The Northern Great Plains at Risk: Oil Spill Planning Deficiencies in Keystone Pipeline System

Plains Justice

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EXECUTIVE SUMMARY

This year's oil spills into the Gulf of Mexico and the Kalamazoo River make it abundantly clear that crude oil infrastructure does fail, sometimes with disastrous results. When large amounts of oil gush onto our waters and lands the costs for all involved are extraordinarily high.

For example, in response to the rupture of the 30-inch diameter 6B Pipeline in southern Michigan, its owner, Enbridge Energy, Limited Partnership (Enbridge), brought in **over 2,000 personnel, over 150,000 feet (28 miles) of boom, 175 heavy spill response trucks, 43 boats, and 48 oil skimmers**. Enbridge also deployed substantial numbers of spill response vans and trailers with portable equipment and hand tools, boom trailers, portable storage tanks and pumps, trailer tow vehicles, pickups and other light vehicles, dump trucks, excavators, and aircraft. Enbridge has estimated that the cost of cleaning up this spill will be $300 to $400 million, excluding fines. Since this spill happened near a number of major metropolitan areas, the amounts of spill response equipment and trained personnel already in the region and available to Enbridge was substantial. **Importantly, the fact that the pipeline ruptured near a number of cities also meant that local and regional businesses had the capacity, on short notice, to feed and shelter Enbridge's small army of workers.**

Recently, TransCanada Keystone Pipeline, LP (TransCanada) completed construction and began operation of a new 30-inch diameter crude oil pipeline, the Keystone Pipeline, that enters the U.S. in northeastern North Dakota and runs south through eastern South Dakota and Nebraska, where it turns east to refineries in southern Illinois. Also, TransCanada has proposed to build an even larger 36-inch diameter crude oil pipe it calls the Keystone XL Pipeline, which would enter the U.S. in northeastern Montana and then cut diagonally through Montana and South Dakota to Nebraska, where it would intersect with TransCanada's existing pipelines and continue to Gulf Coast refineries. These pipelines are some of the longest, highest capacity, and highest pressure crude oil pipelines ever built.

The Michigan spill, in combination with TransCanada's new pipelines, has prompted concern about whether TransCanada has prepared adequately for possible oil spills in the northern Great Plains. **This report is an effort to provide the Americans whose homes and businesses are near the routes of these pipelines with an understanding of what has been done – and what more should be done – to protect them, the lands, and their waters.** Accordingly, this report:

- **Summarizes the Kalamazoo River spill in Michigan to put the impacts and necessary response efforts into context;**
- **Summarizes federal emergency planning laws for crude oil pipelines and compares these requirements with those for oil tankers and oil refineries;**
- **Discusses shortfalls in the federal planning requirements for spills from crude oil pipelines; and**
- **Investigates both TransCanada's compliance with federal law and the quantity of boots, wheels, and boats ready to defend Americans in the northern Great Plains from a major rupture from these pipelines.**

Plains Justice's investigation draws the following conclusions:

- **The federal regulations for crude oil pipeline response plans are much weaker than regulations for other potential polluters, such as oil tankers and oil refineries.** The federal agency responsible for approving "Facility Response Plans" (FRP) for crude oil pipelines, the Pipeline and Hazardous Materials Safety Administration (PHMSA), has issued regulations that have no meaningful standards for the quantity and types of equipment needed to respond to pipeline spills. As a consequence, pipeline companies are left to adopt their own standards, which are then reviewed by PHMSA without reference to any mandatory requirements. In contrast, the U.S. Coast Guard (USCG) and U.S. Environmental Protection Agency (EPA) have both issued regulations with detailed standards that determine necessary amounts of spill response equipment and personnel. **While the USCG and EPA regulations are not perfect, they stand head and shoulders above PHMSA's regulations.**

- Federal law requires that pipeline companies determine the "worst case discharge" possible from their pipelines. The amount of oil spilled is determined in part by how fast a company can turn off pumps and close valves. **Before the 6 B Pipeline spill, Enbridge claimed it could shut down its pipeline in 8 minutes.** Although the National Transportation Safety Board's final report on this spill is not out, **initial reports indicate that, due to operator error, Enbridge may have operated this pipeline for almost two hours after the rupture.** TransCanada claims that it can turn off its pipelines in 18 minutes and bases its worst case spill estimates on doing so. **TransCanada does not consider the possible impacts of operator error during use of its complex pipeline control systems, and therefore underestimates its worst case spill amount.**

- TransCanada's FRP, although largely boilerplate, generally applies USCG spill response resource standards, but fails to do so correctly. As a consequence, **Thus, TransCanada incorrectly selects a slower rate of deployment for on-water capacity (required equipment must be on-scene within six hours instead of twelve hours) and it underestimates needed shoreline cleanup equipment capacity by 50%.**

- With regard to equipment commitments, **for the states of Nebraska, South Dakota, and North Dakota, TransCanada has itself provided these states with one spill response trailer and one boom trailer that together contain 5,000 feet of boom, two skimmers, two portable tanks, and a variety of hand tools and equipment. It has also provided a 14 ft. and 18 ft. boat.** In addition, TransCanada has a relationship with National Response Corporation (NRC), a large national spill response company that has both its own equipment and subcontracts with smaller spill response companies throughout the country. Other than its trailers, TransCanada relies entirely on NRC's capabilities to meet its response commitments.

- **Rather than provide a detailed list of NRC's spill response capacity, TransCanada relies on a USCG classification for NRC, which classification is used by the USCG in its oil spill response planning program for ships, barges, and loading facilities.** This classification is intended for use by the USCG and as such relates primarily to spills into marine environments, but also applies to USCG responsibilities for cleaning up spills into rivers with commercial traffic and the Great Lakes. This report demonstrates that this USCG classification is not suitable for use in remote inland areas far from USCG responsibilities, such as the northern Great Plains. As such, **TransCanada may not rely on NRC's USCG classification to meet its spill response obligations in the northern Great Plains.**

- Looking beyond the USCG classification, NRC's website contains equipment and subcontractor lists. An analysis of the locations and amounts of equipment owned by both NRC and its subcontractors, and analysis of the travel times between the pipeline routes and this equipment, indicates that **NRC does not have the capacity to move adequate amounts of equipment to major rivers put at risk by the Keystone Pipeline System fast enough to**

protect them, including but not limited to the Missouri River at both the Fort Peck Dam and at Yankton, South Dakota, the Yellowstone River at Miles City, Montana, and the Niobrara and Platte Rivers in Nebraska.

- In an effort to gain a fair appraisal of the spill response resources available on the northern Great Plains, Plains Justice reviewed 31 potential sources for lists and descriptions of spill equipment, as well as scores of spill response contractor websites. Our conclusion is that, overall, there is very little spill response equipment in the northern Great Plains.

- Plains Justice is also concerned that should a spill happen in a remote location in the northern Great Plains, the logistical challenges faced by TransCanada and its contractors would be substantially greater than those faced by Enbridge in southern Michigan. **In much of the northern Great Plains, local businesses do not have the ability to shelter and feed thousands of workers at short notice, with the result that TransCanada and its contractors would be responsible not only for responding to an oil spill, but for caring for the needs of thousands of spill responders far from large commercial supply networks. Should a spill happen during harsh winter conditions, these logistical problems could turn into a nightmare.** Unfortunately, TransCanada's FRP offers only lip service to these challenges. It should provide detailed planning and confirmation that logistical supplies and equipment, including large amounts of temporary shelters, are pre-positioned and ready to go.

The report concludes with a number of recommended improvements both in the federal regulatory process and in TransCanada's oil spill planning efforts. Although we expect TransCanada to react to a spill by devoting its considerable resources in an aggressive fashion, the BP Gulf Spill demonstrates the importance of planning for all contingencies and having necessary specialized equipment on the ground and ready to go. The oil industry has great confidence in its technical abilities and resources, but it nonetheless needs to plan for the worst so that it can minimize damage through a quick and effective response. Quick response requires both good planning and pre-positioning of significant amounts of spill response resources. Areas that have experienced major oil spills, such as Alaska and the Gulf Coast, have large amounts of equipment and personnel ready on the ground. The northern Great Plains does not. **This report is intended to promote good planning and increased industry commitments of pre-positioned spill response resources on the northern Great Plains, so that the industry can limit the damage caused by spills – and not just mop up its mistakes.**

INTRODUCTION

Overview of the Keystone Pipeline System and Risks

The slow but steady growth of oil extraction in the tar sands of Canada has fueled industry calls for a new generation of very large, very high pressure pipelines to carry heavy sour crude oil from the mines and wells of Alberta to oil refineries in the U.S. In response, two Canadian pipeline companies, TransCanada and Enbridge, have already constructed and are operating multiple new pipelines that have more than doubled the capacity of Canadian oil companies to sell oil to the U.S. TransCanada, whose business has historically related to natural gas pipelines, calls its new crude oil pipeline system the Keystone Pipeline System. Enbridge, which has used its Lakehead Pipeline System to move Canadian crude to the U.S. since the 1960s, has significantly expanded its aging network by constructing new pipelines called the Alberta Clipper, Southern Access, and Southern Lights Pipelines.

TransCanada calls its first new pipeline the Keystone Pipeline, which is currently operational and is designed to move 591,000 bbl of crude oil per day to Illinois refineries. TransCanada has nearly completed construction of another piece of its system called the Keystone Extension that runs from southern Nebraska to Cushing, Oklahoma. Not satisfied with this massive expansion and fueled by industry optimism, TransCanada has proposed to add to its system by building a third pipeline called the Keystone XL Pipeline. This 1,661 mile pipeline would run from Alberta through the American heartland to Texas Gulf Coast refineries. It will likely be built in two phases, the first from Oklahoma to Texas, and the second from Alberta to Nebraska. Figure 1 shows the routes of each of these pipelines, as well as their diameters and initial and maximum capacities.

TransCanada has chosen a straight line route for the Keystone XL Pipeline between Albert and Texas. This route passes through some of the least populated and most remote parts of the lower 48 states, including eastern Montana, western South Dakota, and north central Nebraska. This country is distant from populated areas and contains few services, including emergency services. Yet it contains nationally important natural resources, such as the Missouri, Yellowstone, Cheyenne, and Niobrara Rivers, as well as the Ogallala Aquifer, all of which could be put at risk by pipeline ruptures.

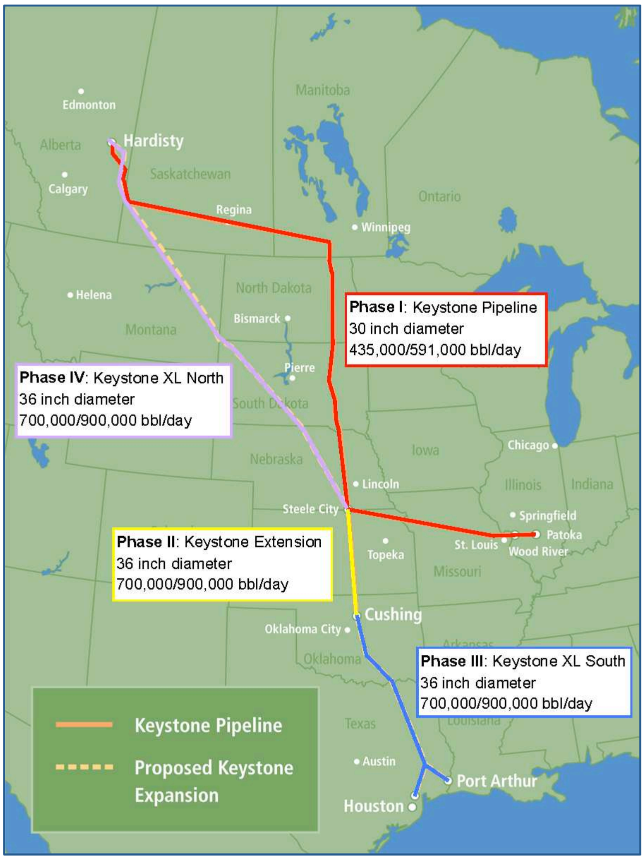

Figure 1 Keystone Pipeline System

The Keystone Pipeline System is designed to operate at high pressures (up to 1,600 psi) and temperatures (up to 158°F), although typical operational pressures and temperatures will fluctuate significantly, depend on regulatory approvals, and be on average be less than maximum levels. The system is also intended to primarily transport different types of heavy sour crude. This crude, however, is unusual in that most of it will be a blend of bitumen, a thick tar-like substance, and various types of diluents, which are lighter petroleum substances that Canadian oil companies use to dilute the bitumen so that is not too thick to pump. Bitumen is so thick that it does not float on water unless blended with diluent. This blended crude oil is also a sour crude, meaning that it contains more sulfur than other types of crude oil, and this makes it more acidic.

TransCanada estimates that the total cost of this system will be $12 billion. Ultimately, this cost will be passed on to consumers at the pump. A part of the cost of this system are its safety systems, including computer monitoring systems intended to alert TransCanada's Canadian operators when there are leaks and ruptures anywhere in the pipeline. TransCanada is required by federal law to respond immediately to and clean up any spill of oil. To do this, TransCanada must ensure that specialized spill response equipment and trained personnel can reach a spill quickly. An effective response to a rupture of a pipeline of this size requires the rapid deployment of enormous amounts of equipment, supplies, personnel, as amply demonstrated by the July 2010 rupture of Enbridge's 6B Pipeline in southern Michigan.

Due to the remoteness of parts of the Keystone System, and especially the northern parts of the Keystone Pipeline and Phase IV of the Keystone XL Pipeline, there is a substantial risk that current on-the-ground spill response equipment and personnel are not up to this task. Bringing in equipment from more populated areas can help with mop up but does not help contain the spill during its first few critical hours.

TransCanada plans to start constructing the Keystone XL Pipeline in 2011, and begin operating at least the southern phase in early 2013. Before it begins operations, it is required by law to have necessary spill response equipment and personnel in place. Likely, it has already begun to determine how to meet federal spill response requirements. Unfortunately, TransCanada has not publicly disclosed any draft spill response plans for the Keystone XL Pipeline. Thus, the Americans along the route are left in the dark about its spill response plans. This report investigates whether TransCanada is currently ready to defend Americans and our property from a rupture of its existing Keystone Pipeline, and what it will take to defend us from ruptures of its Keystone XL Pipeline.

Scope of Investigation of TransCanada's Spill Response Capabilities

TransCanada's commitment to provide equipment and personnel needed to respond to oil spills is contained in a document called a Facility Response Plan (FRP), which is mandated by federal law. Although called a "plan" this document is much more than a paper exercise, because it is intended to ensure that adequate equipment is prepositioned in the event of a spill and that the personnel needed to operate this equipment are available and trained for this specialized work.

TransCanada has a single FRP for its entire Keystone System, and it adds to this plan as each segment becomes operational. Even though TransCanada has not released a draft plan for its proposed Keystone XL Pipeline, it has plans in place for the currently operational Keystone Pipeline and the Cushing Extension. Through Freedom of Information Act (FOIA) requests, citizens put at risk by the Keystone System have acquired TransCanada's FRP for these pipelines and provided them to Plains Justice for its review. By reviewing this document, Plains Justice intends to give all citizens a better understanding of the strengths and weaknesses of the federal planning process and TransCanada's existing plans and resource commitments, and thereby assist in efforts to improve safety for everyone.

Accordingly, this report evaluates the Keystone Pipeline System's existing Facility Response Plan (Keystone FRP)[1] from three perspectives:

> **Evaluation in the context of the recent rupture of the Enbridge 6B Pipeline in southern Michigan.** Comparison to this too-real rupture of a large diameter heavy crude oil pipeline puts these types of pipeline spills in a practical context. Analysis of this spill highlights the challenges of responding to ruptures of large crude oil pipelines, provides a clearer picture of the amounts and types of equipment and personnel needed to contain and cleanup a large spill, and the need for rigorous planning and on-the-ground preparation. Moreover, such comparison demonstrates that oil spills are not all the same. Rather, the type of oil spilled and the location of the spill can

[1] Facility Response Plans are required by the Oil Pollution Act, which is incorporated into the Clean Water Act at 33 U.S.C. § 1321. TransCanada and Enbridge both entitle their Facility Response Plans as "Emergency Response Plan" or "ERP." In this report, the term "Facility Response Plan" or "FRP" is used because that is the term used in federal law.

radically change the type and amount of spill response equipment needed, the plans for use of this equipment, and the damage done if the oil is not contained quickly.

Evaluation in light of federal legal requirements for oil spill response capabilities and planning. Federal law creates a spill response structure that includes national, regional, and facility-specific plans and response capacity requirements. This report focuses on the availability of equipment and personnel, because Congress did not intend these plans to be paper tigers, but rather that that they result in boots, wheels, and boats on the ground. The quality of TransCanada's commitments depends in part on how rigorously it complies with the law, and in part on how rigorously federal regulators enforce the law. Therefore, this report examines both TransCanada's compliance with federal law and federal agency implementation.

Comparison of the Keystone System FRP to the FRP prepared by Enbridge prior to the Line 6B spill. Comparison of TransCanada's FRP to Enbridge's FRP for the 6B Pipeline can highlight both systemic failings in the federal pipeline spill response planning process and deficiencies in both plans. All FRPs should be high quality. Comparing the plans of different companies can help companies with weaker FRPs up their games.

In light of these goals, this report starts with a description of the Enbridge 6B Pipeline Spill and then describes federal oil spill standards before evaluating the Keystone FRP itself.

After presentation of its findings, this report summarizes deficiencies in the Keystone FPP and federal agency actions and provides a set of recommended changes to both the Keystone FRP as well as federal agency enforcement. Our intent is to foster real world improvements in governmental and private oil spill response capabilities and planning so that Americans are protected from oil spills to the full extent intended by Congress.

EXAMPLE OF A MAJOR PIPELINE OIL SPILL: THE ENBRIDGE 6B PIPELINE SPILL IN MICHIGAN

Response to a major oil spill creates difficult logistical and technical challenges, to which equipment of different types and personnel are brought to bear. Absent an understanding of the general nature of the response needed to cleanup a large oil spill, it is difficult to put into perspective our federal oil spill laws and private compliance with these laws.

On July 26, 2010, Enbridge reported that its 30-inch diameter 6B Pipeline had ruptured and released an estimated 19,500 barrels (819,000 gallons, approximately 91 semi tanker trucks) of heavy sour crude oil in a rural area about one mile south of Marshall, Michigan.[2] Investigation showed that the oil flowed into a culvert, which led to Talmadge Creek, then followed the creek to the Kalamazoo River, ultimately contaminating about 30 to 35 miles of the River before it was contained. After the spill, the River flooded and stranded oil on floodplains, wetlands, backwaters, and islands. Importantly, the spill threatened to flow all the way to Lake Michigan, thereby fouling many more miles of river, as well as the lake's shoreline.

The 6B Pipeline transports up to 190,000 barrels per day of oil from Griffith, Indiana, to Sarnia, Ontario. It is part of the Enbridge's Lakehead Pipeline System, the world's longest petroleum pipeline.

[2] U.S. House of Representatives, Committee on Transportation and Infrastructure, Staff Report for September 15, 2010, Hearing on Enbridge Pipeline Oil Spill in Marshall, Michigan, September 14, 2010 (House Staff Memo).

At the time of the spill, the pressure in the pipeline was 425 psig, substantially less than its maximum allowed operating pressure of 624 psig.[3]

Type of Oil Spilled

At the time of the rupture, the 6B Pipeline was transporting a very heavy crude oil from Canada, called "Cold Lake Blend," which is a mix of tar-like bitumen from the Canadian tar sands and a liquid material called "diluent." The diluent is mixed with the bitumen to make it more liquid so that it can be pumped through the pipeline. Diluent is often made using "natural gas liquids," which are light oils that are produced by natural gas wells as a byproduct.

The operating temperature of the pipeline at the time of the spill has not been disclosed, but bitumen blends are typically transported at higher temperatures, because elevated temperatures also make heavy oils more liquid. Elevated pressures and temperatures may also result in an immediate off-gassing of diluents, thereby creating a strong smell when the oil is exposed to air, with the result that heavy blended oils may revert to bitumen when spilled.

The type of oil spilled is important to cleanup efforts because the properties of the spilled oil determine how it behaves when spilled, where it ends up, and the types of equipment needed to clean it up. Lighter petroleum products, such as gasoline and diesel fuel, evaporate quickly, with the result that a large amount of the spill ends up in the air and not in the water or on land, and the oil that does not evaporate floats on water. In contrast, only a small amount of very heavy crude oils evaporate, and the oil may be or may become heavy enough to sink in water.

