UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

IN THE MATTER OF	)	
	)	**FE DOCKET NO. 11-128-LNG**
DOMINION COVE POINT LNG, LP	)	

COMMENTS ON APPLICATION TO EXPORT LNG

Pursuant to 10 C.F.R. § 590.303 of the Administrative Procedures with respect to the Import and Export of Natural Gas,[1] the undersigned submit these comments in opposition to the application of Dominion Cove Point LNG, LP ("DCP") for long-term authorization to export domestically produced liquefied natural gas ("LNG") from its LNG terminal in Lusby, Maryland filed in this docket on October 3, 2011 ("Application"), on behalf of our members and ourselves.

I. COMMUNICATIONS AND CORRESPONDANCE

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[1] 10 C.F.R. § 590.303 (2011)

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II. DCP'S APPLICATION

On October 3, 2011, DCP filed its Application with the Department of Energy, Office of Fossil Energy ("DOE/FE").[2] In the Application DCP seeks long-term, multicontract authority to export domestically produced LNG from its Lusby, Maryland terminal, up to a cumulative total of the equivalent of 1 Bcf of natural gas per day, or approximately 7.82 million metric tons per year. The authority sought by DCP would span 25 years, commencing on the sooner of the date of the first LNG export, or six years from the date the authorization is issued. The authority requested would permit DCP to export LNG to any country with the capacity to import LNG via ocean going carrier and with which the United States does not prohibit trade but also does not have a Free Trade Agreement.[3] DCP states that it does not intend to hold title to the LNG itself; rather, DCP would act as agent for LNG owners that wish to export LNG and that will provide their own gas supply.

DCP further states that it intends to seek authority from the Federal Energy Regulatory Commission ("FERC") to construct new facilities at its LNG terminal to provide natural gas liquefaction ("Liquefaction Project") and to provide LNG export services. DCP states that its Liquefaction Project facilities will be integrated with existing facilities at its LNG terminal, and that "much of the existing facilities at the terminal will be used as part of the liquefaction project."[4] DCP states that it intends to operate its LNG terminal as a "bi-directional facility" following construction of its Liquefaction Project.[5] DCP states that it is in the process of conducting commercial negotiations with potential customers.[6] DCP states that it anticipates placing its Liquefaction Project in service by the end of 2016.

DCP states that the authorization it has requested in this docket is consistent with the public interest.[7] DCP further states that the construction of new facilities at the existing terminal will not constitute a major federal action significantly affecting the quality of the human

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[2] On October 4, 2011, DCP supplemented its Application by withdrawing and replacing Appendix B (Navigant Price Repot) and Appendix C (ICF Economic Benefit Study) to the Application.

[3] DCP's Application represents the second part of its two-part request for authorization to export domestic natural gas in the form of LNG from its terminal. Previously, on September 1, 2011, in FE Docket 11-115-LNG DCP sought (and subsequently was granted) authority to export domestically produced LNG to any country with which the United States has a Free Trade Agreement requiring national treatment for trade in natural gas and which has the capacity to import LNG via ocean-going carrier.

[4] These existing facilities may include DCP's offshore pier (with two berths), insulated LNG and gas piping from the pier to the on-shore terminal and within the terminal, the seven LNG storage tanks, on-site power generation, and control systems.

[5] *See* Application at p. 5.

[6] *See* Application at p. 6.

[7] *See* Application at pp. 5-6.

environment within the meaning of the National Environmental Policy Act (“NEPA”).[8][9] DCP states that it plans to file an application with the FERC for the necessary authorizations for facilities to allow for the liquefaction of domestically produced natural gas and export of LNG from its terminal, and that an environmental review under NEPA will be conducted by FERC prior to granting DCP authorization.[10] DCP states that, as a practical matter, the authorization it is requesting in this docket from DOE/FE “will not be actionable” until FERC grants authorization for the Liquefaction Project and the export of LNG, and the DOE/FE should condition any authorization it may issue in this docket on DCP’s acceptance of a FERC authorization.[11] DCP requested that the DOE/FE grant its Application by June 1, 2012.

III. EXECUTIVE SUMMARY OF COMMENTS

The undersigned oppose DCP’s proposal to convert its Calvert County, Maryland, LNG facility from an import to a bi-directional facility. We believe that the instant proposal, as well as the overarching policy of exporting domestically produced natural gas, is not in the public interest based upon analysis of DOE’s Policy Guidance, nor supported by the best available economic, scientific, and environmental data. Furthermore, we categorically dispute DCP’s statement that the instant project does not constitute a major federal action significantly affecting the quality of the human environment, as we believe this proposal necessitates appropriate analysis pursuant to the National Environmental Policy Act (“NEPA”).[12] Discussion of that issue is provided *infra* at Part V.

IV. THE PUBLIC INTEREST

A. <u>Applicable Legal Standard</u>

Under Section 3 of the Natural Gas Act, DOE must make a determination that the proposed exportation of natural gas “will not be inconsistent with the public interest.”[13] Section 3(a) thus establishes DOE’s authority to deny an application requesting authorization to export natural gas to foreign countries upon a showing of inconsistency with the public interest.[14] This provision indicates that, for the proposed DCP LNG export terminal, DOE must look at whether exportation of natural gas in general is in the public interest.

DOE has previously used policy guidelines to help direct implementation of Section 3 of the NGA and determination of whether the statutorily undefined ‘public interest’ is met when considering objections to applications for natural gas import and export.[15] While normally

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[8] *See* Application at p.45.
[9] National Environmental Policy Act of 1969, 42 U.S.C. 4321, *et seq.*
[10] *See* Application at p. 45.
[11] *See* Application at pp. 10-11.
[12] *See* Application at p. 45.
[13] 15 U.S.C. § 717b(a).
[14] *Id.*; *see also Sabine Pass Liquefaction, LLC,* FE10-111-LNG, DOE Order No. 2961 (May 20, 2011); *Sabine Pass Liquefaction, LLC.* FE10-85-LNG, DOE Opinion and Order No. 2833 (Sept. 7, 2010).
[15] “New Policy Guidelines and Delegation Orders Relating to the Regulation of Natural Gas,” 49 Fed. Reg. 6684-01 (Feb. 22, 1984)(hereinafter the ‘Policy Guidelines”); *see also Sabine Pass*, Order No. 2961, at pp. 28-29.

applicable only to gas import cases, DOE held in Order No. 1473 and subsequent cases that the same policies will be applied to natural gas export applications.[16] The Policy Guidelines stand for the proposition that the goal of DOE oversight of LNG export should be to foster an adequate supply of energy at reasonable costs. Further, the Policy Guidelines state that the government's objective is to ensure natural gas is available to the American consumer at competitive prices, while avoiding undue dependence on unreliable sources of supply.[17] Of note, the Policy Guidelines do not set binding and inflexible rules; rather, they set forth rebuttable presumptions concerning the competitiveness of the export, the propriety of exporting natural gas, the security of the domestic supply relative to the proposed exportation, and any other issue determined to be appropriate.[18]

B. Exports from Cove Point Are Not in the Public Interest

The proposed export of domestically produced natural gas from the Cove Point terminal fails to provide the requisite certainty that it will be competitive for the contract term of 25 years. DOE must evaluate the instant proposal to assure that the export terms will be competitive throughout the contract period, where price is but one factor determining competitiveness. An appropriate indicator of competitiveness for the instant application is projected Mid-Atlantic shale gas supply and demand, taken in conjunction with an understanding of pace and scale.

1. Competitiveness of Exporting Natural Gas

The extraction of non-renewable natural resources such as natural gas is typically characterized by a "boom-and-bust" cycle where a rapid increase in production and economic activity is followed by a corresponding decrease.[19] Whereas DCP anticipates a primary and substantive portion of its exports to come from the Marcellus and Utica shale plays, it is relevant to consider the pace and scale of high-volume hydrofracking ("HVHF"), the developmental mechanism used to produce the natural gas in quantities allegedly ripe for export. Understanding the pace and scale of HVHF will determine the duration of the boom period, and thus a better understanding of DCP's anticipated domestic supply, allowing a rational, fact-driven assessment of competitiveness.

Market & Supply Volatility

DOE should approach the pace and scale of production in the Marcellus & Utica shale plays, and correspondingly its assessment of competitiveness, via both an analysis of (a) total potential natural gas reserves and capacity of existing or anticipated technologies, and via (b) an assessment of the likely firm strategies in response to profit opportunities in particular and overall. Indeed, the Policy Guidance contemplates DOE assessing competitiveness by taking into

[16] *Phillips Alaska Natural Gas Corporation and Marathon Oil Company*, DOE Order No. 1473, at 14, 2 FE ¶ 70,317.
[17] Policy Guidelines at p. 3.
[18] *Id.* at pp. 8-9.
[19] Christopherson, Susan and Ned Rightor. May 2011. "How Should We Think About the Economic Consequences of Shale Gas Drilling?," from "Working Paper Series: A Comprehensive Economic Impact Analysis of Natural Gas Extraction In the Marcellus Shale." p.8.

account gas prices as one of several key considerations.[20] The Policy Guidance also suggests DOE consider price evaluations along with consideration of the export agreement's provisions detailing the basis for price and price adjustments.[21] Notably, DCP's application does not contain any firm commitments or provisions establishing price or price adjustments. Instead, the application solely argues that production and development of domestic gas will be sufficient to allow competitive export without providing key price control provisions, a dubious proposition considering the highly speculative and novel nature of exporting domestic natural gas.

DCP's application fails to rationally explain how its request for export authorization is competitive under the public interest standard when compared with the most current data concerning potential natural gas reserves and foreseeable price impacts arising from authorization of exports. Previous estimates of shale gas resources in the Marcellus deposit - a resource of key importance to DCP's proposal - from Penn State geological scientist Terry Engelder, showed as much as 500 trillion cubic feet (tcf) of natural gas reserves, and in a 2008 report with Gary Lash of SUNY Fredonia, Engelder estimated that perhaps 10% of that gas (50tcf) might be recoverable.[22] In 2009, he estimated that recoverable reserves could be as high as 489 tcf.[23] More recent estimates of recoverable gas fall in the 200-300 tcf range.[24]

It is important to compare those previous figures widely used by the natural gas industry to the Energy Information Administration's (EIA) January 2012 report entitled "Effect of Increased Natural Gas Exports on Domestic Energy Markets" (Export Report).[25] That report responds to an August 2011 request from DOE for an analysis of the potential impact of increased domestic natural gas demand, as exports, to help inform DOE's decision-making in circumstances exactly like the application here: determination of whether applications to export LNG to non free-trade agreement countries fulfills the public interest standard under Section 3 of the NGA. As discussed extensively below, the best available economic and environmental data concerning natural gas production, demand, and export related to DCP's application weighs strongly against finding DCP's instant application as being in the public interest.

