A Looming Fracking Explosion: The Inadequate NEPA Cumulative Effects Analysis for the Keystone XL Pipeline

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Summary

The Keystone XL Pipeline has drawn tremendous media attention over the past seven years as the U.S. Department of State has assessed the Project's environmental impacts through the NEPA review process. Despite the lengthy process, the Keystone XL Pipeline environmental reviews fail to adequately assess the Project's impacts in the Bakken region, where increased pipeline transport capacity is likely to cause increased levels of hydraulic fracturing for oil production. These environmental reviews did not adequately assess the cumulative effects of the Keystone XL Pipeline or its connected actions, which could result in serious and far-reaching environmental consequences if the Pipeline is approved.

I. The Keystone XL Pipeline Approval Process and How the National Environmental Policy Act Fits In

TransCanada's Keystone Pipeline System will be built through the U.S. Midwest, cutting across six states, near the oil-rich Bakken Shale Formation underlying Montana and North Dakota. The Pipeline has spurred public outrage and drawn tremendous media attention over the past seven years, as the U.S. Department of State has assessed the Project's environmental impacts through the National Environmental Policy Act (NEPA)[1] process. Despite the lengthy review process, the environmental impact statements (EISs) have failed to adequately assess the Project's impacts in the Bakken region, where increased pipeline transport capacity is likely to cause increased levels of hydraulic fracturing (fracking) used for oil production, with serious and far-reaching environmental consequences.

A. Pipeline Background

In 2005, TransCanada revealed its plan to construct the Keystone Pipeline System, to transport crude oil from Alberta, Canada, to the U.S. Gulf Coast, to address increased oil production in the Western Canadian Sedimentary Basin (WCSB).[2] The Keystone Project is expected to have a total carrying capacity of 1.3 million barrels of oil per day (bpd)[3] and was proposed as two distinct segments, Keystone and Keystone XL. The Keystone segment is already in operation and was constructed in two phases.[4] The Keystone XL segment was also divided into two phases—first the Gulf Coast Project, and then Keystone XL.[5] Keystone XL, the second phase, is currently under review for approval by the Department of State, and its environmental review is the exclusive focus of this Article.

1. 42 U.S.C. §§4321-4370h, ELR Stat. NEPA §§2-209.
2. Paul W. Parfomak, Congressional Research Service, *Keystone XL Pipeline Project: Key Issues*, 3 (Jan. 24, 2013), *available at* http://www.fas.org/sgp/crs/misc/R41668.pdf. For a diagram of the Keystone Pipeline System, see TransCanada, *About The Project* (last visited Sept. 30, 2013), http://keystone-xl.com/about/the-project/.
3. *Id.* at 5.
4. *Id.* at 3. The first phase—Keystone Mainline—was completed in June 2010 and is currently in service, consisting of 1,353 miles of 30-inch pipeline running from Hardisty, Alberta, to Wood River and Patoka, Illinois. *Id.* The second phase—the Cushing Extension—is 298 miles of 36-inch pipeline running from Steele City, Nebraska, to crude oil terminals and tank farms in Cushing, Oklahoma, and has been in service since February 2011. *Id.*
5. *Id.* at 4. The first phase—the Gulf Coast Project—is 435 miles of 36-inch pipeline and associated facilities linking the Cushing tank farms to refineries in Houston and Port Arthur, TX. *Id.* TransCanada began construction on this phase in August 2012 and anticipates a service date of mid-to-late 2013, with a potential transport capacity of 830,000 bpd. TransCanada, Gulf Coast Pipeline Project (Mar. 15, 2013), http://www.transcanada.com/gulf-coast-pipeline-project.html (last visited Sept. 25, 2013).

Keystone XL is a proposed 875 miles of 36-inch pipeline and associated facilities linking Morgan, Montana, to the existing Keystone pipeline in Steele City, Nebraska.[6] In addition to transporting WCSB crude oil from Canada, the pipeline would also transport domestically produced Bakken crude oil from a terminal near Baker, Montana, to the Gulf Coast refining market.[7] This will be possible with the construction of the Bakken Marketlink Project, a system including a five-mile pipeline, pumps, meters, and storage tanks to supply Bakken crude oil to the Keystone XL Pipeline from the proposed Bakken Marketlink pipeline system in Montana and North Dakota.[8] There are already firm commitments for the Keystone XL Pipeline to transport 65,000 bpd of Bakken crude oil, and currently 100,000 bpd of the Pipeline's capacity has been set aside for this purpose.[9]

Keystone XL requires executive permission in the form of a Presidential Permit for construction, connection, operation, and maintenance with a foreign country.[10] Although the executive branch has traditionally exercised permitting authority over the construction and operation of international petroleum pipelines,[11] Executive Order No. 13337 delegates this executive authorization to the Secretary of State.[12] To authorize Keystone XL, the Secretary of State must find that the project would serve the national interest.[13] In making this determination, the Department of State must analyze a host of factors,[14] including the environmental impacts of the project.[15] When assessing environmental impacts, the Department of State must comply with NEPA.[16]

B. The NEPA Process and Its Value

Congress enacted NEPA in 1969 as the first major federal environmental law in the United States.[17] NEPA serves two critical functions—first, requiring federal agencies to assess the environmental impacts of their proposed actions during the decisionmaking process, and second, requiring disclosures to involve citizens in the decisionmaking process.[18] To fulfill these functions, NEPA requires that agencies prepare an EIS when they propose to take major federal action that may have significant effects on the quality of human environment.[19] Here, the Department of State determined that construction of the Keystone XL Pipeline required an EIS,[20] and in August 2011, it issued the Final EIS (FEIS).[21]

An EIS is a detailed written statement discussing the environmental impact of the proposed action, any adverse environmental effects that cannot be avoided, alternatives to the proposed action, and any irreversible and irretrievable commitments of resources required for the action.[22] The scope of an EIS depends on whether or not the agency is engaged in connected or cumulative actions.[23] Given the interconnected nature of the Keystone XL Pipeline to the Bakken Marketlink Project described earlier, the Department of State determined that the Bakken Marketlink Project is a connected action meriting environmental assessment in the EIS.[24]