As a result, cleanup efforts for lighter crude oils expect to recover a relatively small portion of the spilled oil, and if the spill is into water, the oil will need to be removed by skimming the oil from the surface of water. In contrast, cleanup of very heavy crude oil can be expected to recover almost all of the spilled oil (if it is not dispersed in large bodies of water), and some of the oil may sink either right away or as the diluent evaporates. The result is that cleanups of very heavy crude oil may require removal of the oil by dredging, not by skimming.

The Cold Lake Blend spilled by the 6B Pipeline had an American Petroleum Institute (API) gravity rating of 11. In contrast, bitumen has an API rating of around 8 and diluents have an API rating of 69.3.[4] If a rating is over 10, then the oil will float when first spilled. However, once the oil is exposed to air, the diluent will begin to evaporate and the oil will become heavier, with the result that some of it will likely sink. Local reports indicate that some of the crude oil spilled by the 6B Pipeline did sink.

Time of Rupture and Discovery

Time is of critical concern when responding to oil spills, because the longer the delay in stopping flows and capturing released oil, the farther the oil contamination and damage spreads, making cleanup more difficult and expensive. The exact time of the 6B Pipeline spill has not been officially determined by the National Transportation Safety Board (NTSB), however it is likely that approximately 17 hours passed before the start of the spill and the time that Enbridge received notification of the spill from a natural gas utility employee. This means that the spilled oil likely spread for miles in the Kalamazoo

[3] PHMSA, Corrective Action Order, July 28, 2010. By way of comparison, vehicle tire pressures are typically 30 to 40 psig.

[4] House Staff Memo; Environment Canada Cold Lake Diluent Reference Sheet from http://www.etc-cte.ec.gc.ca/databases/OilProperties/oil_prop_e.html.

River before any spill containment activities began. The following is a summary timeline of events preceding Enbridge's phone calls to the federal government notifying it about the rupture.[5]

Sunday, July 25, 2010

5:58 PM:	**Pipeline pump automatically shuts down** when Enbridge control center in Edmonton, Canada, receives **low pressure alarm**; the control center attributes the alarm to a "column separation," meaning that they thought a vapor bubble formed in the pipeline.
9:25 PM:	**First 911 calls** from residents near the rupture due to odor

Monday, July 26, 2010

4:04 AM:	**Enbridge restarts pipeline**
4:12 AM:	**Volume balance alarm** (less oil in pipeline downstream than upstream)
4:17 AM:	Second volume balance alarm
4:22 AM:	Third volume balance alarm
4:36-4:57 AM:	Several more volume balance alarms
5:03 AM:	**Enbridge control center turns off Pipeline pumps**
6:30-8:00 AM:	Residents notice strong odor on way to work
7:00 AM:	Local resident collects oil sample from Talmadge Creek
7:10 AM:	**Enbridge restarts pipeline pumps**
7:12-7:42 AM:	Five additional volume balance alarms
7:55 AM:	**Pipeline pumps shutdown and downstream valve closed**
9:49 AM:	Technician called to check a pump station about three-quarters of a mile from the rupture
11:18 AM:	A gas utility calls Enbridge to report on oil in Talmadge Creek
11:20 AM:	Enbridge begins closing valves upstream and downstream of the rupture
11:41 AM:	**Enbridge personnel confirm leak** and begin to respond to the spill
1:29 PM:	**Enbridge reports spill to the federal government**

From this timeline it appears that Enbridge may have operated the pipeline pumps for a total of approximately two hours after rupture. Further, If the rupture occurred on Sunday evening and the spill area was not contained until Monday afternoon, this delay allowed the oil to flow out of Talmadge Creek and miles down the Kalamazoo River, thereby resulting in a substantially more damaging and expensive spill than would have happened if the spill was discovered and isolated on Sunday evening.

Time of Response to Spill and Source of Response Personnel and Equipment

Once Enbridge confirmed the spill, it began using its own spill response equipment and started calling in private clean up companies. Enbridge has not publicly disclosed the exact time that spill equipment and personnel arrived during the first three days (72 hours) of the spill.

[5] House Staff Memo p. 3-6.

Due to the very large amounts of equipment needed to respond to major spills, pipeline companies do not own the vast majority of equipment needed, but rather contract with private spill cleanup contractors who transport in equipment from locations across the U.S. These contractors likely first brought in equipment from southern Michigan, the Chicago and Detroit metropolitan areas, and western Ohio, but given the amount of equipment used, it is likely that much of it was brought in from the across the eastern U.S.

The timing and quantity of response resources can substantially impact the effectiveness of spill response. The location of spill equipment relative to the spill is important because rapid response can significantly reduce the impacts of a spill. Oil can move two to five or more miles down a river per hour, meaning that when oil spills into moving water it is important that an initial wave of personnel and equipment sufficient to contain the spill be on site within hours.

Enbridge was fortunate to the extent that the spill happened near caches of its own equipment and relatively near large spill cleanup contractors in Chicago and Detroit. Also, Enbridge benefitted from the fact that the pipe ruptured relatively close to cities and towns with sufficient lodging and food for a large number of temporary spill response workers.

Amount and Types of Spill Response Equipment

The following table, based on Enbridge reports to the media, identifies the amount of certain types of equipment and personnel brought in during the first week of the response, but it also provides the largest amounts reported by Enbridge at any time for two months after the rupture.

Enbridge Report Date	Personnel	Boom Deployed (ft)	Boats	Skimmers	Vacuum Trucks	Frac Trucks	Tanker Trucks
First Week After Rupture							
26-Jul-10	50						
27-Jul-10	150						
28-Jul-10	250						
29-Jul-10	450	12,310	15	14	43	Yes	Yes
30-Jul-10	631	25,000	36		71	>64	12
31-Jul-10	683	60,000	40	39	76	77	17
1-Aug-10	730	69,000	43	48	79		19
Maximum Quantity of Personnel and Equipment Reported by Enbridge							
Through 30-Sep-10	**2,055**	**157,000**	**43**	**48**	**79**	**77**	**19**

Thus, Enbridge brought in a total of **over 2,000 personnel, over 150,000 feet (28 miles) of boom, 175 heavy spill response trucks, 43 boats, and 48 skimmers**. This being said, it is certain that Enbridge also deployed substantial numbers of spill response vans and trailers with portable equipment and hand tools, boom trailers, portable storage tanks and pumps, trailer tow vehicles, pickups and other light vehicles, dump trucks, excavators, and aircraft. Enbridge has estimated that the cost of cleaning up this spill will be $300 to $400 million, excluding fines.[6]

Enbridge and the federal government have not released critical information about the exact time that particular pieces of equipment and personnel arrived on-scene after discovery of the spill. Federal law requires that FRPs contain commitments that specific quantities of equipment arrive within specified timeframes. Since Enbridge has not released information about equipment arrival times during the first three days of the spill, it is not possible to determine whether or not it met its commitments. Review by the National Transportation Safety Board and/or other responsible agencies of equipment arrival times would provide valuable feedback about the effectiveness of the FRP for the Enbridge Lakehead System.

The response to this spill required a substantial amount of equipment. Containment of large spills into creeks and rivers typically require multiple boom and skimmer sites, each set up and serviced by crews, portable tanks, pumps and/or vacuum trucks and tank trucks. It is likely that most of the 48 skimmers deployed by Enbridge captured oil from different boom sites, and each skimmer would need to be serviced 24/7 by pumps, tanks, trucks, and the crew to operate them. Likewise, each vacuum truck would need a crew to operate and maintain it, and would likely need to be emptied into other tank trucks so that vacuuming could continue without interruption. Because power equipment cannot access all areas contaminated with oil, oil spill cleanups require that large areas be protected by hand placement of booms or cleaned by hand using tools from spill response trailers and vans. This type of handwork is enormously labor intensive and requires substantial amounts of hand tools and supplies, such as absorbent pads. This work is often dirty and dangerous and time is of the essence, so workers need to be trained both in spill response techniques and safety.

The equipment listed by Enbridge plays specialized roles in spill cleanup efforts. A brief description of the types and intended purpose of this response equipment follows.

Boom – Oil spill booms are floating barriers intended to contain oil spills in calm non-flowing waters and to channel oil toward skimmers or vacuums in moving water. Boom is categorized as either containment boom or absorbent boom, the difference being that absorbent boom is made of material that also absorbs spilled oil. Different types of boom are needed depending on whether the water is flowing or still, and depending on how rough the water is. Thus, boom intended for use in the ocean or Great Lakes is not appropriate for use on stream and rivers, and vice versa. Likewise, the type of boom needed for a major river is not the same as would be required for a creek. Boom is measured by length and height, with longer and higher boom used in open water, while shorter height and length boom is used in moving waters.

Boats – Unlike ocean spills where larger vessels participate in containment and cleanup, inland spills into lakes, streams, rivers, and wetlands requires the use of different types of boats, depending on the nature of the water. In large rivers, larger boats with powerful motors are required to position boom across river currents. In smaller river and lakes, boats intended for use in shallow water are needed. Work in wetlands or partially frozen lakes and rivers may require the use of airboats or other specialized craft. Since major spills into rivers also require the placement and maintenance of dozens of boom sites, the ability to ferry cleanup crew to islands and shorelines that are not accessible by land, and vessels to monitor the spread of oil and response efforts, spill responders may need dozens of boats.

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[6] Fox Business, Enbridge Plots New U.S. Pipeline, Earns Seen Intact, October 5, 2010 (http://www.foxbusiness.com/markets/2010/10/05/enbridge-plots-new-pipeline-earns-seen-intact/)

Skimmers – Oil skimmers remove floating oil from water. As with boom, different types of skimmers are required for the ocean, lakes, rivers, and streams. Common types include weir, oleophilic (oil attracting), and suction skimmers, each of which uses a different technique to collect oil. On the ocean and lakes, boats use boom to gather or surround oil, which is then removed with skimmers. In rivers and streams, a series of booms are used to channel floating oil toward skimmers located near the shore where the water is still enough to allow skimming. Size and type are also important. A large skimmer suitable for use on the ocean or Great Lakes would not be usable in a smaller river or stream. Further, some skimmers, such as suction skimmers, work best in smooth water and tend to become clogged with debris so require constant attention. Skimmers are not 100% efficient at capturing only oil, but instead capture a mixture of oil and water, which is pumped into tanks for transportation to processing facilities that separate the oil and water so the oil can be reclaimed.

Vacuum Trucks – An important way to remove oil from inland waters and land is to vacuum it up. Typically, cleanup crews vacuum oil using vacuum trucks, but other types of portable vacuum units may also be used. Depending on the type of truck, vacuum trucks can collect oiled water, rocks, dirt and vegetation and may have air filters to limit chemical emissions from the captured oil. For obvious reasons, vacuum trucks are not typically used in open water spills, although it is possible to place them on barges. Unlike more specialized spill response equipment such as skimmers and boom, vacuum trucks are also used to clean tanks and for other industrial and commercial cleaning needs, and are also used in responses to spills from tanker trucks and rail cars. As a consequence, vacuum trucks are relatively common in industrial areas, but uncommon in rural areas.

Frac Trucks and Tanks –"Frac trucks" and "frac tanks" are mobile storage tanks, located either on trucks or towed, that are used to collect a variety of liquids, typically in oil field operations.

Tanker Trucks – Used to transport collected oil to disposal or recycling locations. As with vacuum trucks, tanker trucks capable of transporting oil are relatively common in industrial areas and in regions with producing oil wells.

Temporary Storage Tanks – Although not quantified by Enbridge, a variety of other types of portable and fixed temporary oil storage tanks are also required for oil spill cleanup operations. As noted, mixed oil and water is collected by skimmers or vacuums and then pumped into nearby tanks or tank trucks. Next, this mix is transported from skimming and vacuuming sites to a larger fixed tank, that may or may not be at the processing facility. When a large amount of oil is spilled, the process of capturing oil at many locations and gathering it for final processing requires the use of large numbers of temporary tanks of many sizes.

There can be no doubt that responding to a major oil spill from a large pipeline presents substantial logistical challenges and requires a very large amount of personnel and equipment. Further, the types and pre-positioned locations of equipment are critical to limiting the damage caused by a spill and the overall success of a spill response, because an immediate rapid response limits both damage caused by the spill and the difficulty, cost, and effort of removing widespread oil.

Lessons Learned and Implications for the Keystone Pipeline System

If any good can come from the Line 6B spill, it is to learn lessons about the importance of stopping operations if there is any doubt about the integrity of a pipeline, and if the pipeline has ruptured, the importance of speed in response, which can only happen if significant amounts of equipment, personnel, and supplies are pre-positioned at appropriate intervals along a pipeline's route.

In its FRP, Enbridge claimed it would detect a rupture within 5 minutes and close the pipeline's valves within 8 minutes of a major rupture, thereby limiting further release. Obviously, this did not happen. TransCanada claims in its FRP that it would detect a rupture within 10 minutes and stop operations on its pipeline in 9 minutes. It appears that both companies have failed to take human error and the complexity of pipeline operations into account.

Pipeline operations and sensor systems are complex, and the data provided to operators is subject to multiple interpretations. Absent clear rules for a conservative response to warning alarms, it appears that pipeline companies are free to continue operations even after alarms sound, if they believe that the alarms are caused by factors other than spills. Given the impacts of major pipeline oil spills, a more conservative response to system alarms should be required.

As noted, Enbridge had the advantage that the 6B Pipeline spill happened near a number of spill response equipment storage facilities and in a relatively populated area that could feed and shelter over 2,000 workers on short notice. In contrast, much of the Keystone Pipeline System traverses some of the least populated, most remote parts of the U.S. Moreover, as described in a later section of this report, the amount of pre-existing spill response equipment in the Great Plains is currently very limited because there are few other existing major oil facilities in this region, and relatively little industrial activity. Although equipment can certainly be transported to the Great Plains to respond to an oil spill, this will take time, and in the meantime the oil will spread and more damage will be done.

Unlike Enbridge, TransCanada has chosen to route its pipelines far from existing stockpiles of spill response equipment. As a result, it has a limited ability to share the responsibility to provide pre-positioned spill response equipment with other oil and pipeline companies. But the remoteness of the pipeline route also creates logistical challenges that would significantly complicate its spill response efforts, including:

- a greater risk that a pipeline spill will not be detected by local residents or TransCanada aerial surveys and will spread for days, not the hours it took until a natural gas company employee found and reported the 6B Pipeline spill to Enbridge, thereby resulting in greater dispersion of oil and greater impacts;

- where and how to shelter and feed thousands of response workers – in summer or winter – when the nearest city of any size may be hundreds of miles from the spill;

- the potential impacts on response efforts of the very severe winter weather common to the northern Great Plains; and

- how to transport millions of gallons of mixed oil and water to distant processing facilities faster than oil is collected by booms and skimmers.

Due to the unique challenges related to oil spill response in remote locations, the Keystone System FRP should contain a rigorous plan to address the foregoing logistical challenges and should identify specific quantities of supplies and resources needed to keep spill operations going in remote locations.

The Enbridge 6B Pipeline rupture was an expensive disaster, but the Keystone Pipeline System is higher volume, the proposed Keystone XL Pipeline is significantly larger in diameter, and much of the system is very far from existing stockpiles of spill response equipment. According to the Keystone Pipeline FRP, the pipeline can pump 460 barrels per minute at maximum capacity. This means that it could pump as much oil as was released by the 6B Pipeline spill in about 42 minutes of operation, and this doesn't include oil that would drain out after pumps are turned off and valves closed. As a consequence, there is a very real possibility that the impacts, response, and costs resulting from a rupture of the Keystone Pipeline System could be much worse than the spill from the 6B Pipeline. Given the remoteness of the northern segment of the Keystone XL Pipeline route, TransCanada faces an even greater challenge than that faced by Enbridge during the 6B Pipeline spill. Therefore, TransCanada's spill preparation plans should be significantly more rigorous.

INTRODUCTION TO THE FEDERAL OIL SPILL RESPONSE SYSTEM

Overview of the Response Planning Process and Requirements

Federal law establishes a comprehensive system mandating that federal agencies and private companies plan for and respond to oil spills. Central to this system is a hierarchy of oil spill response plans that are intended to ensure that response planning capability is adequate to respond to worst-case oil spills. These range from the nationwide National Contingency Plan (NCP), to regional Area Contingency Plans (ACP), to more focused Subarea Contingency Plans (SCP) that focus on particular cities and watersheds, and finally to FRPs that are prepared for specific facilities, such as oil refineries, offshore oil platforms, and oil pipelines. Since the owner or operator of a facility that spills oil bears primary responsibility under law for cleaning up oil spills, the plans that most impact the effectiveness of response to a particular oil spill are FRPs.

Federal law does not require mere paper planning. The law also requires that private companies have acquired and pre-positioned necessary equipment and personnel before they begin operations. Congress intended that federally mandated plans result in actual boots and equipment on the ground – not boilerplate and conceptual dreaming. FRPs are the mechanism whereby federal agencies can ensure that private companies have the tools they need at hand when something goes wrong.

This being said, the NCP, ACPs, and SCPs are important because they are intended to contain detailed standards for FRPs. These federal plans are discussed below.

Federal Contingency Plans

Starting at the nationwide level, the National Contingency Plan (NCP) sets overall federal oil spill response planning standards, including standards related to:

- assignment of federal, state, and private responsibilities;
- identification, procurement, maintenance, and storage of equipment and supplies;
- surveillance and notification of spills;
- national coordination;
- procedures and techniques for containing and removing oil;
- use of dispersants;
- federal response actions and responsibilities;
- standards for response to worst-case spills; and
- protection of fish and wildlife.

At a regional level, federal law requires the U.S. Environmental Protection Area (EPA) and the U.S. Coast Guard (USCG) to prepare Area Contingency Plans (ACP) (also called Regional Contingency Plans or Integrated Contingency Plans). ACPs must:

- be adequate to ensure removal of a worst-case spill;
- identify and describe geographic areas of special economic and environmental importance that might be damaged by a spill;
- describe in detail the responsibilities of private facility owners and operators and of federal, state, and local agencies;
- list equipment, dispersants, and personnel available to private facilities owners and operators and government agencies;
- list local scientists with expertise in spill impacts and use of dispersants; and
- describe in detail how the ACP is integrated into other ACPs and FRPs.

However, the areas covered by each agency's ACPs are defined in accordance with their internal administrative boundaries. Since the boundaries of the EPA and USCG are different, the boundaries of the agencies' respective ACPs are also different. EPA Region boundaries are shown in Figure 2, below.

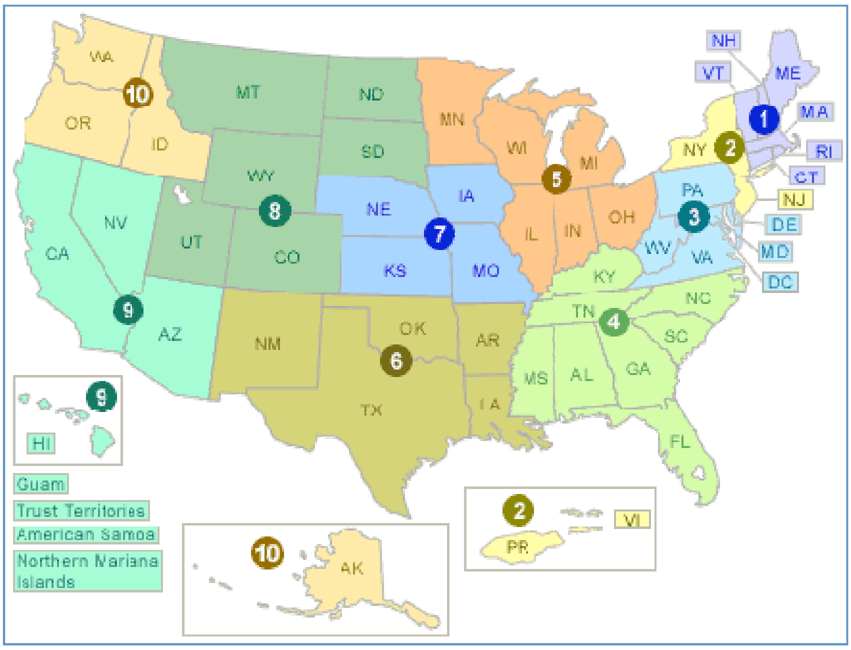

Figure 2 EPA Regions

In addition, the U.S. Coast Guard also has regional response planning responsibilities. Its comparable regions of authority are called Sectors.[7] Sectors have at least one Captain of the Port Zones (COTP Zones). A map of USCG jurisdictional boundaries is provided in Figure 3, below.

[7] A full description of USCG jurisdictional boundaries is contained in 33 C.F.R. Part 3.

