

Dane County Zoning and Land Regulation Committee #CUP 2291

**FURTHER SUPPLEMENTAL TESTIMONY BY 350-MADISON REGARDING THE ADEQUACY OF VOLUNTARY CLEAN UPS,
THE NEED
FOR INSURANCE AND THE COMPLETENESS OF THE NATIONAL ACADEMY OF SCIENCES STUDY IN REGARD TO A
CONDITIONAL USE PERMIT FOR
ENBRIDGE'S WATERLOO PUMPING STATION**

350-MADISON would like to supplement its earlier comments dated November 10, 2014, and its supplemental testimony dated December 1, 2014, in order to respond to Enbridge's letter to the Zoning and Land Regulation Committee dated January 6, 2015, and its inclusion in the record of the National Research Council's 2013 report, *Effects of Diluted Bitumen on Crude Oil Transmission Pipelines*.

The three issues included in this reply relate to:

- (1) Can Dane County rely on Enbridge voluntarily cleaning up a major oil spill on Line 61? **(pp. 1-3)**
- (2) Does Enbridge have the appropriate insurance to protect Dane County? **(pp. 3-6)**
- (3) Does tar sands oil pose no additional risks of an oil spill from a pipeline (NAS study)? **(pp.6-7)**

See also Appendix for further information on spill cleanups in US and on Enbridge record (pp. 7-18)

VOLUNTARY CLEAN UPS

A Somber Picture of "Cleanup and Restoration" Nationwide

— Summary — (SEE APPENDIX FOR ENBRIDGE RECORD AND FULL REPORT)

Environmental disasters make a splash on the news. Sadly, the extremely long-term, sometimes permanent, damage to the environment and people's lives—rivers, wetlands, residents' homes and livelihoods, birds, fish, mammals, and other precious wildlife—*doesn't even make the back page*.

What cleanup and ecological restoration actually happen after tar sands and crude oil spills, and how long does it take to finalize restoration plans and to actually carry out restoration? The examples below underscore the need for Enbridge to carry adequate pollution coverage, to expedite restoration in the event of a spill.

- **1993 fuel and lube oil spill in the Rose Atoll National Wildlife Refuge**

A vessel ran aground in the Rose Atoll National Wildlife Refuge, one of the most remote and pristine coral reefs in the world, spilling 100,000 gallons of fuel and oil, killing wildlife and threatening the coral reef's existence. The owners had little insurance, and thus there was no restoration plan until 2001. The US Fish and Wildlife Service (USFWS) spent millions for cleanup, restoration, and monitoring, allowing successful recovery. Rose Atoll is now a Marine National Monument. **This unusual and successful example illustrates the importance of federal agencies, the need for long-term monitoring, and especially the need for the responsible party to hold adequate insurance.**

- **1996 San Francisco Drydock bunker fuel oil spill**

The SS Cape Mohican discharged 96,000 gallons of heavy fuel oil into the San Francisco Drydock Shipyard, oiling beaches north to Point Reyes National Seashore and many miles south, killing 600 birds, and damaging

shoreline habitat, fisheries, and recreational beaches. After a 1998 consent decree with the responsible party and a 2002 restoration plan, efforts were undertaken to improve wetland habitat and shoreline, restore bird and fish habitat and health, and improve recreational use. Although restoration needs totaled \$5.8 million, only \$3.6 million was awarded, necessitating an unusually heavy use of volunteers for the project to succeed. **This case points to the importance of adequate funding after a disaster and the very long time between disaster and restoration.**

- **1999 Genesis crude oil pipeline spill near Soso, MS**

This 336,000 gallon oil spill contaminated wetlands and the Leaf River, affecting groundwater, killing fish and birds, and permanently destroying 11 acres of wetlands. A 2004 restoration plan was agreed upon between Genesis, the Mississippi Department of Environmental Quality (MDEQ), and USFWS, with Genesis responsible for \$2 million in restoration. The published plan was unclear on key matters, as most work was handed over to Genesis contractors. Annual monitoring by a contractor, with results submitted to MDEQ was required but documentation of this monitoring is not readily available. **This is another example of extended lag time between an oil spill and agreement by the responsible party to pay for restoration, as well as uncertain confirmation of restoration due to lack of readily available documentation.**

- **2000 East Walker River fuel oil spill by Advanced Fuel Filtration Systems (AFFS)**

An AFFS tanker truck overturned on California Route 182, spilling 3,608 gallons fuel oil, most into the East Walker River, spoiling 15 miles of stream habitat and killing vegetation and wildlife in the watershed. Not until 2009 was there a final Restoration Plan that AFFS agreed to. Restoration costs exceeded the \$350,000 AFFS paid, leaving the US Forest Service liable for the remaining \$162,600 needed. **Again, this example underscores the importance of adequate restoration funding from the responsible party, and the long lag time between an incident and a restoration agreement.**

- **2002 Enbridge pipeline spill near Cohasset, MN**

252,000 gallons spilled within the watershed of Blackwater Creek, a Mississippi River tributary, followed by a planned burn with a five mile long, one mile high smoke plume. The disaster destroying wetlands and migratory bird habitat. The pipe failed because it had been cracked even before Enbridge installed it, during transport by train beforehand. A 2004 draft restoration plan between trustees and Enbridge was followed by a 2005 final consent decree. The damaged land was judged not remediable, so restoration of 30 acres of degraded wetlands in Chippewa National Forest was planned, as well as a separate project to address air resource injuries. In 2014, an interim report by the USFWS demonstrated that re-vegetation goals were still unmet, with only 40% of the expected number of willows present. Biologists were hopeful but concerned that goals would not be met even within the agreed-upon 10-year time frame. **Thus, even with some cooperation, return of the environment to its pre-spill state can drag out for many years, with uncertain success—a sad outcome for people, flora, and fauna in the area.**

- **2010 BP Deepwater Horizon Gulf oil spill**

The event: On April 20, 2010, the mobile drilling unit Deepwater Horizon exploded, caught fire, and sank, killing 11 workers. Oil spewed for 87 days, a total of 210 million gallons, covering thousands of square miles and polluting beaches, bays, estuaries, and marshes from the Florida Panhandle to west of the Mississippi River Delta. This was an environmental disaster of unprecedented proportions, with 1,100 miles of shoreline oiled, with estuaries and marshes hard hit and difficult to clean, and with 340 miles of coast still not cleaned up three years after the spill. Thousands of birds, mammals, and sea turtles were plastered with oil and died. As of 2014, some 950 whales and dolphins had been found stranded, representing only a tiny percentage of the animals affected. Birds were particularly vulnerable, and many perished from ingesting oil in attempts to clean themselves, or from cold exposure.