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6. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Draft Supplemental Environmental Impact Statement for the Keystone XL Project Executive Summary*, ES-2 (Mar. 2013), http://keystonepipeline-xl.state.gov/documents/organization/205719.pdf [hereinafter *Draft SEIS Executive Summary*].
7. *Id.* at ES-4.
8. *Id.* at ES-7. The Bakken Marketlink Project would be constructed and operated by Keystone Marketlink, LLC, a wholly owned subsidiary of TransCanada Pipelines Limited. *Id.*
9. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Executive Summary: Final Environmental Impact Statement for the Proposed Keystone XL Project*, ES-3 (Aug. 2011), *available at* http://keystonepipeline-xl.state.gov/documents/organization/182010.pdf [hereinafter *Executive Summary: FEIS*].
10. Parfomak, *supra* note 2, at 6.
11. "The executive branch has exercised permitting authority over the construction and operation of 'pipelines, conveyor belts, and similar facilities for the exportation or importation of petroleum, petroleum products' and other products at least since the promulgation of Executive Order 11423 in 1968." Parfomak, *supra* note 2, at 32.
12. George W. Bush, *Executive Order 13337—Issuance of Permits With Respect to Certain Energy-Related Facilities and Land Transportation Crossings on the International Boundaries of the United States* (Apr. 30, 2004), *available at* http://www.presidency.ucsb.edu/ws/?pid=61431.
13. Parfomak, *supra* note 2, at 6.
14. The factors the Department of State must consider when making a national interest determination include: energy security; environmental, cultural, and economic impacts; foreign policy; and compliance with relevant federal regulations. *Draft SEIS Executive Summary*, *supra* note 6, at ES-1.
15. Parfomak, *supra* note 2, at 6-7.
16. Parfomak, *supra* note 2, at 7.
17. Council on Environmental Quality, Executive Office of the President, *A Citizen's Guide to the NEPA: Having Your Voice Heard*, 2 (Dec. 2007), *available at* http://ceq.hss.doe.gov/nepa/Citizens_Guide_Dec07.pdf [hereinafter *A Citizen's Guide to the NEPA*].
18. *Id.*
19. 42 U.S.C. §4332(2)(c). The significance of an action turns on two factors, context and intensity. *See* 40 C.F.R. §1508.27. Context requires consideration of the setting of the action, meaning that "the significance of an action must be analyzed in several contexts . . . [and] both short-and long-term effects are relevant." *Id.* at §1508.27(a). Intensity "refers to the severity of impact" and CEQ regulations include 10 intensity factors that should be considered, like the "degree to which the effects on the effects on the quality of the human environment are likely to be highly controversial," and the "degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks." *Id.* at §1508.27(b)(1)-(10).
20. U.S. Department of State, *Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Scoping Meetings and Notice of Floodplain and Wetland Involvement and to Initiate Consultation Under Section 106 of the National Historic Preservation Act for the Proposed TransCanada Keystone XL Pipeline*, 74 Fed. Reg. 5020 (Jan. 28, 2009).
21. *Draft SEIS Executive Summary*, *supra* note 6, at ES-1. For a detailed time line of the milestones in the NEPA process for production of the 2011 FEIS, see Parfomak, *supra* note 2, at 10.
22. *See* 40 C.F.R. §1508.11; 42 U.S.C. §4332(2)(C).
23. *See* 40 C.F.R. §1508.25(a).
24. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Final Environmental Impact Statement Keystone XL Project*, Volume I, Project Description, 2-56 (Aug. 2011), *available at*

In March 2013, over one year after the Department of State issued the Keystone XL FEIS, it published a Supplemental EIS (SEIS). Agencies must prepare an SEIS if the major federal action is ongoing when the agency makes substantial changes in the proposed action that are relevant to environmental concerns or if there are significant new circumstances or information relevant to environmental concerns that bear on the proposed action.[25] Here, the Department of State determined that an SEIS was necessary after TransCanada filed for a new Presidential Permit on May 4, 2012, due to route changes.[26]

Although an agency may ultimately base its decision to act on other policy considerations, such as social, economic, technical, or national security interests, NEPA is important, because it requires decisionmakers to assess environmental consequences, alternative actions, and feasible mitigation measures, while also disclosing this information to the public.[27] NEPA provides that federal agencies, when carrying out their duties, have the responsibility to "use all practicable means" to act as "trustee of the environment for succeeding generations" and should "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences."[28] NEPA also gives each person the right "to contribute to the preservation and enhancement of the environment" by imposing a disclosure requirement.[29] NEPA has been hailed as "the most important and far-reaching environmental conservation measure ever enacted by Congress."[30] However, it is not always implemented to its fullest extent. Often, agencies, rather than using NEPA as a tool to ensure well-deliberated decisionmaking, implement NEPA as a document-producing exercise to no specific end, needlessly increasing the cost and length of the NEPA process.[31]

This Article will argue that despite NEPA's required cumulative effects analysis, the Keystone XL Pipeline FEIS and SEIS avoid the looming fracking issue, with possible serious and far-reaching environmental consequences. Part II of this Article provides context around fracking, criticism it has received, and background on the Bakken Shale Formation where a lot of fracking is taking place. Part III then reviews NEPA's "connected action" and "cumulative effects" requirements. Finally, Part IV reviews the Keystone XL Pipeline FEIS and SEIS, and concludes that neither adequately assessed the cumulative effects of the Keystone XL Pipeline or its connected actions. This Article concludes, in Part V, by stressing the importance of NEPA to rational and well-considered U.S. federal decisionmaking and emphasizing the possible serious and far-reaching environmental consequences of the Keystone XL Pipeline FEIS and SEIS's inadequate cumulative effects analysis.

II. The Fracking Controversy and the Bakken Shale Formation

Fracking is a drilling method used to extract tight oil and gas in shale formations that would not be commercially viable without the advances in horizontal drilling and hydraulic fracturing technologies.[32] The hydraulic fracturing process begins with well creation by vertically drilling down to the level where shale rock contains trapped oil or gas, and then employing horizontal drilling to provide more exposure within a formation.[33] Operators then detonate charges underground to create spaces in rock pores to release oil and gas.[34] Additional fissures in the rock are created by injecting fracturing fluids into the formation at high pressure. The fluids contain additives that keep the fissures open and hydrocarbons flowing.[35] Rudimentary fracking was practiced as early as 1947[36] and is now used on more than 90% of new wells.[37]

http://keystonepipeline-xl.state.gov/documents/organization/182012.pdf [hereinafter *FEIS* Volume I, Project Description].