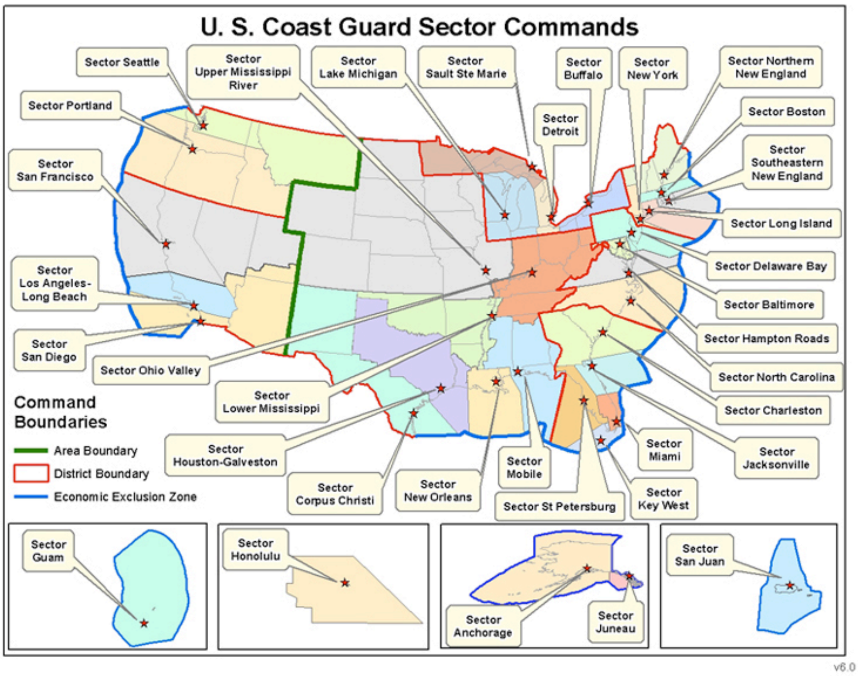

Figure 3 USCG Sectors

The result of these different boundaries is that the regional planning efforts of these agencies are intended to address different geographic regions and correspondingly different planning needs. For example, the EPA Region 5 Area Contingency Plan covers a number of Midwestern states including some that border the Great Lakes. In contrast, five different USCG Sectors prepare ACPs for the Great Lakes as well as major rivers with commercial transportation in these same states. This being said, the EPA and USCG strive to coordinate their contingency planning efforts with each other and with other federal agencies.

Since EPA Regions are very large, it also prepares SCPs (in Region 8 called "Emergency Response Action Plans") to address the unique planning needs of specific geographic areas, such as metropolitan areas or particular watersheds. However, only limited parts of the U.S. are covered by EPA SCPs. For example, EPA Region 8 has prepared SCPs for the Missouri River near Bismarck, North Dakota, and for the Red River of the North along the border of North Dakota and Minnesota. In contrast, there are no SCPs applicable to rivers in South Dakota, such that the only applicable regional response plan for oil spills in South Dakota is the Region 8 ACP.

Although it might be assumed that these jurisdictional boundaries are merely of bureaucratic concern, in fact these regional plans contain standards for the FRPs within their boundaries, such that an interstate pipeline company's compliance with federal law typically requires consideration of a number of these overlapping plans. Therefore, federal interagency coordination is essential to ensure that important FRP standards do not fall through bureaucratic cracks.

Private Facility Response Plans

The most site-specific plans required by federal law are FRPs, because they contain detailed plans and requirements for particular facilities such as individual oil refineries and oil pipelines. Since not all onshore facilities are large and not all of them pose a threat of discharge into water, only facilities that could inflict "substantial" harm on the environment by a discharge into waters are required to submit FRPs. FRP's must:

- be consistent with the NCP and ACPs and SACPs;
- identify the individual who has full authority to implement the FRP and required immediate communication between this individual and federal and private spill response resource providers;
- identify, and ensure by contract or other means, the availability of private personnel and equipment necessary to clean up an oil spill "to the maximum extent practicable;" and
- describe the training, equipment testing, drills, and response actions to be carried out under the FRP.

These FRPs are initially prepared by the facility's owner or operator. Where a facility could reasonably be expected to inflict significant and substantial harm, the appropriate agency must review the FRP and, if it is in compliance with federal standards, approve it.

The Oil Pollution Act does not specify which agencies oversee spill response planning for different types of private facilities, but rather leaves this to Presidential discretion. Pursuant to Executive Order 12777 (October 18, 1991), the Department of Transportation (DOT) reviews and approves onshore pipeline FRPs, the EPA reviews and approves FRPs for onshore non-transportation facilities (such as oil refineries), and the U.S. Coast Guard (USCG) reviews and approves vessel and certain coastal facilities that transfer oil to or from vessels. Each of these agencies has promulgated regulations to implement its responsibilities. These regulations are described in more detail below.

By Memoranda of Understanding (MOA) between certain EPA Regions and USCG Sectors, the agencies have clarified their precise jurisdictional boundaries at facilities along the ocean and Great Lakes coasts and at certain inland ports on major rivers used for commercial transportation. Since EPA Region 8 does not have any coast lines or rivers with commercial shipping, the USCG does not regulate any facilities within Region 8, with the result that a jurisdictional MOA between it and the EPA is not necessary.

Federal agencies may require amendments of submitted plans that are not in accordance with federal standards. Facilities that do not have approved plans are not allowed to operate until a plan is approved. Facilities may operate only if they are in compliance with their plans. To provide agencies time to review and approve plans, a facility may operate for up to two years after submitting a plan if the owner or operator certifies that it has the private personnel and equipment necessary to respond to the maximum extent practicable to a worst-case spill.

The overall goal of the federal oil spill planning structure is to create finer and finer levels of planning and increasing specificity with regard to resource requirements and commitments. Whereas the NCP establishes national standards, ACPs identify regional needs and ensure that equipment and personnel are available in quantities and types necessary to respond to a worst case spill anywhere in the region. In turn, FRPs are required to include detailed planning for particular facilities, and to identify facility-specific equipment and personnel needs to address potential worst-case spills from that facility "to the maximum extent practicable." Since most potential sources of oil spills are private facilities, the private owners and operators of these facilities – not federal agencies – are primarily responsible for spill containment and cleanup. Therefore, the commitments made by private companies in FRPs provide the foundation of on-the-ground resources necessary to the success of the entire federal oil spill response system.

Legislative History and Statutory Law

Congress first acted to require planning to prevent and contain oil spills in 1972 when it passed Section 311(j) of the Federal Water Pollution Control Act (Clean Water Act). In this law Congress required the President to:

- prepare a National Contingency Plan for removal of oil;
- establish "methods and procedures for removal of discharged oil;"
- develop and implement "local and regional oil . . . removal contingency plans;" and
- establish "procedures, methods, and equipment and other requirements for equipment to prevent discharges of oil . . . from vessels and from onshore facilities and offshore facilities, and to contain such discharges . . . ."[8]

These mandates have not changed and remain in effect. Congress required the President to remove spilled oil unless he determined that "removal will be done properly" by the facility or vessel that discharged the oil.[9] Thus, federal law has always put the burden of containing and cleaning up spilled oil first on the entity that spilled it.

Following the Exxon Valdez oil spill in Alaska in 1989, Congress recognized that federal law lacked specificity with regard to private oil spill planning obligations. Accordingly, in the Oil Pollution Act of 1990, Congress expanded Section 311(j) to require that owners and operators of vessels and facilities prepare facility response plans (FRPs).[10] FRPs are required to:

- be consistent with the National Contingency Plan and applicable Area Contingency Plans;
- identify the qualified individual responsible for implementation of the plan;
- "identify, and ensure by contract or other means approved by the President the availability of, private personnel and equipment necessary to remove to the maximum extent practicable a worst case discharge (including a discharge resulting from fire or explosion), and to mitigate or prevent a substantial threat of such a discharge;" and
- Describe training, equipment testing, drills, and response actions.[11]

The President is authorized to issue regulations that implement these requirements.[12]

Where the President finds that a facility could reasonably be expected to inflict significant and substantial harm, the President is required to "promptly review" and either approve or require amendments to FRPs that fail to meet federal standards.[13] Facilities that do not have an approved FRP or that are not operating in accordance with approved plans are prohibited from handling, storing, or transporting oil,[14] except that a facility may operate for up to two years following submission of a plan to the President, if the owner of the facility certifies that it has ensured by contract or other means "the availability of private personnel and equipment necessary to respond, to the maximum extent practicable, to a worst case discharge or a substantial threat of such a discharge."[15]

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[8] Pub. L. No. 92-500, §§ 311(j), 86 Stat. 816. 868-69 (1972), codified at 33 U.S.C. § 1321(j)(1) (2010).
[9] Pub. L. No. 92-500, §§ 311(c)(2), 86 Stat. 816. 865-66 (1972).
[10] 33 U.S.C. § 1321(j)(5).
[11] 33 U.S.C. § 1321(j)(5)(D).
[12] 33 U.S.C. § 1321(j)(5)(A).
[13] 33 U.S.C. § 1321(j)(5)(E).
[14] 33 U.S.C. § 1321(j)(5)(F),
[15] 33 U.S.C. § 1321(j)(5)(G).

It is important to understand that these federal laws apply only to spills of oil into water or that threaten to flow into water. Where a spill is onto land and does not threaten water, then these planning requirements do not apply.

PHMSA's Facility Response Plan Regulations

PHMSA's FRP regulations for oil pipelines are contained in 49 C.F.R. Part 194. These regulations exempt certain smaller diameter or shorter pipelines, define which pipelines are required to have their FRPs approved by PHMSA, describe regulatory standards for FRPs, and describe PHMSA's approval process. Since all long, interstate, large diameter pipelines could reasonably be expected to inflict significant and substantial harm, as a practical result PHMSA is required to approve the FRPs for all such pipelines.

Due to the length of interstate pipelines, PHMSA's regulations require that the plans be based on delineated "response zones." Section 194.5 defines "response zone" as follows.

> Response zone means a geographic area either along a length of pipeline or including multiple pipelines, containing one or more adjacent line sections, for which the operator must plan for the deployment of, and provide, spill response capabilities. <u>The size of the zone is determined by the operator after considering available capability, resources, and geographic characteristics.</u>

Emphasis added. As can be seen, the regulations allow operators to define their own response zones based on certain spill response factors. Since the CWA § 1321(j)(5)(D) requires FRPs to be based on worst-case discharges, Section 194.5 defines "worst case discharge" as:

> Worst case discharge means the largest foreseeable discharge of oil, including a discharge from fire or explosion, in adverse weather conditions. This volume will be determined by each pipeline operator for each response zone and is calculated according to § 194.105.

Thus, worst-case discharges must be determined in light of fire, explosions, and bad weather, all of which may impact the extent of damage caused by a pipeline rupture. Subsections194.105(a) and (b)(1) provide the methodology for determining the "worst case discharge" from a pipeline that has not suffered a worst case discharge and that has no associated tank storage as follows:

> (a) Each operator shall determine the worst case discharge for each of its response zones and provide the methodology, including calculations, used to arrive at the volume.
> (b) The worst case discharge is the largest volume, in barrels (cubic meters), of the following:
> (1) The pipeline's <u>maximum</u> release time in hours, plus the <u>maximum</u> shutdown response time in hours (based on historic discharge data or in the absence of such historic data, the operator's best estimate), multiplied by the <u>maximum</u> flow rate expressed in barrels (cubic meters) per hour (based on the maximum daily capacity of the pipeline), plus the <u>largest</u> line drainage volume after shutdown of the line section(s) in the response zone expressed in barrels (cubic meters) . . . ."

Emphasis added. Section 194.107 contains the following FRP requirements that are relevant here:

> (a) Each response plan must include procedures and a list of resources for responding, to the maximum extent practicable, to a worst case discharge and to a substantial threat of such a discharge.
>
> (b) An operator must certify in the response plan that it reviewed the NCP and each applicable ACP and that its response plan is consistent with the NCP and each applicable ACP . . .
>
> (c) Each response plan must include:
> (1) A core plan consisting of --
> * * *
> (v) Response activities and response resources . . .
> * * *
> (2) An appendix for each response zone that includes the information required in paragraph (c)(1)(i)-(ix) of this section and the worst case discharge calculations that are specific to that response zone.

Emphasis added. In turn, Section 194.5 defines "maximum extent practicable" as:

> Maximum extent practicable means the limits of available technology and the practical and technical limits on a pipeline operator in planning the response resources required to provide the on-water recovery capability and the shoreline protection and cleanup capability to conduct response activities for a worst case discharge from a pipeline in adverse weather.

Although the regulations do not further describe what the practical limits might be, it is likely that PHMSA and pipeline operators would define this in economic terms, meaning that there are limits on how much they should be required to spend on prepositioned equipment and personnel. These limits may also be considered in light of industry best practices and relative to the financial resources of pipeline owners and operators.

With regard to "response resources," Section 194.5 defines this term as:

> Response resources means the personnel, equipment, supplies, and other resources necessary to conduct response activities.

Emphasis added. Section 194.115 describes required response resources at follows:

> (a) Each operator shall identify and ensure, by contract or other approved means, the resources necessary to remove, to the maximum extent practicable, a worst case discharge and to mitigate or prevent a substantial threat of a worst case discharge.
> (b) An operator shall identify in the response plan the response resources which are available to respond within the time specified, after discovery of a worst case discharge, or to mitigate the substantial threat of such a discharge, as follows:

	Tier 1	Tier 2	Tier 3
High volume area	6 hrs	30 hrs	54 hrs.
All other areas	12 hrs	36 hrs	60 hrs.

Significantly, PHMSA's regulations do not contain any standard for required response resources other than that underlined in subsection a, above. This language is nearly identical to the broad standard provided by Congress that the President is required to implement through more detailed regulations.[16] Subsection b, above, merely requires that FRP's "identify" response resources within certain timeframes, but does not contain standards for what these response resources might be.

The timeframes are defined based on whether or not an area is a "high volume area," which Section 194.5 defines as:

> High volume area means an area which an oil pipeline having a nominal outside diameter of 20 inches (508 millimeters) or more crosses a major river or other navigable waters, which, because of the velocity of the river flow and vessel traffic on the river, would require a more rapid response in case of a worst case discharge or substantial threat of such a discharge. Appendix B to this part contains a list of some of the high volume areas in the United States.

Emphasis added. Appendix B contains a relatively short list of locations along rivers in the U.S., but as noted above, this list is not intended to be inclusive. "Major river" is defined as:

> Major river means a river that, because of its velocity and vessel traffic, would require a more rapid response in case of a worst case discharge. For a list of rivers see "Rolling Rivers, An Encyclopedia of America's Rivers," Richard A. Bartlett, Editor, McGraw-Hill Book Company, 1984.

Thus, where oil may be spilled into a fast flowing river sufficient in size to have vessel traffic, FRPs are required only to identify which resources would be at the spill within six hours, rather than twelve hours. The reason for this rule is that major rivers usually have fast currents with the result that oil may spread very quickly if not contained by booms. Further, major rivers are almost always the sources of drinking water for large numbers of people and often serve the needs of large industrial facilities such as power plants. To protect each identified High Volume Area, PHMSA's regulations require that FRPs identify what response resources ("personnel, equipment, supplies, and other resources necessary to conduct response activities") would be on-scene at that High Volume Area within six hours of notification of a rupture.

This being said, PHMSA's regulations contain no detailed mandatory requirements to calculate the amount of equipment and personnel needed to respond to spills into High Volume Areas, or anywhere else for that matter.

Section 194.119 contains PHMSA's submission and approval procedures, which in relevant part state:

> (a) Each operator shall submit two copies of the response plan required by this part . . . .

[16] 33 U.S.C. § 1321(j)(5)(D) requires agencies to "identify, and ensure by contract or other means approved by the President the availability of, private personnel and equipment necessary to remove to the maximum extent practicable a worst case discharge (including a discharge resulting from fire or explosion), and to mitigate or prevent a substantial threat of such a discharge . . . ."

> (b) If PHMSA determines that a response plan requiring approval does not meet all the requirements of this part, PHMSA will notify the operator of any alleged deficiencies, and to provide the operator an opportunity to respond . . . .
> (c) An operator who disagrees with the PHMSA determination that a plan contains alleged deficiencies may petition PHMSA for reconsideration within 30 days . . . .
> (d) For response zones of pipelines described in § 194.103(c) [Office of Pipeline Safety (OPS)] will approve the response plan if OPS determines that the response plan meets all requirements of this part . . . .
> (e) If OPS has not approved a response plan for a pipeline described in § 194.103(c), the operator may submit a certification to OPS that the operator has obtained, through contract or other approved means, the necessary personnel and equipment to respond, to the maximum extent practicable, to a worst case discharge or a substantial threat of such a discharge. The certificate must be signed by the qualified individual or an appropriate corporate officer.

Significantly, and unlike the EPA and USCG, PHMSA does not impose on itself any deadline for approval of submitted FRPs. It does, however, provide ample opportunity for pipeline operators to contest PHMSA requests for improvements.

In Appendix A to 49 C.F.R. Part 194 ("PHMSA Appendix A"), PHMSA's regulations provide non-mandatory "guidelines" for preparation of response plans that also reference a limited set of materials prepared by other agencies. The introduction to Appendix A states:

> This appendix provides a recommended format for the preparation and submission of the response plans required by 49 CFR Part 194. Operators are referenced to the most current version of the guidance documents listed below. Although these documents contain guidance to assist in preparing response plans, their use is not mandatory:
> (1) The "National Preparedness for Response Exercise Program (PREP) Guidelines" (PREP), which can be found using the search function on the USCG's PREP Web page, http://www.uscg.mil;
> (2) The National Response Team's "Integrated Contingency Plan Guidance," which can be found using the search function at the National Response Center's Web site, http://www.nrt.org and;
> (3) 33 CFR Part 154, Appendix C, "Guidelines for Determining and Evaluating Required Response Resources for Facility Response Plans."

PHMSA Appendix A is essentially a <u>recommended</u> outline for the contents of FRPs. It does not include any binding standards for FRPs, nor does it contain any detailed guidance for determining the amount of spill response equipment and personnel that must be provided by pipeline operators. It does, however, incorporate by reference two documents prepared by the Coast Guard and one by the National Response Team, a federal interagency response organization. The third document[17] listed is of particular interest because, as described more fully below, it contains mandatory USCG FRP standards[18] for the type,

[17] 33 C.F.R. Part 154, Appendix C (USCG Appendix C).
[18] *See, e.g.*, 33 C.F.R. § 154.1045(b) and (e), which respectively <u>require</u> the use of Appendix C when determining equipment operating criteria and when calculating the quantity of response resources required within specified timeframes to respond to a worst-case discharge.

general location, and amount of equipment required to be identified FRPs subject to USCG approval. Whereas PHMSA's regulations do not contain any mandatory equipment standards the FRP's it approves, the USCG regulations provide USGC personnel with meaningful detailed standards for evaluation of USCG-approved FRPs.

It is remarkable that PHMSA's FRP regulations do not contain detailed standards for equipment or personnel needed to respond to oil pipeline spills, because determination of the sufficiency of response equipment is not a simple task. It appears that PHMSA allows pipeline companies to define for themselves the extent of their response zones and the type, amount, and location of response equipment and personnel needed to respond to these discharges, but then provides no meaningful standards that would allow PHMSA staff to determine whether or not pipeline operator FRPs are in compliance with the Clean Water Act. Although PHMSA retains ostensible approval authority over pipeline FRPs,[19] absent more detailed standards it is impossible to know the specific standards that PHMSA staff might use in the FRP approval process. This lack of detailed and mandatory pipeline FRP standards is a significant weak link in the federal regulatory chain that must be strengthened. PHMSA's failure to promulgate mandatory detailed standards for pipeline FRPs stands in marked contrast to the both EPA and USCG regulations implementing the same statutory authority.

Although it may be argued that the rigor of Enbridge's response to the 6B Pipeline spill indicates that existing PHMSA regulations are adequate, as noted, Enbridge benefitted from the fact that significant quantities of private contractor equipment and personnel were pre-located near the 6B Pipeline spill. This pre-positioning of resources is largely the result of both EPA and USCG FRP requirements for the many non-pipeline facilities and vessels regulated in this region. Essentially, PHMSA has been piggy-backing on EPA and the USCG FRP requirements for decades.

The weakness in PHMSA's regulations can be expected to come to light in geographic areas where there are few facilities regulated by the EPA or USCG, because enforcement of Clean Water Act oil spill response standards will fall primarily upon PHMSA. The northern Great Plains is the largest such area.

EPA Facility Response Plan Regulations

The EPA's FRP regulations come from the same statutory authority as PHMSA, but EPA approves FRPs for onshore, non-transportation-related facilities, such as oil refineries.[20] Appendix E of the EPA regulations, entitled "Determination and Evaluation of Required Response Resources for Facility Response Plans" (EPA Appendix E), contains <u>mandatory</u>[21] procedures and standards to determine

[19] 49 C.F.R. § 194.119.