Restoration efforts: In 2011, an Early Restoration Plan and Environmental Assessment was agreed upon between BP and trustees from the National Oceanic and Atmospheric Administration, the Department of the

Interior, and the five affected states. BP was to provide \$1 billion for projects to address injuries to birds, mammals and marine organisms and to compensate the public for lost recreational opportunities.

Remaining oil: Although most of the oil has been removed by cleanup operations and other natural mechanisms, **up to 35% of the hydrocarbons were trapped and transported in persistent deep-sea plumes**, which can harm the population recovery of exposed animals.

Ongoing harm to wildlife: Many species remain sickened by oil exposure, and oil continues to wash up on beaches and into marshes. Oyster reproduction remains depressed, many sea turtles continue to be stranded, fish are found with damaged hearts. Dolphins continue to strand at very high rates and in a one survey were underweight, anemic, with liver, adrenal, and lung disease, with half of dolphins found to be extremely sick.

Funding: It is still early days in the lifetime of this spill and its aftermath. The trustees stated, "Restoration work will take many years to complete, and long-term monitoring and adaptive management of the Gulf ecosystem will likely continue for decades until the Trustees can be certain that the public has been fully compensated for its losses." Aside from the above \$1 billion BP funding, other funding is possibly, although not certainly, available: This includes funding through Natural Resource Damage Assessment, from the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act, criminal settlements, the Gulf Environmental Benefit Fund, and the Migratory Bird Treaty Act.

In sum: The BP disaster is a strong example of the importance of adequate insurance for environmental restoration by oil companies. Only time will tell whether the funding is sufficient, how much payment will be contested, and how successful restoration efforts will be. It is very worrisome that, although BP did pledge monies for environmental restoration, it is now disputing some of the claims of continuing harm to animals, and it is by no means certain that BP will fund all necessary environmental restoration. In the same vein, BP is now disputing economic claims of people living along the Gulf Coast, as well as fighting court battles over assignment of blame for the disaster.

- **2013 Mayflower AR Exxon tar sands spill**

An ExxonMobil pipeline ruptured in Mayflower, AR, spilling approximately 210,000 gallons of Canadian tar sands into a residential neighborhood and nearby waterways. The spill ruined 22 homes and other property, sickened residents, and killed birds, turtles, and other wildlife. Some residents whose illness continued had to move away, as did those whose homes were destroyed. A Pipeline and Hazardous Materials Safety Administration (PHMSA) order prevented Exxon from restarting the pipeline until cleanup and safety concerns were adequately addressed, and as far as can be determined, the pipeline has yet to be restarted. Arkansas requested \$4 million from Exxon to pay for the state's investigation, and the state and the Department of the Interior have filed a lawsuit against Exxon. PHMSA found Exxon liable for nine probable violations of safety rules, imposing hefty fines and stating that Exxon did not adequately account for the risks. Uncertainty remains about the exact toll of the spill due to an FAA order closing airspace around the site and thus disallowing aerial photography in the critical early hours after the spill. The environmental impact is likely to be compounded by an evident failure to follow best practices after the spill, with assessment, cleanup, and restoration largely left to the state, which lacks the requisite resources and expertise. **This example again points to the importance of federal agency involvement and the importance of cooperation from the responsible party.**

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INSURANCE

Enbridge repeats several old arguments why their limited partnership should not be required to have the type of insurance that is intended to cover environmental cleanups. Enbridge, of course, is the company with the worst pipeline safety record in the country and the worst possible organizational structure to assign liability.

These were all dealt with previously, and its letter raises no new issues, but in order to ensure that we do not inadvertently appear to acquiesce, let us repeat what has previously been said.

First, Enbridge continues to misrepresent the type and value of insurance that it states it has. The general liability policy that they state they have is NOT intended to reliably cover environmental clean ups. The fact that these general liability policies contain a broad pollution *exclusion* (other than for “sudden and accidental” events) makes that clear.

Second, it is widely understood that a party seeking to protect itself from risk, or those who its action may injure, cannot properly do so with the “sudden and accidental” exception to the broad pollution exclusion.

As we noted before, the most litigated words in the history of the insurance business are lawsuits where the insurance companies and insureds argue over what “sudden and accidental” pollution is and what should be excepted from the pollution exclusion in General Liability insurance policies (as examples, can a pipeline as in Kalamazoo that weakened over the course of years of neglect be called “accidental,” or an oil spill that lasted 17 hours be called “sudden”?). These cases can extend for more than twenty years to resolve. *City of Edgerton v. General Cas. Co.*, 184 Wis. 2d 750, 517 N.W.2d 463 (1994).

The final crucible on which Enbridge’s misrepresentations fall is this fact. If there were any truth to its claim that general liability adequately covers clean ups, then it would not be necessary for Enbridge to have to sue its general liability insurers for payment for the Kalamazoo disaster, as it has had to do. Enbridge FERC Form-6, at pp. 123.9 to 123.11. Enbridge’s letter attempts to ignore that fatal fact that eviscerates its claim.

Obtaining coverage pay outs for sudden and accidental pollution events on a General Liability policy that otherwise absolutely excludes claims from all sources of pollution is a singularly unreliable policy for timely environmental cleanups. The type of coverage that unambiguously does cover cleanups that any company, and especially one so prone to accidents as Enbridge, should have purchased is Environmental Impairment Liability (EIL) insurance.

There is nothing ambiguous or uncertain about this: it is a completely settled fact in the insurance industry. Here are just three quotations from insurance guides as examples:

Environmental Liability Insurance

The large chemical spill from a storage facility owned by Freedom Industries Inc. in West Virginia in early January and other recent high-profile industrial accidents are leading to questions about the role that private insurance plays in such incidents.

Standard business general liability (GL) policies provide little coverage for pollution damage, including toxic spills like the one in West Virginia. Today most companies that store or handle potentially toxic materials purchase a separate environmental liability policy. These policies cover the exposure that the GL policy excludes.

Property owners purchase environmental impairment liability insurance. It covers property loss and liability arising from pollution-related damages for sites that have been inspected and found uncontaminated. It is usually written on a claims-made basis so policies pay only claims presented during the term of the policy or within a specified time frame after the policy expires. It limits liability insurers’ exposure to unknown future liabilities.

Generally coverage includes statutory clean-up requirements and bodily injury and property damage third-party claims and legal expenses resulting from pollution or contamination incidents. The coverage kicks in both for incidents that are “sudden and accidental” and “gradual.” Coverage also exists for business interruption losses.

