TAR SANDS OIL AND PIPELINE SAFETY: EXAMINING REGULATORY SHORTCOMINGS

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I. INTRODUCTION

Worldwide, both demand for energy and the cost of the crude oil that has traditionally provided that energy are continuing an upward trend; the world is using more energy and paying more for what it uses.[1] This increasing demand means sources of energy, which were historically too difficult and costly to extract, are now becoming economically viable for energy producers.[2] One such resource is tar sands oil.[3] One of the major advantages of tar sands oil as an energy source is its availability.[4]

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1. *Petroleum Prices: Crude Oil Spot Prices*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D (last visited Feb. 28, 2012).

2. *Alberta's Oil Sands: About the Resource*, GOV'T OF ALTA., http://www.oilsands.alberta.ca/resource.html (last visited Feb. 28, 2012).

3. *Id.*

4. *Id.*

Massive deposits are located in Alberta, Canada, making tar sands oil an apparently attractive option to replace Middle Eastern imports.[5] However, production of usable fuel from tar sands oil has several major drawbacks, particularly from an environmental standpoint: extraction of the resource causes significant damage to local ecosystems,[6] the fuel itself is "dirtier" than typical crude oil,[7] and finally, transportation of tar sands oil through pipelines may carry increased risks of spilling.[8] This Note will concentrate only on the latter issue, discussing how increased risks associated with pipeline transportation of tar sands oil are currently being addressed, and will also offer suggestions for improvements in pipeline safety regulation to better mitigate those risks.

II. BACKGROUND

A. What Is "Tar Sands Oil"?

Tar sands, also referred to as oil sands, are naturally-occurring petroleum deposits composed of a "mixture of sand, clay or other minerals, water and bitumen."[9] Bitumen "is a heavy and extremely viscous" form of petroleum that is nearly solid at room temperature.[10] Because of its viscosity, the bitumen in tar sands involves considerably more processing and refining than conventional crude oil.[11] Transporting the bitumen from tar sands requires dilution with hazardous chemicals to make it liquid enough to pump through pipelines.[12] However, one aspect of tar sands extraction makes it very attractive in today's energy market: tar sands deposits amount to approximately two trillion barrels worth of

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5. *Id.*

6. Robert Kunzig, *The Canadian Oil Boom*, NAT'L GEOGRAPHIC, Mar. 2009, at 4, *available at* http://ngm.nationalgeographic.com/2009/03/canadian-oil-sands/kunzig-text/4.

7. *Id.* at 5.

8. ANTHONY SWIFT, SUSAN CASEY-LEFKOWITZ & ELIZABETH SHOPE, NATURAL RES. DEF. COUNCIL, TAR SANDS PIPELINES SAFETY RISKS 6 (2011) [hereinafter PIPELINES SAFETY RISKS], *available at* http://www.nrdc.org/energy/files/tarsandssafetyrisks.pdf.

9. *What is Oil Sands?*, GOV'T OF ALTA., http://www.energy.gov.ab.ca/OilSands/793.asp (last visited Nov. 18, 2011) [hereinafter *What is Oil Sands?*].

10. *Id.*

11. Andrew C. Mergen, *The Mining of the North: A Review of Andrew Nikiforuk's Tar Sands: Dirty Oil and the Future of a Continent*, 21 VILL. ENVTL. L.J. 219, 221 (2010) (book review).

12. *About Tar Sands*, ARGONNE NAT'L LAB. OIL SHALE AND TAR SANDS PROGRAMMATIC EIS INFORMATION CENTER (2012), http://ostseis.anl.gov/guide/tarsands/index.cfm [hereinafter *About Tar Sands*].

oil reserves,[13] compared to approximately 1.34 trillion barrels of proven crude oil reserves.[14] Currently, however, only Canada is pursuing full-scale production, from its Athabasca deposits located in the province of Alberta.[15]

B. Extraction

Whereas conventional crude oil extraction generally involves little more than drilling a hole and pumping out the liquid oil, extraction of tar sands is a much more involved process.[16] There are two primary methods for extracting bitumen from tar sands oil: mining and *in situ* extraction.[17] The method employed at any particular tar sands deposit depends on the nature of that deposit.[18] Tar sands deposits, which are closer to the surface, tend to be colder and thus more viscous; in these deposits, mining techniques are generally used.[19] Conversely, deeper tar sands deposits are usually warmer and more fluid; in such formations, a technique known as steam extraction is commonly employed.[20]

Surface mining accounts for a little over half of the tar sands production in Alberta.[21] Extraction of near-surface tar sands is much like a strip mining operation, requiring heavy earthmoving equipment to clear away the dirt and rocks (and natural ecosystems) covering the thick,

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13. *Id.*

14. *International Energy Statistics*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=5&pid=57&aid=6 (last visited Nov. 18, 2011).

15. *About Tar Sands, supra* note 12. There are also large tar sands deposits in the western United States and in Venezuela. *Id.* There is some small-scale commercial production occurring in Venezuela, but U.S. tar sands deposits are not currently being developed. *Id.* This is partly due to the fact that U.S. tar sands have a different composition that makes them more costly to refine and partly due to concerns about the large water demands that accompany tar sands extraction. *Id.*

16. *Id.*

17. *Id.* As the tar sands industry grows, it will no doubt continue to invest in improved extraction technologies, which will hopefully lead to both increased production efficiency and decreased environmental impact. One of the largest Canadian tar sands companies invests $50 million yearly into research to improve extraction techniques. SYNERGY SYNCRUDE CAN. LTD., 2008/9 SUSTAINABILITY REPORT 23 (2009), *available at* http://www.syncrude.ca/pdf/Syncrude-SD-report.pdf.