25. 40 C.F.R. §1502.9(c)(1).
26. *Draft SEIS Executive Summary*, *supra* note 6, at ES-1. TransCanada's new application calls for a shorter pipeline because the company proceeded with construction of the Gulf Coast portion of the project—from Cushing, Oklahoma, to the Gulf Coast—without a Presidential Permit since it believed that the pipeline had independent economic utility apart from Keystone XL, and it did not cross an international border. *Id.* The revised route also avoids the sensitive Nebraska Sand Hills Region and is one-half the length of the previously proposed project analyzed in the 2011 FEIS; it also includes new information about the Bakken Marketlink connected action. *Id.*
27. *A Citizen's Guide to the NEPA*, *supra* note 17, at 5.
28. 42 U.S.C. §4331(b)(1)(3).
29. 42 U.S.C. §4331(c). NEPA's disclosure requirements function via notice-and-comment procedure whereby an agency must notify the public, make available its environmental assessment for public comment, and then address all public comments received.
30. Council on Environmental Quality, Executive Office of the President, *The National Environmental Policy Act: A Study of Its Effectiveness After Twenty-Five Years*, 3 (Jan. 1997), *available at* http://ceq.hss.doe.gov/nepa/nepa25fn.pdf. NEPA has been emulated by more than 25 states, 80 countries, and even serves as a model for environmental impact assessments (EIAs) for such global institutions as the World Bank. *Id.*
31. *Id.* at iii. A study of NEPA effectiveness, conducted by the Council on Environmental Quality (CEQ), found that agencies sometimes engage in consultation only after a decision has been made, focusing their efforts on producing litigation-proof documents. *Id.*
32. *See* U.S. EPA, *Natural Gas Extraction—Hydraulic Fracturing* (Mar. 11, 2013), http://www2.epa.gov/hydraulicfracturing (last visited Sept. 26, 2013); Michael Ratner et al., *The Bakken Formation: Leading Unconventional Oil Development*, CRS Report R42032, 20 (Sept. 2011).
33. Institute for Energy Research, *Hydraulic Fracturing—Is It Safe?* (May 3, 2011), http://www.instituteforenergyresearch.org/2011/05/03/hydraulic-fracturing-is-it-safe/#_ftn2 (last visited Sept. 26, 2013).
34. *Id.*
35. *See id.*; Shawna Bligh & Chris Wendelbo, *Hydraulic Fracturing: Drilling Into the Issue*, 27 Nat. Resources & Env't. 7, 7 (Winter 2013).
36. Institute for Energy Research, *supra* note 33. Fracking began in Oklahoma and Texas as a rudimentary process of using dynamite to fracture the surrounding rock formation. Ratner et al., *supra* note 32, at 25.
37. Mary Tiemann & Michael Ratner, *Shale Gas and Hydraulic Fracturing: CRS Experts*, R42677, at 1 (Aug. 24, 2012), *available at* http://digital.library.unt.edu/ark:/67531/metadc122242/m1/1/high_res_d/R42677_2012Aug24.pdf. As of 2011, fracking had been employed in over one million wells to extract more than seven billion barrels of oil. Institute for Energy Research, *supra* note 33.

A. *The Controversy Over Fracking*

Fracking began to surge in 2007, creating a wave of public concern over its potential environmental impacts,[38] including excessive water use, water and soil contamination, and seismic activity. Concerns over water use stem from fracking's dependence on massive quantities of water that compete with agriculture and drinking water needs.[39] In North Dakota, for example, the development of 28,000 new oil wells will require more than 20 million gallons of water per day.[40] This will strain demands on regional water resources.[41] Just five million gallons of water are equivalent to the water used by approximately 50,000 people for an entire day.[42]

Water contamination from fracking fluids is another concern.[43] Although fracturing fluids are composed of 90% water, a single small fracking well that uses five million gallons of fluid contains the equivalent of 50,000 gallons of pure chemical fluid.[44] Many of the chemicals are known or suspected carcinogens, regulated under the Safe Drinking Water Act (SDWA)[45] or classified as hazardous air pollutants (HAPs) under the Clean Air Act (CAA).[46] Many chemicals used in fracking are unknown, as they are protected by drilling companies as proprietary information.[47] Contamination from the fracturing fluids could occur when fracturing fluids are pumped down fracking wells or from accidental spills or leaks from delivery vehicles, or onsite storage, mixing, and pumping equipment.[48] Released fluids could flow to nearby surface waters or groundwater aquifers, potentially reaching drinking water resources.[49] Additionally, once fracking fluid is used to extract oil, it must be disposed of in wastewater injection wells, which also have the potential to leak.[50]

Finally, fracking has also been associated with increased seismic activity, especially in the U.S. Midwest. According to the U.S. Geological Service (USGS), the average number of earthquakes in the Midwest for the past three decades until 2000 jumped from 21 per year, to 50 in 2009, 87 in 2010, and 134 in 2011.[51] The USGS attributes the increase in seismic activity to fracking.[52] There has especially been an uptick in areas where fracking fluid is disposed of via injection into deep wastewater wells.[53]

Despite the serious environmental concerns over fracking, it still remains a highly unregulated field in the federal arena. While there has been pressure for federal regulation,[54] legislators in major oil and gas producing states like North Dakota have blocked all efforts.[55] Some states have implemented sparse fracking regulations, including Colorado, Montana, and Wyoming, which have implemented disclosure rules for chemicals in fracturing fluids, although these have been criticized for not requiring more disclosure.[56] While the scarce regulation and public outcry has spurred studies on the potential impacts of fracking by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy, and private entities and researches, these are currently ongoing.[57]

B. *The Fracking Boom and the Bakken Shale Formation*

The controversy over fracking, as well as the lack of fracking regulation, has not impeded the expansion of fracking. The north central region of the United States, particularly North Dakota, has emerged as "the most significant

38. Abrahm Lustgarten, *Hydraulic Fracturing Cracks the Public Consciousness in 2011*, PROPUBLICA (Dec. 29, 2011), http://www.propublica.org/article/fracking-cracks-the-public-consciousness-in-2011 (last visited Sept. 26, 2013); William Fisher, *Is Fracking Even Worse Than Drilling?* (Mar. 19, 2013), http://ipsnorthamerica.net/news.php?idnews=3254 (last visited Sept. 26, 2013).
39. Ratner et al., *supra* note 32, at summary. The hydraulic fracturing fluids used in fracking are 90% water-based. U.S. EPA, *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Progress Report*, 14 (Dec. 2012), http://www.epa.gov/hfstudy/pdfs/hf-report20121214.pdf#page=209 (last visited Sept. 26, 2013) [hereinafter *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*]. Estimates of water needs per well vary from 65,000 gallons to 13 million, depending on the well-type. *Id.*
40. Ratner et al., *supra* note 32, at 10.
41. *Id.*
42. *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*, *supra* note 39, at 14.
43. Gabe Rozsa, *All of the Above: Fracking & Keystone XL Pipeline* (Mar. 8, 2013), http://www.prime-policy.com/practitioners-corner/all-above-fracking-keystone-xl-pipeline (last visited Sept. 26, 2013).
44. *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*, *supra* note 39, at 29 (containing a list of chemicals contained in hydraulic fluid that are identified as known or suspected carcinogens).
45. 42 U.S.C. §§300f to 300j-26, ELR Stat. SDWA §§1401-1465.
46. 42 U.S.C. §§7401-7671q, ELR Stat. CAA §§101-618.
47. Tom Lutey, *Former EPA Expert: States Can Control Fracking Rules* (Mar. 20, 2013), http://billingsgazette.com/news/state-and-regional/montana/former-epa-expert-states-can-control-fracking-rules/article_1aa7cb83-5645-5875-ab67-8dd42a9fe6bb.html (last visited Sept. 26, 2013).
48. *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*, *supra* note 39, at 16.
49. *Id.*
50. Ratner et al., *supra* note 32, at 11.
51. William L. Ellsworth, *Are Seismicity Rate Changes in the Midcontinent Natural or Manmade?*, U.S., Geological Survey, Abstract #12-137 (Apr. 2012), *available at* http://www.fossil.energy.gov/programs/gasregulation/authorizations/Orders_Issued_2012/65._Are_Seismicity_Rate_or_Manmade_.pdf; Mark Drajem, *Fracking Tied to Unusual Rise in Earthquakes in U.S.* (Apr. 12, 2012), http://www.bloomberg.com/news/2012-04-12/earthquake-outbreak-in-central-u-s-tied-to-drilling-wastewater.html (last visited Sept. 26, 2013).
52. Ellsworth, *supra* note 51; Drajem, *supra* note 51.
53. Ellsworth, *supra* note 51; Drajem, *supra* note 51.
54. Ratner et al., *supra* note 32, at 18. Authority for federal regulation would come from the SDWA underground injection control program, which falls under EPA's jurisdiction. *Id.*
55. Ratner et al., *supra* note 32, at 18.
56. Lutey, *supra* note 47. In Montana, for example, drilling companies can avoid disclosing what chemicals are in the fracturing fluids by claiming it is a trade secret. *Id.*
57. Ratner et al., *supra* note 32, at 19 (EPA has been directed by Congress to study the impact of fracking on drinking water sources); *Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*, *supra* note 39, at 16 (EPA is compiling information on reported spills, chemical additives used in hydraulic fracturing fluids, and their chemical, physical, and toxicological properties); Jon Hurdle, *Taking a Harder Look at Fracking and Health*, NY Times (Jan 21, 2013), http://green.blogs.nytimes.com/2013/01/21/taking-a-harder-look-at-fracking-and-health/ (last visited Sept. 26, 2013) (private entities and researches, like toxicologists at the University of Pennsylvania, Columbia, Johns Hopkins, and the University of North Carolina are also undertaking national efforts to study the health effects of fracking).