— Insurance Information Institute

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Generally coverage includes statutory clean-up requirements and bodily injury and property damage third-party claims and legal expenses resulting from pollution or contamination incidents. The coverage kicks in both for incidents that are “sudden and accidental” and “gradual.” Coverage also exists for business interruption losses.

— A User’s Guide to Environmental Insurance (ARMR)

Confusion over coverage

There is significant confusion in the market over whether existing general liability policies cover environmental risks as highlighted in a report by the International Underwriting Association in London.

In most European countries traditional general liability policies provide only a basic level of coverage for environmental liabilities. They pay for damages suffered by a third party following a sudden and accidental event. However, these policies will in most cases fail to respond to liabilities established under the statutory / public law system, e.g. a clean-up notice from the authorities. Since the early 1990s virtually all public liability policies across the UK include “gradual pollution” exclusions.

This means that a GL policy will usually only indemnify for a “sudden, identifiable, unintended and unexpected incident,” leaving the insured exposed to gradual pollution conditions, such as the cumulative impact of a leaking underground storage tank, or the ongoing odour that can arise from waste management facilities.

— Insight International 2011

Enbridge attempts to suggest that EIL policies are only for spills of a slow, “seeping” nature. This, too, is another false misrepresentation by Enbridge.

What Enbridge does not state is the fact that presumably influences their decision to fly without a reliable insurance net. That is EIL policies cost more than GL policies, and they do not intend to provide any coverage for Dane County’s environment that is beyond that which they already cover to protect their property.

Third, Enbridge attempts to claim that Dane County is protected by the federal Oil Spill Liability Trust Fund, to which, incidentally, Enbridge makes no premium payments for the tar sands oil that it transports through its pipelines. This, too, is completely untrue. For one thing, the spill must impact navigable waterways to be covered. For another, and more important, the GAO has concluded that the fund is woefully underfunded for the liabilities it covers. (*Government Accounting Office, Cost of Major Spills May Impact Viability of Oil Spill Liability Trust Fund (2010)* www.gao.gov/pdfs/GAO-10-795T). Even more important, as documented in the prior section, the degree and speed of Trust Fund clean ups are heavily influenced by the polluters, whose main concern is reducing the visibility of the spill to the news media, not restoring the water and land to its prior condition.

In any event, the very nature of insurance will provide a dispositive answer from the free market to the question of whether this trust fund is adequate to restore Dane County’s water and land to their prior condition. This is because the actuaries will consider trust fund pay outs as first dollar payments in an accident, and the EIL coverage will be priced for what they consider left over. That is to say, EIL insurance will have whatever value should attach to the trust fund priced into the premium.

NAS STUDY

We noticed that the committee record now includes a link to the report by the National Academy of Sciences, “Effects of Diluted Bitumen on Crude Oil Transmission Pipelines.”

This report is sometimes erroneously read to state that there is no difference between tar sands oil (or diluted bitumen or dilbit) and the conventional oil typically shipped through US pipelines. That would be a wholly incorrect and unsupported reading of the report for the following reasons:

- (1) The report is confined to the quality of the oil in the pipeline and it explicitly ignores the salient question revealed by the Kalamazoo oil spill, which is the environmental and economic consequences of a spill from a tar sands pipeline when one occurs because of dilbit's tendency to sink instead of float, making the cleanup exceedingly more difficult.
- (2) As to the effects of carrying dilbit in a pipeline, the report compared dilbit to other Canadian heavy crude, whose composition is similar, instead of to the less abrasive and less corrosive conventional light grades of crude oil, which is the vast majority of what has historically been carried in US pipelines and, therefore, should have been the baseline for comparison.
- (3) As to the comparison of dilbit to other heavy grades, first, the overwhelming majority of the studies referenced are from industry sources; second, there are debilitating shortcomings in the accident data, which often fails to disclose the nature of the oil carried or cause of the spill; and, third, the composition of the NAS review panel was heavily stacked to industry representatives, which was mirrored in the strong bias to industry instead of independent or critical speakers invited to present testimony to the group.

For these reasons, the only thing that the NAS study can be used for is the conclusion that tar sands dilbit appears to resemble Canadian heavy crude oil, which is something that it was not necessary to conduct a study to find out.

Finally, serious concerns continue regarding the danger of tar sands spills, and how difficult they are to clean up compared to conventional crude oils So much so, that the National Academy of Sciences has initiated a new study on this very question.

Several facts underscore the need for such a study.

- a. Tar sands are diluted with toxic and volatile organic chemicals, such as benzene (a known carcinogen and teratogen) to allow flow through a pipeline. With a spill, these chemicals evaporate, exposing and sickening people in surrounding areas.
- b. Also, as these lighter chemicals evaporate, the heavy tar sands sink to the bottom of waterways, making cleanup expensive.
- c. Using figures from PHMSA's pipeline incident database, an attorney and researcher with the National Resources Defense Council calculated that the average cleanup cost of every crude oil spill from the past 10 years was \$2,000 per barrel, whereas the Enbridge Kalamazoo spill has cost upwards of \$29,000 per barrel.

<http://insideclimatenews.org/news/20120626/dilbit-primer-diluted-bitumen-conventional-oil-tar-sands-Alberta-Kalamazoo-Keystone-XL-Enbridge>

Here are links to critical references to the NAS study that we ask also be included in the Committee records:

The Natural Resources Defense Council:

http://switchboard.nrdc.org/blogs/aswift/diluted_bitumen_tar_sands_stud.html

Inside Climate News: <http://insideclimatenews.org/print/26538>

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APPENDIX: Dane County cannot rely upon voluntary compliance to clean up major spills

Enbridge, a \$43 billion Canadian company, proposes to expand the flow of tar sands through its Line 61 from the current 400,000 barrels per day to 1.2 million barrels per day—*45% more than the proposed Keystone XL*. The path the pipeline takes through Wisconsin runs through the northeast corner of Dane County. Enbridge is currently requesting a permit from the Dane County Zoning and Regulation Committee to upgrade its pump station in the town of Medina.

Why should Dane County citizens be concerned about the chance of an oil spill? Some reasons are obvious:

First, Enbridge has a terrible safety record, with more than 800 reported spills, and has been the focus of withering criticism and/or huge fines from the state of Wisconsin, the Environmental Protection Agency (EPA), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and the National Transportation Safety Board. Moreover, included among Enbridge's 800+ spills is the 2010 Kalamazoo River tar sands spill, the worst inland pipeline spill in US history (details below).

