

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Subject: CP15-558 Application of PennEast Pipeline Company, LLC

Dear Secretary Bose,

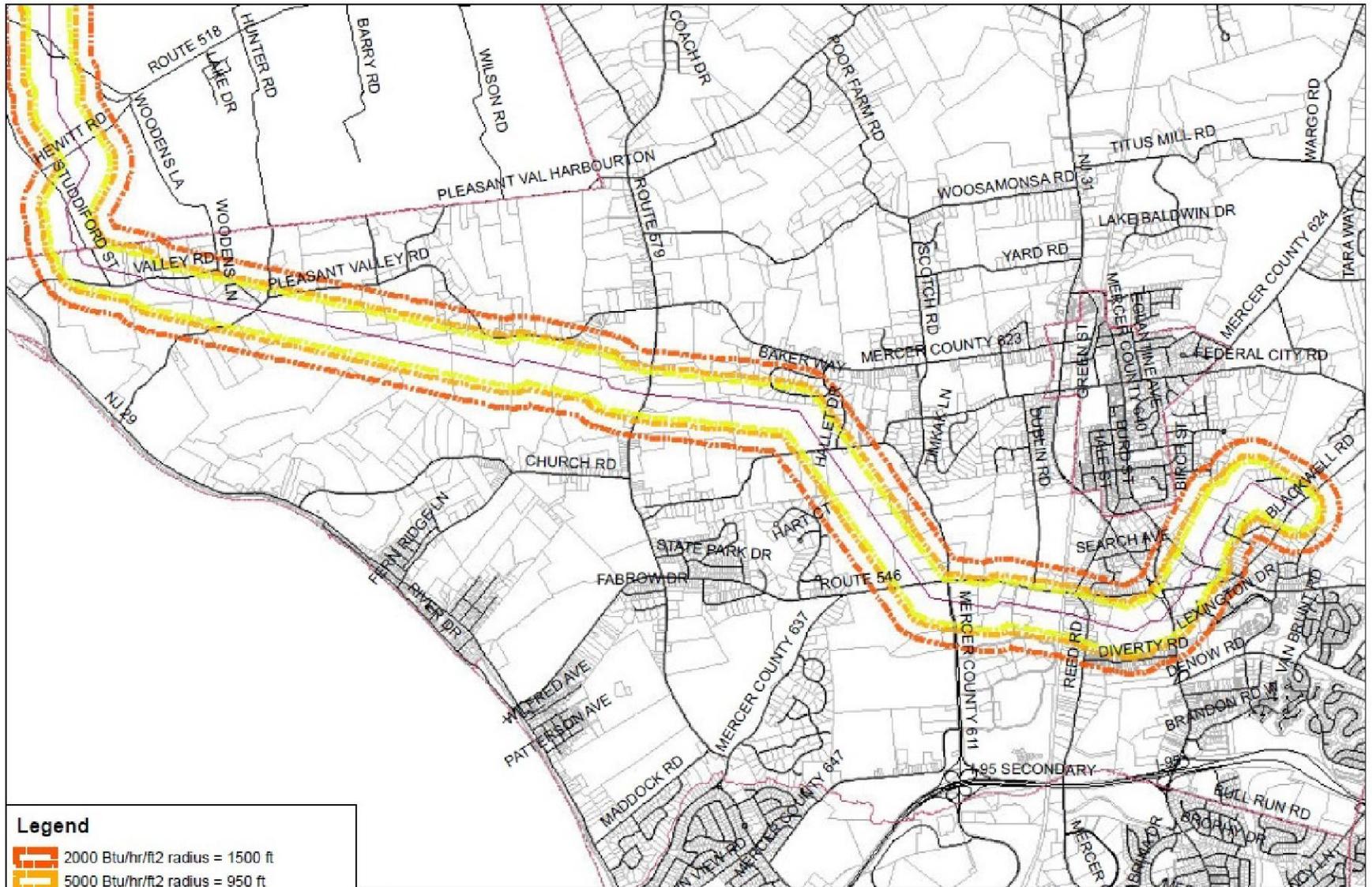
Hopewell Township Citizens Against the PennEast Pipeline is submitting this supplementary material to our comments. PennEast did not provide maps to the docket showing the danger zones of the proposed pipeline so we hired experts to create these materials. We have attached 3 maps and the calculations used to determine potential incident impact areas.

