DECLARATION OF PAUL BLANCH UNDER 28 U.S.C. §1746

My name is Paul Blanch. I am over the age of 18, competent to testify and have personal knowledge of the matters discussed below. Under penalty of perjury, I state the following:

1. I have a bachelor's degree in Electrical Engineering and I am a Registered Professional Engineer (presently inactive). I have more than 50 years of nuclear operations, engineering and regulatory experience. Since working for the Attorney General for the State of New York I obtained more than nine years experience evaluating the regulatory, technical and safety requirements of gas transmission pipelines located in the vicinity of nuclear plants including Indian Point.

2. A letter dated June 22, 2018, from the New York State Department of Homeland Security and Emergency Services (DHSES), Department of Public Service (DPS), Department of Environmental Conservation (DEC) and Department of Health (DOH) informed the Federal Energy Regulatory Commission (FERC) of a recently completed risk analysis by HDR Engineering.[1] The risk assessment, commissioned by these departments in July 2016, concerns the Algonquin pipelines that traverse the Indian Point Energy Center (IPEC), a nuclear power plant in Westchester County New York. The IPEC facility is one of only two nuclear power plants in the United States with gas transmission pipelines either crossing its property or sited in close proximity to the plant. The Executive Summary [2] of the risk assessment and the letter to FERC's Chairman McIntyre, [3] confirmed some of the shortcomings in FERC's review of the Algonquin pipelines' safety that I had previously commented on, and raised other issues not previously addressed.

[1] The New York State Department of Homeland Security and Emergency Services, Department of Public Services, Department of Health, and the Department of Environmental Conservations.Letter to Chairman McIntyre, FERC, Regarding Safety Study of Algonquin Natural Gas Pipelines, Westchester County, New York June 22, 2018

[2] AIM Pipeline Risk Analysis Executive Summary Report #17-99, Undated and unidentified author

[3] Letter to Chairman McIntyre, FERC, Regarding Safety Study of Algonquin Natural Gas Pipelines, Westchester County, New York June 22, 2018

3. My review in this Declaration is based upon the limited information provided in the publicly released June 22, 2018 letter from the State of New York to the FERC Chairman and the Executive Summary of the risk assessment, which is undated and its author unidentified. As stated in the State agencies' letter, the full report was sent to FERC with the request to protect its confidential nature. The complete risk assessment commissioned by New York State has been withheld from the public and is considered "Privileged" by the State according to one response from DHSES to a FOIL request,,[4] which stated, "The remainder of the report is being withheld pursuant to Public Officers Law§ 87(2)(f). The withheld portions of the report discuss critical infrastructure and specific risk profiles. DHSES has determined that these records should not be released due to public safety concerns that such disclosure could endanger the public." I possess the necessary security clearances and have just filed a CEII request with FERC to access and review the full risk analysis. FOIA request to the Pipeline and Hazardous Materials Safety Administration (PHMSA) [5] and FOIL request to New York State have also been filed. The State has not provided the requested information for the risk analysis [6]. On July 17, 2018, in response to my FOIL request, I received the following letter from NYS:

[4] FOIL response from DHSES dated June 22, 2018

[5] FOIA request to PHMSA acknowledged and received on July 6, 2018

[6] Letter to Paul Blanch from NY Office of General Services dated June 13, 2018

NEW YORK STATE OF OPPORTUNITY. Office of General Services

ANDREW M. CUOMO
Governor

ROANN M. DESTITO
Commissioner

July 17, 2018

Mr. Paul Blanch
1358 Hyde Rd.
West Hartford, CT 06117

Dear Mr. Blanch:

RE: Freedom of Information Request Number 6287
Requester/Subject: Blanch/OGS project #SB485

Please be advised that we require additional time to complete our response to your Freedom of Information Law request. We are continuing to collect and review records to ensure that the documents are responsive to your request and not exempt from disclosure under Public Officers Law § 87 (2). We anticipate responding to your request or providing a status update by 08/14/2018.

Sincerely,

Heather R. Groll
Records Access Officer

Mayor Erastus Corning 2nd Tower, Governor Nelson A. Rockefeller Empire State Plaza, Albany, New York 12242 | www.ogs.ny.gov

4. The State contracted for a "risk assessment." Risk is defined as the product of the probability of an event and its consequences. ASME B31.8(s) (a regulatory requirement) describes a risk assessment as *"Risk assessment is an analytical process by which an operator determines the types of adverse events or conditions that might impact pipeline integrity. Risk assessment also determines the likelihood or probability of those events or conditions that will lead to a loss of integrity, and the nature and severity of the consequences that might occur following a failure."*[7]

5. Neither probability nor consequences are discussed in the Executive Summary. When I obtain a copy of the New York State risk assessment my views may change and I will amend my declaration. Details of some of the identified shortcomings are discussed below including a more in depth explanation of both the probability and catastrophic consequences of a gas transmission pipeline failure,

[7] ASME B31.8(s) *This Standard describes a process that an operator of a pipeline system can use to assess and mitigate risks order to reduce both the likelihood and consequences of incidents*

which are critical factors when evaluating the pipelines co-located at the Indian Point nuclear power plant.

6. The most significant risk is the potential for a gas transmission pipeline event that impacts the ability to cool the spent fuel pools. This may be an ignited or unignited release of gas. While this may be considered a low probability event, its consequences could impact the entire Hudson Valley, and a significant part of the East Coast according to the Nuclear Regulatory Commission (NRC) and other documents discussed in further detail in this document. Although certain additional risks [8] were identified in the Executive Summary, these are trivial compared to the potential breach of the spent fuel pools at Indian Point.

7. The Executive Summary fails to discuss the methodology, personnel experience, consequences or compliance with established standards and U.S. Department of Transportation (DOT)/PHMSA regulations. These requirements are clearly stated in DOT/PHMSA regulations.

8. The New York State agencies did not ask in their recent letter to FERC to require Spectra Energy acquired by Enbridge, to verify that the pipeline and its approval are in full compliance with all federal regulations nor did they set a deadline by which FERC must respond. The purpose of this Declaration is to demonstrate that many of the serious concerns raised by New York State's letter to FERC have not been fully addressed and could result in catastrophic harm [9] as well as to provide my professional opinion as to what must be accomplished in order to assure the safety of the public and the environment.

9. In their letter of June 22, 2018 [10] the New York State agencies stated: "*First and foremost, because the safety analyses relied upon by FERC when approving the Algonquin Incremental Market (AIM) project were based on current maximum operating pressures on the pipelines, FERC must not allow any additional gas capacity or increased pressure on these pipelines at this time."* Numerous FOIA re-

[8] AIM Pipeline Risk Analysis Executive Summary Report #17-99, Undated and unidentified author

[9] Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor October 2013

[10] Letter to Chairman McIntyre, FERC, Regarding Safety Study of Algonquin Natural Gas Pipelines, Westchester County, New York June 22, 2018

quests and appeals[11] have been made to PHMSA and to the Secretary of the U.S. Department of Transportation, who is also required to review and approve the analyses, yet, they have been unable to locate any copies or documentation of the existence of the "safety analysis" mandated by federal law. New York State DPS is required [12] to receive the mandated "safety analysis" from PHMSA, but FOIL requests reveal that the State has not been in receipt of any such analyses. Had the State of New York received this required information from PHMSA[13] there would have been no need for this two and half year process to conduct and release the study with questionable results and substantial expenditure of valuable State and public resources as well as taxpayer dollars.

10. FERC's role and responsibility in the pipeline approval process is clearly stated in the top paragraph of the FERC Natural Gas website: [14]

> *"FERC reviews applications for construction and operation of interstate natural gas pipelines under authority of section 7 of the Natural Gas Act.* ***FERC review ensures that applicants certify that they will comply with Department of Transportation safety standards****." [Emphasis added]*

11. The safety standards are stated in DOT/PHMSA regulations in 49 CFR 192 and the process for review and approval is further described in a FERC publication. [15] There is no documentation to support that the Algonquin Incremental Market (AIM) pipeline approval process included any review by FERC for compliance with the DOT "safety standards." Based on my regulatory and technical expertise, numerous FOIA requests and communications with PHMSA and FERC, the "safety standards" required by FERC have neither been addressed nor met.