The Export Report considers four scenarios of export-related increases in natural gas demand with EIA beginning its assessment by specifically acknowledging the inherent difficulties of accurately projecting any certain estimates of energy markets over a 25-year period, calling the process "highly uncertain."[26] In representing natural gas markets the report explains that due to the non-integrated nature of natural gas globally, and due to variable U.S. market conditions, gas markets as a whole are dynamic and predictions are likely specious at this

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[20] Policy Guidelines at p.7.
[21] *Id*. at 7.
[22] Engelder, Terry and G.G. Lash. 2008. "Marcellus shale play's vast resource potential creating stir in Appalachia." *American Oil and Gas Reporter*, v. 51, n. 6, p. 76-87.
[23] Engelder T. 2009, "Marcellus 2008: Report card on the breakout year for gas production in the Appalachian Basin." *Fort Worth Basin Oil & Gas Magazine*. August 2009, p. 19-22. Available at: http://www.geosc.psu.edu/~jte2/references/link155.pdf
[24] Christopherson and Rightor, 2011. p.9.
[25] U.S. Energy Information Administration, "Effect of Increased Natural Gas Exports on Domestic Energy Markets," January 2012. Available online at: http://www.eia.gov/analysis/requests/fe/pdf/fe_lng.pdf.
[26] *Id*. at 3.

time. For instance, future exports of U.S. LNG depend on a number of variable factors potentially including but not limited to the greater diversity of supply that North American liquefaction projects potentially represent and a current low-level of regulatory control.[27] The four scenarios essentially entailed a discussion of impacts arising from low export and slow introduction to gas markets, low export and rapid introduction to gas markets, high exports and slow introduction to gas markets, and high exports and rapid introduction to gas markets, referenced *infra* as Scenarios 1-4, respectively.

DCP's Proposal Will Increase Natural Gas Prices

The Export Report summarized EIA's findings as showing that increased natural gas exports lead to higher domestic natural gas prices, increased domestic natural gas production, reduced domestic natural gas consumption, and increased natural gas imports from Canada via pipeline.[28] In other words, four certainties can be drawn. First, larger export levels lead to larger domestic price increases, while rapid increases in export levels lead to large initial price increases that moderate somewhat in time. Even slower increases in export levels lead to price increases, just at a slower scale of price hikes. Second, natural gas markets in the U.S. will increase production to satisfy an estimated 60-70% of the increase in natural gas exports, with three-quarters of this increased production expected from shale resources. Third, the remaining deficit in energy supply correlated to price increases will likely be met by the electric sector, which the EIA anticipates coal-fired generation to primarily produce. Fourth and last, consumers will consume less but still see an increase in their natural gas and electricity costs if export is allowed under any scenario.[29] Increases in domestic natural gas prices, in shale gas production, and in coal-fired electricity production possess serious economic and environmental consequences for the greater public and as well as mid-Atlantic economies that cast significant doubt on the competitiveness of DCP's export proposal.

Because price is a key component of DOE's competitiveness analysis, and because DCP's application is replete with information allegedly proving the proposition that export will not affect domestic gas prices, the following section explains EIA's conclusion that LNG export will cause gas price hikes.

EIA projects that U.S. natural gas prices will rise over the long run, even before considering the possibility of additional exports, with projected pricing varying considerably depending on assumptions concerning supplies and economic growth.[30] However, increases in natural gas prices at the wellhead translate to similar absolute increases in delivered prices to customers under all scenarios and baseline cases. If exports proceed under the assumptions of Scenario 1, phasing in 6 Bcf/d of exports over six years, price impacts peak at about 14% in 2022. In contrast, rapid increases in export levels in Scenario 4, phasing in 12 Bcf/d of exports over 4 years, equates to a 36% price hike at the wellhead. Particularly troubling is the Low Shale EUR case, where the rapid introduction of 12 Bcf/d of exports results in a 54% increase in wellhead price by 2018. Although notably termed "pessimistic" by the EIA, this estimate is

[27] *Id.* at 4.
[28] *Id.* at 6. "Summary of Results."
[29] *Id.*
[30] *Id.* at p. 6.

closely corroborated by current data showing how many LNG export authorizations are currently before DOE and FERC, and by the volumes requested in those applications. If all domestic LNG export applications are approved as written, Scenario 4 and the Low-Shale EUR casestudy may very closely reflect reality where the public experiences a drastic hike in natural gas prices, an outcome that weighs strongly against the competitiveness of DCP's application.

Further, the Export Report clearly corroborates higher gas prices with increased production, particularly in shale reserves. The baseline case anticipates total domestic natural gas production to grow from 22.4 Tcf in 2015 to 26.3 Tcf in 2035, averaging 24.2 Tcf for the 2015-2035 period, where increased export incites higher domestic pricing, reduced domestic consumption, and increased domestic production.[31] However, the Export Report does not provide a substantive analysis of new estimates of recoverable natural gas reserves, data that is crucial to an accurate assessment of whether DCP's export proposal is competitive or secure.

The EIA estimates in the Early Release Overview of its "Annual Energy Outlook 2012" (AEO2012)[32] that domestic natural gas reserve estimations are down 42% from 2011, and estimates for the Marcellus reserve in particular are down 66% from 2011 estimates.[33] That is, the estimated unproven technically recoverable resource of shale gas for the U.S. is 482 Tcf, substantially below the previous estimate of 827 Tcf in 2011. Likewise, this significant decrease is due in large part to the decreased estimate for the Marcellus shale, from 410 Tcf to 141 Tcf. The report notes these updates come from an increase in information available as daily rates of drilling have dramatically increased, in fact doubling for the Marcellus reserve since 2011 alone.

This update is particularly salient to DCP's application as DCP intends to rely heavily on shale gas resources of the Marcellus for export during its proposed 25-year term. These new figures suggest a dramatically smaller supply than previously thought for mid-Atlantic shale reserves, as well as a corresponding decrease in the overall estimated natural gas reserves for the nation over the contract term. A lower potentially recoverable volume of gas in reserves that DCP anticipates utilizing for export equates to uncertainty in the 'security of supply', a primary consideration in assessing whether DCP's proposal satisfies the public interest standard. We disagree with the current policy encouraging hurried extraction of natural gas reserves via HVHF, especially considering the socio-environmental impacts such development inevitably entails, and strongly disagree with the proposition that exporting those limited reserves for higher profit margins – which in turn will increase the aforementioned development and impacts - is in the public interest.

Gas & Electricity Price Increases Are Not in the Public Interest

In addition to price and production estimations DOE's competitiveness analysis should examine the nexus between increased natural gas export, decrease in consumption in electric power sector, and an increase in other power generation for electricity needs. In scenarios 1-4, where there is natural gas export, most of the decrease in consumption occurs in the electrical

[31] Export Report at p. 10.

[32] U.S. Energy Information Administration, AEO2012 Early Release Overview, available online at: http://www.eia.gov/forecasts/aeo/er/.

[33] AEO2012 at p. 9.

power sector, where the tradeoff in sources is between natural gas and coal, especially in the short-term relative to the 25-year reference period.[34] The EIA estimates that increased coal-fired generation will account for approximately 65% of the decrease in natural gas-fired generation under reference case conditions, and likely an even higher percentage in a Low Shale EUR case.[35] The increased use of coal for power generation results in an average increase in coal production from 2015-2035 over reference case levels of between 2 and 4 percent across all export scenarios. In the words of the EIA: "[As natural gas exports increase, along with prices for electricity generation], [a]ccordingly, coal prices also increase slightly which, along with higher gas prices, drive up electricity prices."

In other words, exporting LNG would not only increase domestic gas prices on the order of as much as 50%, but also increase our nation's reliance on coal-fired energy combustion – a dubious endeavor for many health and environmental concerns in and of itself not specifically discussed here – as well as increase general electricity costs for the public. When adding these facts to the highly uncertain and volatile nature of international gas prices, the negative correlation that high domestic energy costs have on the public's economic well-being, and the potentially disastrous effects a collapse of international gas demand due to a glut from North American market entrance, the available evidence weighs strongly against a finding of competitiveness for DCP's export application.

DOE should also consider productivity and its relation to an assessment of competitiveness in light of likely firm strategies responsive to profit opportunities. Given a limited number of drilling rigs, firms will certainly deploy them in those places where profits are most likely, where the question for an energy company is not whether a well is viable in terms of potentially recoverable gas, but whether it is *commercially* viable.[36] Production in shale plays is unpredictable and only a small number of wells may be able to produce commercial volumes of gas over time without costly re-fracking. Evidence from the Barnett and Haynesville shale plays indicates that high initial production rates may drop off rapidly, making it difficult for operators to cover costs. "Shale production is characterized by a steep decline curve early in its productive life. The more oil and/or gas that you can make up front the better the economics."[37]

Similarly, geologist and investment advisor Arthur Berman[38] states the following in regard to production trends across US shale plays:

> *... most wells do not maintain the hyperbolic decline projection indicated from their first months or years of production. Production rates commonly exhibit abrupt, catastrophic departures from hyperbolic decline as early as 12-18 months into the production cycle but, more commonly, in the fourth or fifth years for the control group. Pressure is drawn down and hydraulically produced fractures close...Workovers and additional fracture stimulations may boost rates back to previous*

[34] Export Report at p. 12.
[35] *Id.*
[36] Christopherson and Rightor, 2011. p.9.
[37] McFarland, Greg. 2010. "Shale Economics: Watch the Curve". *Oil & Gas Evaluation Report*. Website published by Obsidian Energy Company, LLC. March 17. Available at: http://www.oilandgasevaluationreport.com/tags/shale-play/.
[38] Berman, A. 2009. "Lessons from the Barnett Shale suggest caution in other shale plays." Available at: http://www.aspousa.org/index.php/2009/08/lessons-from-the-barnett-shale-suggest-caution- in-other-shale-plays/.

levels, but rarely restore a well to its initial decline trajectory. More often, a steep hyperbolic or exponential terminal decline follows attempts to remedy a well's deteriorating performance.

Christopherson notes the distinct possibility that "few wells will exhibit the hyperbolic production curves that are used to describe trends *across* wells in a shale play,"[39] such unpredictability demonstrated by the 2009 collapse in levels of production of drilling in the Jonah Field in Colorado, indicating the volatility and difficulty in accurate projects for long-term periods. Because shale plays may not produce the long-term results indicated by the hyperbolic curves used by industry, the HVHF boom in the US shows evidence of a speculative "bubble" undermining DCP's reliance thereon in support of its LNG export application.

The EIA's Annual Energy Outlook 2011 ("Annual Report ") concludes that production of natural gas from large shale gas formations in the United States grew by an average of 17 percent per year from 2000 to 2006, and while it predicts further increases in shale gas production, it also states there is a high degree of uncertainty.[40] The uncertainty embodies the aforementioned difficulty in accurate projections due to wide disparities in technically recoverable shale gas resources. For instance, the Report states: "across a single shale formation, there are significant variations … [giving rise to different] production rates for different wells in the same formations … by as much as a factor of 10."[41] The report also admits "considerable uncertainty about the ultimate size of the technically and economically recoverable shale gas resource base … and the amount of gas that can be recovered per well, on average, over the full extent of a shale formation." In other words, the report admits that on the whole "reliable data [corroborating] long-term production profiles and ultimate gas recovery rates for shale gas wells are lacking."[42]

The EIA also conducted a series of self-described "plausible but not definitive" case-studies with potentially significant implications for future natural gas prices, production, and consumption.[43] For instance, and representative of the volatile, unpredictable nature of shale gas reserves, two projections for US shale gas production in 2035 had a difference of 3 magnitudes, at 17.1 tcf versus 5.5 tcf.[44] The same studies show less pronounced price differentials than noted *supra*, however this is because the models contemplate the cost per unit of production from each shale formation as the same as the reference case.