Respectfully,

Patricia Cronheim

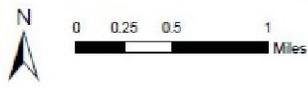
Hopewell Township Citizens Against the PennEast Pipeline

Encl: HTCAPP Supplementary Materials



Legend

-  2000 Btu/hr/ft² radius = 1500 ft
-  5000 Btu/hr/ft² radius = 950 ft
-  8000 Btu/hr/ft² radius = 750 ft
-  Parcels (2014)
-  Roads
-  PennEast Centerline - 07/22/2015 version
-  Municipal Boundaries



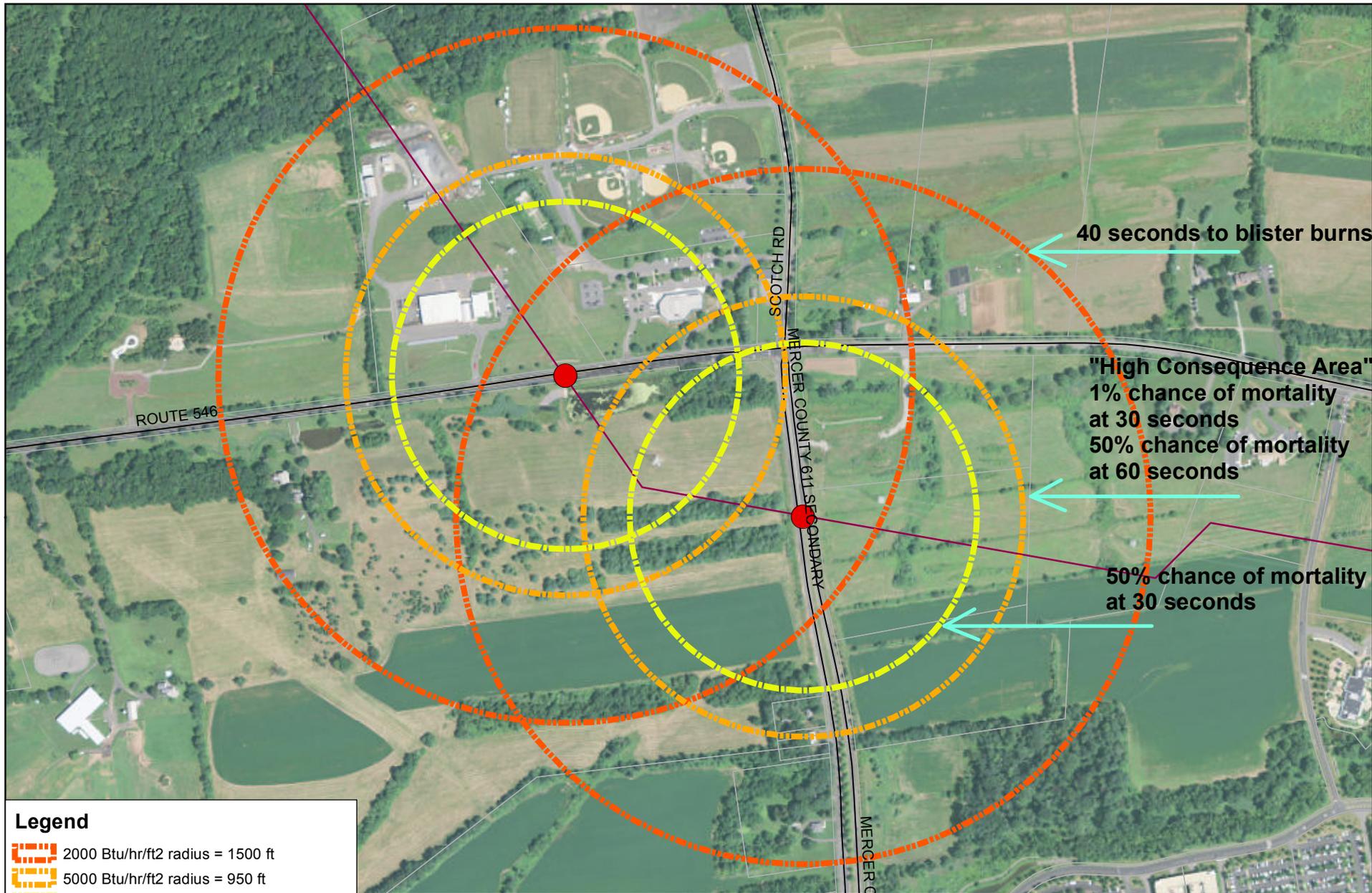
Data Sources: NJDEP, Hunterdon County and PennEast.
 Disclaimer required for NJDEP and Hunterdon County Data:
 This map was developed using NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP or Hunterdon County and is not NJDEP or county authorized.

Danger Zones calculated by Rob Goldston for Hopewell Twp. using A MODEL FOR SIZING HIGH CONSEQUENCE AREAS ASSOCIATED WITH GAS PIPELINES TOPICAL REPORT, by Mark J. Stephens in October 2000 for the GAS RESEARCH INSTITUTE. Map by D.Kratzer 7/28/2015.

**Penn East Pipeline
 Danger Zones
 Hopewell Township**

Vanessa Sandom
 RE: Surveyors on Blackwell rd
 Is that where they are? Did L
 approval?

File Hopewell-ProposedPennEastPipeline-July2015_BlastZones4.PDF cannot be converted to PDF.



Legend

-  2000 Btu/hr/ft² radius = 1500 ft
-  5000 Btu/hr/ft² radius = 950 ft
-  8000 Btu/hr/ft² radius = 750 ft
-  Hypothetical Incidents
-  PennEast Centerline - 07/22/2015 version
-  Roads
-  Parcels (2014)



Data Sources: NJDEP, Hunterdon County and PennEast.
Disclaimer required for NJDEP and Hunterdon County Data:
 This map was developed using NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP or Hunterdon County and is not NJDEP or county authorized.