18. *See Fact Sheet: U.S. Tar Sands Potential*, U.S. DEP'T OF ENERGY OFF. OF PETROLEUM RESERVES 1, http://circleofblue.org/waternews/wp-content/uploads/2010/08/Tar_Sands_Fact_Sheet.pdf (last visited Sept. 28, 2013) [hereinafter *Tar Sands Fact Sheet*].

19. *Id.*

20. *Id.*

21. *Facts and Statistics*, GOV'T OF ALTA., http://www.energy.gov.ab.ca/OilSands/791.asp#Production (last visited Nov. 18, 2011).

asphalt-like deposits.[22] Tar sands companies employ massive electric shovels and fleets of enormous trucks to strip away the overburden to reveal the tar sands fields.[23] The scale of these operations is simply tremendous.[24]

Mining the tar sands is only the first step.[25] After the thick, tar-like substance is removed from the earth, it must be processed to separate the bitumen from the sand, clay, and other minerals that are also trapped in the tar sand.[26] The tar sand is treated with hot water and then agitated, making the bitumen rise to the top of the slurry mixture, where it can be skimmed off.[27] The rest of the slurry, referred to as "tailings," is dumped into man-made ponds, where the suspended solids are allowed to settle, a process that can take years.[28] These ponds, like the mines, are simply massive—more lake than pond, covering an area of over 170 square kilometers and containing over 840 million cubic meters of tailings.[29]

In situ extraction techniques have a less dramatic impact on the landscape, but the scale at which they are employed is no less massive.[30]

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22. *Recovery*, GOV'T OF ALTA., http://www.energy.gov.ab.ca/OilSands/1719.asp (last visited Nov. 18, 2011) [hereinafter *Recovery*].

23. *About Tar Sands*, *supra* note 12. In fact, the largest trucks used to mine tar sands average about 50 feet tall, weigh approximately 1,375,000 pounds, and can carry up to 400 tons of tar sands at one time. *See 797F Mining Truck*, CATERPILLAR INC. 17 (2010), http://xml.catmms.com/servlet/ImageServlet?imageId=C639683; *Mining*, OIL SANDS DEVELOPERS GROUP, http://www.oilsandsdevelopers.ca/index.php/oil-sands-technologies/mining/ (last visited Apr. 2, 2012).

24. The sheer size of tar sands mining operations can be seen by utilizing Google Maps' satellite view. *See* GOOGLE MAPS, http://www.maps.google.com (last visited Oct. 10, 2013). The coordinates for Alberta's largest surface mining projects are 57.019007,-111.57486. Entering these coordinates into Google Maps will provide the reader with some idea of the scale of these open pit mines, especially when compared to the nearby town of Fort McMurray, located to the south of Alberta, which has a population of nearly 50,000 (as of 2006). *See id.*; *Population and Dwelling Counts, for Canada, Provinces and Territories, and Urban Areas, 2006 and 2001 Censuses – 100% Data*, STAT. CAN., http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/hlt/97-550/Index.cfm?TPL=P1C&Page=RETR&LANG=Eng&T=802&SR=1&S=3&O=D&RPP=9999&PR=48&CMA=0 (last modified Jan. 6, 2010).

25. *About Tar Sands*, *supra* note 12.

26. *Id.*

27. *Id.*

28. *ECRB Approves Fort Hills and Syncrude Tailings Pond Plans with Conditions*, ENERGY RESOURCES CONSERVATION BOARD (Apr. 23, 2010), http://www.ercb.ca/news-releases/NR2010-05.pdf.

29. *Id.* at 7.

30. The government of Alberta estimates the total area of tar sands deposits to be approximately 140,000 square kilometers, of which about 4,800 is suitable for surface mining. *Facts About the Resource*, GOV'T OF ALTA., http://www.oilsands.alberta.ca/FactSheets/FS-Resource.pdf (last visited Nov. 18, 2011) [hereinafter *Facts*

The most commonly used *in situ* technique is known as Steam-Assisted Gravity Drainage (SAGD).[31] In this method, superheated steam is injected deep underground into a tar sands deposit.[32] The steam softens the bitumen in the tar sands enough to allow it to "drain" down to an extraction well—which is drilled below the steam injection well—where it is then pumped to the surface.[33] One advantage of this system is that it does not consume nearly as much water as mining,[34] nor does it require the large tailings ponds that accompany tar sands mining operations.[35] SAGD also leaves the sand and other materials in place, extracting only bitumen from the tar sands.[36] However, SAGD and other *in situ* techniques require a large amount of energy to heat the underground bitumen.[37]

C. Upgrading

Once the bitumen is extracted, either by mining or *in situ* techniques, energy companies face another obstacle: at fifty degrees Fahrenheit or less, bitumen is "as hard as a hockey puck."[38] In this state, bitumen is not very useful, so before it can be processed into finished products or even transported, it must first be either upgraded or diluted.[39] The upgrading process produces a product known as synthetic crude, or "syncrude" for short.[40] This product is similar to conventional crude oil and can be

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About the Resource]. The rest, some 135,200 square kilometers, can only be accessed with *in situ* extraction methods. *Id.*

31. *Tar Sands Fact Sheet, supra* note 18.