Second, Enbridge Limited Partnership operates Line 61 but has no “deep pockets” and inadequate insurance. (See pages 3-6 in this document)

What about Enbridge’s record in Wisconsin?

- Huge spills have occurred at Enbridge terminals themselves. In Wisconsin, 189,000 gallons of crude oil spilled into the Nemadji River in 2003 from the Enbridge Energy Terminal in Superior. Environmental damage was reportedly limited as the spill occurred in winter, with the river frozen, but that happenstance timing is hardly reassuring.
- PHMSA reports that from 2006 to 2014, Enbridge reported 15 spills in Wisconsin. Two Wisconsin spills in 2007 are notable: On January 1, an Enbridge pipeline ruptured and spilled more than 29,000 gallons of oil into a farm field in Clark County. On February 2, an Enbridge construction crew struck an Enbridge pipeline in Rusk County with equipment, spilling 200,000 gallons of crude oil, of which only 87,000 gallons were recovered. Some of the oil filled a hole more than 20 feet deep and was reported to have contaminated the local water table. To provide perspective, these two Wisconsin spills alone would represent 43% of the volume of total spills in North America in 2005. (Berquist L. 2007, February 16 .Oil spill tainted water table: Recent pipeline leak seeped into deep hole in northern Wisconsin. The Milwaukee Journal Sentinel.)
<http://www.jsonline.com/news/wisconsin/29343664.html>
- In 2008, the WI DNR charged Enbridge Energy with more than 100 environmental violations relating to the construction of a 320-mile pipeline across much of the state. The agency said that Enbridge workers illegally cleared and disrupted wooded wetlands and were responsible for other actions that resulted in discharging sediment into waterways. In January 2009, the company settled the charges by agreeing to pay \$1.1 million in penalties.
- An Enbridge crude oil pipeline ruptured July 27, 2012, in Grand Marsh, spilling 50,000 gallons. A corrective action order from PHMSA referred to this and other problems in Enbridge’s system in concluding **that the company’s integrity management program may be inadequate.**
- Finally, according to PHMSA, from 2006 to 2014 Enbridge spilled 350,000 gallons of tar sands or crude oil in Wisconsin, reporting that one third of the spilled material was not recoverable and is still in the environment.

The 2010 Enbridge Kalamazoo River tar sands oil spill

A devastating example of a company’s response to a large spill—such as could occur here in Dane County from a revved up line 61—is Enbridge’s action after the Kalamazoo River disaster of 2010. This spill of 843,000 gallons of tar sands into the Kalamazoo River, and Enbridge’s approach to the cleanup and restoration, are alarming—to wit:

According to the National Transportation Safety Board. 2012. *Enbridge Incorporated Hazardous Liquid Pipeline Rupture and Release, Marshall, Michigan, July 25, 2010*. Pipeline Accident Report NTSB/PAR-12/01. Washington, D.C:

“The rupture occurred during the last stages of a planned shutdown and was not discovered or addressed for over 17 hours. During the time lapse, Enbridge twice pumped additional oil (81 percent of the total release) into Line 6B during two startups; the total release was estimated to be 843,444 gallons of crude oil. The oil saturated the surrounding wetlands and flowed into the Talmadge Creek and the Kalamazoo River. Local residents self-evacuated from their houses, and the environment was negatively affected. Cleanup efforts continue as of the adoption date of this report, with continuing costs exceeding \$767 million. About 320 people reported symptoms consistent with crude oil exposure.”

Other serious concerns regarding this disaster included:

- The tar sands sank and coated the riverbed, necessitating extensive dredging, with consequent destruction of much riparian flora and fauna. Tar sands can float temporarily, as it takes some time for it to lose the highly volatile diluents, and to “weather” and sink.
- Enbridge’s 17-hour delay in recognizing the leak and in subsequently formulating suitable cleanup plans likely worsened outcomes.
- Federal and local officials didn't discover until more than a week after the spill that the pipeline was carrying tar sands, also called dilbit, rather than conventional oil. Why Enbridge would not let local authorities know this important fact is unclear.
- Only two weeks after the spill, Enbridge requested that the line be restarted. This is shocking in view of statements from Enbridge personnel emphasizing how safety-conscious the company became following the massive and unprecedented spill. Enbridge’s request was firmly refused by PHMSA as posing an unacceptable spill risk until other safety measures could be carried out.
- Enbridge continued to submit a multitude of inadequate and poorly thought out cleanup plans, which the EPA refused and sent back to the company for reworking. This pattern lasted years, throughout much of the cleanup, according to EPA correspondence.
- Enbridge dragged its feet on the cleanup. Even as late as November 2013, the company requested a delay in the completion date until October 2014, which was refused by the EPA.
- When duly authorized Michigan trustees submitted plans for vegetation and recreational use assessment due to the oil spill, Enbridge declined to fund these requests.
- When duly authorized Michigan trustees submitted to Enbridge in 2013 an Interim, Partial Claim for Assessment Costs in order to evaluate the condition of birds, turtles and other wildlife and to plan for their recovery, Enbridge declined to pay for this assessment. The projected cost was just \$980,091, a very tiny fraction of Enbridge’s yearly profits.

Questions and additional reasons for concern about tar sands or other spills

- What cleanup and ecological restoration actually happen after tar sands and crude oil spills? This information is not routinely and easily accessible, whether from the EPA, state EPAs, state DNRs, the US Fish and Wildlife Service (USFWS), or other sources.
- How long does it take to draft restoration plans after a cleanup? And how long to finalize plans between the parties so that restoration can begin? It has taken three years and six years on average, respectively, based on our review.

Some sobering examples of spills

In addition to evaluating the likelihood of Enbridge spills and potential damage, examination of spills’ aftermath is key. What exactly is done to reinvigorate oil-soaked wetlands or farmlands and to ensure that waterways, flora, and fauna can rebound? Robust, timely, and transparent cleanup plans are critical to environmental recovery and to those living and farming in surrounding communities. Examples from Enbridge spills in the US—and from other companies’ spills of tar sands, crude oil, and other environmental hazards—are concerning. Here are a select few:

- **1993 fuel and lube oil spill in the Rose Atoll National Wildlife Refuge**

In October 1993, the *Jin Shiang Fa*, a Taiwanese straight-line fishing vessel, ran aground in the Rose Atoll National Wildlife Refuge, broke up, and released more than 100,000 gallons of diesel and lube oil, killing a large area rich with the main reef-building organisms, crustose coralline algae. Prior to the grounding, the atoll was considered one of the most remote and pristine coral reefs in the world. The spill itself killed many giant clams, sea cucumbers, and sea urchins and altered the fish community. Over time and with further corrosion of the vessel, invasive species colonized the reef, encouraged by iron continually leached into the water.

