary and Conclusions

4.1 Potential Policy Options

Earlier estimated Fund deficiency estimates are premised upon what may be considered an aggressive assumption that no additional sources of revenue are available for the state to respond to oil spills. This is not an entirely unreasonable assumption, at least from a planning and policy perspective, for a number of reasons.

First, the Fund deficiencies estimated in this report are based on what have historically been more typical types of spills, not the historically rare “extreme” events like the DWH spill. While it is true that the federal government and the responsible party during the DWH spill provided significant revenue assistance, there is nothing to suggest that the same outcome would arise, on an annually consistent basis, in responding to typical spill activity.

Second, there were lags in the disbursement and reimbursement of revenues and other forms of financial support during this recent “extreme” spill event. Louisiana had to bear the financial and cash flow risk associated with these payments and financial support lags. There is nothing reasonable, nor economically efficient, about the state bearing the cash flow risk related to spill response and assessment.

Third, these estimated Fund deficiencies are driven exclusively by state agency cost projections being consistently larger than anticipated annual Fund revenue collections under the normal fee rate of a quarter cent per barrel. Consideration of the higher half cent fee collection rate showed that revenues could be sufficient under a low agency cost assumption, but may still fall short if agency costs are more in line with a broader historical trend. The higher state agency cost estimates (for spills that are more typical in Louisiana), are not entirely unreasonable considering that a heightened level of spill activity in the five years preceding the DWH spill drove down agency costs per barrel spilled to a level that may have needed adjusting even before the DWH spill brought a new appreciation for the potential oil spill risk associated with today’s oil activities.

However, there are, admittedly, a number of uncertainties associated with the future crude oil supply disposition and oil spill outlooks included in this analysis which leads to a range of potential policy options that may include: (1) maintaining the status quo; (2) increasing volumetric Fund assessment fees; (3) expanding Fund volume eligibility and fees.

4.1.1 Status Quo

Deferring to the status quo is an option, but choosing that option comes with a cost. As noted earlier, the Fund is projected to be consistently deficient under each supply scenario, as well as each spill and cost assumption at the normal collection rate. Doing nothing exposes the State to potential future financial liabilities if the projections included in this report materialize. These deficiencies will only be higher if spill probabilities are more in line with post-DWH information or agency costs are above the 5-year period leading up to the DWH spill, which is the lowest sustained period for agency costs since the inception of the Fund.

There is, however, an admittedly high degree of uncertainty about the future crude oil supply disposition and spill activity level. The continued development and expansion of unconventional crude oil and natural gas resources in the U.S. are resulting in a complete realignment of North American energy markets as well as a realignment of the infrastructure utilized to move hydrocarbons to markets. This realignment will have impacts on future Louisiana oil spills that, at this point in time, are indeterminate.

As recently as eight years ago, the U.S. was anticipated to import as much as 80 percent of its crude oil supplies and 25 percent of its natural gas supplies from international sources (EIA, 2006). Those trends suggest a considerably large movement of crude oil, and ultimately liquefied natural gas ("LNG"), via large ocean-going tankers carrying thousands of barrels of crude oil or billions of cubic feet of natural gas. Today, those trends have completely reversed with many asserting that the U.S. could become one of the world's largest, if not the largest, crude oil and natural gas producer.

The first U.S. natural gas exports are anticipated to start departing Louisiana ports in 2015 (The Advocate, 2013). The U.S. is anticipated to become self-sufficient in crude oil production and potentially a net exporter of crude oil by 2020 (Gilbert, 2013). In fact, 2014 is likely to be the first time in over six decades in which the topic of U.S. exports will be a serious part of current public policy debate (Gilbert, 2013). One, if not several, of the leading potential ports that would likely support these potential U.S. crude oil exports will be located in Louisiana. In fact, these dramatic industry and market changes motivated the supply disposition outlooks included in Scenarios 2 and 3 of this study. Both of these scenarios have attempted to account for these increasing domestic and international crude oil trade opportunities.

In the past, the nature of crude oil trade was restricted to very large tankers and ships moving crude oil into the state to refineries and other intermediate storage facilities. Crude oil has passed through and out of the state via a number of interstate pipelines. These trends are likely to change given the new emphasis on domestic crude oil resources likely to move into the state. In the future, domestic crude oil imports are likely to move into, and even out of the state through a broader and more diversified set of transportation modes that rely less on ocean-bound tankers and more on coastal marine vessels and barges, pipelines, and increasingly, rail (Shauk, 2013). How these changes in crude oil supply and transportation will impact future spills is unknown. While these potential movements can be simulated (and have been in Scenario 2 and Scenario 3), those simulations are not based upon historic crude oil movements, and likely volume magnitudes, that are comparable to what could occur in the future.