32. *Recovery, supra* note 22. Other techniques involve variations on the steam-injection theme, but more exotic methods exist, such as injecting chemicals into the underground tar sands formations to dissolve the bitumen, or the "fireflood" technique, which involves igniting an underground fire in a tar sands formation to provide the heat to soften the bitumen. *About Tar Sands, supra* note 12.

33. *Recovery, supra* note 22.

34. *See* UPSTREAM DIALOGUE: THE FACTS ON: OIL SANDS, CANADIAN ASS'N OF PETROLEUM PRODUCERS 39 (2013), *available at* http://www.capp.ca/getdoc.aspx?DocId=220513&DT=NTV [hereinafter UPSTREAM DIALOGUE]. Mining requires an average of 2.7 barrels of water for every barrel of bitumen produced, whereas *in situ* methods require only about 0.5 barrels of water per barrel of bitumen. *Id.*

35. *Recovery, supra* note 22.

36. *Id.*

37. *About Tar Sands, supra* note 12.

38. UPSTREAM DIALOGUE, *supra* note 34, at 5.

39. IHS CERA, OIL SANDS, GREENHOUSE GASES, AND US OIL SUPPLY 2 (2010) [hereinafter *Oil Sands and US Oil Supply*], *available at* http://www.api.org/aboutoilgas/oilsands/upload/CERA_Oil_Sands_GHGs_US_Oil_Supply.pdf.

40. *Id.*

shipped and processed in much the same ways.[41] The upgrading process is usually employed at tar sands mines and requires on-site refining capabilities.[42] Dilution creates a product that is, unsurprisingly, referred to as diluted bitumen or "dilbit."[43] In this process, more commonly employed at *in situ* operations,[44] bitumen is mixed with other lighter petroleum products, typically natural gas condensate, to produce a more fluid substance that can be transported through pipelines for further refining and upgrading.[45]

D. Dangers of Tar Sands Oil

Much of the controversy over tar sands development has been focused on the extraction of tar sands oil and the damage it causes to the environment in the form of increased greenhouse gas emissions, destruction of the Canadian boreal forest, disruption and fragmentation of Alberta's ecosystem, and harm to wildlife.[46] However, extraction is only one part of the process to create useful energy resources out of tar sands.[47] Transporting diluted bitumen poses its own risks as well.[48] Dilbit is much heavier than conventional crude, requiring "higher operating temperatures and pressures to move [it] through a pipe."[49] The mixture is much thicker, much more corrosive, and much more abrasive to pipelines than conventional crude, which can cause damage to the pipeline, increasing the risk of rupture.[50] These properties of dilbit, in

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41. *Facts About the Resource*, *supra* note 30.

42. *Id.*

43. OIL SANDS AND US OIL SUPPLY, *supra* note 39, at 2.

44. *Facts About the Resource*, *supra* note 30.

45. OIL SANDS AND US OIL SUPPLY, *supra* note 39, at 2.

46. *See, e.g.*, Rob Gillies, *Environmentalists Weigh Costs of Alberta Oil Sands*, N.Y. TIMES (Aug. 25, 2008), http://www.nytimes.com/2008/08/25/business/worldbusiness/25iht-sand.4.15617946.html?pagewanted=1&sq=if%20one%20of%20the%20ponds%20spilled %20into%20the%20river&st=cse&scp=2.

47. *See Hearing on "Pipeline Safety Oversight" Before the Subcomm. on Energy and Power of the H. Comm. on Energy and Commerce*, 112th Cong. 1 (2011) [hereinafter *Testimony of Anthony R. Swift*], *available at* http://democrats.energycommerce.house.gov/sites/default/files/image_uploads/Testimony_06.15.11_EP_Swift.pdf (statement of Anthony R. Swift).

48. *Id.*

49. PIPELINES SAFETY RISKS, *supra* note 8, at 6.

50. *Id.* Specifically,

> Bitumen blends are more acidic, thick, and sulfuric than conventional crude oil. DilBit contains fifteen to twenty times higher acid concentrations than conventional crudes and five to ten times as much sulfur as conventional crudes. It is up to seventy times more viscous than conventional crudes. The additional sulfur can lead to the weakening or embrittlement of pipelines.

combination, mean that transporting dilbit through pipelines should require extra care, at the very least.[51]

E. Diluted Bitumen Pipeline Spills

America's aging pipeline infrastructure was simply not designed to handle the transportation of diluted bitumen, the corrosive and abrasive properties of which place increased strain on the pipelines through which it is transported.[52] This situation resulted in disaster in July 2010 when an oil pipeline ruptured near Kalamazoo, Michigan, sending thousands of gallons of petroleum into Talmadge Creek, which feeds the Kalamazoo River.[53] The pipeline, operated by Enbridge Energy Partners, was constructed in 1969 and was carrying diluted bitumen when it burst.[54]

The Enbridge spill also highlights further dangers of transporting diluted bitumen. Like any other oil spill, the Enbridge incident caused significant damage to the environment, killing wildlife, coating water in an oil slick, and possibly causing health problems to those exposed.[55] Unlike conventional crude, however, a spill of diluted bitumen creates some unique and difficult problems.[56] Perhaps the most readily apparent problem that arises in a dilbit spill comes from the diluents mixed with

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> DilBit also has high concentrations of chloride salts which can lead to chloride stress corrosion in high temperature pipelines. Refiners have found tar sands derived crude to contain significantly higher quantities of abrasive quartz sand particles than conventional crude.

Id. (citations omitted).

51. *See infra* Part II.E.