[20] 40 C.F.R. Part 112, Subpart D; Executive Order 12777.

[21] Section 1.1 of EPA Appendix E states, "The purpose of this appendix is to describe the procedures to identify response resources to meet the requirements of § 112.20. To identify response resources to meet the facility response plan requirements of 40 CFR 112.20(h), owners or operators <u>shall</u> follow this appendix or, where not appropriate, shall clearly demonstrate in the response plan why use of this appendix is not appropriate at the facility and make comparable arrangements for response resources (emphasis added); 40 C.F.R. § 112.20(h)(3)(i) ("To identify response resources to meet the facility response plan requirements of this section, owners or operators <u>shall</u> follow Appendix E to this part . . . ." (emphasis added)). An operator may make comparable arrangements for response resources if it can "clearly demonstrate" to the EPA that the use Appendix E is not appropriate. *See also* 40 C.F.R. Part 112 Appendix C, Attachment C-III ("Once it is determined that a plan must be developed for the facility, the owner or operator shall reference Appendix E to this part to determine appropriate resource levels and response times. The specified time intervals of this appendix include a 3-hour time period for deployment of boom and other response equipment.")

required amounts of response resources and their locations relative to the facility. Among other requirements, EPA Appendix E contains the following:

- All identified equipment must be designed to operate in the conditions expected in a facility's geographic area (Section 2.1).

- Where the facility operates in more than one area, equipment must be capable of successfully functioning in each area (Section 2.2).

- Identification of the distance between a facility and its response resources to allow EPA to confirm that response resources can arrive on-scene with the required timeframe. Further, the FRP must use specific time criteria for notification, mobilization, and travel times, including an assumed on-land speed of 35 mph, unless the facility owner can demonstrate that a faster speed is merited (Section 2.6).

- Identification of equipment storage locations, quantities, and manufacturer's make and model, as well as the effective daily recover capacity (EDRC) of oil recover devices (*e.g.,* skimmers) using methodology of Section 6 of the Appendix (Section 2.7).

- Confirmation that required response resources are located so that they can arrive on-scene within the specified times (Section 5.3) by showing the storage locations of required equipment (Section 5.4).

- Identification of temporary oil storage capacity to ensure compliance with volumes required by Section 12.2 (Section 5.5).

- Confirmation that twenty-percent of required response resources must be capable of operating in water less than 6 feet deep (Section 5.6).

- Identification of equipment capable of removing a specified amount of oil each day (Section 6).

- Calculation of a "planning volume" used to determine a specific amount of required response equipment. The planning volume is determined by adjusting the worst-case discharge based on Table 2 in the Appendix, which adjust for loss of oil to the environment either through dispersal or evaporation and emulsification of oil with water as this increases the volume of captured oil, and based on Table 3 in the Appendix, which is used to estimate the amount of oil left floating on the water or on shorelines, depending on types of locations. Next, Table 4 must be used to determine the percentages of equipment that must be on-scene within the tier times identified in Sections 5.3 and 7.2.3. However, the amount of response resources is capped by Table 5 of the Appendix. (Section 7.0). Thus, the amount of equipment required is based on the amount and type of oil spilled, but may be capped if the potential worst-case spill is very large.

- Identification of equipment capable of fighting fires (Section 7.4).

- Identification of response resources capable of locating and removing submerged heavy oil (Section 7.6).

In short, an EPA-approved FRP must identify with particularity the amount, type, characteristics, and locations of specific pieces of response equipment and prove that specific amounts of equipment are available, operational, and located close enough to a facility to ensure a rapid response to a worst-case discharge. An FRP must:

1) Calculate the worst case discharge;

2) Determine the type of oil handled;

3) Based on the type of oil, calculate a spilled oil removal planning volume by adjusting the worst-case discharge downward to account for loss of volume to the environment and then increasing the volume upwards to account for emulsification;

4) Depending on the type of oil, estimate the volumes of spilled oil that will be floating, on shorelines, and for heavy oils, the volume that will be submerged;

5) Determine the amount and type of equipment needed to collect the calculated volumes of floating, beached, and submerged oil;

6) Demonstrate that certain portions of the required equipment can arrive on-scene in accordance with mobilization factors that require faster deployment in rivers and canals;

7) Determine whether the amounts of required equipment are large enough to be limited by capacity caps that define maximum commitments of spill response equipment;

8) Determine the time deadlines for on-scene arrival based on whether or not a facility is in a "higher volume port area," which requires arrival of equipment six hours faster than other areas;

9) Identify the locations of committed (owned or under contract) resources, including the amounts, types, and capacities of spill response equipment that can be moved to the spill within time deadlines; and

10) Where equipment caps are applicable, identify the locations, amounts, and types of equipment that are not committed but available to respond to a worst case spill.

The end result of this process is a list of the types and locations of equipment that must be committed by facility operators that will allow continued operations, as well as identification of the location and types of equipment not under contract that could be brought in if necessary.

Also, EPA <u>requires</u> all FRPs to follow the model FRP format in Appendix F, unless the FRP must also comply with the regulatory requirements of other agencies. Even then, an EPA-approved FRP must contain essential information, meet certain minimum format requirements, and contain a cross-reference table so that EPA can quickly find required information.[22] This uniformity ensures that responders can familiarize themselves with one FRP format and minimize the time needed to find vital information after a rupture.

Coast Guard Facility Response Plan Regulations

The USCG also has regulations that implement the Clean Water Act's FRP requirement.[23] These regulations are similar to the EPA's in that they require the use of <u>mandatory</u> procedures and standards to

[22] 40 C.F.R. § 112.20(h); 40 C.F.R. Part 112, Subpart D, Appendix F.
[23] 33 C.F.R. Subpart F.

determine required response resources, many of which are contained in Appendix C to the USCG regulations (USCG Appendix C).[24] The process used by the USCG to determine required resources is similar to the EPA process, and the USCG requires compliance with a mandatory response plan format.[25] Further, each FRP must include an appendix that contains a list of all equipment and facility personnel required to respond to a worst case discharge, including equipment owned by private oil spill removal organizations ("OSRO") (essentially spill response contractors) with which the operator of a facility has a contract to provide spill response capability.[26]

However, the USCG regulations add one significant element to this process. Specifically, the regulations allow an OSROs to voluntarily register its equipment in an on-line USCG database (called the Response Resource Inventory (RRI)[27]), which allows the USCG to "classify" the OSRO according to its spill response capabilities within each USCG COTP Zone. The USCG also conducts on-site inspections of OSRO equipment to confirm that the RRI listing is accurate.

If a USCG response plan references a classified OSRO then it need not include detailed lists of equipment, because the USCG already has this information on file. Compiling a list of available private resources helps the USCG by:

- confirming that sufficient private response resources are available within its jurisdictions, even though these resources may be owned by many different companies;
- creating a list of OSROS that may be called out by the USCG in the event that a facility owner fails to take responsibility for a spill;
- accelerating review of both FRPs and vessel response plans, particularly in coastal areas, such as the Gulf Coast and Prince Williams Sound, Alaska, where private companies pre-position large amounts of spill response equipment; and
- providing a system to track and confirm the availability of resources that can be used for spills of oil from vessels at sea, regardless of where the vessel is within the US.

A facility's contract with a classified OSRO provides the USCG with assurance that the owner of a facility or vessel can provide legally mandated amounts and types of spill response equipment. It also means that response plans do not contain redundant lengthy lists of equipment.

The USCG classifies OSROs based on the distance between OSROs and (1) COTP Cities; (2) designated high volume ports ("HVP"); and (3) designated Alternative Classification Cities ("ACC").[28]

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[24] 33 C.F.R. Part 154, Appendix C.
[25] 33 C.F.R. § 154.1030.
[26] 33 C.F.R. § 154.1035(e)(3).
[27] https://cgrri.uscg.mil/logon.aspx?ReturnUrl=%2fdefault.aspx
[28] The full list of COTP Cities, HVPs, and ACCs includes: Boston (MA), Long Island Sound (RI, MA, CT, NY), New York, Northern New England (ME, MA, VT, NH), Southern New England (RI, MA, CT), Baltimore (MD), Cape Fear River (NC), Delaware Bay (DE, NJ), Hampton Roads (VA), North Carolina, Charleston (SC), Jacksonville (FL), Port Canaveral (FL), Key West (FL), Miami (FL), San Juan (PR), Savannah (GA), St. Petersburg (FL), Corpus Christi (TX), Houston (TX), Huntington (WV), Lower Mississippi (AK, MS, LA, OK), Mobile (AL), Panama City (FL), Morgan City (LA), New Orleans (LA), Ohio Valley (OH, WV, IN, KY, TN), Paducah (KY), Pittsburg (PA), Port Arthur (LA), Upper Mississippi (MO, IL, IA, WI, MN, ND, SD, NE, KS, CO, WY), Buffalo (NY), Oswego (NY), Chicago (IL), Cleveland (OH), Detroit (MI), Duluth (MN), Lake Michigan (WI, IL, MI), Sault Ste. Marie (MI, MN), Alpena, (MI) Marquette (MI), Traverse City (MI), Toledo (OH), Los Angeles/Long Beach (CA), Morro Bay (CA), San Diego (CA, AZ), San Francisco (CA, NV, UT), Eureka (CA), Portland (OR, ID), Coos

Most of these locations are ocean ports or Great Lakes ports. The USCG inland COPT Cities include Louisville, KY, St. Louis, MO, and Memphis, TN (there is also an office in Pittsburg, PA, but this is not a designated COPT City). Given that the USCG typically regulates facilities in or near these ports and vessels in or transiting the oceans, Great Lakes, or Rivers on which these ports are located, classification based on distance to these particular ports makes sense.

Response travel times to these ports are calculated by measuring the straight-line (great circle) distance between the latitude and longitude of an OSRO's equipment site and the latitude and longitude of the COTP City, HVP, or ACC. The response travel time to cover the straight-line distance is then calculated using a speed of 35 MPH over land or 5 KTS over water. The total response time needed for equipment and personnel to move from its staging site to a COTP City, HVA, or ACC is the sum of the notification time, mobilization time, and travel time.

However, the USCG also specifies that notification and mobilization times differ depending on whether a resource is owned or contracted, and dedicated to spill response or non-dedicated (such as a tank truck that may be used for different service). The USCG notification/mobilization times are shown below.[29]

Resource Notification/Mobilization Response Times in Hours		
	Response Personnel Availability	
Resource Status	**On-Site (OS)[1]**	**Recall (R)[2]**
Owned/Dedicated (O/D)	1	2
Contract or Dedicated (C/D)	1.5	2.5
Owned/Non-dedicated (O/ND)	2.5	3.5
Contract /Non-dedicated (C/ND)	3	4
Notes: Full-time personnel are a dedicated resource; part-time personnel are a nondedicated resource. Table includes 0.5 hours between discovery of discharge and notification of OSRO.		
[1] On-site means a 24-hour staffed resource site. [2] Available on recall means personnel recalled on beeper or phone tree.		

The OSRO program is primarily a planning tool and classification is voluntary, but it does have regulatory impact to the degree that it allows operators not to provide detailed lists of spill response equipment otherwise required by law. Use of a classified OSRO does not relieve facilities of their responsibility to determine whether or not an OSRO will meet the response standards contained in the USCG regulations.

Limitations of Oil Spill Response Organization Classification Program

The USCG OSRO classification program certainly has its strengths, but it is not a nationwide listing of all response equipment necessary to comply with federal law. Rather, it is an USCG-specific program intended to facilitate regulatory review of USCG-approved response plans. Its utility to the EPA and PHMSA is significantly limited because:

Bay (OR), Puget Sound (WA, ID, MT), Guam, Honolulu (HI), Prince William Sound (AK), Southeast AK, Ketchikan (AK), Western Alaska, Prudhoe Bay, (AK).

[29] Guidelines for the U.S. Coast Guard Oil Spill Removal Organization Classification Program, June 2008 (USCG OSRO Guidelines), p. 21.

- The RRI does not list important types of equipment used primarily in inland spill responses, such as vacuum trucks, spill response trailers, and utility boats. Instead, it lists spill response resources typically used in coastal areas, including ships, barges and other large vessels, such as those used to respond to the Deepwater Horizon spill. Further, since USCG personnel do not have responsibility for spills in inland areas, the USCG has limited experience and capacity to evaluate inland spill resource equipment or needs or to conduct site inspections of OSROs far from USCG facilities.

- As described below, the RRI identifies very few resources in the Great Plains.

- The USCG classification system is based on the distances between equipment and certain ports, and only one of these ports, St. Louis, is located in the Upper Mississippi Sector, which encompasses almost all of the Northern Great Plains (eastern Montana is in the Seattle Sector). Given that the Upper Mississippi Sector is by far the largest in the continental U.S, and St. Louis is in the extreme southeast of this very large geographic area, it is not possible to use the classification system to evaluate an OSRO's equipment and personnel capacities located far away from St. Louis. USCG classification for this Sector is intended to determine OSRO capability to respond to oil spills on the commercially navigable portions of the Mississippi and Missouri Rivers, which end at Minneapolis, Minnesota, and Sioux City, Iowa, respectively. It is not intended to determine PHMSA and EPA responsibilities to evaluate other FRPs.

Use of the USCG classification system to confirm equipment commitments in locations far from USCG-regulated facilities is not justified by the program's current structure and equipment inventories. Moreover, the limitations of the classification system's use in inland areas has been recognized by the Coast Guard and industry for some time.[30] Yet both the EPA and PHMSA rely on USCG classifications when reviewing FRPs.

Use of USCG classification to evaluate facility commitments in the northern Great Plains is demonstrably problematic, because the RRI contains records for relatively few pieces of equipment in the northern Great Plains and adjoining states. As part of its investigation, Plains Justice acquired the USCG's entire RRI list for the following states: Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Illinois, Wisconsin, Michigan, Indiana. Plains Justice also reviewed other lists available to the public at the USCG RRI website.

This investigation found that there are <u>no</u> RRI spill response resources listed in the state of Wyoming.[31] In total, the RRI contains the following resources for the other northern Great Plains states.

Site Name	State	City	Equipment Description
South Dakota			
Bay West Inc	SD	Sioux Falls	1,000 ft of 12" Boom
Bay West Inc	SD	Sioux Falls	1 Skimmer, EDRC 411 bbl/day
Bay West Inc	SD	Sioux Falls	1 Temporary Storage Tank, 1,500

[30] Bradley et al., OSROs: Will They Be There for Inland Environments? Paper Presented to the International Oil Spill Conference (2003).
[31] Email, LT L. Fullam, USCG, National Strike Force, Nov. 2, 2010 (stating if a state has no entries in a spreadsheet, then it has no listed equipment.

Site Name	State	City	Equipment Description
Nebraska			
Clean Harbor Environmental Services	NE	Kimball	3 Temporary Storage Fixed Facility Tank, 6,000
Clean Harbor Environmental Services	NE	Kimball	13 Temporary Storage Fixed Facility Tank, 20,000
Clean Harbor Environmental Services	NE	Kimball	1 Temporary Storage Fixed Facility Tank, 6,000
Clean Harbor Environmental Services	NE	Kimball	1 Temporary Storage Fixed Facility Tank, 5,000
Haz-Mat Response, Inc.	NE	North Platte	600 ft of Curtain Boom, 18" Height
Haz-Mat Response, Inc.	NE	North Platte	400 ft of Curtain Boom, 10" Height
Haz-Mat Response, Inc.	NE	North Platte	1 Skimmer, Oleophilic, EDRC 137
Haz-Mat Response, Inc.	NE	North Platte	1 Skimmer, Oleophilic, EDRC 480
Haz-Mat Response, Inc.	NE	North Platte	1 Skimmer, Weir/Suction, ECRC 240
Haz-Mat Response, Inc.	NE	North Platte	5 Oil Storage Bags, 2,016
North Dakota			
Baker Tanks	ND	Killdeer	2 Tank Trucks, 24,990
Baker Tanks	ND	Killdeer	2 Tank Trucks, 17,640
Earth Movers	ND	Minot	1,500 ft of Curtain Boom, 18" Height
Earth Movers	ND	Minot	100 ft of Curtain Boom, 8" Height
Earth Movers	ND	Minot	1 Skimmer, Weir, EDRC 1646
Montana			
Baker Tanks	MT	Billings	2 Modular Storage Containers, 21,966
Baker Tanks	MT	Billings	1 Modular Storage Container, 17,670
Baker Tanks	MT	Billings	4 Modular Storage Containers, 21,000
Baker Tanks	MT	Billings	8 Modular Storage Container, 630
Baker Tanks	MT	Billings	1 Modular Storage Container, 24,990
Total			
Boom			1,000 ft of 12" Boom 2,100 ft of Curtain Boom, 18" Height 400 ft of Curtain Boom, 10" Height 100 ft of Curtain Boom, 8" Height
Skimmers			5 Skimmers, Total EDRC 2,914 bbl
Tanks			26 Portable Tanks – 132,402 (3,152 bbl) 18 Fixed Tanks

Thus, the USCG RRI lists one skimmer each in North and South Dakota, three in Nebraska, and none Montana or Wyoming. It lists 1,000 feet of boom in South Dakota, 1,600 feet of boom in North Dakota, and 1,000 feet of boom in Nebraska. It also lists a number of storage tanks, but the units are not specified such that it is not possible to state their capacity with certainty. The portable tanks, however, are likely measured in gallons, in which case there would be 132,402 gallons or, 3,152 bbl of capacity, mostly in Billings, Montana, which is about eight hours, in good weather and at highway speeds, from the nearest part of the Keystone Pipeline. It is not clear whether these storage tanks are dedicated to emergency spill response or undedicated.

The equipment in North Platte, NE, is within four hours of the Keystone Pipeline crossing of the Platte River High Volume Area at Duncan, NE, but this equipment is over five hours away from Keystone Pipeline Missouri River crossing High Volume Area at Yankton, SD.

Looking farther afield, the next possible states that could provide response resources to the Northern Response Zone of the Keystone Pipeline are Minnesota, Iowa, Missouri, and Kansas. There is only one cache of equipment registered with the RRI in western Minnesota, in Alexandria, at which Bay West, Inc. has 900 feet of 12" boom. Although there are significant amounts of equipment listed in the RRI near Duluth and the Twin Cities metropolitan area, these equipment locations are almost entirely more than four hours away from the Keystone Pipeline based either on USCG straight line distance and required 35 mph speeds or standard highway speeds. It may be possible to move equipment from the western suburb of Chaska[32] to the closest part of the Keystone Pipeline near Raymond, SD a distance of approximately 225 miles by highway or approximately 210 miles straight line in less than four hours, but this equipment is six hours away using an assumed USCG speed of 35 mph and just over four hours away using standard highway speeds. In any case, this equipment is over five hours from the High Volume Area at Yankton and all other parts of the Keystone Pipeline, as well.

There is only one equipment cache registered in the RRI for Iowa, at Bay West, Inc. in Des Moines, IA, which has 900 feet of 12" boom. This location is just under four hours away from the Keystone Pipeline crossing of the Platte River near Duncan, NE.

The closest equipment in Missouri and Kansas is in the Kansas City metropolitan area, the Wichita area, and Great Bend, KS, all of which are more than four hours away from the Keystone Pipeline crossing of the Platte River. However, this equipment is within four hours of the Keystone Pipeline Route as far north as Seward County, Nebraska.

The equipment in Minnesota and Iowa within four hours of the Keystone Pipeline High Volume Areas in the Dakotas and Nebraska are listed in the table below.

Minnesota			
Bay West Inc	MN	Alexandria	Boom, 900 ft of 12"
Quali Tech Environmental, Inc.	MN	Chaska	Boom, 1,000 ft of 18"
Quali Tech Environmental, Inc.	MN	Chaska	Boom, 1,000 ft of 43"
Quali Tech Environmental, Inc.	MN	Chaska	Boom, 100 ft of 10"
Quali Tech Environmental, Inc.	MN	Chaska	1 Skimmer, not described, EDRC 905
Quali Tech Environmental, Inc.	MN	Chaska	1 Skimmer, Weir, EDRC 905
Quali Tech Environmental, Inc.	MN	Chaska	1 Skimmer, Weir, EDRC 905
Quali Tech Environmental, Inc.	MN	Chaska	1 Skimmer, Weir, EDRC 823
Quali Tech Environmental, Inc.	MN	Chaska	1 Skimmer, not described, EDRC 905
Quali Tech Environmental, Inc.	MN	Chaska	1 Temporary Storage Tank, not described, 21,000 gal
Quali Tech Environmental, Inc.	MN	Chaska	1 Temporary Storage Tank, not described, 4,200 gal
Iowa			
Bay West Inc	IA	Des Moines	Boom, 900 ft of 12"

[32] There are 5 Skimmers, 3,000 feet of boom, and two storage tanks in Chaska at a company named Quali Tech Environmental, Inc.