EIA's natural gas production forecast predicts shale gas to be the largest contributor to production growth, mainly due to new exploration and continued development. DCP correctly quotes the EIA model's prediction that in 2035, shale gas makes up 47% of total U.S. production, nearly triple its 16-percent share in 2009. However, DCP conveniently excludes EIA's relevant disclaimer that estimates of technically recoverable resources and well productivity remain highly uncertain. Therein lies the rub. At best DCP's commissioned studies and 210 pages of application make a hyperbolic - but unsubstantiated – argument in favor of

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[39] Christopherson and Rightor, 2011. p.10.

[40] U.S. Energy Information Administration, "Annual Energy Outlook Report 2011," p. 36, available online at: http://www.eia.gov/forecasts/aeo/.

[41] *Id.*

[42] *Id.*

[43] *Id*. at pp. *37-8.*

[44] *Id.* at p. 39.

LNG export competitiveness. The simple truth is that DCP's terminal will largely rely on Mid-Atlantic shale plays for its primary source of LNG, and those plays are not capable of accurate prediction for the 25 year span requested.

Further, in addition to significant variation among published projections is the fact that models uniformly assume that current laws and regulations will continue through the projection period. Indeed, EIA notes that its projections do not assume the implementation of regulations limiting carbon dioxide emissions or other types of emissions beyond those currently in effect.[45] This issue is compounded in the case of shale gas production. While Western states have utilized HVHF for over a decade, the practice is nascent, contentious, and not widespread in Mid-Atlantic shale plays. Of particular note, the states of New York and Maryland have not yet decided to allow shale gas development within their borders. Indeed, those states have yet to even implement necessary regulatory controls for shale gas. Only Pennsylvania, with a rather pock-marked record infamous for ad hoc regulation of natural resource extraction, has decided to uniformly, and largely without adequate regulation, allow shale gas development. That uniformed and rash decision-making is already causing direct, indirect and cumulative impacts that are discussed *infra* at Section IV.

It is inappropriate to assume that the status quo of laisse-faire regulation will continue unabated for the pendency of DCP's requested 25 year contract term. For instance, EPA is expected to propose new regulatory measures safeguarding human health and the environment related to HVHF by 2014. The Pennsylvania Governor's own Marcellus Shale Advisory Commission[46] last year recommended the need for significant additional and/or changed regulatory controls over the use of HVHF gas drilling in the State. These anticipated and recommended new programs cast significant doubt as to the accuracy of estimated shale gas production trends, contributing to the uncertainty of shale gas competitiveness. Thus, on the whole, there exists a preponderance of the evidence casting doubt on the competitiveness of exportation over the duration of the contract period.

2. Need for natural gas

DCP's application poses significant doubt as to the need for export. As domestic shale gas production ramps up, other traditional domestic natural gas are expected to fall.[47] Likewise, imports are expected to fall from 11% of total supply in 2009 to 1% in 2035.[48] The EIA's Annual Report showcases several projections, each evidencing an increase in overall domestic natural gas consumption from 2009-2035, with two studies estimating as much as a 40% or more increase.[49] The Annual Report also provides useful data for estimating various sector's consumption patterns, with data corroborating increases in consumption by electricity generators, by industrial users, and by residential users.

Natural gas is now the cheapest option for power generation, which has led companies to

[45] *Id.* at p. 97.
[46] Governor's Marcellus Shale Advisory Commission, Report, 7/22/2011.
[47] *Id.* at p. 80.
[48] *Id.*
[49] *Id.* at p. 97.

shelve wind and nuclear power projects in the country. The largest wind energy producer, NextEra Energy Inc., canceled plans for new wind projects next year, and Exelon Corp. has decided not to expand its nuclear power plants. CMS Energy Corp. in Michigan has canceled its plans to build a $2 billion coal-fired power plant. The low price of gas has been mirrored in the electricity market. Electricity pricing is linked to the gas market, so profits for power producers have shrunk dramatically. Tighter margins have discouraged investments in coal, nuclear and wind projects. This shift will have an impact on the clean energy sector for decades to come, analysts say.

The low prices have already drained the nuclear industry resurgence as well as carbon capture and sequestration projects related to coal-powered production. Investment in wind is also slowing, due to cheap gas prices, a lack of transmission infrastructure and subsidies that will expire next year.[50] The result is that the dominant dialogue treating natural gas as a transitional fuel is hyperbole, as long-term investments in natural gas such as LNG export contracts threaten to hold the U.S to a path of fossil fuel consumption and increased production indefinitely, instead of prioritizing the development and implementation of clean energy alternatives on appropriate economies of scale. And by logical extension, if natural gas extracted in the U.S. is later to be shipped to communities overseas it cannot in fact be available to serve that transitional role. In other words, the claim of natural gas as a bridge fuel is being used to support its exploitation, which is resulting in a reduction in investment in alternative fuel sources, while at the same time being planned for exportation – so rather than serving as a bridge to alternative sources it is serving as a high hurdle. The point here is that exporting natural gas will cause several negative impacts domestically, all of which weigh against the public interest.

As the discussion above illustrates, reliable demand is key to the stable growth of a reliable supply. While the data referenced *supra* corroborates the *potential* for domestic natural gas to fulfill projected domestic baseloads, the uncertainty inherent in the evolution of shale gas production rightfully demands caution in making *assumptions* in favor of authorizing export authorizations *spanning decades.* The NGA framework does presume increased competition is a public benefit; however, it also leaves for consideration other relevant factors (*see* discussion *infra* of significant and unevaluated environmental and community impacts) which, in conjunction with unverifiable competitiveness discussed above, provide a strong argument that LNG export from DCP's facility is not in the public interest.

3. Security of supply

"The security of gas supply and its transportation to the U.S. border remain important components of the public interest, especially those under long-term arrangements. An [export] will be considered secure if it does not lead to undue dependence on unreliable sources of supply."[51] Two important messages are evident: the security of supply, and the security of transportation. DCP correctly states that EIA currently estimates domestic natural gas reserves of 2,543 tcf, representing more than 100 years of supply at current usage rates of approximately 24

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[50] Bloomberg News, "US Shale Bubble Inflates After Near-Record Prices for Untested Fields," available online at: http://www.bloomberg.com/news/2012-01-09/shale-bubble-inflates-on-near-record-prices-for-untested-fields.html

[51] Policy Guidelines, p. 9.

tcf per year.[52] However, DCP devotes no time or explanation to the uncertainty surrounding shale gas productivity, nor does it discuss relevant security concerns related to transportation.

Firstly, the undersigned continue to dispute any clear signal concerning the application's competitiveness due to the aforementioned unverifiable uncertainties inherent in modeling domestic shale gas production. Secondly, DCP fails to discuss the foreseeable cumulative implications of all pending LNG export proposals being granted and drawing their maximum allotments on domestic supplies. For instance, if all 7 potential U.S. domestic export terminals were operational, they would draw a cumulative 12.1 Bcfd for export.[53] As a mathematical matter, 7 fully operational and drawing export facilities could then export approximately 4 tcf per annum, or 16% of current domestic baseload. Thus, in at least one plausible scenario, reserves would be depleted at a much faster rate than DCP's projections which, considered next to the uncertainty of shale gas production in the Mid-Atlantic, raise significant questions as to the security of domestic natural gas supplies.

Although adding LNG to the mix of sources of natural gas available worldwide would, in effect, "diversify" the sources of natural gas available, it does not follow that such diversity would lead to more competitive prices within U.S. markets or that such diversity is in the public interest. In fact, logic indicates that LNG is an expensive choice for the use of domestic natural gas (which is only logical, given that the LNG would have to include the price of liquefaction, transportation, and regasification). Further, due to global warming concerns, among other factors, there are significant national and state policies moving away from increased reliance on fossil fuels and towards renewables, and a recognition that for purposes of energy independence, energy security, and positive impact on the future of global climate change, domestically produced natural gas does not make sense as a so-called "transition fuel". There is simply no authority for the conclusion that increasing our dependence on natural gas in the name of 'diversity' satisfies the public interest; however, there is plenty to suggest that it does not serve the public interest.

Likewise, DOE should not allow the market to drive decisions as to which gas projects will go forward. Not only is DOE not allowed to "punt" to "the market" in this way, to do so clearly violates its mandate to protect the public interest. As we should have learned from the rush to develop nuclear power in this country, even if the precedent agreements do bind those companies to take on the burden of the cost of constructing a boondoggle, those costs will eventually be borne by their ratepayers (a subset of the general public) or the taxpayers (a larger subset of the general public) when the project doesn't cost out as companies anticipated and the companies declare financial distress or even bankruptcy. "The market" does not protect the public – that is DOE's responsibility, and DOE has no authority to abdicate that responsibility to "the market" or the signatories – or even worse, to anticipated signatories - to contractual export agreements.

As a practical matter the natural gas reserves DCP's proposal anticipates being developed do not evidence a reliability ensuring a dependable source of gas for domestic baseload and the

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[52] *See* Application, at p. 26.
[53] "North American LNGImport/Export Terminals," "Proposed/Potential," FERC, available online at: http://ferc.gov/industries/gas/indus-act/lng/LNG-proposed-potential.pdf.

proposed export. The Policy Guidance provides that reference can be made to any gas reserves committed to the export arrangement for the term of the contract. Here again, the speculative nature of shale gas production is relevant and casts significant doubt on the security component of DOE's public interest evaluation. DCP anticipates primarily tapping the projected shale gas reserves of the Marcellus and Utica shale plays yet, as documented *supra*, the sufficiency of those plays, their physical accessibility, and their projected yields possess little certainty, in fact exhibiting a substantively speculative nature. The unverifiable nature of these shale plays is compounded by the lack of positive historical precedent for Mid-Atlantic shale gas production, together casting doubt on the reliability of primary anticipated production supplies for DCP's proposed export.

Furthermore, there are a number of regulatory limitations that are coming on line which will further diminish access to identified shale areas. In the Delaware River watershed there is a moratorium on gas drilling that would affect Marcellus and Utica shales in New York, Pennsylvania and New Jersey; in New York there is an ongoing regulatory process that will certainly diminish the areas of shale available for drilling (how much is yet to be determined); in Pennsylvania there are legislative initiatives focused on putting shales located under public lands off limits for drilling; in New Jersey there was proposed and passed a ban on hydrofracking in that state, and while recently vetoed by the Governor there is every expectation the ban will be re-proposed and has a high likelihood of passage once again. These are but a small sampling of the efforts happening just in the region that could, via regulation or legislation, affect the volume of shale that is available for extraction.

The authorization of a new LNG export facility in the Chesapeake Bay also poses significant issues relevant to national security that are relevant to a determination of whether DCP's application fulfills the public interest standard. During a hearing in the United States House of Representatives on 21 March 2007, Jim Wells of the GAO raised doubt that the Coast Guard can marshal the resources needed to meet its responsibilities.[54] While it took 40 years to build the fleet of LNG carriers to 200 tankers worldwide, it could take less than four more years for that number to grow to 300. This rapid growth rate coupled with the anticipated number of LNG proposals in the U.S. presents a real security challenge. The U.S. faces today a potential lack of security measures and resources to protect these new assets.