52. PIPELINES SAFETY RISKS, *supra* note 8, at 6.

53. Fritz Klug, *Oil Spills into Calhoun County Creek that Leads to Kalamazoo River*, MLIVE (July 27, 2010, 2:49 PM), www.mlive.com/news/kalamazoo/index.ssf/2010/07/oil_spills_into_creek_that_lea.html.

54. Fritz Klug, *Kalamazoo River Oil Spill Puts Spotlight on Pipeline Regulation*, MLIVE (July 26, 2011, 9:29 AM), http://www.mlive.com/news/kalamazoo/index.ssf/2011/07/kalamazoo_river_oil_spill_puts.html.

55. *See, e.g.*, RALPH DOLLHOPF, U.S. ENVTL. PROT. AGENCY, REGION V, POLLUTION/SITUATION REPORT #114, at 4, 10 (2011), *available at* http://www.epa.gov/enbridgespill/pdfs/sitreps/2011_sitrep_114.pdf (discussing effects on local wildlife); MARTHA STANBUREY ET AL., MICH. DEP'T OF CMTY. HEALTH, ACUTE HEALTH EFFECTS OF THE ENBRIDGE OIL SPILL 3 (2010), *available at* http://www.michigan.gov/documents/mdch/enbridge_oil_spill_epi_report_with_cover_11_22_10_339101_7.pdf (discussing health effects of exposure to the Enbridge spill); *Toxicologist: Michigan Oil Spill in Kalamazoo River Far More Toxic Than Admitted*, MICH. MESSENGER (Sept. 1, 2011), http://washingtonindependent.com/111092/toxicologist-michigan-oil-spill-far-more-toxic-than-admitted (describing symptoms common to many people who are exposed to oil spills).

56. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 7.

the bitumen.[57] These lighter chemicals, including benzene, a highly dangerous solvent and known carcinogen,[58] tend to evaporate when the dilbit is exposed, dispersing into the air where they can come into contact with people and animals.[59]

Once the volatile diluents evaporate away, the heavy, thick bitumen remains.[60] In a typical oil spill, most of the oil is relatively easy to recover since conventional crude tends to float on water and can be skimmed off, whereas bitumen is heavier than water and tends to sink to the bottom of the water body, mixing with sediment.[61] This means that when bitumen spills do occur, they are much more difficult to clean up—a fact that became clear during the Talmadge Creek cleanup effort.[62] The submerged bitumen has hampered remediation efforts for the Enbridge spill, resulting in a job—originally expected to take two months—now approaching the two-year mark.[63]

Because of the additional challenges and risks involved in transporting diluted bitumen, along with the increased hazards and possibility of widespread, lasting damage in the event of a spill, lawmakers and regulators need to develop a comprehensive response to the increasing use of this newer energy source. Pipelines that were built only with conventional crude oil in mind are not sufficient to handle the increased corrosion and abrasion caused by transporting diluted bitumen.[64] As Canadian energy companies increase their tar sands production capacity and the United States imports more and more tar sands oil, failure to proactively address the issue could result in even more devastating environmental disasters.[65]

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57. *Id.* Diluents are chemicals mixed with bitumen to create diluted bitumen, which is a solution fluid enough to pass through pipelines. *Id.*

58. *See Materials Safety Data Sheet – Benzene*, NOVA CHEMICALS (Jan. 17, 2011), http://www.novachem.com/product%20Documents/Benzene_MSDS_AMER_EN.pdf. *See also Benzene*, OCCUPATIONAL SAFETY AND HEALTH ADMIN., http://www.osha.gov/SLTC/benzene/ (last visited March 20, 2012) (describing short- and long-term effects of benzene exposure, including leukemia).

59. PIPELINES SAFETY RISKS, *supra* note 8, at 7.

60. *See id.*

61. *Id.*

62. Kari Lydersen, *A Year After Pipeline Spill, Tar Sands Oil Still Plagues a Michigan Community*, ONE EARTH (July 25, 2011), http://www.onearth.org/article/tar-sands-oil-plagues-a-michigan-community.

63. *Id.*

64. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 6.

65. Sadly, in the summer of 2011, a pipeline in Montana ruptured, contaminating the Yellowstone River with crude oil. Laura Zuckerman, *Montana Spill Pipeline May Have Carried Oil Sands Crude*, REUTERS (July 14, 2011), http://www.reuters.com/article/2011/07/15/us-oil-spill-montana-idUSTRE76E0OJ20110715. Although representatives from Exxon, which owns the pipeline, initially stated that it carried only conventional

F. The Current State of Pipeline Regulation

In the United States, pipeline safety regulation is largely federally-driven with varying levels of state involvement.[66] Interstate pipelines, predictably, fall under the jurisdiction of the federal government.[67] The regulatory body responsible for pipeline safety is the Office of Pipeline Safety (OPS), part of the Pipeline and Hazardous Materials Safety Administration (PHMSA).[68] OPS is responsible for carrying out the requirements of 49 U.S.C. § 601, which requires the agency to establish minimum safety standards for pipelines.[69] Under 49 U.S.C. § 60102, the standards that OPA sets must be "practicable," while providing for pipeline safety and environmental protection.[70] In setting the standards, OPA must consider all "relevant available . . . safety information [and] environmental information," as well as the costs and benefits of prospective regulations.[71]

The regulations that have been promulgated are codified in 49 C.F.R. §§ 190 through 199.[72] Liquid pipeline safety regulations are contained in 49 C.F.R. § 195.[73] These regulations provide thorough safety guidelines for every part of the pipeline construction and operation process.[74] PHMSA has established detailed regulations that cover nearly every aspect of hazardous liquid pipelines, from reporting[75] to testing procedures[76] and design requirements.[77] These regulations are thorough; however, there is one major problem as far as tar sands oil is concerned. Under PHMSA's regulatory scheme, there is no distinction between

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crude oil, they later admitted that the pipeline sometimes carries tar sands oil from Alberta. *Id.* Increased corrosion and wear on the pipeline from the diluted bitumen may have contributed to the rupture. *See id.*

66. *See Pipelines and Safety*, ASS'N OF OIL PIPE LINES 2, http://www.aopl.org/files/Pipelines_and_Safety.pdf (last visited February 29, 2012).

