

Concerns Regarding Tar Sand Crude and the Proposed Seaway Pipeline

DFW Water Supplies Threatened

Submitted by



Seaway - A Pipeline of Poison

The Enbridge Seaway pipeline is slated to start operations June 2012. It will reverse a 36-year old pipeline to carry bitumen crude from Cushing to the Gulf coast. Concerns regarding the Seaway include the following:

- **Dilbit is far more toxic -- and explosive** than conventional crude.
- **Pipeline transports highly pressurized, acidic and corrosive material** making pipes susceptible to rupture.
- **Aging pipeline is 36 years old.**
- **Dilbit spill threatens DFW water supplies** and their tributaries with proprietary material that is difficult, if not impossible to clean up.
- **Tar sand crude will increase U.S. oil costs 2-4 billion dollars.**
- **Tar sand is meant for export,** not to decrease our dependency on foreign oil.
- **Lack of oversight demands both federal and state agency intervention.**

Seaway Tar Sand Pipeline is Coming to DFW



On November 16, 2011, Enbridge Inc. announced the purchase of a 50% share of the 670-mile Seaway Crude Pipeline System. Enterprise Products Partners L.P. will continue to own the other 50% of Seaway and will operate the system.

The Seaway is an existing crude oil transportation network, originally built for natural gas, that includes a 500-mile segment from Freeport, Texas to Cushing, Oklahoma.

Seaway will be reversed to carry diluted bitumen from Cushing to the vast refinery complex near Houston and the Texas City Terminal.

Anticipating the pipeline's reversed service as early as June 2012, the change from its current feedstock to the more viscous bitumen will result in a reduced throughput of 350,000 to 150,000 barrels per day.

With the addition of pump stations by early 2013 to increase the pressures for bitumen flow, the capacity of the Seaway Pipeline will be bolstered to 400,000 barrels per day.

The reversal is to relieve an oil "glut" in Cushing. This glut has been responsible for keeping midwestern gas prices low. However, an Enterprise spokesman noted that a parallel or twin pipeline may be constructed if enough commitments from shippers are secured, driving their capacity to transport tar sand bitumen even higher.

DFW's Water Supplies at Risk



In Oklahoma, the Seaway passes through Lincoln, Pottawatomie, Seminole, Pontotoc, Johnston, and Bryan counties.

In Texas, Seaway passes through the following 16 Texas counties:

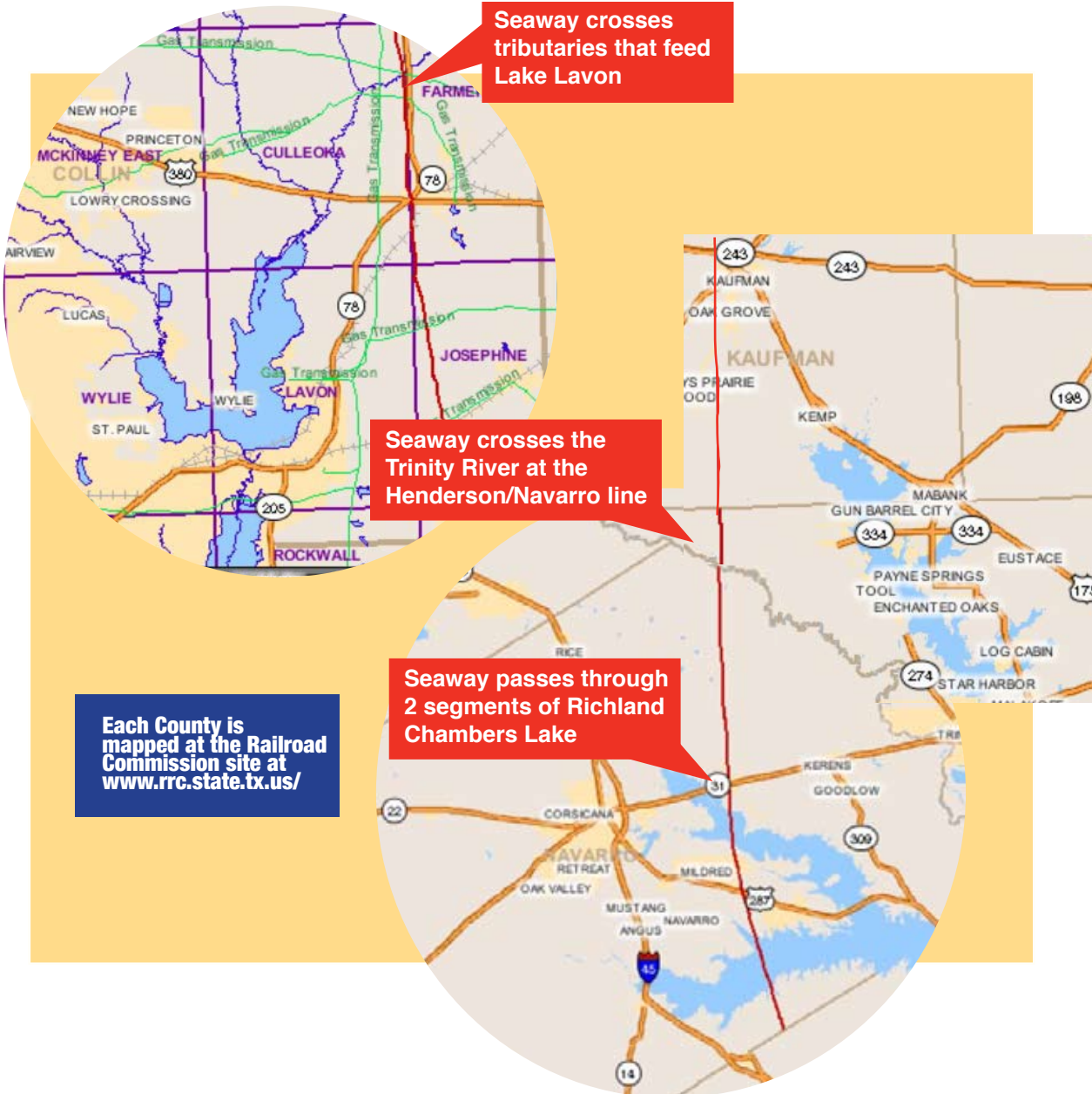
Grayson, Collin, Rockwall, Kaufman, Henderson, Navarro, Freestone, Leon, Madison, Grimes, Waller, Harris, Fort Bend, Brazoria, with terminal segments to Chambers and Jefferson counties.

Seven of these counties (highlighted above) are within the purview of the Region C Regional Water Planning Group. Region C is responsible for water planning in the DFW area.

At least three aquifers are crossed by the pipeline to its refinery destination: the Trinity, Carrizo Wilcox and the Gulf Coast.

The Trinity is a major aquifer for DFW water supplies. ¹

Seaway Crosses Tributaries Near Major Water Supplies



According to the mapping on the Texas Railroad Commission site under pipeline #05161, the 30" pipeline takes the following route through Texas:

- A) Crosses Red River into Grayson County
- B) Crosses tributaries that feed Lake Lavon in Collin County
- C) Passes East Lake Ray Hubbard in Rockwall County near Royce City
- D) Travels west of Cedar Creek Reservoir in Kaufman County
- E) Passes under the Trinity River at the Henderson-Navarro County line
- F) Crosses under both segments of Richland Chambers Reservoir in Navarro County
- G) Crosses over the Carrizo-Wilcox aquifer where it outcrops in Freestone and Leon Counties, and then along the Brazos River in Madison, Grimes, Waller, and Fort Bend Counties.

Lake Lavon is a major water source for Dallas. Cedar Creek and Richland Chambers are major sources for Ft. Worth and the Tarrant Regional Water District.²

Tar Sand - Not Your "Grandad's Texas Crude"



Bitumen is Mined

Bitumen is a solid. Surface deposits make up about 20% of tar sand reserves. To extract bitumen, huge excavators scrape away the topsoil and the underlying tar sands are lifted into huge dump trucks.

The superficial tar sands are then trucked to extraction processes, where they are steamed to extract the heavy, bitumenous oil.