The rapid growth of LNG does not affect only the ability to safeguard each ship; it also affects the quality of mariners working onboard these vessels. Due to the nature of LNG, highly skilled and trustworthy individuals are required to ensure its safe transport. Currently, LNG tankers have crews consisting of mostly foreigners. Yea Byeon-Deok, professor and LNG initiative coordinator of the International Association of Maritime Universities said, during a conference in Australia, "Many sub-standard vessels have begun to appear as demand for LNG increases, while there is a chronic shortage of experienced crew."[55] Because of sudden rapid growth in the industry, many experts question whether or not there will be enough qualified mariners to crew these vessels. Nearly 1,500 senior officers and 750 senior engineers will be required to man the 100 new LNG ships. Approximately 80 percent of these ships will be fitted

[54] "Securing LNG Tankers to Protect the Homeland," United States House of Representatives, Committee on Homeland Security, a hearing on March 12, 2007.
[55] "Warning on LNG Shipping Standards," *Oil and Gas News Worldwide*, May 7, 2007

with steam turbines, which require engineers with steam experience, which, according to one report, is a "vanishing resource."[56] The fact that many senior LNG officers are due to retire soon, and new, highly skilled mariners will be required to replace them exacerbates the situation. It will be tough enough just to replace crew and officers who are retiring, making these shortages of crew members and officers reach crisis proportions.[57]

The Society ofInternational Gas Tanker and Terminal Operators LTD (SIGTTO) has recognized the acute shortage. "A short-term answer for an LNG vessel operator is to 'poach' its crew from another such operator but, clearly, the long-term answer is training, training, and further training. SIGTTO members, as much as anyone, wish for the quite unique safety record of LNG shipping to be preserved. The influx of new personnel into the industry is of concern, especially if there is a temptation by a minority of operators to 'cut corners' and put officers into positions of responsibility on a LNG carrier before they have been properly trained."[58] The quality-control of shipping is of direct relevance to DCP's proposal as the Chesapeake represents a congested and relatively shallow port host to a slew of other economically important activities aside from natural gas distribution.

A key question for security is whether or not the benefits outweigh the risks and how big the risks truly are. The most inherent problem with LNG is that despite scientists, scholars, officials and academicians conducting various high-profile studies on the safety implications of LNG, in addition to a variety of known hazards, there are many unknown variables and unanswered questions concerning security which still exist. For example, empirical data demonstrating what would happen if there were to be a catastrophic accident are virtually non-existent. This intangible aspect of security lends credence to seriously questioning the propriety of DCP's export proposal as being in the public interest, particularly in light of its location in the economically vital Chesapeake Bay, not to mention its adjacency to a nuclear power plant.

4. Other relevant considerations in the Public Interest

Increased Gas Production Harms Communities & the Environment

DCP claims that the most basic benefit of the proposed LNG export will be to encourage and support increased domestic production of natural gas.[59] Indeed, approval of the proposal would likely facilitate a steady new demand associated with LNG exports that could spur the development of natural gas resources. Admittedly, DOE reached that conclusion in recently authorizing exports from Sabine Pass.[60] However, neither DCP nor DOE in its Sabine Pass authorization provided data corroborating the long-term economic benefit of increased shale gas production with positive economic benefits for the communities from which it is extracted. That impact is certainly relevant to the disposition of American citizens, and thus relevant to

[56] "Serious LNG Crew Shortage Looms," Summary from *Oil and Gas Journal*, April 4, 2005, http://www.ogj.com/display_article/224811/94/ARCHI/none/none/Qatar,-India,-Egypt-advance-plans;-US-gulf-terminals-break-ground/, May 13, 2007.
[57] *Id.*
[58] SIGTTO News, September 2005, p.5.
[59] *See* Application, at p. 35.
[60] *Sabine Pass*, Order No. 2961 at 35.

determination of whether the instant proposal fulfills the public interest standard. In fact, the majority of scientific and economic literature shows that long-term economic development in regional economies dependent on resource extraction is negatively impacted by continued – and in the instant circumstance increased – development and production. DOE's determination of whether DCP's proposal satisfies the public interest standard must contemplate and rationally reconcile studies proving extractive industrial development overall harms dependent regional economies and jeopardizes existing jobs and economic stability.

One recent study considered 26 Western counties that have concentrated on fossil fuel extraction from public lands for economic development, concluding that at least in recent years such counties have increasingly underperformed economically compared to less energy-industry-focused counties.[61] Another older benchmark review of 19 separate studies of mining-dependent rural economies concluded that, there is surprisingly little evidence that mining will bring about economic good times, while there is a good deal of evidence for expecting just the opposite.'[62] Since the mid-1990's an extensive body of empirical research has also investigated the existence and dynamics of the so-called, resource curse.'[63] [64] Michael Ross summarized the curse literature to date by noting, "There is now strong evidence that states with abundant resource wealth perform less well than their resource poor counterparts, but there is little agreement on why this occurs."[65]

Four of the categories of reasons summarized by Ross are economic. These are 1) a decline in terms of trade for primary commodities, 2) the instability of international commodity markets (making government revenues & foreign exchange unstable and investment risky), 3) the poor economic linkages between resource and nonresource sectors, especially as external investors remove profits from the local economy, and 4) the 'Dutch Disease' that associates resource boom economies with a) increases in the exchange rate, making other domestic exports more expensive, and b) increased competition with other domestic sectors for scarce capital and labor.

In terms of their translatability to a subnational and domestic context, only some of these reasons are even theoretically relevant. The terms of trade logic is completely inapplicable. In contrast, the instability of commodity prices is partially salient, especially as both government revenues and investment risk are affected by unstable prices in regional markets. The linkage argument also seems potentially relevant insofar as nonlocal firms are likely to come into a region only temporarily, extract profits along with the gas, and be likely to purchase only a limited array of local goods and services lacking a well developed economy of strong, locally well linked sectors (again, the share of expenditures going to local landowners vs. local firms

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[61] Headwaters Economics. 2008. *Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-focusing Counties Benefiting?* accessed December 20,2010, http://www.headwaterseconomics.org/pubs/energy/HeadwatersEconomics_EnergyFocusing.pdf

[62] Freudenburg, W.R. and Wilson, L.J. 2002. ‚Mining the Data: Analyzing the Economic Implications of Mining for Nonmetropolitan Regions.' *Sociological Inquiry*, 72(4):549-575.

[63] Sachs, J.D. and Warner, A.M., 1995. revised 1997, 1999. ‚Natural resource abundance and economic growth.' *National Bureau of Economic Research Working Paper No. 5398*, Cambridge, MA.

[64] Ross, Michael. 1999. ‚The Political Economic of the Resource Curse', *World Politics* 51(2):297- 322.

[65] *Id.*

would have important implications). Part of the Dutch Disease argument also seems potentially relevant. Though the increased cost of domestic currency is obviously not relevant at a regional level, tighter competition of the resource sector for factors of production is quite likely to crowd out competing sectors, at least during some time periods in the adaptation of the local economy.[66]

Perhaps of most significance for the new shale gas economies are several recent subnational empirical studies of the resource curse phenomenon, three of which have investigated the issue within the United States using both state and county level data sets. Each of these studies finds evidence that some version of a resource curse is detectable within a subnational economy, and that poor governance and crowding out effects are contributing factors of varying importance. Papyrakis and Gelragh optimistically conclude that, 'prudent economic policies and cautious planning can reverse the pattern'. Unfortunately, Pennsylvania contains a significant percentage of the shale plays in the Mid-Atlantic with Maryland and New York as yet not choosing to develop those resources, and Pennsylvania's regulatory policies thus far are inapposite to prudent, cautious planning.[67]

Exporting Natural Gas Does Not Create Long-Term Jobs

DCP claims billions of dollars in benefits and tens of thousands of jobs will result from its export proposal,[68] but the vast majority of these benefits are not directly associated with the construction or operation of the facility itself. That project will only result in several thousand temporary construction-related job and several hundred jobs during operations, only 70 of which appear to be direct employees of the facility.[69]

Instead, the bulk of the economic benefits DCP claims result from what DCP calls its "most basic benefit": its ability to "encourage and support increased domestic production of natural gas and [natural gas liquids]."[70] In DCP's view, increased production will, directly and indirectly, pump money into the economy and create jobs regionally and nationally.[71] Increasing gas production will increase employment in that sector by some amount, but a more careful look at the data demonstrates that booms in resource extraction industry are far more of a mixed bag than DCP acknowledges.

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[66] Kay, David. "The Economic Impact of Marcellus Shale Gas Drilling, What Have We Learned? What Are the Limitations?" part of the "Working Paper Series: A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale." April 2011, p. 28, available online at: http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/PDFs/KayFormattedMarcellus%20WorkingPaperREvised4-4-2011.pdf

[67] *Id.* at 30.

[68] *See* DCP Proposal at 16-19 & ICF Study.

[69] *See* ICF Study at Table 2.

[70] DCP Application at 35.

[71] *See* DCP Application at 36-40.

Nearly all jobs in the natural gas industry earn among the highest wages of any industrial sector, with a mean hourly wage of $34 per hour, typically excellent benefits,[72] and dramatically increasing wages among highly skilled positions, including skilled trades such as specialized welding or crane operation, and positions in advanced fields such as engineering and geosciences. Non-experienced roustabouts or construction helpers can start at wages close to $20 an hour, with many opportunities for overtime.[73]

However, to accurately assess whether the shale gas development provides the claimed job numbers, which indirectly would support the economic benefit of increased production for LNG export - it is necessary to assess drilling phase jobs versus production phase jobs. Clearing and constructing a natural gas well site, drilling and casing the well, performing the hydro-fracturing process, and constructing the associated pipeline infrastructure are all considered part of the Drilling Phase, a very labor-intensive process. After this work is performed, however, the number of workers needed to keep producing gas for the remainder of the life of the well -- the Production Phase -- is much smaller.

A worker-by-worker tally of the Marcellus Shale industry in Pennsylvania found that *the drilling phase accounted for over 98% of the natural gas industry workforce* engaged at the drilling site.[74] [75] Because most of the job opportunities occur during the drilling phase of operations, and because drilling activity in a given locale can quickly escalate or decline, natural gas employment conforms to a pattern of “Boom" and "Bust” found in other types of mining and natural resource development activity -- where the population base may expand rapidly over a number of years before shifts in commodity prices, energy company business strategies, or natural resource policies cause extraction activity to collapse, leading new residents and workers to leave the community.[76] [77]

While comprising less than 5% of the total workforce, jobs associated with the Production Phase of operations (i.e. the employees of the energy company operator required to manage gas production from existing wells) will remain local and predictable. A 30-year production phase is the typical estimate, although the reality varies by well, location, and market conditions. These production phase jobs will be required even if drilling ceases completely. *Occupations associated with the production phase tend to be less labor intensive, more location*

[72] United States Bureau of Labor Statistics (USBLS). 2010. *May 2009 National Industry-Specific Occupational Employment and Wage Estimates*

[73] Jacquet, Jeffrey. 2006. *Sublette County Wage Study* Sublette County Community Partnership. July 2006. Available online: http://www.sublettewyo.com/index.aspx?NID=305

[74] Marcellus Shale Education and Training Center (MSETC). 2009. *Marcellus Shale Workforce Needs Assessment: North-Central Pennsylvania*. Publication. Williamsport, PA: Marcellus Shale Education and Training Center.