67. *See* 49 U.S.C.A. § 60102 (West 2012).

68. *About Us*, PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMIN., http://phmsa.dot.gov/pipeline/about (last visited February 26, 2012).

69. 49 U.S.C.A. § 60102(a)(2) (West 2012) ("The Secretary shall prescribe minimum safety standards for pipeline transportation and for pipeline facilities."). *Id.*

70. *Id.* § 60102(b)(1).

71. *Id.* § 60102(b)(2). OPA must also consider public comments when fashioning its regulations. *Id.*

72. 49 C.F.R. §§ 190-99 (2005).

73. 49 C.F.R. § 195 (1991).

74. *See* 49 C.F.R. §§ 195.0-195.589.

75. *See, e.g.*, 49 C.F.R. § 195.54 (2011).

76. *See, e.g.*, 49 C.F.R. § 195.308 (1994).

77. *See, e.g.*, 49 C.F.R. § 130.1 (2005).

"petroleum [and] petroleum products" and the diluted bitumen produced from tar sands mining.[78]

III. ANALYSIS

A. Problems with the Current Regulatory Scheme

As discussed above, the current federal pipeline safety regulatory scheme makes no distinction between diluted bitumen and conventional crude oil.[79] The problem with PHMSA and OPS treating diluted bitumen the same as regular crude oil is that, as noted above, diluted bitumen has very different qualities.[80] Under PHMSA's regulations there is no requirement to build more robust pipelines that can withstand the increased stresses inherent in diluted bitumen transport.[81] As a result, there is nothing to prevent pipeline operators from simply transporting diluted bitumen in pipelines originally designed for crude oil—which is precisely what happened in the Enbridge spill.[82]

B. Addressing Regulatory Shortcomings on the State Level

There are several possible responses to this problem. The pipeline safety statutes allow for state regulation of intrastate pipelines by a certification process.[83] Once certified, states must ensure that the

78. 49 C.F.R § 195.2. In fact, there is no mention at all of diluted bitumen or tar sands in the regulations. Perhaps this fact will change in the near future with recently enacted amendments to 49 U.S.C. § 601, which will require the agency to conduct a study of diluted bitumen's safety in pipeline transportation. *See* Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Pub. L. No. 112-90, 125 Stat. 1904 (2012) [hereinafter Pipeline Safety Act].

79. *See, e.g.*, 49 C.F.R. § 195.308.

80. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 6.

81. *See* 49 C.F.R. §§ 195.100-.589.

82. Klug, *supra* note 54.

83. 49 U.S.C.A. § 60105 (West 2012). The certification process requires the state to satisfy a number of conditions. A state seeking to become certified to regulate its intrastate pipelines must show that it

> (1) has regulatory jurisdiction over the standards and practices to which the certification applies;
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> (2) has adopted, by the date of certification, each applicable standard prescribed under this chapter or . . . is taking steps to adopt that standard;
>
> (3) is enforcing each adopted standard through ways that include inspections conducted by State employees . . . ;
>
> (4) is encouraging and promoting the establishment of a program designed to prevent damage by demolition, excavation, tunneling, or construction activity to the pipeline facilities to which the certification applies that subjects persons who violate the applicable requirements of that program to civil penalties and

federally-mandated minimum safety requirements are enforced, but states are also free to set more stringent requirements on intrastate pipelines.[84] Not every state has elected to do so, however.[85] States that decline certification leave regulation of intrastate pipelines to the OSP.[86]

Aside from certification, states can also receive permission from the agency to act as an "interstate agent."[87] As an interstate agent, a state may "participate in the oversight of interstate pipeline transportation."[88] Enforcement of pipeline safety regulations remains within the jurisdiction of the federal government.[89] Before the agency can grant a state "interstate agent" status, the Secretary must determine that such an agreement with the state would be consistent with federal pipeline regulation and would neither impede interstate commerce nor place the safety of the public in danger.[90] By achieving certification and interstate

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other enforcement actions that are substantially the same as are provided under this chapter, and addresses the elements in section 60134(b);
(5) may require record maintenance, reporting, and inspection substantially the same as provided under section 60117 of this title;
(6) may require that plans for inspection and maintenance under section 60108 (a) and (b) of this title be filed for approval; and
(7) may enforce safety standards of the authority under a law of the State by injunctive relief and civil penalties substantially the same as provided under sections 60120 and 60122(a)(1) and (b)-(f) of this title.

Id.

84. *Id.*

85. *State Pipeline Safety Policy*, PIPELINE SAFETY TRUST, http://pstrust.org/about-pipelines1/regulators-regulations/state-pipeline-safety-policy (last visited Sept. 29, 2013).

