Paul M. Blanch
Energy Consultant

30 November 2016

Rao Tammara
USNRC
Washington DC

Dear Mr. Tammara:

Enclosed is a copy of a calculation conducted in accordance meeting the intent of the requirements of 10 CFR 50 Appendix B, Criterion III. We have additional calculations conducted by other professional engineers all using the equations of Regulatory Guide 1.91 with similar results. We have used the assumptions provided by the NRC for mass flow rate and total mass released.

I am fully aware the NRC has no Quality Assurances (QA) requirements for any of its calculations and is reflected in the numerous calculations provided me under FOIA. Because of this, there may be errors even in our calculations.

The following is one example of a calculation and methodology projecting a damaging blast radius of about 4200 feet within 3 minutes. Blast radius at 30 minutes is much greater. This blast radius would encompass the entire Indian Point site, including the unprotected control rooms, switchgear rooms and backup emergency power sources.

The likely outcome of this scenario may be core melting along with spent fuel damage with significant radioactive releases.

From NRC Regulatory Guide 1.91, Rev. 2, April 2013

Equation (1):

Rmin = Z * W^.333

where

Rmin = distance from explosion to point where overpressure will drop to 1.0 psi
Z = scaled distance = 45 ft/lb^.333 when R is in feet and W is in pounds
Z = scaled distance = 18 m/kg^.333 when R is in meters and W is in kilograms
Check: NUREG-1805 (December 2004) Figure 15-3 supports 45 ft/lb^.333 for 1 psi overpressure

Equation (2):

Weff = (Hexp/Htnt) * Wexp

where

Weff = effective charge equivalent
Wexp = weight of the explosive charge
Hexp = heat of detonation of the explosive
Htnt = heat of detonation of TNT

Equation (3):

E = α * △Hc * mf

where

E = blast wave energy, BTU or kilojoules
α = yield (fraction of available combustion energy participating in blast wave = 5% from Table 1
△Hc = theoretical net heat of combustion (BTU/lb or kilojoules/kilogram)
mf = mass of flammable vapor released (pounds mass or kilograms)

Equation (4):

Wtnt = E / (1900 BTU/pound mass) or E / (4420 kilojoules/kilogram)

From FOIA-2015-0076:

△Hc = 50,030 kiljoules/kilogram
Check: NUREG-1805 (December 2004) Table 3-2 gives 50,000 kJ/kg for LNG and 46.000 kJ/kg for LPG
Check: NUREG-1805 (December 2004) Table 15-2 gives 50,030 kJ/kg for Methane gas
Check: NUREG-1805 (December 2004) Table 15-2 gives 46,360 kJ/kg for Propane gas
Check: NUREG-1805 (December 2004) Table 15-2 gives 47,490 kJ/kg for Ethane gas
mf = 376,000 kilograms + 200,000 kilograms + 100,000 kilograms = 676,000 kilograms

Solving Equation (3):

E = α * △Hc * mf
E = 0.05 * 50,030 kilojoules/kilogram * 676,000 kilograms
E = 1,691,014,000 kilojoules for 676,000 kilograms
E = 940,564,000 kilojoules for 376,000 kilograms

Solving Equation (4):

Wtnt = E / (1900 BTU/pound mass) or **E / (4420 kilojoules/kilogram)**
Wtnt = 382,582 kilograms for 676,000 kilograms
Wtnt = 212,797 kilograms for 376,000 kilograms

Solving Equation (1):

Rmin = Z * W^.333
Rmin = 1,301 meters for 676,000 kilograms
Rmin = 4,269 feet for 676,000 kilograms
Rmin = 0.81 miles for 676,000 kilograms
Rmin = 1,070 meters for 376,000 kilograms
Rmin = 3,511 feet for 376,000 kilograms
Rmin = 0.67 miles for 376,000 kilograms

The assumed mass flow rates above were obtained from the NRC from numerous FOIA responses. All three independent calculations yielded about the same blast radius of about 4000 feet after a 3-6 minute release. We all used a yield factor of 5%, the least conservative value provided by Regulatory Guide 1.91.

We are aware of your statements January 12, 2015 (below) that you had not developed a "formal calculation package," yet your calculation formed the basis for the NRC's

approval to FERC and the misleading statements made by the Chairman to members of Congress, thus placing 20 million persons at risk. According to FERC the NRC approval was provided in its Inspection Report of November 7, 2014. This was provided to me in response to a FERC FOIA request.