[75] Marcellus Shale Education and Training Center (MSETC). 2010. *Marcellus Shale Workforce Needs Assessment: Southwest Pennsylvania*. Publication. Williamsport, PA: Marcellus Shale Education and Training Center.

[76] Jacquet, Jeffrey. 2009. *Energy Boomtowns and Natural Gas: Implications for Marcellus Shale Local Governments and Rural Communities*. Working paper no. 43. State College: Northeast Regional Center for Rural Development.

[77] Haefele, Michelle and Morton, Pete 2009. “The Influence of the Pace and Scale of Energy Development on Communities: Lessons from the Natural Gas Drilling Boom in the Rocky Mountains” *Western Economics Forum* Vol 8, Number 2

specific, less hazardous, and more specialized than development phase occupations, while still providing excellent wages and benefits.[78]

Insofar as DCP's proposal anticipates heavy reliance on Eastern regional shale gas plays, and Pennsylvania represents the current and projected largest contributor of those shale gases, it is appropriate to consider job and economic modeling of shale gas development's impacts on that state to assess the truth of 'job-creation.' The Penn College of Technology's Marcellus Shale Education and Training Center (MSETC) has performed a number of regional workforce needs assessments focused on the Marcellus shale gas industry in Pennsylvania. Their study found approximately 250 different occupations comprised of over 400 different individuals are required to drill a Marcellus Shale well. *However, the vast majority of these individuals and occupations are required for only a few hours or days for each well.*

The number of Full Time Equivalent (FTE) workers (an FTE is equal to one worker working full time for a year) for these 410 individuals was about 13 FTE to complete a well.[79] Using the "maximum" amount of development predicted by the NYDEC -- 500 wells drilled in New York State per year -- this would result in the equivalent of approximately 6,500 full-time jobs needed while drilling activity is occurring. It is important to note that these jobs are required only while wells are being drilled; once drilling activity stops, these jobs are no longer needed locally. Many times, drilling activity may pause, or move to another area of the play, or move to another part of the continent, forcing drilling crew workers to follow the work to a new location or find a new source of employment.

DCP's Proposal Entails Significant Unevaluated Environmental and Health Impacts

To the extent that the proposed LNG facility is deemed in the public interest because it will inspire and support increased drilling, the proposal ignores the environmental, health and community ramifications of drilling using HVHF practices. In this case, DOE should be particularly attentive to all impacts of gas export and production. DCP's application discusses only the purported benefits of its proposal, conveniently failing to discuss or even acknowledge the less savory environmental and societal impacts. DOE must determine whether DCP's proposal is in the public interest by considering all the positives and negatives of the requested authorization.

In particular DOE must account for the effects of shale gas extraction in its analysis and decision-making. Shale gas development is an extraordinarily land and water-intensive process that converts agricultural, forest, and range lands to industrial uses, consumes millions of gallons

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[78] Jacquet, Jeffrey, "Workforce Development Challenges in the Natural Gas Industry," part of the "Working Paper Series: A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale," February 2011, p. 5, available online at: http://cce.cornell.edu/EnergyClimateChange/NaturalGasDev/Documents/Green%20Choices%20Papers/Marcellus_Jacquet.pdf

[79] *Id.* at notes 48, 49.

of water per well, and generates huge quantities of hazardous wastes.[80] Some of the major water quality impacts shale gas development causes are as follows:

Casing and Cementing Failures

Failures in the integrity of well casing and cementing occur regularly, either because of faulty construction or because of degradation over time, opening potential pathways for contaminants to reach shallow aquifers.[81] It is also plausible that fracking may create fissures that extend above the targeted horizontal shale layer and link with naturally occurring fissures or abandoned wellbores, allowing methane, fracking fluids, and produced waters to reach shallow aquifers.[82]

Hazardous Waste Disposal

Shale gas extraction uses and produces numerous toxic substances that are not governed by uniform national standards for treatment and disposal. Drilling muds and fracturing fluids contain a laundry list of toxic ingredients, while produced waters and drill cuttings bring to the surface naturally occurring hazards such as highly carcinogenic BTEX chemicals (benzene, toluene, ethylbenzene, and xylene) as well as brines, radioactive materials, arsenic, mercury, and hydrogen sulfide. Most of these wastes are exempt from regulation under Subtitle C of the Resource Conservation and Recovery Act governing the generation, transportation, treatment, storage, and disposal of hazardous wastes.[83] Similarly, under the Comprehensive Environmental Response, Compensation, and Liability Act, petroleum and natural gas (including liquefied

[80] Shale gas extraction is also a significant source of hazardous air pollution, including methane, volatile organic chemicals (VOCs), and air toxics such as benzene and ethylbenzene. In July 2011, EPA proposed a suite of draft regulations under the Clean Air Act to set new source performance standards for VOCs and sulfur dioxide, an air toxics standard for oil and natural gas production, and an air toxics standard for natural gas transmission and storage. Final regulations are due by April 3, 2012. See http://www.epa.gov/airquality/oilandgas/ The Department of Energy's advisory panel on shale gas has urged EPA to extend these rules to existing shale gas production sources and to adopt regulations addressing methane explicitly. Bridget DiCosmo, "DOE Panel Urges EPA to Strengthen Proposed Air Rules for 'Fracking,'" Nov. 10, 2010, http://insideepa.com/201111102381935/EPA-Daily-News/Daily-News/doe-panel-urges-epa-to-strengthen-proposed-air-rules-for-fracking/menu-id-95.html Methane is twenty times more potent a greenhouse gas than carbon dioxide. See http://www.climatescience.gov/infosheets/highlight1/default.htm
The oil and gas industry is the single largest source of methane emissions in the US, accounting for nearly 40% of national methane emissions. See http://epa.gov/airquality/oilandgas/pdfs/20110728factsheet.pdf

[81] See, e.g., Andrew Nikiforuk, "Fracking Contamination 'Will Get Worse': Alberta Expert," The Tyee, Dec. 19, 2011, http://thetyee.ca/News/2011/12/19/Fracking-Contamination/ (quoting University of Alberta geochemist Karlis Muelenbachs); see also Runar Nygaard, Wabamun Area CO2 Sequestration Project: Well Design and Well Integrity at 6, Jan. 4, 2010, available at http://www.ucalgary.ca/wasp/Well%20Integrity%20Analysis.pdf (summarizing data on well integrity).

[82] See Mooney, "The Truth About Fracking," Scientific American, November 2011, pp. 80-85, at 83 (graphic), 84-5.

[83] U.S. Environmental Protection Agency, "Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations," pp. 10-11, available at http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf (listing exempt and non-exempt wastes). NRDC petitioned EPA in 2010 to regulate these wastes under RCRA. NRDC, "Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy," Sept. 8, 2010, available at http://docs.nrdc.org/energy/files/ene_10091301a.pdf EPA has not yet formally responded to the petition.

natural gas) are excluded from regulation as hazardous substances.[84] These wastes pose water contamination and health hazard risks whether they are buried in pits, applied to land, injected into underground wells, sprayed into the air, spilled, leaked, or intentionally dumped.

Wastewater Treatment and Disposal

Flowback fluids and produced water that result from HVHF and drilling contain all of the chemicals initially injected as part of the fracturing fluid, as well as other naturally occurring hazardous compounds released during the fracturing process. Wastewater pollutants include everything from lead, arsenic, benzene, diesel fuel, and high levels of total dissolved solids to naturally occurring radioactive materials such as uranium and radium.[85] Ground and water contamination may result from spills, leaks, or improper disposal.

Common disposal methods for the wastewater include underground injection and the transport of flowback to wastewater treatment facilities. Underground injection of fracking waste has recently been associated with induced seismicity.[86] With regards to the use of wastewater treatment facilities for treatment and disposal, most commercial and municipal wastewater treatment facilities are ill-equipped to handle fracking waste. Such facilities are unable to remove naturally occurring radioactive material from the waste stream and the high levels of total dissolved solids present may overwhelm a plant's treatment capacity.[87] Once released into surface waters following insufficient treatment, the wastewater may subsequently overwhelm the dilution-capacity of rivers in regions undergoing intensive shale gas development.[88]

Water Consumption

The proliferation of shale gas development has the potential to degrade water systems due to the massive volumes of water consumed. To the extent that fracking fluids remain underground or are disposed of in underground injection wells, much of the freshwater used for fracking is permanently removed from the hydrological cycle. While some improvements have been made in developing wastewater reuse systems, eventually the pollutants in the fracking fluid reach such extreme concentrations that the fluid becomes unusable and must disposed of.[89]

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[84] 42 U.S.C. § 9601(14).

[85] See N.Y.C. Dep't of Envtl. Prot., Final Impact Assessment Report: Impact Assessment of Natural Gas Production in the New York City Water Supply Watershed 6 (2009); NRDC, Land Facts: Protecting New Yorkers' Health and the Environment by Regulating Drilling in the Marcellus Shale 3 (2009), available at http://www.nrdc.org/land/files/marcellus.pdf ; Chemicals Used by Hydraulic Fracturing Companies in Pennsylvania for Surface and Hydraulic Fracturing Activities, Pa. Dep't of Envtl. Prot., http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/Reports/Frac%20list%206-30-2010.pdf

[86] Briana Mordick, "More Earthquakes, This Time from Oil and Gas Disposal," NRDC Switchboard (Jan. 3, 2012), http://switchboard.nrdc.org/blogs/bmordick/more_earthquakes_this_time_fro.html

[87] See, e.g., Joaquin Sapien, "What Can Be Done With Wastewater?," Pittsburgh Post-Gazette, Oct. 4, 2009, http://www.post-gazette.com/pg/09277/1002919-113.stm ; Ian Urbina, "Regulation Lax As Gas Wells' Tainted Water Hits Rivers," New York Times, Feb. 26, 2011, http://www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=all

[88] Id.

[89] Susan Phillips, "New Technology Treats Fracking Water In Pennsylvania," Sept. 6, 2011, http://stateimpact.npr.org/pennsylvania/2011/09/06/new-technology-treats-frack-water-in-pennsylvania/

Accidents, Negligence, and Illegal Actions

Accidents resulting from negligent construction methods and operations are inevitable. In 2011 alone, the Pennsylvania Department of Environmental Protection issued more than a thousand notices of violation to natural gas operators within the Marcellus Shale region.[90] This represents a 400% increase in reported violations as compared to 2008 – thus emphasizing that activities which encourage increased drilling also result in increased harm.[91] These accidents cover a wide spectrum of violations, including surface spills, blowouts, improper casing construction, erosion and sediment control failures, faulty pollution prevention, failures in site restoration, improper waste management, and wastewater impoundment construction failures.[92] One well blowout is estimated to occur for every thousand wells drilled; however, the severe consequences of a blowout make this ostensibly small number significant.[93]

Similarly, DOE must consider the safety concerns authorizing a bidirectional LNG facility entails. These concerns include but are not limited to a siting and carrier analysis,[94] risk and consequence assessment of potential LNG spills over water,[95] and National Protection Association standards applying to LNG.[96] And, as aforementioned, local and international regulatory requirements from such organizations as the International Maritime Organization, U.S. Coast Guard and hosting Port Authority should all be assessed for their roles in mitigating risks of LNG. In particular, DCP's proposal demands re-assessment of the potential for catastrophic LNG explosions due to its proximity to Calvert Cliffs nuclear facility. In fact, prior to DCP being authorized to resume gas imports in 2003 it was required to complete such a reassessment.[97] As citizen advocates for the safety and health of a generous portion of the Chesapeake Bay watershed we take this opportunity to stress the simple, and easily overlooked, issue of safety due to the several serious domestic LNG accidents history has recorded:

> • *Staten Island Tank Fire, USA, 1973.* A fire erupted at an out-of-service LNG tank that was being repaired. Forty workers then inside the tank were killed. LNG, which had leaked through the liner during previous

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[90] Matthew Kelso, "2011 Marcellus Shale Violations in PA," http://data.fractracker.org/cbi/dataset/datasetPreviewPage?uuid=~01eff9046c035611e19931a7bb56cb4f26

[91] PADEP Oil & Gas Inspections – Violations – Enforcements: Updated 11/17/11, http://www.dep.state.pa.us/dep/deputate/minres/oilgas/OGInspectionsViolations/OGInspviol.htm (2008 total number of violations: 205; 2011 total number of violations: 1090).