Concerns arose that the weakened reef could be breached, which would change water circulation patterns across the atoll and eventually bring about the destruction of Rose and Sand Islands. This, in turn, would destroy the most important resting and nesting habitat for federally protected seabirds and the federally listed green sea turtle in the American Samoa archipelago.

In 1999, 100 tons of shipwreck debris were removed. The remaining 85 tons were removed in 2004 in accordance with the final restoration plan of 2001. The sum requested by the USFWS for further restoration was \$1,853,911, of which \$653,017 was provided. The ship's insurance carrier had paid for some debris removal but refused further payments as it was at the limit of its insurance liability. As a result of the debris removal, monitoring, predator removal, vegetation planting, lakeshore cleanup, and other measures, it has been established that the reefs are now recovering rapidly. The United States established Rose Atoll as a Marine National Monument in January 2009, thus banning commercial fishing within 50 nautical miles of the Atoll. The successful recovery of the reefs at Rose Atoll was due largely to the Atoll's status as an actively managed protected area, in combination with sufficient funding, effort, and expertise to monitor the injury to the atoll and its subsequent restoration.

This is an unusual example, but it illustrates the importance of the involvement of federal agencies, funding from the responsible party, and sufficiently long-term monitoring. It also underscores the importance of adequate insurance. Although a long time again intervened between accident and restoration, this was ultimately an important success story.

- **1996 San Francisco Drydock bunker fuel oil spill**

On October 28, 1996, the SS Cape Mohican, a 725-foot Maritime Administration vessel, discharged an estimated 96,000 gallons of a heavy bunker fuel oil into a floating drydock at the San Francisco Drydock Shipyard. Approximately 40,000 gallons of fuel spilled into the bay, oiling beaches as far north as the Point Reyes National Seashore and as far south as Pillar Point, and killing an estimated 593 birds. Recreational beach use, shoreline habitat, and fisheries were also affected.

A trustee agreement and consent decree were signed in 1998, and restoration plan, in 2002. Required measures included improved wetland habitat and shoreline, bird and fish restoration, and improved recreation opportunities. A total of \$3,625,000 was awarded to the trustees under the consent decree for the design, implementation, permitting, monitoring, and oversight of restoration projects. The proposed restoration costs totaled \$5,853,324.

The funds ultimately provided fell significantly short of what was proposed, and it appears that heavy use of volunteers was required to accomplish the restoration, which had good results in the end. This case again exemplifies the importance of adequate funding after a disaster and the significant time lag between spill and restoration efforts.

- **1999 Genesis crude oil pipeline spill near Soso, MS**

The Genesis crude oil pipeline spill near Soso, MS, released 336,000 gallons of crude oil, contaminating wetlands, a stream, and the Leaf River. Approximately 27 miles of the Leaf River were oiled to varying degrees. Several natural resources, including wetlands, groundwater, and wildlife habitat, were affected. Fish and birds, notably wood ducks, were oiled and killed. Due to the proximity of the wetlands to ground zero and the degree of impact from both the oil spill and the subsequent cleanup efforts, the wetlands lost all function.

It was not until five years after the spill that a final restoration plan was agreed upon between Genesis, the Mississippi Department of Environmental Quality (MDEQ), and the USFWS. This agreement was unclear on a number of key matters (e.g., agreed-upon restoration costs, compensation for damage to streambed and riparian zones, treatment of contaminated soils, purchase of new land, provision of wood duck nesting houses, and monitoring by the state and USFWS), as most work was to be done by Genesis contractors. However, a 2004 settlement with the Department of Justice clarified that Genesis was to pay \$2 million for

restoration. There was to be annual monitoring by a Genesis contractor, with results submitted to MDEQ, but we have found no documentation that these have occurred.

The Soso oil spill provides yet another example of an extended lag time between an oil spill and agreement by the responsible party to pay for restoration, as well as uncertain confirmation of restoration due to lack of readily available documentation.

- **2000 East Walker River fuel oil spill by Advanced Fuel Filtration Systems**

On December 30, 2000, a tanker truck operated by Advanced Fuel Filtration Systems, Inc. (AFFS), of Corona, CA, overturned on California State Route 182 north of Bridgeport, resulting in the release of approximately 3,608 gallons of #6 fuel oil, the majority of which entered the East Walker River. The fuel visibly oiled approximately 10 miles of stream habitat, 7 of which were in California (Mono County) and 3 in Nevada (Lyon County). Based on water and sediment samples taken downstream in Nevada, approximately 15 miles of stream were affected. The cleanup lasted throughout the winter months. This oil spill had an impact on natural resources along the spill path of the East Walker River watershed, causing injury and mortality to plants and animals.

A memorandum of understanding with AFFS was signed in 2005. The restoration plan was dated August 2009. Under a trustee agreement, AFSS agreed to pay a total of \$418,000, of which *only \$350,000* would go to the trustees for restoration, with the balance going to the California Department of Fish and Wildlife for assessment. Restoration costs exceeded the \$350,000 AFFS paid, and the US Forest Service was liable for \$162,600 for part of the recreational improvement project. Restoration projects included riparian enhancement and fuels reduction (fire prevention), improved trout fishing, and outdoor recreational improvements.

Again, this example underscores the importance of adequate restoration funding from the responsible party, and the long lag time between an incident and a restoration agreement.

- **July 2002 Enbridge pipeline spill near Cohasset, MN**

In July 2002, an Enbridge pipeline spilled 252,000 gallons of crude oil into wetlands near Cohasset, MN. The wetland was within the watershed of Blackwater Creek, a tributary of the Mississippi River. To minimize the risk for contamination of the Mississippi, response strategies included a controlled burn of the oil and a containment berm. The daylong burn created a smoke plume about one mile high and five miles long. The pipe failed because it had been cracked even before installation, when being transported by train beforehand.

The discharge of oil and subsequent response resulted in near-complete loss of 11 acres of wetland vegetation in the affected area, destroying migratory bird habitat. A draft restoration plan was developed between Minnesota trustees and Enbridge in 2004, with a final consent decree for restoration finalized in 2008. The trustees judged that restoration of wetland vegetative communities at the damaged site was not possible due to the extensive and very long-lasting damage to the area. Given that damage, an “off-site restoration alternative” was selected as the preferred means of addressing the loss of ecological resources. The plan called for restoration of approximately 30 acres of degraded forested and scrub-shrub wetlands at a site located within the Chippewa National Forest, including reestablishing appropriate forested and scrub-shrub wetland vegetation through natural regeneration and replanting. Air resource injuries associated with the discharge of oil and *in-situ* burning were to be addressed through a separate project to retrofit vehicles (school buses) having older diesel engines with improved emission controls to reduce air pollutant emissions.