new domestic energy resource[ ]"[58] thanks to fracking. Currently, North Dakota's oil production rate is roughly 425,000 bpd, which is about 7.5% of total U.S. oil production. Much of the oil is coming from fracking development in the Bakken Shale Formation—a large, unconventional oil and natural gas resource in the Williston Basin—underlying parts of Montana, North Dakota, and the Canadian provinces of Saskatchewan and Manitoba.[59] The USGS has estimated that the Bakken Shale Formation may contain 3.65 billion barrels of undiscovered oil.[60]

Oil wells started appearing in the Bakken Shale Formation around 2006, but the numbers of wells have been increasing dramatically.[61] Rapid development of Bakken shale oil faces a major constraint however: transport capacity.[62] There is a lack of pipeline capacity to move oil to refineries.[63] Bakken oil production went up by 150% between 2008 and 2011, creating the existing bottleneck of oil.[64] Production, however, is expected to increase further, exacerbating the transport issue.[65] This year, the North Dakota Industrial Commission announced that during the next 15 years, oil companies would drill an additional 35,000 wells and increase production to two million bpd, tripling the current volume.[66] To relieve the bottleneck, the oil sector has been relying on rail and trucks.[67] There are higher costs associated with moving oil by truck and rail, and this is reflected in Bakken oil's low price,[68] despite that, it is a high-quality crude that is easy to refine into high-value products like gasoline.[69] Transport capacity, therefore, is truly constraining Bakken oil production by reducing profit margins and making it slow and difficult to tranport Bakken oil to refineries and large demand centers.[70]

The Keystone XL Pipeline will help with the Bakken transport-capacity issue via the Bakken Marketlink Project. This Project would provide transport of up to 100,000 bpd of crude oil from the Bakken Shale Formation to the Keystone XL Pipeline.[71] The Bakken Marketlink facilities would include two 250,000-barrel tanks that would be used to accumulate crude from connecting third-party pipelines and terminals, and a five-mile-long pipeline that would start at an existing Montana tank farm facility and connect to the proposed Keystone XL Pipeline.[72] The Bakken Marketlink Project would provide the first direct link between the Bakken crude oil-producing region and the Gulf Coast, the largest refining market in North America.[73] Given the link between the Bakken Marketlink Project and the Keystone XL Pipeline, the Keystone FEIS and SEIS categorized the Bakken Marketlink Project as a connected action, requiring NEPA cumulative effects analysis (CEA).

III. NEPA's Connected Actions and CEA Requirements

NEPA requires that environmental impact assessments (EIAs) "provide full and fair discussion of significant environmental impacts."[74] The details of this requirement are found in NEPA's statutory mandates at 42 U.S.C. §§4321 et seq., NEPA regulations issued by the Council on Environmental Quality (CEQ), the entity created by Congress to oversee the NEPA process, at 40 C.F.R. §§1500-1508, as well as CEQ guidance documents, such as the CEQ NEPA Cumulative Effects Handbook,[75] and existing federal case law. These sources elaborate on the required scope of an EIS, which depends on several factors, including whether or not the agency is engaged in connected or cumulative actions.[76] The scope of the Keystone XL Pipeline FEIS and SEIS—while it includes the Bakken Marketlink Project and BakkenLink Pipeline as connected actions—is inadequate because it fails to consider the cumulative effects of the proposed action and its connected actions. In particular, the environmental analysis completely disregards the strong link between the Keystone XL Pipeline, the Bakken Marketlink Project, and the Bakken Marketlink Pipeline with increased fracking in the Williston Basin.

A. *Connected Actions*

Connected actions are those that are "closely related" and should be discussed in the same EIS.[77] Actions are considered "connected" if they: "(i) [a]utomatically trigger other actions that may require environmental impact statements; (ii) [c]annot or will not proceed unless other actions are taken previously or simultaneously; or (iii) [a]re interde-

58. Ratner et al., *supra* note 32, at summary.
59. Ratner et al., *supra* note 32, at 1, 3. For a diagram of the Bakken Shale Formation, see Ratner et al., *supra* note 32, at 2.
60. Ratner et al., *supra* note 32, at summary.
61. *See* James Gibson, *Bombing North Dakota: Living Amid the Bakken Oil Boom* (Winter 2013), http://www.earthisland.org/journal/index.php/eij/article/bombing_north_dakota/ (last visited Sept. 26, 2013); Ratner et al., *supra* note 32, at 2.
62. Ratner et al., *supra* note 32, at summary.
63. *Id.* at 4.
64. *Id.*
65. *Id.*
66. Gibson, *supra* note 61.
67. Ratner et al., *supra* note 32, at 4.
68. The price for North Dakota crude oil is about 10% less than the price for west Texas intermediate oil. The price difference is solely attributable to transportation constraints on Bakken oil. *Id.* at 18.
69. *Id.* at 5.
70. *See id.* at 6.
71. *Executive Summary: FEIS*, *supra* note 9, at ES-3.
72. *FEIS* Volume I, Project Description, *supra* note 24, at 2-62. For a diagram of the planned Bakken Marketlink facilities near Baker, Montana, see U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Final Environmental Impact Statement Keystone XL Project*, Volume I, Figure 2.5.3-1: Planned Bakken Marketlink Facilities Near Baker, Montana (Aug. 2011), *available at* http://keystonepipeline-xl.state.gov/documents/organization/182043.pdf.
73. *FEIS* Volume I, Project Description, *supra* note 24, at 2-62.
74. 40 C.F.R. §1502.1.
75. *See generally* Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act* (Jan. 1997), *available at* http://ceq.hss.doe.gov/nepa/ccenepa/exec.pdf [hereinafter *Considering Cumulative Effects Under the National Environmental Policy Act*].
76. *See* 40 C.F.R. §1508.25(a).
77. *See* 40 C.F.R. §1508.25(a)(1).

pendent parts of a larger action and depend on the larger action for their justification."[78]

Here, the Department of State appropriately categorized the Bakken Marketlink Project as a connected action.[79] The Bakken Marketlink Project is dependent on the construction of the Keystone XL Pipeline, as its purpose is to supply Bakken crude oil from the Bakken Marketlink Pipeline system in North Dakota and Montana to the Keystone XL Pipeline.[80] Given the interconnected nature of these projects, it is logical that the environmental impacts of both projects would be discussed in the same NEPA documents. The scope of the considered effects should include both cumulative and indirect effects.