[92] Id.

[93] In April 2011, for example, a natural gas well operated by Chesapeake went out of control for roughly twelve straight hours, spewing more than 10,000 gallons of chemically laced fuel into the local environment, which included a pasture and creek. Dave Fehling, "When Wells Blow Out In Pennsylvania, Texans Step In," Jan. 5, 2012, http://stateimpact.npr.org/texas/2012/01/05/when-wells-blow-out-in-pennsylvania-texans-step-in/

[94] Consequence Assessment methods for Incidents Involving Releases from Liquefied Natural Gas Carriers. (May 13, 2004) ABSG Consulting Inc. for the Federal Energy Regulatory Commission. Available online at: http://www.ferc.gov/industries/lng/safety/reports/cons-model.pdf.

[95] Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water. (December 2004) Sandia National Laboratories. Available online at: http://fossil.energy.gov/programs/oilgas/storage/lng/sandia_lng_1204.pdf.

[96] NFPA 59A: Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG), 2009 Edition. National Fire Protection Association. (Next edition 2012).

[97] "Safety Evaluation Regarding Effect of Modification of Liquefied Natural Gas Facility On Safety of Calvert Cliffs Nuclear Power Plant," available online at: http://pbadupws.nrc.gov/docs/ML0335/ML033500123.pdf.

fillings, had accumulated in the soil below and around the concrete tank wall berm. It has been assumed that an electrical spark in one of the irons or vacuum cleaners ignited the flammable gas reentering the tank.

• *Massachusetts Barge Spill, July 1974.* After a power failure and the automatic closure of the main liquid line valves, a small amount of LNG leaked from a 1-inch nitrogen-purge globe valve on the vessel's liquid header - pressure surge caused by the valve closure induced the leakage of LNG – caused another LNG accident.

• *Cove Point, Maryland, 1979.* LNG leak from a high-pressure pump found its way into an electrical conduit – caused another LNG accident.

• *Nevada Test Site, Mercury, NV, 1987.* An accidental ignition of an LNG vapor cloud occurred at the US Department of Energy (DOE) Nevada Test Site in August 1987.

• *USA, March 2005.* LNG Causes Pipeline Leaks and house explosion. On July 7, 2005, a company-sponsored study, launched after a District Heights house exploded in late March, found that subtle molecular differences in the imported liquefied natural gas the utility began using in August 2003 were drying the rubber seals of aging metal couplings that link sections of pipe. The breakdown of seals in the couplings of gas pipelines led to about 1,400 gas leaks during the past two years, and has required the company to launch a $144 million project to replace lines and equipment. Two other house explosions in the area are now under investigation.

• *Savannah, GA March 14, 2006.* A potentially disastrous spill was averted early Tuesday morning when the liquefied natural gas tanker Golar Freeze discharging its load at the Southern LNG terminal on Elba Island broke from its moorings and pulled away from the pier. The dock was shut down for about 36 hours while representatives from the Coast Guard and an LNG engineer from the Federal Energy Regulatory Commission investigated the incident.

• *LNG Tanker Adrift Off Cape Cod Needs Rescue February 11, 2008.* Coast Guard and tugboat crews rescued a liquefied natural gas tanker crippled off Cape Cod after many hours of drifting at sea at the mercy of powerful winds and high waves. Just 5-years-old, the fully laden LNG carrier was corraled by four tugboats about 25 miles east of Provincetown.

Impacts of Shale Gas Infrastructure Construction and Maintenance

Shale gas development consumes not only vast quantities of water but also acres of land for well pads, pipelines, and access roads. In the forested and agricultural lands overlaying the Marcellus Shale, this massive industrialization will cause widespread impacts to surface water quality from deforestation, stormwater runoff, and erosion and sedimentation.

Forests play an essential role in water purification.[98] The scientific literature clearly establishes the link between percent forest cover and water quality; for example, reductions in forest cover are directly correlated with negative changes in water chemistry, such as increased levels of nitrogen, phosphorus, sodium, chlorides, and sulfates as well as reduced levels of macroinvertebrate diversity.[99] Reducing forest cover decreases areas available for aquifer

[98] Robert A. Smail & David J. Lewis, Forest Service, U.S. Dep't of Agric., Forest Land Conversion, Ecosystem Services, and Economic Issues for Policy: A Review 12 (2009), available at http://www.fs.fed.us/openspace/fote/pnw-gtr797.pdf

[99] Jackson, J.K. & Sweeney, B.W., "Expert Report on the Relationship Between Land Use and Stream Condition (as Measured by Water Chemistry and Aquatic Macroinvertebrates) in the Delaware River Basin," Stroud Water Research Center, Avondale, PA, available at http://www.state.nj.us/drbc/Sweeney-Jackson.pdf

recharge, increases erosion, stormwater runoff, and flooding, and adversely affects aquatic habitats.[100] Already in Pennsylvania, researchers have correlated areas of high natural gas well density with decreased water quality, as indicated by lower macroinvertebrate density and higher levels of specific conductivity and total dissolved solids.[101]

Both deforestation and shale gas infrastructure construction and operation will, in turn, lead to greatly increased levels of erosion, sedimentation, and stormwater runoff affecting surface water quality. Excess sedimentation is associated with a number of detrimental effects on water quality, stream morphology, and aquatic life, and has been identified by the EPA as one of the primary threats to US surface waters.[102]

Shale gas well sites are like traditional construction sites in terms of stormwater runoff and sediment discharge levels.[103] A 2005 EPA study concluded that "gas well sites have the potential to negatively impact the aquatic environment due to site activities that result in increased sedimentation rates."[104] In Pennsylvania, the Nature Conservancy has estimated that nearly two-thirds of well pads targeting the Marcellus Shale will be developed in forested areas, necessitating the clearing of 38,000 to 90,000 acres.[105] An additional 60,000 to 150,000 acres of forest area will be lost to pipeline construction and right-of-way maintenance.[106] Compressor stations along the pipelines, which occupy an average of five acres each, are likely to number in the hundreds.[107] In New York, deforestation will occur on a similar scale, with losses in forest cover of up to 16%.[108]

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[100] State of N.J. Highlands Water Prot. and Planning Council, Ecosystem Management Technical Report 39 (2008).

[101] Academy of Natural Sciences of Drexel University, "A Preliminary Study of the Impact of Marcellus Shale Drilling on Headwater Streams," available at http://www.ansp.org/research/pcer/projects/marcellus-shale-prelim/index.php

[102] Entrekin, S. et al., "Rapid expansion of natural gas development poses a threat to surface waters," Frontiers in Ecology and Environment 2011, 9(9), 503-11 (Oct. 6, 2011), at 507, 509, available at http://www.esajournals.org/doi/abs/10.1890/110053

[103] Havens, David Loran, Assessment of sediment runoff from natural gas well development sites. M.S. thesis May 2007, available at http://digital.library.unt.edu/ark:/67531/metadc3665/m1/1/high_res_d/thesis.pdf ; see also 55 Fed. Reg. 47,990, 48,044-34 (Nov. 16, 1990) (Phase I stormwater regulation describing scope and significance of water quality impacts from sediment runoff from construction activities); 64 Fed. Reg. 68,722, 68,728-30 (Dec. 8, 1999) (Phase II stormwater regulation reiterating concerns about sediment-laded stormwater discharges and extending permitting requirements to small construction sites).

[104] Banks, Kenneth E., Ph.D., and Wachal, David J., U.S. EPA, Final Report for Catalog of Federal Domestic Assistance Grant Number 66.463 Water Quality Cooperative Agreement for Project Entitled "Demonstrating the Impacts of Oil and Gas Exploration on Water Quality and How to Minimize these Impacts Through Targeted Monitoring Activities and Local Ordinances" (Dec. 2007), available at http://www.epa.gov/npdes/pubs/oilandgas_impactgrant.pdf

[105] Id. at 29.

[106] The Nature Conservancy, "Natural Gas Pipelines," Excerpt from Report 2 of the Pennsylvania Energy Impacts Assessment, December 16, 2011, at 5, available at http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/pennsylvania/ng-pipelines.pdf

[107] Id. at 5-6.

[108] The Nature Conservancy, "An Assessment of the Potential Impacts of High Volume Hydraulic Fracturing (HVHF) on Forest Resources," Dec, 19, 2011, at 4, available at http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/newyork/ny-hydrofracking-impacts-20111220.pdf

Heavy truck traffic on rural roads, especially unpaved roads, that were not built to withstand hundreds or thousands of truck trips also leads to significant erosion and sedimentation problems.[109] Thousands of truck trips (according to DEP officials speaking at public meetings) with each vehicle weighing up to 10 tons, may be required to construct and operate a single well. Ditches along rural roads are the primary pathways for the conveyance of polluted runoff bearing sediments and nutrients to streams, and increase runoff volume and energy as well, contributing to flooding.[110] In addition, access roads constructed or modified to enter gas exploration or extraction facilities contribute significantly to sedimentation and surface water quality degradation.

Pipeline construction and right-of-way maintenance account for a significant proportion of shale gas extraction's land use impacts. Pipelines also create significant erosion and sedimentation problems during construction as well as over the decades-long maintenance of cleared rights-of-way. In joining well pads to transmission infrastructure, a single gathering line may cross numerous streams and rivers, especially in states such as Pennsylvania with a high density of stream mileage per unit of land. Stream and wetland pipeline crossings cause erosion and sedimentation whether implemented through dry ditch or wet ditch crossings.[111] Though erosion and sediment control permits may be required for stream crossings—indeed, in Pennsylvania they are the only permits necessary for gathering line construction—in practice, permit requirements are routinely violated.[112] Both dry and wet ditch crossings necessitate the clearing of area stream banks. Because riparian vegetation functions as a natural barrier along the stream edge, both removing sediment and other pollutants from surface runoff and stabilizing stream banks,[113] its clearing necessarily increases a stream's susceptibility to erosion events. Cumulatively, the construction of numerous crossings across a single watercourse may significantly degrade the quality and flow rate of the water body.[114] Erosion and sedimentation problems are often exacerbated by the staging of construction, during which soils are exposed for long periods and over long distances by clearing, grading, and trench cutting before final pipeline installation and revegetation.[115]

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[109] See C.J. Randall, Hammer Down: A Guide to Protecting Local Roads Impacted by the Marcellus Shale (Dec. 2010), available at http://www.greenchoices.cornell.edu/downloads/development/marcellus/Marcellus_Randall.pdf

[110] Yen Hoang & Keith Porter, Stormwater Management in the Rural New York Headwater Areas of the Chesapeake Bay Watershed, Journal of Water Law 21:6 (2010) at 8.