The uncertainty associated with future Louisiana oil spill outcomes, and state agency costs, are further compounded by the nature of Louisiana crude oil production. In the past, the state was a prolific crude oil producer. While crude oil production is still an important part of Louisiana's energy economy, onshore production has fallen considerably and is expected to continue to decrease without the development of some new, large in-state resource like the Tuscaloosa Marine Shale, located across the Florida parishes, or the Brown Dense Shale, located in North Louisiana. Other things being equal, this should lead to a continued decrease in reported fixed location spills at onshore production sites.

Trends in offshore Louisiana production, however, have been flat to increasing over the past several years. Offshore production is a very important determinant of reported spills and reported spill volumes and, as highlighted in Section 3, platform-based spills account for 27 percent of all reported spill volumes and this share has been growing over the past several years despite relatively flat overall offshore production. Whether this trend will continue in the future in the aftermath of the DWH spill is still uncertain for a variety of reasons.

First, the future scope of offshore activity continues to be unclear even three years after the DWH spill. While it is clear that OCS activity will likely be (a) focused on crude oil, as opposed to natural gas development and (b) focused primarily in deepwater areas of the Gulf, the degree with which future drilling and production activities will be pursued is still ambiguous. Offshore regulators continue to adopt, and consider, changes in regulations that could impact offshore production investment attractiveness.

If these changes are perceived by investors and developers as negatively impacting profitability, investment dollars will likely move to other domestic and international producing basins thereby reducing offshore activity, and potentially reducing total annual oil spills. Other industry observers, however, suggest that the better part of these regulatory changes is over, and that the OCS is becoming a more attractive area for oil and gas investment (MarketWatch, 2013). If this view emerges as the consensus, then additional activity may arise in the Gulf, potentially increasing spill volumes over time.

Second, the effectiveness of new federal offshore safety and environmental regulations, as well as the new technologies and response protocols independently implemented and adopted by industry, represent another set of factors that will influence future oil spill activity and are uncertain at the current time.

4.1.2 Increase Volumetric Fees

Increasing fee revenues, through an increase in volumetric fees (assessment rates) applied on crude oil refinery deliveries, is one potential policy response to remedy the earlier-identified potential Fund deficiencies. A fee of one half cent per barrel on crude oil delivered to Louisiana refineries will produce revenue much closer in line with projected agency costs for most of the outlooks considered when using the low agency cost assumption (See Figure 3).

However, it is important to recall that the low agency cost estimate is based on the five years right before the DWH spill. It may be true that those costs were artificially low due to high spill volumes and a binding agency budget constraint that prevented a level of response more in line with long-term trends. It may also be true that costs have risen since the DWH spill. If annual agency costs are expected to return to levels more in line with long-term trends, then a per barrel fee in the range of three quarters of a cent to one cent per barrel would bring revenues in line with annual agency costs. The exact fee that would bring 2015 revenues and expenses (based on the $83.13 agency cost assumption) into balance using pre-DWH spill probabilities would be about $0.0057 per barrel across all three scenarios, $0.01 per barrel based on post-DWH spill probabilities, and $0.0085 based on the weighted average spill probabilities. Under all three oil supply scenarios, the fee needed to keep up with anticipated agency cost growth will increase over time reaching a range of $0.0076 to $0.0173 per barrel by 2035 depending on the spill probability and specific spill scenario.

4.1.3 Increase Volume Eligibility and Fees

One potential solution to the potentially large increases in fees needed to make estimated Fund revenues adequate under several potential scenarios would be to expand the scope of the eligible volumes contributing to the Fund. Currently, fees are assessed on only those crude oil volumes delivered to Louisiana refineries for storage or processing. These refinery deliveries account for 73 percent of total supply volumes over the past five years. The remaining volumes are associated with storage and export. There are several strong arguments for expanding the scope of eligible volumes to all Louisiana crude oil supplies.

The first argument for potentially expanding volumetric fee eligibility is the lack of uniformity and fairness associated with export volumes but not those associated with refinery deliveries. Crude oil is a commodity and, generally, of uniform and homogeneous quality. It is difficult from a public finance perspective to differentiate one barrel of crude oil from another as it relates to that barrel’s impact on Louisiana oil spills. A crude oil spill on a pipeline in Louisiana creates potential damage to the state regardless of whether that crude oil was ultimately destined to be delivered to a refinery in Baton Rouge, Louisiana or a refinery in Lima, Ohio. Subjecting a barrel of oil to a fee to cover the cost of spills, while exempting another comparable barrel, simply violates most public finance definitions of uniformity and equity, and could serve as ample reason to expand the scope of fee collections to all crude oil volumes entering the state.