12. The FERC Process for Natural Gas Certificates does not contain any provisions for review and verification of the pipeline project's required compliance

[11] FOIA 2016-0101, FOIA 2016-0074, FOIA 2017-0166, FOIA Appeal 2018-82A, and FOIA Appeal 2018-0039

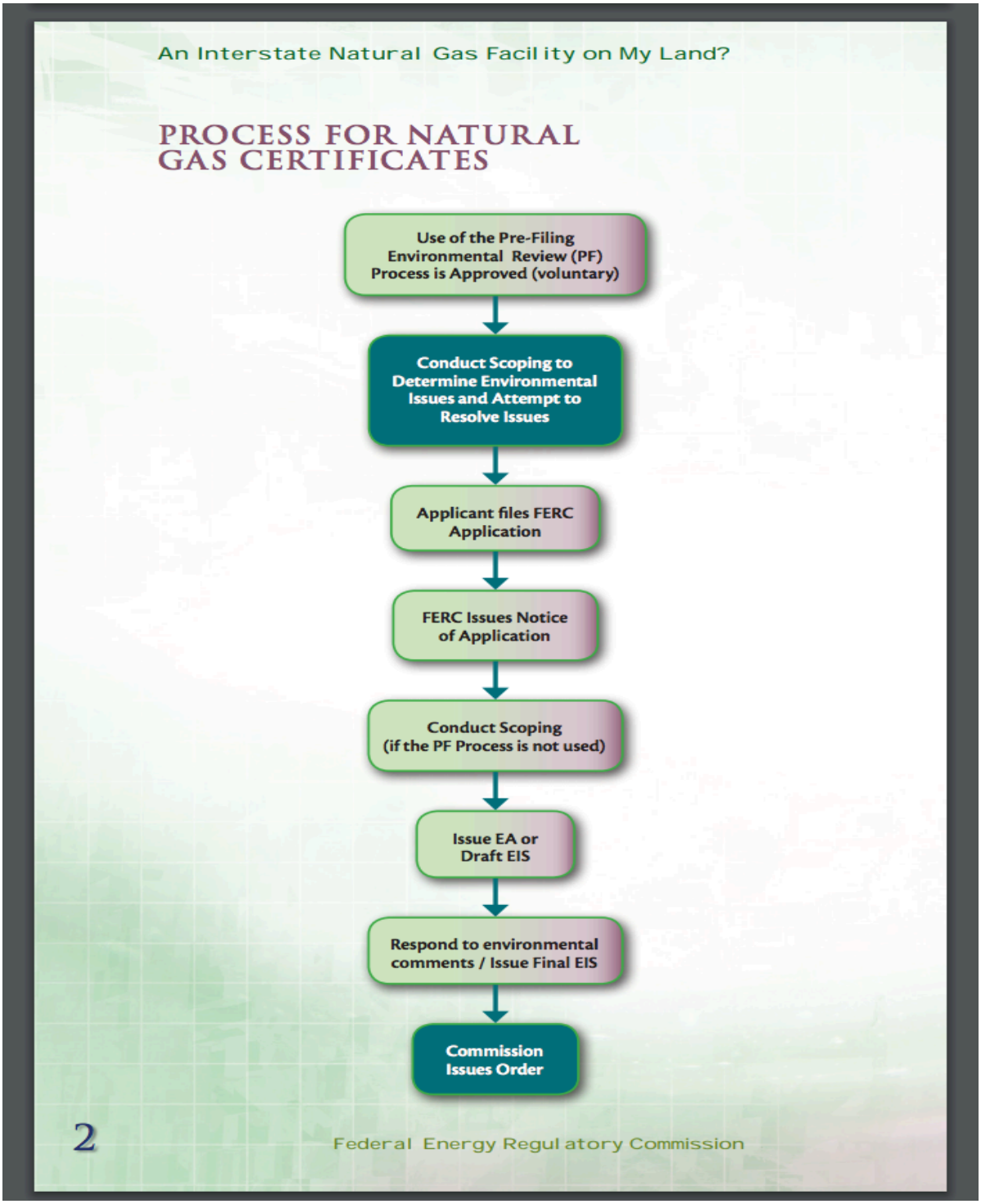
[12] 49 U.C.S. § 60101 through § 60109

[13] 49 U.C.S. § 60109

[14] https://www.ferc.gov/industries/gas/indus-act/pipelines.asp

[15] http://www.ferc.gov/resources/guides/gas/gas.pdf

with DOT "safety standards." A copy of this review process is provided below. [16] [17]



[16] Ibid.

[17] https://www.ferc.gov/industries/gas/indus-act/pipelines.asp

13. The State also acknowledged its responsibility in its letter [18] by stating: "*DPS, which is delegated by the federal government to ensure compliance with federal gas pipeline safety standards,…*[19]*"* The DPS failed to identify the shortcoming by not informing PHMSA that it did not receive a copy of the risk assessment as required by 49 U.S.C. § 60109.

14. The regulatory requirements specified by the Nuclear Regulatory Commission (NRC) are contained in 10 CFR 50 and 10 CFR 100. Regulatory Guide 1.91 further clarifies these requirements.[20] 10 CFR 50.34 specifies the requirements for a safety analysis. An applicant for an NRC license spends millions of dollars and scores of man-years on its risk assessment commonly referred to as the Final Safety Analysis Report (FSAR). The FSAR is required to be updated annually.

15. Similar regulatory requirements for gas transmission lines are specified by 49 CFR 192.917 and ASME B31.8(s) (incorporated by reference into 49 CFR 192.7).

16. 49 U.C.S. § 60101 through § 60109 and 49 CFR 192.917 specify the requirement for a risk assessment and the State's responsibilities to assure continued safety and inspections. Any valid risk assessment must meet these mandated requirements at an absolute minimum. Documentation that these "safety standards" have been met have not been located, even after numerous FOIA requests and appeals. Additionally, I wrote a letter on September 27, 2014 to Kimberly D. Bose, Secretary of FERC expressing concerns with regulatory compliance. A response from FERC has not been forthcoming. My letter can be located on the FERC website.[21]

17. An apparent undefined "ad hoc" analysis conducted by HDR Engineering is insufficient unless it can be demonstrated that it is in full compliance with the re-

[18] Letter to Chairman McIntyre, FERC, Regarding Safety Study of Algonquin Natural Gas Pipelines, Westchester County, New York June 22, 2018

[19] 49 CFR 192.917 is the safety standard for a risk assessment.

[20] Regulatory Guide 1.91
(Draft was issued as DG-1270, dated July 2011)
Evaluations Of Explosions Postulated To Occur At Nearby Facilities And On Transportation Routes Near Nuclear Power Plants

[21] 20140929-5080 FERC PDF (Unofficial) 9/29/2014 8:24:38 AM

quirements of 49 CFR 192.917, ASMS B 31.8(s), and other documents incorporated by reference. [22]

18. The State's letter provided Recommendations for Additional Risk Reduction:

> *"The report identified areas of potential concern that should be used to inform appropriate regulatory activities designed to further reduce the risk profile during the remaining operating life of IPEC, the transfer of spent fuel to dry cask storage, and decommissioning activities. Based on these identified risks, we recommend the following:*
>
> A. *Given that previous safety assessments have been done based on currently approved operating pressures, FERC cannot allow any additional capacity or increased pressure on the three pipelines without at least conducting new safety assessments. During the remaining operating life of IPEC, including the transfer of spent fuel into dry cask storage, FERC cannot approve any applications for new capacity or increased pressures on the pipeline segments in close proximity to IPEC (including the 42-inch, 30-inch and 26-inch pipelines).*
>
> B. *DPS, which is delegated by the federal government to ensure compliance with federal gas pipeline safety standards, has already enhanced monitoring of the pipelines in the vicinity of IPEC. We recommend more regular communications between the pipeline owner, Enbridge, Inc., and Entergy on incident prevention activities and emergency preparedness. DPS is prepared to facilitate such coordination.*
>
> C. *FERC should require regular testing of Enbridge Inc.'s ability to remotely close valves on the 42-inch, 30-inch, and 26-inch pipelines in the vicinity of IPEC within 3 minutes of an event. This valve closure time was assumed by FERC when it approved the AIM pipeline, but it must be regularly confirmed for all three pipeline segments.*
>
> D. *Lastly, at some point after the reactors cease generating electricity, decommissioning and decontamination work will begin at the IPEC site. NRC and FERC must coordinate a review of Entergy's decommissioning*

[22] 49 CFR 192.7

plan when filed to determine potential impacts to the original Algonquin pipelines and the AIM pipeline. Given the heavy excavator work that will be part of decommissioning, FERC may need to require Enbridge, Inc. to temporarily cease gas operations during the decommissioning activities that may threaten the pipeline integrity."