[111] The Nature Conservancy, "Natural Gas Pipelines," Excerpt from Report 2 of the Pennsylvania Energy Impacts Assessment, December 16, 2011, at 7, available at http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/pennsylvania/ng-pipelines.pdf

[112] Beth Brelje, Pike Conservation Official Fed Up With Gas Company's Violations, Pocono Record, Sept. 20, 2011, http://www.poconorecord.com/apps/pbcs.dll/article?AID=/20110920/NEWS/109200330/-1/rss01 (noting numerous violations documented on Tennessee Gas Pipeline Company project).

[113] David J. Welsch, Forest Service, U.S. Dep't Agric., NA-PR-07-91, Riparian Forest Buffers: Function and Design for Protection and Enhancement of Water Resources (1991), available at http://na.fs.fed.us/spfo/pubs/n_resource/buffer/cover.htm

[114] Canadian Association of Petroleum Producers, Canadian Energy Pipeline Association, and Canadian Gas Association, "Pipeline Associated Watercourse Crossings," 1-4 (2005).

[115] Comments on Environmental Assessment of MARC I Hub Line Project, Exhibit G, FERC Docket No. CP10-480-000, Submittal 20110711-5189 (filed Jul. 22, 2011) (statement of Susan Beecher, Executive Director, Pike County PA Conservation District (Jul. 8, 2011)), available at http://elibrary.ferc.gov/idmws/docket_sheet.asp

Authorizing DCP to export LNG will exacerbate these types of environmental impacts. Each one of the issues described in the section above creates individual, direct impacts of an intense nature. Taken in the context of the widespread boom for shale gas in the mid-Atlantic, these types of impacts also possess an extreme contextual significance. LNG export will in fact increase production of shale gases in the mid-Atlantic, and because LNG export is the causal link inciting such action the aforementioned impacts require a hard look and properly in-depth, informative assessment by DOE.

Health Impacts

Evidence of drinking water contamination resulting from HVHF is increasing. For example, December 8, 2011 the Environmental Protection Agency issued a draft report documenting the initial findings of its investigation into whether drinking water wells in Pavillion, Wyoming were contaminated by gas drilling. According to the EPA, "Chemicals detected in the most recent samples are consistent with those identified in earlier EPA samples and include methane, other petroleum hydrocarbons and other chemical compounds. The presence of these compounds is consistent with migration from areas of gas production."[116] Additionally, having found arsenic, barium and other hazardous substances in drinking water wells that serve homes in Dimock, PA and which could indicate contamination due to nearby drilling; the EPA has opened an investigation into the source of that contamination.[117] These are but two examples of recent investigations and evidence into the potential contamination of drinking water supplies as the result of gas drilling.

Contamination by drilling of surface waters that serve to provide drinking water to communities is also a concern. In September, 2011, concerned about the implementation of drilling and the discharge of drilling wastewater in the watersheds that serve drinking water to New York City and other communities, 59 scientists write Governor Cuomo expressing their concern that there does not exist adequate knowledge to conclude that filtering by municipal drinking water filtration systems "would remove all, or even most, of the hazardous substances found in flow-back fluids from hydraulic fracturing. Potential contaminants of concern known to be in some flow-back fluids include benzene and other volatile aromatic hydrocarbons, surfactants and organic biocides, barium and other toxic metals, and soluble radioactive compounds containing thorium, radium and uranium. … We believe, however, the best available science suggests that some of these substances would pass through the typical municipal filtration system."[118]

Human Health Impacts.

While there is genuine concern about a lack of investigation and data into the human and livestock health impacts of gas drilling, the body of research and knowledge that is documenting

[116] New Release, EPA Region 8, EPA Releases Draft Findings of Pavillion, Wyoming Ground Water Investigation for Public Comment and Independent Scientific Review, 12/08/2011.
[117] See, EPA Region 3, Action Memorandum – Request for Funding for a Removal Action at the Dimock Residential Groundwater Site, Jan. 19, 2012.
[118] Letter from Physicians Scientists and Engineers for Healthy Energy to Governor Cuomo, dated Sept. 15, 2011.

the human and animal health harms of gas drilling is growing. For example: "Documentation of cases in six states strongly implicates exposure to gas drilling operations in serious health effects on humans, companion animals, livestock, horses, and wildlife."[119]

New Facility Construction & Emissions

DCP anticipates utilizing much of its existing infrastructure to facilitate its transition to a bidirectional facility. Such infrastructure includes docks, piers, land structures. Of direct importance and significance, DCP will need to construct new facilities for storage and liquefaction of LNG. Those projects will entail certain direct, site-specific impacts and, relevant to the larger scope of whether LNG export is appropriate per se under the public interest standard, certain direct, indirect and cumulative air impacts of significant magnitude. In particular, the construction of liquefaction facilities and their subsequent use will increase greenhouse gas emissions for Maryland and the Chesapeake region.

Similarly, because the construction and use of liquefaction facilities at DCP will facilitate and encourage further gas production at inland reserves, DOE must account for emissions and air pollution from wells, compressors, pipelines, pneumatic devices, dehydrators, storage tanks, pits and ponds, natural gas processing plants, and trucks and construction equipment. Major air pollutants of concern from these operations include methane (CH_4), volatile organic compounds (VOCs), nitrogen oxides (NO_x), sulfur dioxide (SO_2), hydrogen sulfide (H_2S), and particulate matter (PM_{10} and $PM_{2.5}$). Oil and natural gas operations also emit listed hazardous air pollutants (HAPs) in significant quantities, and so contribute to cancer risks and other acute public health problems. All these direct, indirect, and cumulative impacts are relevant considerations for DOE's to examine under the NGA, as well as under the required NEPA analysis.

Carbon dioxide equivalent (CO2-e) emissions are of particular concern due to the liquefaction process, when natural gas is used to fuel gas turbines, which in turn power the plants and refrigeration compressors. Fuel consumption is dependent upon the efficiency and productive capacity of the liquefaction plant[120] and subsequently represent an area of further research. The main types of greenhouse gas emissions in LNG liquefaction identified by Arteconi et al (2010):[121]

- Fuel consumption for driving turbines and motors to operate equipment.
- Combustion of waste gases in flares.
- Gas losses from venting associated with pre-treatments, maintenance processes and losses from equipment and pipes.

CO_2-e emissions also occur during flare combustion, emissions of raw gas (leaks) and venting. During the liquefaction process, carbon dioxide (CO_2) is initially removed from natural gas using

[119] M. Bamberger & R. Oswald, "Impacts of Gas Drilling on Human and Animal Health", New Solutions, Vol. 22(1) 51-77, 2012.
[120] Tamura, I., Tanaka, T., Kagajo, T., Kuwabara, S., Yoshioka, T., Nagata, T., Kurahashi, K., Ishitani, H., 2001. Applied Energy. Volume 68, pages 301-319. "Life cycle CO2 analysis of LNG and city gas".
[121] Arteconi, A., Brandoni, C., Evangelista, D., Polonara, F. 2010. Applied Energy. Volume 87, pages 2005 – 2013. "Life-cycle greenhouse gas analysis of LNG as a heavy vehicle fuel in Europe".

amines as a solvent. This regeneration process causes CO_2 and methane (CH_4) to be dissolved in small quantities.[122] CH_4 is typically recovered and used as fuel for turbines, while CO_2 is released to the atmosphere as off-gas.

At a receiving terminal, CO_2-e emission occur due to the electrical energy required to drive pumps used to transfer the LNG from the ship to storage facilities and re-gassification plant. Boil-off gases are considered to be recovered during re-gassification. Likewise, shipping LNG produces emissions that must also be taken into account. Because LNG requires additional energy to liquefy, transport, and then regasify, its energy and emissions lifecycle releases substantially more greenhouse pollution than that of gas generally, whether conventionally or unconventionally sourced. In fact, according to the only published lifecycle study of LNG used for electricity generation of which we are aware, these upstream emissions are sufficient to push LNG lifecycle emissiosn well above those of natural gas generally, and into the range of coal emissions.

DOE should consider the potential for increased emissions from the LNG lifecycle and shale gas production lifecycle in determining whether DCP's application fulfills the public interest. Currently, the U.S. Environmental Protection Agency (EPA) is promulgating rules and regulations concerning under the Clean Air Act to mitigate greenhouse gases and CO_2 emissions.[123] Similarly, EPA is working to finalize GhG reporting rules and requirements that will enable the United States to better assess and mitigate GhG emissions and their unwanted consequences.[124] Whereas there is an increased awareness of the human health and environmental threats posed by increased emissions and national movement to reduce emissions, and whereas authorizing new LNG export facilities will directly, indirectly, and cumulatively incite further economic, environmental, and social ills discussed above, DOE should deny DCP's application as not in the public interest.

C. <u>DCP's Application is Distinguishable from the *Sabine Pass* Decision</u>

DOE conditionally approved the Sabine Pass LNG facility to export up to 2.2 bcf/d.[125] However that order was premised upon at two distinct rationales which are inapplicable here.

First, DOE's conditional order authorizing Sabine Pass to export LNG relied heavily on the absence of "factual studies or analyses" contrary to the applicant's modeling and reports which substantively stated that as exports would not raise domestic gas and electric prices.[126] Further, that authorization was premised on studies allegedly showing proving a number of economic and public benefits that would follow a grant of the requested authorization. As amply demonstrated above, there is a wealth of scientific and economic data contrary to DCP's commissioned studies. Likewise, taken together the body of evidence presented above outweighs the purported benefits that DCP claims will arise from a grant of the requested authorization.

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[122] Tamura et al 2001.

[123] U.S. EPA Endangerment Finding, available online at: http://www.epa.gov/climatechange/endangerment.html; *see also* GhG rules, available online at: http://www.epa.gov/otaq/climate/regulations.htm.

[124] *See Proposed Rule,* Mandatory Reporting of Greenhouse Gases, 75 Fed. Reg. 18455 (April 12, 2010).

[125] *See* Sabine Pass at 1-2.

[126] *Id*. at 30.

Second, as discussed above, authorizing DCP's facility to export natural gas will increase gas and electricity prices. DOE's conditional order in the Sabine Pass case did not consider the cumulative nature of several authorized export facilities, instead only considering a small price hike relative to the Sabine facilities anticipated exports. DOE must acknowledge the fact that every new approval of LNG export will exponentially increase price hikes in domestic utility costs. While it may have found one price increase from the Sabine Pass order acceptable, innumerable more export facilities and commensurate price hikes cannot be found acceptable as benefiting the public interest.

The new scientific, economic and environmental data submitted in this letter demonstrates that exporting LNG is not in the public interest.