This first step of tar sand extraction is estimated to result in **gasoline that carries a burden of "at least five times more carbon dioxide"** than product realized from conventional "sweet crude" oil production.³

Because the remaining 80 percent of the sands are too deep to be mined, steam is injected into these deeper oil sands, loosening the bitumen and allowing producers to draw it upward (see graphic).



Tar Sand - Liquified with Toxic Diluents and Highly Pressurized



Bitumen is Liquified for Transport

Before tar sand is refined and turned into heavy crude, it has to be diluted to flow through a pipeline.

Since bitumen has the composition of asphalt and tar, it is *liquified with diluents and then highly pressurized (up to 1600 psi) causing high heat (158°) due to friction.*

The diluents include natural gas condensate and other hazardous chemicals including hydrogen sulfide, benzene, and toluene.

These diluents greatly increase the toxicity of tar sand which already contains some naturally occurring heavy metals when mined.

Highly Corrosive, Acidic, and Potentially Unstable



Up to **20x**
more acidic

Up to **10x**
more sulfuric

Up to **70x**
more viscous

than conventional crude

Diluted bitumen or “Dilbit” tar sand oil is a highly corrosive, acidic, and potential unstable blend of thick raw bitumen and volatile natural gas liquid condensate.

Unlike some tar sands crude which has been up-graded before transported such as Syncrude, this material is carried in its corrosive raw form.

Bitumen blends *contain fifteen to twenty times higher acid concentrations* than conventional crude, *and five to ten times as much sulfur.*¹⁴ Dilbit is also up to *seventy times more viscous* than conventional crude oil.¹⁵

Pipelines More Susceptible to Deterioration and Rupture



The additional sulfur can lead to the weakening or embrittlement of pipelines.¹⁶ Tar sand oil's high concentrations of chloride salts can lead to stress corrosion in high temperature pipelines.¹⁷ Higher quantities of abrasive quartz particles can also be found.¹⁸

This combination of chemical and physical abrasion can dramatically increase the rate of pipeline deterioration.¹⁹

The resulting corrosion and abrasive nature of tar sand crude is heightened by the relatively high heat and pressure by which these pipelines are used to transport the thick Dilbit.

While industry defines high pressure at 600 psi, tar sands pipelines operate at up to 1440 psi and temps up to 158°.²⁰

In December 2011, Congress passed legislation requiring that a study of diluents be conducted to analyze the effect of diluent on pipelines to determine if additional safety regulations are needed. This study is due before the end of July 2013.

Bitumen Spills Hard to Detect



High temps speed the Dilbit, but also accelerate the corrosion. High temps can create instability with the natural gas condensate, where it can change from a liquid to a gas, affecting the viability of the pipeline's metal.²¹

This instability makes leaks difficult to detect and often pipeline operators are unable to accurately discern a leak from a gas bubble which can also affect the crude flow rate.²²

In the Enbridge tar sand spill on the Kalamazoo River, operators took more than 7 hours to detect the spill due to their determinations that false positive readings were creating a flow change. Only upon visual inspection was the leak confirmed. By the time the rupture was varified, more than 884,000 gallons of Dilbit crude had leaked.²³

Though TransCanada claims its spills can be detected in less than nine minutes with its state-of-the-art computerized monitoring, its Keystone I spill in North Dakota was confirmed only 45 minutes after its start when a land-owner reported sighting a 6-story gusher from a leak the size of a 3/4" garden hose.²⁴

Increased Risks to Public Health and Safety



Unlike conventional crude, tar sands poses an elevated risk to human health and safety.

Due to the natural gas condensate, *bitumen crude has an increased risk of leaked material exploding at temps above 0° F.*²⁴

This mixture can be ignited by heat, spark, static charge, or flame.²⁵

One of the toxic risks is hydrogen sulfide, a gas which can cause suffocation at 100 ppb.²⁶

Tar sand crude also contains benzene, polycyclic aromatic hydrocarbons, and n-hexane – toxins that can affect the central nervous system.²⁷ Long time exposure to these chemicals can cause cancer.²⁸

*Vanadium, nickel, arsenic, and other heavy metals are present in significantly higher quantities in Dilbit than conventional crude.*²⁹ These heavy metals are not biodegradable, and can bioaccumulate in both people and the environment causing a variety of toxic effects.³⁰