19. Statement A does not adequately address the problem. It is my professional opinion that in order to protect the residents of the Hudson Valley and in the surrounding states, full compliance must be demonstrated with the minimum safety requirements specified in 49 C.F.R. Parts 190 through 199, 49 U.S.C. § 60101 *et seq*.[23],

20. It appears that both Spectra/Enbridge and PHMSA misled the State of New York and the general public by stating that the pipelines will be designed and operated in accordance with all parts of 49 CFR 192. These statements, which are in Spectra's application and within the Environmental Impact Statement (EIS), appear to be materially false as PHMSA has not been able to provide any risk assessment or otherwise demonstrate compliance with 49 CFR 192. The DPS must have been aware of these requirements, as it is their responsibility to assure compliance with "safety standards."

21. I agree with statement B, that the DPS "*is delegated by the federal government to ensure compliance with federal gas pipeline safety standards,*" It appears the DPS failed to comply with these regulations. It is very clear the "safety standards" may not be fully understood by the DPS.

22. I agree with statement C, that "FERC should require regular testing of Enbridge Inc.'s ability to remotely close valves on the 42-inch, 30-inch, and 26-inch pipelines in the vicinity of IPEC within 3 minutes of an event." However, my review of numerous gas transmission pipeline ruptures shows the typical time from the event to complete isolation of a pipeline rupture is in the range of 30 minutes to more than 24 hours. I believe the New York State Public Service Commission (PSC) may also have this authority to order Enbridge to perform these verification tests.

[23] PHMSA Order to Columbia Gas Dated July 9, 2018

23. The analysis by Entergy and the NRC both assume a 3-minute time to isolation. Mr. Richard Kuprewicz, a pipeline expert and President of Accufacts, who conducts pipeline rupture investigations, confirms in his earlier affidavit that these assertions implying a pipeline operator can quickly and remotely recognize and isolate a pipeline rupture within 3 minutes, are "misleading and downright false" [24] and finds "that the NRC does not grasp the tremendous energy releases and dynamics associated with pipeline rupture of this very large diameter pipeline, and therefore should not be using their current approaches to evaluate gas transmission pipeline rupture impacts on their facilities." [25] The time from the event to complete isolation is vital for any analysis and the longer the persistence of the methane gas release during a pipeline rupture, the larger the impact radius.

24. According to the NRC's own information,[26] 32 million pounds of TNT equivalent would be released in the first 6 minutes after a rupture.[27] To put this into perspective, this is the TNT equivalent to the size of the atomic bomb dropped on Hiroshima. It is unrealistic to identify and terminate the flow of gas in 3 minutes or even 6 minutes, and in that short span of time significant damage will have already taken place.

25. A "one valve" closure time demonstration is meaningless, as isolation of a pipeline break will require the closure of multiple valves on all of the Algonquin pipelines in the vicinity of Indian Point.

26. I agree with statement D, concerning the NRC and FERC reviewing Entergy's decommissioning plan to determine potential impacts to the Algonquin and AIM pipelines, but add that a thorough risk analysis must be conducted to assure the dry cask integrity is maintained in the event of a gas pipeline rupture or multiple proximate pipeline ruptures.

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[24] https://drive.google.com/file/d/0B7g3zFc9C_r6TUMxbHRGWWg0UHc/view

[25] Ibid.

[26] https://www.nrc.gov/docs/ML1516/ML15168A042.pdf

[27] https://sape2016.files.wordpress.com/2017/04/tnt-equivalent-blanch.pdf

27. The letter also requested FERC provide answers to the following questions:

1. Were IPEC's spent fuel pools accounted for with respect to analyzing pipeline rupture hazards at the IPEC site, with respect to both the pre-existing pipelines and the new AIM pipeline segment?
2. NRC and Entergy apparently relied on a software tool known as "ALOHA" in conducting their analysis of potential gas pipeline risks to the IPEC facilities. But NRC Regulatory Guide (RG) 1.91, which speaks to risk analysis of pipeline and transportation explosions postulated to occur near nuclear power plants, does not list ALOHA as a referenced tool for such analysis. A NOAA evaluation characterizes ALOHA as a "compromise between accuracy and speed. . . . developed to quickly assist the responder" in an emergency.[2] In light of the different purposes of these analytical tools and frameworks:
    a. Has an RG 1.91 analysis ever been performed for the existing gas pipelines running through the IPEC site?
        i. Where is this analysis documented?
        ii. What were the results?
    b. Is it typical for the NRC to use ALOHA to model a natural gas plume prior to using the RG 1.91 equation? If so, what other nuclear sites has this been used for? Have federal agencies ever performed the RG 1.91 analysis for a site and NOT used the ALOHA model?
3. In the April 25, 2003 NRC "Review of Natural Gas Hazards" at IPEC, NRC Staff recommend one aspect of determining the probability of a vapor cloud explosion to be further evaluated by the NRC's Office of Nuclear Safety and Incident Response. It is not clear whether this evaluation was ever performed. Was this evaluation performed, and if so, when was it competed, and what were the results?
4. There was a 2008 hazards study performed on the existing pipelines at the IPEC site that was not made public. Is this analysis (and its conclusions) available for review by the New York State Agencies? At a minimum, there should be a summary available to review.
5. What were the seismic risk parameters that were applied to the pre-existing pipelines that traverse the IPEC site and what were the seismic risk parameters that were applied to the new AIM pipeline segment?

28. With respect to question #1 above in the letter to FERC, I am not aware of any risk analysis conducted specifically addressing spent fuel pool integrity. There are at least two events that could impact the spent fuel pool integrity. These concerns have been raised with the NRC, but no satisfactory answers have been provided.

- The first event would be loss of integrity of the existing gas transmission pipelines located within 400 feet of the Reactor Unit 3 control room. Ignited or unignited gases could enter the control room and electrical switchgear room, disabling the operators. According to the NRC there is no detection, isolation or other protection for this event other than the operators would "smell" it and take appropriate actions. This event would likely lead to loss of spent fuel pool integrity.

- The second event is a pipeline rupture and explosion adjacent to the switchyard and the diesel fuel storage tanks. This could lead to a loss of

offsite power, destruction of on-site back-up equipment and on-site infrastructure needed to supply the power and controls and consequently a station blackout that may impact the integrity of the spent fuel pools and could result in a spent fuel fire that could dwarf the radioactive releases that occurred at Fukushima[28].

CONSEQUENCES OF FAILURE

29. In order to provide a perspective of the potential impact of a spent fuel fire emitting high-level radioactive releases, the maps below simulate a spent fuel fire at Indian Point based on weather patterns in 2015. [29] The maps are based on relocation standards used for Chernobyl, Fukushima and recommended by the U.S. Environmental Protection Agency (EPA). [30] [31] Multi-year relocation would occur in the orange and red areas. At Chernobyl and Fukushima, a large fraction of the population also evacuated out of the contamination level shown in yellow. [32]

30. NRC's own study conducted by Brookhaven National Labs [33] also predicts consequences of a spent fuel fire. While these estimates are more modest than those in the studies referenced above, the NRC study demonstrates the spread of radioactive material would impact a 500-mile radius and would result in 2,790 square miles of "condemned land." These are "mean" not "worst case" estimates and only consider a single spent fuel pool.