In 2014, an interim report by the USFWS demonstrated that re-vegetation goals were still unmet, with only 40% of the expected number of willows present, although biologists were hopeful for the future. However, without a substantial infusion of reforestation funds, they expressed concerns that goals would not be met even within the agreed-upon 10-year time frame.

To sum up, there was no action until after 2008 on compensatory restoration of the wetlands and migratory bird habitat destroyed in 2002, and even today, restoration is incomplete and will likely need further funding.

This example indicates that even with cooperation, return of the environment to its pre-spill state can drag out for many years, with uncertain success—a sad outcome for people, flora, and fauna in the area.

- **2010 BP Deepwater Horizon Gulf oil spill**

The Event

On April 20, 2010, the mobile drilling unit Deepwater Horizon was drilling an exploratory well for BP Exploration and Production, Inc. (BP), when it violently exploded, caught fire, and eventually sank, killing 11 workers. Oil flowed unabated one mile below the surface. The well could not be capped for 87 days, and oil spewed into the Gulf, eventually covering thousands of square miles and polluting beaches, bays, estuaries, and marshes from the Florida Panhandle to west of the Mississippi River Delta. At one point, 37% of the Gulf was closed to fishing. Approximately 210 million gallons escaped from the well. Approximately 771,000 gallons of dispersants were used on the surface and at the well head one mile below. This was an environmental disaster of unprecedented proportions and a devastating blow to the resource-dependent economy of the region.

Oil contaminating Louisiana beaches in May was manually removed; more difficult to clean were the state's marshes and estuaries, the area knit together by delicate plant life. By June, oil and tar balls were found on Mississippi, Alabama, and Florida beaches, with 1,100 miles of shoreline polluted; nearly three years later, about 340 miles of coast were still in need of cleanup. Coast Guard cleanup patrols drew to a close in Alabama, Florida, and Mississippi in June 2013 and in Louisiana in April 2014, but crews remained available as needed.

Thousands of birds, mammals, and sea turtles were plastered with oil and died. As of 2014, some 950 whales and dolphins had been found stranded, representing only a tiny percentage of the animals affected. Birds were particularly vulnerable, and many perished from ingesting oil as they tried to clean themselves or because they could not regulate their body temperature. The brown pelican, recently delisted as an endangered species, was among the species most affected.

Restoration efforts

Restoration of damaged natural resources was urgent immediately following the spill. By April 2011, an Early Restoration Plan and Environmental Assessment was put in place between BP and trustees from the National Oceanic and Atmospheric Administration (NOAA) and the Department of the Interior, as well as from Texas, Louisiana, Florida, Alabama, and Mississippi, with \$1 billion in funds from BP. Each state was to receive \$100 million, with the remainder to be used by the Department of the Interior and NOAA. The projects were to address an array of injuries throughout the Gulf. Included in Phase I of the Early Restoration Plan and Environmental Assessment were two oyster projects, two marsh projects, a nearshore artificial reef project, two dune projects, and a boat-ramp enhancement project. These projects were to address injuries to mammals and marine organisms, on the coast and offshore, and/or to compensate for lost recreational opportunities for the public.

Projects added in Phase II Early Restoration Plan and Environmental Assessment were titled (1) Enhanced Management of Avian Breeding Habitat Injured by Response in the Florida Panhandle, Alabama, and Mississippi and (2) Improving Habitat Injured by Spill Response: Restoring the Night Sky (to allow normal nesting habitat for loggerhead sea turtles). The more detailed October 2014 Phase III Early Restoration Plan and Environmental Assessment listed preferred alternatives intended to contribute to (1) restoring habitats and living coastal and marine resources and (2) providing and enhancing recreational opportunities. These included 44 projects totaling \$627 million, with 53% going to habitats and 37% to recreational opportunities. Within the ecological project category, barrier island restoration and dune projects account for \$319 million of estimated project costs, followed by living shoreline (\$66.6 million), oyster (\$8.6 million), and seagrasses (\$2.7 million).

Ongoing concerns

Funding: It is still early days in the lifetime of this spill and its aftermath and too soon to know how long restoration will take. The trustees have noted that “Restoration work will take many years to complete, and long-term monitoring and adaptive management of the Gulf ecosystem will likely continue for decades until the Trustees can be certain that the public has been fully compensated for its losses” ([Deepwater Horizon Oil Spill Phase I Early Restoration Plan and Environmental Assessment](#), p. ES-3). The trustees emphasized that the early restoration projects listed were not intended to provide the full extent of restoration needed to satisfy the trustees’ claims against BP, stating: “Restoration . . . will continue until the public is fully compensated for the natural resources and services that were lost as a result of the Spill” (*ibid.*, p. ES-5). The National Wildlife Federation has outlined several sources of funding that should, hopefully, be available: <http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2014/04-07-14-Gulf-Report-2014.aspx>

- Early Natural Resource Damage Assessment Restoration Phases I-III with BP agreeing to \$1 billion in funding as described above.

Other potential funding is as follows:

- Natural Resource Damage Assessment (full amount still to be determined): Under the Oil Pollution Act, the responsible company must pay for cleanup and restoration of lost resources. The responsible parties could pay the amount defined in the restoration plan, or they could challenge it, initiating further legal action.
- Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act: The amount paid will depend on the outcome of the trial. BP could pay from \$3.6 billion to \$14 billion into the Gulf Coast Restoration Trust Fund. Transocean has settled, with \$800 million going to the trust fund.
- Criminal settlements through the Justice Department: \$2.544 billion in settlements against BP and Transocean goes to the National Fish and Wildlife Foundation for projects benefiting Gulf natural resources affected by the spill.
- Gulf Environmental Benefit Fund: This fund will invest a total of \$1.272 billion in barrier island and river diversion projects in Louisiana; \$356 million per state in ecosystem restoration in Alabama, Florida, and Mississippi; and \$203 million in restoration efforts in Texas.
- Migratory Bird Treaty Act: For criminal violations of this act, BP agreed to pay \$100 million for wetlands restoration and conservation in Gulf States or to otherwise benefit migratory birds affected by the Deepwater Horizon spill.

The above funding sources sound promising, but only time will tell whether the funding is sufficient, how much payment will be contested, and how successful restoration efforts will be.