Given the small quantity of equipment listed in the above tables and the size of northern plains states, it does not seem possible that any classified OSRO could commit to a six hour Tier 1 worst case discharge USCG classification for the Keystone Pipeline Northern Response Zone, and particularly the High Volume Areas in this Zone, both because there is too little equipment available and it is too distant from High Volume Areas. The distances in these states are too great to justify reliance on USCG ratings, particularly because this rating is based on distances between equipment and port cities, the only one of which is St. Louis.

If the route of the proposed Keystone XL is considered in light of USCG RRI equipment locations and COPT City, the classification becomes even more meaningless. The route of the Keystone XL is even further from any significant RRI equipment caches. Minot, ND, which has the only skimmer and boom in the western Dakotas and eastern Montana and Wyoming, is over four hours away from both the Keystone XL crossing of the Missouri River at the Fort Peck Dam, and from the crossing of the Yellowstone River near Miles City, MT. The only RRI equipment caches within four hours of these crossings are some portable tanks in Billings, MT, and Killdeer, ND, and because these may be in use in the nearby Bakken Formation oil fields, their availability should be confirmed.

The limited amount of RRI-registered equipment in the northern Great Plains, the size of the Upper Mississippi River USCG Sector, the single COPT city near its southeastern boundary, the lack of ACCs and HVPs in this Sector, mean that the USCG OSRO classification system cannot be used to determine compliance with federal law for EPA and PHMSA facilities in this region. Classification of an OSRO as being able to respond within six hours (including one hour each for notification and mobilization) to such a large area when there is very little equipment on the ground stretches the intent and utility of the USCG classification system well past its capacity.

In concept, a central listing of spill response equipment in the Great Plains is a good idea, but the USCG RRI is not this list. Plains Justice suggests that if PHMSA and EPA wish to use an OSRO classification system in the Great Plains, that they either work with the USCG to formally expand the RRI's coverage or implement their own system. Bootstrapping USCG classifications to determine compliance with federal law in these remote areas is a disservice to the citizens put at risk by these pipelines.

Comparison of Regulatory Requirements

Comparison of PHMSA's FRP regulations to those promulgated by the EPA and USCG shows that PHMSA has taken a radically different regulatory approach. PHMSA's regulations contain no meaningful standards for determination of whether a pipeline operator's commitments of resources are adequate. Instead, PHMSA allows pipeline operators to invent their own standards or voluntarily use selected parts of USCG standards, and then evaluates the pipeline FRP resource commitments without reference to detailed standards. This approach creates the risk of misapplication of USCG spill response and OSRO classifications to inland pipeline facilities. It also creates a risk that PHMSA staff evaluations of FRPs will become, in essence, negotiations with pipeline companies that result in inadequate commitments of resources. Also, the lack of clear standards makes enforcement of PHMSA spill response requirements problematic. Finally, unlike the EPA and USCG, PHMSA does not require any standard format for its FRPs, creating a risk that the content and quality of its FRPs will vary excessively. In comparison to the EPA and USCG regulations, PHMSA's regulations are seriously deficient and must be revised.

DESCRIPTION OF KEYSTONE PIPELINE SYSTEM FACILITY RESPONSE PLAN

It appears that TransCanada first submitted a FRP for the Keystone Pipeline System to PHMSA in late 2008 ("Keystone FRP"). The Keystone FRP includes the certification allowed by law, which permits operations for up to two years pending approval of a plan.[33] This certification was executed by Robert Jones, Vice President, Keystone Pipeline Project, on October 14, 2008.

It also appears that TransCanada revised the FRP in January 2009 and September 2009. The January 2009 revision includes only the 30-inch diameter portion of the pipeline from the U.S.-Canada border to terminals in Wood River and Patoka, IL. The September 2009 revision adds the 36-inch diameter Cushing Extension from Steele City, NE, to Cushing, OK. It is likely that TransCanada has already submitted a draft plan that also covers the Keystone XL Pipeline, but so far this document has not been made publicly available. Unless otherwise noted, this report refers to the September 2009 Keystone FRP revision.

The Keystone FRP includes the core plan itself, Appendices A through I, a regulatory cross reference, and a glossary of terms and acronyms. It does not appear to contain a table of contents. Relevant parts of these documents are discussed below.

Contents of Keystone Facility Response Core Plan

A majority of the information in the Keystone FRP core plan is not project-specific, but rather is generic response planning material that could be applied to any pipeline system spill, or even any onshore oil spill. The plan does, however, designate three response zones in the U.S., including:

- the North Dakota-South Dakota-Nebraska Response Zone (from the U.S.-Canada border to Steele City, NE, approximately 630 miles);
- the Kansas-Missouri-Illinois Response Zone (from Steele City, NE, to Wood River, IL, approximately 450 miles); and
- the Cushing Extension Segment (from Steele City, NE, to Cushing, OK, approximately 300 miles).

The total length of pipeline subject to the Keystone FRP is approximately 1,352 miles. It does not appear that the Keystone FRP identifies the length of each Response Zone; however, the approximate lengths of the Zones are provided in the bullet points, above. It does not appear that TransCanada provides any spill-planning rationale for the length or beginning and ending points for the Response Zones even though PHMSA regulations require that Response Zones be defined based on "available capability, resources, and geographic characteristics."[34] For example, it would be reasonable to determine zone length based on appropriate spacing of response equipment, given travel times and the potential for severe winter weather. Instead, it appears that TransCanada chose to separate the response zones at the Steele City junction because this point is the beginning and ending point for segments of its pipeline, the lengths of which have nothing to do with spill response needs. As a result, TransCanada provides the same amount of self-owned equipment, as discussed below, for the 630 mile Northern Response Zone as it does for the 300 mile Cushing Zone, even though the Cushing Response Zone is in closer proximity to a greater amount of response equipment in the Kansas City and Wichita metropolitan areas. This also means that the northern

[33] 33 U.S.C. § 1321(j)(5)(G).
[34] 49 C.F.R. § 194.5 (definition of "response zone").

end of this response zone is over eight hours drive time from the equipment location in Yankton, SD. TransCanada's response zone definitions appear to have no relationship to spill response needs, such that the response zones must be redefined.

The FRP core plan does not contain a list of equipment available to respond to a spill from the Keystone Pipeline System, but it does contain a list of U.S. companies that are "additional response resources," including National Response Corporation ("NRC") of Great River, NY, ENSR of Fort Collins, CO, and O'Brien's Response Management of Spring, TX. The core plan does not otherwise describe the capabilities of these companies, except to note that NRC is the "Spill Response Contractor." It appears that O'Brien's Response Management does not itself own or contract equipment, but rather it provides management services, including public relations services, in the event of a spill. As discussed below, NRC does own and contract for spill response equipment, but its capacity in the northern Great Plains is limited.

Keystone Pipeline Worst Case Discharge Analysis

Appendix B contains TransCanada's worst case discharge mathematical calculations, but it includes almost no discussion of potential worst case spills. The company states that it will respond to spills "in a consistent manner regardless of the location," such that "the guidelines discussed in this appendix will apply to all spills wherever possible." It also states that worst case discharge may be caused by:

- Piping rupture;
- Piping leak, under pressure and not under pressure;
- Explosion or fire;
- Equipment failure (*e.g.,* pumping system failure, relief valve failure, or other general equipment relevant to operational activities associated with internal or external facility transfers).

However, Appendix B does not describe how these factors can combine in a worst case discharge scenario, does not consider operator failure, and provides no description of worst case discharge site and possible conditions that might impact response to worst case discharges. Instead, it refers to Core Plan Section 3.1 and Figure 3.1, which contain generic descriptions of response methodology to the foregoing bullet list of causes with minimal discussion of site or project-specific information. It also refers readers to Core Plan Figures 2.2 and 2.5 for response personnel contact information.

Next, for each response zone, Appendix B identifies the worst case location and calculates (1) the worst case discharge and (2) "planning volumes." The calculation methodology for each is described below.

Keystone Worst Case Discharge Calculation Methodology

The worst case discharge calculation methodology is identical for each response zone, such that the descriptions of the methodologies are also identical (except that, perhaps as a typographical error, the worst case discharge methodology description for the Cushing Response Zone does not include the full explanation even though the calculations are identical). TransCanada's complete description of its calculation methodology is as follows:

> The Worst Case Discharge for this response zone was calculated electronically using elevation data, pipeline statistics, and designed

> operational levels. The first calculation completed was the volume released prior to the shutdown of the pipeline system. This volume is noted as "Pumping Rate Volume" and is equal to 8,740 barrels. Using the designed operational levels, the pumping rate volume is calculated by taking the pumping rate of 662,400 barrels per day and multiplying by the shutdown time of 19 minutes. The 19 minutes of shutdown time consists of 10 minutes of evaluation time, where the controllers decide that there is a problem and the line needs to be shut down, 9 minutes of pump station shutdown, which must be completed in a certain order to prevent damage to the system. To ensure that the volume is not underestimated, the 19 minutes of shutdown time is multiplied by the full pumping rate, 460 barrels per minute, even though, as pump stations are shut down the rate will decrease throughout the 9 minutes of shutdown.
>
> The second calculated number is the amount of drain down. These calculations were done at 100 foot increments throughout the length of the pipeline. This drain down volume is calculated using electronic elevation data and assumes a complete break in the pipeline. The computer program used develops elevation profiles of the pipeline and provides the volume of a release at each 100 foot point taking into account the large elevation changes in the pipeline. The combination of the pumping rate volume and the drain down volume provides the "Initial Line Fill Volume".
>
> In the Initial Line Fill Volume calculation the program only accounts for large elevation changes. In such, long flat portions that have smaller hills and valleys are calculated as draining fully, when common sense and subject matter studies, such as the California State Fire Marshall report of March 1993, have proven that these smaller elevation changes will prevent much of these areas from draining. Therefore, the worst case discharge has been calculated above reducing the line drainage component to 60% of the computer generated amount.

Thus the factors used in the calculation include:

Pumping Rate Volume = Pumping Rate X Time to Pump Shutdown X Pumping Rate

Drain Down Volume = Produced by a computer model of the pipeline

Initial Line Fill Volume = Pumping Rate Volume + Drain Down Volume

Drain Down Adjustment Factor = 0.60

Stated most simply, TransCanada's worst case discharge formula is:

Worst Case Discharge = ((Discovery Time + Pump Shut Down Time) x Pumping Rate) + (Drain Down Volume x 0.60)

Because TransCanada does not state the Drain Down Volume directly, the worst case discharge calculation provided by TransCanada is a more complicated version of the foregoing formula, though it has the same result. TransCanada calculates the worst case discharge using the following methodology (numbers are from the Northern Response Zone):

Worst Case = (Initial Line Fill Volume - Pumping Rate Volume) x 0.60 = barrels (bbls)
= (39722.00 - 8740.00) x 0.60 = 18589.2 bbls
= Adjusted Line Volume + Pumping Rate Volume
= 18589.2 + 8740.00 = 27,329 bbls

The Pumping Rate Volume is the same for all worst case discharge calculations, specifically, 10 minutes to discover and decide to shut off the pumps after a full rupture, and 9 minutes to shut down the pumps and close valves, for a total of 19 minutes of time during which pumps are operating to some degree. 19 minutes is then multiplied by 460 barrels per minute, for a total Pumping Rate Volume of 8,740. This figure is the same for all Response Zones.

TransCanada does not directly provide the Drain Down Volume for each Response Zone but rather expresses the Drain Down Volumes as the difference between the Initial Line Fill Volume and the Pumping rate volume. For the Northern Response Zone, the worst case discharge Drain Down Volume is 30,982 bbls. Multiplying this figure by 0.60 equals 18,589.2, which is included in TransCanada's calculation. Using this methodology, TransCanada provides the Pumping Rate, Drain Down and worst case discharge volumes for each response zone, as shown together with Enbridge estimates, below.

TransCanada's pumping rate volume is not appropriate because it does not estimate the "maximum shutdown response time" as required by 49 C.F.R. § 194.105 (emphasis added). Instead, the 10 minute evaluation time and 9 minute shutdown are approximately the fastest that TransCanada can shut down the pipeline in the event of a rupture. It is hard to see how TransCanada could, from its remote control center in Canada, interpret warnings, evaluate these warnings, and decide to shut down the pipeline in much less than 10 minutes. In sharp contrast to TransCanada's rosy scenario, Enbridge unfortunately demonstrated through its 6B Pipeline spill that operator misunderstanding of system warnings can lead to operation for much longer times than expected, in that case for what appears to be almost two hours.

Therefore, TransCanada's pumping rate volume is not the "maximum" shutdown time, but instead it is closer to the minimum shutdown time or perhaps an expected shutdown time, assuming no operator error or equipment malfunctions. A realistic worst case scenario must assume some operator error or equipment failure that extends the pumping time for longer than the planned time. By failing to consider operator error and system malfunctions, TransCanada underestimates the pumping rate volume, and therefore also underestimates the worst case discharge. Therefore, TransCanada should revise this calculation.

TransCanada and other pipeline companies might argue that assigning a longer time for shutdown would be arbitrary and would not be needed because pipelines do not operate at maximum capacity all the time. Regardless, federal law requires an estimate of the "worst" case and the "maximum" shutdown response time.[35] PHMSA regulations also state that if a pipeline has no history of worst case spills, the operators are responsible for estimating the worst case discharge.[36]

It is entirely possible for PHMSA to: (1) review its extensive archive of pipeline spill information, as well as National Transportation Safety Board (NTSB) reports analyzing causes of spills;

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[35] 49 C.F.R. § 194.105(b).
[36] 49 C.F.R. § 194.105(b)(1).

(2) determine a range of actual shutdown times; and (3) calculate a shutdown response time that is a reasonable approximation of the "maximum" shutdown time expected based on actual data. In any case, it is not appropriate for pipeline operators to estimate worst case discharge volumes based on "expected case" shutdown times, because doing so is counter to the clear language of federal law and results in underestimations of worst case spills.

TransCanada's Worst Case Discharge Locations and Volumes

The following table summarizes TransCanada's worst case discharge volume calculations for each response zone, and also provides the size of the pipe and approximate location of a worst case discharge. For comparison purposes, it also provides worst case discharge information for Enbridge's 6B Pipeline and its new 36-inch diameter Alberta Clipper (Line 67) pipeline.

Response Zone	WCD Location Nearest City and River	Size Dia. (in)	Shut Down Time (min)	Pumping Rate (min)	Pumping Rate Volume	Drain Down Volume	WCD
Keystone Pipeline							
Northern	Yankton, SD Missouri River	30	19	460	8,740	18,589	27,329
Southern	St. Peters, MO Mississippi River	30	19	460	8,740	15,329	24,069
Cushing	Ponca City, OK Arkansas River	36	19	460	8,740	23,525	32,265
Select Enbridge Pipelines							
6B FRP Chicago Zone	Not Available	30	8	209	1,672	24,784	26,456
Alberta Clipper (Line 67) Superior Zone	Not Available	36	8	312	2,496	37,992	40,488

As an initial observation, all of TransCanada's worst case discharge volumes are substantially larger than the actual volume of the 6B Pipeline spill of 19,500 bbl. Surprisingly, TransCanada's worst case discharge volumes are approximately the same as the 26,456 bbl worst case discharge estimate provided in Enbridge's 6B Pipeline FRP, even though:

- Enbridge rated the daily capacity of the 6B Pipeline at 300,653 bbl/day[37] (209 bbl/minute) in its FRP, which is less than half the maximum pumping rate for the Keystone Pipeline of 662,400 bbl/day (460 bbls/minute);
- Enbridge assumes shutdown in only 8 minutes whereas TransCanada estimates 19 minutes; and
- The 6B Pipeline diameter is 30 inches, the same as the Keystone Pipeline, meaning that given similar topography, the drain down volumes should be similar.

Similarly, Enbridge's estimate for its recently completed 36" Alberta Clipper (Line 67) Pipeline is substantially larger than the TransCanada's estimate for the Cushing Extension Pipeline, even though

[37] The House Committee Report stated that the rated capacity of the 6B pipeline was 190,000 bbl/day at the time of the spill. It may be that the Enbridge 6B Pipeline was down rated, but the FRP was not updated.

these pipelines are the same diameter and the Alberta Clipper pumping rate is approximately two-thirds as great.

The discrepancies in magnitude may be attributed to topographical factors, but they may also be based on significant differences in methodologies for estimating drain down volumes. As neither company has described in detail their methodologies or the computer programs, it is not possible to determine whether TransCanada has underestimated its worst case discharges. Given PHMSA's lack of detailed regulations for estimating worst case discharges from pipelines, it is entirely possible that worst case discharge estimates could differ significantly between pipelines merely because of the use of non-uniform methodologies. As such, PHMSA should provide more detailed guidance on the calculation of worst case discharges and require full disclosure of methodologies.

For example, TransCanada's smaller drain down volumes may be based on its use of the 0.60 adjustment factor. This factor means that TransCanada expects that 40% of the oil in the pipeline will be caught in low points in the pipeline. It does not appear that Enbridge used this factor.[38] TransCanada does not provide any detailed support for use of this factor. Instead, it justifies its use by noting that its computer program (name not disclosed) that calculates drain down volumes takes into account only large elevation changes in the pipeline and does not take into account small ones. To compensate for this lack of computer program sophistication, TransCanada turns to "common sense" and a 1993 California State Fire Marshall report as justification that its worst case discharge volumes should be uniformly reduced by 40%. Given the sophistication of computer modeling for pipelines and the availability of very precise topographical data, and it should be possible for PHMSA to require more accurate estimates, taking into account topography, siphon effects, and other relevant factors.

Moreover, TransCanada does not say whether or not its drain down volume estimates assume a failure of equipment, such as a rupture at a valve where the valve is either destroyed or fails in an open position, or is left open due to operator error. TransCanada should estimate drain down volumes based on valve failures, as well.

TransCanada's Calculations Used to Determine Necessary Equipment Capacity

After estimating the worst case discharge volume, TransCanada provides a "Response Planning Volume Calculations" worksheet for each response zone. The worksheets are identical, but the information in them varies by response zone. It appears that TransCanada used USCG Appendix C requirements as voluntary guidance in its preparation of the Response Planning Volume Calculations. This being said, since PHMSA has no binding standards for estimating equipment requirements, the following calculations are TransCanada's estimates and are rational only to the degree that use of the USCG equipment requirement methodologies make sense for inland pipelines.

USCG Equipment Capacity Calculation Methodology

Although the USCG methodology used by TransCanada is not complex, neither is it clear. The following discusses how these calculations work and identifies a number of reasons why TransCanada's

[38] In the 6B FRP, Enbridge states that it uses American Innovation's Integrity Assessment Program (IAP) software to estimate the worst case discharge; however, it provides only the following statement describing its methodology for determining its "maximum stabilization loss" (equivalent to the maximum drain down volume): "The maximum stabilization loss is a worst case calculation of the amount of oil that will escape to ground after isolation has occurred. The calculation takes into consideration the outer diameter and wall thickness of the pipe, the pipeline elevation profile, and the location of remote-controlled valves."

rote use of the USCG methodology is inappropriate, and also identifies some departures by TransCanada from USCG standards.

The general USCG methodology for calculating required equipment is similar to EPA's methodology, which is described above. The point of this methodology is to match the capacity of cleanup equipment (expressed in barrels per day) with the amount of oil that will likely need to be cleaned up after some of the oil dissipates and the remaining oil emulsifies (mixes with water) and then spreads both over the water and onto shorelines. The steps required by the USCG are described below.

Step 1: Calculate a worst case discharge.

Step 2: Identify a particular "Operating Area," which are the environments into which oil may be spilled. The USCG identifies the following types of operating areas: "offshore," "near shore," "Great Lakes," "inland," and "rivers and canals." Different operating areas require different equipment types and amounts. TransCanada refers to this factor as "Location Type."

Step 3: Determine whether the facility is in a "High Volume Port Area." If it is, then this affects the speed of response, because "High Volume Port Areas" require faster response. This factor is not applicable to inland areas outside of USCG facility oversight. Moreover, PHMSA regulations define the term "High Volume Area," which relates to river size and use, and it is this factor that requires faster deployment of equipment to certain locations on pipelines.

Step 4: Identify the "Product Type," here crude oil.

Step 5: Identify an "Oil Group" for removal capacity planning. This is used to determine the percentages of oil that will naturally dissipate, require on-water removal, or require removal from shorelines. TransCanada selected Oil Group 3, Medium Crudes and Fuels.