**Penn East Pipeline
 Danger Zones
 Hopewell Township**

Danger Zones calculated by Rob Goldston for Hopewell Twp. using A MODEL FOR SIZING HIGH CONSEQUENCE AREAS ASSOCIATED WITH NATURAL GAS PIPELINES TOPICAL REPORT, by Mark J. Stephens in October 2000 for the GAS RESEARCH INSTITUTE. Map by D.Kratzer 7/28/2015.

Friday, July 17, 2015

Penn East Pipeline Danger Zones

Prepared for HTCAPP

Heat Intensity Equation

The Gas Research Institute's report GRI-00/0189 gives the radius at which a given intensity of heat flux will be experienced as:

$$r = \sqrt{\frac{2348 p d^2}{I_{th}}} \quad (\text{ft})$$

where I_{th} = threshold heat intensity (Btu/hr/ft²);
 p = line pressure (psi); and
 d = line diameter (in).

Heat Flux Intensity Thresholds

The GRI report table 2.1 (below) indicates that at 2000 Btu/hr/ft² 18.1 to 60.4 seconds of exposure will result in blister burns. The average of these two values is 39.5 seconds. Call it 40 seconds for simplicity. At 8000 Btu/hr/ft² one has a 50% chance of mortality after 31.4 seconds. Call it 30 seconds for simplicity. PHMSA considers the "High Consequence Area" around a pipeline to extend to where the heat flux falls to 5000 Btu/hr/ft², where the probability of mortality within 27 seconds is estimated to be 1%, and within 58.7 seconds is 50%. Call these 30 seconds and 60 seconds for simplicity. Note that if you want to use the equations in the column headers yourself, such as $t \cdot I^{1.33} = 2300$ for time to 50% mortality, you must use Radiation Intensity or Heat Flux in kW/m², shown in the second column.

Radiation Intensity or Heat Flux (Btu/hr ft ²)	Radiation Intensity or Heat Flux (kW/m ²)	Time to Burn Threshold (Eisenberg et al. 1975) $t \cdot I^{1.15} = 195$	Time to Blister Threshold - lower ¹ (Hymes 1983) ² $t \cdot I^{1.33} = 210$	Time to Blister Threshold - upper ¹ (Hymes 1983) ² $t \cdot I^{1.33} = 700$	Time to 1% Mortality (Hymes 1983) ² $t \cdot I^{1.33} = 1060$	Time to 50% Mortality (Hymes 1983) ² $t \cdot I^{1.33} = 2300$	Time to 100% Mortality ³ (Bilo & Kinsman 1997) $t \cdot I^{1.33} = 3500$
1600	5.05	30.3	24.4	81.3	123.1	267.1	406.4
2000	6.31	23.5	18.1	60.4	91.5	198.5	302.1
3000	9.46	14.7	10.6	35.2	53.4	115.8	176.2
4000	12.62	10.6	7.2	24.0	36.4	79.0	120.2
5000	15.77	8.2	5.4	17.9	27.0	58.7	89.3
8000	25.24	4.8	2.9	9.6	14.5	31.4	47.8
10000	31.55	3.7	2.1	7.1	10.8	23.3	35.5
12000	37.85	3.0	1.7	5.6	8.4	18.3	27.9

Note:

- 1) Hymes gives a thermal load range (210 to 700) rather than a single value for blister formation
- 2) the thermal load values given by Hymes are based on a revised interpretation of the results obtained by Eisenberg et al.
- 3) Bilo and Kinsman assume that 100% mortality corresponds to a lower bound estimate of the thermal load associated with the spontaneous ignition of clothing

Table 2.1 Effects of thermal radiation on people.

Friday, July 17, 2015

Distance to these Heat Flux Intensities

For Penn East values of 36" diameter and 1480 psi, we have

2000 Btu/hr/ft² radius = 1500 ft

5000 Btu/hr/ft² radius = 950 ft

8000 Btu/hr/ft² radius = 750 ft

In Sum

If you are within 1500 ft of a ruptured and ignited pipeline with Penn East's parameters, you have about 40 seconds to get to shelter from the radiant heat or you will suffer blister burns.

If you are within 750 ft, you will have about 30 seconds to find shelter or you will have a 50% chance of mortality.

PHMSA considers the high consequence area to be within 950 ft for Penn East. This is where you have a 1% chance of mortality at 30 seconds, and a 50% chance of mortality at 60 seconds.

Document Content(s)

HTCAPP Supplementary Materials.DOCX.....	1-1
penneastpipeline1jpg-5cc3d94e94ecc8c1.JPG.....	2-2
Hopewell-ProposedPennEastPipeline-July2015_BlastZones4.PDF.....	3-3
Hopewell-ProposedPennEastPipeline-July2015_BlastZones5.PDF.....	4-4
Calculations for Blast zone Penn East Effects Radii.PDF.....	5-6