Remaining oil: Although most of the oil has been removed by cleanup operations and other natural mechanisms, up to 35% of the hydrocarbons were trapped and transported in persistent deep-sea plumes, which can harm the population recovery of exposed animals.

Ongoing harm to wildlife: According to published research from NOAA researchers, the Deepwater Horizon blowout and subsequent oil spill adversely affected deep-sea animals living in bottom sediment, and recovery of deep-sea soft-bottom habitat and the associated communities in the vicinity of the blowout may take decades or longer. (*Montagna PA, et al. (2013) Deep-Sea Benthic Footprint of the Deepwater Horizon Blowout. PLoS ONE 8(8): e70540*). This is concerning as these organisms serve vital functions in the deep-sea ecosystem (e.g., organic matter decomposition and nutrient regeneration) and in carbon cycling, and are a critical part of the food web base. A recent report has shown that harmful aftereffects of the BP spill persist for many larger and better known animals, with 14 species showing symptoms of oil exposure, and that oil remains in the seabed, washing up on beaches, and in marshes. (Four Years Into the Gulf Oil Disaster: Still Waiting for

Restoration. <http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2014/04-07-14-Gulf-Report-2014.aspx> In 2013, dolphins were still stranding at more than three times the average annual rates before the spill, according to the report, and oyster reproductive rates were depressed. Many sea turtles continue to be found stranded in areas affected by the spill. In a recent report from Stanford, heart toxicity was noted in fish exposed in the Gulf Oil Spill. (*Block BA et al. Crude Oil Impairs Cardiac Excitation-Contraction Coupling in Fish. Science 14 February 2014: 772-776.*) A 2013 study by NOAA in Barataria Bay, LA, which was heavily oiled during the spill, found dolphins were underweight, anemic, and showing signs of liver and lung disease; roughly half were extremely sick, many suffering from lung and adrenal disorders known to be linked to oil exposure. (*Health of Common Bottlenose Dolphins in Barataria Bay, Louisiana, Following the Deepwater Horizon Oil Spill. Environmental Science & Technology 2014; 48, 93-103*)

Although BP has pledged or provided monies for initial restoration projects as described above, it will be many years before it is known if natural resources restoration is complete (or at least as complete as is possible after such a spill). Finally, it is very worrisome that, although BP did pledge monies for environmental restoration, it is now disputing some of the claims of continuing harm to animals, and it is by no means certain that BP will fund all necessary environmental restoration. In the same vein, BP is now disputing economic claims of people living along the Gulf Coast, as well as fighting court battles over assignment of blame for the disaster.

- **2013 Mayflower AK Exxon tar sands spill**

The event

The 2013 Mayflower oil spill occurred on March 29, 2013, when an ExxonMobil pipeline carrying Canadian tar sands ruptured in Mayflower, AR, spilling directly into a residential neighborhood and into nearby waterways, including an unnamed creek, wetlands, and Lake Conway. (Mayflower Oil Spill.

http://en.wikipedia.org/wiki/2013_Mayflower_oil_spill

Many residents were immediately forced to evacuate their homes. The 20-inch-diameter Pegasus pipeline was nearly 70 years old and carried 95,000 barrels per day for the 850 miles from Patoka, IL, to Nederland, TX. Company officials at the scene claimed the spill was simply "heavy oil," but when the EPA checked with an Exxon safety law attorney, it became clear the spill involved dilbit (diluted bitumen), otherwise known as oil sands or tar sands. The spill, approximately 210,000 gallons total, covered some streets and lawns, ruined 22 homes and other property in the neighborhood, sickened residents, and killed birds, turtles, and other wildlife in the surroundings.

Exxon shut two valves 18 miles apart to isolate the ruptured section, with the line leaking for 12 hours longer as it lost pressure, according to PHMSA. First responders built dikes and used containment booms in an attempt to minimize wetland contamination. Cleanup by company personnel continued, with approximately 600 people working for Exxon or its contractors, and five EPA employees on site as well. EPA and PHMSA officials initiated an investigation of the spill.

For some unknown reason, on April 1, 2013 the Federal Aviation Administration (FAA) closed the airspace for a five-mile radius around the site, up to 1000 feet, allowing only aircraft operations under the direction of the Exxon aviation advisor. The FAA later changed the restriction to allow outside media to observe (if they were indeed there), explaining that media should not have been restricted to begin with. It is not clear what really happened or why, but this baffling order did have the effect of disallowing aerial photography during the early spill, a critical interval. It should also be noted that Exxon strictly policed the area of the spill and would not allow any outsiders in, which lends an air of uncertainty to their dead animal counts and likely more.

For several weeks after the spill, local residents complained about the "horrible smell" in the area, and several were sickened with symptoms characteristic of exposure to petrochemicals (dizziness, headaches, nausea and vomiting). Some residents continued to be sickened for months, and some of these had to move away, in addition to those whose homes were destroyed.

The legal and regulatory front

On April 2, 2013, PHMSA issued a corrective action order preventing restarting of the pipeline until the agency was satisfied with repairs and all safety concerns had been addressed (not yet restarted as far as one can tell). Arkansas Attorney General Dustin McDaniel promised a state investigation into the cause and impact of the spill.

In a letter to ExxonMobil, McDaniel stated: "There are many questions and concerns remaining as to the long-term impacts, environmental or otherwise, from this spill." Nuss, J. (April 2, 2013). Arkansas Oil Spill Investigation: State Attorney General to Look into ExxonMobil Pipeline Rupture. *Huffington Post*. He asked ExxonMobil to preserve records pending his investigation. Mr. McDaniel noted that the rupture itself was 22 feet long and that a team of experts for the state were combing through pipeline documents and environmental samples. McDaniel also requested \$4 million from Exxon to immediately establish a fund to pay for the state's investigative expenses. He stated that this was consistent with federal law and the approach taken by the attorney generals for Gulf Coast states, which were advanced considerable sums right away by the responsible party, BP. There is currently a pending lawsuit by the Department of the Interior and the state of Arkansas against Exxon.