B. Cumulative Actions/Effects

The CEQ has recognized that the NEPA CEA may be one of the most critical components of a NEPA analysis, as evidence increasingly shows that some of the most devastating environmental effects are caused by the combination of individually minor effects of multiple actions over time, rather than the direct effects of a particular action.[81] Cumulative actions are those that "when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement."[82] Environmental cumulative impacts or effects that must be considered in NEPA assessments are those that "result[ ] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions."[83] These impacts can also "result from individually minor but collectively significant actions taking place over a period of time."

Analyzing cumulative effects is challenging, primarily because of the difficulty of defining the geographic and temporal boundaries of the analysis.[84] When boundaries are defined too broadly, the analysis can become unmanageable, but if they are defined too narrowly, significant issues can be overlooked.[85] CEQ's cumulative effects handbook[86] analogizes the CEA process to the traditional components of the EIA, including scoping, describing the affected environment, and determining the environmental consequences.[87]

First, scoping is the key to analyzing cumulative effects. This process helps to decrease the focus on the project itself and focuses on resource impact zones and the life cycle of effects, which helps with setting the appropriate boundaries for analysis.[88] Scoping requires a review of all past, present, and future actions, including all federal, nonfederal, and private actions that have truly meaningful effects on affected resources, ecosystems, and human communities.[89] This scoping process should help with the second EIA component in which the affected environment must be described. Natural boundaries should be based on the identified affected resources, ecosystems, and human communities. Finally, when determining the environmental consequences, the assessment should look beyond the life of the project, and consider additive, countervailing, and synergistic relationships between the multiple actions and the resources, ecosystems, and human communities.[90] The focus should be on interactions that substantially affect the resources at issue.[91] To determine the significance of the interactions, the analysis should compare the cumulative effects to the environmental baseline, employing modeling, trends analysis, and scenario-building, especially if uncertainties are great.[92] The environmental baseline should be established by analyzing the historical context surrounding the resource.[93]

Given the difficulty of completing an adequate CEA, it is not surprising that this aspect of environmental assessments is one of the most highly litigated NEPA issues where plaintiffs are increasingly having high success rates.[94] Plaintiffs most often challenge the sufficiency of the agency's analysis of other past, present, and reasonably foreseeable future actions within the analysis area, rather than any failure to consider cumulative impacts.[95] Another common CEA challenge is that the analysis lacked data or a convincing rationale for selection of data and a conclusion that cumulative impacts were insignificant.[96] Other challenges include that the geographic area of analysis was too small for the CEA, or that the temporal period chosen for analysis was too short.[97] All of these inadequacies are present in the Keystone XL Pipeline FEIS and SEIS.

78. 40 C.F.R. §1508.25(a)(1)(i)-(iii).
79. *FEIS* Volume I, Project Description, *supra* note 24, at 2-56.
80. *Draft SEIS Executive Summary*, *supra* note 6, at ES-7. The Bakken Marketlink Project would be constructed and operated by Keystone Marketlink, LLC, a wholly owned subsidiary of TransCanada Pipelines Limited. *Id.*
81. Michael D. Smith, The Shipley Group, *Recent Trends in Cumulative Impact Case Law*, 1 (Apr. 2005), *available at* http://training.fws.gov/CSP/Resources/nepa/cd/NEPA%20Terms%20and%20Questions/cumulative%20impact%20analysis%20case%20law.pdf.
82. *See* 40 C.F.R. §1508.25(a)(2).
83. 40 C.F.R. §1508.7.
84. *Considering Cumulative Effects Under the National Environmental Policy Act*, *supra* note 75, at v.
85. *Id.*
86. In response to requests for more direction regarding cumulative effects assessments, CEQ published a comprehensive handbook, *Considering Cumulative Effects Under the National Environmental Policy Act* in 1997. The handbook does not establish new requirements for such analyses, but rather just serves as informal guidance for how agencies should direct their cumulative impact analysis. *See id.* at iii. It is not legally binding, and federal courts do not regard the handbook as such, *id.*, however, according to EPA, which has the responsibility of reviewing all NEPA EISs prepared by federal agencies, the "CEQ's handbook offers the most comprehensive and useful information to date on practical methods for addressing cumulative impacts in NEPA documents." *See* Smith, *supra* note 81, at 2.
87. *Considering Cumulative Effects Under the National Environmental Policy Act*, *supra* note 75, at v.
88. *Id.*
89. *Id.* vii.
90. *Id.* vi-vii.
91. *Id.* vi.
92. *Id.*
93. *Id.*
94. Smith, *supra* note 81, at 3-4.
95. *Id.*
96. *Id.*
97. *Id.*

IV. Keystone XL Environmental Review (FEIS & SEIS)

The Department of State concluded that issuance of a permit for the proposed construction, connection, operation, and maintenance of the Keystone XL Pipeline and its associated facilities would constitute a major federal action that may have a significant impact upon the environment within the meaning of NEPA.[98] Therefore, it conducted an FEIS, released in August 2011, and a later SEIS, released in March 2013. The Department of State was the lead agency for preparing both of these documents.[99]

A. The CEAs in the FEIS and SEIS

The CEAs in the FEIS and SEIS are inadequate and they inappropriately conclude that the effects of Keystone XL and the Bakken Marketlink Project on the Bakken region are negligible and will not impact the rate of crude oil production. First, the discussion of impacts in the Bakken region was cursory, merely one page[100] in the nine-volume FEIS that was over 1,000 pages long, and just two sentences[101] in the 2,000-plus-paged SEIS. Additionally, both CEAs relied on self-serving and incomplete Bakken transport data, and were internally contradictory. They emphasized increased transport capacity out of the Bakken region by convoluting rail and pipeline transport capacity, ignored the price difference between these two methods of transportation, and therefore improperly assessed the project's relationship with Bakken oil production levels. Since the CEAs improperly assessed this relationship, neither the FEIS nor the SEIS discuss the tremendous environmental impacts associated with increased fracking.