Emergency Response & Clean Up Challenges



Cleaning up a tar sand spill poses special challenges since *Dilbit is heavier than water. The heavier components of Dilbit, due to the raw bitumen, will sink.*

Therefore, a spill may require more dredging than a conventional oil spill.³¹ Sunlight causes the bitumen crude to form a dense, sticky tar substance which is hard to remove.³²

In the State Department's analysis of the Environmental Impact Statement for the proposed Keystone XL, the agency admitted that it cannot fully analyze the chemical transported since the *Dilbit make-up is considered to be proprietary information.* As a result, the EPA has stated that it cannot fully determine the full spill impacts that tar sand crude would have on groundwater.³³

Added Danger of Transporting Dilbit in Aging U.S. Pipelines



“The U.S. pipeline system was not designed with raw tar sands crude in mind, ...safety regulations were not written to address its unique risks... PHMSA has not yet been able to study the issue or been involved in the environmental review for Keystone XL.”

Cynthia Quartermann, PHMSA Administrator, June 2011, Federal Energy & Commerce Hearing on Pipeline Safety

More than half the pipelines operating in Alberta have been built in the last 20 years while the tar sands region was developed. ³⁴

In contrast, the majority of hazardous liquid pipelines in the U.S. are more than 40 years old. ³⁵

The older a pipeline, the greater the potential that its coating, steel strength, or corrosive protections could be compromised. ³⁶

According to the Railroad Commission, *the existing pipeline for Seaway is more than 36 years old.*

Since 1975, Seaway has carried both natural gas and crude. More recently, the pipeline has mainly been used to carry both heavy and light crude from offshore drilling rigs and from Central and South America. Only relatively minor alterations will be needed to allow it to carry Canadian oil sands oil south according to a company spokesman. ³⁷

Enbridge - Largest U.S. Tar Sand Spill in a 43-year old Pipeline



Actual photo of of Kalamazoo Rupture

On July 26, 2010, an Enbridge tar sands pipeline spilled more than 840,000 gallons of diluted bitumen in Michigan's Kalamazoo watershed. ³⁸

The highly computerized alarm system of Enbridge detected its first alarms of a possible spill at 4:12 am--but operators kept turning on and off the pumping till the spill was confirmed at 11:41 am the same morning. This was more than 7 hours later--and the spill was only confirmed then by an onsite, visual pipeline inspection. By then, at least 884,000 gallons of crude had leaked. ³⁹

A day after the spill, air samples along the Kalamazoo River showed readings of 15,000 ppb. According to the Agency for Toxic Substances and Disease Registry, the maximum safe level for acute benzene exposure is 9 parts per billion (ppb). ⁴⁰

For more than three weeks after the spill, transient benzene levels remained exponentially high in the area where the spill occurred.

Hundreds were evacuated...many still feel sick. The extent of long term effects are unknown. ⁴¹

In September 2011, Enbridge estimated the cost of its Michigan spill would rise from \$585 million to \$700 million. It also stated that it was unsure if its insurance company would cover all the costs. ⁴²

Seventeen months later, after traveling more than 30 miles down the Kalamazoo River, the spill is still not cleaned up.

Enbridge - A History of Violations



According to the U.S. Dept. of Transportation, Enbridge has been fined more than \$2.4 million in violations dating back to 2006. ⁴³

In November 2007, two Enbridge employees were killed when repairs on the same Lakehead system in Minnesota caused leaking crude oil to ignite.

In relation to that incident, the Pipeline and Hazardous Materials Safety Administration (PHMSA) conducted an extensive year-long accident investigation and determined that Enbridge failed to safely and adequately perform maintenance and repair activities, failed to clear the designated work area from possible ignition sources, and hired workers who were not adequately trained or qualified. ⁴⁴

In August 2010, PHMSA also issued final orders totaling more than \$2.4 million in civil penalties for violations identified at facilities in Houma, Louisiana in 2006 and in Cushing, Oklahoma in 2009. ⁴⁵

The Houma fine was for Enbridge's failure to properly monitor for internal corrosion and perform valve maintenance procedures. The Cushing fine was for failing to properly inspect in-service breakout tanks. ⁴⁶

What Agency is Looking After Our Interests?