31. A follow-up study was conducted after Fukushima titled " Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool." [34] This

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[28] Spent Fuel Fire on U.S. Soil Could Dwarf Impact of Fukushima**,** Stone, R., Science 2016 http://www.sciencemag.org/news/2016/05/spent-fuel-fire-us-soil-could-dwarf-impact-fukushima

[29] Schoeppner, M., PhD, CTBTO, Vienna, Austria and Program on Science and Global Security, Princeton University

[30] Reducing the Danger From Fires in Spent Fuel Pools, V.Hippel, F., Schoeppner, M., Science and Global Security, 2016, Vol. 24, No. 3, 141-173 http://scienceandglobalsecurity.org/archive/sgs24vonhippel.pdf

[31] Economic Losses from a Fire in a Dense-Packed U.S. Spent Fuel Pool, V. Hippel, F., Schoeppner, M., Science and Global Security, 2017, Vol. 25, Nol 2, 80-92

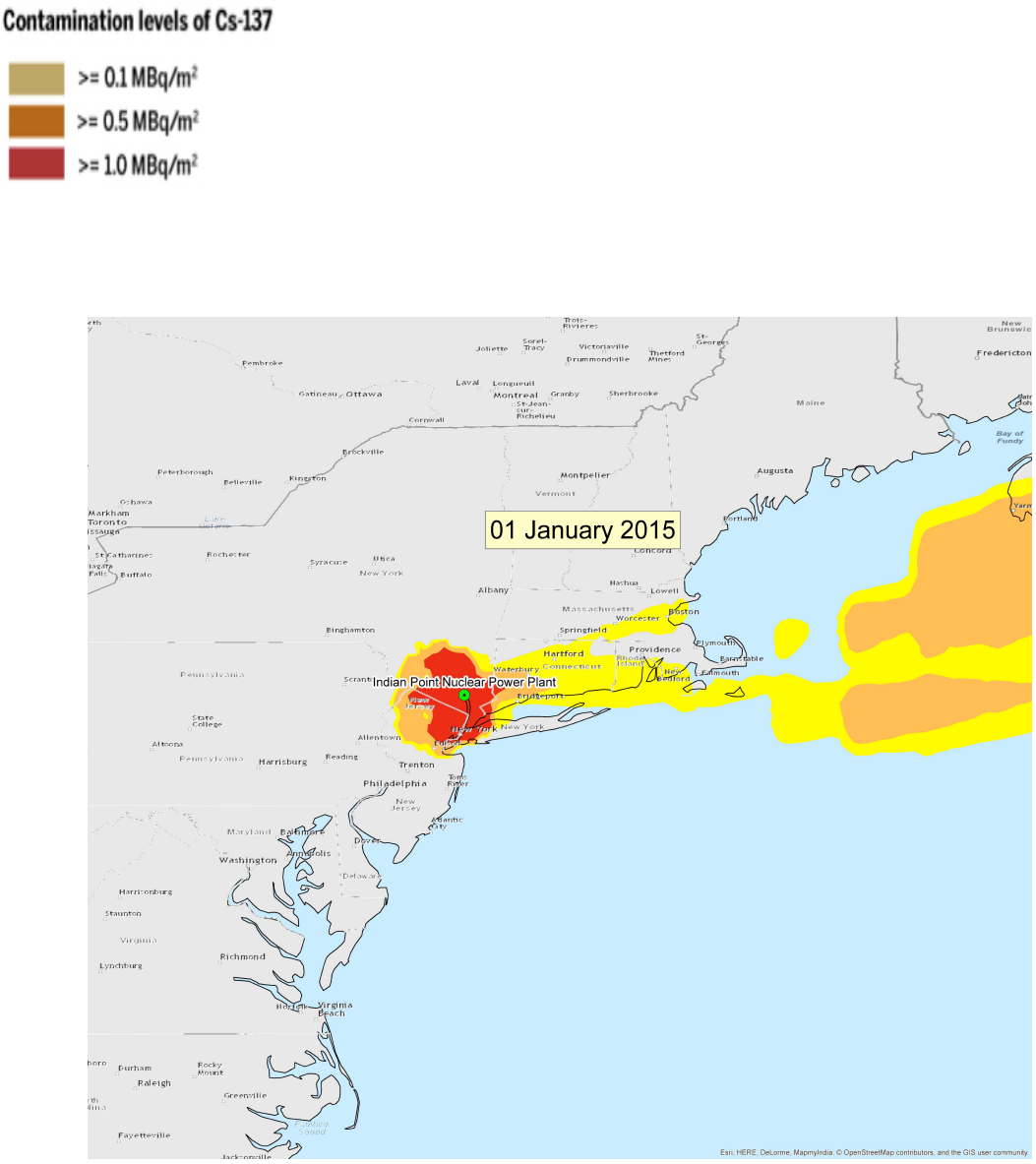
[32] Ibid.

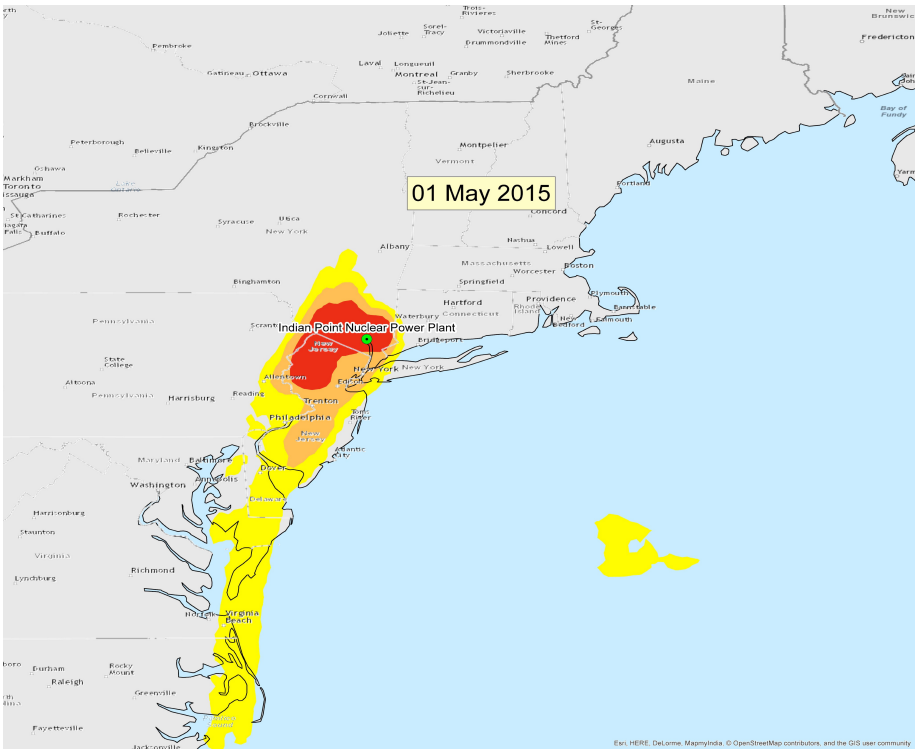
[33] NUREG/CR-6451 "A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants" published in 1997.

[34] https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2161/

NRC study from 2013 concluded that 9,400 square miles would be contaminated and "only" 4.1 million persons displaced for the long-term. This study hypothesized this event at a Pennsylvania reactor where the population is significantly less than the most densely populated region in the nation that surrounds Indian Point and includes New York City.