1. The Keystone XL Pipeline FEIS

The CEA in the FEIS described Keystone XL's impacts on the Bakken Shale Formation region via its discussion of the Bakken Marketlink Project, and concluded that the projects would not impact the rate of growth in crude oil production in the area.[102] The only referenced support for the conclusion is one chart, referred to as Figure 3.14.2-2, out of a lengthy 2011 North Dakota Pipeline Authority Report consisting of 46 slides.[103] Figure 3.14.2-2 is a chart that interposed Williston Basin oil production levels with export *pipelines and rail* capacity out of the region.[104] The chart, however, was used to support the proposition that there is sufficient existing and planned *pipeline* transport capacity to accommodate the increased production from the Bakken Shale Formation through at least 2017, even without the Bakken Marketlink Project.[105] This is not the appropriate conclusion to draw from Figure 3.14.2-2, as it depicts combined rail and pipeline transport capacity, not just pipeline capacity. Additionally, the FEIS should not have relied on the figure, as it contained a disclaimer from the North Dakota Pipeline Authority that the production forecasts are just for "visual demonstration purposes only and should not be considered accurate for any near or long term planning."[106]

To make matters worse, in the same 2011 North Dakota Report, on the slide right before Figure 3.14.2-2, there is a chart that the CEA should have relied on but never mentioned.[107] This chart superimposes Williston oil production levels on pure pipeline capacity, and it clearly contradicts the conclusion in the CEA.[108] This chart shows that pipeline capacity out of the Williston Basin will be surpassed by production levels as early as late 2013 or 2014, depending on whether production levels meet the high or low production forecast.[109] Additionally, the chart shows that in 2011, the same year that the FEIS was produced, there was insufficient pipeline transport capacity to keep pace with the oil production levels.[110] The chart forecasted that transport capacity would remain insufficient until the Keystone XL target operation date.[111] This data, however, is never mentioned in the CEA, and it directly refutes the CEA conclusion.

Since the CEA lumped rail and pipeline transport capacity together, it should have at least presented the price difference between rail and pipeline transport methods and included the effects of this price differential into its analysis about Bakken oil production levels. Instead, the CEA remains silent on this issue, burying the price data in an Appendix to the FEIS, so that it does not factor into the CEA analysis. Appendix A specifically states:

98. 74 Fed. Reg. 5020, *supra* note 20.
99. Parfomak, *supra* note 2, at 8. The Department of State requested input from cooperating agencies that had legal jurisdiction or special expertise regarding any environmental impact associated with the project, including: EPA; the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS); the U.S. Fish and Wildlife Service (FWS); and the U.S. Army Corps of Engineers, to name a few. *Id.* at 9.
100. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Final Environmental Impact Statement Keystone XL Project*, Volume 2, Cumulative Impacts AMENDED 9/22/2011, 3.14-9 (Aug. 2011), *available at* http://keystonepipeline-xl.state.gov/documents/organization/182069.pdf [hereinafter *FEIS* Volume 2, Cumulative Impacts AMENDED].
101. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Draft Supplemental Environmental Impact Statement for the Keystone XL Project*, Volume II, 4.15-21 (Mar. 2013), *available at* http://keystonepipeline-xl.state.gov/documents/organization/205618.pdf [hereinafter *Draft SEIS* Volume II].
102. *FEIS* Volume 2, Cumulative Impacts AMENDED, *supra* note 100, at 3.14-9.
103. *Id.*
104. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Final Environmental Impact Statement Keystone XL Project*, Volume 2, Figures, 3.14.2-2 (Aug. 2011), *available at* http://keystonepipeline-xl.state.gov/documents/organization/182091.pdf.
105. *FEIS* Volume 2, Cumulative Impacts AMENDED, *supra* note 100, at 3.14-9.
106. *See* Justin J. Kringstad, North Dakota Pipeline Authority, *IOGCC 2011 Midyear Meeting—Bismarck, ND*, 24 (June 28, 2011), *available at* https://www.dmr.nd.gov/pipeline/assets/07142011/NDPA%20IOGCC%206-28-2011.pdf.
107. *See id.* at 23.
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.*

> [P]roducers currently use rail and truck transportation to ship crude oil produced from the Bakken formation. Due to the high costs associated with these transportation alternatives, Bakken producers must discount their crude oil to be competitive with other sources of crude oil. . . . the Bakken Marketlink Project would provide direct access with a less expensive mode of transporting crude oil to markets in Petroleum Administration for Defense District (PADD) II and PADD III.[112]

Even the 2011 North Dakota Report highlighted the heavy price discounts on North Dakota crude oil due to transport constraints.[113] Given this data, it seems plausible that faster and cheaper oil transport by pipeline, rather than by rail, would facilitate and increase oil production in the Bakken Shale Formation. The CEA in the FEIS, therefore, is inappropriate because it does not contain any analysis on forecasted oil production levels based on a cheaper and faster transportation method.

There is an additional contradiction within the CEA that is sufficiently significant to alter the CEA conclusion. The CEA hinges on its unsupported finding that there is a "surplus of existing, currently under construction, and planned take-away capacity from the Williston Basin."[114] This statement, however, is completely contradicted by a later statement in Appendix A that states, "the Bakken region does not have existing pipeline infrastructure to support the current level of production and the anticipated growth in that production."[115] This later statement is supported by the 2011 North Dakota Report that explicitly states that the number one challenge to production of North Dakota crude oil is "moving oil out of the Williston Basin."[116]

In sum, there is an alarming and unexplained distinction between the situation presented by the CEA in the FEIS and the situation described in Appendix A of the FEIS and the 2011 North Dakota Pipeline Authority Report. This distinction could clearly impact the CEA and its conclusion that Keystone XL and the Bakken Marketlink Project would have no effect on oil production in the Bakken Shale Formation. It is ironic how much the Department of State's FEIS downplays the significance of the Keystone XL Pipeline and the Bakken Marketlink Project's impact on oil transportation, when even the oil industry, including the North Dakota Pipeline Authority, recognizes that the projects are "exciting developments for post 2010 crude oil transport."[117] By downplaying the projects' significance, the CEA denies any increase in oil production and completely evades mention of the tremendous environmental impacts associated with increased fracking in the Bakken Shale Formation.

2. The Keystone XL Pipeline Draft SEIS

The CEA in the SEIS is similarly inadequate. While the SEIS never once uses the word fracking, it does allude to it as the "technology of extracting crude oil from tight rock formations" when describing the U.S. crude oil market.[118] Nevertheless, in the Market Analysis Section—between the Purpose and Need Section and the Agency Participation Section—rather than in the CEA Section, the SEIS evades addressing the relationship between the Keystone XL Pipeline and the extraction rate of Bakken shale oil. Instead, the SEIS just asserts that the project will not significantly affect the rate of extraction in U.S. refining activities overall.[119] Since the Bakken Marketlink is a connected action to the Keystone XL Pipeline that will serve the Bakken shale oil region, the rate of extraction should have been assessed at this localized level.