Step 6: Identify an "Emulsification Factor" based on the definition of "persistent oil" and the specific gravity of oil. Although this step also requires selection of an "Oil Group," this is a different group then used in the preceding step. Emulsification is important because it increases recovery volumes. TransCanada selected Oil Group III because the oils it transports will have specific gravities between 0.89 and 0.95, which results in an emulsification factor of 2.

Step 7: Adjust the worst case discharge volume by multiplying it by the emulsification factor and then separately for each (dissipation, on water, and on shore) removal capacity factor to determine the amount of oil lost to natural dissipation, the amount that will require on-water removal, and the amount that will need to be cleaned up from shorelines.

Step 8: Identify the "Resource Mobilization Factor" based on Operating Area and for each "Tier" of response times. This determines how fast and how much equipment must be on-scene within certain times.

Step 9: For each tier of time, calculate the equipment cleanup capacity in barrels per day that must be on-scene within the specified timeframe.

Step 10: Determine if the required equipment capacity exceeds a USCG cap, which puts a ceiling on the amount of equipment required.

Again, this process is not necessarily clear, but it is logically related to the USCG's objectives.

INCORRECT ASSUMPTIONS FOR OPERATING AREAS (LOCATION TYPE) AND OIL GROUPS

TransCanada's assumptions for each response zone are provided below.

	Northern Response Zone	**Southern Response Zone**	**Cushing Extension Response Zone**
Location and Oil Types			
Location Type	Inland/ Near Shore	Inland/ Near Shore	Inland/ Near Shore
Port Type	Non-High Volume	High Volume	High Volume
worst case discharge Product Type	Crude Oil	Crude Oil	Crude Oil
Product Group	3	3	3
Emulsification Factor	2	2	2

TransCanada's "Location Type" is equivalent to the USCG "Operating Area" definition that describes different types of operating areas, including "River/Canal," "Inland," "Open Ocean," "Offshore," "Near Shore," "Great Lakes." Since the USCG does not regulate onshore pipelines, the onshore facilities it regulates are in single locations, such that a single operating area can be assigned to these facilities. The same is not true for long interstate pipelines.

Given that the Northern and Southern Response Zone worst case discharge locations are immediately adjacent to very large rivers, it is not clear why TransCanada has chosen to designate these response zones as "Inland/Near Shore." This may be because TransCanada is attempting to use USCG methodology for a purpose for which it was not intended, specifically, to assign a single operating area for a pipeline hundreds of miles long.

Designation of a single location type is appropriate for a facility such as an oil refinery, but long interstate pipelines may impact all types of operating areas, including marine and Great Lakes environments. If FRPs assume only releases into a single type of environment, FRP equipment amounts and types might not be appropriate for significant portions of pipelines. For example, designation of the Keystone Pipeline as an "inland/near shore" location means that TransCanada's planning would not account for possible releases into major rivers. PHMSA should provide regulations that take into account the diversity of possible operating areas and ensure that FRPs take into consideration and plan for spills in each of these areas.

The designation of "Inland/Near Shore" for the Southern and Cushing Response Zones is particularly odd given that they are also designated as "High Volume Port Areas," which include only major seaports, such as New York and San Francisco. Although St. Louis is a COPT City, it is not a designated USCG "High Volume Port Area," and neither is Ponca City, OK.

It appears that TransCanada has confused the PHMSA term “High Volume Area” with the USCG term “High Volume Port Area.” PHMSA regulations define the terms “High Volume Area” and “Major River” to be areas where spill response equipment must arrive six hours sooner than other areas,[39] due largely to the speed with which oil can move in a very large river and the risk to downstream locations. The USCG defines individual “High Volume Port Areas” in accordance with its regulations.

TransCanada assigns the Northern Response Zone as a “Non-High Volume,” even though the worst case discharge for this zone is near the Keystone Pipeline’s crossing of the Missouri River at Yankton, SD. In contrast, it assigns a “High Volume” classification to the Cushing Extension Response Zone, even though the worst case discharge for this zone appears to be approximately 12 miles as the crow flies from the Arkansas River, which is much smaller than the Missouri River at Yankton. The assignment of “Non-High Volume” is also odd, give that the rivers crossed by the Keystone Pipeline in the Cushing Response Zone are all smaller than its crossing of the Missouri River at Yankton. Further, the largest rivers crossed in the Cushing Response Zone are also approximately the same size as the Platte River crossing in Nebraska.

The following table shows the volumes of the major rivers crossed by the Keystone and Keystone XL Pipelines in comparison to examples of rivers that are specifically considered High Volume Areas in the federal regulations.”[40]

River and Location	**USGS 2009 Average Annual Flow (cfs)**	**Pipeline Crossing or App. B List**
Missouri River at Yankton, SD	18,447 [41]	Keystone
Potomac River near Reston, VA	11,871[42]	On App B List
Yellowstone River at Miles City, MT	11,180[43]	Keystone XL
Missouri River below the Fort Peck Dam, MT	9,225[44]	Keystone XL
Arkansas River near Ralston, OK (Ponca City)	8,910[45]	Keystone
Maumee River near Defiance, OH	4,530[46]	On App B List
Platte River near Duncan, NE	1,758[47]	Keystone
Smokey Hill River near Abilene, KS	1,540[48]	On App B List
Platte River near Grand Island, NE	1,537[49]	Keystone XL

[39] 49 U.S.C. §§ 194.5, 194.115(b).
[40] 49 C.F.R. Part 194, Appendix B.
[41] USGS Water Data Report 2009, Missouri River at Yankton, SD.
[42] USCG Water Data Report 2009, Potomac River Near Washington, DC (closest downstream gauge to Reston, VA).
[43] USGS Water Data Report 2009, Yellowstone River near Miles City, MT (closest upstream gauge to crossing near Marsh, Montana).
[44] USGS Water Data Report 2009, Missouri River below the Fort Peck Dam, MT.
[45] USGS Water Data Report 2009, Arkansas River at Ralston, OK (closest USGS gauge downriver from the Cushing Response Zone worst case discharge location).
[46] USGS Water Data Report 2009, Maumee River near Defiance, OH.
[47] USGS Water Data Report 2009, Platte River near Duncan, NE (closest USGS upriver of crossing near Richland, NE).
[48] USGS Water Data Report 2009, Smokey Hill River at Enterprise, KS (closest USGS river gauge).
[49] USGS Water Data Report 2009, Platte River Near Grand Island, NE (closest USGS gauge to crossing near Archer, NE).

River and Location	USGS 2009 Average Annual Flow (cfs)	Pipeline Crossing or App. B List
Brazos River near Glen Rose, TX	1,231[50]	On App. B List
Niobrara River near Sparks, NE	767[51]	Keystone XL
Cheyenne River near Plainview, SD	741[52]	Keystone XL
Red River of the North at Wahpeton, ND	688[53]	On App B List

That the Missouri River at Yankton is a 'Major River" and a "High Volume Area" cannot be in doubt, especially when compared to the average annual volume of the Arkansas River and other "high volume areas" specifically listed in PHMSA Appendix B.

The Missouri River, even as far north as Yankton, is still substantially larger than many of the rivers in Appendix B. Moreover, the Keystone Pipeline crossing is approximately 30 miles upriver from Sioux City, Iowa, the head of commercial navigation on the Missouri River. Given that its current is typically between three and five miles per hours, but may be significantly faster, a spill near Yankton could impact commercial vessel traffic – and water intakes – in Sioux City in approximately six hours. Further, the area between Yankton and Sioux City is almost entirely designated as a National Park Unit and as a Wild and Scenic River, is critical habitat for a number of endangered species, and is a popular fishing and recreational boating destination, with the result that it has significant vessel traffic.

Based on the examples in PHMSA Appendix B, the Keystone Pipeline's crossing of the Platte and Niobrara Rivers, and the proposed crossings by the Keystone XL of the Missouri River at the Fort Peck Dam, MT, the Yellowstone River at Miles City, MT, and the Cheyenne River near Plainview, SD, are also "High Volume Areas." Therefore, TransCanada must assign a "High Volume Area" designation to all of these crossings, and the initial equipment response times for these crossings should be 6 hours, not 12 hours, and subsequent responses accelerated, as well.

TransCanada's "Product Group" appears to be based on the USCG "Oil Group" designation used in Table 2 of USCG Appendix C:

Oil Group	
1	Non-persistent oils
2	Light crudes
3	Medium crudes and fuels
4	Heavy crudes and fuels

This designation is important because it is used to determine the expected recovery factors, which in turn are used to calculate the planning volumes later in the worksheets that in turn are used in combination with the operating area to estimate of the amounts and types of equipment likely to be needed.

TransCanada selects Oil Group 3, which results in use of the recovery factors in bold below:

[50] USGS Water Data Report 2009, Brazos River near Glen Rose, TX.
[51] USGS Water Data Report 2009, Niobrara River near Sparks, NE.
[52] USGS Water Data Report 2009, Cheyenne River near Plainview, SD.
[53] USGS Water Data Report 2009, Red River of the North at Wahpeton, ND.

Spill location	**USCG Appendix C Table 2** **Near Shore/Inland Great Lakes**		
Sustainability of on-water oil recovery	4 Days		
Oil group	% Natural dissipation	% Recovered floating oil	% Oil on shore
1 Non-persistent oils	80	20	10
2 Light crudes	50	50	30
3 Medium crudes and fuels	**30**	**50**	**50**
4 Heavy crudes and fuels	10	50	70

Where more than one type of oil is handled by a facility, USCG regulations require calculation of the maximum on shore and on water response volumes for each type of oil and then using the maximum values to determine equipment requirements.[54] These regulations are not entirely clear because of the use of two different types of "Oil Groups," one used for determining mobilization factors and one used to determine the emulsification factor. What is clear is that the USCG regulations require using the maximum figures generated, because this is required by the statutory requirement to estimate the "worst case" discharge and to provide for containment and cleanup to the "maximum extent practicable.[55]

Since use of both Oil Groups 3 and 4 results in a 50% on-water recovery factor, but use of Oil Group 4 results in an on shore recovery factor of 70%, which is more than the Oil Group 3 on shore factor of 50%, TransCanada should have selected Oil Group 4 for both on water and on shore recovery estimates. In a practical sense, it is likely that the Keystone Pipeline will ship almost exclusively heavy oil. Therefore the use of the "medium crude and fuels" classification is not appropriate for planning purposes, even if the pipeline occasionally ships lighter grades of crude oil. By designating Oil Group 3 instead of Oil Group 4, subsequent calculations by TransCanada underestimate the percentage of oil on shore and over estimate how much oil will be lost to natural dissipation.

TransCanada also appears to use Table 3 from USCG Appendix C to determine the emulsification factor. Here, the "Oil Group" is defined in the definition of "persistent oil"[56]:

> Persistent oil means a petroleum-based oil that does not meet the distillation criteria for a non-persistent oil. For the purposes of this subpart, persistent oils are further classified based on specific gravity as follows:
> (1) Group II -- specific gravity of less than.85.
> (2) Group III -- specific gravity equal to or greater than .85 and less than .95.
> (3) Group IV -- specific gravity equal to or greater than .95 and less than or equal to 1.0.
> (4) Group V -- specific gravity greater than 1.0.

Although the enumeration here is similar to that used in Table 2, the purpose of the designations are different such that Table 2, Group 3 is not analogous to § 154.1020 Group III. From the Material Data Safety Sheets in the Keystone FRP Appendix G, it appears that the Keystone Pipeline System will

[54] 33 C.F.R. Part 154 Appendix C, Section 7.2.2 and 7.3.2.
[55] 33 U.S.C. § 1321(j)(5)(D).
[56] 33 C.F.R. § 154.1020.

transport crude oil with specific gravity of approximately 0.91 to 0.94. Accordingly, TransCanada appropriately selects Group III and then an emulsification factor of 2, as shown below.

EMULSIFICATION FACTORS FOR PETROLEUM OIL GROUPS	
Non-Persistent Oil:	
Group I	1.0
Persistent Oil:	
Group II	1.8
Group III	2.0
Group IV	1.4

By designating the entire pipeline as being in an inland/near shore area, TransCanada's calculations of required response equipment will not take into account the fact that oil spill response for the rivers/canals operating area differs substantially from response efforts in other inland areas. Further, by failing to designate the Missouri River at Yankton and other major river crossings as a PHMSA "High Volume Areas," TransCanada allows response resources to arrive in twelve hours, rather than six. As explained below, these assumptions significantly impact the quantity, type, and arrival time of needed spill response equipment.

INCORRECT EQUIPMENT CAPACITY CALCULATIONS

The following table summarizes the adjustment factors and volumes calculated by TransCanada.

	Northern Response Zone	Southern Response Zone	Cushing Extension Response Zone
Discharge Volumes/Calculations			
Worst Case Discharge - Based on PHMSA criteria (bbls)	27,329	24,069	32,265
Removal Capacity Factors			
Removal Capacity Planning Vol. - % Natural Dissipation	30%	30%	30%
Removal Capacity Planning Vol. - % Recovered Floating	50%	50%	50%
Removal Capacity Planning Vol. - % Oil Onshore	50%	50%	50%
Mobilization Factors			
Tier 1- On Water Oil Recovery Resource Mob. Factor	0.15	0.15	0.15
Tier 2 - On Water Oil Recovery Resource Mob. Factor	0.25	0.25	0.25
Tier 3 - On Water Oil Recovery Resource Mob. Factor	0.40	0.40	0.40
Response Planning Volumes			
On-Water Recovery Volume (bbls)	13,665	12,035	16,132
Shoreline Recovery Volume (bbls)	13,665	12,035	16,132
Shoreline Cleanup Volume (bbls)	27,330	24,070	32,264
Tier 1 Response Equipment On-Scene Time and Capacities			
Response Time (hrs)	12	6	6
On-Water Recovery Capacity (bbls/day)	4,099	3,610	4,840

Shallow Water Recovery Capacity (bbls/day)	820	722	968
Storage Capacity (bbls/day)	8,198	7,220	9,680
On-Water Cap on Equipment (bbls/day)	12,500	12,500	12,500
On-Water Equipment Above Cap (bbl/day)	0	0	0
Tier 2 Response Equipment On-Scene Time and Capacities			
Response Time (hrs)	36	30	30
On-Water Recovery Capacity (bbls/day)	6,832	6,017	8,066
Shallow Water Recovery Capacity (bbls/day)	1,366	1,203	1,613
Storage Capacity (bbls/day)	13,664	12,034	16,132
On-Water Cap on Equipment (bbls/day)	25,000	25,000	25,000
On-Water Equipment Above Cap (bbl/day)	0	0	0
Tier 3 Response Equipment On-Scene Time and Capacities			
Response Time (hrs)	60	54	54
On-Water Recovery Capacity (bbls/day)	10,932	9,628	12,906
Shallow Water Recovery Capacity (bbls/day)	2,186	1,926	2,581
Storage Capacity (bbls/day)	21,864	19,256	25,812
On-Water Cap on Equipment (bbls/day)	50,000	50,000	50,000
On-Water Equipment Above Cap (bbl/day)	0	0	0

As described below, TransCanada appears to make errors in its application of USCG methodology, and its assumptions significantly reduce some of the required equipment calculations.

After selecting its removal capacity and mobilization factors for inland/near shore areas, TransCanada calculates its on-water recovery volumes. These figures are half of their respective worst case discharges, because it appears that TransCanada multiplied the worst case discharge volume by the 50% recovery factors in Table 2, but then failed to multiply the resulting numbers by the emulsification factor of 2,[57] with the result that the on-water recovery volumes are half of USCG requirements.

However, without explaining why, TransCanada corrects this error amount when it calculates its "Shoreline Cleanup Volume," but does not do so for the On-Water Recovery Volume, which remains at half the worst case discharge. When referring to the capacity of equipment needed to collect oil floating on water, the USCG uses the term "on water recovery capacity." When referring to the capacity of equipment to remove oil from shorelines, the USCG uses the term "shoreline cleanup capacity." Calculation of both of these amounts requires adjustment by both the removal capacity (50%) and emulsification factors (2).[58] Ultimately, TransCanada corrects this error in the mobilization analysis.

However, by selecting Oil Group 3 rather than Oil Group 4, TransCanada injects a systemic error into subsequent calculations. Assuming Oil Group 4, for inland areas the on shore recovery factor is 70%, making the Shoreline Cleanup Volume equal to the worst case discharge x 2 x 70%. For the Northern Response Zone this equals 38,261 bbl, instead of the 27, 229 bbl estimated by TransCanada, an increase of 40% over TransCanada's calculation.

[57] Required by USCG Appendix C, Sections 7.2.2 and 7.3.2, respectively.

[58] Id. Although the instructions in Sections 7.2.2 and 7.3.2 are not entirely clear about the use of both recovery factors and emulsification factors for on shore and on water calculations, the example provided by the regulations at Section 7.3.4 makes this requirement clear.

Moreover, as previously discussed, application of a single location factor to a very long interstate pipeline is a misapplication of USCG methodology such that TransCanada should also have calculated response volumes for spills into rivers and used Product Group 4 (heavy oils) instead of Product Group 3 (medium crude oils) for these calculations. This change in assumptions has significant implications for TransCanada's recovery capacity. The USCG Appendix C, Table 2 "Rivers and Canals" recovery factors are as follows:

Spill location	**USCG Appendix C Table 2 Rivers and Canals**		
Sustainability of on-water oil recovery		3 Days	
Oil group	% Natural dissipation	% Recovered floating oil	% Oil on shore
1 Non-persistent oils	80	10	10
2 Light crudes	40	15	45
3 Medium crudes and fuels	20	15	65
4 Heavy crudes and fuels	5	20	75

The calculation for Rivers and Canals for cleanup of on-shore heavy crude oil is the worst case discharge x 2 x 75%. For the Northern Response Zone, this would produce a Shoreline Cleanup capacity of 40,994, instead of the 27,329 bbls that TransCanada estimated for inland areas, a figure that is 50% higher than TransCanada's Shoreline Cleanup Volume. This correction also applies to the other response zone calculations.

In contrast, the Rivers and Canals on-water recovery would be the worst case discharge x 2 x 20%, which for the Northern Response Zone equals 10,931 bbls, instead of the 13,665 bbls estimated by TransCanada, a figure 20% lower than estimated by TransCanada. This reflects the fact that a spill into a river would require more shoreline cleanup capacity and less on-water capacity than would a spill into a lake. Put another way, a spill into a river would require relatively more vacuum trucks and hand equipment to remove oil from shore lines and relatively fewer skimmers to remove oil floating on the water. This result seems to be supported by the large number of vacuum trucks used by Enbridge in its Response to the 6B Pipeline spill.

The foregoing comparison of the inland/near shore and rivers operating area assumptions shows how pipelines may require significantly different types of response equipment depending on the exact the location of a rupture. It is of critical importance that FRPs use appropriate assumptions, otherwise pipeline companies might commit to insufficient amounts and/or inappropriate types of spill response equipment.

An analysis appropriate for long interstate pipelines should require estimation of response needs for all types of operating areas traversed by a pipeline in a response zone and provide for the greatest amount of each type of equipment calculated for any type of location. Response to pipeline spills requires greater diversity of equipment and greater flexibility in response than response for non-pipeline facilities. PHMSA's regulations must take this simple truth into account.

TransCanada next applies the inland/near shore mobilization factors (in bold) from Table 4 of USCG Appendix C to determine the amount of on-water equipment needed within the Tier 1-3 timeframes.

USCG Appendix C Table 4			
ON WATER OIL RECOVERY RESOURCE MOBILIZATION FACTORS			
Operating Area	**Tier 1**	**Tier 2**	**Tier 3**
Rivers and Canals	0.30	0.40	0.60
Inland/Nearshore/Great Lakes	**0.15**	**0.25**	**0.40**
Offshore	0.10	0.165	0.21

Next, TransCanada uses the tier times from the PHMSA regulations[59] (identical to the USCG times[60]) to determine on-scene deadlines.

	Tier 1	Tier 2	Tier 3
High volume area	6 hrs	30 hrs	54 hrs.
All other areas	12 hrs	36 hrs	60 hrs.

Again, assumptions about the operating areas have significant impacts on how fast equipment should arrive at a rupture. The mobilization factors for major rivers that are defined as High Volume Areas are twice as high as that for inland areas. This means that the rate of deployment of equipment is twice as high within the first tier timeframe, which for high volume areas, such as the Missouri River at Yankton, is six hours.[61] This difference is based on the fact that equipment is needed more quickly for spills into major rivers. USCG regulations also require faster deployment during Tiers 2 and 3, as well.