Simulated spent fuel fire at Indian Point nuclear plant in Westchester County, New York, based on 2015 weather patterns. Courtesy of M. Schoeppner, PhD [35]

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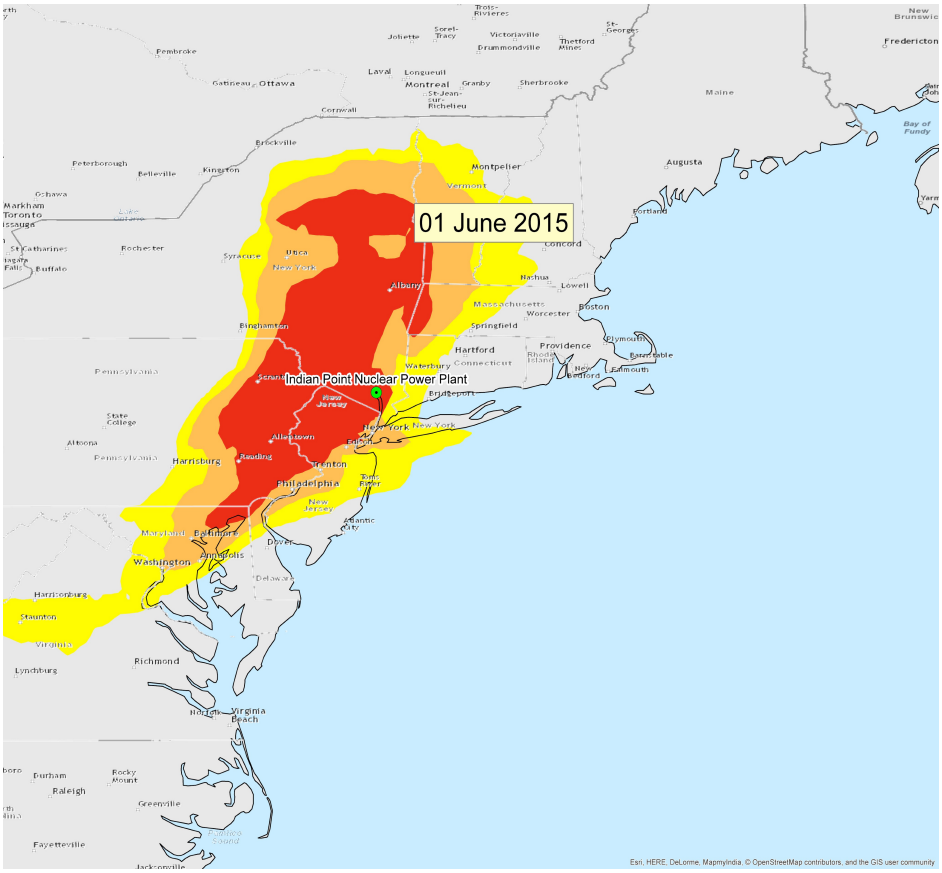
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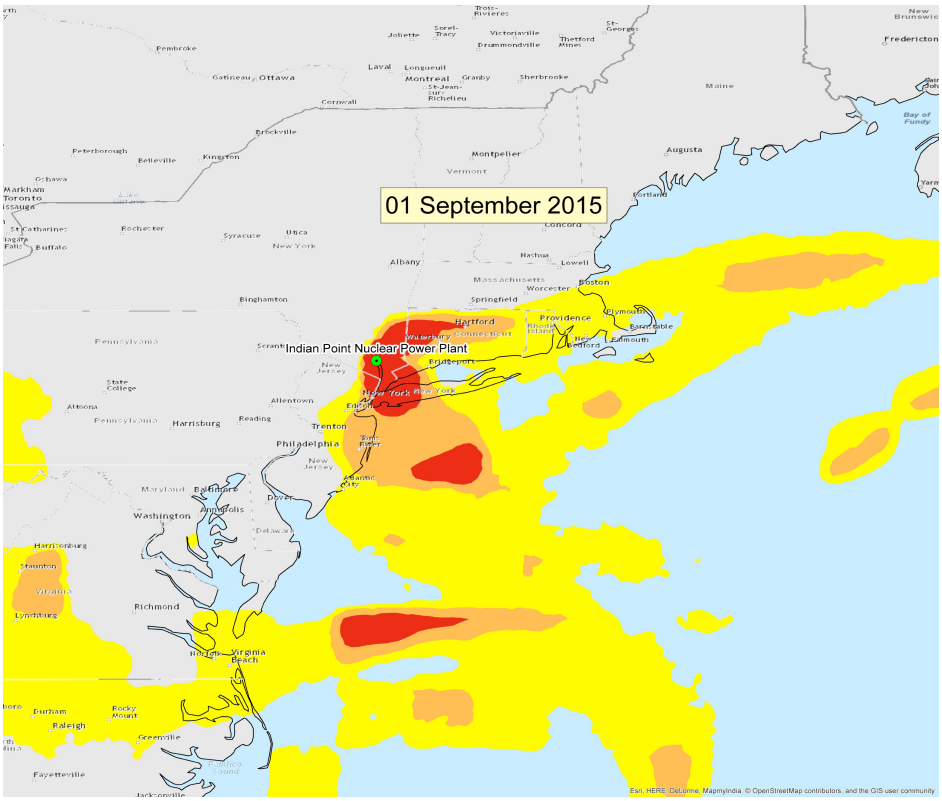
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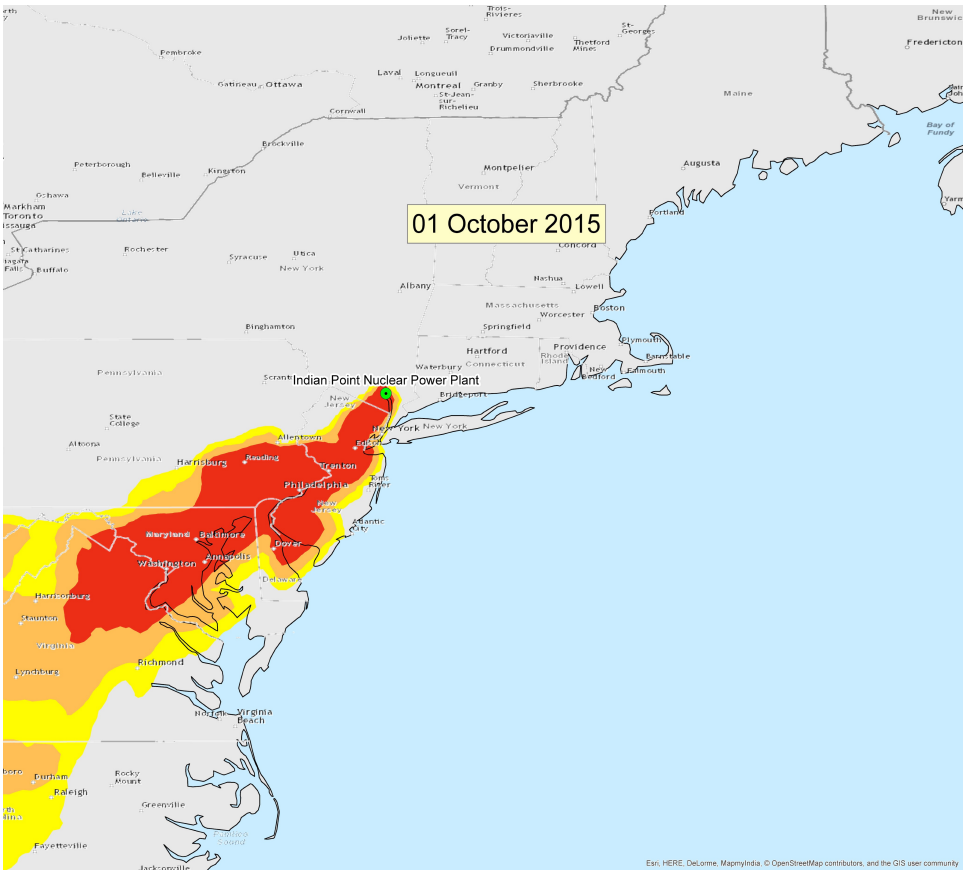
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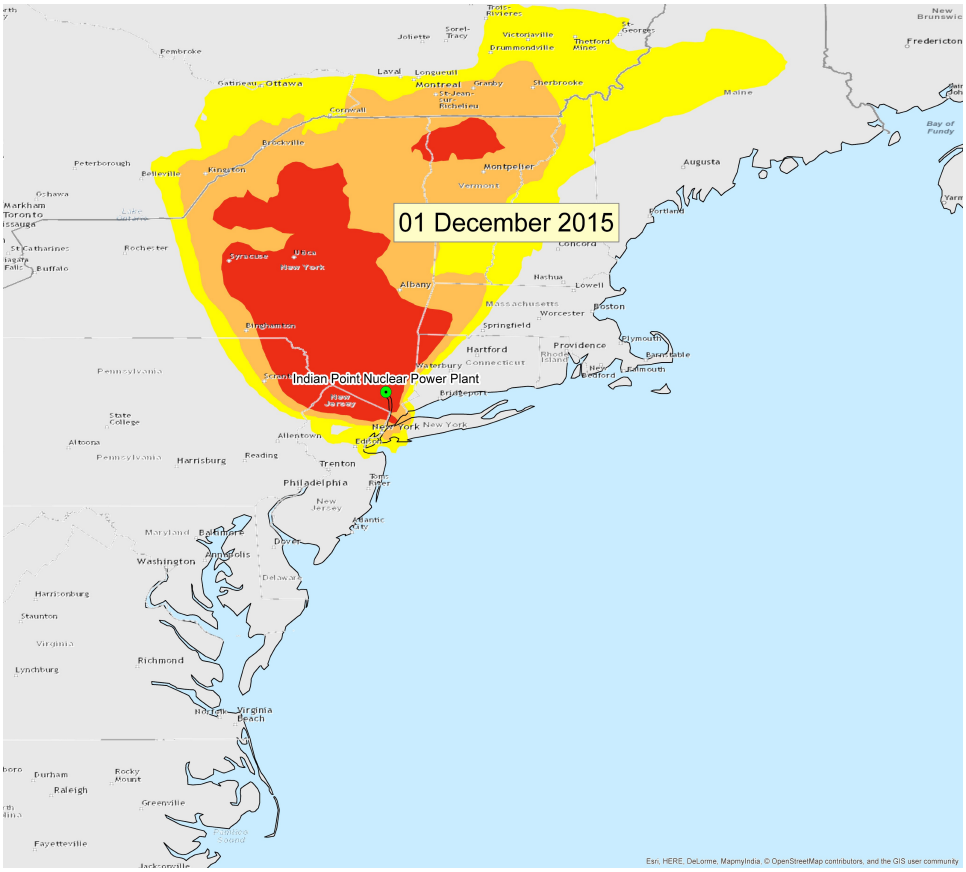
Indian Point Nuclear Power Plant