As Enbridge and Enterprise race to push Canadian tar sands to refineries in Freeport, Houston and Pt. Arthur, big questions emerge. What agency will permit this pipeline? Who will ensure its safety and oversight?

Will an environmental assessment be done before pushing a relatively new and toxic substance through an aging 36 year-old pipeline?

From our investigations, and according to an interview between an Enterprise spokesman and the Austin American Statesman, ***only a perfunctory permit is required from the Federal Energy Regulatory Commission (FERC) to reverse the flow from the pipeline from the Texas Gulf coast to Cushing.***⁴⁷

The sale has cleared the initial FERC regulatory hurdle and the only remaining regulatory action needed is approval of the pipeline's proposed shipping rate, expected by March 31, 2012.⁴⁸

Additionally, the Enbridge/Enterprise partnership could secure enough shipments to allow them to build a parallel or twin the pipeline along the same right-of-way.⁴⁹

Unlike TransCanada's Keystone XL pipeline where a presidential permit was required, no State Department permit is needed for Enbridge since there is no international crossing. Now both TransCanada and Enbridge hope to do an "end run" by building pipelines in shorter segments to the gulf coast.⁵⁰

No State Agency Approvals Required

The Seaway pipeline won't need state approvals.

According to a spokesman for an Oklahoma Corporation Commission (OCC), which regulates oil and gas in its state, it has no permitting authority with interstate pipelines.⁵¹

In Texas, the Railroad Commission (RRC) confirmed to the Austin American Statesman that it “does not issue construction permits for interstate or intrastate pipelines to be built.”⁵²

The Railroad Commission currently has no authority over the routing or siting of intrastate and interstate pipelines, and has no safety jurisdiction over interstate pipelines such as a pipeline that would be built from an adjacent state into Texas.”⁵³

So who should intervene on behalf of Texas to protect our precious water supplies?

Since the Seaway pipeline will not require state approvals, EPA and PHMSA should ask for an:

- ***Environmental Assessment from Enbridge***
- ***Emergency Response Plan filed by Enbridge pursuant to that required by the Clean Water Act***

The Texas State Legislature should require the:

- ***Railroad Commission to review and approve the safety of interstate pipelines***

Oil for Export – Increasing Domestic Costs \$2 to \$3.9 Billion



**Dilbit would increase the price
for Canadian crude by**

**\$2 to \$3.9
billion per year.**

Tar sands oil does not enhance energy security simply because it comes from a friendly neighbor. Continued reliance on oil empowers ALL major oil exporters. *The recent debate over tar sands has obscured the fact that Canadian oil is being moved to the Gulf Coast primarily for export.*⁵⁴

When analyzing the movement of Dilbit crude from Canada to the Gulf coast:

- The cost of production adds \$50 more a barrel than conventional foreign imports.⁵⁵
- The cost of pipeline construction, due to distance, is four times greater than transporting Dilbit to the Pacific West. When this distance is expressed as pipeline dollars in cost per barrel, the price per barrel is \$8-\$10 less if the Pacific West coast destination was used.⁵⁶
- Dilbit will increase midwest oil prices as it will divert oil destined for that region and be sent to the Gulf coast, in turn reducing U.S. oil supply and increasing prices.⁵⁷
- Tar sand oil would increase the price the U.S. market pays for Canadian crude by between \$2 billion and \$3.9 billion a year.⁵⁸

Immediately after the White House rejected TransCanada's application for Keystone XL, crude oil futures fell by \$.75. When Enbridge announced its plan for Seaway, U.S. crude jumped by over \$3.00 a barrel. Meanwhile Brent crude, the world market's oil benchmark, declined by over \$0.30 a barrel.⁵⁹

Enbridge and Keystone are simply using these export pipelines as part of a larger strategy to redirect oil for international buyers willing to pay a higher price for oil, adding billions of dollars to the annual cost for U.S. consumers. Conveniently, many of the Gulf coast refineries are also in Foreign Trade Zones where they can export refined products without having to pay U.S. taxes.⁶⁰

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