TransCanada also uses the USCG requirement that 20% of all spill response equipment be useable in water less than six feet deep to calculate that it needs 820 bbls per day of shallow water response resources. Given that almost all of the waters in the inland and river areas traversed by the Keystone Pipeline are less than 6 feet deep on average (with exception of the Mississippi and Missouri River crossings), this USCG factor seems entirely inappropriate. Instead all of the equipment provided in all of the Keystone Pipeline Response Zones should be capable of shallow water operation. It appears that TransCanada has mechanically applied a USCG rule that is not rationally related to inland pipeline spill response efforts.

Finally, TransCanada applies the USCG equipment caps (in bold) from Table 5 of USCG Appendix C:

USCG Appendix C Table 5			
RESPONSE CAPABILITY CAPS BY OPERATING AREA			
Operating Area	**Tier 1**	**Tier 2**	**Tier 3**
All Except Rivers & Canals & Great Lakes	**12.5K bbls/day**	**25K bbls/day**	**50K bbls/day/**
Great Lakes	6.25K bbls/day	12.3K bbls/day	25K bbls/day.
Rivers and Canals	1,875 bbls/day	3,750 bbls/day	7,500 bbls/day

These caps limit the obligation of USCG-regulated facilities to pre-arrange for response equipment. TransCanada provides no rationale for why these USCG caps are appropriate for use when major oil pipelines rupture in inland waters and rivers. Regardless, TransCanada's calculated recovery equipment capacities are small enough to be well below USCG caps, so the caps make no difference.

[59] 49 C.F.R. § 194.115(b).
[60] 33 C.F.R. § 154.1045(f).
[61] 49 C.F.R. § 194.115.

Corrected Equipment Capacity Calculations

The following table provides TransCanada's calculation figures as well as corrected calculations for the Northern Response Zone for both inland and river locations. All corrected calculations assume:

- an Oil Group of III for the purposes of determining an emulsification factor, resulting in an emulsification factor of 2;
- an Oil Group of 4 for the purposes of estimating on water and on shore recovery factors; and
- that the Northern Response Zone is a High Volume Area.

The table compares the inland and rivers operating area equipment requirements and selects the larger one as the appropriate equipment capacity.

Northern Response Zone Equipment Capacity Calculation Corrections Assuming Applicability of USCG Appendix C Methodology and Use of PHMSA "High Volume Area" Definition

	Keystone FRP Estimates	Revised Using Group 4 Oil and Inland Operating Area	Revised Using Group 4 Oil and River Operating Area	Greater of Inland v. River
Discharge Volumes/Calculations				
Worst Case Discharge	27,329	27,329	27,329	
Emulsification Factor (Oil Group III)	2	2	2	
Removal Capacity Factors (Oil Group)	3	4	4	
% Natural Dissipation	30%	10%	5%	
% Recovered Floating	50%	50%	20%	
% Oil Onshore	50%	70%	75%	
Mobilization Factors				
Tier 1	0.15	0.15	0.30	
Tier 2	0.25	0.25	0.40	
Tier 3	0.40	0.40	0.60	
Response Planning Volumes/Capacities				
On Water Recovery (bbls)	13,665	27,329	10,932	27,329
Shoreline Cleanup (bbls)	27,330	38,261	40,994	40,994
Tier 1 Response Equipment On-Scene Time and Recovery Capacities				
Response Time (hrs)	12	6	6	6
On-Water (bbls/day)	4,099	4,099	3,280	4,099
Shallow Water 20% Rule (bbls/day)	820	All	All	All
Storage Capacity (bbls/day)	8,198	8,198	6,560	8,198
Tier 2 Response Equipment On-Scene				

Time and Capacities				
Response Time (hrs)	36	30	30	30
On-Water (bbls/day)	6,832	6,832	4,373	6,832
Shallow Water 20% Rule (bbls/day)	1,366	All	All	All
Storage Capacity (bbls/day)	13,664	13,664	8,546	13,664
Tier 3 Response Equipment On-Scene Time and Capacities				
Response Time (hrs)	60	54	54	54
On-Water (bbls/day)	10,932	15,304	6,559	15,304
Shallow Water 20% Rule (bbls/day)	2,186	All	All	All
Storage Capacity (bbls/day)	21,864	21,864	13,118	21,864

As demonstrated by the above table, TransCanada incorrectly selects a slower rate of deployment for on-water capacity and it underestimates needed shoreline cleanup equipment capacity by 50%.

SUMMARY OF KEYSTONE FRP CALCULATIONS FOR EQUIPMENT CAPACITIES

PHMSA's lack of meaningful guidance for calculating required spill response resources means that it is not possible to say that TransCanada has violated any specific standards. However, it is possible to say that TransCanada appears to believe that it is appropriate to apply USCG standards for estimating its equipment commitments. Given this assumption:

(1) the appropriate Oil Group for determination of recovery factors is Group 4 (heavy oils), not Group 3;
(2) the Missouri River at Yankton is a High Volume Area;
(3) "Rivers and Canals" is the appropriate location type for the Missouri River, whereas "Inland" location type is appropriate for most other areas traversed by the Keystone Pipeline and TransCanada must plan for spills into both types of areas, including planning to have necessary equipment on-scene at Keystone 1 High Volume Areas within six hours of notification of a spill; and
(4) TransCanada underestimates its shoreline recovery needs by 50%.

Although these calculations are somewhat difficult to follow, the result is logical. A spill of heavy crude into the Missouri River means that oil would spread very quickly downstream and the heavy crude would tend to collect on the shoreline rather than dissipate, such that TransCanada should be prepared to deploy equipment more quickly to stop the oil from spreading, and it should also plan on providing greater amounts of on equipment used to cleanup shorelines. This being said, TransCanada should also be fully prepared to respond to spills into waters other than rivers, which requires different types of equipment and supplies.

TransCanada's Response Resources for the Keystone Pipeline

Keystone FRP Appendix A (Response Equipment/Resources) identifies and describes TransCanada's commitment to provide needed response resources. Additional details about TransCanada-owned equipment are provided in Appendix F, Miscellaneous Forms, which also contains a Supplemental Emergency Response and Equipment statement.

All descriptions of U.S. spill response resources contained in Appendix A are discussed below. The narrative text in Appendix A that describes spill response equipment (other than generic communication equipment such as cell phones) is as follows:

> The Company owns and operates oil spill response equipment contained within response trailers staged throughout the pipeline system. This equipment is maintained according to manufacture's [sic] recommendations by Company and/or contracted personnel. An equipment summary detailing locations, type and amount stored in the response trailers is listed in Figure A.1. The Company also has contracts in place with Oil Spill Removal Organizations and other clean-up contractors that are capable of responding to all discharges along the Pipeline. Figure A.2 lists the contracted Oil Spill Removal Organizations.
>
> * * *
>
> Additional Company spill response equipment and manpower resources are not available to supplement the response operation; however, third party contractors will be activated on an as needed basis.
>
> * * *
>
> The resources will be secured from a Company approved contractor. Management will typically handle notification/implementation of these resources. Figure A.2 provides a quick reference to the Oil Spill Removal Organizations and details their response capability and estimated response times. Telephone reference is provided in Figure 2.5. (Note: The Company will ensure that each OSRO has a comprehensive maintenance program and applicable training / drills programs in place at contract renewal.)

Thus, the Keystone FRP states that there are threee categories of equipment available: (1) equipment owned by TransCanada; (2) equipment owned by National Response Corporation (NRC); and (3) equipment owned by NRC's subcontractors. These equipment categories are discussed in turn, below.

Equipment Owned by TransCanada

The spill response equipment owned by TransCanada is described in Figure A-1, which is shown in its entirety, below:

FIGURE A.1

COMPANY OWNED SPILL RESPONSE EQUIPMENT

COMPANY OWNED RESPONSE EQUIPMENT	
5 SPILL RESPONSE TRAILERS (ONE PER RESPONSE ZONE)	
Description	Quantity
Response boat 18.5 foot work boat with a 60 HP outboard	1
Jon boat 14 foot Safety boat with a 9.9 hp	1
34 ft Equipment trailer with 6 ft office includes equipment shelving, heat lights, power awning, rear ramp door and 1 side door. Roof rack for storage of the 14' boat and 500ft boom.	1
River Boom 6" x 6'	500 ft
Portable dam 50 ft	1
Diesel /hydraulic Skimming System with diesel power transfer pump and hoses	1
Sorbent pads	5 bales
Sorbent boom	5 bales
500 gallon portable tank	1
2,000 gallon portable tank	1
10,000 gallon portable bladder	1
Winter equipment(e.g. Chain saws, chains, pry bars, ropes,ice,augers)	varies
Bird Hazing Kit	1
20' boom Trailer	1

The reference to "5 spill response trailers (one per response zone)," includes the two Canadian spill response zones. Thus, TransCanada has committed to own and position one 34 foot spill response trailer, one 20 foot boom trailer, one 18.5 foot boat/trailer, and one 14 foot boat (on top of the spill response trailer) in each response zone. TransCanada does not identify the location for or type or owner of the tow vehicles for the response trailers or 18 foot boat, which obviously can't move over land unless towed. Appendix A does not contain the locations, either specifically or approximately, of the spill response trailers or boats, nor does it describe the number or locations of TransCanada personnel trained and available to deploy and use this equipment.

As noted, Appendix F contains a detailed list of equipment contained in each trailer. It indicates that TransCanada acquired four boom trailers, not five, but does not explain this difference in number. It also describes the boats as 20 foot and 14 foot boats. The major specialized spill response equipment in each trailer includes the following:

Spill and Boom Trailer Major Equipment	Quantity
10,000 gallon (238 bbl) "pillow tank"	1
Tank, Canflex, 2000 Gallon (48 bbl) w/ fittings	1
Tank, 500 Gallon (12 bbl) Open Top Tank w/ fittings	1
Fast Water Boom, 6" x 6" x 33'	15 (total = 495 ft)
Bales Sorbent Booms, 4 ea, 5" x 100 ft/bale (40ft)	5 (total = 400 ft)
1,000' 6"x 6" Boom in 100' sections	1 (total 1,000 ft)
TDS118G Grooved Drum Skimmer w/ 3" hose, pump, and fittings	1
Manta Ray Skimmer Head w/ 3" pump and fittings	1

Thus, for each response zone, the major equipment acquired by TransCanada includes: one response trailer, one boom trailer (together the trailers contain 2,000 feet of different types of boom), two boats, 298 bbls of temporary storage capacity, and two skimmers. As noted, there is no discussion of the locations of the tow vehicles for these trailer or response personnel.

The Supplemental Emergency Response and Equipment statement at the end of Appendix F was prepared in response to a request by the South Dakota Department of Environment and Natural Resources for additional information regarding the Keystone Pipeline's ability to respond to a spill specifically in South Dakota. This document refers to Appendices A and F, but adds that the trailer for the Northern Response Zone is located in Yankton, SD. It also identifies NRC as being TransCanada's primary spill contractor, and states that NRC is "strategically aliened" [sic] with Coteau Environmental based in Watertown, SD, and that no other NRC assets or subcontractors reside in South Dakota. Finally, this document states that "Keystone Pipeline fully expects to have the required assets for a spill within the four (4) hour time frame previously stated in the Response Plan."

Equipment Provided by National Response Corporation

TransCanada Reliance on National Response Corporation OSRO Classification

Appendix A includes no lists of contractor equipment and personnel resources. Instead, Appendix A includes the following tables that show NRC's USCG OSRO classification. Thus, TransCanada appears to rely wholly on NRC's USCG OSRO classification to comply with FRP requirements.

TransCanada assigns NRC's classification to each response zone, even though the USCG OSRO classification is not determined on a state-by-state basis, but rather is assigned to the USCG Sector, which includes all of the states through which the Keystone Pipeline passes.

Zone : North Dakota, South Dakota, Nebraska

Area : North Dakota, South Dakota, Nebraska						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lakes				

Zone : Kansas, Missouri, Illinois

Area : Kansas, Missouri, Illinois						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lakes				

Zone : Cushing Extension

Area : Cushing Extension Area						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore				
		Near Shore	X	X	X	X
		Great Lakes	X	X	X	X

As an initial observation, it is not clear why NRC would have "Offshore" and "Open Ocean" classifications in North Dakota, South Dakota, Nebraska, Kansas, Missouri, and Illinois. Likewise, it not clear why it would have a "Great Lakes" rating in the Cushing Response Zone, since this is response zone is entirely in Nebraska, Kansas, and Oklahoma. Rather than provide a contract number, the field for this number states "TBD." This being said, Figure A.4 includes a list entitled "Agreements/Contracts," including an entry for an "NRC Packet" dated January 23, 2009. Since PHMSA did not release this "packet," it is unknown whether it includes any equipment and personnel lists, or an actual executed contract with NRC for services to the Keystone Pipeline System.

Appendix A also includes figures that describe minimum OSRO equipment requirements to achieve USCG classifications for response capabilities. The introduction to these figures states:

> The USCG has classified OSROs according to their response capabilities, within each Captain of the Port (COTP) zone, for vessels and for facilities in four types of environments. Response capabilities are rated MM, W1, W2, or W3 as described below.

These figures provide classifications for each USCG operating area (Rivers/Canals, Inland, Great lakes, Offshore, Open Ocean). The classifications are MM, W1, W2, and W3, and specific equipment capacities are included for each classification for each operating area. "MM" is an abbreviation for "Maximum Most Probable Discharge," which relates to USCG estimating for a standard for spills smaller than worst case discharges, that is used in addition to worst case discharge scenarios.[62] "W1" is an abbreviations for "Worst Case Discharge Tier1," and "W2" and "W3" are similarly defined. The capacities are for "ERDC" and "TSC," which are defined as:

> EDRC stands for "effective daily recovery capacity," or the calculated recovery capacity of oil recovery devices determined by using a formula that takes into account limiting factors such as daylight, weather, sea state, and emulsified oil in the recovered material.
>
> TSC stands for "temporary storage capacity," meaning sufficient storage capacity equal to twice the EDRC of an OSRO. Temporary storage may include inflatable bladders, rubber barges, certified barge capacity, or other temporary storage that can be utilized on scene at a spill response and which is designed and intended for the storage of flammable or combustible liquids. It does not include vessels or barges of opportunity for which no pre-arrangements have been made. Fixed shore-based storage capacity, ensured available by contract or other means, will be acceptable.

Otherwise, Appendix A contains no further explanation for these classifications. The classifications for the Rivers/Canals and Inland operating areas are provided below, as well as the only explanatory text included with these classifications. It should be noted that the June 2008 USCG OSRO Classification Guidelines indicate that the time deadline for "Facility High Volume Ports" is 6 hours, not 12 hours indicated in these tables.[63]

MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATION

Classification	Resource Quantity Guidelines	Maximum Facility Response Times	Maximum Vessel Response Times
	Inland		
MM	Protective Boom:6,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 30,000*ft EDRC:; 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom: 25,000*ft EDRC:; 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
W3	Protective Boom: 25,000*ft EDRC:; 50,500 bbls TSC: 100,500 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours

[62] For a description of the USCG classification program see, Guidelines for the U.S. Coast Guard Oil spill Removal Organization Classification Program, June 2008 (USCG OSRO Guidelines 2008).

[63] USCG OSRO Guidelines 2008, p. 30.

MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATION			
Classification	Resource Quantity Guidelines	Maximum Facility Response Times	Maximum Vessel Response Times
		Rivers/Canals	
MM	Protective Boom: 4,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 25,000*ft EDRC:; 1,875 bbls TSC: 3,750 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom: 25,000*ft EDRC:; 3,750 bbls TSC: 7,500 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
W3	Protective Boom: 25,000*ft EDRC:; 7,500 bbls TSC: 15,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours

1. Rivers/canals include bodies of water, including the Intracoastal Waterway and other bodies artificially created for navigation, confined within an inland area and having a project depth of 12 feet (3.66 meters).
2. EDRC stands for "effective daily recovery capacity," or the calculated recovery capacity of oil recovery devices determined by using a formula that takes into account limiting factors such as daylight, weather, sea state, and emulsified oil in the recovered material.
3. TSC stands for "temporary storage capacity," meaning sufficient storage capacity equal to twice the EDRC of an OSRO. Temporary storage may include inflatable bladders, rubber barges, certified barge capacity, or other temporary storage that can be utilized on scene at a spill response and which is designed and intended for the storage of flammable or combustible liquids. It does not include vessels or barges of opportunity for which no pre-arrangements have been made. Fixed shore-based storage capacity, ensured available by contract or other means, will be acceptable.

* In addition, 1,000 feet of containment boom plus 300 feet per skimming system.

Putting all this together – and using corrections from the USGC OSRO 2008 Guidelines – NRC claims and has committed to have the following equipment on-scene at an inland spill within the specified times:

Time	Additional Equipment On-Scene
6 Hours HVA 12 Hours Other Locations	30,000 ft of protective boom, plus 1,000 feet of containment boom and 300 feet of boom for each skimming system
	12,500 bbl/day EDRC
	25,000 bbl of temporary storage
30 Hours HVA 36 Hours Other Locations	25,000 ft of protective boom, plus 1,000 feet of containment boom and 300 feet of boom for each skimming system
	12,500 EDRC
	25,500 bbl of temporary storage
54 Hours 60 Hours Other Locations	25,000 ft of protective boom, plus 1,000 feet of containment boom and 300 feet of boom for each skimming system
	50,500 bbl/day of effective daily recovery capacity (EDRC)
	100,500 bbl of temporary storage

Again, TransCanada does not include an NRC equipment list in the FRP. Instead it appears that TransCanada relies solely on NRC's USCG classification as proof that NRC can provide the resources claimed. As previously discussed, use of USCG OSRO classifications to demonstrate compliance with federal law in FRPs for facilities on the northern Great Plains has no foundation of support in USCG classification methodology or in the RRI equipment lists. Therefore, TransCanada may not rely on NRC's OSRO classification for meeting federal oil spill response requirements, either for times of response of amount of response equipment required. As such, TransCanada must provide complete lists of all equipment on which it relies for compliance with federal law.

EQUIPMENT OWNED BY NATIONAL RESPONSE CORPORATION

Since there are no NRC equipment lists in the Keystone FRP, this report turns to NRC equipment listed elsewhere. NRC includes on its website a list of the equipment it owns outright, as well as a list of its subcontractors.[64] The vast majority of NRC's equipment is on the coasts. The only equipment that NRC claims to own in the Midwest is in Chicago and Wood River, IL, Duluth, MN, and Fenton, MO. The full list of this equipment is included in Appendix A. A summary by location is provided below. In total NRC owns the following equipment in the Midwest:

NRC Location	NRC Equipment	Quantity
CHICAGO, IL	Skimmers Response Trailer Boom Power Pack Storage Tanks Boats	1 – EDRC 480 bbl/day 1 1,000 ft 1 4 – Storage Capacity 96 bbl 0
WOOD RIVER, IL	Skimmers Response Trailer Boom Power Pack Storage Tanks Boats	1 – EDRC 2112 bbl/day 1 4,000 ft 0 0 0
DULUTH, MN	Skimmers Response Trailer Boom Power Pack Storage Tanks Boats	1 – EDRC 823 bbl/day 2 4,000 ft 1 2 – Storage Capacity 200 bbl 1
FENTON, MO	Skimmers Response Trailer Boom Power Pack Storage Tanks Boats	3 – EDRC 8969 bbl/day+24 bbl TSC 1 4,100 ft 1 0 1 – Storage Capacity 238 bbl
PADUCAH, KY	Skimmers Response Trailer Boom Power Pack Storage Tanks Boats	1 – EDRC 2112 bbl/day 0 0 ft 1 0 1– Storage Capacity 238 bbl
MEMPHIS, TN	Skimmers Response Trailer Boom	0 1 2,600 ft

64 http://www.nrcc.com/ under "Equipment" link.

NRC Location	NRC Equipment	Quantity
	Power Pack Storage Tanks Boats	0 0 1 – Storage Capacity 238 bbl
TOTAL NRC MIDWEST EQUIPMENT	**Skimmers** **Response Trailer** **Boom** **Power Pack** **Storage Tanks** **Boats**	**7 – EDRC 14,496 bbl/day** **6** **15,700 ft 18" Boom** **4** **6 – 320 bbl** **4 – 714 bbl**

This being said, almost half the total skimmer ERDC comes from one "vacuum transfer unit" in Fenton, MO, all of the listed boom is 18" boom, which is not suitable for fast moving water and small rivers and streams, and three of the four listed vessels are portable barges which may or may not be useable in inland areas.

More importantly, as show in the table below, almost all of NRC's Midwest equipment is more than four hours[65] time away from the worst case discharge locations.