32. The second question above raised in the agencies' letter to FERC deals with the use of the EPA ALOHA program. ALOHA is a quick reference for first responders and performs this function well when compared to National Transportation Safety Board (NTSB) investigations.

> *"ALOHA*[36] *(Areal Locations of Hazardous Atmospheres) is a computer program designed to model chemical releases for* ***emergency responders and planners****. It can estimate how a toxic cloud might disperse after a chemical release—as well as several fires and explosions scenarios. ALOHA is designed to produce reasonable results quickly enough to be of use to responders during a real emergency. Therefore,* ***ALOHA's calculations represent a compromise between accuracy and speed.*** *Many of ALOHA's features were developed to quickly assist the responder." ALOHA is not an engineering or analytical and should not be used for such purposes as it on-*

[36] https://response.restoration.noaa.gov/sites/default/files/aloha.pdf

ly provides a quick estimate of the potential magnitude and general direction resulting from explosions and vapor clouds."

33. In response to FOIA 2015-0246, the NRC provided total gas flow and flow rate. According to the NRC, 32 million pounds of TNT equivalent would be released in the first 6 minutes after a rupture. This NRC-calculated gas flow rate is 1877 kilograms per second and will persist until the rupture is isolated. When using NRC data and their approved formula from RG 1.91, [37] several professional and independent engineers corroborated my calculation that the blast impact radius from a rupture of the AIM gas transmission pipeline at Indian Point, would exceed 4,000 feet and encompass the entire facility. [38]

34. The only analytically correct equation I am aware of comes from NRC Regulatory Guide (RG) 1.91 [39] as follows:

$$R_{min} = Z * W^{\frac{1}{3}} \quad (1)$$

where

R_{min} = distance from explosion where P_{so} will equal 1.0 psi (6.9 kPa) (feet or meters)
W = mass of TNT (pounds or kilograms (kg))
Z = scaled distance equal to 45 ($ft/lb^{1/3}$) when R is in feet and W is in pounds
Z = scaled distance equal to 18 ($m/kg^{1/3}$) when R is in meters and W is in kilograms

A safe distance from a source of potential explosion to critical plant structures would be equal to or greater than R_{min}.

This RG is the NRC's interpretation of its regulations for gas line events and considers the impact of vapor clouds. The equation in PHMSA's regulations does not appear to consider vapor clouds and results in a much smaller radius.

35. Out of professional curiosity I calculated the impacted blast radius using the ALOHA program. The plot below from ALOHA shows the potential impact radius using the gas flow rates provided by the NRC. Note that even when using ALOHA, the potential blast impact radius exceeds one mile and is consistent with

[37] Nuclear Regulatory Commission Regulatory Guide 1.91 Regulatory Guide 1.91
(Draft was issued as DG-1270, dated July 2011)
Evaluations Of Explosions Postulated To Occur At Nearby Facilities And On Transportation Routes Near Nuclear Power Plants

[38] http://www.grassrootsinfo.org/pdf/2763ipbirc/ip_blast_impact_radius_calculations.pdf

[39] Nuclear Regulatory Commission Regulatory Guide 1.91 Regulatory Guide 1.91
(Draft was issued as DG-1270, dated July 2011)
Evaluations Of Explosions Postulated To Occur At Nearby Facilities And On Transportation Routes Near Nuclear Power Plants

the independent calculations that the blast impact radius would encompass the entire Indian Point facility. [40] This result is consistent with the NRC's equations provided in Regulatory Guide 1.91.

36. The following quoted from the ALOHA manual explain a "vapor cloud" and is similar to numerous definitions also discussed in NRC RG 1.91.

> *"When a flammable chemical is released into the atmosphere, it forms a vapor cloud that will disperse as it travels downwind. If the cloud encounters an ignition source, the parts of the cloud where the concentration is within the flammable range (between the LEL and UEL) will burn." "When a flammable vapor cloud encounters an ignition source, the cloud can catch fire and burn rapidly in what is called a flash fire. Potential hazards associated with a flash fire include thermal radiation, smoke, and toxic byproducts from the fire."* [41]

37. The cited reference [42] by HDR acknowledges it does not consider vapor cloud explosions or fires. Further, the HDR reference is not cited in ASME B31.8(s) as an approved document. The use of this unapproved document clearly explains the difference in blast radius calculated by the HDR reference and ALOHA and Regulatory Guide 1.91. The blast radius calculated by RG 1.91 and ALOHA exceeds 4000 feet. Even though ALOHA is not meant for analyzing ruptures between valves, the impacted radius from ALOHA is consistent with RG 1.91.