-----Original Message-----
From: Tammara, Seshagiri
Sent: Monday, January 12, 2015 11:02 AM
To: McCoppin, Michael
Subject: FW: IPEC Gasline Analysis

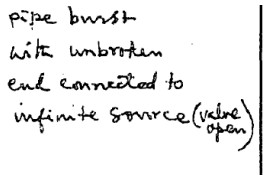
Mike:

Please advise about this request. I have personal hand written calculations and ALOHA computer runs, but do not have a formal calculation package. Summarized methodology and results are included in the report transmitted to the Region for their use in the 50.59 Review and Evaluation/Inspection Report.

Thanks,

FERC's final approval for the safety of Indian Point and 20 million residents was predicated on "no formal calculation package," a statement made by you more than 2 months **after** FERC received approval from the NRC of "no significant risk." (See your email above). How could FERC approval be given without any formal calculation as you stated above?

Please review the enclosed calculation and identify our inconsistencies between our calculations. We would also like to discuss your meaning of and what does an "unbroken end" of a pipe burst mean. As an amateur plumber, I have not yet seen an "unbroken end" of a pipe burst. These types of errors had this calculation been conducted under some type of QA program.



As a cross check, I also ran the unapproved ALOHA program for a single ended pipe break[1] and we can see below the high risk areas range from 4200 feet all the way to 5.8 miles, somewhat higher than the NRC's calculations of 1100 feet. The actual flow rate for a double ended break would be much greater and but not inconsistent with the NRC's calculated value of 376,000 kg/minute, a number also provided by FOIA. ALOHA may or may not be correct but it does project a blast radius similar to the engineering calculations.

The bottom line is that we have three professional engineers using a QA program and a physical scientist running calculations without any guidelines, procedures, reviews or approvals. The engineers project a blast radius in the range of 4200 feet and confirmed by ALOHA using a single ended break. You calculated a blast radius of about 1100 feet. Why the very significant difference? Claiming "Regulatory Infallibility" will not suffice.

[1] Double ended beaks in the middle of the pipeline can not be calculated by ALOHA

FERC has based its approval of the AIM pipeline on the NRC's assessment of risk and this must be immediately corrected by informing FERC that the NRC's approval of the AIM pipeline must be rescinded until such time that our professional differences are determined.

Is it possible that we could sit down and have a professional dialog and determine why your informal calculation projected an 1100-foot blast radius whereas our formal calculations projected more than 4000 feet using the same approved NRC equations and input assumptions obtained under FOIA and your use of the prohibited EPA ALOHA program?

SITE DATA:
Location: Northeast US
Building Air Exchanges Per Hour: 0.45 (unsheltered single storied)
Time: November 30, 2016 & 1105 hours EST (using computer's clock)

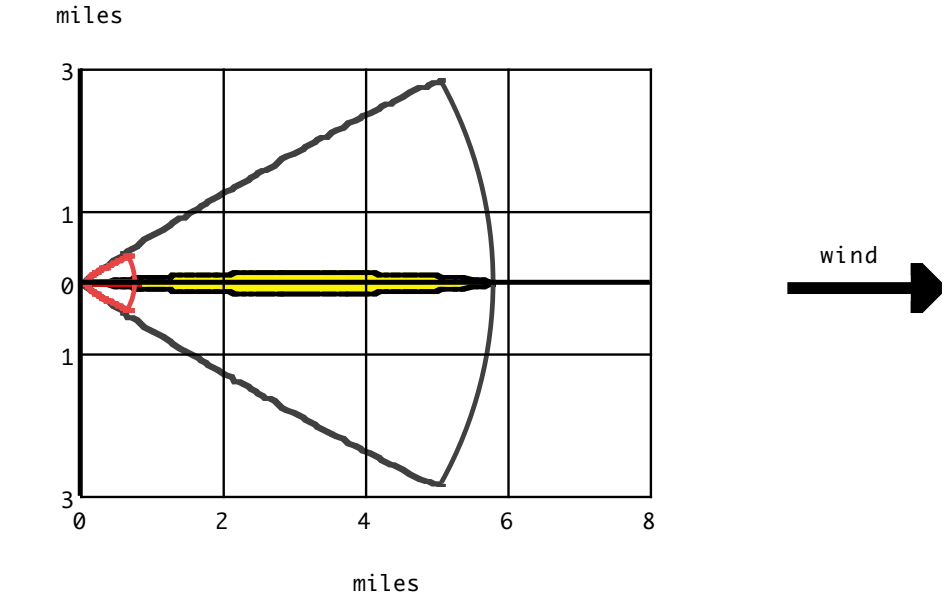
CHEMICAL DATA:
Chemical Name: METHANE
CAS Number: 74-82-8 Molecular Weight: 16.04 g/mol
PAC-1: 65000 ppm PAC-2: 230000 ppm PAC-3: 400000 ppm
LEL: 50000 ppm UEL: 150000 ppm (Upper Explosive Limit and Lower Explosive Limit)
Ambient Boiling Point: -258.7˚F
Vapor Pressure at Ambient Temperature: greater than 1 atmosphere
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