86. 49 U.S.C. § 60105. States may elect not to participate for a variety of reasons. A state that simply does not have many pipelines running through it may decide to avoid the cost of regulating by leaving it to OSP. Similarly, states with tight budgetary constraints may decide that taking over regulation of intrastate pipelines is not worth the cost. 49 U.S.C.A § 60107 does provide for grants to certified states that can cover up to eighty percent of the cost of a state's pipeline regulatory program. 49 U.S.C.A § 60107 (West 2012). However, finding the resources in the state budget to cover the remaining twenty percent may still be difficult for many states.

87. 49 U.S.C.A. § 60106 (West 2012). Pursuant to § 60106(b)(1), the Secretary has the authority to allow states to take over inspection and monitoring of *inter*state pipelines as well as complete regulation of *intra*state pipelines. *Id.* Enforcement for interstate pipelines remains the exclusive responsibility of OSP, however. *Id.*

88. *Id.*

89. *Id.*

90. *See id.* The specific determinations that the Secretary must make before a state can be certified are:

(A) the agreement allowing participation of the State authority is consistent with the Secretary's program for inspection and consistent with the safety policies and provisions provided under this chapter;

agent status, Michigan will be able to have greater control over the safety of the hazardous liquid pipelines that run through and across the state.

Because transporting diluted bitumen through pipelines carries with it greater risks due to its greater abrasiveness and corrosiveness, improving inspection and monitoring procedures could help prevent disasters like the Enbridge spill.[91] Early detection of weakened sections of pipe would allow pipeline operators to safely shut off the flow of diluted bitumen and repair the pipeline before it ruptures, preventing serious damage to the environment and human health.[92] The main risk of transporting diluted bitumen through pipelines is that increased rates of corrosion and abrasion result in accelerated wear and deterioration of the pipeline walls, which can result in failures of the pipe earlier than would be expected if the pipeline were only transporting crude oil.[93] Thus, more frequent or more thorough inspection may help prevent pipeline failures and mitigate the destructive effects of diluted bitumen.[94]

California provides an example of what a state can do to improve pipeline safety within its borders. California is one of the few states certified to regulate its intrastate pipelines, and it is an approved interstate agent for inspection and monitoring of interstate pipelines within its borders.[95] California does not impose any stricter regulations on pipeline design or construction than those required by OPS,[96] but it does provide for frequent testing of pipelines in service for longer than

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(B) the interstate participation agreement would not adversely affect the oversight responsibilities of intrastate pipeline transportation by the State authority;

(C) the State is carrying out a program demonstrated to promote preparedness and risk prevention activities that enable communities to live safely with pipelines;

(D) the State meets the minimum standards for State one-call notification set forth in chapter 61; and

(E) the actions planned under the agreement would not impede interstate commerce or jeopardize public safety.

49 U.S.C.A. § 60106.

91. Improved monitoring may have even prevented the Enbridge spill. *See* Emma Graves Fitzsimmons, *Regulators Warned Company on Pipeline Corrosion*, N.Y. TIMES (July 29, 2010), http://www.nytimes.com/2010/07/30/us/30michigan.html.

92. *Id.*

93. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 6.

94. *Id.* at 9.

95. *State Pipeline Safety Policy*, *supra* note 85.

96. *See* CAL. GOV'T CODE § 51012.3 (West 2012). The California legislature simply incorporates the federal regulations into its statute. *Id.*

ten years or those deemed "high risk" pipelines.[97] There are a number of slightly different criteria for placing a pipeline on the high-risk list, but, in essence, this list is for aged and corroded pipelines—exactly the type of pipeline that is at even greater risk from the abrasiveness and corrosiveness of diluted bitumen.[98]

Although states can take some action to increase pipeline safety by regulating intrastate pipelines and monitoring interstate pipelines,[99] the most straightforward way to address the increased danger from transporting diluted bitumen would be through a federal initiative. Because the federal government sets the minimum "floor" for pipeline safety standards,[100] a new federal regulation requiring either construction of pipelines with increased durability and corrosion resistance, or increased frequency and detail of inspection of pipelines used for transportation of diluted bitumen, would implement such changes across the country.

C. Addressing Regulatory Shortcomings at the Federal Level

Congress has not been ignorant of recent public attention to tar sands oil and the risks of transporting diluted bitumen.[101] Recently, Congress passed an amendment to the Pipeline Safety Act, a detailed statute covering every part of the pipeline life cycle from design and construction standards to inspection and maintenance requirements.[102] In this amendment, Congress charged the Secretary of Transportation with

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97. CAL. GOV'T CODE § 51013.5 (West 2012). Pipelines over ten years of age that are not equipped with cathodic corrosion protection and that are deemed high-risk are tested annually. *Id.*

98. *Id.* The statute requires the Fire Marshal (whose office administers the California pipeline safety regulations) to place on the high-risk list any pipelines that:

> (1) Have suffered two or more reportable leaks . . . due to corrosion or defect in the prior three years.
>
> (2) Have suffered three or more reportable leaks . . . due to corrosion, defects, or external forces, but not all due to external forces, in the prior three years.
>
> (3) Have suffered a reportable leak . . . due to corrosion or defect of more than 50,000 gallons, or 10,000 gallons in a standard metropolitan statistical area, in the prior three years; or have suffered a leak due to corrosion or defect which . . . has resulted in more than 42 gallons of a hazardous liquid . . . entering a waterway in the prior three years; or have suffered a reportable leak of a hazardous liquid with a flashpoint of less than 140 degrees Fahrenheit . . . in the prior three years.