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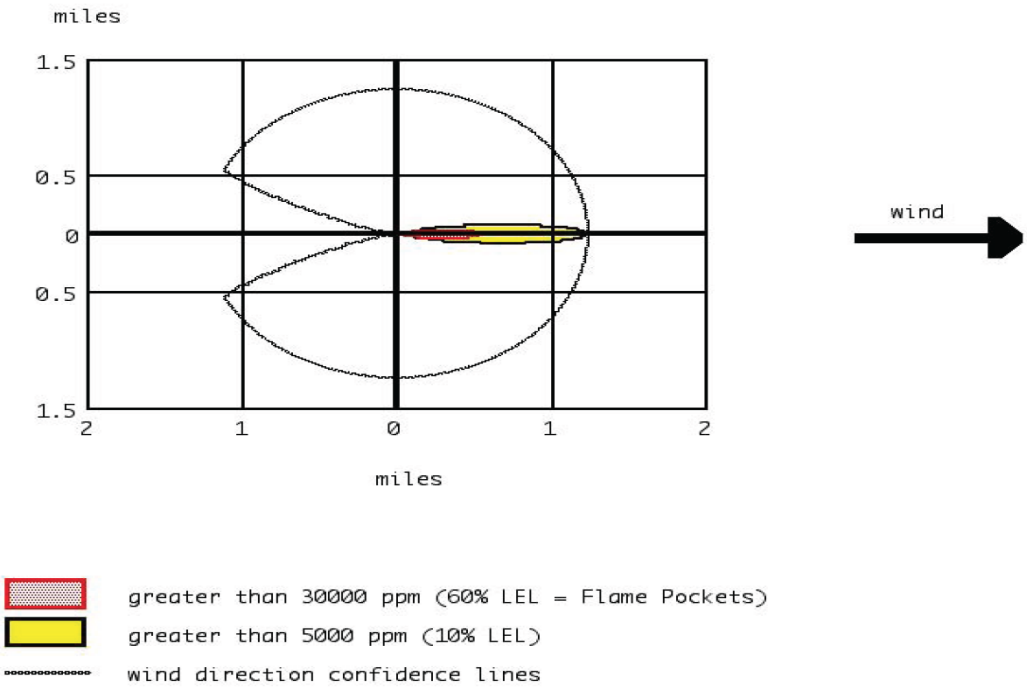
[40] http://www.grassrootsinfo.org/pdf/2763ipbirc/ip_blast_impact_radius_calculations.pdf

[41] ALOHA® USER'S MANUAL February 2007

[42] A Model For Sizing High Consequence Areas Associated With Natural Gas Pipelines, Mark J. Stephens, C-FER Technologies, C-FER Report 99068. October, 2000.



Plot of Impact Radius from ALOHA

38. With respect to questions three, four and five in the State agencies' letter to FERC, the NRC has not provided this information to me. I am not aware of any seismic studies conducted for any of these pipelines despite the fact that they are sited near 2 earthquake fault lines. With respect to seismic risk, 49 CFR 192 requires the consideration of "earth movements" which I assume would include seismic events.

From a previous affidavit [43] executed on September 16, 2016 I stated:

> *"The NRC has underestimated the probability of a gas line accident impacting the Indian Point nuclear plant by at least a factor of 1000. Moreover, the NRC and Entergy have failed to provide any supportable documentation that Indian Point 2 can safely shut down the plant in the event of a gas line rupture, and Entergy has no emergency procedures in place at Indian Point to respond to a gas line rupture. The blast radius from a gas line rupture would likely encompass the entire Indian Point site, disabling all vital equipment required to prevent core damage and major radioactive releases to the environment." It is my expert opinion that once gas is introduced into the AIM pipeline there will be a grave and imminent danger to the surrounding area and residents. The consequences of a nuclear event at Indian Point may impact millions of lives in the Hud-*

[43] United States Court of Appeals for the District of Columbia Circuit City of Boston, Delegation Docket No. 16-1081

son Valley and New York City and cause social and economic impacts in the trillions of dollars range."

39. With gas flowing through multiple Algonquin pipelines at the Indian Point nuclear plant, I believe they pose serious risks and imminent danger to the residents in the surrounding region and to the nuclear plant's infrastructure. This is heightened further by the failure of FERC, PHMSA and the New York State DPS to require compliance with clear regulations.

40. There are numerous other risks and threats [44] discussed in AMSE B31.8(s) that are not discussed within the Executive Summary that include cyber terrorism, vandalism, airborne threats, etc.

41. In the EIS, FERC, PHMSA, Spectra and the EPA, provide for the protection of various Species [45] but do not provide any assessment or protection for the most important species — the Human Species.

42. It is very clear from the Executive Summary that whomever conducted this study has a lack of understanding of nuclear technology, design, operation and regulation of nuclear power plants. The impacts on the Hudson River traffic that were listed in the Executive Summary as major risks are trivial when compared to the potential catastrophic harm from the highly radioactive releases from the contents of the spent fuel pools in the event of a cooling pool fire. [46] [47] [48] Such dan-

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[44] ASME B31.8(s)

[45] Page 4-104 of the FERC DEIS
"Puritan tiger beetle, Indiana bat, bog turtle, northern red-bellied cooter, and small whorled pogonia, as well as one candidate species (New England cottontail) and one species proposed for listing as endangered (northern long-eared bat) that are known to occur in the Project area." Additionally, pages 102 and 103 discuss the potential impact on various fishes in the Hudson River that could be impacted

[46] Spent Fuel Fire on U.S. Soil Could Dwarf Impact of Fukushima**,** Stone, R., Science 2016
http://www.sciencemag.org/news/2016/05/spent-fuel-fire-us-soil-could-dwarf-impact-fukushima

[47] NRC NUREG 1353

[48] Economic Losses from a Fire in a Dense-Packed U.S. Spent Fuel Pool, V. Hippel, F., Schoeppner, M., Science and Global Security, 2017, Vol. 25, Nov 2, 80-92

gerous releases would directly impact vast populations in the New York tri-state region and along the East Coast.[49]

PROBABILITY OF FAILURE

43. The plot of PHMSA data [50] below clearly demonstrates that pipeline failures are highest in older and newer pipelines, which raises concerns regarding all three Algonquin pipelines crossing the Indian Point nuclear plant property, both those installed in the 1950s and the AIM pipeline installed and operational as of January 2017. Especially concerning is the recently installed AIM pipeline, which has more than seven times the failure probability than pipelines installed in the 1990's and five times that of pipelines installed in the 2000's. Possible explanations include defective foreign made pipes and/or quality assurance during manufacturing and installation. The DPS and PHMSA should determine the reason for this five to seven-fold increase in pipeline failure rates.

44. This probability of failures does not include the failure due to intentional acts to readily accessible portions of the new and existing pipelines in the vicinity of Indian Point. The gas lines outside the IPEC facility are unprotected and can be accessed by anyone, including persons intending harm to the facilities. This is also a requirement that must be addressed according to safety standards but has not been met.

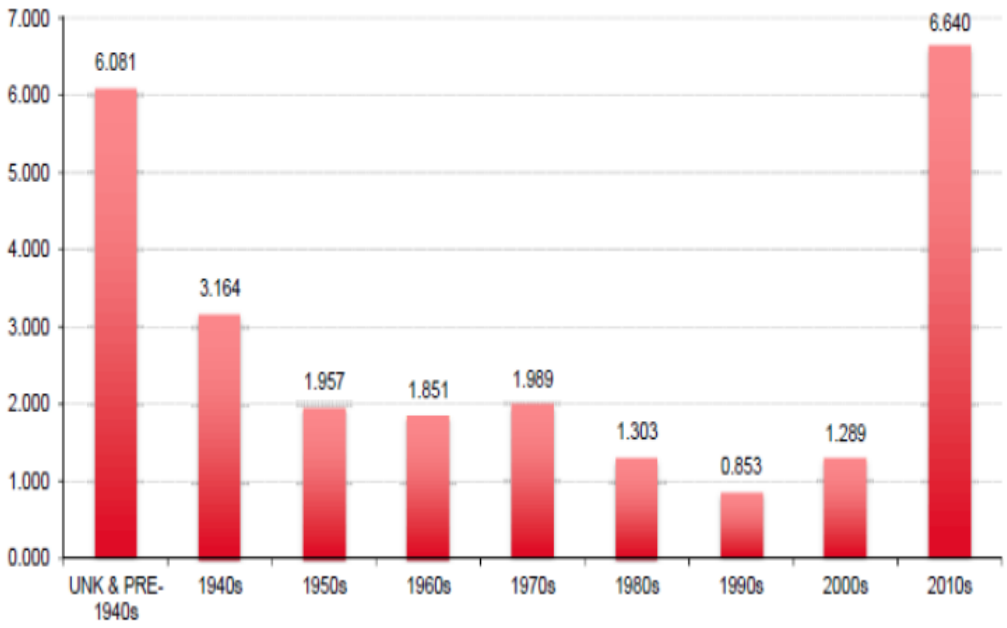
45. It is my professional opinion that the NRC has underestimated the probability of a gas line accident impacting the Indian Point nuclear plant by at least a factor of 1000.[51]