In discussing the project's relationship with the Bakken crude oil market, the SEIS refuses to acknowledge any impacts the project may have on Bakken oil extraction rates. Instead, the SEIS evades the issue, asserting that the infrastructure for crude oil transportation, including pipeline and rail, is undergoing significant adaptation to increases in capacity, developing an alternative capacity to move Bakken crudes to markets in the event the project is not built.[120] While such assertions are later qualified by statements admitting that, despite rapid rail expansion, neither rail nor pipeline capacity have kept pace with the increases in production in the region and that there are substantial price discounts on inland Bakken crude oil attributable to infrastructure constraints, all these remarks miss the point.[121]

A proper CEA must assess the environmental impacts of the project and its connected actions that are *cumulative* with other past, present, and future actions regardless of what agency or person undertakes such other actions.[122] In other words, the focus cannot be switched from the proposed actions' environmental impacts just because there may be future projects that serve a similar purpose. The impacts of the Keystone XL Pipeline's additional carrying capacity of 1.3 million bpd[123] to the environmental baseline must be assessed to properly comply with NEPA's CEA requirement.

The actual CEA Section of the SEIS for the Bakken Marketlink Project is just two sentences long and extremely

112. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Final Environmental Impact Statement Keystone XL Project*, Volume 3, app. A, Part 1—Consolidated Responses AMENDED 9/22/2011, at A-8 (Aug. 2011), *available at* http://keystonepipelinexl.state.gov/documents/organization/182120.pdf [hereinafter *FEIS* Volume 3, app. A].
113. Kringstad, *supra* note 106, at 27.
114. *FEIS* Volume 2, Cumulative Impacts AMENDED, *supra* note 100, at 3.14-9.
115. *FEIS* Volume 3, app. A, *supra* note 112, at A-7.
116. Kringstad, *supra* note 106, at 8.
117. Kringstad, *supra* note 106, at 14.
118. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Draft Supplemental Environmental Impact Statement Keystone XL Project*, 1.4-1 (Mar. 2013), *available at* http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf [hereinafter *Draft SEIS*].
119. *Id.*
120. *Id.*
121. *Id.* at 1.4-32 to 1.4-33.
122. 40 C.F.R. §1508.7.
123. Parfomak, *supra* note 2, at 5.

vague. It first asserts that the cumulative impacts of the Bakken Marketlink connected action will "occur where long-term and permanent residual impacts of the proposed Project are additive with long-term and permanent impacts of construction and operation of the above projects."[124] It is unclear what circumstances this is alluding to, and this seems to be a mere reformulation of the definition of cumulative impacts. It is worse than a rocky start to a CEA when one-half of the analysis simply states that cumulative effects will occur when cumulative effects occur. The next and last sentence of the CEA similarly lacks effective analysis. It merely states that the residual impacts from the Bakken Marketlink connected action would be the same impacts as those "associated with [the] operation of these types of facilities," referring back to the impacts discussed in two previous sections for past and present projects.[125] These referenced sections, however, only mention that "construction and operation of these types of systems may result in permanent alterations to terrestrial vegetation . . . as well as impacts to wildlife habitat, land use, visual resources, noise, and air quality," without providing further details or analysis.[126] The CEA in the SEIS therefore fails to discuss the relationship between Keystone XL and increased Bakken oil development.

Despite the failure to explore this relationship and its cumulative impacts, it is clear that at the time the SEIS was developed, the Department of State was aware that the Keystone XL Pipeline would enable construction of additional pipelines in the Bakken shale oil region, increasing transport capacity and access to new markets, and thereby encouraging the expansion of fracking. Specifically, the Department of State knew that construction of the BakkenLink Pipeline system, a 144-mile-long oil gathering system to move Bakken crude oil from North Dakota down toward Baker, Montana,[127] could not proceed without approval and construction of Keystone XL and the Bakken Marketlink Project. The BakkenLink Pipeline's dependency on Keystone XL was explicitly recognized in the SEIS, where the Pipeline was labeled as a connected action, one that "[c]annot or will not proceed unless other actions are taken previously or simultaneously."[128]

The SEIS CEA, however, never addressed the impacts of this connected action or even recognized it as a specific instance of Keystone XL's impacts on development in the Bakken region. In fact, any mention of the BakkenLink Pipeline as a connected action is buried at the end of the SEIS, within a parenthetical, in a 10-point font table.[129] The Pipeline is not even listed or assessed as a connected action in the SEIS Connected Actions Section, which only mentions the following connected actions: the Bakken Marketlink Project (a five-mile pipeline with booster pumps, meter manifolds, a 250,000-barrel tank, and a 100,000-barrel tank); the Big Bend to Witten 230-kilovolt electric transmission line; and electric distribution lines and substations associated with the proposed pump stations.[130] The Department of State's label of the BakkenLink Pipeline as a connected action, combined with its attempt to hide this fact, and its nonassessment of the cumulative impacts, suggests that it is aware that the Keystone XL is driving additional investment in the Bakken region, which may increase fracking. NEPA's CEA requirement mandates that these relationships and cumulative environmental consequences be assessed, and the SEIS failed to do so.

B. The Required NEPA Analysis for an Adequate Keystone XL Pipeline CEA

An adequate CEA for Keystone XL must include proper scoping, it must describe the affected environment, and it must explore the environmental consequences.[131] These three steps are all linked together and are heavily driven by the scoping process. Scoping is the key to analyzing cumulative effects. This process helps to decrease the focus on the project itself and focuses on resource impact zones and the life cycle of effects, which helps with setting the appropriate boundaries for analysis.[132] Scoping requires a review of all past, present, and future actions, including all federal, nonfederal, and private actions that have truly meaningful effects on affected resources, ecosystems, and human communities, drawing out the interconnected relationship.[133] Here, the CEAs' scope was the possible future construction and operational impacts from the Keystone XL and connected actions that were in the project area, defined as the land along the pipeline right-of-way, and the local area, defined as a two-mile distance on either side of the pipeline right-of-way. The brief discussion of affected resources in the region only included direct, short-term effects on the nearby area's geology, soil, and surface and groundwater,[134] all of which were predicted to be negligible.[135] Such a narrow scope ignores the likely future, private actions that will follow as a result of these projects.

The CEA scope must be broader to assess the truly meaningful effect Keystone XL is predicted to have on Bakken region development. The Congressional Research Service Report on Bakken development—using resources compiled by the North Dakota Pipeline Authority—notes that the Keystone XL pipeline will lower transportation costs and provide access to new markets that may support

124. *Draft SEIS* Volume II, *supra* note 101, at 4.15-21.
125. *Id.*
126. *Draft SEIS* Volume II, *supra* note 101, at 4.15-12.
127. *Draft SEIS* Volume II, *supra* note 101, at 4.15-19.
128. 40 C.F.R. §1508.25(a)(1)(ii).
129. *Draft SEIS* Volume II, *supra* note 101, at 4.15-19.
130. U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, *Draft Supplemental Environmental Impact Statement for the Keystone XL Project*, Volume I, 2.1-74 to 2.1-75 (Mar. 2013), *available at* http://keystonepipeline-xl.state.gov/documents/organization/205645.pdf.
131. *Considering Cumulative Effects Under the National Environmental Policy Act*, *supra* 75, at v.
132. *Id.*
133. *Id.* at vii.
134. *Draft SEIS*, *supra* note 118, at 4.15-2.
135. *Id.* at 4.15-26, 4.15-31 to 4.15-32, 4.15-34, 4.15-36, 4.15-38.

increased investment in the Bakken.[136] In fact, without the [Keystone] XL project the Marketlink pipeline probabably would not be constructed.[137] Without the Marketlink Pipeline, all the "feeder pipelines" proposed by other companies to be constructed across the Bakken region to move Montana and North Dakota crude to Baker, would not be constructed.[138] These interconnected future private actions mean more fracking in the Bakken region, with all of its associated environmental impacts, and this should have been considered during the CEA scoping process.