In assessing the pipeline rupture, PHMSA had previously noted that an original manufacturing defect by a now-defunct Youngstown steel pipe company had contributed to the accident. In November, PHMSA found Exxon liable for nine probable violations of safety rules, with accompanying hefty fines, stating that Exxon did not adequately account for risks posed by the pipeline: (Exxon faces \$2.7 Million fine for Arkansas pipeline spill. Wed Nov 6, 2013

<http://www.reuters.com/article/2013/11/07/us-usa-exxon-fine-idUSBRE9A603X20131107>

"Specifically, the operator failed to include the susceptibility of its Youngstown, pre-1970 . . . pipe seam to failures as a risk factor for the Pegasus Pipeline System in the implementation of its integrity management program." Exxon found PHMSA's reasoning flawed, but Senator Mark Pryor praised PHMSA's decision, stating, "Exxon has caused undue harm to Arkansas families and must be held accountable." (Exxon faces \$2.7 Million fine for Arkansas pipeline spill. Wed Nov 6, 2013

<http://www.reuters.com/article/2013/11/07/us-usa-exxon-fine-idUSBRE9A603X20131107>

Of real concern: Environmental assessment and restoration

The environment is expected to be significantly and negatively affected after the Exxon spill due to several factors. First, it was a tar sands spill—which is vastly more difficult to manage than a classic crude oil spill—involving approximately 210,000 gallons. Second, it appears that best practices have not been followed in the aftermath of the spill. It is crucial that environmental injuries be assessed starting immediately after any serious spill, especially of tar sands, which sink, stick to everything, and get “lost” in the environment. In the case of some other large spills—such as the Kalamazoo River spill and the BP Gulf oil spill—highly trained and experienced professionals, including biologists, from NOAA, USFWS, EPA, and the US Coast Guard, as appropriate, have been brought in quickly, even before full assessment, to initiate the Natural Resource Damage Assessment (NRDA) process and other measures likely to be urgently needed to save wildlife and other natural resources. This does not appear to have been done for the Mayflower spill. (Arkansas Oil Spill Damage Assessment: If Not the Feds, Then Who?

<http://insideclimatenews.org/news/20130425/arkansas-oil-spill-damage-assessment-if-not-feds-then-who>) States are not authorized to carry out an NRDA themselves and would not have the requisite expertise. The Arkansas Department of Environmental Quality and the Arkansas Game and Fish Commission are nominally in charge of surveying the damage to oil-hit wildlife, wetlands, soil, and groundwater along the mile-long spill site but are candid about having very little experience in handling restoration after such a major oil spill. A volunteer group there, the Faulkner County Citizens Advisory Group, is aware of these matters and has had meetings about the spill and the need for an NRDA, but has no significant funding. Finally, unfortunately,

there is evidence that oil which reached water is still remaining: The latest “sheen reports” from August of 2014 indicate there is still oil on the surface of water in the cove adjacent to the lake. Arkansas Department of Environmental Quality. Available Reports. Mayflower Oil Spill.

http://www2.adeq.state.ar.us/hazwaste/mayflower_oil_spill_2013/oil_spill_available_reports.htm

In sum

Although Enbridge has stated that it has a much improved safety culture since the Kalamazoo spill, its actions even during the four years of post-spill cleanup are not strongly reassuring to some Dane County citizens. Moreover, the proposed flow rate in Dane County—1.2 million barrels per day—means that a full rupture would equal the size of the Kalamazoo spill in *just 40 minutes*. It is imperative that Dane County be insured against such a catastrophe.

Given that Enbridge is a Master Limited Partnership, with profits distributed among partners and thus with little cash on hand; given that the Kalamazoo tar sands spill cost more than \$1.2 Billion, and that Enbridge’s current insurance (to cover any and all Enbridge spills) is well below that figure; and given that their insurance excludes pollution coverage, therefore Dane County residents and taxpayers should be protected against the expense of an Enbridge spill here by requiring Enbridge have adequate insurance coverage including Environmental Impairment Liability (EIL) insurance, with Dane County as a named insured.

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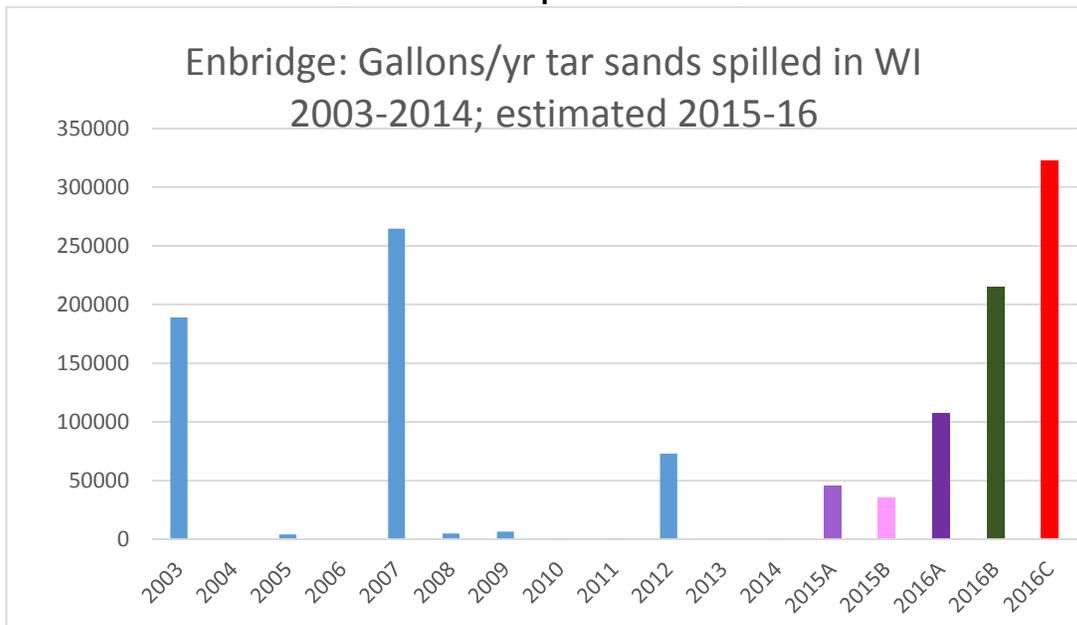
Earthday Town Hall 4/22/13. Hosted by Faulkner County Citizens' Advisory Group.

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What can we expect in the future?



KEY:

2006 thru 2014 are data from Pipeline & Hazardous Materials Safety Administration

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2003-2005 from Wikipedia http://en.wikipedia.org/wiki/List_of_pipeline_accidents_in_the_United_States_in_the_21st_century

2015A data: Predicted based on mean gallons spilled in WI 2003-2014 spills

2015B and all 2016 data: predicted values based on expected billion barrel-miles/yr on line 61, with historical Enbridge spill vol/unit throughput (bbl spilled/billion bbl-miles), 1996-2006

(<http://www.enbridge.com/AboutEnbridge/CorporateSocialResponsibility/CSRReports.aspx>)

2016B value included assumption of two fold increased spill risk due to increased operating pressure

2016C value included assumption of three fold increased spill risk due to increased operating pressure

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