Drive Times at Standard Highway Speeds Between Worst Case Discharge Location and NRC Equipment Caches	
NRC Equipment Cache Locations	**Distance and Time to Yankton, SD**
Chicago, IL	594 Miles 9.5 Hours
Wood River, IL	599 Miles 10 Hours
Fenton, MO	585 Miles 9.5 Hours
Duluth, MN	509 Miles 8 Hours
Paducah, KY	764 Miles 13 Hours
Memphis, TN	798 Miles 13.5 Hours

The implication of these travel times is that NRC does not own equipment with the required six hours of Yankton, SD. The next nearest equipment it owns is on the Gulf Coast and in Ohio. Otherwise, NRC would need to draw equipment from even further afield.

Equipment Owned by Subcontractors

As a consequence, an effective response from NRC will require that it rely on its subcontractors. In an effort to determine which NRC contractors can help TransCanada meet its equipment obligations in the northern Great Plains, highway travel times were determined between: (1) the Keystone Pipeline

[65] Where a location is a "High Volume Area," equipment must be on-scene within six hours, but USCG and EPA standards allocate one hour for notification and one hour for mobilization, leaving four hours of travel time. Even though PHMSA does not provide detailed rules about how to calculate notification, mobilization, and travel time, the EPA and USCG regulations would seem to be the minimum times for notification and mobilization.

Missouri River crossing High Volume Area at Yankton, SD and the proposed Keystone XL Pipeline High Volume Areas at the Fort Peck Dam Missouri River crossing and the Yellowstone River crossing at Miles City, MT, and (2) locations of NRC contractors in North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Montana, Minnesota, and Iowa. The tables below lists the NRC subcontractors within four hours travel time of Yankton, SD, and contractors within 4 hours of the Montana crossings.

NRC Contractor	City	State	Hours to Yankton
Coteau Environmental	Watertown	SD	3
Hulcher Services, Inc.	Grand Island	NE	3
Environmental Restoration LLC	Council Bluffs	IA	2.5
			Hours to Niobrara Crossing
Haz-Mat Response, Inc.	North Platte	NE	2.5
Hulcher Services, Inc.	Grand Island	NE	4
Hulcher Services, Inc.	North Platte	NE	2.5
			Hours to Keystone Platte River Crossing at Duncan
Haz-Mat Response, Inc.	North Platte	NE	3.5
Hulcher Services, Inc.	Grand Island	NE	1
Hulcher Services, Inc.	North Platte	NE	3.5
			Hours to Keystone XL River Crossing near Grand Island
Haz-Mat Response, Inc.	North Platte	NE	2.5
Hulcher Services, Inc.	Grand Island	NE	0.5
Hulcher Services, Inc.	North Platte	NE	2.5
			Hours to Fort Peck Dam
Baker Tanks	Sidney	MT	2.5
Franz Construction, Inc.	Sidney	MT	2.5
Hulcher Services, INC.	Laurel	MT	5
			Hours to Miles City
Baker Tanks	Billings	MT	2
Baker Tanks	Sidney	MT	2
Franz Construction, Inc.	Sidney	MT	2
Hulcher Services, Inc.	Laurel	MT	2.5
Baker Tanks	Killdeer	ND	3

Unfortunately, NRC does not list the resources of its contractors on its website, such that determination of the amounts and types of equipment these contractors own requires research beyond both the Keystone FRP and material arguably included in the Keystone FRP by reference, such as NRC's website.

In an effort to identify all spill response equipment in the northern Great Plains, Plains Justice reviewed the websites for all of NRC's contractors, to the extent they existed. In addition, Plains Justice reviewed the following potential sources for descriptions of available spill response equipment:

- USCG RRI
- NRC Equipment Lists
- www.cleanupoil.com (online spill contractor web listing)
- Spill Control Association of America Membership Directory
- TransCanada 2009 Freshwater Spill Symposium Presentation
- Garner Environmental Services, Inc. Response Equipment Listing
- Clean Harbors Emergency Response Resource Book
- Hazco Inc. Facility Brochures (Canada)
- South Dakota Department of Environment and Natural Resources Spill Contractor List
- North Dakota 1999 Inventory of Emergency Equipment
- USCG Lake Michigan Area Contingency Plan
- USCG Northern Michigan Area Contingency Plan
- USCG Western Superior Area Contingency Plan
- USCG Grand Haven Quadrant Area Contingency Plan
- USCG Green Bay Quadrant Area Contingency Plan
- USCG Milwaukee Quadrant Area Contingency Plan
- USCG/EPA Southeast Michigan Area Contingency Plan
- EPA Region 5 Area Contingency Plan
- EPA Region 5 Twin Cities Subarea Contingency Plan
- EPA Region 5 Quad Cities Subarea Contingency Plan
- EPA Region 7 Area Contingency Plan
- EPA Region 7 Central Kansas Wetlands Subarea Contingency Plan
- EPA Region 7 Omaha/Council Bluffs Subarea Contingency Plan
- EPA Region 7 Greater St. Louis Subarea Contingency Plan
- EPA Region 8 Area Contingency Plan
- EPA Region 8 Red River of the North Subarea Emergency Response Action Plan
- EPA Region 8 Missouri River Subarea Contingency Plan (North Dakota)
- Upper Mississippi River Basin Association Spill Response Plan and Resource Manual
- Wakota Minnesota CAER Boom Cache Map
- Yellowpages.com
- Google.com

Based on this research, Plains Justice compiled a list of 1,170 entries for spill response equipment and contractors in the states of Michigan, Indiana, Illinois, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Montana, and Wyoming. The vast majority of identified equipment is near the Great Lakes or in major metropolitan areas. Since the resulting master list is derived from multiple sources, it appears that there are many duplicates. However, due the vague nature of many of the equipment reports, it is not possible to determine with certainty whether or not an entry is duplicative.

Further, a variety of different types of companies work on hazardous substance response efforts, including oil removal companies, remediation plan contractors, underground storage tank remediation service providers, government compliance contractors, heavy construction contractors, and others. It is not always possible to distinguish between companies with on-the-ground resources and those that provide only consulting services. Further, many spill response contractors are small businesses, such that they may change their names, merge with other companies, or go out of business.

Ultimately, Plains Justice cannot claim that its master list is completely comprehensive. This being said, this list does serve as a useful compilation of publicly available information about private spill response companies and their resources. The following tables contain whatever information was discovered about the equipment available at each NRC contractor listed above.

NRC Contractor	**City**	**State**	**Equipment within 4 Hours of Yankton**
Coteau Environmental	Watertown	SD	This company has no website. In a presentation given in 2009, a slide describing a software package called ePlanPro contains the following list of equipment in "Watertown," TransCanada reported that this location contained: 2 vacuum trucks, 2 jon boats, 2 response trailers, 5,000 ft of containment boom, 1 sorbent trailer, 2 product storage, 2 skimming systems, 2 product storage barges. However, except for the vacuum trucks, this equipment list is similar to the equipment owned by TransCanada. Therefore, it is uncertain how much equipment this contractor owns itself.
Hulcher Services, Inc.	Grand Island	NE	No information on website, other than that the location provides "disaster response" services. Hulcher Services is primarily a heavy construction contractor with offices throughout the U.S. The website states: "All 10 of Hulcher Services environmental divisions are equipped with an emergency response trailer and we have two fully equipped emergency response tractor and trailers centrally located to respond to any location in the United States. We are prepared for any emergency situation." However, since the company has many locations, it is not possible to determine what equipment, if any, is located at this site.
Environmental Restoration LLC	Council Bluffs	IA	No specific equipment is listed on the company website.
NRC Contractor	**City**	**State**	**Equipment within 4 Hours of Niobrara (Keystone XL only) and North Platte River Crossings**
Haz-Mat Response, Inc.	North Platte	NE	The USCG RRI lists this site as having three skimmers, 1,000 feet of boom, and one storage tank.
Hulcher Services, Inc.	Grand Island	NE	See description above for Hulcher Services.
Hulcher Services, Inc.	North Platte	NE	See description above for Hulcher Services.
NRC Contractor	**City**	**State**	**Equipment within 4 Hours of Fort Peck Dam**
Baker Tanks	Sidney	MT	No equipment list found.
Franz Construction, Inc.	Sidney	MT	No website; no equipment list found.
Hulcher Services, Inc.	Laurel	MT	No information on website; this location is not listed on the website as a company location.
NRC Contractor	**City**	**State**	**Equipment within 4 Hours of Miles City**

Baker Tanks	Billings	MT	The USCG RRI lists a total of 16 temporary storage tanks at this location.
Baker Tanks	Sidney	MT	No equipment list found.
Franz Contruction, Inc.	Sidney	MT	No website; no equipment list found.
Hulcher Services, Inc.	Laurel/ Billings	MT	See description above for Hulcher Services.
Baker Tanks	Killdeer	ND	The USCG RRI lists four mobile tanks at this location.

Thus, of the NRC subcontractors within four hours of Yankton, SD, Coteau Environmental is the only one with quantified information about available equipment. This being said, the only report of equipment at this location comes from a TransCanada presentation about its spill response planning software that may or may not list TransCanada-owned equipment.

The only NRC contractor equipment quantified in Nebraska is at Haz-Mat Response, Inc. in North Platte. If TransCanada's response trailer is in Yankton and not Watertown, SD, then this equipment would be with reach of both locations as well.

The only NRC contractor equipment quantified in western North Dakota and eastern Montana are the Baker Tank listings in Billings, MT, and Killdeer, ND. As noted, it is not known if these tanks are dedicated to spill response or if they are in use in the Bakken Formation oil fields.

Thus, it appears that there is no publicly available evidence of any substantial quantified amounts of NRC equipment in or near the northern Great Plains. While NRC does have substantial amounts of equipment, most of it is on the coasts and much of it may not be suitable for use in inland areas. As a consequence, there appears to be no substantial evidence that NRC can provide the amounts of equipment needed to respond to a spill in a Keystone Pipeline System High Volume Area in South Dakota, Nebraska, North Dakota, or Montana within appropriate timeframes.

Equipment Owned by Other Spill Response Companies in the Northern Great Plains

Finally, the following is a list of all private contractor equipment in Montana, North Dakota, Nebraska, and South Dakota, some of which has been previously identified. In theory, TransCanada could call on them, even if it does not have contractual arrangements with them, to respond to a worst case discharge spill. In fact, TransCanada has already used Safety-Kleen of Sioux Falls to respond to at least one small spill from the Keystone Pipeline.

Plains Justice does not claim that this list contain all spill response equipment in these states, but rather that this is the only equipment with publicly available quantified descriptions. Further, some of these companies are oil field service companies or general construction companies, so it seems likely that not all of this equipment is dedicated to oil spill response efforts. As a consequence, not all of this equipment should qualify as emergency response equipment. Some equipment, such as the spill response trailers owned by the Montana-Wyoming Oil Spill Cooperative, are likely dedicated to particular facilities and may not be available to respond to distant pipelines spills for liability or contractual reasons.

Equipment Type	Company Name	City	State
16 Temp Storage Tanks	Baker Tanks	Billings	MT
3 Spill Trailers	Montana - Wyoming Oil Spill Cooperative	Billings	MT
4 Spill Trailers	Montana - Wyoming Oil Spill Cooperative	Laurel & Billings	MT
16 Tanks	Baker Tanks	Billings	MT
1,600 ft Boom	Earth Movers	Minot	MT
1 Skimmer	Earth Movers	Minot	MT
1 Tank Truck	Earth Movers	Minot	MT
1 Pump	Braun Intertec Corporation	Bismarck	ND
8 Oil and Water Separators	Tooz Construction Inc.	Dickinson	ND
6 High Pressure Pumps	Tooz Construction Inc.	Dickinson	ND
1 Tank Truck	Tooz Construction Inc.	Dickinson	ND
1 Vacuum Truck	Tooz Construction Inc.	Dickinson	ND
1 Boat	Tooz Construction Inc.	Dickinson	ND
1 Vacuum Truck	Advanced Pollution Control	Grand Forks	ND
4 Tank Trucks	Baker Tanks	Killdeer	ND
1 Oil/Water Separator	Advanced Pollution Control	Mandan	ND
2 Pump	Advanced Pollution Control	Mandan	ND
1 Vacuum Truck	Advanced Pollution Control	Mandan	ND
1 Pump	Coughlin Construction Co,	Minot	ND
3 Tank Trucks	Coughlin Construction Co,	Minot	ND
1 Boat	Coughlin Construction Co,	Minot	ND
18 Storage Tanks	Clean Harbor Environmental Services	Kimball	NE
1,000 ft Boom	Haz-Mat Response, Inc.	North Platte	NE
3 Skimmers	Haz-Mat Response, Inc.	North Platte	NE
5 Temp Storage Tanks	Haz-Mat Response, Inc.	North Platte	NE
1 Temp Storage Tank	Environmental Solutions Inc	Omaha	NE
2 Vacuum Trucks	Environmental Solutions Inc	Omaha	NE
1 Vacuum Truck	Terracon Consultants, Inc.	Rapid City	SD
1,000 ft Boom	Bay West Inc	Sioux Falls	SD
1 Skimmer	Bay West Inc	Sioux Falls	SD
1 Temp Storage	Bay West Inc	Sioux Falls	SD
1 Trailer - Spill	Geotek Engineering & Testing Services	Sioux Falls	SD
1 Vacuum Truck	Safety-Kleen Co.	Sioux Falls	SD
1 Van/Truck - Spill	Safety-Kleen Co.	Sioux Falls	SD
1 or 2 Vacuum Trucks	Coteau Environmental	Watertown	SD

There simply is very little emergency spill response equipment in the northern Great Plains. As such, emergency response times in this region would be expected to be slow and inadequate to respond to a complete rupture of a Keystone System pipeline.

Summary of TransCanada Spill Response Resource Commitments in the Northern Great Plains

TransCanada's spill response resource commitments to the Northern Plains include the equipment it owns (two spill response trailers with 5,000 feet of boom, two skimmers, and two portable storage tanks in each response zone) and those it commits to provide through a contract with National Response Corporation, which in turn has contracts with local spill response companies. It is abundantly clear that private contractors and their spill response equipment are rare in the northern Great Plains. Including TransCanada's self-owned equipment, **the total amount of spill response equipment listed in the very large area included in the states of Montana, Nebraska, North Dakota, and South Dakota is: 8 spill response trailers, 8,000 feet of boom, 7 skimmers, 52 temporary storage tanks, 9 oil and water separators, 9 vacuum trucks, and 4 boats.** Again, Plains Justice does not claim this list is exhaustive, but it is substantially smaller than similar equipment lists in smaller regions that are more densely populated. Given the size of this region, equipment is thin on the ground.

Thus, while spill response capacity does exist in the northern Great Plains, it does not seem to be in quantities "necessary to remove to the maximum extent practicable a worst case discharge (including a discharge resulting from fire or explosion), and to mitigate or prevent a substantial threat of such a discharge . . . ."[66] This seems particularly apparent given the amount of equipment and personnel required in Enbridge's response to the 6B Pipeline Spill: **over 2,000 personnel, over 150,000 feet (28 miles) of boom, 175 heavy spill response trucks, 43 boats, and 48 skimmers**. In fact, compared to this list, the equipment available in the northern Great Plains seems a drop in a barrel of oil.

Given this paucity of equipment, it does not appear that TransCanada has committed the equipment currently needed to comply with Congress's mandate that companies provide spill response equipment to the maximum extent practicable, particularly with regard to the speed of deployment in remote areas. Unless substantially more equipment is provided along the Keystone Pipeline System's routes in the northern plains, it seems likely that a spill response there would be hampered by the logistical challenges of bringing in resources from more populated areas. Undoubtedly both TransCanada and NRC have the capacity to bring in large amounts of equipment eventually, just as Enbridge did. Our primary concern, though, is that there are not enough on-the-ground resources currently committed to the northern Great Plains to ensure that spilled crude oil is contained to the maximum extent practical – and not just mopped up after it has spread far and wide.

COMPARISON OF KEYSTONE SYSTEM FRP TO ENBRIDGE CHICAGO-SUPERIOR FRP

A comprehensive comparison of the Keystone Pipeline System FRP with the Enbridge Lakehead System FRP is beyond the scope of this study. The following presents our preliminary findings.

As an initial observation, the Lakehead FRP is far more detailed and comprehensive than the Keystone FRP. Enbridge provides detailed lists of its own equipment, including the locations and descriptions of equipment (six equipment caches for the Chicago Response Zone alone), a minimum set of response equipment to be located at each pump station, cross-border resources, detailed lists of winter equipment, and six boats dedicated to the Chicago response zone. Moreover, equipment is listed by location and by type for the entire response zone. Altogether, Enbridge's equipment lists are 52 pages

[66] 33 U.S.C. § 1321(j)(5)(D).

long for this zone. Also, Enbridge provides color maps that show that all parts of its pipelines are located within 4 hours of equipment locations.

This being said, Enbridge relies on the OSRO classification of its spill contractors (Bay West of St. Paul, MN, and Garner Environmental Services, inc. of Deer Park, TX) to meet federal worst case discharge response requirements. This may be reasonable given the amount of equipment on the Great Lakes. Garner's lists are online and include only equipment outside of the response zone. Bay West's equipment lists are not online. Enbridge's FRP would be substantially improved if it included lists of contractor equipment locations, showed contractor equipment locations on maps, and provided links to contractor equipment lists, as this would allow confirmation that it has fully met its federal FRP obligations. While Enbridge does not list all of the equipment or contractors it needs to respond to a worst case discharge, it provides much better information – and more equipment – than TransCanada.

Enbridge also provides the following table identifying the number of HAZWOPER trained employees for each of its response zones, and it provides specific information on employee training.

Superior Region Response Zone	**Chicago Region Response Zone**	**Cushing Region Response Zone**	**Enbridge Pipelines North Dakota Response Zone**
110	112	60	40

In contrast, TransCanada identifies only its two "qualified individuals" although in a presentation about its ePlanPro management program that 30 individuals are available Watertown, SD, which given the size of the town seems doubtful. This number might mean that 30 individuals are available in the response zone, or it might just be a placeholder number used to demonstrate the program.

In addition, Enbridge identifies high consequence areas potentially impacted by its pipelines, both in lists and in maps. The disclosure of the vast majority of these could not be considered to create security threats, but they would allow concerned citizens to determine how Enbridge intends to protect them in the event of spill.

Enbridge's Lakehead FRP is heavy on data and light on planning, but it provides a better understanding of how Enbridge would respond to a spill than TransCanada's FRP does for the Keystone Pipeline. Enbridge's greater experience responding to oil spills may be reflected in its superior effort to comply with federal FRP requirements.

PLAINS JUSTICE RECOMMENDATIONS

Plains Justice makes the following recommendations for improvements in federal oversight of pipeline FRPs in general and PHMSA's FRP regulations in particular:

- A National Transportation Safety Board study that evaluates equipment arrival times during the response to the 6B Pipeline spill to determine if the rate of equipment availability was sufficient during the first three days, and particularly in the first twelve hours, to meet FRP planning expectations.

- Ongoing reporting by all pipeline operators to PHMSA of pipeline alarms to determine if the number of false alarms is sufficiently high to increase the risk that alarms will be misinterpreted, thereby allowing ruptured pipelines to continue pumping oil into the environment.

- Revision of PHMSA's regulations to require detailed and enforceable equipment and personnel capacity standards based in part on operation in different types of environments, and clarification that operators must provide the maximum amount of equipment required in any environment.

- Revise PHMSA regulations so that worst case discharge pumping times are based on historical shutdown times, rather than operator expected times.

- Revise PHMSA regulations to require full disclosure of worst case discharge calculation methodologies, including computer program design and output.

- Require more accurate drain down estimating software, taking into account topography, siphon effects, valve malfunction, and other relevant factors, and prohibit flat adjustment factors.

- Cooperative development by the USCG, EPA, and PHMSA of a mandatory nationwide OSRO registration system to ensure adequate resources in all regions of the U.S.

Plains Justice makes the following recommendations for improvements in the Keystone Pipeline System FRP:

- Amend the Keystone FRP to require recognition of the pipeline's crossing of the Missouri and Platte, Rivers as High Volume Areas. Recognize in the Keystone XL FRP the pipeline's crossings of the Missouri River at the Fort Peck Dam, MT, the Yellowstone River at Miles City, MT, the Cheyenne River near Plainview, SD, and the Niobrara River as "High Volume Areas."

- Provide equipment along the pipeline route, in high volume areas and otherwise, in amounts sufficient to respond to a worst case spill to the maximum extent practicable.

- Amend the Keystone FRP to use the Group 4 oil category rather than the Group 3 category.

- Amend the Keystone FRP to require response zone delineation so that it relates to equipment locations and travel times.

- Amend the Keystone FRP worst case discharge calculations to increase the pumping time to account for the potential for operator error.

- Amend the Keystone FRP to include complete lists of all equipment on which it relies for compliance with federal law.

- Include a plan in the FRP that describes how TransCanada will support up to 2,000 spill response workers in remote areas of the northern Great Plains for the duration a worst case discharge cleanup response.