[49] Maps shown on Declaration pages 13-16 of simulated spent fuel fire at Indian Point, courtesy of M. Schoeppner, PhD, CTBTO, Vienna, Austria and Program on Science and Global Security, Princeton University

[50] As U.S. Rushes to Build Gas Lines, Failure Rate of New Pipes has Spiked, Sept 2015, S& P Global Market Intelligence, https://www.snl.com/interactiveX/article.aspx?CDID=A-33791090-11060&ID=33791090&Printable=1

[51] https://sape2016.files.wordpress.com/2014/05/foiadocument1.pdf

Average number of annual incidents over 2005-2013 per 10,000 miles of onshore gas transmission pipe by decade of pipe installation



As of March 2015.
Sources: U.S. Pipeline and Hazardous Materials Safety Administration, Pipeline Safety Trust

46. According to Executive Summary[52] of the risk assessment:

> The top risks, including critical infrastructure risks, identified in the risk register associated with the AIM Pipeline and the existing Algonquin Mainline System adjacent to it are listed in decreasing order of the expected impact:
>
> - River traffic or dredging damage to the existing 30-inch Algonquin Mainline pipeline and dual 24-inch diameter pipelines (not being replaced) in the Hudson River to the southwest of the IPEC facility. This will not be expected to impact the safe operation of the IPEC facility, but an underwater incident could have a long-term impact on the existing pipeline operations.
> - Excavation damage by a third-party contractor for the existing 30-inch Algonquin Mainline pipeline (not being replaced) near the IPEC facility.
> - Earthquake-related damage to the existing 30-inch Algonquin Mainline pipeline (not being replaced) near to the IPEC facility.
> - Excavation damage by a third-party contractor at locations other than identified under Item 2 above.
> - Sabotage by a disgruntled employee with specialized knowledge who intentionally damages the pipeline or manipulates controls.
> - Corrosion to the exterior of the pipeline that leads to a rupture.
> - The release of hazardous waste materials due to a pipeline incident with the proximity of 17 New York State regulated Hazardous Waste Generating facilities within 1 Potential Impact Radius (PIR) of the pipeline.
> - Disruption of transit or passenger rail service on the two passenger rail lines within 1 PIR of the pipeline.
> - Disruption of the freight rail service with one freight rail line within 1 PIR of the pipeline.

47. It is my expert opinion that the Algonquin and Algonquin Incremental Market (AIM) gas transmission pipelines sited at the Indian Point nuclear power facility pose a grave and imminent danger to the Hudson Valley and the surrounding states. The consequences of a nuclear event at Indian Point may impact millions of lives and include New York City causing social and economic impacts in the trillions of dollars range. It is for these reasons that I recommend that FERC and the State of New York require Enbridge, Inc. to immediately implement the short and long-term recommendations outlined as follows:

Short and Long Term Recommendations

- I fully support the State's recommendation as stated in its letter to FERC:

[52]. AIM Pipeline Risk Analysis Executive Summary Report #17-99 . There is no attribution, identification of the author or date of this Executive Summary

"FERC should require regular testing of Enbridge Inc.'s ability to remotely close valves on the 42-inch, 30-inch, and 26-inch pipelines in the vicinity of IPEC within 3 minutes of an event. This valve closure time was assumed by FERC when it approved the AIM pipeline, but it must be regularly confirmed for all three pipeline segments."

- The "valve closure time" is a critical but only a small part of the time from pipeline rupture to isolation of the gas release. When an event occurs, it must be recognized at some remote location. Once recognized, a remote operator must identify the numerous valves needing closure. The operator must then initiate a signal to close the valves. Once closed, the gas in the line will continue to be released. Typical times from event to termination can range from 30 minutes to more then 24 hours. A recent gas transmission pipeline explosion on June 7, 2018 in West Virginia took more than 30 minutes from the time of detection of the event until valve closure. There is no information available determining the time of the event occurrence to the time of the pipeline rupture identification.

- The State must assure that all valves required for isolation of a pipeline rupture can be detected then isolated within the three-minute time assumed by FERC. Closure time of a single valve is meaningless. Gas is released from both sides of a ruptured pipeline and will continue, beyond three minutes to be released until all pipeline segments on both sides are isolated. It is not clear from the information provided if the additional gas releases were considered.

- Upon completion of the verification of the pipelines closest to the Indian Point reactors verification must also be performed on the new AIM pipeline. The State should determine the timeframe for the completion of these tests given the currently existing extreme risk. Given the extreme risks it is my professional opinion that these tests should be completed no later than the end of September 2018.

- If the valves cannot be closed within the three-minute timeframe, then gas cannot be allowed to flow at Indian Point.

- If the validation tests of the three-minute isolation time cannot be accomplished by the end of September 2018, the State must take actions to terminate the gas flow at Indian Point until the tests are successfully conducted or until it can provide a transparent independent study and determine if the

benefit of these gas lines exceeds the potential consequences discussed above.

- Upon completion of these valve closure verifications, a full compliance review and verification must be performed certifying all "***Department of Transportation safety standards***[53]*"* have been met. I fully realize this is a monumental task but it must be completed within six months. I believe both the State and FERC have the authority to order the operator to perform these tasks in an expeditious manner.

48. I am in possession of compelling documentation[54] that PHMSA has not fulfilled it statutory obligations demonstrating compliance with 49 CFR 192 with respect to the requirements for a risk assessment, Public Awareness,[55] Emergency Planning[56] and Public Awareness.[57]

49. The inescapable fact is that despite the statement: *"FERC review ensures that applicants certify that they will comply with Department of Transportation safety standards."*[58] *and that* The Environmental Assessment states the AIM project will be in compliance with 49 CFR 192, without any identified exceptions, PHMSA has not been able to provide any objective documentation of a risk assessment supporting this statement in spite of numerous FOIAs, CEII documents and FOIA appeals.

50. As an expert I can say that the imminent danger of potentially catastrophic consequences posed by the co-location of the Algonquin pipelines at Indian Point, the numerous unresolved questions raised in the Executive Summary and the State's letter to FERC and in this declaration, necessitate that FERC, PHMSA and New York State address the short and long term recommendations outlined above with utmost urgency and diligence.

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[53] 49 C.F.R. Parts 190 through 199, 49 U.S.C. § 60101 *et seq.*

[54] Call with PHMSA Karen Gentile 4/12/16 (Paul Blanch, Amy Rosmarin, Susan Van Dolsen)
Letter from PHMSA 9/9/2016 FOIA Tracking Number: 2016-0101
Email from Karen Gentile (PHMSA) 3/31/2016
Letter to PHMSA from Paul Blanch 4/7/2016
Letter from Paul Blanch to Office of Government Information Services 03/19/2018
Letter from Paul Blanch to PHMSA Administrator 4/18/2018
Letter from Paul Blanch to PHMSA Administrator 12/16/2015
Letter from Paul Blanch to PHMSA Administrator 3/11//2016
Letter from PHMSA Administrator to Paul Blanch 2/18/2016
Paul Blanch comments on proposed rulemaking 7/7/2016

[55] 49 CFR 192.917

[56] 49 CFR 192.615

[57] 49 CFR 192.616

[58] https://www.ferc.gov/industries/gas/indus-act/pipelines.asp

I certify that under penalty of perjury, the foregoing Declaration is true and accurate to the best of my knowledge.

Paul M. Blanch
July 18, 2018