SOURCE STRENGTH:
Flammable gas escaping from pipe (not burning)
Pipe Diameter: 42 inches Pipe Length: 10000 feet
Unbroken end of the pipe is connected to an infinite source
Pipe Roughness: smooth Hole Area: 1,385 sq in
Pipe Press: 850 psia Pipe Temperature: 70˚F
Release Duration: ALOHA limited the duration to 1 hour
Max Average Sustained Release Rate: 339,000 pounds/min[2]
(Averaged over a minute or more)
Total Amount Released: 16,999,870 pounds

THREAT ZONE:
Threat Modeled: Flammable Area of Vapor Cloud
Model Run: Gaussian
Red : 1401 yards=4200 feet --- (30000 ppm = 60% LEL*[3] *= Flame Pockets).
Yellow: 5.8 miles --- (5000 ppm = 10% LEL)

[2] Both ends of pipe releasing methane would be close to the NRC number of 376,000 Kg/Min
[3] Lower Explosion Limit

THREAT AT POINT:
Concentration Estimates at the point:
Downwind: 3400 feet *Off Centerline: 0 feet*
Max Concentration:
Outdoor: 42,300 ppm
Indoor: 13,500 ppm



ALOHA calculated blast radius for 339,000 pounds/min release rate

Your prompt response to my request for a meeting will be appreciated as we can not await the normal response time of the NRC when faced with such differences of opinions and the fact that once the gas is flowing through the new 42-inch AIM line, the plants will be operating in an unanalyzed condition requiring an 8-hour report[4] to the NRC.

Paul M. Blanch

Paul Blanch
135 Hyde Rd.
West Hartford, CT 06117

[4] 10 CFR 50.72 (B) The nuclear power plant being in an unanalyzed condition that significantly degrades plant safety.

pmblanch@comcast.net
860-236-0326
Cell 860-922-3119

CHAIRMAN Resource

From: Paul <pmblanch@comcast.net>
Sent: Wednesday, November 30, 2016 3:48 PM
To: Tammara, Seshagiri
Cc: Paul Blanch; Burritt, Arthur; Miller, Chris; Beasley, Benjamin; Pickett, Douglas; Dean, Bill; Beaulieu, David; Hansen, Brian; Spicher, Terri; Raspa, Rossana; Setzer, Thomas; McCoppin, Michael; Dorman, Dan; svand58@aol.com; Amy Rosmarin; Ellen Weininger; Sandy Galef; David Buchwald; Dave Lochbaum; Jim Riccio; Lampert Mary; Karen Gentile; Joe Carson; William. R. Corcoran; Paul Gallay; vaughey@aol.com; Richard Kuprewicz; CHAIRMAN Resource; Dentel, Glenn
Subject: [External_Sender] QA Calculation for Indian Point blast radius
Attachments: Letter to Tammara on blast radius.pdf; ATT00001.htm

Paul M. Blanch Energy Consultant

See enclosed pdf letter.