Id.

99. 49 U.S.C.A. § 60106 (West 2012).

100. 49 U.S.C.A. § 60105 (West 2012).

101. *See infra* notes 102-103 and accompanying text.

102. *See* Pipeline Safety Act, 49 U.S.C.A. §§ 60101-60140.

conducting a "comprehensive review" of pipeline regulations to determine whether the current regulatory scheme adequately addresses the hazards of diluted bitumen.[103] The results of this study could result in a modification of current pipeline safety statutes and regulations to address the different challenges posed by transportation of diluted bitumen.

If the Secretary finds that diluted bitumen does indeed create complications for pipeline transportation that do not exist for crude oil, there appear to be two main ways to address the problem. The first, and perhaps easiest, is simply to enhance federal and state inspection and monitoring of pipelines.[104] California's statute could be instructive here.[105] Those pipelines that are older or known to be corroded are riskier even when just transporting crude oil; pumping diluted bitumen through them will only increase this risk.[106] Frequent and thorough inspection can help mitigate the risk by detecting critical weakening of the pipelines *before* they rupture.[107]

Alternatively, PHMSA could adopt regulations that focus on the design and construction of pipelines in order to mitigate the damaging effects of diluted bitumen on pipelines.[108] Pipelines that carry diluted bitumen could be built with thicker pipe, for instance, which would be able to withstand the abrasion and corrosion of diluted bitumen for a longer period of time before failure.[109] Other mitigation techniques such

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103. Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Pub. L. No. 112-90, § 16, 125 Stat. 1904, 1921 (2012). Specifically, Congress instructed that:

> [T]he Secretary of Transportation shall complete a comprehensive review of hazardous liquid pipeline facility regulations to determine whether the regulations are sufficient to regulate pipeline facilities used for the transportation of diluted bitumen. In conducting the review, the Secretary shall conduct an analysis of whether any increase in the risk of a release exists for pipeline facilities transporting diluted bitumen.

Id.

104. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 12. Enhanced monitoring would allow the use of existing pipelines for the transportation of diluted bitumen and would be faster to implement than more stringent design requirements.

105. *See supra* notes 96-98.

106. PIPELINES SAFETY RISKS, *supra* note 8, at 9.

107. *See id.*

108. *See "Dilbit,"* CANADIAN ASS'N OF ENERGY AND PIPELINE LANDOWNER ASS'NS (2012), http://www.landownerassociation.ca/rsrcs/DilBit_0212.pdf.

109. *See id*; *see also Materials—Effects and Economic Impact of Corrosion*, WERMAC.ORG, http://www.wermac.org/materials/corrosion_allowance.html (last visited March 26, 2012) (explaining how pipe wall thickness can be designed with a "corrosion allowance," or extra thickness not necessary for withstanding the internal pressure of the pipeline, which wears away as the pipeline corrodes).

as anti-corrosion coatings[110] could also be mandated to help protect the pipelines against diluted bitumen. However, a technology-based approach such as this one has one glaring disadvantage—it may work well for new construction, but the reality is that older pipelines are being used to transport diluted bitumen.[111] To retrofit these pipelines with new pipe or to shut them down to apply coatings could be very costly.[112] Thus, improved inspection may well be the most effective method for increasing the safety of older pipes carrying diluted bitumen.[113]

Finally, Congress could simply foreclose the issue by banning importation of diluted bitumen into the United States.[114] This option would likely have more severe repercussions than tightening up pipeline security,[115] but it would completely eliminate the increased risk of diluted bitumen flowing through United States pipelines.[116] Banning diluted bitumen would not necessarily cut off the flow of tar sands-derived petroleum into the United States, but it would ensure that such petroleum came in the form of the more pipeline-friendly syncrude.[117] However, one major problem with this course of action, at least from the standpoint of energy companies, is that there is a lack of refining capacity in Canada to upgrade the bitumen into syncrude.[118]

D. Responding to the Risks of Diluted Bitumen Through Tort Law

Finally, there is a possibility of using tort law to provide pipeline operators with an incentive to ensure adequate safety when transporting bitumen.[119] *Holder v. Enbridge* is a case from the Western District of

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110. *See id.*

111. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 3. Although older pipelines are used to transport bitumen, new pipeline construction is not suggested until proper pipeline safety regulations are in place. *Id.*

112. *See* 2008/9 SUSTAINABILITY REPORT, *supra* note 17, at 23.

113. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 9.

114. Such a ban would be well within Congress' constitutional authority to regulate international trade. *See* U.S. CONST. art I, § 8.

115. Repercussions might include irritating Canada, one of the United States' largest trading partners, and angering the oil industry, which has invested heavily in tar sands development. *See* 2008/9 SUSTAINABILITY REPORT, *supra* note 17, at 23 (discussing large investments of oil companies into tar sands development and predicting growth of up to a trillion dollars worth of tar sands-related economic activity in the next ten years).

116. *Id.*; *see* PIPELINES SAFETY RISKS, *supra* note 8.

117. *See New Upgrading a Decade Away: Syncrude*, CAN. MANUFACTURING (Sept. 14, 2011, 1:18 PM), http://www.canadianmanufacturing.com/fabrication/news/new-upgrading-a-decade-away-syncrude-42031.

118. *See id.*

119. *See, e.g.*, Holder v. Enbridge Energy, L.P., No. 1:10–CV–752, 2011 WL 3878876 (W.D. Mich. Sept. 2, 2011).