Cost causation is a second potential rationale for expanding the scope of Fund contribution eligibility. This report has shown in several places that spill volumes are influenced by both total crude oil supplies as well as the sources of those supplies (i.e., platforms, pipelines, vessels, etc.). Increases in total spills results in an increase in total agency costs. However, not all crude oil volumes are required to make a contribution to the Fund even though they can contribute, at least in some part, to total Louisiana oil spills. Such an outcome is inefficient from an economic perspective since one party (those transporting crude for export) are imposing a cost onto Louisiana that is not recovered. Inefficient outcomes of this nature can, at least in theory, lead to a greater level of spills than would otherwise occur if the “externality” imposed by the crude oil volumes were assessed a fee (i.e., paid for the cost imposed upon the State of Louisiana). Thus, economic efficiency would dictate that all volumes that have the possibility of imposing costs on the state should be required to make a contribution to the Fund.

Lastly, there is a significant chance that Louisiana crude oil volumes will grow over the next several years to meet growing exports: both domestic and international. In fact, the Scenario 3 supply disposition is modeled upon the premise that exports will grow to levels that comprise as much as 40 percent of total Louisiana crude oil supplies by 2035. This assumption is not unreasonable, or inconsistent with past historic experience, since Louisiana crude oil exports have reached levels as high as 40 percent in 1990. Excluding such large volumes from Fund revenue contributions could have significant ramifications for Louisiana oil spill costs if they continue to be exempt from Fund contributions.

Figure 4 and Figure 5 present a comparison of the various fee revenue collections that could arise from assessing fees on refinery volumes versus those that apply to all volumes that cross state lines. The expansion of eligible volumes, at current fees, would only increase Fund revenue collections from between close to $1 million to over $2 million per year and while it would help in reducing estimated Fund deficiencies, the expansion of volumes alone would not entirely offset revenue deficiencies under many future scenarios considered.

Figure 4. Potential Annual Fee Revenue Collections under Expanded Volume Eligibilities (Scenario 1 & 2) (Constant Dollar, 2013=100)

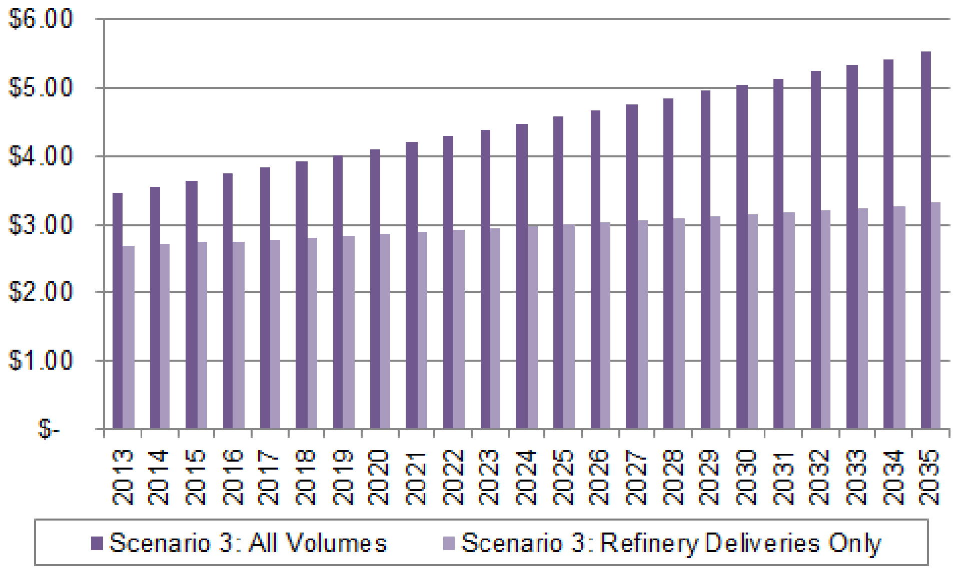

Figure 5. Potential Annual Fee Revenue Collections under Expanded Volume Eligibilities (Scenario 3) (Constant Dollar, 2013=100)

4.2 Other Policy Considerations

Regardless of which policy option is chosen, there are a number of additional Fund policy modifications that should be considered, even if a status quo option is selected for the fee level and volume basis. These additional policy considerations include:

(1) No revenue caps on Fund balances (as provided in Act 394).

(2) Implementation of a $17 million Fund balance floor (instead of $5 million) with a trigger mechanism that increases fees to provide ongoing floor support.

(3) Inflation indexing of the volumetric fee.

(4) A periodic review to update and follow-up on the results of this study and keep the Legislature, LOSCO, and other stakeholders apprised of any Fund challenges.

Each of the policy safeguards are discussed in further detail below.