30 November 2016

Rao Tammara

USNRC

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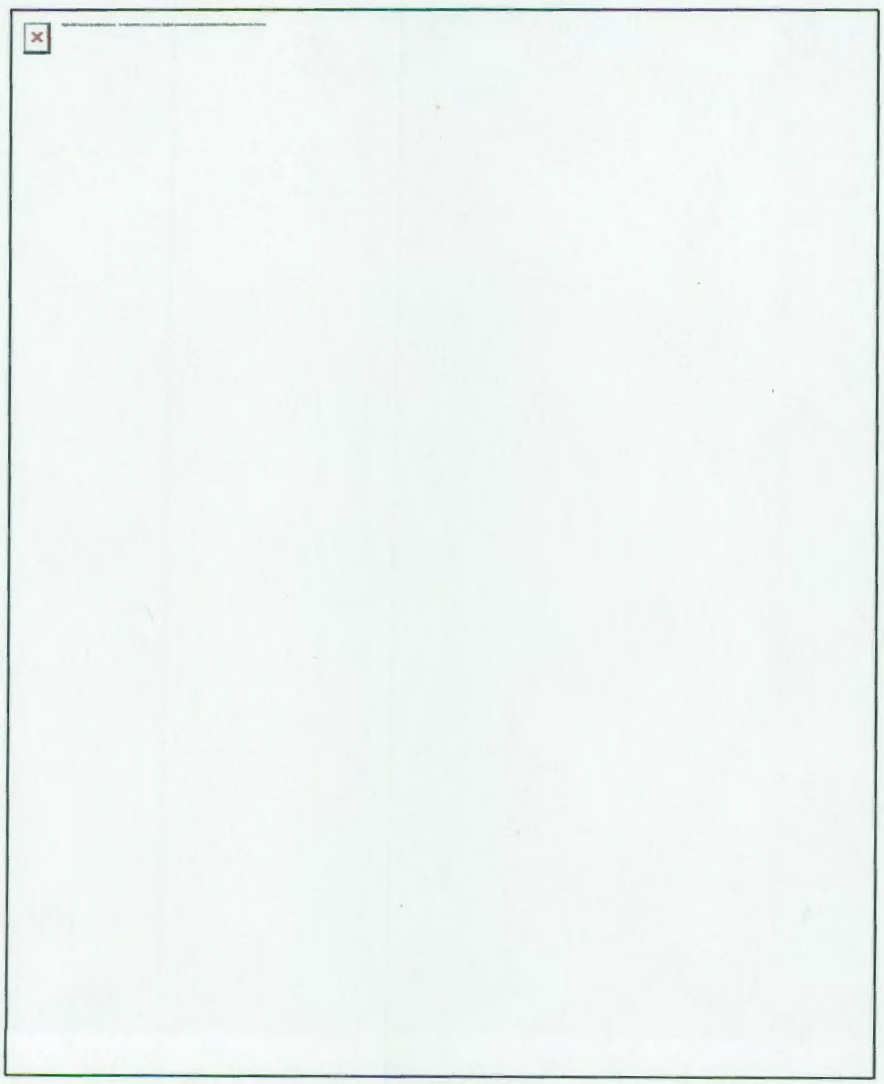

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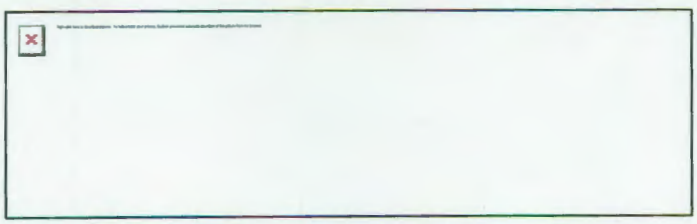

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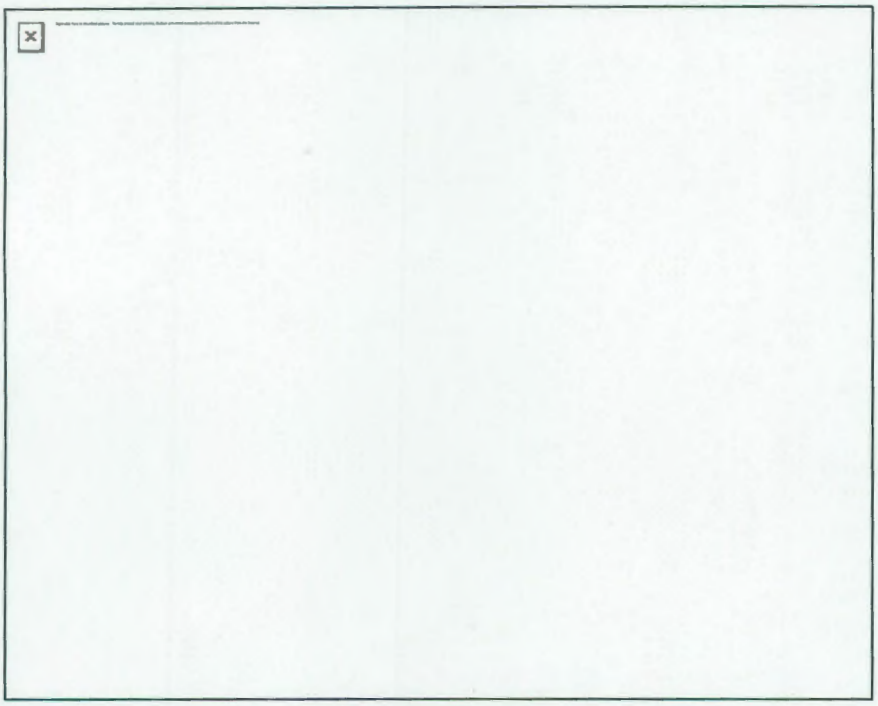

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