Michigan arising out of the Enbridge spill.[120] The plaintiffs were local residents who had been adversely affected by the release of diluted bitumen into Talmadge Creek.[121] In *Holder*, the plaintiffs argued that Enbridge should be held strictly liable for damages caused by the spill because the operation of a diluted bitumen pipeline is an "abnormally dangerous activity."[122] Interestingly, this claim has thus far survived Enbridge's attempts to dismiss it, at least pending further discovery in the case.[123]

Michigan uses the approach of the Restatement (Second) of Torts to classify an activity as "abnormally dangerous."[124] Under this approach, whether or not a particular activity is considered abnormally dangerous is a question of law for the court to decide.[125] Courts should weigh several factors: (1) whether the activity creates a great risk of harm to others or their property; (2) whether the harm that may result is likely to be great; (3) the degree to which the risk can be mitigated by reasonable care; (4) whether the activity is a "matter of common usage"; (5) whether the activity was conducted in an appropriate place; and (6) the degree to which the activity's value outweighs its risks.[126] It remains to be seen whether the *Holder* court will decide that transporting diluted bitumen through aging pipelines is abnormally dangerous, but if the court does rule in favor of the plaintiffs, such precedent could be a very strong tool for forcing pipeline operators to improve the safety of their pipelines.[127]

IV. CONCLUSION

The sheer size of Alberta's tar sands deposits, along with rising world energy demand, means that, at least for the near future, tar sands oil is likely to increase in importance as an energy resource.[128] The

120. *Id.*

121. *Id.* at *1.

122. *See id.* at *2. The defendants argued, in response, that many courts have held the transportation of crude oil through a pipeline to *not* be an abnormally dangerous activity. *Id.* However, the plaintiffs' argument was more specific than that. They argued that "transporting *tar sands oil*, alongside sensitive waterways, through an antiquated pipeline that was not specifically designed for transporting such a corrosive oil" is abnormally dangerous and therefore should be subject to strict liability. *Id.* (emphasis added).

123. *Holder*, 2011 WL 3878876, at *4.

124. *Id.* at *2.

125. *Id.* at *3.

126. *Id.*

127. This assumes, of course, that the defendants do not win on appeal, since they would very likely appeal such a decision. *See id.*

128. *See* PIPELINES SAFETY RISKS, *supra* note 8, at 5.

United States is importing diluted bitumen in ever-larger quantities,[129] and new pipelines have been proposed to handle the greater demand.[130] If constructed, these proposed new pipelines would span the country and cross highly sensitive ecosystems, exposing them to the risk of contamination by a spill of diluted bitumen.[131] The controversial Keystone XL pipeline is one of these pipelines and, in fact, was put on hold pending further investigation into the hazards of diluted bitumen transportation.[132] In addition, the existing United States pipeline network is aged and may not be adequate to meet the higher technical demands of transporting diluted bitumen.[133] Finally, spills of bitumen carry higher risks of greater damage to human health and natural ecosystems and are more difficult to repair.[134]

Therefore, it is critically important that governmental authorities take rapid action to address the shortcomings of the existing regulatory requirements. The simplest and most straightforward solution would be an outright ban on carrying diluted bitumen in pipelines.[135] This would certainly solve the problem, but the blow to international trade might be too severe to make this option worthwhile, and opposition to such a draconian move would likely be stiff.[136]

In the likely scenario that Congress declines to ban diluted bitumen, pipeline safety standards should be strengthened to meet the unique technical challenges posed by diluted bitumen. There are several options

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129. *Id.*

130. *Id.*

131. *See id. See also Keystone XL Pipeline,* NAT'L WILDLIFE FOUND., http://www.nwf.org/What-We-Do/Energy-and-Climate/Drilling-and-Mining/Tar-Sands/Keystone-XL-Pipeline.aspx (last visited April 6, 2013) (showing that both the original and the modified proposed Keystone XL routes would cross many sensitive ecosystems and bodies of water).

132. *See* Press Release, U.S. Dep't of State, Denial of the Keystone XL Pipeline Application, PRN 2012/070 (Jan. 18, 2012), http://www.state.gov/r/pa/prs/ps/2012/01/181473.htm. There are serious concerns about nearly every aspect of the pipeline, from its ability to safely carry diluted bitumen to the possible environmental effects of a spill. *See Nebraska Water Scientists Warn of Oil Pipeline's Risk, Call for More Study,* REUTERS (June 15, 2011, 9:10 AM), http://www.reuters.com/article/2011/06/15/idUS83598404220110615 (stating that current predictions of spill behavior are based on only a single study from Minnesota).

133. PIPELINES SAFETY RISKS, *supra* note 8, at 5. *See also* Press Release, U.S. Dep't of Transp., U.S. Transportation Secretary Ray LaHood Announces Pipeline Safety Action Plan (Apr. 4, 2011), http://www.dot.gov/briefing-room/us-transportation-secretary-ray-lahood-announces-pipeline-safety-action-plan (describing deteriorated condition of the U.S.' pipeline system).

134. *Id.*

135. *Id.*

136. *See supra* notes 114-117.

for accomplishing this: increased monitoring on the part of states, stricter technical standards on the part of the federal government, or even imposition of strict tort liability in the event of a diluted bitumen spill. The best response may even be a combination of the three, but whatever the route, the end result should be to address the risks of tar sands oil to ensure that, to the extent that it is used, it is used in a manner that ensures the protection of human health and sensitive natural ecosystems.