Proper scoping would have assisted with the second CEA step—describing the affected environment. Natural boundaries should be based on the identified affected resources and ecosystems. Here, the sought-after natural resource is oil. The entire shale formation underlying the Bakken region will be affected. Extracting the crude oil in this region requires the construction of more pipelines for transport and fracking for oil extraction. Fracking places immense demand on water resources, so nearby areas with water resources are also likely to be part of the affected environment. Additionally, any areas around injection wells or disposal sites for fracking wastewater are also likely to be part of the affected environment.

Finally, when completing the last CEA step, determining environmental consequences, it is important to look beyond the life of the project, and consider additive, countervailing, and synergistic relationships between the multiple actions and the resources and ecosystems.[139] The focus should be on interactions that substantially affect the resources at issue.[140] To determine the significance of the interactions, the analysis should compare the cumulative effects to the environmental baseline, employing modeling, trends analysis, and scenario-building, especially if uncertainties are great.[141] The environmental baseline should be established by analyzing the historical context surrounding the resource.[142]

Here, the environmental baseline and synergistic relationships in the Bakken region were not appropriately assessed. The CEA focused on future rail and truck-capacity expansion rather than on the lack of existing pipeline capacity and excess oil resources. While the SEIS identified an increase in the number of announced capacity-expansion projects since 2011,[143] it should have discussed the relationship of this development with Keystone XL Pipeline plans and the publication of the optimistic Keystone XL FEIS. Additionally, there should have been a discussion of oil production rates in the Bakken region pre- and post-announcement of the Keystone XL Pipeline, along with modeling or trends analysis to seriously explore if there is a synergistic relationship between construction of the Keystone XL Pipeline and increased fracking in the Bakken region. The FEIS and SIES only discussed forecasted aggregate U.S. oil production rates, demonstrating improper scoping and a lack of focus on the actual affected environment and its historical context.[144]

These inadequacies resulted in two CEAs that failed to discuss serious potential environmental consequences for the Bakken region. The two biggest environmental impacts from increased fracking on the Bakken region will be water shortages and water contamination. Most of the water sources used for fracking Bakken shale oil have come from groundwater sources in the Bakken area like the Fox Hills Aquifer, but also from surface water sources, primarily the Missouri River System.[145] The rapid use of groundwater for fracking has led to the accelerated decline of groundwater levels since the mid-1980s.[146] The North Dakota State Water Commission has reported declines of one to two feet of groundwater per year, with negative impacts on domestic water wells in the area.[147] The Commission has concluded that "[g]iven current estimates of oil production from the Bakken Shale Formation over the next decade, water requirements will not be met from groundwater sources and non-Missouri River surface water sources."[148]

Protecting groundwater quality, not just quantity, is also important in the Bakken region. Aquifers in the region are the principal source of water for domestic and agricultural purposes.[149] Both Montana and North Dakota have several shallow potable aquifers that could be impacted by fracking.[150] There is concern that as fracking increases, the process might introduce hydrocarbons, fracking fluids, and other contaminants into aquifers.[151] While state oil regulators note that the oil shale formations are 6,000 to 8,000 feet below freshwater aquifers,[152] and that thick steel and concrete casings are used to protect groundwater,[153] accidents do occur.[154] Groundwater could be contaminated during drilling operations while drilling the wellbore through groundwater aquifers, before installing steel pipe and cement casings. Contamination could also occur as the fracking process creates fractures along rock formations that have naturally isolated the aquifer.

Water and soil contamination from fracking wastewater is also a big concern in the Bakken region. More than the average number of fracking wastewater injection wells are necessary to support Bakken shale oil development because

136. Ratner et al., *supra* note 32, at 8.
137. *Id.* at 7.
138. Stevie Moe, *TransCanada Receives Contracts for Bakken Marketlink Pipeline* (Jan. 21, 2011), http://tarsandspipelines.wordpress.com/2011/01/21/transcanada-receives-contracts-for-bakken-marketlink-pipeline/ (last visited Sept. 26, 2013).
139. *Considering Cumulative Effects Under the National Environmental Policy Act*, *supra* note 75, at vi-vii.
140. *Id.* at vi.
141. *Id.*
142. *Id.*
143. *Draft SEIS*, *supra* note 118, at 1.4-28.
144. *Id.* at 1.4-18.
145. Ratner et al., *supra* note 32, at 11.
146. *Id.*
147. *Id.*
148. *Id.*
149. *Id.* at 14.
150. *Id.*
151. *Id.*
152. *Id.*
153. Energy Answered, *How Does Hydraulic Fracturing Work?*, http://www.energyanswered.org/questions/how-does-hydraulic-fracturing-work (last visited Sept. 26, 2013).
154. Gibson, *supra* note 61.

wastewater there is highly saline, making it technically impractical to recycle it.[155] Fracking fluids can contaminate the soil and water in a number of ways. Some wells lose pressure and release fracking wastewater at or near the surface, where they can enter the water supply.[156] In other cases, wastewater migrates into soil and water over time, as wastewater pits leak when liners wear out or tear, since the life of the contained chemicals is much longer than the life of the liners.[157] Wastewater pits can also overflow in heavy rain.[158] The impacts of such contamination are tremendous considering that there are thousands of waste pits from oil wells all over western North Dakota.[159] According to North Dakota public records, more than 1,000 accidental releases of oil, drilling wastewater, and other fluids occurred in 2011, including a spill of two million gallons of brine. State regulators admit that these are just incidents that oil drillers self-reported, and that many more spills and intentional dumping of wastewater occur.[160] All these environmental consequences should have been explored through proper scoping and definition of the affected environment.

V. Conclusion

Despite Keystone XL's lengthy NEPA review process, the FEIS and SEIS failed to adequately assess the Project's impact in the Bakken region. Potential environmental impacts that should have been explored include water shortages associated with fracking's excessive water use, water and soil contamination from fracking wastewater, and seismic activity associated with wastewater injection wells. The environmental consequences of increased fracking were never explored because the CEAs were cursory and relied on self-serving and incomplete data, so that the relationship between Keystone XL, its connected actions, and Bakken oil production levels was improperly assessed. The CEAs should have included proper scoping, identification of the affected environment, and a thorough discussion of the environmental consequences. Instead, the inadequate CEAs disregard NEPA's federal decisionmaking and citizen-disclosure requirements and miss a critical opportunity to assess serious and far-reaching environmental consequences associated with increased fracking in the Bakken region.

155. Ratner et al., *supra* note 32, at 11.
156. *Id.*
157. Gibson, *supra* note 61.
158. *Id.*
159. *Id.*
160. *Id.*