V. CONVERSION OF AN LNG IMPORT FACILITY TO A BI-DIRECTIONAL FACILITY TRIGGERS NEPA ANALYSIS

Congress enacted NEPA in 1969, directing all federal agencies to assess the environmental impact of proposed actions that significantly affect the quality of the environment. 42 U.S.C. § 4332(2)(C). The law requires federal agencies to "consider every significant aspect of the environmental impact of a proposed action . . . [and] inform the public that it has indeed considered environmental concerns in its decision-making process."[127] To accomplish this goal, NEPA imposes procedural requirements to ensure that federal agencies "take a 'hard look' at environmental consequences."[128]

NEPA's disclosure goals are two-fold: (1) to insure that the agency has carefully and fully contemplated the environmental effects of its action, and (2) "to insure that the public has sufficient information to challenge the agency."[129] By focusing the agency's action on the environmental consequences of its proposed action, NEPA "ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed and the die otherwise cast."[130] The Council on Environmental Quality (CEQ) promulgated uniform regulations to implement NEPA that are binding on all federal agencies.[131]

DOE is required under NEPA to prepare an environmental impact statement (EIS) for any "major federal actions significantly affecting the quality of the human environment."[132] In determining whether or not the effects will be "significant," or whether substantial questions exist as to the significance of the effects, NEPA's implementing regulations require DOE to consider the "context" and "intensity" of the likely impacts. "Context" means "that the significance of an action must be analyzed in several contexts such as society as a whole (human,

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[127] *Earth Island Inst. v. USFS*, 351 F.3d 1291, 1300 (9th Cir. 2003).
[128] *Id.*
[129] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989); *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1151 (9th Cir. 1998).
[130] *Robertson*, 490 U.S. at 349.
[131] 42 U.S.C. § 4342; 40 C.F.R. § 1500 *et seq.*
[132] 42 U.S.C. § 4332(2)(C).

national), the affected region, the affected interests, and the locality."[133] Both short and long-term effects are relevant" for context.[134] "Intensity" means the "severity of impact" and is to be judged according to several criteria.[135]

Pursuant to CEQ implementing regulations DOE may be a cooperating agency with the Federal Energy Regulatory Commission ("FERC") in its role as lead agency performing requisite environmental analyses.[136] An EIS must consider both direct and indirect environmental impacts of the proposed action.[137] Direct effects are caused by the action and occur at the same time and place as the proposed project.[138] Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.[139] Both types of impacts include "effects on natural resources and on the components, structures, and functioning of affected ecosystems." *Id.*

The regulations implementing NEPA also require an agency to assess the cumulative effects of its proposed action on the environment.[140] The pertinent regulation defines cumulative impact as follows:

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[141]

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[142] NEPA additionally requires that environmental information be made available to public officials and citizens before decisions are made and before actions are taken.[143] The information must be of high quality.[144] The purpose of this requirement is to ensure that the public has information that allows it to question and understand the decision made by the agency.

NEPA requires an EIS to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning

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133 40 C.F.R. § 1508.27(b).
134 *Id.*
135 *Id.*
136 *See* 40 C.F.R. §§ 1500.5, 1501.5,6.
137 40 C.F.R. § 1508.8.
138 *Id.* at § 1508.8(a).
139 *Id.* at § 1508.8(b).
140 40 C.F.R. § 1508.7.
141 *Id.*
142 *Id*.
143 40 C.F.R. §1500.1 (b).
144

alternative uses of available resources."[145] The NEPA process and documents should "identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment."[146]

Relevant here, agencies may also prepare "programmatic" EISs, which address "a group of concerted actions to implement a specific policy or plan; [or] systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive."[147] Importantly, while an EIS is being prepared "DOE shall take no action concerning the proposal that is the subject of the EIS" until the EIS is complete and a formal Record of Decision has been issued.[148] During this time, DOE may take no action which would tend to "limit the choice of reasonable alternatives," or "tend[] to determine subsequent development ."[149]

a. <u>Authorizing DCP's proposal is a major federal action significantly affecting the quality of the human environment</u>

Authorizing DCP to export LNG and to construct and operate LNG export facilities demands an EIS because aspects of the project will have significant effects on the human environment. Unquestionably, construction and operation of the export facilities will have effects, however, stopping inquiry there would not suffice as a hard look at other related and reasonably foreseeable actions such authorization would arise as a result of DOE's authorization. Export of LNG will induce additional shale gas production in upstream regions, incite further infrastructure development to transport upstream gas to downstream facilities, increase domestic gas prices and additional coal consumption, and increase greenhouse gas emissions and global warming. Each of these effects has direct importance to DOE's determination of whether authorizing DCP's export proposal is in the public interest and requires individual assessment pursuant to NEPA.

Indeed, DCP's export proposal must specifically take into account cumulative impacts related to the instant authorization. A cumulative impact analysis "must be more than perfunctory; it must provide 'a useful analysis of the cumulative impacts of past, present, and future projects.'"[150] "To be useful to decision makers and the public, the cumulative impact analysis must include "some quantified or detailed information; … general statements about possible effects and some risk do not constitute a hard look absent justification regarding why more definitive information could not be provided.""[151] The need to assess relevant, project-specific effects over the entire period of a proposed project is key to a cumulative impacts

[145] 42 U.S.C. § 4332(E).
[146]

[147] 40 C.F.R. § 1508.17(b)(3); *see also* 10 C.F.R. § 1021.330 (DOE regulations discussing this possibility.
[148] 10 C.F.R. § 1021.211.
[149] 40 C.F.R. § 1506.1.
[150] *Kern v. U.S. Bureau of Land Mgmt.,* 284 F.3d 1062, 1075 (9th Cir.2002) (quoting *Muckleshoot Indian tribe v. U.S. Forest Serv.,* 177 F.3d 800, 810 (9th Cir.1999)).
[151] *Northern Plains Resource Council v. Surface Transp. Bd.*, 2011 WL 6826409, 6, --- F.3d ---- (9th Cir.2011), (quoting *Ocean Advocates v. U.S. Army Corps of Eng'rs,* 402 F.3d 846, 868 (9th Cir.2005) (quoting *Neighbors of Cuddy Mountain v. U.S. Forest Serv.,* 137 F.3d 1372, 1379–80 (9th Cir.1998)).

analysis.[152] As the EPA also has noted, "reasonably foreseeable future actions need to be considered even if they are not specific proposals."[153]

DOE is determining whether or not gas exports are in the "public interest," a term which the Supreme Court has repeatedly held includes consideration of environmental impacts.[154] Thus, just as DOE must consider upstream environmental impacts in its public interest determination, so too, it must analyze and disclose these impacts in the NEPA analysis that will support its final determination. Therefore infrastructure projects, like DCP's proposal, that enable resource extraction activities to expand upstream naturally must fully analyze those impacts in the NEPA framework. In *Northern Plains Resource Council v. Surface Transportation Board*, - F.3d -, 2011 WL 6826409, the Court considered a railway line which was developed in order to expand coal production at several mines.[155] It held that the Surface Transportation Board's NEPA analysis for the line was illegal because the Board had refused to consider the mines' impacts. The Court held that such impacts were plainly "reasonably foreseeable" – and, indeed, were the premise for the construction project in the first place. *Id.* They therefore had to be considered in the NEPA analysis. This same rule of law is applicable to DCP's application.

DCP's statement that its project will not require an EIS is simply wrong. The stated purpose of DCP's project is in large part to facilitate the exploitation of shale gas resources in the mid-Atlantic, an action that has both direct and indirect impacts that exceed "context" and "intensity" thresholds,[156] impacts the DOE must account for in its EIS. Further, authorizing DCP to export LNG will also trigger FERC's NEPA regulations, such rules providing that an EIS is 'generally' required for "authorizations to … export natural gas under Section 3 of the Natural Gas Act involving construction of … liquefied natural gas terminals and regasification or storage facilities or significant expansions and modifications of existing pipelines or related facilities."[157] Taken together, there can be no question that DCP's export proposal necessitates an EIS.

As previously mentioned, DCP's proposal is but one of many before DOE. Because the effects of these projects are cumulative, and because each approval alters the price and production effects of exports on the economy, DOE must consider these projects' interactions. It can do so by conducting a programmatic EIS considering the impacts of *all* gas export proposals at once. DOE has the discretion to do so, even if it determines that it does not have the duty to do

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[152] *See* Council on Envtl. Quality, *Considering Cumulative Effects Under the National Environmental Policy Act,* Office of NEPA Policy and Compliance, 16 (Jan.1997), available online at: http://energy.gov/nepa/downloads/considering-cumulative-effects-under-national-environmental-policy-act ("The time frame of the *project-specific* analysis should also be evaluated to determine its applicability to the cumulative effects analysis.") (emphasis added).

[153] EPA, *Consideration of Cumulative Impact Analysis in EPA Review of NEPA Documents,* Office of Federal Activities,12–13 (May1999), available online at: http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf

[154] *Nat'l Ass'n for the Advancement of Colored People v. Federal Power Commission*, 425 U.S.at 670 n.4; *Udall v. Federal Power Comm'n*, 387 U.S. at 450.

[155] *Northern Plains Resource Council v. Surface Transportation Board,* at *10.

[156] *See supra*, at FN. 125.

[157] 10 C.F.R. § 1021 app. D ("Classes of Actions that Normally Require EISs")

so.[158] Such a programmatic EIS would allow DOE, and the public, to understand the impacts of all of these proposals, their interactions, and their cumulative environmental and economic impacts. That understanding would serve improved decision-making, and allow DOE, the public, and industry, to identify prudent alternatives to serve the public interest and minimize environmental impacts.

Programmatic EISs are designed to serve precisely this purpose. Rather than proceeding in a piecemeal fashion, DOE must recognize that it is making what is, functionally, a programmatic decision to radically alter the U.S. market and production system by allowing for large-scale LNG export, and perform an EIS commensurate with the decision it is making, rather than conducting piece-meal decisions application to application.

b. **Alternatively, DCP's Proposal at minimum requires a supplemental EIS**

NEPA also requires DOE to prepare a supplemental NEPA analysis when a "major federal action" remains to occur and the initial NEPA document does not adequately discuss "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts."[159] It is clear that DCP's proposal constitutes a significant change in the fundamental purpose of the import facility warranting at least supplemental NEPA analysis. Failure to prepare a supplemental environmental impact statement would be arbitrary, capricious, and not in accordance with NEPA.[160]

VI. **CONCLUSION**

For all these reasons the commenting parties urge DOE to find that DCP's proposal to export LNG does not satisfy the public interest and deny its application. Alternatively, should DOE believe DCP's application is in the public interest and approve DCP's application, we urge DOE to make clear in its contingent order the need for an EIS during FERC's subsequent review.

Respectfully submitted,

/s/ Maya van Rossum
The Delaware Riverkeeper

/s/ Michael Helfrich
The Lower Susquehanna Riverkeeper

/s/ Frederick Tutman
The Patuxent Riverkeeper

/s/ Jeff Kelbe
The Shenandoah Riverkeeper

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[158] *See* 40 C.F.R. § 1508.17(b)(3); *see also* 10 C.F.R. § 1021.330.
[159] 40 C.F.R. § 1502.9(c)(1)(ii); *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 374 (1989); *Or. Natural Res. Council Action v. United States Forest Serv.*, 2004 U.S. Dist. Lexis 59034, 24 (D. Or., Aug. 9, 2006).
[160] 5 U.S.C. § 706(2)(A).

/s/ Ed Merrifield
The Potomac Riverkeeper

Theaux Le Gardeur
The Gunpowder Riverkeeper

/s/ Diana Koslow
The South Riverkeeper

/s/ Jamie Brunkow
The Sassafras Riverkeeper