4.2.1 Elimination of Revenue Caps

In the past, the Fund has been subjected to various different caps on its balances. For instance, in 1991 there was a cap of $15 million which was ultimately reduced down to $7 million. Acts 633 and 962 of 2010 removed these caps. Fund balances should be allowed to grow if fees are increased in order to develop some type of Fund adequacy over time. Currently projected deficiencies would be much less severe if caps had not been placed on the Fund in the past.

4.2.2 Adoption of Fund Balance Floor

Earlier analyses suggest annual agency costs, under several worst-case scenarios, of around $14 million to almost $16 million. Thus, a $17 million Fund balance floor should provide protection against high cost oil spill response years that are still considered normal in scope relative to that experienced with the DWH spill. A meaningful floor should provide the state with adequate financial protection against larger spills. A floor of this level is also consistent with the balances that are currently held in other states' oil spill trust funds. Figure 6 highlights the current balances and fund caps for these states. Louisiana's existing balances and caps are far off from most of those states.

A supplemental volumetric fee trigger could also be utilized that takes actual or projected Fund deficiencies in any given year, and divides that deficiency by most-recently reported refinery inputs in order to construct a supplemental volumetric fee designed to bring the Fund above its $17 million floor.

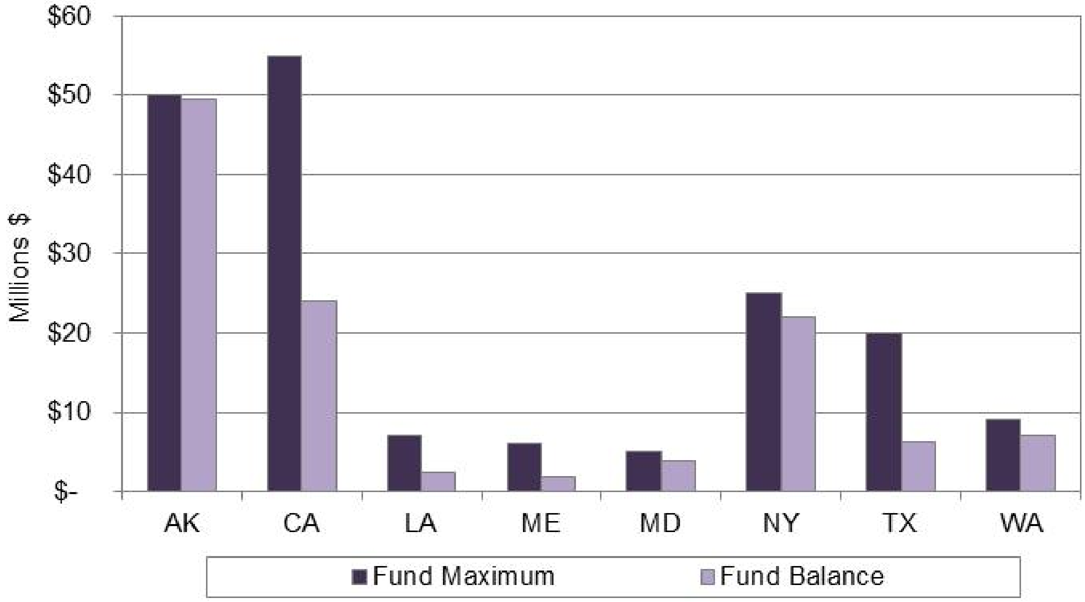

Figure 6. Comparison of Other States' Current Estimated Balances and Fund Caps
(Source: Individual State Statutes; Individual States' Department of Revenue.)

4.2.3 Inflation Indexing the Volumetric Fee

One potential remedy to avoid unnecessary balance deficiencies, particularly in "real dollar" terms, would be to index the annual Fund volumetric fee to a commonly reported measure of inflation like the Gross Domestic Product Price Index ("GDP-PI"). This would ensure that the purchasing power of Fund collections would remain consistent with inflation over time.

4.2.4 Period Fund Adequacy Review

As noted earlier, the upstream oil and gas industry, and many sectors of the midstream components of the industry, are in the midst of a significant transition and where that transition will lead is somewhat uncertain. However, within the next three years, the industry outlook for unconventional crude oil production should become increasingly clear as a large number of wells, from a broader distribution of unconventional shale basins come on line. The outlook for deepwater activity should also become more apparent as the number of offshore lease sales increases, as the offshore permitting process becomes more apparent, and as a larger number of post-DWH fields come on line. Lastly, the policy outlook for U.S. crude oil exports should also have greater transparency over the next three years. Thus, conducting a continued periodic review of the Fund and oil spills generally would appear to be a prudent public policy endeavor.

5.0 Acknowledgments

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